Towards an Integrated Approach to Address Social Adaptation in Sustainability Neighbourhoods: The Potential of Governance and Community Indicators in BREEAM Communities

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ABSTRACT

With the need to achieve sustainability and adaptation to climate change for communities around the world, the adoption of assessment tools in the development process has become a significant issue. Fuelled by this need, Neighbourhood Sustainability Assessment tools (NSAs) are increasingly being applied in various developments and communities. BREEAM Communities (BC) is acknowledged to be one of the most well-known and successful sustainability assessment tools at the neighbourhood scale around the world.

The aim of this research is to contribute to the current literature in sustainability and adaptation through identifying and evaluating the potentials of BC as a selected NSA case study to promote and support adaptation to climate change in the social context in theory and practice.

The study was conducted in four key phases. Firstly, a literature review highlighted issues related to the need for establishment of adaptation characteristics in the social context as well as the identification of relevant theoretical approaches required to promote them: namely, Adaptive Governance, Resilient Communities and Intermediaries. Secondly, the selection of the two key relevant BREEAM Communities categories and their associated indicators as well as a relevant practical case study for the investigation was undertaken. Media City, Salford, UK, is demonstrated in this thesis to be an important exemplar case study that constitutes important strategies to address community sustainability. Thirdly, analysis of the relationship between the three identified theoretical approaches using their associated characteristics against the content of the BC tool's selected indicators as well as actors' perceptions of its capacity to promote adaptation was undertaken. Fourthly, the identification of areas that require enhancement in terms of both indicators and characteristics was undertaken and suggestions enhancement proposed, informed by stakeholder interviews.

According to the results, BC is considered an important tool that holds significant potential to address the challenges of adaptation to Climate Change for communities, through its coverage and positive performance in relation to issues at both governance & community levels, such as actors' consultation & engagement & management; community demographic needs and well-being. However, it was also concluded that an area of enhancement in relation to the role of BC is as a main intermediary tool in order to address the underevaluated issues of: community awareness, knowledge, communication, management and adaptive behaviour and learning, in order to reflect the overall adaptation process at the neighbourhood scale.

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My Wonderful Mother 'Layla' who has always believed in me and taught me to trust in myself and to work hard towards any decent goal in Life

…I Love you deeply Mom…

To my Father's Soul who was and still with me all the time

To My beloved Sister 'Dahlia' & Brother 'Ahmad' for being by my side and for providing me with their endless love…

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Acronyms

BC BREEAM Communities

CC Climate Change

AG Adaptive Governance

RC Resilient Community

I Intermediaries

NSAs Neighbourhood Sustainability Assessment Tools

FRA Flood Risk Assessment

ACC Adapting to Climate Change

Co Community

Chapter 1: Introduction

1.1 Climate Change

Climate change is widely acknowledged as a complex and evolving issue, as climatic changes can create feedback loops that then negatively reinforce each other (Wilder et al 2010). An increase in frequency and magnitude of extreme climatic events is the most likely form in which longer term climate change will be manifest (Tompkins and Adger 2004). Thus, the frequency, geographical range, and magnitude of extreme events is expected to increase, with events such as that experienced in central Europe during the summer of 2000, where extremely unusual long-lived high temperatures led to the deaths of over 20,000 people (Pan et al 2010), becoming more common. Extreme weather events, increased precipitation fluctuation, and other climate change impacts all pose substantial threats to human lives and lead to an increased need for communities' abilities to adapt to be enhanced (Lindsay 2018). Unfortunately, however, current responses to climate change have tended to focus on mitigation and responses to short term impacts, ignoring all potentially appropriate and necessary capacity for adaptation to the longer-term impacts.

Climate change has inevitable impacts on urban systems and communities (Tyler and Moench 2012), and the issues raised by climate change present real challenges that can dramatically hinder the achievement of sustainability goals (Burch et al 2014). Climate adaptation has thus become a pressing issue (Eriksen et al 2011). In particular, climate change increases rainfall variability and average temperatures, influencing both the supply and demand sides of water usage and affecting irrigation, making strategies for enhancing water security and agricultural productivity essential; adaptation to climate change is thus an urgent issue (Kakumanu et al 2018).

Adaptation is thus an important strategy that aims to reduce the variable and harmful effects of climate change to lessen its effects on communities' lives (Kakumanu et al 2018). The term can also refer to changes in the processes, practices, and structures used to act against or, potentially, benefit from the opportunities associated with the effects of climate change (Smit & Pilifosova, 2001, p. 879). This includes changes and adjustments that happen in various contexts, whether social, ecological, or economic, that are essential to manage climatic changes and their impacts.

Accordingly, the development of methods and tools to enable appropriate responses to the risks associated with climate change must be prioritised (Parry et al 2007), leading to a need for analysis and discussion regarding both short term and likely long term impacts. This must, however, be tempered by the recognition that not every adaptation to climate change is a good one, drawing attention to the need for sustainable adaptation strategies and measures that contribute to social justice and environmental integrity (Eriksen et al 2011). In this context, therefore, sustainability is important insofar as it involves the practical processes and strategies required to reduce various harmful impacts of human development, including climate change. Engle (2011) argued that there is a substantial need to understand the process required to design actions and deliver desirable outcomes in the context of the relationship between adaptation and sustainability, as well as a need to address the types of decision-support tools and metrics that can facilitate this delivery process in the face of climate change.

1.2 Sustainability and Adaptation in a Social Context

It has been acknowledged in the literature that the social context, in particular, the relevant population or community, must be capable of adapting to the variable impacts of climate change (CC) for successful adaptation to occur. The social context is particularly important in the context of addressing adaptive capacity. Adaptive capacity in the social context, which may be referred to in the literature as “human system”, “communities”, or “population”, has increasingly become a necessity in relation to mitigating or adapting to the effects of CC. In all cases, adaptation requires an adjustment process that is undertaken by people in response to CC effects; done well, this may access benefits from opportunities associated with CC and moderate negative potential changes (Grothmann and Patt 2005).

In this research, the social context is thus related to a focus on communities that affect and are affected by the adaptation processes that are promoted or implemented through built environment development and or the regeneration decision making process. This focus on the social context requires the integration of focus on both community and the policy or the decision making that enables the building of adaptive capacity to CC for the community.

Laukkonen et al (2009) argued that adaptation to CC is more likely to be based on a local sustainable development framework that incorporates social and economic issues rather than those focusing specifically on environmental measures. The need for sustainable development is thus paramount in the light of major concerns around the negative effects of

urbanisation on the environment (Sharifi and Murayama 2013). In the context of policy and under various decision-making scenarios, sustainable development has thus become an important and comprehensive target (Rotmans 2006), and addressing adaptive capacity to CC can be regarded as an essential component of such sustainable development targets and strategies. *"Sustainability is intimately related to various measures of risk and uncertainty about a future we cannot know, but which we can surely influence"* (Loucks 2000, p3). Work on the adaptive capacity of local community is thus important and should be considered core to both sustainable development and resilience building processes (Lebel et al 2006).

The integration between sustainability and the adaptation to CC is not a new issue. The link between sustainability and adaptation to CC has been indicated by various studies within the literature in different scenarios, and has been examined in relation to scale (Folke et al 2002; Kreimer et al 2003); sector (MacDonald 2010); management (Wall and Smit 2005); policy (Swart 2003); governmental and decision-making structures (Wall and Smit 2005; Lockwood 2013); information (Melville 2010); the protection of climate resources (Ikeme 2003); and business and industry (Shaw et al 2014). Thus, the protection of communities and their associated resources across various sectors has been acknowledged as an important commonality between sustainability and CC adaptation. Nevertheless, and despite the general acknowledgement of this close relationship, there is a lack of understanding in the current academic literature of how sustainability can be used to manage CC impacts (Bond et al 2012). Further, there remains a lack of understanding as to how sustainability might be employed to manage CC impacts in terms of delivering positive net sustainability gains both now and in the future (Bond et al 2012).

While the concept of sustainability is associated with managing relationships between social systems and the environment (Boyle et al 2018), it must also be recognised that strategies for adaptation to CC must be integrated in a suitable manner with communities' sustainable development (Laukkonen 2009). *"Sustainability of community involves social interaction between community members; the relative stability of the community, both in terms of overall maintenance of numbers/ balance (net migration) and of the turnover of individual members; the existence of, and participation in, local collective institutions, formal and informal; levels of trust across the community, including issues of security from threats; and a positive sense of identification with, and pride in, the community"* (Dempsey et al 2011, p293-294).

Despite the general acknowledgement of a close relationship, there is a lack of understanding of how sustainability can be used to manage CC impacts (Bond et al 2012). This work, thus, aims to argue that creating the integration process requires the combining of resilience and adaptive capacity principles with sustainability development tools. As such, the evaluation of relevant sustainability development tools in terms of characteristics associated with resilience and adaptive capacity is proposed as effective in terms of advancing both the theory and practice of such a combination. This integration, however, must be applied at both the decision making and the implementation stages of strategies at the community level; intervention at these two levels is thus considered essential to the process of building adaptation strategies to address climate change in the social context.

1.2.1 Neighbourhood Scale

Having established that the relevant focus should be on the community in order to promote adaptation as a priority, it can thus be argued that the neighbourhood is the most relevant scale at which to address adaptation potential. The scale of neighbourhood is an essential factor in addressing sustainability in a physical neighbourhood, as it stands in relation to community assets and the interactions between them (Yigitcanlar and Dur 2010). Thus, the concept of neighbourhood can be seen to incorporate both place and people.

Neighbourhood scale is important not only in terms of the physical built environment but also as the best scale at which to form a sense of community, a highly important ingredient of resilience (Uda and Kennedy 2015). Addressing adaptation on this scale is thus more influential in terms of both peoples' lives and the sustainability of resources.

The neighbourhood also represents a middle level of analysis and action between the city and single buildings (Lützkendorf and Balouktsi 2017). Zheng et al (2017) identified that neighbourhoods can be demonstrated to be geographical planned sub-regions of a city where residents interact and share services and facilities; these are then connected under the umbrella of a city. Subsequently, the importance of the neighbourhood scale is that it represents a key part of peoples' everyday lives and existence, being the scale at which the processes of engagement and interaction between groups of people who live, work, and engage in various activities together are acted out (Platts-Fowler and Robinson 2013). Building adaptive capacity at the neighbourhood scale thus provides a geographic focus to this research. However, it must be noted that examining sustainability at the neighbourhood

scale does require much more complex issues to be addresses than examining the performance of single buildings (Lützkendorf and Balouktsi 2017).

1.3 The Context of Sustainability Assessment Tools

Sustainability assessments tools have a rich and advanced history; since the emergence of the concept of sustainable development, its measurement has been considered as an effective method for its promotion (Sharifi and Murayama 2015), and it has been argued that it is important to adopt measurable targets for sustainable development as they provide the main organising principle for global cooperation by means of addressing economic development, social inclusion, and environmental sustainability (UN SDGs 2015). The need for sustainable development is paramount, particularly when considering the negative effects of urbanisation on the environment (Sharifi and Murayama 2013). Thus, several existing sustainability assessment tools as referred to in the literature are available, and these provide a range of indicators, across a breadth of sectors, that aim to guarantee appropriate endeavours in the conservation of the environment; however, in many cases, this explicitly refers to the mitigation of rather than adaptation to climate change (Bakar and Cheen 2013). Nevertheless, sustainability assessment tools are considered to be significant and widespread means to address and promote sustainable development targets in the built environment sector, and thus these tools are widely considered to be essential in achieving sustainability in environmental, social, and economic contexts.

The adoption of sustainability assessment tools does provide support in adapting to climate change, however, due to their effects on the management of resources (Parry et al 2007); they can also direct decision-making towards sustainability, within which climate change mitigation strategies are likely to be embedded (Bond et al 2012). Such strategies and tools are constructed as dynamic strategies, that are capable of responding to required changes (Eriksen et al 2011), whether climate changes or any other type; thus, it has been broadly argued that adaptation to change is embedded with these tools. Elsewhere, however, the complexity of the process of sustainable development, and the tools' application across a breadth of sectors of development has raised concerns that the extent to which these tools can be certain to address adaptation is limited (Rotmans 2006).

Several recent studies have aimed to link the effects of sustainability assessment tools on climate change with the effects that rapid urbanisation on certain nations, determining where physical and non-physical aspects give rise to the local adaptability to climate change which is necessary for applying the contextual nature of space to the development of these sustainability tools (Dawodu et al 2017). However, there is still a need to further focus on linking these tools with risk and building resilience scenarios through analysing the indicators of performance in both theory and practice. Matthews et al (2014) concluded that these sustainability assessment systems did not adequately account for hazard resilience and argued that there should be more concentrated efforts made towards including adaptation to climate change to adequately address hazard resilience where these sustainable assessment tools are applied.

Furthermore, despite the importance of sustainability assessment tools in terms of educating users and enabling the incorporation of sustainability strategies into planning, design, and construction, a substantial gap remains in users' ability to incorporate hazard resistance and hazard mitigation into the broader context of sustainable design (Matthews et al 2014). These tools can be important in terms of addressing many of the key ideas associated with adaptation to climate change, particularly in the context of resource management and decision making; they do, however, need to be developed and implemented widely as well as embedded in decision making processes. In this context, it is proposed that there is a potential to achieve this through an investigation of how existing widely adopted neighbourhood sustainability assessment tools might be better utilised to address these issues.

In this context, based on the increase in the number of sustainability assessment tools around the world and the importance of both sustainability and climate change adaptation at the neighbourhood scale, tools at this scale have thus been chosen for the current research.

1.4 Research Aim and Objectives:

This overall aim of this thesis is to investigate the role of an international sustainability assessment tool, BREEAM Communities, in enabling adaptation in the social context based on its role as an intermediary in a neighbourhood development project. This study will

examine the BREEAM Communities tool in the form of a case study that integrates the characteristics of adaptation in top-down, bottom-up, and intermediation processes.

The main objectives for this thesis are thus:

1. To establish a theoretical framework for the evaluation of adaptation in the social context by identifying the main applicable theoretical approaches and their associated characteristics.

2. To identify the importance of Neighbourhood Sustainability Assessment tools based on their potential to support adaptation in the social context in both theory and practice.

3. To evaluate the theoretical capacity of the case study NSA (BREEAM Communities) in terms of enabling adaptation based on an analysis of relevant constituent indicators in relation to the three identified theoretical approaches.

4. To investigate the impact of the case study NSA in application to the project case study (Media City) in terms of the promotion of adaptation through an analysis of the actors' perceptions in relation to the three identified theoretical approaches.

5. To evaluate the implications of key findings that can potentially be applied to enhance the role of the case study NSA at governance and community levels, thus identifying its strategic enhancement potential.

1.5 Research Approach

The research questions, aims and objectives of this thesis were identified based on a careful literature review that included identifying research gaps in current studies regarding the development of an integrated approach towards investigating the adaptation of the social context at the neighbourhood scale through the application of NSA tools. Due to the significant gap in research in the social context with regard to applying a theoretical framework that combines levels of governance and community, and their connections at the neighbourhood scale, the adoption of Adaptive Governance, Resilience Community, and

Intermediaries were the key theoretical approaches applied in the development of an analytical approach for this thesis.

A matrix approach, featuring expert questionnaires, focus groups, and local community interviews, was used to analyse the extent to which adaptation evaluation characteristics are enabled when BC is applied in practice. The indicators analysis facilitated by this matrix approach was important in terms of understanding each NSA indicator and its theoretical basis in relation to each of the evaluation characteristics. For this research, as the main focus is on governance and social contexts as the two main levels that influence adaptation to CC, in BC, the indicators associated with governance and social contexts were identified as a focus: Governance and Social well-being. Those indicators with a focus on physical context, such as energy, water, or transportation, were not included in this research, as the main focus is on addressing community adaptation to CC in social terms, that is, in relation to community participation with, engagement with, and preparation for CC throughout the development process governance and delivery stages. Thus, the outcomes of physical context indicators, would be influenced both by the professionals engaged in design and construction, drivers embedded in these indicators and by those actors engaged by indicators located in the social and governance contexts. It is this latter influence on the design, construction and operation of the physical that is of interest to this study. Examination of this social aspect of sustainability in the context of sustainability assessment tools is lacking within the existing literature and thus requires specific focus and attention, while physical impacts are more subject to focus in the literature.

The indicators associated with governance in BC were examined against Adaptive governance characteristics, while the indicators of social well-being were examined against the Resilient Communities characteristics; intermediary characteristics were examined in both groups of indicators.

In terms of the case study, Media City was selected for four reasons:

- the first is its importance as the first neighbourhood regeneration project in the world developed with the application of BC.
- The second is that it involved a wide breadth of actors in the governance process due to the complexity associated with adaptive governance potentials.
- The third is that the focus on community sustainability was a core target behind the development of this project in environmental, social, and economic aspects; and

- the fourth was its specific focus on water and the strategies that were thus important for adaptation to CC.

Therefore, the incorporation of perceptions from both experts and the community involved in this project offers important results with regard to potential adaptation characteristics and BC indicator performance, including the identification of negative characteristics and indicators resulting from this integration process. Finally, it allowed any negative performance of both indicators and characteristics to be identified. A final phase of interviews was undertaken to establish experts' perceptions towards the negative indicators, with regard to potential enhancements to the BC and its process of application.

1.6 Thesis structure

The thesis is organised in seven chapters including the introduction; the ensuing sections are a literature review; selection of the case study; research methodology; analysis of the results; a discussion of implications and enhancements; and, finally, the conclusion.

Chapter Two reviews literature associated with the main issues that influence the topic of this study. It establishes the main theoretical approaches relating to the adaptation of the social context in neighbourhoods and how this affects communities' capabilities to adapt to CC. In addition, it reviews the approaches used to investigate adaptation to CC in the social context in neighbourhoods and establishes an evaluation framework, including themes and characteristics, applied in this research.

Chapter Three is concerned with developing the main assumptions of the study relating to the identification of a case study for investigation. It presents the arguments for the selection of BREEAM Communities as the main selected case study. It also identifies the importance of assessment tool indicators for application in the theoretical analysis as well as discussing the selection of the project for the case study, which is Media City, Salford, UK.

Chapter Four provides the methodology for the research, explaining the methods used for conducting this research and the data analysis performed in this study. It describes the survey and interview methods' development along with the procedures used for data analysis.

Chapter Five presents the results of the core phases of this study. It focuses on the findings related to the analysis of BC indicators based on the research framework established in chapter 2.. It also presents an analysis of the expert and local community perceptions of

Media City in order to better explain the performance of the framework's characteristics and indicators, in theory and practice.

Chapter Six provides a discussion of the main findings and the potential for enhancement with regard to the characteristics and BC indicators investigated and the possible implications of the proposed enhancements on the development project. In this chapter, experts' perceptions on the findings and the potentials for enhancement, resulting from a final phase of interviews, are also presented.

Chapter Seven discusses the main contribution of this study and reflects on the aims, objectives, and research questions initially presented in this work. Finally, it describes the limitations of this research and offers recommendations for future research on this topic.

A list of the essential appendices can be found at the end of this study; these support the content of various chapters.

Chapter 2: Literature Review:

2.1 Introduction

This chapter aims to build an integrated approach for a framework to investigate social adaptation in neighbourhoods in the context of sustainability. It is acknowledged that Climate Change (CC) is having inevitable impacts on both the built environment and populations (Tyler and Moench 2012); and the issue of CC is presenting a real challenge that can dramatically hinder the achievement of sustainability goals (Burchet al 2014). In considering the relationship between sustainability and CC, the application of sustainability assessment tools is a key issue that requires investigation, especially when it comes to tools applicable at the neighbourhood scale.

It is argued that in order to investigate the potential for social adaptation of neighbourhoods, it is vital to build an integrated approach that encompasses both governance and community levels. Here, intermediaries have a significant role in connecting these two levels and thus their importance needs to be understood and acknowledged.

Therefore, three main theoretical approaches are presented here: Adaptive Governance, Community Resilience Factors, and Intermediaries, for possible application in the investigative framework for this research, followed by identification of their characteristics. An extensive literature review is conducted in order to establish relevant characteristics for the evaluation/ understanding of sustainable social adaptation of neighbourhoods. Nine main themes and 20 associated characteristics are identified and presented.

In the final part of this chapter, the discussion centres on the adoption of integrated tools at the neighborhood scale (Neighbourhood Sustainability Assessment tools or NSAs). It is concluded that NSAs can be important in the promotion of adaptation in the social context through their importance in the governance process and promoting the sustainability outcomes for communities as main applied strategies that comprise both indicators and actors.

2.2 Sustainability at the Neighbourhood Scale

Sustainability has become an increasingly important element to be considered in the planning of urban areas. Although it is central in the consideration of cities, for some reason it has received less attention in the development of neighbourhoods. Yet cities cannot be

considered sustainable if their component parts, such as neighbourhoods, do not meet sustainability criteria (Choguill 2008).

It is acknowledged that the neighbourhood scale is regarded as the most effective scale at which to take account of linkages between the different parts of the urban system, such as population, buildings, land uses, transportation, water, energy, biodiversity, air, geology and topography (Sharifi and Murayama 2013). What is interesting in the definitions is that what exactly a neighbourhood is, lies primarily in the eyes of the beholder (Choguill 2008).
Indeed, neighbourhood represents:

> *a key component of the social and material setting of everyday life, that shapes opportunities for interaction and engagement, contains key resources that inform the experiences of individuals, households and groups of people who reside therein and inform different outcomes in different places* (Platts-Fowler and Robinson 2013, P4).

Generally, it is acknowledged that sustainability has become an increasingly important element to be considered in the planning of urban areas, at the city or neighbourhood scale. Although neighbourhood planning has a relatively long history, it was not until the beginning of the 21st century that planners and environmentalists began to design tools for Sustainability Assessment at the neighbourhood scale (Sharifi 2013).

It is acknowledged that the neighbourhood scale is a relevant scale for promoting adaptation in the social context. Neighbourhood Sustainability Assessment tools have the potential to involve a focus on communities, actors and people; in contrast to the physical focus of building assessment tools (Reith and Orova 2015), they represent greater potential to address adaptive capacity to Climate Change.
This scale should be considered as central and be prioritised in order to develop efficient, sustainable neighbourhood systems and understand the extent to which NSAs are addressing adaptive capacity to CC in their coverage and performance is an important issue for research.

2.2.1 Neighbourhood Sustainability Assessment Tools

It is argued that the complexity of CC, in terms of which response to involve and at what level, requires clear processes and methods as well as adequate tools (Laukkonen et al 2009). Globally, there is an increase in the adoption and application of 'Sustainability Assessment Tools', which have been effectively and widely adopted to address and deliver more socially, economically, and environmentally appropriate development of the built environment over

the last two decades (Sharifi and Murayama 2014). It should be said, however, that the relationship between these tools and CC to promote adaptation is not a clear issue. As Engle (2011) demonstrated, the relationship between CC and sustainability is still not sufficiently addressed, particularly in the current sustainability literature. This is particularly evident when it comes to gaps in the explanation of the application of the frameworks in the social context and the planning of adaptation strategies to promote adaptation to CC (Gillard et al 2016; Rodriguez et al 2018).

NSAs can be recognised as the latest generation of impact assessment tools (Sharifi and Murayama 2013, 2014), where NSAs aim to evaluate the performance of neighbourhood development or regeneration according to a specific group of standards (Sharifi and Murayama 2013; Reith and Orova 2014). These tools mainly aim to assess the neighbourhoods' position with regard to the delivery of specific sustainability targets (Sharifi and Murayama 2013) and have become widespread since the beginning of the 21st century, mainly in the developed world.

These tools need to be developed and implemented widely, as well as embedded in the decision-making process. In this context, with the increase of the number of sustainability assessment tools around the world, and with the importance of both sustainability and CC adaptation at the neighbourhood or community level, tools at this scale are considered key topics for investigation. With this in mind, many scholars such as (Engle 2011; Arnott et al 2016; Rodriguez et al 2018) assert that there is a substantial need to understand the process required to design actions and deliver desirable outcomes in the context of the relationship between adaptation and sustainability, as well as addressing the types of decision support tools and measures that can facilitate this delivery process in the face of CC.

The sustainability tools or, as named in the literature, the sustainability assessment tools are considered a significant means with which to address sustainability development targets. These tools are essential in achieving sustainability in the environmental, social and economic contexts.

Although neighbourhood planning has a relatively long history, planners and environmentalists have only recently begun to design tools for sustainability assessment at the neighbourhood scale (Sharifi 2013). The NSAs are considered crucial compared with the tools at the buildings scale or at the city scale. Addressing sustainability at the neighbourhood scale is important because many of the problems encountered at the city scale are, in fact, cumulative consequences of poor planning at the neighbourhood level (Said et al 2009).

At the building scale, sustainability tools typically fail to provide a complete assessment of the cumulative impacts of sustainability and do not adequately depict sustainable development, nor do they sufficiently address adaptation (Sharifi and Murayama 2014; Sullivan et al 2014; Kang et al 2016). Moreover, while tools at the city scale have been discussed in many studies (Turcu 2012; Sharifi and Murayama 2014), there is a level of complexity involved when focusing on this scale, with the aim to achieve sustainable urban development targets in the long term. Indeed, more broadly, urban sustainability has attracted much criticism, as urban areas rely on too many external resources, and these regions are, and probably will always be, net consumers of resources (Turcu 2012).

Therefore, the potential of NSA tools to address social adaptation in relation to both governance and community is a key issue in this research, due to their importance for sustainable development, and in relation to sustainability and CC adaptation.

2.3 Levels for Building Adaptation in the Social Context

It was argued earlier that the social context mainly refers to adaptation in association with community adaptation to CC and its potential risks. The community level is relatively neglected and therefore requires more attention (Berkes and Ross 2013). Adaptation is required for the various divisions of community in order to face the potential impacts of climate change, despite the level of action taken by local government and national policies (Vignola et al 2009; Roberts 2010). There are still gaps around how to evolve more sustainable and resilient urban communities into sharp focus, with the increased CC impacts (Stevenson and Petrescu 2016).

Therefore, the inputs of the local community must be in tune with any outcomes of the adaptation process, which requires the inclusion of the local community in the decision-making process, known as ‘bottom-up’ planning. This is associated with the inclusion of important aspects that could help in enabling adaptation of the various individuals or local communities to the potential impacts and risks (Wibly and Dessai 2010). Such incorporation of the opinions of the local people could help in determining the issues which might cause hindrance to adaptation to CC (Pelling 2010).

Nevertheless, it is argued that the complexity of addressing adaptation in the social context is also associated with the complexity of the governance systems. Governance is an example of a driving force of adaptive capacity that is difficult to capture in an indicator, despite it

being widely accepted that good governance and institutional structures are important in promoting adaptive capacity (Vincent 2007). It is argued that the impacts of CC affect the development and decision-making processes through transfer within professional actors' information about various subjects (Linder et al 2010).

It is also considered that failing to address adaptation for communities will leave them in a state of poor preparation and behaviour with regards to the climatic changes that are expected over the next few decades (Ebi and Semenza 2008). Importantly, this requires that local communities themselves be capable of adapting to the variable impacts of CC (Roberts 2010). It has also been acknowledged that the strengthening of the role of the local community, and the need for policymakers to empower local and indigenous communities to facilitate adaptation processes through taking local traditional knowledge into consideration is a valuable step towards achieving adaptive capacity in the neighbourhood context (Vignola et al 2009).

It should be said that with the importance of building social adaptation, it is acknowledged that the connections among the various actors at both levels is necessary in order to lessen the gaps among the actors and to increase the effective engagement process of various actors towards building adaptation. The emergence of connections of the various organisations or institutions supports collaborative actions and addresses the adaptation strategies for communities (Folke et al 2005). It is recognised that the collaborative networks are considered a crucial factor in defining the responses needed for the communities' interaction towards environmental changes (Brown and Westaway 2011).

Networking promotes efficient communication and collaboration among the actors in order to enable the process of building adaptation outcomes. Therefore, it is important to understand that networking has a role in mediating the adaptation between governance and the local community levels. The next part of this chapter shows the main definitions of governance, community and intermediaries as important components for adaptation. Latour (2005) has clarified that, in Actors Network Theory (ANT)[1] terms, *the network is a method, not a thing 'out there' to be discovered.* Primarily, ANT is important when it comes to the increased challenges that are associated with the technological and environmental changes in relation to the lack of collaboration and interaction between society and social networks (Rydin 2006), and to influence the effects of our actions and change the way we move

[1]Actor–network theory (ANT) is a theoretical and methodological approach to social theory where everything in the social and natural worlds exists in constantly shifting networks of relationships (Latour 1990).

through the world (Yaneva 2009). Thus, social networks are important and add information regarding the relations of humans in a social and natural world, which is the very essence of societies and natures (Latour 1996).

2.3.1 Governance level

The term 'governance' is used in the literature as an alternative to the conventional top-down process of decision-making by an authority and refers to the role of institutions associated with collaboration and networks (Folke et al 2005). It points towards the preparations and plans of the various institutions, including the important role of the authority with other community groups or organisations (Hatfield-Dodds et al 2007).

It is recognised that the governance process must be able to adapt to address the required responses in the environmental and social contexts (Pahl-Wostl 2009). Governance is associated with various actions and strategies that influence the adaptation process (Dewulf and Termeer 2015). The process of governance focuses on making communities more adaptable through considering them as a reliable party in the governance process (Petrescu et al 2016). Accordingly, the definition of governance as used here in the research refers to the process of planning and implementing adaptation strategies in the top-down decision-making applied to deliver the adaptation or to address the adaptive capacities of communities. Governance is understood as a broad concept that relates to intentional actions or interventions by multiple actors to address a specific problem (Broto 2017).

It is argued that the complexity of addressing adaptation in the social context is associated with the complexity of the governance issues. It has also become evident that many problems are not primarily associated with the resource base but have to be attributed to governance failures (Pahl-Wostl 2009). Neighbourhood governance, or rather the lack of it, could also be the cause of many of the problems that exist in neighbourhoods (Somerville et al 2009). There is also a pressing need to understand which tools assist resilient development best at the neighbourhood level, and why (Stevenson and Petrescu 2016).

It is argued that governance is a key factor in the promotion of adaptive capacity for communities, and this requires the adoption of actions/strategies. In order to promote adaptive capacity, it should be said that governance strategies must themselves be able to adapt in order to address the required responses in the natural and social environments (Pahl-Wostl 2009).

For this research, the focus is on local governance and its importance to adaptation is particularly significant. The role of the local governance level is considered critical in adaptation to CC (Agrawal 2008), and their role is considered to be important in addressing the required regulations or in constraining them (Adger et al 2005). In particular, understanding the decision-making process is considered a basic issue for building adaptive capacity for communities and towards building their adaptive behaviour to challenging situations (Grothmann and Patt 2005).

For the most part, when it comes to addressing adaptation, it is argued that the governance needs to be constructed on the idea of working together, and be based on the cooperation between different kinds of actors, such as national and local government, residents or local communities and private partners such as developers and insurance companies (e.g. Kooiman 1993; Rhodes 1996; Elander 2002). The role of those actors is essential in influencing the adaptation process and the process of making decisions related to adaptation. Thus, the governance process affects and is affected by the role of the actors (Dewulf and Termeer 2015).

2.3.2 Community level

It was argued earlier that addressing adaptation in the social context requires that the local communities themselves be capable of adapting to the variable impacts of CC and its associated potential risks (Roberts 2010). Adaptation at the community level means being able to maintain (and preferably improve) the current living standards in the face of the expected impacts of CC and the intensity and frequency of severe events which may affect people's livelihoods (Van Aalst et al 2008).

The community can be defined as the group of people with varied characteristics that belong to a geographical neighbourhood setting and who share mutual perspectives about their community issues and environment (Green and Mercer 2001). The communities are considered as unique and they have their own local needs, experiences, resources, and ideas about the preparation for and protection against the various CC impacts and the potential risks, respectively (Choguill 2008). Therefore, their inclusion in the adaptation process is an indispensable issue. This would mean that they should be considered as a vital component in building the adaptation strategies themselves. Regarding this, Rojas Blanco (2006, p 141) demonstrated that: *'Not only do local communities have the right to be informed about the*

ramifications of climate change, but they are also capable of generating solutions likely to work at their level'.

When the local communities are able to adapt, then they should not only have the right to be aware of CC and the potential impacts and risks, but also these communities should have the ability to think and behave in adaptive ways (Van Aalst et al 2008). It is argued that when local communities are engaged in the adaptation process, this will give them the ability to cope with the various impacts and potential risks of climate change. Nevertheless, despite the focus on the community level in the literature review, the adaptive capacity building process is still in need of attention. In other words, the local communities should impact decisions related to their neighbourhood, and this can be guaranteed through the role of the various actors involved in the governance process in relation to the application of strategies (Somerville et al 2009).

Addressing the local communities' demands is important for securing or aiming to lessen the gaps that relate to the final adaptation of their community. Here it is argued that when the delivered context is not in parallel with the people's priorities and essential needs, there is significant potential for this adaptation process to be unsuccessful (Cannon and Muller-Mahn 2010). Therefore, the inputs of the local community must be in tune with any outcomes of the adaptation process, which requires the inclusion of the local community in the decision-making process, known as 'bottom-up' planning, and is associated with the inclusion of important aspects that could help in enabling the adaptation of the various individuals or local communities to the potential impacts and risks (Wibly and Dessai 2010). Such incorporation of the opinions of local people could help in determining the issues that might cause hindrance to adaptation to CC (Pelling 2010). So, the communities' adaptation process must start from within the communities themselves.

It is also argued that the importance of the local communities, whether through the delivery of adaptive capacities for better well-being, or/and through their inclusion in the decision-making processes, should not be an overlooked issue when aiming for adaptation. The adaptive capacity of communities is a very important issue, with an investigation needed into the characteristics that make the community be able to act in adaptive ways. For instance, Singh and Butler (2015) demonstrated that the adaptive capacity of communities is important and is associated with their well-being and their feeling of belonging and support of their environment.

Accordingly, it is demonstrated that the role of governance and community are both essential in enabling the planning and implementation strategies to address adaptive capacity in relation to climate change. The understanding of both contexts demands not only knowing what to adapt and who is adapting, but it requires realising how the adaptation is happening as well (Berrang-Ford 2011).

Further, and importantly, there needs to be a focus on the actors that are involved in addressing the adaptation, in relation to both the governance process level and local communities. For the most part, adaptation processes involve the interconnection of various agents or actors through their relationships with each other (Adger 2003). It is important to investigate the interconnection, to know whether it enables or hinders adaptive capacity.

2.3.3 The Importance of Intermediaries in Bridging Gaps in the Social Context

Climate Change is a complex issue that requires complex responses to address adaptation. This implies the understanding of thematic issues as well as the inclusion of different actors in the decision-making process (Laukkonen et al 2009). It is argued that the decisions relating to adaptation are made by various actors including individuals, groups within communities, organisations and governments (Adger 2003).

Further, it is acknowledged that organisations that explicitly focus on this intermediary function are considered as bridging organisations (Guston 1999, 2001; Cash 2001; Folke et al 2005), because they play an intermediary role between different levels, or scales, and facilitate the actions of creating knowledge (Cash et al 2006). It is considered that intermediaries are important actors when sustainability is the aim.

As Latour (2005) demonstrated, intermediaries, as participants, are important in setting the function of passing information without transforming its meaning among the various actors. Callon (1991) argued that intermediaries are individuals that make changes to the networks that they are part of because of their role in transporting information, while Hayes and Westrup (2014) suggested that they act as relays to others, but are still considered as highly significant in shaping social relation. On the other hand, a social network adds information on the relations of humans in a social and natural world which is left untouched by the analysis, and ANT aims at accounting for the very essence of societies and natures (Latour 1996).

Mainly, the function of intermediaries is in their connection among various participants or actors, in order to promote openness in the process when communicating the various opinions of the life-world (Fehren 2010). Therefore, it is acknowledged that intermediary actors have been proposed as having key roles in encouraging the adoption of strategies and changes towards more sustainable processes and developments (Kivimaa et al 2018). They represent individuals/organisations that link various actors together (Pham et al 2010), and as such they can range from councils, public bodies, associations, non-governmental organisations, or consultancies (Bush et al 2017), and that for intermediaries, there is no ambiguity since from knowing the inputs, the outputs are acknowledged as well (Latour 2007). A key feature of the theory is that actors are taken to include both human beings and nonhuman actors such as technological artefacts.

It should be noted that in order to address the connections and changes needed in the decision making through the actors' participation process, it is important to consider their roles as both intermediary actors and as mediators. The importance of considering mediators and intermediaries is captured clearly by Latour, who explains that mediators have significant functions that influence the development of projects through their ability to change and alter the decisions and circumstances (Latour 2005).

As shown in Fig 2-1, it is important that these actors are able to take over an intermediary function in community development. it is crucial for trust to be available between all parties, with the administrative and decision makers on one hand and the local community on the other (Fehren 2010). Therefore, their role should be acknowledged when aiming to understand the process of building and promoting adaptive capacity in the social context. Thus, the role of actors who are known as intermediaries can be either as intermediaries and / or also as mediators, depending on their main function in the project.

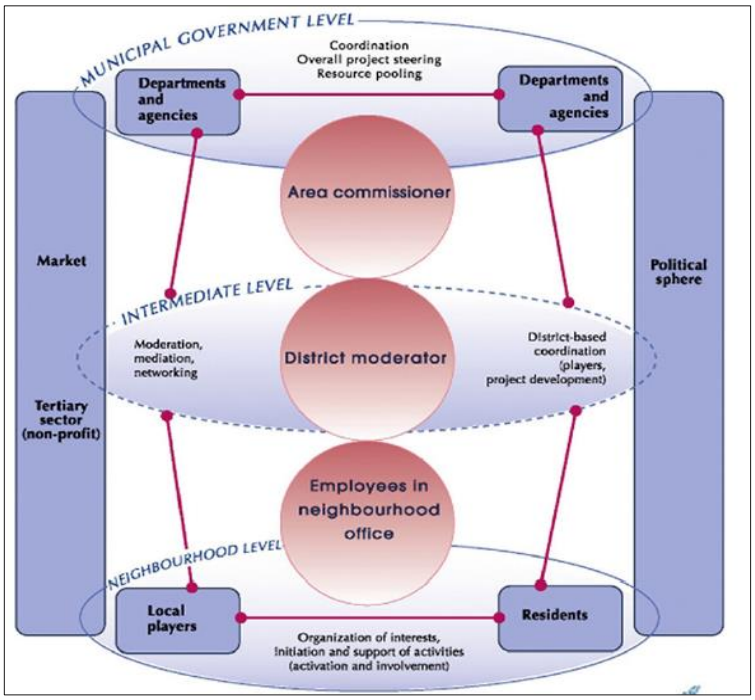


Figure 2. 1: Neighbourhood management – areas of responsibility and organisation (example) (Fehren 2010)

When mediators are included, the causes or the inputs differ from the effects or the outputs of the decision making. The term mediator is sometimes used instead of intermediary to distinguish between the more neutral transference implied by being an intermediary and the more unpredictable activities of a mediator (Latour 2005). As a result, mediators are also important in development networks, but they differ from intermediaries, as mediators alter whatever they engage with. As Latour (2005) puts it, with an intermediary, an input leads to a known output, but with a mediator the outputs are unknowable in advance and will be different under different circumstances. Latour argues that mediators are important in actively transforming and shaping the process, and when compared with intermediaries, mediators can bring about unpredictable outcomes as they actively interpret their interests into the network with which they are engaged (Latour, 2005). The transferring of strategies through mediators is always complex, involving socially, culturally and politically embedded translation practices. This does not include translation with its literal meaning, and instead indicates a set of processes of discussion, displacement, and alteration (Lendvai and Stubbs

2006). Latour and Callon's work on 'translation' takes the concept way beyond linguistics, in an attempt to emphasise the dynamic nature of the social world, where meanings are constantly transformed, translated and altered (Latour 2005). Translation takes place in complex relations between the human actors and not human actants, where everyone and everything has the important role as mediators to shape and transform discussions, consultations, and interpretations according to their various projects (Latour 1987). Therefore, it can be noticed that this concept is inseparable from with buildings, transforming the relations of the projects (Lendvai and Stubbs 2008).

It should be said that the role of actors as mediators is an essential key in making the transformation based on the arguments and the changes that are made through a specified agency, which cannot be undertaken without differences and changes in the relationships and decisions through the agency's constituent actors (Latour 2007). By focusing on an actors' interactions with a concrete set of preferred individuals, the social network approach is a promising theory to incorporate interactions in the agency role as a mediator party (Carrasco et al 2008). Generally speaking, some actors are more active in seeking interactions with their network, whereas others can be more passive, where this difference in the actors' engagement with the social network can be termed as actors' agency (Carrasco et al 2008). Agency is about acting, and can be formulated as the willingness and ability to act. In a way, it is not so much that acting entails agency but rather agency is a product of actions (Kinnunen and Koskinen 2010). It has to do with the ways in which an agency is said to bring about effect; which, in this respect, the criterion of strength is the degree to which an agency is treated as a mediator that really makes a difference, and not as an intermediary that only carries force or meaning without transforming anything (Bruni and Teli 2007).

Therefore, the role of the intermediaries as bonding organisations that pass information between the two essential levels of governance and community, to address sustainability, needs to be investigated with regard to their potential importance for promoting adaptation at the neighbourhood scale. The associated actors need to be involved with the varied actors at different scales, to address their importance as a bonding party and as a changing one that can connect and change the development process, particularly when it comes to the actors from the governance as a top-down process and the local community as a bottom-up process. Once again, the major difference will be to decide whether the agency— once provided with existence, figuration, and opponents—is treated as an intermediary or as a mediator. In both cases, the outcome of the actor's account will be deeply different (Latour

2007). Latour argued that agencies are always presented in an account as doing something that is making some difference to a state of affairs, involving transformation.

2.4 Resilience and Adaptive Capacity as Main Integrated Concepts to Build Adaptation

It has been demonstrated that adaptation depends to a great extent on the adaptive capacity or the adaptability of any context to CC (Grothmann and Patt 2005). The term 'Adaptive Capacity' has proliferated in recent years through its use in the context of CC, mainly in conjunction with the term 'adaptation' (Engle 2011). However, there are many definitions and studies about adaptive capacity, as indicated in the literature studies. It is argued that the influences of adaptive capacity are considered when assessing the potential for adaptation to future CC (Vincent 2006).

The 'Adaptive Capacity' is defined as the '*the potential or ability of a system, region, or community to adapt to the effects or impacts of climate change'* (Smit and Pilifosova 2001, p. 879). It is most commonly related to the ability of a system to evolve in order to accommodate environmental risks or policy change and to expand the range of variability with which it can cope (Kim and Chung 2013). The strategies for addressing adaptive capacity are necessary, and these actions are applied to enhance the coping capacity of the systems and its coping extent (Brooks and Adger 2005).

However, with the importance of the adaptive capacity, there is still a lack of clear measures found in the literature for the promotion of adaptation in various contexts, particularly with the community scale context. However, in the literature, resilience appeared to be a vital approach for the management of change and for the promotion of adaptation. There is a growing set of studies that rigorously explore how resilience is connected to other key concepts which appear within the CC literature, particularly including sustainability and adaptation (Leichenko 2011).

Resilience thinking (resilience theory) is one of the major conceptual approaches in environment literature when it comes to dealing with change (Chapin et al 2009), at multiple levels of an organisation, from local to global (Gunderson and Holling 2002). For instance, it is argued that where addressing communities' resilience, the ways that these communities are being prepared requires enhancement at household and individual levels, to include all members of the communities (Sharifi and Yamagata 2016, 2018).

Chapter 2: Literature Review

Resilience is considered as an essential basic concept for adapting to climate change, because it explores the system's flexibility, and in particular during times of change (Platts-Fowler and Robinson 2013). Resilience is associated with the adjustment in its characteristics, to better adapt to stress and potential harmful impacts (Pahl -Wostl 2007). This issue is very important in the context of the increasing pace and magnitude of the impacts anticipated under CC. Where there is no focus on addressing such impacts, this could expose historic planning and management practices to potential risks, and as result, could cause a lack of security for people and their built environment (Bierbaum et al 2013).

It is acknowledged that resilience has become a central concept in delivering effective adaptation to CC and building adaptive capacity in various contexts. However, despite the abundance of research on resilience, there is still no single, widely accepted definition for it (Sharifi and Yamagata 2014). Most definitions of resilience are linked to the ability to prepare for CC through characteristics or strategies. Resilience is, however, not a new concept. Indeed, in 1973 Holling argued that resilience is connected with the various systems' abilities to withstand perturbations or shocks. As a concept it represents a profound shift in traditional perspectives, which attempts to promote changes in systems towards sustaining and enhancing their capacity to adapt to uncertainty (Adger et al 2005).

The application of resilience has received increased attention in current literature. A common viewpoint put forward raises the importance of addressing resilience as a central matter, saying that:

> *The need to account for resilience in a world of transformations is a perspective that should become embedded in strategies and policy of the World Summit on Sustainable Development and recognized in the next phases for implementation of Agenda 21* (Folke et al 2002, p 440).

Therefore, both resilience and adaptive capacity are strongly linked. This agrees with the demonstration of Cutter et al (2008), describing resilience as a concept that is interconnected with provision of characteristics or strategies that exist at the core of the adaptive capacity process. There is a strong relationship between the two concepts.

As Folke et al (2002) demonstrated, resilience is related to the degree to which the system can build capacity for adaptation and as such, there is a strong relation between the two

concepts. Engle (2011) indicated that the greater the adaptive capacity within a system, the more the likelihood that the system will be resilient in the face of Climate Change.

While the literature provides examples of strategies that are construed to build resilience, there is no clear connection between the definition of resilience and the required actions or characteristics that enable building and evaluating resilience (Tyler and Moench 2012). In other words, more focus is needed to demonstrate the process of building resilience to promote adaptive capacity towards climate change, or vice versa. In the literature, however, this relationship has been differently indicated, where analysis of adaptive capacity has been related to the development of robust strategies for adaptation in addressing the flexibility of strategies that systems adopt towards the changing condition (Engle 2011; Krasny and Tidball 2009; Fleischhauer 2008). Improvement strategies and methods in Adaptive Capacity are required in order to promote the adoption of resilience (Adger et al 2011).

Further, for the most part, resilience studies have linked adaptive capacity with ideas such as governance and institutions, and while it has also been evaluated in relation to physical assets and disaster contexts by Pelling and Manuel-Navarrete (2011) and Bahadur et al (2010), the social context is typically the focus. For example, studies have associated resilience with communities and understanding their resilience through bonding with the physical resources and management (Hughes 2003; Graugaard 2012; Engle et al 2014; Hallegatte and Engle 2019).

Therefore, as resilience is important to enable adaptive capacity towards climate change, this research should be informed by examples from the literature of the strategies and actions that integrate both resilience and adaptive capacity. Resilience and adaptive capacity are thus found to be strongly related, where both can build and promote adaptation to climate change through strategies or characteristics that are applied to advance adaptation. These are areas in need of further exploration. In this research, it is argued that the integration of both approaches can be effective in developing a framework that is appropriate for the investigation of adaptation.

2.4.1 The importance of Adaptive Governance & Resilience in Governance and Community Levels

It has been demonstrated earlier that the importance of governance and community levels and their connection through actors in promoting adaptation to climate change should be

acknowledged. Therefore, the application of approaches that aim to promote adaptation in these three aspects is essential.

Governance is considered important in promoting adaptive capacity as it is an example of a driving force of adaptive capacity (Vincent 2007). Addressing effective strategies and implementation routes for adaptation means the utilisation of various strategies to implement and enhance the governance process and their outcomes. The adoption of adaptation strategies in governance or, as it is called in the literature, 'Adaptive Governance', is essential in addressing the building of a system's adaptive capacity (Folke et al 2005). Adaptive governance is considered to provide a vehicle for putting resilience theory into practice (Garmestani 2013). Therefore, adopting adaptive governance can be regarded as an important factor in promoting resilience.

However, there are still many gaps in the literature, regarding designing governance processes and strategies to build resilience, particularly in the context of CC impacts and disasters, as well as the implementation of adaptation strategies in the decision-making context (Djalante et al 2011; Cutter 2016). This includes determining who the key actors are, what their roles are in developing neighbourhood strategies, their collaboration experiences, project outcomes and the lessons to be learnt from these (Stevenson and Petrescu 2016).

The main focus on adaptive governance is associated with the ways developed by the various institutions to address the community's needs and priorities, in order for these communities to be able to adapt along with their changing environment.

As illustrated earlier, both the governance and community levels are important when building resilience and adaptive capacity to CC. Therefore, it is important to build adaptive governance, which is essential for advancing community resiliency and adaptation. In order to enable adaptation to CC governance to improve community development, a focus on resilience is essential (Engle et al 2014). Therefore, examination of existing literature on both adaptive governance and resilient communities is essential to explore the main characteristics that enable their success. However, they should be addressed together. In other words, what makes a community resilient as a delivered outcome, through the adaptive governance process actions/characteristics, needs to be investigated in both contexts.

In existing literature, the focus on resilience at the community level is being increased. It is argued that community resilience requires that local communities themselves be capable of

adapting to the variable impacts of CC and its associated potential risks (Roberts 2010). It is recognised that resilience arises from interactive processes across multiple levels of functioning, including social interactions with the local communities (Brown and Westaway 2011). Therefore, community resilience is significant for building the applied strategies in resilience towards adaptation, in particular, in neighbourhoods (Eisenman et al 2016). The set of ideas from the emerging community resilience literature examining community health and development can help develop an enriched and integrated concept of community resilience, and inform new research directions and practice (Berkes and Ross 2013). In the literature, the characteristics or strategies that promote community resilience are called community resilience factors.

However, in order to address adaptive capacity and resilience it is important to understand the different capability of the various actors and interventions that exist to promote adaptation and to reduce the adverse impacts of CC (Vincent, 2007), in both governance and community. It should be said that investigating the resilience of any system cannot be addressed without considering the interconnection among the involved actors.

Therefore, it is necessary to consider the integration of other factors of the adaptive governance and the role of the intermediaries, as representatives for sustainable development targets.

The interaction among the actors or networks is an essential matter that should be part of the resilience and the adaptation process (Walker et al 2004). It is argued that the actions of actors/organisations influence resilience, either intentionally or unintentionally (Walker et al 2008). It is considered that addressing resilience across human development is an important aim or target to be approached by these networks/organisations that are called 'intermediaries' in order to understand the environmental changes (Brown and Westaway 2011). Therefore, it seems crucial to investigate the roles and aspects associated with the intermediaries.

As sustainability is important in the context of CC adaptation, it is vital to explore the integration of the intermediaries' theoretical approach with both the adaptive governance and resilience community factors and then extract the characteristics that lay at the basis of each approach. Accordingly, in order to promote social adaptation to CC, the integration of resilience, adaptive capacity in the governance and community levels is necessary, in addition to the integration of the actors that enable the process of sustainability and adaptation strategies to be achieved. The next sections present the three approaches that are indicated

in the literature in relation to governance, community and intermediaries and facilitating adaptation processes. The definitions of each approach and their main themes are presented and discussed.

2.4.1.1 Theory one: Adaptive Governance

Adaptive governance is a form of governance that incorporates formal institutions, informal groups/networks, and individuals at multiple scales for the purposes of collaborative environmental management (Folke et al 2005).

> *Adaptive governance refers to the evolution of rules and norms that better promote the satisfaction of underlying human needs and preferences given changes in understanding, objectives, and the social, economic and environmental context (Hatfield-Dodds et al 2007, P4).*

Important themes are indicated in the literature for promoting adaptive governance (Folke et al 2005) as follows:

- **Extended collaboration process** and support for the inclusion of multiple parties or actors in the process of adaptation of governance;
- **Build knowledge and understanding** of the actions associated with adaptation strategies and the feedback;
- **Continuous monitoring and evaluation** to enhance adaptive responses, acknowledging the inherent uncertainty in complex systems;

  Develop capacities when dealing with the CC and their impacts.

Climate information and adaptation strategies are adopted and used in decision-making throughout the governance system. It is essential to organise plans that aim to manage adaptation for both communities and the built environment (Sharifi and Yamagata 2016). Further, Garmestani (2013) illustrates that adaptive governance requires the capacity to learn to manage for resilience.

It is important in the context of governance, in relation to the theme of engagement and collaboration, to think of the relationship between the actors' roles and their collaboration with the planning and implementation of effective strategies in association with CC and adaptation. There should be cooperation between the local actors and the institutions and decision-makers to coordinate the adaptation polices and strategies adopted by both the former and latter parties (Agrawal 2008). In this regard, understanding the roles and

responsibilities of the various actors could be of significance when it comes to the realisation of the relevant levels of the strategies.

For this research, the four themes indicated by Folke et al (2005) and in the wider literature represent the theoretical basis for the adaptive governance process that is adopted for building and evaluating adaptive capacity and resilience. These themes actually form the principles upon which Folke builds a theory of adaptive governance and are essential for building adaptive governance in various communities, where building knowledge and awareness of the environmental changes are important for learning and adapting (Lebel et al 2006). This requires extensive collaboration between actors from various institutions. Nevertheless, the governance structures and their roles are still in need of further clarification in the CC context (Dewulf and Termeer 2015), and; in particular regarding the level of action taken by local government and national policies (Vignola et al 2009; Roberts 2010), as well as in relation to focusing on decision-making processes and including policymaking and planning (Westman 2017).

Then, continuous monitoring and evaluation to enhance adaptive responses are vital components in addressing successful governance processes as indicated by Folke et al (2005), through access to reliable information (Cundill and Fabricius 2010). Finally, the focus is on developing possible actions in response to environmental change linked with the longer-term well-being of the community (Chaskin 2001; Brown and Westaway 2011) and to strengthen the capacity of societies to manage resilience (Lebel et al 2006). Well-being is a process as well as an outcome, part of which is associated with having a good life and material welfare and living standards (Brownand and Westaway 2011). These living standards are irreplaceable factors in resilient neighbourhoods

Table 2.1: Themesof Adaptive Governance theoretical approach

Adaptive Governance theoretical approach	
Themes	**Sources**
AG-1: Extended collaboration process AG-2: Build knowledge and understanding AG-3: Continuous monitoring and evaluation AG-4: Develop capacities with CC impacts	Folke et al 2005, Lebel et al 2006, Agrawal 2008, Cundill and Fabricius 2010, Garmestani 2013, Dewulf and Termeer 2015, Sharifi and Yamagata 2016, Westman 2017

2.4.1.2 Theory two: Resilient Communities

It is acknowledged that in order to promote adaptation to CC, it is vital to integrate preparation strategies within targets for sustainability development (Engle et al 2014). The understanding of the relationship between the performance of sustainability tools and resilience potentials for communities is still a very limited issue. The resilience of groups and communities has gained the attention of researchers across academic literature studies, yet the scale of analysis for much of the existing assessments has focused on the city level or higher (Kowk et al 2016).

A community's resilience is often understood as the capacity of individuals or groups within a community to work together toward a communal objective, and a community with individuals who are personally resilient in the face of CC impacts is likely to be resilient as a community as well (Berkes and Ross 2013). This requires understanding of whom the community consists of and then the role of local communities and their connection with the organisation responsible for adaptation.

There is an increasing need to evaluate the underlying drivers of community resilience (Kowk et al 2016). At the community level, essential factors in the promotion of resilience in communities are effective engagement, knowledge, adaptive behaviour and well-being, as indicated in the literature studies by Tompkins and Adger (2004), Chaskin (2008), Chandra et al (2011), Poortinga et al (2012), Platts-Fowler and Robinson (2013), Singh and Butler 2015, Apostolopoulos et al 2018.

The community's preparations to adapt are related to their feeling of providing a supportive environment and having better well-being in their neighbourhood, where the constituent community individuals need to feel that they live in a neighbourhood where a healthy and supportive environment exists, to make them better prepared for the impacts of CC (Singh and Butler 2015). It is acknowledged that there is a need to develop a strong and integrated concept of community resilience, and inform new research directions and practice regarding well-being and health that facilitate community interactions with the physical adaptive capacity of the built environment (Kamoto et al 2013; Paton and Johnston 2017).

Platts-Fowler and Robinson (2013) argued that in order for communities to become able to adapt and be resilient, there are themes that need to be addressed, such as the following:

Nature of Community: This includes whether there is a shared notion of belonging and identity, regarding the shared notions including, belonging and identity, engagement, participation, and interests (Platts-Fowler and Robinson 2013) and engagement at the community level, including a sense of cohesiveness and neighbourhood involvement or integration (Chandra et al 2011).

Community adaptive behaviour towards their facilities and built environment: Changes in behaviour to promote uptake of adaptive behaviour are not limited to the role of the governments only, but also involve the communities' individuals, through their actions to address responsible adaptive behaviour for resource management (Tompkins and Adger 2004). Under the local context, individual-level preparedness and ability to adapt are also important (Chandra et al 2011), including natural and built resources, services, amenities and facilities, community sector infrastructure and opportunities for engagement and voice, and physical environment, such as facilities and amenities and service provision (Poortinga et al 2012;Platts-Fowler and Robinson 2013 ;Paton and Johnston 2017).

Community well-being: Community health and access to high-quality health services (Platts-Fowler and Robinson 2013; Chandra et al 2011; Pecl et al 2017; Paton and Johnston 2017). Well-being is important for addressing community resilience, and linked to human capacity (Chaskin 2008), and in creating healthy individuals able to adapt (Choguill 2008).

The definitions included in the literature are more likely to have referred to well-being at the individual level or at the national level but are still ambiguous when explaining well-being at the collective level of a community (McCrea et al 2014). Therefore, this issue is still in need of exploration, particularly in relation to resilience. Certain limitations are indicated when it comes to the exploration of links existing between well-being and resilience as a framework (Armitage et al 2012).

Table 2.2: Themes of Resilient Communities theoretical approach

Resilient Communities theoretical approach	
Themes	**Sources**
RC-1: Nature of Community RC-2: Community adaptive behaviour towards their facilities and built environment RC-3: Community well-being	Tompkins and Adger 2004, Chaskin 2008, Choguill 2008, Chandra et al 2011, Poortinga et al 2012, Platts-Fowler and Robinson 2013, Singh and Butler 2015, Pecl et al 2017, Paton and Johnston 2017, Apostolopoulos et al 2018.

2.4.1.3 Theory three: Intermediaries

It is acknowledged that the term 'intermediary' comes from Actor Network Theory, in association with the concept of transportation of the meaning without transforming it, in which the definition of the inputs is sufficient to define the outputs (Latour 2005). It is also acknowledged that, as demonstrated in ANT, the role of intermediaries can be extended to constitute the role of mediator as well. Moss (2009) demonstrated that this latter role is important and relates to changing attitudes, building trust, networking actors and influencing policy priorities. Their roles range from advisory groups and information campaigns examining resource use or pollution, to training and educational programmes for targeted consumer groups (Moss 2009). Also, they involve creation and facilitation of new networks, configuring and aligning interests and identification by management of human resource needs in relation to their skills and behaviour (Bird and Barnes 2014).

To understand the role of intermediaries as both intermediaries and mediators, these two roles are explained below.

- **Intermediary's Role in Facilitating Knowledge Transfer**

It is seen that the ability to shape relationships within the networks of planning regulation have been shown to depend on the role of planning documents as intermediaries and the potential they offer to govern at a distance (Rydin 2012). It is argued that intermediaries can play a role in supporting and enabling the development processes and policy (Bush et al 2017). and through enabling the community to effectively participate in community development (Singh and Butler 2015).

In order to be able to take over an intermediary function in community development, it is crucial for trust to be present between all parties, with the administrative and decision makers on one hand and the local community on the other (Fehren 2010). Their role, as demonstrated according to Latour theory, is important in passing on information to many actors in the development and decision-making processes. Their role in facilitating dialogue to bridge the gaps among the actors is important (Moss et al 2009). One stance is that consultants act as intermediaries, where their primary purpose is to provide expertise to implement specific functions without longer-term commitments (Hayes and Westrup 2014).

As Hinkel et al (2009) argued, the communication process among the actors is more important than the information they share, regarding CC. However, that does not mean that the information is not crucial for adaptation. On the contrary, any limitation in the information is considered an important factor that influences adaptation and the formulation of decisions by the various actors. It is also acknowledged that many of the intermediaries studied operations across different levels of social organisation, from the household level to the region level and beyond (Moss et al 2009). As Gustedt (2000) has argued, intermediaries in the field of regional development can be distinguished not only by their organisational form but also in terms of their functions including mediating, informing, connecting and coordinating, and the stage of their development.

- **Mediator's Role in Making Changes**

The term "mediator" refers to the course of actions that is overtaken by the agencies, but it is sometimes used instead of intermediary to distinguish between the more neutral trans-ference implied by being an and the more unpredictable activities of a mediator (Latour 2005).

A mediator role is important, as it constitutes, recreates and modifies social relationships (Rydin 2006). Mediators are important in shaping the development process and the outcomes of the development (Latour 2005). For instance, consultants are considered valuable mediators with important roles in creating new ways or methods to do things related to the development process and social relationships, as well as re-shaping the development process and, when possible, enhancing the delivery of the outcome (Hayes and Westrup 2014).

Therefore, the role of intermediaries as mediators, as Moss et al (2009) illustrate, is important in their provision of guidance, lessening gaps, and making enhancements through interactions among various actors. Therefore, intermediaries have important roles in transferring information without changing it, whereas when the intermediaries are acting as mediators, their roles constitute changing and modifying the information, which as a result makes the outcome changeable and unpredictable (Latour 2005: 37-42). For instance, in universities, the role of mediators is important through the mediation between the various actors, involving recreating and modifying social relationships (Yaneva 2009).

Accordingly, the role of intermediaries is not very tangible when compared with the role of mediators, in which the latter have the role of mediating between the people who have formal roles and those with informal roles (Jones et al 2016). This is because the role of intermediaries is concerned with passing information and the process of maintaining networks, which are essentially created by mediators. Thus, mediators are important participants in setting plans and establishing the conditions needed in the various development processes. For example, this is seen in association with the application of the technological decisions and plans, where the role of intermediaries is related primarily to changing attitudes, building trust, networking stakeholders, influencing policy priorities, or bridging discourses (Moss et al 2009).

2009).

Table 2.3: Themes of Adaptive Governance theoretical approach

Adaptive Governance theoretical approach	
Themes	**Sources**
I-1: Intermediary role in facilitating knowledge I-2: Mediator role in making changes	Gustedt 2000, Latour 2005, Yaneva 2009, Moss et al 2009, Fehren 2010, Rydin 2012, Bird and Barnes 2014, Hayes and Westrup 2014, Jones et al 2016, Bush et al 2017

These three approaches and their related themes are important in the promotion of adaptation to CC in the social context. There is, however, a need to investigate each theme and what it entails, in theory and practice, to influence social adaptation to CC. These three theoretical approaches and the themes are integrated to promote social adaptation to CC at the neighbourhood scale, as figure (2.2) shows.

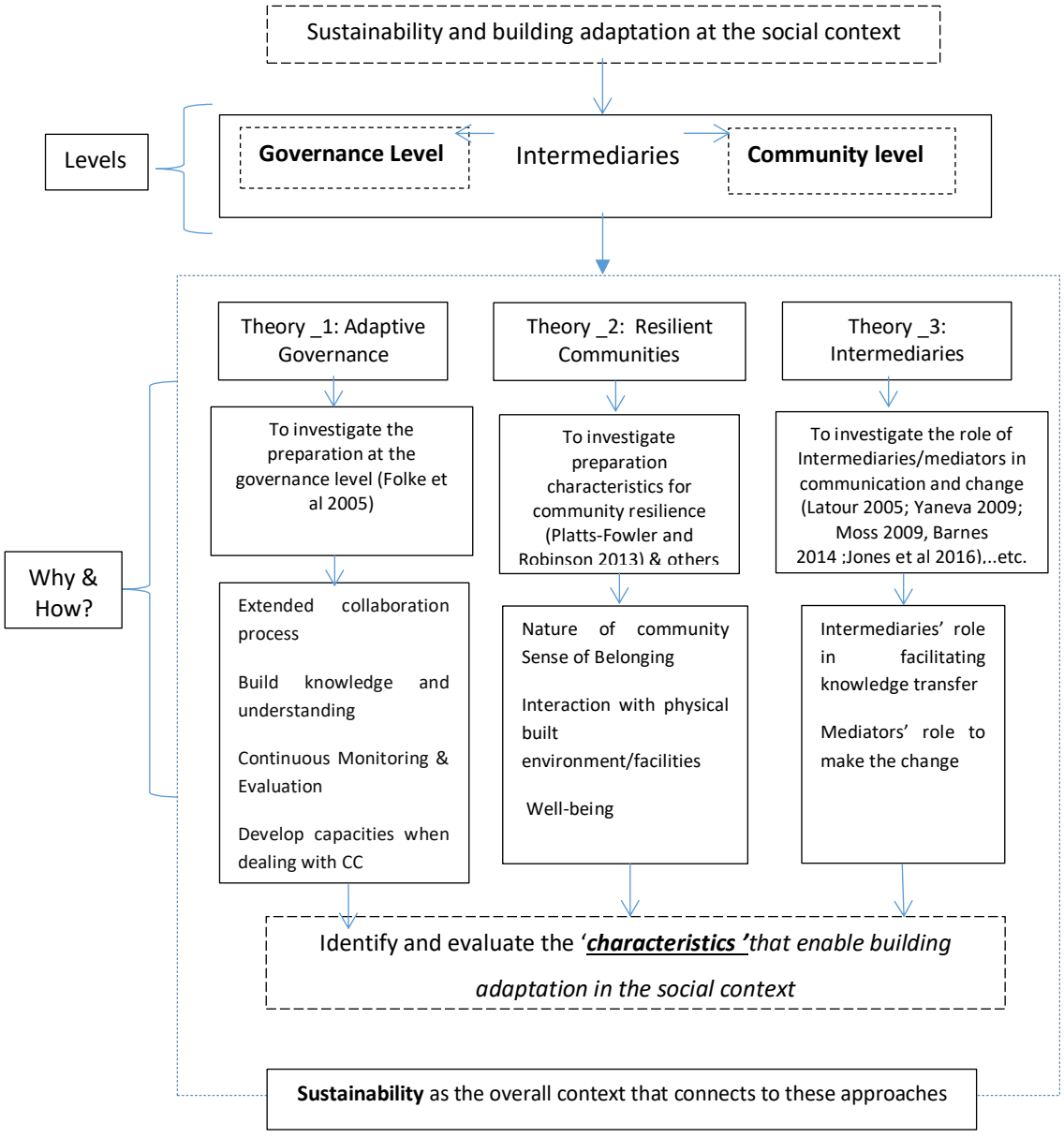


Figure 2. 2 the Integrated Approach to promote social adaptation to CC at the neighbourhood scale

2.5 The Identification of Characteristics for the Three Theoretical Approaches to Promote Adaptation

As mentioned earlier, the themes that enable adaptation in the social context are based on the integration of the three theories of Adaptive Governance (AG), Resilient Community (RC) & Intermediaries (I). This section of the chapter will consider their operational contents, named as 'characteristics', in order to enable the investigation of social adaptation in this research.

It is argued that resilience characteristics are needed for the adaptation process, acting as operational criteria to be adopted in the policy and decision-making actions of the development process (Wardekker et al 2010). However, despite the importance of resilience, there is no clear connection between the definition, or inherent qualities, of resilience and the required action (Tyler and Moench 2012). It is also crucial to consider adaptive capacity as an approach for addressing adaptation to CC through the initial planning and the delivery of the outcomes in the development process. Also, for effective preparation and response to CC, continuous assessment of the strategies or actions that address resilience is required (Ebi and Semenza 2008). This process of evaluating adaptive capacity is important and it should lead to the use of measurement approaches or methods that are clear and feasible for the users (Williamson et al 2012). In the next section, the characteristics of the three theoretical approaches and their themes are presented.

It should be said that for the demonstration of the characteristics in this chapter, water is selected as the main sector that is directly influenced by CC impacts. Water was selected as the main sector in order to illustrate the characteristics that are being explored in a consistent manner regarding the investigated theories. The other sectors such as energy, transportation etc are as important as water, but are not considered here, because the main focus is not on comparing these sectors, and instead the aim is to demonstrate the main characteristics that influence CC adaptation in the governance and the social context. However, water is very important for the context of CC adaptation. It is acknowledged that the greatest climate change impacts are likely to be felt in the water sector (Elala 2011). These impacts are particularly notable when it comes to the effects of temperature and precipitation (Bates et al 2008, Hanjra and Qureshi 2010) from higher temperatures, reduction of snow cover, rise in sea level, more tropical storms and heavy rains, and frequent

summer heat waves and droughts. CC brings the major challenges and impacts of climate change on water availability and quality, and will likely threaten sustainability and increase risk for existing social and ecological systems (Engle and Lemos 2010).

2.5.1 Adaptive Governance Theoretical Approach

Four themes are considered important to this approach, as discussed below.

AG-1: Extended Collaboration Process

It is acknowledged that adaptation research has focused on the provision of guidance for decision-making by identifying comprehensive principles for governance and institutional design for successful adaptation (Oberlack 2017). It is argued that building adaptive governance that feeds adaptive management[2] processes requires the sharing of power and responsibility between user groups or communities, and government agencies and nongovernmental organisations that exist and operate as social networks, often in an ad hoc and flexible manner (Boyd and Juhola 2015). Such an extended collaboration process is assumed to have a higher adaptive capacity and to be less vulnerable to disturbance (Pahl-Wostl 2009).

Wide-ranging participation and multi-level interactions among the various participants can positively contribute to the generation of physical strategies needed for the management process. Such multi-level interactions across the various administrations/organisations are vital characteristics of environmental governance regimes (Pahl-Wostl 2009). In contrast, disconnected relationships among actors impede openness and the extent to which various actors are able to express their true ideas and concerns (Gargiulo and Benassi 2000). Collective decisions implement effective management through extending the involvement of the actors and through combining bottom-up and top-down governance approaches for both formal and informal situations (Pahl-Wostl et al 2007). These demand attention towards the multiple actors that interact in a direct way or through mixed methods in governance, including the business sector, public–private partnerships, civil society organizations and

[2]Adaptive Management is a method mainly associated with the conservation of resources, and relies on making learning a priority in the stewardship. It is grounded in the basis that humans do not know enough to manage their environment or the ecosystem. However, Adaptive Management is still by far associated with more theoretical concepts than practical implemented strategies, particularly regarding the development of knowledge and learning required for the behaviour of humans to adapt with their environment (Lee 1999).

community groups, and other various networks of actors who routinely change urban trajectories (Broto 2017).

Governance studies suggest that the involvement of poor and marginalised groups in decision-making, monitoring and evaluation is a key characteristic of a city intent on improving the conditions for those living in informal settlements or living in exposed locations (Tanner et al 2009). The role of local institutions in adaptation to CC is therefore very important and is associated with the extent to which social groups are capable of accessing resources (Agrawal 2008). Regarding this, Ivey et al (2004) argued that effective management systems within institutional organisations (in terms of transparent, solid and thorough roles and duties of local governmental organisations) influence the extent to which suitable adaptation strategies are available to the decision-makers based on their roles and duties, as well as the way that the local community influences adaptation strategies, how the nature of the community is understood and how the local water managers and developers understand the community priorities, and the extent to which these managers consider the community as a legal part of decision-making. Despite this, the importance of government in advancing adaptation decisions must be seen in the context of face-to-face local interactions of community, the latter not being a substitute for effective government, but rather a complement (Bowles and Gintis 2002).

The role of specific parties in the preparation of this collaborative process, the role of policy/administrative parties in inviting the various actors and with the provision of structured scenarios for the purposes of linking with the active adaptation process is a substantial matter (Folke et al 2002). For example, in water management, it is acknowledged that despite the importance of the role of the bottom-up governance approach towards adaptive water management, the role of the authority must be central, in order to support and set the requirements for the participatory process. This will also provide routes and methods for local individuals, organisations and professionals to access relevant information and knowledge. This is particularly true in the context of complicated and diverse development, for instance river basins (Huntjens et al 2011). Therefore, the role of institutions is essential in the adaptation process and it is acknowledged that the institutional barriers are opposite actions of adaptation criteria associated with specific properties of institutions (Oberlack 2017).

Accordingly, based on the literature, Table 2-4 shows the two main characteristics of this theory.

Table 2.4: Characteristics to enable AG-1: Extended Collaboration process

AG-1: Extended Collaboration Process		
Characteristics		**Source**
C.1	Broad decentralisation of decisions for effective management	Pahl-Wostl et al 2007, Boyd and Juhola 2015, Lund 2015, Broto 2017
C.2	Local institutional support	Ivey et al 2004, Folke et al 2005, Pahl-Wostl 2009, Oberlack 2017

AG-2: Build Knowledge and Understanding

It is recognised that responses to CC require not only local knowledge awareness but also a translation of information into a learning process (Schmitt 2010). Without this awareness, any proposed adaptation scheme may face resistance. The knowledge level is associated with the availability of climate information and the manner by which scientists and relevant professionals provide climate information and data.

For example, increased knowledge of water resource management through the wider collaboration process is a positive change, and is closely associated with an increase in social learning among the varied actors. This has been based on the incorporation of the knowledge from various disciplines (Medema et al 2008) and will be useful in generating new ideas and alternatives for water policies and strategies. The availability of methods for evaluating and comparing the alternatives will deliver better results for management (Pahl-Wostl 2006). This will also lead to an increased possibility of selecting the appropriate scenario under any condition and decreasing the ambiguity of the physical, social or integrated systems.

The inclusion of a wide range of professionals is highly important in providing credible, scientific and intelligent governance processes, polices and adaptation targets (Georgakakos et al 2012). Furthermore, it is important that the availability, quality and accessibility of data on the physical actions to adapt to CC impacts and potential risks must itself be appropriate for all of the various actors (Ivey et al 2004). For instance, hydrologists can play an important role in increasing awareness through discussions with students, business groups,

corporations and communities, conferences as well as other public awareness raising actions, in order to minimise the impacts of CC on water resources (Misra 2014).

The adaptation in governance strategies should constitute the production of a clear understanding of previous impacts and future predicted impacts as well (Medema et al 2008). This knowledge-building process requires the development of shared ways of communication among the various professionals as a key matter, including approaches to enable the incorporation of marginalised people into the management or decision-making process, to address equality and enable the necessary power shift (Ensor and Harvey 2015). Thus, this would enable different groups to learn and increase their awareness of their biophysical environment and the complexity of social interactions. This does not imply that a consensus must be achieved, but what is required is the development of a minimum level of trust and openness as a basis for transparent and efficient communication.

It is argued that when participants realise and accept each other's roles and responsibilities, and are ready to direct their endeavours to responsible agencies, the possibilities for functional responses and actions are improved (Ivey et al 2004). It is acknowledged that the complex problems that are associated with CC require learning as a main strategy (Ensor and Harvey 2015). The capacity for learning has long been understood as an integral part of resilience thinking, and the adaptive capacity that is being addressed here also requires that social learning be established in the social networks among the participating actors (Tschakert and Dietrich 2010). Addressing social learning among various actors through the sharing of knowledge is a vital issue to be addressed through the various actors' incorporation and not a single party. Social learning, in river basin management, for example, needs to develop and sustain the capacity of different authorities, experts, and local communities to address the long-term management process and the adaptive capacity for the social-ecological system as a whole (Pahl-Wostl et al 2007). Further, social learning[3] should be an organised process and not randomised, even with the multi-organisational style that adaptive governance can take (Medema et al 2008).

'The process of becoming more able to adapt can itself be a learning process, if we consider on-going adaptation to be part of the everyday behaviour of the system in question' (Peling and High 2005, P7). This happens where system understanding, action, and evaluation are

[3]Social Learning refers to sustained, i.e. decade-long, processes of attitudinal and behavioural change by individuals in social environments through interaction and deliberation.

updated and refined every time new information exists (Tschakert and Dietrich 2010). Without a doubt, committing to a learning process that aims to enhance anticipatory and adaptive capacity requires knowledge to be accessible for those who need it most, through carefully designed yet flexible, iterative learning-reflection that is tailored to real day-to-day risks, and allows for experimentation in practice and offers tangible and short-term results (Tschakert and Dietrich 2010).

Furthermore, improved knowledge of the nature and pace of CC and its impacts can be useful for enabling communities to understand their points of weakness and help them to identify appropriate responses to prevent future impacts, such as water shortages in the context of the water system. However, understanding local water systems and users, fostering local partnerships, identifying alternative pathways for response, and establishing transparent institutional arrangements at lower- and upper-tier levels will be critical in translating knowledge into action in local communities (Ivey et al 2004). Therefore, it is important that local knowledge from local communities is integrated in order to provide access to information. It is acknowledged that sufficient knowledge and access to relevant information is essential for actors that are participating in the decision-making processes of development (Brugnach 2017).

Engaging with communities is a central part of good governance because this can help to address certain problems that cannot be handled either by individuals acting alone or by markets and governments. It is argued that a pressing need exists to engage with the diversity of everyday lives. Whether differences in values, assumptions and views are visible or hidden, they will, ultimately, come to bear on the effectiveness and fairness of climate change responses (Romero-Lankao et al 2018). Thus, addressing the knowledge of local communities and their role in decision-making is highly recommended, but demands understanding the social relationships among the communities themselves and how this affects the level of knowledge and information production. On building adaptation, '*It requires strengthening the role of local community, and that the national policymakers empower local and indigenous communities to facilitate adaptation processes through taking the local traditional knowledge into consideration'* (Vignola et al 2009, P5). It is acknowledged that the participation of local communities in decisions that are associated with adaptation to CC is important to confirm that the needed strategies are implemented through enforcing the role of communities, as the latter will have a better position in their community and their environment, and be more influential and supportive to the adaptation process (Brugnach 2017).

Therefore, incorporating local communities can be useful in ensuring that their opinions and needs are integrated and communicated in order to deliver better outcomes for them. Adopting communities-based adaptation is a statement of how local development contexts are important in the experience of risk, and a demonstration of how participatory techniques and deliberation of different sources of knowledge can lead to more successful outcomes (Forsyth 2013). This involves the inclusion of information or knowledge of the local community in the decision-making, which can be considered a very worthwhile intention for CC adaptation (Aalst et al 2008). Participation in the development process by indigenous people in particular is important in providing development of indicators for CC, as the focus on the experts' knowledge regarding these problems will mean knowledge about CC problems would be lacking (Brugnach 2017).

Since the adaptation process at the urban level is highly dependent on and affected by the cooperative act and behaviour between the community individuals and the administrative level, this leads to various opinions and options resulting within these local collaboration process (Tanner et al 2009).

Accordingly, based on the literature, Table 2-5 shows the three main characteristics for this theme.

Table 2.5: Characteristics to enable AG-2: Build knowledge and understanding

AG-2: Build Knowledge and Understanding		
Characteristics		**Source**
C.3	Focus/incorporation of information and understanding the impacts of CC & potential risks	Folke et al 2002, Bowles and Gintis 2002, Ivey et al 2004, Medema et al 2008, Misra 2014
C.4	Shared/participatory ways of knowledge	Pahl-Wostl et al 2007, Tschakert and Dietrich 2010, Forsyth 2013, Ensor and Harvey 2015
C.5	Consider the physical performance of facilities regarding the water strategies	Ivey et al 2004, Pahl-Wostl et al 2007, Medema et al 2008, Brugnach 2017

AG-3: Continuous Monitoring and Evaluation

Continuously monitoring and evaluating the outcomes and linking them with potential goals (Plummer et al 2012) should be the approach adopted for components of any context that aim to address adaptation. It is acknowledged that monitoring and feedback are considered as key characteristics to be considered when addressing the improvement of lives of communities under any potential risk or impact (Tanner et al 2009). However, addressing the

monitoring of governance to address adaptive capacity is a particularly challenging matter. Monitoring is an important method in community or human studies, and can vary in focus, method or technique (Conrad and Hilchey 2011).

For the linkage among the fields of ecological knowledge, for instance, into adaptive governance practices, it is acknowledged that successful management is characterised by continuous testing and monitoring to enhance adaptive responses, acknowledging the uncertainty inherent in complex systems. In order to achieve sustainability, it is vital to incorporate climate risk and disaster management into the local development policies, allowing adaptation to these risks to be addressed (Uitto and Shaw 2006).

It is argued that risk indicators need to be rooted and linked more with social consultation, engagement and management (Nkhata and Breen 2010). When addressing adaptive management, continuous monitoring, evaluation and adjustment of policies are needed (Kallis et al 2009). Adaptive governance also addresses this. The evaluation of the outcome of an applied strategy or a decision in the development process is essential for adapting the components and their interaction to various scenarios. However, there is still a challenge in that the governance domain typically consists of national policies that negatively constrain local policies, associated with integrating the short-term solutions into long-term problems (Cash et al 2006). Linking feedback with the performance of the various systems under CC impacts or potential risks is an essential issue. From linking the outcome of these feedbacks loops with performance, whether positive or negative, the system will be transformed into a new condition (Tomlinson et al 2011).

For example, in terms of addressing the adaptation of water, Kiparsky and Gleick (2003) argued that designing local storm water control and drainage facilities is dependent on the monitoring and updating of information regarding rainfall characteristics that relate to depth, duration and frequency, and to connecting this information with the performance and operation of the water system, under various CC impacts. The evaluation process as part of the continuous monitoring programmes is important under various risk scenarios.

Fernandez-Gimenez et al (2008) demonstrated that collaborative monitoring provides massive advantages, particularly for local communities and collaborative monitoring, feedback and re-evaluation leads to shared understanding of the various systems management, fosters social learning and builds community. Currently, there is a growing focus on monitoring and evaluating the associated outcomes with the improvement of climate risk management (Hallegatte and Engle 2019). Therefore, an important part of the

monitoring and evaluation characteristic is the incorporation of community members, as this is important for providing information and feedback. Indeed, communities can sometimes do what governments are not able to, through providing information that relates to their own behaviours, abilities and demands (Bowles and Gintis 2002).

Thus, involving and empowering communities to define their own goals, strategies and monitoring and evaluations will significantly enhance ownership and the participatory development and learning processes (Uitto and Shaw 2006). It is argued that the community monitoring of their facilities is an important aspect in community empowerment. When the local community becomes able to understand the aspects or methods of monitoring, then the communities will be able to manage their facilities, and with time they can comprehend the methods and processes used for evaluating the various decisions that relate to their own development. However, there is still a need to investigate whether the monitoring and evaluation processes lead to effective ways of communicating the problems to the various parties in order to enhance the significant polices and plans and outcomes of the decision-making process (Bennett 2016). Mainly, long term risk monitoring can be vital in creating evidence about environmental laws, for instance legislation associated with the water management process, with the focus on pollution (Likens and Lindenmayer 2018).

Accordingly, based on the literature, Table 2-6 shows the main characteristic for this theme.

Table 2.6: Characteristics to enable AG-3: Continuous testing, monitoring, and evaluation

AG-3: Continuous Testing, Monitoring, and Evaluation		
Characteristics		**Source**
C.6	Monitoring and continuous evaluation of development facilities	Bowles and Gintis 2002, Kiparsky and Gleick 2003, Tanner et al 2009, Kallis et al 2009, Nkhata and Breen 2010, Tomlinson et al 2011, Plummer et al 2012, Bennett 2016, Likens and Lindenmayer 2018

AG-4: Develop Capacities with CC Impacts

In relation to governance, the design and management processes of various facilities must be based on both the environmental or engineering legislations and also related to the demands of the communities who use these facilities, in addition to their satisfaction level (Tyler and Moench 2012).

It is argued that when the delivered context is not in line with the peoples' priorities and essential needs, there is a high possibility that the adaptation process will be unsuccessful (Cannon and Muller-Mahn 2010). For example, when addressing the relationship between the possible health impacts of increases in the frequency and intensity of floods it is important to engage with the main organised party of the professionals who work in public health and infrastructure planning (Ebi and Semenza 2008). Plans for protecting people's lives and enhancing communities' well-being are an essential part of communities' resilience, and this happens through considering the importance of the human needs, rights and well-being of community members when addressing the overall adaptive human system (Tanner et al 2015).

It will be important to strengthen the livelihoods of communities to be better equipped against these impacts. This may be potentially addressed through incorporating opportunities for enhancement of the communities' various needs during the design process and in the development and construction of their homes or neighbourhoods (Schilderman and Lyons 2011). The development site should not increase the local communities' exposure to risks through the creation of unsafe urban hill slopes, coastal or marginal regions (Brownand and Westaway 2011). It is important to include apparent actions and strategies for prevention purposes. For instance, an example of adaptation strategies would be a policy that limits constructing and implementing buildings in flood plains or low-lying coastal areas (Younger et al 2008). Further, it is demonstrated in the various literature about communities and building resilience that the strategies for protecting people's lives during and after disasters should be prioritised in the decision-making process.

However, addressing the well-being of communities does not only rely on creating more safe homes or neighbourhoods, but it also demands the reduction of communities' exposure to risks and increasing their capability to adapt to risks and potential CC impacts, through having programmes for communities' participation and social networks (Schilderman and Lyons 2011).

Accordingly, based on the literature, Table 2-7 shows the one main characteristic for this theme.

Table 2.7: Characteristics to enable AG-4: Develop capacities with CC impacts

AG-4: Develop Capacities with CC Impacts		
Characteristics		**Source**
C.7	Develop possible actions in facilities in response to protection from CC risks	Adger and Brooks 2005, Ebi and Semenza 2008, Younger et al 2008, Schilderman and Lyons 2011, Brownand Westaway 2011, Tyler and Moench 2012, Jacobs et al 2015

2.5.2 Resilient Communities Theoretical Approach

Three themes are considered important to this theoretical approach. The main characteristics are described below.

RC-1: Nature of Community

The nature of community – the feeling of belonging, being connected, of participation and organisation – are important issues that can influence community capacity and resilience. The community feeling of belonging, which is characterised by a high concern for community issues, their environment and services, is assumed to be a dimension of community capacity (Goodman et al 1998, p. 261). The existence of shared and inclusive perceptions of belonging and identity, which provide a basis for the community to come together and act, is an important matter for resilience (Platts-Fowler and Robinson 2013).

Points that influence community organising efforts include a sense of social connectedness and a sense of community among neighbourhood residents (Ebi and Semenza 2008). It is argued that the feelings of attachment are important when trying to influence community resilience, and are influenced by understanding the nature of community.

This process of connection among communities, in social networks, is important and can influence the community feeling of belonging and the presence of a sense of community, and can also influence the process of community preparation for CC scenarios. The community

feeling of attachment to a neighbourhood is considered influential when it comes to resilience, and describes one's connection with their environment (Eisenman et al 2016).

It is argued that communities' resilience requires enhancement of the ways that these communities are being prepared, not only at household level, but at the community level as well (Sharifi and Yamagata 2016, 2018). Community participation is widely believed to be a fundamental element for community resilience (Norris et al 2008).

These issues are important and can give the community a feeling of empowerment and can offer them the ability to be a real and significant part of the adaptation process. For the most part, community empowerment encourages neighbourhood stewardship that can be translated into concrete action, such as physical improvements of the urban environment (Ebi and Semenza 2008). This influences their resilience as a result.

Accordingly, based on the literature, Table 2-8 shows the one main characteristic for this theme.

Table 2.8: Characteristics to enable RC-1: Nature of Community

RC-1: Nature of Community		
Characteristics		**Source**
C.8	Community feeling of attachment to neighbourhood & social engagement	Goodman et al 1998, Platts-Fowler and Robinson 2013, Eisenman et al 2016 Tompkins and Adger 2004, Tanner et al 2009, Heeks and Ospina 2014, Sharifi and Yamagata 2016, Sharifi and Yamagata 2018

RC-2: Community Adaptive Behaviour towards their Facilities and Built Environment

It is argued that the interconnection between the environmental and social elements remains a priority. In order to address the resilience of communities and enable preparation for CC responsiveness it is important that communities attain the required level of performance in terms of adaptive behaviour to avoid systems failure (Silva et al 2012, Tylor and Moench 2012). It is acknowledged that communities' activities and their engagement is important to secure beneficial outcomes from their enticement through their

engagement in activities such as environmental resources usage, harvesting strategies, forests management, flood plains management...etc (Paton and Johnston 2017).

As stated earlier, in principle, the concept of collective action seems to offer one solution to resource management. This can be achieved through expanding the engagement process of local communities and addressing the cooperative behaviour of communities to better cope with Climate Change. Interactions and feedback loops resulting from the implementation of adaptive management plans and processes provide benefits (Tompkins and Adger 2003). It should be said, however, that there is a challenge associated with the integration of the local communities' actions into local policies, which will constrain the ability of the communities to adapt and address management resilience (Cash et al 2006). The potential resources available and ways of operationalisation of resources and mechanisms in a resilience process are the most determinant factors of the final outcomes, with respect to impacts of CC (Sapountzaki 2007). Therefore, the behaviour of the community towards their neighbourhood facilities is an important part of building resilience. Individuals are encouraged to turn inwards toward personal decisions and self-resourcefulness, and this issue relates to lifestyle choices and personal opinions. However, this individualisation is also related to the greater personal responsibility and accountability of behaviour of those individuals (Sapountzaki 2007). Therefore, as a result, the practices of individual social actors have been widely acknowledged as ways of promoting adaptation, and resilience (Sapountzaki 2007).

Thus, local communities must be equipped with the ability to address and implement suitable behaviours (Ivey et al 2004). For instance, regarding water usage, there are also concerns about the adaptation capability of urban communities when it comes to the shortage of water resources as a result of CC impacts, especially as current levels of water consumption are likely to become unsustainable in the long term (Kallis et al 2009). It is seen that personal experience is thought to be a vital matter of risk perceptions, and the perceived likelihood of a risk is found to increase if it has recently been experienced (Spence et al 2011).

Communities who have knowledge of the accessibility of timely information related to risks and disasters can be more able to respond to potential CC impacts and risk, particularly when such information/strategies are needed and adopted by the communities in risk times, such as evacuation routes and transport support (Moser and Satterthwaite 2010). It is acknowledged that the local knowledge of communities is very important and needed to understand the numerous practices that lead to a certain problem that influences CC such as

GHG emissions, and at the same time, it is important to place the measures that face this problem (Brugnach et al 2017).

It is argued that the existence of local resources, which are collectively held or accessible to the community and that can be developed and engaged with, is considered a crucial matter (Platts-Fowler and Robinson 2013). The relationships between resource users at the community level, their access to new technology, and their willingness to change will determine their immediate response to CC risks (Tompkins and Adger 2004).

Accordingly, and based on the literature, Table 2-9 shows the three main characteristics for this theme.

Table 2.9: Characteristics to enable RC-2: Community adaptive behaviour towards their facilities and built environment

RC-2: Community Adaptive Behaviour towards their Facilities and Built Environment		
Characteristics		**Source**
C.9	Increase the level of learning and awareness knowledge	Tompkins and Adger 2004, Moser and Satterthwaite 2010, Brugnach et al 2017
C.10	Effective & responsive behaviour for risks	Plsek and Wilson 2001, Bowles and Gintis 2002, Tompkins and Adger 2003, Tompkins and Adger 2004, Ivey et al 2004, Sapountzaki 2007, Silva et al 2012, Tylor and Moench 2012, Paton and Johnston 2017
C.11	Increased Satisfaction with sustainable physical building strategies	Moser and Satterthwaite 2010, Schilderman and Lyons 2011, Tyler and Moench 2012, Tompkins and Adger 2004, Moser and Satterthwaite 2010, Platts-Fowler and Robinson 2013

RC-3: Community Well-Being

It has been argued that human well-being, survival, and geographical distribution have always depended upon the ability to respond to changes arising from CC (Pecl et al 2017).

> *Adaptation at the community level means being able to maintain (and preferably improve) current living standards in the face of expected changes in climate trends and the intensity and frequency of severe events that may affect people's livelihoods* (Van Aalst et al 2008, P170).

Adaptation to CC requires public-health strategies and improved surveillance (Haines et al 2006). The focus on physical health and the performance of physical facilities and assets is considered essential for human well-being (McCrea et al 2014). It is argued that when the delivered context is not in parallel with peoples' priorities and essential needs there is a high probability that the adaptation process will be unsuccessful (Cannon and Muller-Mahn 2010). Understanding the social perception of well-being is very important in order to understand community resilience. A social understanding of well-being provides a helpful tool with which to identify the restrictions of policy and governance that are too narrowly focused on limited indicators (McCrea et al 2014). Therefore, in resilience literature increased attention has been given on understanding the well-being of individuals or groups within the community. There is an increased volume of evidence that environmental and natural elements are essential aspects for human health and well-being (Paton and Johnston 2017).

McCrea et al (2014) demonstrated (based on the Millennium Ecosystem Assessment (MA) 2005 Ecosystems and human well-being) that it is important to aggregate the basic material needs of health, security and good social relations in order to understand the parts that link to human well-being. This constitutes the level of satisfaction existing with the local place of residence, taking into account attachment to it, the social and physical environment, and the services and facilities (Armitage et al 2012). For instance, health and drinking water supply are two important matters identified by communities and also seriously influenced by CC (Van Aalst et al 2008).

It is argued that well-being at the community level is very important, but the relational and subjective dimensions of the social world remain largely outside the calculus of trade-offs made by policymakers in a conventional socioeconomic analysis (McCrea et al 2014). Therefore, understanding these issues is important for this research, but focusing on economic issues as part of well-being is not included in this study.

There is very limited information available regarding the methods and extent to which CC is likely to affect the well-being of various groups of communities, and further, what the effect of the former might be on the available resources for those communities or their livelihoods (Gentle and Maraseni 2012).

Accordingly, and based on the literature, Table 2-10 shows the main characteristic for this theme.

Table 2.10: Characteristics to enable RC-3: Community Well-being

RC-3: Community Well-being		
Characteristics		**Source**
C.12	Enhanced delivery of human health and well-being	Van Aalst et al 2008, Schilderman and Lyons 2011, Gentle and Maraseni 2012, McCrea et al 2014, Pecl et al 2017, Paton and Johnston 2017

2.5.3 Intermediaries' Theoretical Approach

As illustrated in the sections above about intermediary approach, two main roles are considered important to this approach, and their key characteristics will be explained below.

I-1: Intermediaries' Role in Facilitating Knowledge

It is argued that intermediaries can influence the pursuit of collective goals under shifting governance structures and processes (Moss 2009). Indeed, the intermediaries undertake activities in the development process, related to the building of social communication and collaboration, through aligning interests, aiming for collaboration among the actors, and through facilitating knowledge sharing and learning (Kivima 2014; Bush et al 2017; Hodson and Marvin 2010). Also, there are studies, such as the work by Jones et al (2016), which have focused on the importance of non-governmental organisations as intermediaries that positively contribute to the climate services, through improvement in shared knowledge and enhanced collaboration and learning. Adaptation to CC impacts and risks can be restricted due to different factors, particularly with a lack of detailed information about CC influence (Ricart et al 2019).

On the other hand, it is acknowledged that intermediaries for the most part have important roles in working towards community development processes and advancing sustainability targets. These intermediaries link actors, activities, skills and resources connected to these actors for the development and enhancement of ideas, collaborations and technologies (Kivimaa et al 2014; Kivimaa et al 2018). However, there is still a need to understand the role

of intermediaries in the process of communicating with the community to address resilience in their neighbourhood. Notably, the intermediaries' role is important at both the governance level and the community level.

The process of knowledge and information exchange through the collaboration and bridging of actors is important for addressing adaptation, through social-learning exchange between the various actors that may assist in promoting common understanding and to lessen vulnerability (Ricart et al 2019). Addressing the capacity to learn interlinks with the system's capability to integrate traditional and new knowledge, to establish an advanced learning process that is essential for addressing the right attitudes and skills for the development process, especially during times of risk (Heeks and Ospina 2014). It has been demonstrated that intermediaries are able to combine the different principles of organisation and exceed traditional boundaries regarding communications: between different departments and professions, between the governmental and administrative levels and agents, between formal/administrative and less formal or local communities/actors (Fehren 2010). This issue also requires maintaining participatory and collaborative behaviours among the actors over the longer term (Djalante et al 2011).

The communities and their interaction with resources and the environment, regarding water use for instance, is acknowledged to affect the adaptation targets. It is argued that intermediaries can be beneficial and influence this issue, through applied strategies and measures of technological aspects and their relation with the social practices that influence water consumption rates and wastewater production (Moss 2009). This issue is affected by the intermediaries as organisations that act between the traditional relationships of utilities, regulators and end users to enable these relations and strategies, and to maintain these networks (Moss 2009).

At the same time, these communities have to avoid the transfer and inclusion of incorrect information about CC and adaptation solutions (Little 2002). It is acknowledged that intermediaries need to address this not only in relation to the knowledge or information communication process, but also in updating and keeping long-term communication with the various actors as well (Moss 2009). However, there is a leading issue concerning the relationship between responsive behaviour towards resource use, when policy changes, and addressing feedback and update aspects (Marshall and Marshall 2007).

The intermediaries have a crucial role in this process, and it is important to identify them and include them from the beginning (Howells 2006). The identification and organisation of various actors in the planning and implementation process is thus a key issue.

Therefore, the intermediaries need to have complete access through building relationships with actors from both the local community and the municipal authority and administration (Fehren 2010). Accessing information and knowledge before and after risks is an essential matter for adaptation and promotion of resilience. Therefore, the intermediaries should be in a place where they can have good access to resources and information, in order to deliver the response or the systemic outcome, whether at the local level or across multiple levels (Fehren 2010).

Intermediaries could also be of importance in increasing organisational capability and the learning of communities to be able to adapt. It is argued that intermediaries have roles that relate to knowledge gathering, processing, generation and combination, as well as technology assessment and evaluation (Kivimaa 2014). Such monitoring reports are not only for resource usage, but also relate to the ways that and the extent to which communities might effectively monitor the behaviour of its members to confirm the achievement of the required adaptable actions (Bowles and Gintis 2002).

However, it is acknowledged that policy should encourage communities towards having better knowledge and to increase their learning, through a number of ways such as the provision of incentives to the various participants of communities as a part of the multi-level governance towards adaptation targets (Folke et al 2002). In water management, for instance, there is no doubt that the methods and timing of interactions among the local communities and the local organisations that promote sustainability at any stage is a crucial matter in addressing the sharing and production of the information and attitudes needed for adaptation (Ivey et al 2004). This is a topic for further research, however.

Accordingly, based on the literature, Table 2-11 shows the four main characteristics for this theme.

Table 2.11: Characteristics to enable I-1: Mediation between different research disciplines to facilitate knowledge transfer & Learning

I-2: Intermediaries Roles		
Characteristics		Source
C.13	Information availability & interpretation	Kivima 2014; Jones et al 2016; Bush et al 2017; Ricart et al 2019
C.14	Communication between departments	Fehren 2010; Djalante et al 2011; Jones et al 2016
C.15	Long-term programmes for community organisation capability and adaptive behaviour	Folke et al 2002; Little 2002; Tompkins and Adger 2003; Ivey et al 2004; Pahl - Wostl et al 2007; Adger et al 2009; Moss 2009; Kivimaa 2014
C.16	Bottom- up feedback from iterative process of adaptive social learning	Tompkins and Adger 2003; Sharifi and Yamagata 2016
C.17	Training and educational programme	Folke et al 2002; Fehren 2010; Ricart et al 2019

I-2: Mediator Role in Making Social Changes

In the work of (Latour 2005) it was shown that mediators have complex jobs in making the radical changes needed for the various issues, no matter how apparently simple they may appear. The role of mediators is important and starts with the process of creation of the network that it is aimed at creating the change (Kivima 2014; Bush et al 2017).

It is argued that the integration of intermediaries' role could be important in changing the behaviour of communities towards more sustainable and adaptable targets. For instance, it is demonstrated that any of the mediators studied are undeniably influential in promoting more sustainable forms of water use (Moss 2009). Indeed, these are all important parts in the adaptive management process. Accordingly, addressing behavioural change is essential for addressing the communities' adaptation (Plsek and Wilson 2001), and demands the inclusion of key uncertainties and continuous re-evaluation (Williams 2011). In turn, the focus should be on identifying problems and presenting a prepared plan that is able to create

a quick and efficient response after a disaster (Tylor and Moench 2012). Furthermore, bottom-up feedback from users is useful for rapid detection of potential failures. These communal solutions contribute to the iterative process of adaptive social learning and increases the social capital of communities which would be important for both risk avoidance and recovery (Sharifi and Yamagata 2016).

In order to promote the vital involvement of communities in their own development, access to relevant information is essential, as without an equal right for communities to access information, the whole idea of communities' collaboration and engagement processes would be redundant (Tanner et al 2009). This issue is of increased importance when the communities are dependent on natural resources in their daily lives, and in this case, the adaptive capacity of these communities should be increased through increasing the empowerment of these communities towards their environment.

Building community capacity and resilience is largely dependent on the development of knowledge and the ability to continuously learn to adapt (Chaskin 2008), with an equal right for communities to access information (Tanner et al 2009; Heeks and Ospina 2014), and with an effective and culturally relevant education about risks implemented (Chandra et al 2011). The role of mediators is closely related to education and training, provision of advice and support, and creating conditions for learning by hands-on activity (Kivimaa 2014).

Therefore, identifying, mobilising and involving relevant actors is important (Van Lente et al 2003). Further, collaboration of local communities with the government through the interconnection process and collective actions is important in promoting the processing of information and managing of knowledge to implement successful adaptation plans and targets for community resilience to better cope with CC impacts and potential risks (Tompkins and Adger 2003; Pahl-Wostl et al 2007). For instance, it is acknowledged that the existence of a large number of diverse organisations who have intermediary roles as mediators can perform various actions capable of influencing water management in a considerable way, whether through collective or non-collective actions (Moss et al 2009).

It should be mentioned that the access various networks have to different information resources is an important topic. In this context, it is important to study the various communities' interactive ways of communication and information transfer to address adaptive behaviour and outcomes (Little 2002), and how this issue is influenced by mediators. This places an equal importance on the participation of all community members and equal opportunity for all to be involved. This equality of opportunity is associated with

the provision of access by various communities' individuals in relation to resources, information, and opportunities to be made available in their communities' context (Heeks and Ospina 2014). For instance, it is indicated that public awareness of CC is positively associated with the government's targets that are set in relation to pollutant reductions (Drummond et al 2018).

Ensuring that information remains up to date and accessible will enable community risk preparation, and will avoid the potential delays of the impacts and risks which actually occur (Pelling 2010). Many adaptation strategies will be more effective if they are designed, implemented, and monitored with a strong level of community inclusion and engagement (Ebi and Semenza 2008). However, addressing adaptation requires greater focus on the preparation of communities, which needs a wide range of community individuals and actors to be involved in developing and implementing these strategies, thus enhancing preparation (Sharifi and Yamagata 2016, 2018). The mediators' roles can be important in bonding the community groups towards the process of making them a vital part in the preparation process tied to CC (Moss 2009). For this, community uncertainties about how social learning is achieved, its measurement, and the possible outcomes cause issues with regards to justifying an investment into approaches that may demand changes in practice and resource allocation (Ensor and Harvey 2015). For example, Jones et al (2016) mentioned that for implementing climate resilience strategies through the role of NGOs as mediators, there are important roles in development and delivery established, based on the collection of observational climate data, linking the local communities' knowledge with the information of climate experts, translating the technical information into comprehensible, local, non-technical language for communication and explanation of the issues that are linked to uncertainty levels, and supporting the uptake of climate information in local and national decision-making.

Enabling local communities to take a collaborative role in the development of their communities is important in developing their understanding of the context in which they live, and to promote their adaptive behaviour towards this context, whether physical or social. This requires organised processes among the participating community, where incorporation of organisational capability within the community collaboration process can increase their resilience to various CC impacts, even within the context of large-scale disasters (Krasny and Tidball 2009).

This empowerment and participation planning should be as long term as possible. It should encourage strategic thinking, helping community groups to think about a systematic picture of the sector and the possible outcomes of the various structures that could be developed to

support them over time (Bird and Barnes 2014). This is especially the case at times of risk, where changes are needed.

Accordingly, based on the literature, Table 2-12 shows the three main characteristics for this theme.

Table 2.12: Characteristics to enable I-2: Empower the role of local Communities

I-2: Empower the Role of Local Communities		
Characteristics		**Source**
C.18	Create the Network and identify targets and strategies	Latour 2005; Tylor and Moench 2012; Sharifi and Yamagata 2016
C.19	Understand the nature of community and enable their active involvement & participation	Ebi and Semenza 2008; Moss 2009; Pelling 2010; Bird and Barnes 2014; Sharifi and Yamagata 2018
C.20	Information update and translate the information	Krasny and Tidball 2009; Ensor and Harvey 2015; Jones et al 2016; Sharifi and Yamagata 2018

2.6 Investigation of the Neighbourhood Sustainability Assessment Potential towards Building Social Adaptation to CC

It has been acknowledged elsewhere that Neighbourhood Sustainability Assessment tools (NSAs) are important in acting as the physical manifestation of the frontline battle for sustainability at the neighbourhood scale, as a distinct part of a larger urban/city scale (Choguill 2007). The sustainability tools available to date have covered sectors including energy, transportation, buildings and water. It is argued that this sustainability coverage can be considered as the broadness and profundity of the sustainability topics that are addressed in the development process (Yigitcanlar and Dur 2010).

For CC adaptation, it is argued that the adoption of sustainability assessment tools can already provide support in adapting to CC, through their effect when it comes to managing resources for communities (Parry et al 2007), and also in directing decision-making towards sustainability (Bond et al 2012).

In this situation, existing sustainability assessment tools, which are referred to in the literature, consist of a range of indicators, across a breadth of sectors that aim to guarantee an appropriate endeavour in the conservation of environment and mitigation of CC (Bakar and Cheen 2013). Importantly, these indicators can ideally stimulate processes to enhance

the overall understanding of environmental and social problems, facilitate community capacity building, and help guide policy and development projects (Reed et al 2006).

These assessment tools are comprised of *indicators* that are practical components designed to track various changes over time (Fekete and Stakhiv 2014). The assessment of sustainability through the use of sustainability assessment tools, through their constituent indicators, is a well-established and documented approach for various development sectors (Makropoulos et al 2008; Ness et al 2007). It is also acknowledged that they have a vital role in the creation of sustainable communities (Sharifi and Murayama 2014) and are likely to continue to be used widely into the future (Charlton and Arnell 2011). As a result, there is a need to investigate how and to what extent information is passed through these tools' content 'indicators', and then how the mediators are enabling the creation process of sustainable community, progressing towards building adaptive capacity related to CC. It should be said that the intermediaries constitute both human and non-human actors that influence the intermediary and mediating roles. So, when talking about these tools, it means investigating the role of these tools as tools that constitute actors and indicators, that could represent the human and non-human actors.

It should be said that these intermediary tools, as they could perhaps be termed, not only relate to the application of the categories and indicators as main methodological approaches for sustainability, but they are highly influenced by other actors such as planners, developers & authority actors. So, acknowledging and investigating the role of those actors that influence the role of these sustainability assessment tools is also important. It is recognised that the usage of advanced and suitable tools could have a substantial effect in making actors move away from their current thinking and attitudes and to become effectively engaged in the CC adaptation process (Bergkamp et al 2003, p.35). Sullivan et al (2014) argued that there are relatively few research studies examining the effects of frameworks on their users, the development process, and the wider social/institutional environment, such as planning. Therefore, in general, it seems that there is still a need to establish how tools such as NSAs can work in the wider planning context, with the inclusion of stakeholder participation (Sullivan et al 2014). Also, it has been recognised that the assessment of progress toward resilience requires consideration of those intermediary processes that increase the likelihood of resilience (Zautra et al 2011).

NSAs, as intermediaries, are currently being developed at a fast pace and are becoming adopted by urban planners and developers in order to address urban sustainability (Boyle et al 2018) in both new development and regeneration development contexts. Despite the importance of sustainability assessment tools in educating users and maintaining the incorporation of sustainability strategies into planning, design, and construction, a substantial gap remains in their ability to incorporate hazard resistance and hazard mitigation in the broader context of sustainable design (Matthews et al 2014), as well as in relation with the engagement of actors, including the community (Sullivan et al 2014).

Accordingly, this research needs to investigate the potential of NSAs as tools that combine the indicators and their associated actors, in order to explore their capacity to address resilience and adaptive capacity to climate change. In this context, it is an essential matter to review and investigate the importance of the sustainability assessment tools as potential tools that integrate both the *theoretical applied indicators* and *actors* that influence the development process.

2.7 Sub-Conclusion:

This chapter has focused on building a framework to address the importance of investigating social adaptation at the neighbourhood scale. It is acknowledged that Climate Change adaptation and sustainability should be explored as two integrated concepts and not separated ones. In this context, it is a key to explore the potential of neighbourhood sustainability assessment tools as representative tools for sustainability, to address adaptation at the neighbourhood scale considered in this study.

It is argued that in order to build social adaptation, governance, community and intermediaries are considered as the main levels for the process of addressing adaptation in the social context. Both adaptive capacity and resilience are key integrated methods that need to be acknowledged when building adaptation to Climate Change.

In this chapter, three theoretical approaches are presented for the investigation of social adaptation analysis, namely Adaptive Governance, Resilient Communities and Intermediaries. The main themes and characteristics representing these three approaches have been identified to build a practical method. There are nine main themes and 20 characteristics proposed for the analysis of this research, as Table 2-13 summarises.

Chapter 2: Literature Review

This research aims to analyse the resultant themes and characteristics against both a theoretical and live application of neighbourhood sustainability assessment tools. The identification of the potential of neighbourhood sustainability assessment tools as tools with the capability for social adaptation is needed in both the literature examining sustainability as well as Climate Change adaptation. For the most part, research is still required to include methodological developments, indicator studies, testing and evaluation of adaptation characteristics, and actor participation (Fussel 2007; Lee et al 2015). This is regarding the level of action taken by local government and national policies (Vignola et al 2009; Roberts 2010). Research is also required to investigate the social context required, such as where local communities themselves become capable of adapting to the variable impacts of Climate Change and its associated potential risks (Roberts 2010; Lee et al 2015).

Table 2.13: AG & RC & I Themes & characteristics

Theory	Themes	Characteristics	
Adaptive Governance (AG)	AG-1: Extended collaboration process	**C.1**	Broad inclusion of actors for effective management
		C.2	Strong local institution support
	AG-2: Build knowledge and understanding	**C.3**	Focus/incorporation of information and understanding the impacts of CC & potential risks
		C.4	Shared/participatory ways of knowledge
		C.5	Consider the physical performance of resource facilities
	AG-3: Continuous monitoring & evaluation	**C.6**	Monitoring and continuous evaluation of development facilities
	AG-4: Develop capacities with CC impacts	**C.7**	Develop the possible actions in facilities in response
Resilient Community (RC)	RC-1: Nature of Community	**C.8**	Community feeling of attachment & social engagement
	RC-2: Community adaptive behaviour towards their facilities and built environment	**C.9**	Increase the level of learning and awareness knowledge
		C.10	Effective & responsive behaviour for risks
	RC-3: Community well-being	**C.11**	Increased satisfaction with physical strategies
		C.12	Enhanced delivery of human health and well-being
Intermediaries (I)	I-1: Intermediaries role in facilitating knowledge transfer	**C.13**	Information availability & interpretation
		C.14	Communication between departments
		C.15	Long-term programmes for community organisation capability and adaptive behaviour
		C.16	Bottom- up feedback from iterative process of adaptive social learning
		C.17	Training and educational programme
	I-2: Mediator roles in making the change	**C.18**	Create the Network and identify the targets and strategies
		C.19	Understanding the nature of community and enable their active involvement & participation
		C.20	Information update and translate the information

Chapter 3: Selection of Case Study

3.1 Introduction

The case study research approach is important to respond to the “how” and “why” types of questions, while taking into consideration how a phenomenon is influenced by the context within which it is situated (Yin 2003).

This chapter aims to present the argument for the selection of a particular neighbourhood scale sustainable assessment tool, BREEAM Communities (BC), and the practical case study, MediaCity, Manchester, that will enable the evaluation of the tool’s impact in theory and in application. The case study tool is chosen from the range of available NSA on the basis of existing coverage of the social context, both in terms of governance and community, with regard to evaluation, coverage of categories and relevant indicators. It is acknowledged, however, that despite the coverage within BC’s theoretical indicators that are associated with the social context, there is a need to evaluate the performance of these indicators towards promoting adaptation in the social context. This issue is important to address the main aim of this research regarding the evaluation of the social adaptation approaches of Adaptive Governance, Resilient Communities & Intermediaries, in linkage with these tools.

Case studies have often been considered to be part of qualitative research and methodology; they may also be quantitative or contain a combination of qualitative and quantitative approaches (Starman 2013). However, qualitative case study methodology is considered as an essential tool for the study of complex phenomena within their contexts, where it becomes a valuable method in research to develop theory, assess cases, and develop interventions (Baxter and Jack 2008).

The MediaCity regeneration project was selected as the case study for this research for the following reasons:

- MediaCityUK was awarded the status of the first sustainable community in the world by BREEAM Communities in 2011.

- It has integrated significant sustainable strategies to deliver community-scale sustainability in terms of promoting their needs and priorities, in addition to the implementation of sustainable physical strategies.

Indeed, delivering MediaCity as a sustainable community was the main argument for implementation of BC within the project, as well as in promoting these strategies across the whole Salford area and the wider Manchester conurbation. The research will evaluate these applied strategies in terms of the three theoretical approaches identified in chapter 2. In practice, it is argued that BC actors are involved in both the governance and the community levels regarding the planning and implementation of strategies of sustainability; however, there is a level of ambiguity associated with the role of BC actors/experts acting in intermediary and/or mediation roles among and between the various actors, towards promoting the adaptation.

3.2 The Importance of the NSA Theoretical and Practical Case Study Context

The case study is considered as a research method that constitutes empirical inquiries which explore and investigate important and current issues within their real-life context (Yin 1984). The case study allows an investigation of real-life events such as individual life cycles, organisational and managerial processes, neighbourhood change and environmental impacts.

It is acknowledged that the application of NSAs is a process that integrates many actors, and has addressed various categories including Water, Energy and Community, through the adoption of comprehensive indicators. Understanding the coverage of these sectors in existing tools necessitates an analysis of the indicators as well as their methods of measurement and weighting. Typically, indicators are simple measures: most often quantitative measures that represent a state of economic, social and environmental development in a defined area (Ness et al 2007). However, in order to promote holistic sustainable development strategies and targets, the indicators need to be acknowledged or measured in a wider sense, employing techniques that are influenced by the actors' engagement processes (Ness et al 2007).

So, understanding these indicators' performance and the various actors involved is crucial in order to investigate the NSAs' role and performance in theory and practice in the

development process. In this research, this investigation is focused on the role of NSAs in addressing adaptation in the social context, where both indicators and the practical case study will be analysed based on the evaluation characteristics of the three theoretical approaches that were identified in chapter 2.

However, in order to promote holistic sustainable development strategies and targets, the indicators need to be acknowledged or measured in a wider sense, through the embedding of techniques that influence the actors' engagement process (Ness et al 2007). In other words, the case study method is important to investigate the application of the phenomena which here are associated with the sustainability tools' influences on adaptation in the social context. Notably, Yin (2003) demonstrated that the case study method is used when there is a focus on a certain situation, to answer how and when questions, understand the actors' behaviour and contextual conditions that influence this situation. Given that the exemplar methodology has become an increasingly popular means of investigating issues of social constructs such as activism, care, environmental activism, and purpose in life, through studying selected samples of the development measures and individuals, and construct questions around investigating these issue (Bronk 2012).

Therefore, conducting exemplar research can add a great deal to our understanding of positive developmental phenomena, and it provides a picture of complete or nearly complete development, and adding this understanding to research on deficient to give us the ability to examine the influences of the development (Bronk 2012).

In this research, the performance of the contents of these indicators needs to be investigated in theory by evaluating the tools' manuals and in practice through consideration of a case study when the actors are involved. It is argued that the case study suggests that agency concerning more sustainable outcomes needs to be displayed through the lens of an organisational and authority leadership (Rydin 2012), which, therefore, means that the investigation of both the context and the influenced actors are important for the investigation of the sustainability tools' performance.

Accordingly, the evaluation of the indicators in the case study represents two major approaches to explore the performance of the tools in theory and practice. The evaluation of sustainability through the use of sustainability tools, consisting of indicators, is a well-established and documented approach for various development sectors (Makropoulos et al 2008; Ness et al 2007). The improvements in sustainability performance resulting from the application of indicators are not only associated with their identification and application, but also, with the processes of engagement and their selection (Dewulf et al 2005). So, the case study is indispensable here. However, as Urwin and Jordan (2008) have suggested, case studies are far from being only an exploratory strategy. Further, the research of case studies can constitute single or multiple case studies (Urwin and Jordan 2008) and it is demonstrated that when a single case study is used, the researcher can question specific theoretical relationships and explore new ones because of the depth of study that can be made. The single case study is adopted when, for example, there is a focus on the roles of institutions or organisations (Gustafsson 2017).

Here, in this research the investigation is therefore focused on the exploration of a single case study, as the main aim is to explore the potential of the NSA to enable adaptation to Climate Change in the social context, which has been identified as an issue that is lacking in the literature.

The investigation of the indicators and their potential to influence the process of social adaptation to CC is important due to their social focus on governance and the community. It has been acknowledged that indicators should be built on the basis of local information and data, to act as practical monitoring measures towards sustainable development targets (Reed et al 2006). In other words, indicators must not only be relevant to local people, but the methods used to collect, interpret and display data must be easily and effectively used by non-specialists so that local communities can be active participants in the process. Thus, ideally, sustainability indicators embedded within NSAs should go far beyond simply measuring progress towards quantitatively defined objectives (Reed et al 2006). The NSAs do currently include indicators that are associated with the community regarding their participation in decision-making, community management, and addressing their needs in the development process (Reith and Orova 2015). However, it has been argued that this remains insufficiently addressed in existing NSAs (Zakaria and Vikneswaran 2009; Reith and Orova 2015).

In addition, there is a level of ambiguity regarding the social context within existing NSAs associated with decision-making, and the evaluation strategies that are followed by the planners and decision makers through using different categories and indicators to evaluate both the social and cultural sustainability contexts (Sharifi and Murayama 2015).

Nevertheless, there has been a widespread application of these tools on various development projects (Haapio 2012) and throughout the development stages. Generally, the use of these tools is seen as positive within the planning and implementation of strategies for the construction industry (Garde 2009; Schweber 2013). However, notwithstanding the fact that more than one decade has passed since the introduction of NSA tools, there is a current deficiency in the amount of research evaluating their performance and efficacy in the context of practical case studies (Sharifi and Murayama 2013).

In the next section, the three most popular NSA tools are considered. On the basis of comparison and evaluation, the case study NSA tool for this research was selected, and the relevant indicators for the investigation in the social context were identified.

3.2.1 Popular NSA tools

Many tools such as LEED-ND, BC, CASBEE-UD, Earth Craft Communities, DGNB for Urban Development, Green Star Communities, Star Community Index, GSAS/QSAS Neighbourhoods and Green Mark for Districts, have been developed to facilitate sustainability assessment beyond the level of a single building (Sharifi and Murayama 2013b, 2013c). Currently, several NSAs that are applied around the world can be categorised into two groups: spin off tools and plan-embedded tools (Table 3-1):

Table 3. 1 Well-known NSA tools (Sharifi and Murayama 2013)

	Tool's name	Developer(s)	Country/region
Spin-off tools	LEED-ND	USGBC, CNU, and NRDC	US
	ECC	The Greater Atlanta Home Builders Association, the Atlanta Regional Commission, the Urban Land Institute Atlanta District Council, and Southface	US
	BREEAM Communities	Building Research Establishment (BRE)	UK
	CASBEE-UD	Japan Sustainable Building Consortium (JSBC), and Japan Green Building Council (JaGBC)	Japan
	Qatar Sustainability Assessment System (QSAS) Neighborhoods	Gulf Organization for Research and Development	Qatar
	Green Star Communities	Green Building Council of Australia	Australia
	Green Mark for Districts	Building and Construction Authority (BCA)	Singapore
	Green Neighborhood Index (GNI)	Malaysian Institute of Architects (PAM) and the Association of Consulting Engineers Malaysia (ACEM)	Malaysia
	Neighborhood Sustainability Framework	Beacon Pathway	NZ
Plan-embedded tools	HQE^{2}R	CSTB	EU
	Ecocity	EU research project	EU
	SCR	Victorian State Government	Australia
	EcoDistricts Performance and Assessment Toolkit	Portland sustainability institute (POSI)	US
	Sustainable Project Appraisal Routine (SPeAR)	ARUP	UK
	One Planet Living (OPL)	BioRegional Development Group and WWF International	UK
	Cascadia Scorecard	Sightline Institute	US

The first group is comprised of tools that developed from building scale assessment, including, LEED-ND, BREEAM Communities (BC), and CASBEE-UD, while the second group includes those that emerged only for assessment of neighbourhood-scale plans and sustainability initiatives (Sharifi 2013).

LEED-ND was the result of the coming together of the US Green Building Council (USGBC), the Congress for the New Urbanism (CNU), and the Natural Resources Defence Council (NRDC) as organisations that represent leading design professionals, progressive builders and developers, and the environmental community (Council UGB 2009). BC was developed in 2009 as an important international tool, designed to promote and assess sustainability at the community scale (BREEAM 2009). BC is one of the most developed international tools at this scale, aiming to enable new developments to achieve environmental sustainability targets. According to BRE Global, the tool includes a wide list of essential aspects designed to assist developers, communities and local authorities to integrate environmental sustainability into the design and planning stages (BC 2012, p.15). Finally, CASBEE-UD was developed by the Japan Sustainable Building Consortium (JSBC), that involves committees in academic, industrial and government sectors, and, like LEED and BREEAM, its family of assessment tools includes those that can be applied at housing, building, and urban scales (CASBEE for Urban Development 2007).

The various NSAs comprise categories and indicators that are associated with environmental issues, including energy, water, transportation, resources, in order to address the protection of the environment from the potentially harmful impacts of development. Arguably this should include protection from the direct and on-going impacts and risks resulting from Climate Change, core to the aim of the work being undertaken here. However, as has been established from the literature, the social part of sustainability assessment tools is still in need of further investigation. Indeed, this human dimension has largely been ignored in the sustainability context for almost two decades, in comparison with the increased focus on the bio-physical, environmental issues (Vallance et al 2011 p. 342; Langlois et al 2012; Annan-Diab and Molinari 2017). It is therefore vital to understand how the application of these tools is affecting occupants' quality of life, whether positively or negatively, particularly in the long term (Turcu 2012).

Within the NSAs, as with similar tools applicable at other scales including building and city, the environmental categories present the largest proportion of the measures, compared with the other aspects of sustainability. It could be argued that the environmental aspect of

sustainability is the main intent of these tools (Matthews et al 2014). For instance, according to Happio (2012), the most significant category within CASBEE-UD is the Infrastructure category with focus on the categories of Resources, Energy and Ecology; also for LEED-ND in terms of the focus on categories of Infrastructure with an importance also given to the ecology category; while in BREEAM Communities, the categories of Infrastructure and Transportation are again the largest focus. The next section will explore the coverage and scope of these three tools in order to inform the case study selection.

3.3 Selection of NSA Case Study Tool

LEED-ND, BC & CASBEE-UD are the three tools that are the most widely applied in various global contexts. Indeed according to Beradi (2013), these represent the most internationally known systems, especially as the building versions of these tools have been significantly adopted, as many researchers have demonstrated in their studies (Haapio and Viitaniemi 2008; Garde 2009; Sharifi 2013; Sharifi and Murayama 2013; Berardi 2013; Reith and Orova 2014; Sullivan et al 2014; Reith and Orova 2015). Their prominence is perhaps due to the existing significant diffusion of sustainability assessments of buildings, and their promise to diffuse this practice to the community scale (Berardi 2013). The popularity of these tools, in particular, is not only due to their status as the most developed currently applied NSAs (Turner 2010), but, also, that they seek to address all three pillars of sustainability; further that their manuals are made readily accessible (Berardi 2013).

The three community-scale NSAs will now be evaluated in relation to their coverage and scope regarding social context. In particular the following aspects will be evaluated below in order to inform the selection of the case study tool:

- Mandatory indicators
- Implementation
- Actor engagement and community inclusion.

- **Mandatory indicators:**

The nature of the CASBEE-UD system differs from that of LEED-ND and BREAM Communities in that the tool has no prerequisites. So, all indicators in CASBEE-UD are optional. Further comparison, as seen in Table 3-2 below, demonstrates that only 24% of BC criteria are mandatory with 76% optional; this is found to be in contrast with other

comparable NSAs, where many alternative tools constitute 100% optional criteria. In the context of this work it is suggested that such a breadth of optional criteria might have the potential to negatively influence the adoption of adaptation principles and targets.

Table 3-2 Percentages of mandatory and optional elements in NSA tools (After Sharifi and Murayama 2013)

NSA Tools	**LEED-ND**	**BREEAM Communities**	**CASBEE-UD**
Mandatory	21%	24%	0%
Optional	79%	76%	100%

Generally, the structure of the BC tool combines optional and mandatory indicators across the five categories, which is considered to be positive, as this gives the tool flexibility while ensuring it drives real and measurable improvement (Arayici et al 2010). Previously it has been demonstrated that the application of mandatory indicators is seen as important to ensure that the minimum sustainability requirements are met (Garde 2009; Sharifi and Murayama 2013). However, there is still a need to understand whether the issue is affecting the tool's capability in promoting sustainability and adaptation.

The coverage of the indicators in association to a certain sector is very important and relates to the performance of these tools across the development stages. Further, application of these indicators enhances sustainability, and as a result, these indicators should be able to cope with various changes of the sectors and decision-making process regarding the specific institutional circumstances, data availability and management approaches (Ioris et al 2008). Very little research has focused on understanding what performance is really expected when applying each indicator (Sullivan et al 2014), in the context of case studies.

- **Implementation**:

LEED-ND is considered as a voluntary tool regarding aspects of implementation, where there is no legislation supporting its implementation (Sharifi and Murayama 2013). CASBEE-UD is mainly associated with specific grand projects and for the environmental sustainability focus only (ibid) despite the existence of the legislation of environmental impact assessment in Japan.

Compared to these two tools, BC shows a stronger implementation potential, in which there is a concrete legislation basis for the process of sustainability assessment, with respect to its

potential in speeding up implementation. It also has greater reliability and a cheaper cost in comparison with the two previous tools (Sharifi and Murayama 2013).

BC is adopting a process called 'International Bespoke', which provides assessment of the applicability issues in the context of international projects. It will embed in the applied tool those indicators related to the local factors of these projects, such as climate, culture, and others (Sullivan et al 2014). This is favourable when compared with the others which have stronger embedded linkages to their original local contexts, and are not as flexible to settings outside these contexts (Haapio 2012).

Further, each of the NSAs includes indicators that are associated with the community, regarding their participation in the decision-making process, community management, and addressing their needs in the development process (Reith and Orova 2015). However, it is argued that this remains insufficiently addressed in the NSAs being considered here (Zakaria and Vikneswaran 2009; Reith and Orova 2015). Therefore, more research is needed for the investigation of the implementation of NSAs and their capacity to address sustainability and adaptation in the social context.

- **Actor engagement and community inclusion:**

It can be argued that actors' engagement, constituting the experts and local community, is an important part of the tools' application process in the main planning and implementation of the strategies that relate to these tools. However, the focus on including the various actors in the governance process, including the community, has been differently indicated in the three NSAs being compared here. Despite the fact that many institutions and organisations have been involved in the planning and implementation stages, the effects of the tools on the actors' engagement and planning has not been investigated to date (Sullivan et al 2014).

While such tools are typically used by governments (local and national) in order to "*rais[e] public awareness, promoting achievements of standards over and above the minimum regulatory requirements and in maintaining dialogue with the private sector"* (Lee 2013, p. 403), it is still difficult to distinguish the real users of the tools, and there has been only limited research on this topic (Haapio and Viitaniemi 2008, p. 476).

It is argued that during the governance process, LEED-ND has no requirement to hold meetings with local communities or public officials, or to gather actors together (Sullivan et al 2014). However, this issue is considered important in BC. It has been demonstrated that

the BC enables the communication process among the various actors, including the community, and promotes benefits for the community and the site through the application of the sustainability strategies (www.BC.com 2019). In CASBEE-UD the focus in this tool has been reduced to those actors directly involved, including actors in the industry, government and academia (Sharifi and Murayama 2013).

Table 3. 3 The main categories of the three NSAs

LEED-ND	BREEAM Communities	CASBEE-UD
• Smart location and linkage • Neighbourhood pattern and design • Green infrastructure and buildings • Innovation and design process • Regional priority credit	• Governance • Social and economic well-being • Resources and energy • Land use and ecology • Transport and movement	• Natural environmental • Quality in urban development • Service function for the designated area • Contribution to the local community (history, culture, scenery, and revitalisation) • Environmental impact on microclimates • Facade and landscape • Social infrastructure

As can be seen in Table -3-3- above, BC includes two main categories that relate to the governance process and actors' engagement with a focus on community engagement and the management process, and a further category that considers the issues associated with community well-being and social and economic needs and priorities. In the other two tools, LEED-ND does not have a category that is focused on governance or the community as a specific category, while CASBEE-UD has incorporated one optional category that has a focus on community aspects. For example, CASBEE-UD has a few criteria in the category of health and well-being, as well as several relevant criteria in the categories of infrastructure, location and transportation (Haapi 2012), all of which are optional.

Garde (2009) concluded, from a survey of 11 respondents, that the application of LEED-ND appeared to have very little influence on the planning and design of projects. So, despite the inclusion of the various actors in the process of applying and implementing these tools, the issue of community engagement is yet to be adequately covered by NSAs (Berardi 2013).

Therefore, regarding the focus across such points by the community scale NSAs, BC is considered to have a better potential focus on the social aspects and theoretical applicability of indicators. This is not only because BC is the oldest and one of the most widely used certification tools among the others (Hamedani and Huber 2012), but because it presents

reasonably balanced coverage for most categories (Haapio 2012). In addition, it advocates the consideration of sustainability strategies at the earliest stage of the design process in order to inform the development process (Sharifi and Marayama 2015).

Nevertheless, there is a need for further research, because BC is still not easy to access in both theory and practice (Kyrkou and Karthaus 2011). However, it can be noted that BC gives developers and local authorities a clear framework within which to demonstrate the sustainability of a development proposal, where both parties know what to expect and can easily measure the sustainability outcomes and successes of the development.

As a result of this comparison, it has been decided to select BC for analysis in both theory and practice. This section of the chapter has discussed the indicators and their relevance for the social context. This will be followed by a further discussion on the indicators that will be evaluated in relation to BC, and finally a project case study that has implemented the BC will then be selected and illustrated.

3.4 Selection of BC Indicators

Matters that are associated with indicators, including coverage and application, are important for any investigation of NSA tools and their effectiveness throughout the development process. The relevance of indicators to the various contexts is also an important matter, as well as the roles of the various scientific and technical expert actors, in particular with regard to their responsibility in addressing their choices and possible preferences about embedded predefined categories and indicators (Dewulf et al 2005).

This section will now explain the structure of the BC NSA and explore the selection of the indicators to be evaluated in the research phases of this work. The BC has five main categories:

1. Governance
2. Social and economic well-being
3. Resources and energy
4. Land use and ecology
5. Transport and movement.

These are further described in Table 3-4 below.

Table 3. 4 Five main categories of BC

Categories		Aim	Indicators	
			Mandatory	Optional
Governance	GO	Addresses community involvement in decisions affecting the design, construction, operation and long-term stewardship of the development	2	2
Social and Economic Well-being	SE	Addresses societal and economic factors affecting health and well-being such as inclusive design, cohesion, adequate housing and access to employment	3	14
Resources and Energy	RE	Addresses the sustainable use of natural resources and the reduction of carbon emissions	3	4
Land Use and Ecology	LE	Addresses sustainable land use and ecological enhancement	1	5
Transport and Movement	TM	Addresses the design and provision of transport and movement infrastructure to encourage the use of sustainable modes of transport	1	5

As acknowledged in chapter 2, this thesis is researching adaptation in the social context with the focus on community adaptation, and preparing community members for adaptation. It is suggested that both governance and local community contexts should work in parallel to enable this aim to be achieved. Nevertheless, there is a level of ambiguity in the BC, as in other NSAs, regarding the decision-making process, and the evaluation strategies followed by planners and decision makers. Throughout the governance process different categories and indicators are used for the evaluation of social sustainability (Sharifi and Murayama 2015), and how this issue is associated with the wider governance of the development is not clear. In order to explore in finer detail, the extent to which engagement with both governance and community is enabled, it will be necessary to consider the tool at the indicator level, as described in Table 3-5 below.

Table 3. 5 Overall BC categories & indicators

Category One: Governance	**Category Three: Resources and Energy**
Indicator_1: Consultation plan Indicator_2: Consultation and engagement Indicator_3: Design review Indicator_4: Community management of facilities	Indicator_22: Energy strategy Indicator_23: Existing buildings and infrastructure Indicator_24: Water strategy Indicator_25: Sustainable buildings Indicator_26: Low impact materials Indicator_27: Resource efficiency Indicator_28: Transport carbon emissions
Category Two: Social and Economic Well-being	**Category Four: Land Use and Ecology**
Indicator_5: Demographic needs and priorities Indicator_6 : Adapting to Climate Change Indicator_7: Flood risk assessment Indicator_8: Microclimate Indicator_9: Flood risk management Indicator_10: Delivery of services, facilities and amenities Indicator_11: Utilities Indicator_12: Public realm Indicator_13: Inclusive design Indicator_14: Housing provision Indicator_15: Green infrastructure Indicator_16: Local vernacular Indicator_17: Noise pollution Indicator_18: Local parking Indicator_19: Light pollution Indicator_20: Economic impact Indicator_21: Labour and skills	Indicator_29: Ecology strategy Indicator_30: Land use Indicator_31: Water pollution Indicator_32: Enhancement of ecological value Indicator_33: Landscape Indicator_34: Rainwater harvesting
	Category Five: Transport and Movement
	Indicator_35: Transport assessment Indicator_36: Safe and appealing streets Indicator_37: Cycling network Indicator_38: Access to public transport Indicator_39: Cycling facilities Indicator_40: Public transport

As can be understood from this table, the first category 'Governance' focuses on governance issues, while the second category 'Social and Economic Well-being' focuses on the communities themselves and their needs and well-being through considering the effects of risks, Climate Change impacts, delivery of facilities and built environment, and the natural environment. The remaining three categories focus on the physical strategies and they do not constitute explicit links to the social context, and are therefore considered beyond the scope and focus of this work. These three categories relate to the performance of the physical amenities and services in the neighbourhood regarding the post-occupancy stage and need to be considered in further studies. In this research the main focus, as demonstrated in chapter 2, is on the community as an important element that needs to be involved in the governance process and in the management processes as well.

Furthermore, it should be said here, that there are some indicators that also focus on the economic context, which are beyond the scope of this work. It is generally acknowledged

that the NSA frameworks provide a more holistic approach to sustainable development through covering the three pillars of sustainability (environmental, social & economic), though they have been accused of favouring the environmental aspects, and they particularly lack the focus on the economic aspects (Sullivan et al 2014; Sharifi and Murayam 2014).

Accordingly, it can be noted that two main categories correspond most closely to the focus on the social context adopted here:

- Governance
- Social and Economic Well-being

The next section aims to explore the contents of the two socially relevant categories and evaluate their importance to the research being undertaken here. Mainly, these two categories and their constituted indicators are considered important as main important categories for the case study context that is selected for this research. It is argued that MediaCity is considered as an important case study that has applied the BREEAM Communities in UK, and has achieved excellent rank according to this tool. MediaCityUK is an exemplar of BREEAM Communities as it has embodied BREEAM principles from the outset across this city's buildings, education, health to achieve a truly leading-edge modern low carbon and environmentally friendly city.

In this project, there is a focus and an aim to promote sustainable communities through providing better quality of life and meeting the needs of the local community in better well-big and choices in the development in the present and future, and increase the interaction between the community and the real estate development with providing the skills and jobs required for the community (Arayici et al 2010). In this project, there are various strategies that are applied to make effective use of natural resources, enhance the environment and to address sustainability strategies, regarding the transportation, energy, and water. Moreover, it is mentioned that the developer of the project is giving importance to the social issues regarding to neighbourhood and considers the benefits of the local community, and creates recreational facilities on the project site (Arayici et al 2010). Further It should be mentioned that one of the most important priorities for the MediaCity development is to focus on the issues that promote stronger communities and build a secure and sustainable environment; in which this has been addressed through setting the objectives such as: make communities

safer from various risks, build more cohesive, empowered and active communities, and Improve outcomes for various divisions of the communities, particularly for the students and learners (Ozturk et al 2010). However, there is a need to investigate the performance of the various indicators of BC in a case study context, particularly regarding the social context and the overall governance process that influence the sustainability and adaptation of community towards the CC.

3.4.1 Governance indicators

This category addresses the theoretical involvement of the various actors, including the local communities, in decisions affecting the design, construction, operation and long-term stewardship of a development being undertaken under the influence of the BC tool.

As stated previously, under each category there are a number of indicators that promote and enable achievement of the main aims of each category. It can be argued that any tool for sustainability that does not sufficiently consider the substantial linkage between components will have weak capacity to guide strategies and planning decisions to approach and deliver urban or community sustainability (Davidson and Venning 2011). Therefore, investigation of this matter within and between these indicators will enable understanding of the potential of the tool itself also to promote adaptive capacity.

For this context in BC, the relevant category is termed 'Governance' under which there are four main indicators:

1. *Consultation Plan*
2. *Consultation and Engagement*
3. *Design Review*
4. *Community Management of Facilities*

Only the first two indicators of this category: 'Consultation Plan' and 'Consultation and Engagement' are mandatory while the other two indicators are optional, as Table 3-6 demonstrates.

Table 3. 6 Governance_ category context and indicators_ BC

Category	Indicators		Optional/Mandatory	Reference
Governance	Indicator_1	Consultation Plan	Mandatory	GO01
	Indicator_2	Consultation and Engagement	Mandatory	GO02
	Indicator_3	Design Review	Optional	GO03
	Indicator_4	Community Management of Facilities	Optional	GO04

The two indicators of 'Consultation Plan' and 'Consultation and Engagement' are associated with decision-making and the actor engagement process. They both aim to confirm that the ideas, needs and the knowledge of the community are adopted within the engagement of other actors to enhance the design process through ensuring the incorporation of local knowledge. These mandatory indicators are considered important for the analysis associated with the Adaptive Governance theoretical approach themes and characteristics identified in chapter 2, as they both consider the focus on the engagement of the various actors and their collaboration, knowledge sharing and transfer. They also enable the main discussion that revolves around the application of the physical strategies among the various actors. So, understanding these actors as having intermediary and/or meditating roles is necessary. How and to what extent these things are addressed according to these indicators in theory and practice will be investigated as a part of the research.

Indicator_3: Design Review is an optional indicator that aims to address the achievement of healthy and functional development for the community through the planning and design process, with a focus on communication and feedback among the potentially intermediate actors and through reviewing of decisions.

Finally, Indicator_4: Community Management of Facilities is also optional, and aims to ensure the active incorporation of the local communities in the management process of the facilities in their neighbourhood.

These two optional indicators are very important for the identified AG themes and characteristics regarding the review of decisions that influence people's lives and the sustainable performance management processes and outcomes for the communities.

3.4.2 Community indicators

In BC, the focus on the community, the social context, is represented by the category called 'Social and Economic Well-being'. This addresses both the societal and economic factors affecting communities' quality of life and their well-being, such as social cohesion, and economic well-being regarding adequate housing and access to employment.

NSA tools in general cover the communities' involvement across the development stages and also their health and well-being through the application of the categories and indicators that address environmental and resource management. In other words, social sustainability has been linked to these tools in an indirect way, as secondary aspects of a range of indicators (Reith and Orova 2015).

Table 3. 7 Social and Economic Well-Being Context Indicators in BC

Indicators		**Optional/Mandatory**	**Reference**
Group 1 Preparation for CC Impacts	Flood Risk Assessment	**Mandatory**	**FRA**
	Adapting to Climate Change	Optional	ACC
	Microclimate	Optional	M
	Flood Risk Management	Optional	FRM
Group 2 Communities' Satisfaction and Well-being	Demographic Needs and Priorities	**Mandatory**	**DNP**
	Delivery of Services, Facilities and Amenities	Optional	DSFA
	Utilities	Optional	U
	Green Infrastructure	Optional	GI
	Local Parking	Optional	LP1
	Local Vernacular	Optional	LV
	Housing Provision	Optional	HP
	Inclusive Design	Optional	ID
	Public Realm	Optional	PR
	Light Pollution	Optional	LP
	Noise Pollution	**Mandatory**	**NP**

For the category of Social and Economic Well-being, Table 3-7 shows 15 of the 17 indicators. Two of the 17 indicators have been excluded – Economic Impact and Labour and Skills[4] – as

[4] Economic Impact and Labour and Skills focus on the economic well-being through ensuring the development attracts inward investment and employment opportunities respectively.

they have a focus on economics and are less likely to be explicitly relevant to this research. It can be noted, however, that despite the category having a stated economic focus, there is a clear lack in the overall indicators of this category, or regarding the contents of the indicators themselves. In particular the two identified indicators are optional. Elsewhere it has been argued that BC does not set guidelines for the development economics of a site, as this remains the responsibility of the local authority and the developer and as such is considered to lay outside of the BC enabled processes (Arayici et al 2010).

The focus on the social aspects, in association with community and addressing resilience to Climate Change, is related to the importance given to community needs and demands, preparedness to adapt to risks, and their interaction with the facilities, as well as their satisfaction.

For ***Preparation for Climate Change impacts*** there are four indicators that focus on the importance of the adaptation to Climate Change and potential risks. It has been noted that for both BC and other NSAs, as well as other building and urban tools, flooding is the most well incorporated of all the hazards (Matthews et al 2014).

These indicators are:

1. **Flood risk assessment**: the indicator aims to ensure that suitable measures are employed to reduce flood risks
2. **Adapting to Climate Change**: aims to address the protection of the development from existing and currently predicted impacts of Climate Change
3. **Microclimate**: to ensure the development provides a comfortable outdoor environment through the control of general climatic conditions
4. **Flood risk management:** the indicator focuses on minimising localised floods on site through prevention and reduction of rainfall flow to the water courses and the public sewage systems.

For ***Communities' Satisfaction and Well-being*** there are number of indicators that focus on the performance of facilities and the environmental influences, comprising 11 indicators.

These indicators are:

1. **Demographic needs and priorities:** to address the local needs and priorities based on the planning issues of housing, services and other facilities within the development.
2. **Delivery of services, facilities and amenities:** to affirm that the basic and fundamental services and facilities are delivered to the communities.
3. **Utilities:** to provide easy access to site services and communications infrastructure, with minimal disruption and need for reconstruction, and to allow for future growth in services.
4. **Inclusive design:** to create an inclusive community by encouraging the construction of a built environment that optimises accessibility for as many current and future residents as possible.
5. **Housing provision:** to minimise social inequalities and foster a socially inclusive community by ensuring appropriate housing provision within the development.
6. **Green infrastructure:** to ensure access to high-quality space in the natural environment and/or urban green infrastructure for all.
7. **Public realm:** to encourage social interaction by creating comfortable and vibrant spaces in the public realm.
8. **Local vernacular:** to ensure that the development relates to local character while reinforcing its own identity.
9. **Noise pollution:** to ensure that the development is designed to mitigate the impacts of noise. This includes mitigation from existing sources of noise, reducing potential noise conflicts between future site occupants, and protecting nearby noise-sensitive areas from noise sources associated with the new development.
10. **Local parking:** to ensure parking is appropriate for the expected users and well integrated into the development.
11. **Light pollution:** to ensure that lighting on the development site is designed to reduce light pollution.

3.5 Selection of Project Case Study

It is acknowledged that NSAs, including BC, continue to gain ground as tools for guiding sustainability, and that further case studies on the practice of NSA are recommended in order to reveal the context-specificities of different regions (Sharifi and Murayama 2015). As already noted, the empirical aspects of NSA have received very little attention in the literature. Such case studies could provide evidence that might be used to examine the

feasibility of applying these assessment tools in the real world (Sharifi and Murayam 2013). As already discussed, BC is applied during the early planning and design stages of a development ''*It offers a holistic framework with which to frame key indicators that assist decision makers to better understand and improve upon the impact their decisions will have upon the longer term environmental, social and economic aspects of the development*'' (http://www.breeam.com/communities).

BC has been widely applied in various projects in the UK, Europe, Asia, and the Middle East. For instance, the projects of Garitage Park in Bulgaria and Gardabaer in Urridaholt/ Iceland, as Figure 3-1 demonstrates.

(A) Garitage Park, Bulgaria (B) Urridaholt, Gardabaer, Iceland

Figure 3. 1: Examples of two community projects certified by BREEAM Communities (A & B)

It is important to ensure an effective case study design (Yin 1999) to investigate and evaluate certain characteristics for the identification of the priorities that should be explored and enhanced.

The MediaCity project has been awarded the status of the first sustainable community in the UK by BREEAM Communities 2012. It is acknowledged that the project is considered to be important through its development process, for the communities who study, work and live in the projects, and for their present and future needs (www.mediacityuk.co.uk). It is designated as a regeneration project because it aims to transform the brownfield site located in the Salford Quays region into an iconic development that has the potential to add value to the surrounding area (Arayici 2014). It represents a regeneration project located in Salford Quays, Manchester (Figure 3-2) and aims to become one of the most modern areas in Greater Manchester (Sharifi and Murayama 2015).

Figure 3. 2: Salford Quays in Manchester – (Binder and Knowles 2012)

Here the exemplar case study is used, which is associated with the intentional choice of the participants who have certain roles in the development process. In adopting the exemplar methodology, the researcher knows the sample of the participants or the actors that are part of the development process. Participants are chosen based on their possession of characteristics important for the investigation of the phenomena of interest (Bronk 2012). In this research, this implies the application of certain sustainability indicators and associated actors, promoting adaptation to CC and building adaptive capacity for the communities, in order to face the CC impacts and potential risks. So, the choice of the case study as BREEAM Communities should demonstrate the potentials of this tool, compared with the other NSA tools.

The application of the BC tool across the governance process of this sustainable project and the inclusion of the community as important participants makes the selection of both community and experts two important groups of samples in the study to be undertaken here. As Fitzpatrick (2004) argues, in an exemplar case study, it is important to develop an understanding of the stakeholders' differences in terms of their roles and their involvement in the development process, in order to understand the advantages and the disadvantages behind this differing involvement. Therefore, this kind of case study is important for investigating the evaluation of a certain system or actors in a certain phenomenon.

''We were awarded the status of the first sustainable community in the world by BREEAM in 2011 – one of our most innovative measures was the delivery of our own tri-generation power plant which helps to heat, cool and power the buildings at the heart of MediaCity/UK'' (www.mediacityuk.co.uk).

3.6 Development

This development project constitutes a total of 200 acres (81 ha) of land assigned for the development of MediaCity (MediaCity Planning Guidance, 2007), with seven phases, as shown in Figure 3-3. The first phase comprises over 36 acres (14.5 ha) and has been awarded the BC Excellent certification (Sharifi and Murayama 2015). It is located on the waterfront in Salford Quays, Manchester, and media companies are central to its delivery (Arayici and Ozturk 2014).

In May 2007, a second round of culturally led regeneration commenced in the Salford Quays development, with the confirmation that five of the BBC's key departments would move from London to a new home in Salford Quays, ensuring the future of 'MediaCityUK'. At its 2011 opening, MediaCityUK will house one million square feet of commercial space with a clear focus on the digital and creative industries, as well as residential, retail and public spaces for thousands of residents. However, a year before the official opening, proprietors of the MediaCity development *already* stressed that *"the site being developed for 2011 only represents about one fifth of the total land available – there's actually potential to utilise up to 200 acres"* (Slee et al 2010). This reinforces the idea that the evaluation work being undertaken here and the role that BC has played this far – is just the start of the regeneration story planned for this site.

Figure 3. 3: Phase one of MediaCity

Source: https://www.chapmantaylor.com/projects/mediacityuk#&gid=1&pid=9

3.6.1 Physical layout and location

MediaCityUK is located in Salford Quays at the head of the Manchester Ship Canal, on part of the site of the former Manchester Docks, Pier 9, in Salford and at Trafford Wharf in the Trafford Park Industrial Estate immediately across from the Ship Canal as shown in Figure 3-4 (Knowles and Binder 2014).

Figure 3. 4: Salford Quays location

(Knowles and Binder 2012)

Situated within the Manchester Regional Centre, The Quays (Salford Quays and Trafford Wharfside) function as Greater Manchester's waterfront and has been the catalyst for

regeneration within the western gateway to Manchester over the last 20 years. Quays Point is the last undeve loped part of the former Manchester Docks. Figure 3-5 shows the road planning that radiates from the waterfront in this development.

Figure 3. 5: Typically, the road and public realm areas should radiate from the waterfront, with larger development plots to the north of Quays Point (Arayici and Ozturk 2014)

3.6.2 Physical layout

The first stage of the project includes the following developments on the initial 36-acre site (www.mediacityuk.co.uk):

- Office space – 700,000 sq ft (65,032 sq m) (spread across five buildings)
- Studio block – 250,000 sq ft (23,225 sq m)
- Retail/leisure space – 80,000 sq ft (7,432 sq m) (divided into units)
- 378 apartments (divided between two towers)
- 218 bed hotel
- Five-acre public realm area, including piazza for 4,000 people.

The apartment buildings in MediaCity are illustrated in Figure 3-6 below.

Figure 3. 6: The housing apartments (Photo by author)

This first phase also comprises new public spaces, a new Metrolink station and a pedestrian footbridge across the Manchester Ship Canal (http://www.mediacityuk.co.uk). Figure 3-7 shows the bridges in MediaCity. The project also comprises 300 cycle bays and a multi-storey car park with approximately 2,200 spaces (Ozturk et al 2010).

Figure 3. 7: Bridges in Media City (Photo by author)

Chapter 3: Selection of Case Study

It is recognised that in Media City during the development process, it was challenging for the designers and engineers to deliver a landscape for people and tourists in the middle of extensive underground communications and the other restrictions on the site (www.gillespies.co.uk). The landscape was designed for pedestrians and aimed to create one of the UK's largest shared surface environments by incorporating sustainable design principles. The landscape aimed to support this by including over 200 new deciduous and evergreen trees (www.gillespies.co.uk).

For the future development phases of the project, it is reported that the second phase is in development: *"Phase two will provide a unique opportunity for a new generation of designs to complement what is already a thriving and vibrant destination. Like any city, we continue to grow in line with the needs of business – today's plans show the huge potential for the MediaCityUK of 2026"* Stephen Wild, Managing Director, MediaCityUK.

The new public realm and landscape provided in the phase two masterplan again aims to offer a rich mix of public and private spaces, with an ambition that community-based interaction should be at its centre through providing space. Located at the heart of the development, the largest public space - Market Square – aims to provide a dynamic and flexible space incorporating a contemporary market hall and event space, with the intention that these are *"animated by restaurants, shops and apartments"* (www.mediacityuk.co.uk). Figure 3-8 shows phase two of MediaCity, comprising the main community building centre.

The phase two site, for which planning permission has now been granted, extends across eight plots on the north-eastern part of the site and will provide over 50,000 sq m of business accommodation, over 4,000 sq m of live/work units, 1,871 residential units including town houses, over 4,400 sq m of retail and leisure space and over 1,800 car parking spaces. Each plot has been designed by a different architect, with a sixth firm co-ordinating the overall layout (www.mediacityuk.co.uk):

Among the plans are:

- The Arcade – retail/leisure and office space around a pedestrian arcade with office space above
- Studio Square – office building and pocket park

- Georgian Square – a new public courtyard, a six-storey podium on top of which would be two slender taller buildings of 14 and 25 storeys with residents' terraces and winter gardens, and 18 three-storey live/work units and separate commercial office space
- Market Square – a contemporary 'village hall' with seating for dining and square for markets and events
- London Square – 14 three-storey town houses with 460 apartments on the upper floors, and gym, cinema room and shared office space
- Northern Edge – a new 'gateway' to MediaCityUK comprising three buildings with 632 apartments, six two-storey live/work units, office space, retail and leisure uses, a cycle hub and three multistorey car parks

Figure 3. 8: Phase two in Media City

Source: https://www.gillespies.co.uk/news/mediacityuk-phase-2-plans-given-go-ahead

Finally, another phase is planned which will comprise 1,036 apartments covering an area of approximately 544,820 sq ft, MediaCity will form the largest residential development in the north-west. This proposed development will consist of four iconic towers, each containing a mixture of studios, 1, 2- and 3-bedroom apartments, see figure (3-9). (https://www.thepropertysupplier.co.uk/property-details/37/manchester-/salford-1)

Figure 3. 9(a & b): Phase three of MediaCity

Source: https://www.thepropertysupplier.co.uk/property-details/37/manchester-/salford-1

Figure 3.9(c): Phase three of MediaCity

Source: https://www.e-architect.co.uk/manchester/media-city-salford

3.6.3 Importance

According to the 2015 Index, Salford is ranked as the sixteenth-most-deprived local authority in England, in terms of the proportion (28.7%) of neighbourhoods falling within the most-deprived decile nationally, 4 % (3 ranks) improvement from the 2010 Index (DCLG 2015). Deprivation in Salford is very much concentrated on income and the employment problems of its neighbourhoods, with a respective deprivation rank of fifteenth and nineteenth nationally. The place suffers less severely from other forms of deprivation such as those

measures associated with housing, education, crime and living environment when compared against the national context (www.trafford.gov.uk). This project is not only addressing the targets of environmental sustainability, but it has the potential to have a positive social impact on the local community of the neighbourhood, in addition to its ambition to be considered as a project that aims to transform the look of the Salford Quays waterfront (Arayici and Ozturk 2014). Figure (3-10) shows this iconic project.

It was intended to embody sound environmental practices through design, construction and operation, providing opportunities for local economic growth and sustainable living as well as flexibility for future growth (Ozturk2 et al 2010). Furthermore, it has been argued that the project is has many reasons behind its construction, economic, environmental and social. MediaCity is an exemplar of BC as it has embodied BREEAM principles from the outset across its buildings (offices, studios, car parks, retail, residential, hotels, education, health) in order to deliver what is considered by BRE to be "*a truly leading-edge modern low carbon, environmentally friendly city"* (www.BRE.org).

Figure 3. 10: The iconic sustainable MediaCity project

Source: https://www.chapmantaylor.com/projects/mediacityuk

3.6.4 Policy

MediaCityUK is considered to be an example of sustainable regeneration on a large scale, where, it is considered as a purpose-built home for creative and digital business (Arayici 2014) and is one of the first developments to use the new BC methodology.

> *Our client Peel Media had seen the benefit of BREEAM in the design and construction of each building on the new MediaCityUK – Peel have committed to BREEAM targets on every building across the development – and were keen to extend this approach*

across the site to achieve a truly environmentally friendly regeneration of a former dockland site alongside the Manchester Ship Canal in Salford' (www.MediaCity.com).

Salford City Council played an important role in supporting the development of MediaCityUK through the provision of opportunities for creating a different and better community, not only through the focus on infrastructure, but through creating a better quality of life, accessibility to resources and job opportunities for local residents. The idea behind the project was to create a sustainable community that can raise the experience across the whole of Salford (http://www.salford.gov.uk/mediacityuk.htm).

This city council policy promotes MediaCityUK as suitable for the development of a vibrant mixed-use area with a broad range of uses and activities (Ozturk et al 2010). It identified uses for the area including: housing, offices, tourism (including hotels), leisure, cultural uses, education, community facilities, retail and food and drink uses (subject to compliance with associated retail and leisure policies), knowledge-based employment (including live-work units), and essential infrastructure and support facilities. The guidance note entitled '*Encouraging Better Design'* explains that the council is committed to securing high-quality design in all new developments across the city. It states that poor design is a valid reason for the refusal of planning permission (www.trafford.gov.uk). The Salford City Council aims to transform Central Salford over the next 20 years, guided by a new vision and regeneration framework. It intends to unlock hundreds of millions of pounds of private sector investment leading to thousands of new job opportunities for the area (www.salford.gov.uk).

3.6.5 Governance process

MediaCity is mainly being developed and managed by Peel Holdings, Salford City Council, and a range of other actors (Ozturk et al 2010; Knowles and Binder). Salford City Council and Peel are working collaboratively to produce a masterplan for MediaCity regarding the regeneration process of the central part of Salford (www.trafford.gov.uk).

It is argued that the role of Peel is very important to support the application of sustainability strategies in the MediaCity project (Arayici et al 2010). Peel[5] has an important role in ensuring that the development integrates environmental management and sustainability measures

[5] Peel is one of the leading infrastructure, transport and real estate investors in the UK. It has grown through an ethos of recycling capital and long-term investment, gaining a reputation for visionary regeneration projects, primarily in the North of England (https://www.peel.co.uk).

throughout its planning, design and construction. The role of architects in the governance process is crucial in leading the design of MediaCity. The Peel Group and Chapman Taylor, the leading architectural design company for this project, collaborate to continue with the delivery of the sustainability community in this project, in the design of buildings, and the development of residential units for a better quality of life for those in the community (https://www.chapmantaylor.com/projects/mediacityuk).

There are challenges associated with the implementation of large-scale projects such as MediaCity, and the efforts that are applied to address the sustainability strategies and targets, and some might be considered as impediments for the sustainable development of such projects (Gorod et al 2014). MediaCity has involved a wide range of specialists to date, who were/are varied in their expertise, educational background, professional skills, and working environment. However, it is argued that the role of BC was itself an important part of the governance process, especially regarding the application of the sustainability strategies and the process of making these strategies comprehensible to the other actors in the governance process. The role of BC is to help the developers, local authorities and design teams promote the process of applying the sustainability measures in the neighbourhood scale (www.BREEAM.org/Communities).

So, with the inclusion of a wide range of actors, these challenges are mainly associated with the exchange of information and communication among this wide range of participants; a situation that can lead to many mistakes that can be difficult to be solved and also expensive, as Gorod et al (2014) have argued.

However, for the communication among actors regarding sustainability strategies, the role of BC is likely to be influential. It enables both planners and developers to set and agree on appropriate targets for developments, and its targets are based on key sustainability objectives and core planning policy requirements, adapted for the specific development and its surrounding area (Arayici et al 2010).

The process of inclusion embedded within BC has a specific relevance in its application as a dialogue tool to provide the local authority, planners and developers with the importance of sustainability measures and ensure that planning policy requirements are clearly indicated and ensured (Arayici et al 2010). However, the extent to which BC is influencing the incorporation of the actors' collaboration, communication and learning about sustainability is still unclear in current literature, and thus requires further investigation. In other words, the potential for the role of BC as an intermediary party is still not clear, particularly regarding

the extent to which intermediary themes and characteristics as identified in chapter 2, are extant and enabled in the BC process.

BC is considered an important factor in applying sustainability measures, where, it is argued that its process can be vital in focusing action on setting sustainability measures, commitments and agreement during the planning process (www.breeam.org/). However, it remains unclear about the extent to which it also supports and promotes effective ways of communicating with or identifying the role of its constituent actors. As argued in the literature, there is still a need to establish how BC can work effectively as an intermediary or mediator in the wider planning context, in particular in relation to promoting the inclusion of wider actors' participation (Sullivan et al 2014). There are gaps in both policy and academic research regarding this issue. Research studies on the effects of these tools on their users, the development process, and the wider social/institutional environment, such as planning, are relatively scarce (Sullivan et al 2014). Gorod et al (2014) assert that the collaboration process among the varied parties has not been as effective as it could have been in MediaCity, particularly regarding the involvement and the agreement of the users and communities in the main decision-making. For instance, Gorod et al (2014) argued that the inclusion and engagement of actors in the development process was not effective; moreover, in the development of various strategies and construction details, the developer and the contractor both implemented various strategies and accessed the site without the agreement of the BBC, despite the latter's involvement and agreement being essential prior to starting the work.

Therefore, it seems that the local authority, represented in Salford City Council, is having a central, high-level role in establishing the main strategies for the planning process in MediaCity. There is support and importance given by the local council to the role of the BC as a tool that ensures application of sustainability strategies. In addition, regarding the council's relation with Peel developers, it is argued that Peel is supporting the application of the tool, as Arayici et al (2010) have suggested. However, regarding the role of BC actors in the process of addressing the interaction and collaboration with the developers, as intermediary actors, this is not yet clear and requires further attention. Figure 3-11 shows the main actors involved in the governance process of MediaCity and their potential positions as intermediaries and/or mediators, potentially played by actors associated with the BC process or indeed by BC itself.

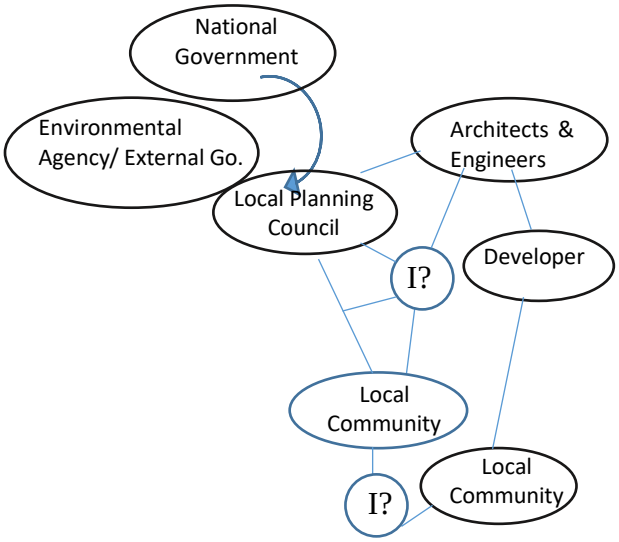


Figure 3. 11: The main actors in the governance process to address sustainability in MediaCity

It should be said that one other issue needs further research associated with the focus on the community engagement process in MediaCity. It is argued by Porter et al (2014) that in the UK context, despite a stated priority for UK local authorities on addressing the various needs and priorities of the community, research remains lacking in this area, especially in establishing the extent to and level at which, for instance, the occupants should engage in the planning and sustainability building process and adaptation. So, despite there being an explicit ambition for inclusion of the local community in MediaCity as well as engagement in the governance process, the role of BC in enabling this is in need of further evaluation. In particular, in terms of the extent to which this has been delivered and its impact on the development process regarding communication and collaboration with the local community.

3.6.6 Community of MediaCity

It is mentioned earlier that the project is known to be the first development to obtain BREEAM Sustainable Community certification. As such it could be expected that the community is central to the project. As mentioned earlier, BC places specific importance, when compared with other NSAs, on the community regarding engagement and management issues. MediaCity, reportedly, uniquely embodies sound environmental practices throughout its planning, design, construction and operation to provide sustainable living for the communities (Ozturk et al 2010; Arayici et al 2010).

Notably, the local planning authority in Salford has a stated vision for making community needs and sustainability living a core adopted strategy, referred to as a 'Sustainable Community Strategy' (Chilaka 2011). This strategy comprises a focus on covering the key themes that relate to community development and sustainability, regarding community connection, health and well-being, and learning aspects (Chilaka 2011). Ozturk et al (2010) reported that this is expected to lead to raised community pride, enhanced social capital and positive mental and psychological health impacts.

It has been argued by its developers and promoters that this project aims to be an iconic neighbourhood, where people want to live and work, now and in the future; indeed, it has strived to be a purpose built, well planned, and environmentally friendly neighbourhood that meets the diverse needs of the future occupants regarding many aspects, such as health and well-being, facilities, parking and sustainable development targets (Ozturk et al 2010). Therefore, it is important to realise the experiences of those various people when investigating the sustainability or the adaptation in this project, because they present the overall picture of MediaCity's whole community. Indeed, such an evaluation would enable an understanding of the extent to which such strategies have had, or not had, a substantial positive and beneficial impact on employees, residents, students, and also the visitors to this neighbourhood's facilities and its services (Chilaka 2011).

It should be noted that at the time of undertaking this work, this project was still under development. In the future, it is expected to potentially accommodate employment opportunities for 15,500 people, training posts for 1,500 people per year and space for 1,150 media, creative and related businesses (Arayici and Ozturk 2014). According to the Salford Sustainable Community Strategy, MediaCity is one of the development projects which is promoted to foster the agenda of making opportunities for community engagement and recreation, together with employment (Chilaka 2011).

Further, as demonstrated elsewhere, one of the main drivers for this development was the creation of a built neighbourhood area for national broadcasting companies including the BBC (Arayici and Ozturk 2014). The BBC moved around 2,500 staff to MediaCityUK, involving relocating five London-based departments, along with the entire local and network broadcasting. Figure 3-12 shows some of the departments of the BBC & ITV studios in MediaCity. The existence of the BBC, ITV, and other media companies is very important in MediaCity, not least in creating job opportunities for the graduating students of Salford University and to create a learning environment, an issue that is core to the promotion of

communication and learning in the site. These matters, as acknowledged in chapter 2, are central to building community resilience. In addition, having the BBC and media communities at the same site with the students' communities is also important for the creation of local jobs and local employment opportunities, central for the realisation of anticipated economic benefits, although, as stated previously, economics of sustainability development are not within the scope of this work.

Figure 3. 12: BBC & ITV studios in Media City (Photo by author)

Core to the development of MediaCity was also an ambition that it should not be isolated from the other parts of Salford and Manchester, including its deprived surrounding areas. As such, for the local and wider communities there are recreational and leisure facilities, such as piazza, quays and other areas, that have potentially strong positive impacts for wider community cohesion and enhancement of well-being and lifestyle (Ozturk et al 2010). Figure 3-13 shows the Lowry outlet shopping centre and the big open space that has been used to host large-scale social events and activities that are important for the community of MediaCity and its environs. These facilities are also considered important to attract the visitors and tourists to this project as well (Ozturk et al 2010).

Figure 3. 13: Lowry outlets and the open space that is used for the social events and activities for MediaCity community & visitors (Photo by author)

In addition to employees and wider community, students are also considered to form an important component of the MediaCity community. The University of Salford has a reasonably large presence in MediaCity, with a new modern campus for more than 800 students and staff. The university's role in MediaCity is important in promoting opportunities for community development, through enabling skills and creating jobs for local people in order to broaden the focus of the project beyond the external perception of media and business interests (Ozturk et al 2010). As was acknowledged in chapter 2, in order to achieve promotion of resilient communities and achieve sustainable outcomes, the process of inclusion of the wider community members in the planning as well as in the post-occupancy stage is important. Moreover, as discussed earlier, there is a synergy between the university and the media businesses supporting both the students' needs and development as a main part of the sustainable community as well as promoting the sustainability of the national broadcast institutions themselves. Figure 3-14 shows Salford University building in Media City.

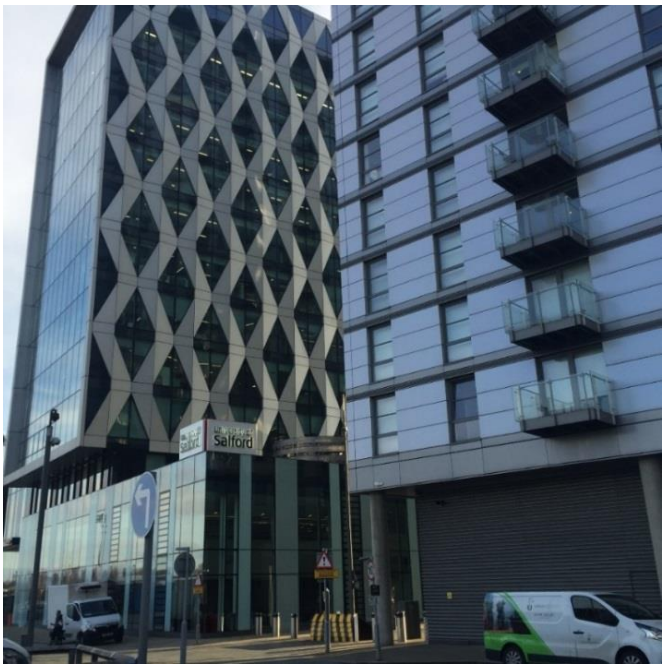


Figure 3. 14: Salford University in MediaCity (Photo by author)

Despite the focus on the community of MediaCity regarding the incorporation of the wide range of sustainability measures and the neighbourhood as a whole, it is suggested that there is still a need for further enhancement regarding the social part, in the matters that relate to housing, health, or parking. Sharifi and Murayam (2014) identified a striking issue that is negatively associated with the creation of an inclusive community regarding the capability of the residents in MediaCity to afford housing in the development, despite BC having a main focus on appropriate housing provision as an indicator that is applied to ensure that there is consideration of this matter. In addition, Salford City Council has reportedly made great efforts towards promoting sustainable community values and a better quality of life, particularly in the housing sector (Ozturk et al 2010).

Chilaka (2011) also mentioned that in MediaCity, there are concerns that affect people's well-being and health in a negative way. Concerns have arisen about safety in public places, including the piazzas and playgrounds, particularly during social gatherings and events relating to the protection of people from crime or attack, as well as other safety issues associated with risks of people falling into the water and drowning, during sport and other activities.

3.6.7 The importance of water sustainability

It should be noted that of all of the factors associated with sustainable environmental performance, this project is regarded as particularly important for water sustainability. MediaCityUK is a 220-ha waterfront development at the site of the former Manchester Docks in Salford Quays. The water supply and demand strategies have taken into account the implications of future growth of the development, including consideration of Climate Change impacts (Final Water Resources Management Plan 2014). As is typical for such a large-scale project within the UK planning system, the plans for water sustainability and adaptation throughout the development were discussed with the Environment Agency to ensure that any key issues or concerns were addressed, and methodologies were agreed on (Final Water Resources Management Plan 2014).

Further, for setting the plan for the future forecast growth in demands for water and how this will be met over the next 25 years, Peel are working with the developers to encourage water efficiency from the outset, building in efficiency in the design at an early stage (Final Water Resources Management Plan 2014).

3.7 Sub-Conclusion

This chapter aimed to explain the selection of BREEAM Communities for the evaluation process as a tool that could enable adaptation in the social context through its indicators at the neighbourhood scale. It briefly reviewed the strength and weakness of BC based on the literature, in association with the importance of this tool for promoting sustainability of communities and governance compared with LEED-ND & CASBEE-UD. Through this process of selection, some gaps have already been identified regarding the relatively weak coverage of the social aspects of sustainability in all of these tools, in common with other neighbourhood sustainability assessment tools. The BREEAM Communities indicators that are associated with the social context have been selected as having the potential to address adaptation with respect to the three identified theoretical approaches selected to inform the evaluation framework in chapter 2.

It has been argued that case studies enable the investigation of the various issues through detailed contextual analysis regarding the main involved actors and their roles, and with understanding the various influenced conditions and their relationships (Zainal 2007). It is demonstrated in this chapter that the case study is considered as an exemplar case study regarding the focus on understanding a certain issue and the actors' behaviours and

perceptions that influenced by this issue. The exemplar methodology is a sample selection technique that involves the intentional selection of individuals, groups, or entities that exemplify the construct of interest in a developed manner (Bronk 2012). It constitutes a detailed examination of a single example, and the study of a single example can provide a hypothesis, which can be tested systematically (Flyvbjerg 2006).

For this research MediaCityUK was selected, not only because of its status as the first project in the world to have applied this tool, but due to the main aspects central to its development associated with community development and sustainability in Salford and the UK. In addition, achieving an 'Excellent' rating through the tool certification process, suggests that its ambitions align closely with those of the tool. Yet, there is little information in the academic literature and policy about this project nor its performance in theory or in practice. It is acknowledged that the selection of the case study represents an exemplar case study, in which the samples of the actors, of the experts and the community are identified for the investigation process. For the MediaCity case study as an example here, the investigation of the BREEAM Communities application process as an exemplary of the evaluation process to examine the contextual factors associated with the role of experts.

This chapter then moved towards identifying the linkages between BREEAM Communities and the other actors in the process, through the context of the MediaCity case study, and then to providing a description of this project and its context. The MediaCity development is used as an exemplar case study to evaluate and analyse the social and governance context, and the extent that the BREEAM Communities tool influences actors and indicators towards addressing adaptation to Climate Change. The research analyses the context, purpose and the main involved actors, and how these are influenced by the methods used (Fitzpatrick 2004), using interviews and questionnaires as main practical methods. Therefore, the practical evaluation of BREEAM Communities influence on addressing adaptation is in need of investigation using practical methods, for both the governance actors and community individuals.

In general, BREEAM Communities resembles the LEED-ND and CASBEE-UD regarding the need for more investigation about the issues that are associated with community engagement and management during the development planning stages and after occupancy. With the absence of community/occupant consultation and on-going engagement with developments, this is particularly lacking in the neighbourhood sustainability assessment tools coverage and specification process (Schweber 2013). In association with the local

communities, it is still not clear to what extent BREEAM Communities connects the local community and the experts to inform a vital part in decision-making and planning. In particular, the interconnection with the local community to make them a valid part in the development process is still in need of further investigation. Therefore, it is a vital matter to investigate the delivery of the main theoretical themes and characteristics among the local community that were identified in the previous chapter, in the sustainable neighbourhood that is certified by BREEAM Communities.

Chapter 4: Research Methodology

4.1 Introduction

This chapter presents the means by which the research methodology for this thesis was devised. It is divided into three main sections.

Phase 1: The first section offers an analysis of the extent to which BREEAM Communities' indicators address the Adaptive Governance, Resilient Communities, and Intermediaries theoretical approaches. The chosen mechanism for the application of a matrix approach is also presented to demonstrate the extent to which the evaluation characteristics are positively or negatively indicated for each of the relevant BC indicators.

Phase 2: The second section refers to the case study research, with Media City, Salford, UK, selected as a case study for the practical analysis process. Qualitative research methods are adopted to utilise the perceptions of both expert and community actors, which are integrated to inform the findings. The decision to adopt both of these types of actors' perceptions was based on the importance of such analysis in previous studies (e.g. Parry et al 2007) in association with the theoretical background of the case study in relation to the integrated approaches adopted in this research.

The methods utilised for this research included questionnaires and focus groups, and in this section, the structure and content of both questionnaires and focus groups are explained, describing their relationship with the evaluation framework developed in chapter 2. Qualitative descriptive analysis using SPSS was utilised to summarise the questionnaire findings, with NVIVO software used to undertake content analysis of the findings from the focus groups. The results are combined in a matrix approach, including expert and community opinions and evaluation of the BREEAM Communities indicators, to identify those characteristics that have a negative influence on the delivery of adaptive capacity.

Phase 3: The third section presents proposals for enhancement of the BREEAM Communities process where Adaptive Governance, Resilient Communities and Intermediaries characteristics were found to have negative performance that influenced the role of BC as either an intermediary or mediating party. The validation

of results through further interviews with experts was also conducted to inform this final phase of the research.

4.2 Research Structure

Three theoretical approaches, Adaptive Governance (AG), Resilient Communities (RC) and Intermediaries (I) were identified as being central to the promotion of adaptive capacity in response to CC. It was further established that Neighbourhood Sustainability Assessment Tools (NSAs) have the potential to integrate these three theoretical approaches in a social context at the neighbourhood scale. Nine main themes and 20 associated characteristics of AG, RC, and I theoretical approaches were thus established from literature.

The first phase of this study thus aimed to theoretically evaluate these characteristics against a case study NSA. As argued in chapter three, BREEAM Communities was selected for this study based on the potential that this tool has shown in both theory and practice. In the second phase of the work, the impact of integration of a full range of actors' perspectives on the results of the application of the NSA to a project was recognised as an important part of the evaluation process, ensuring that the reality of the application of the tool, including the impacts of the selection and implementation of indicators, is based on the actors' own thinking, values, and experiences (Hyytinen et al 2014). Utilising the perspectives of the communities that actually live, work, and study in the resulting built environment provide a vital perspective for this study.

This study adopts a combined approach and seeks to address the research questions through developing a methodology that combines theoretical evaluation of the NSA's indicators with analyses of the actors' perceptions. The integrated approach offers an analysis of the BC indicators relating to governance and community levels (23 indicators) as identified in chapter three. The BC theoretical indicators' performance, experts' perceptions, and community perceptions of Media City are thus analysed in relation to the AG, RC, and I characteristics. Figure 4-1 more clearly outlines the integrated methodology used.

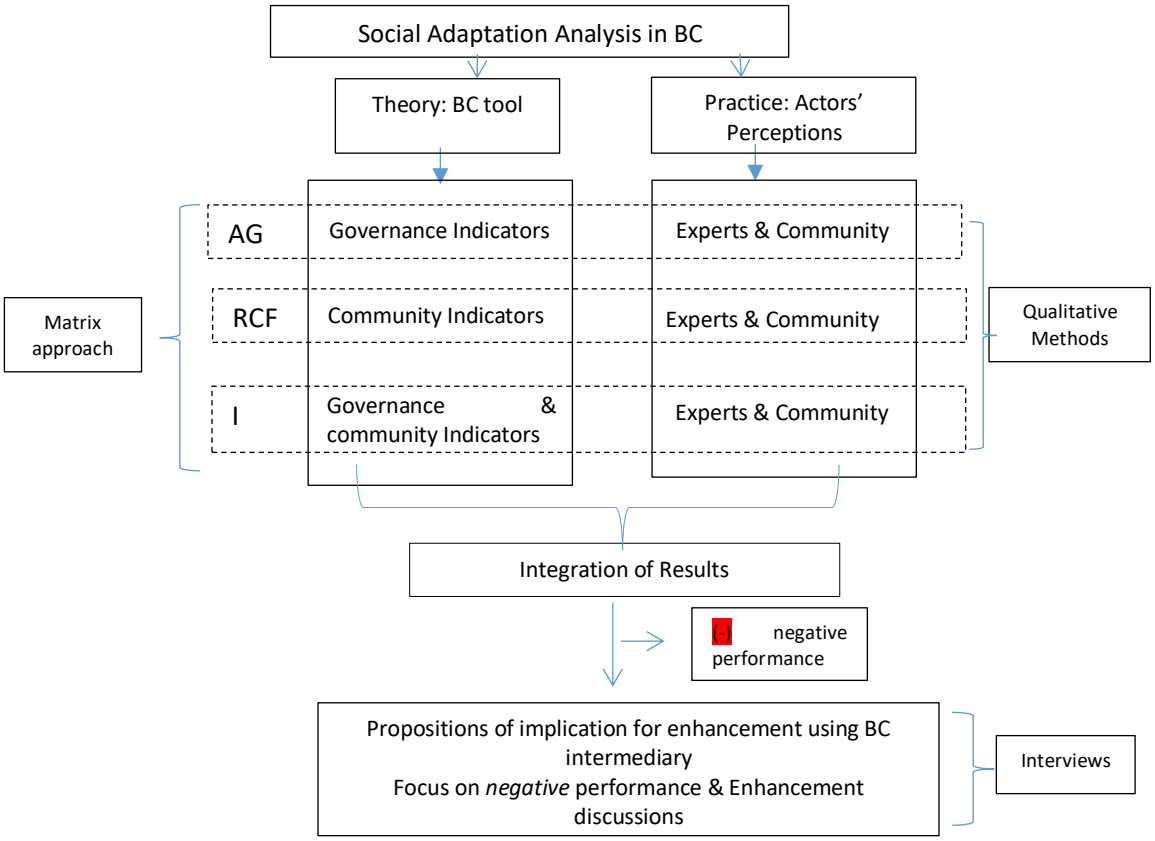


Figure 4. 1: The research methods applied

4.3 Phase 1: Evaluation of the Theoretical Adaptive Capacity enabled by BREEAM Communities' Indicators in the Social Context

It has been argued in the literature that there is a need to discover the measured issues and this is the purpose of NSA indicators (Orova and Reith 2013). Analysing the indicators' role as main components of NSA tools, and examining how they are applied, can thus provide various options for the delivery of both sustainability and resilience (Tyler and Moench 2012). It appears, however, that in the context of existing literature, an integration of the methods for assessing both adaptive capacity and resilience in the context of sustainability assessment tools has not yet been undertaken.

With regard to resilience and its relationship with sustainability indicators, the performance analysis of both is important when addressing adaptation. Matthews et al (2014) argued that

there is a need for an exploration of the connections between resilience and sustainability indicators. In addition, investigation of sustainable development indicators that may negatively or positively impact resilience is also warranted.

For this research, the analysis of the 19 selected BC indicators' performance in relation to the characteristics of the three theoretical approaches is undertaken by means of a matrix approach. Danilovic and Sandkull (2005) in particular acknowledge that matrix representation makes it possible to create a more comprehensive model of the information flows and interdependency analysis when describing and analysing complex projects.

4.3.1 Phase 1 Method: Matrix Approach

The social context in BC is largely manifest in the two categories: Governance and Social and Economic Well-being, which have 4 and 15 indicators, respectively.

The application of the three theoretical approaches that were developed in chapter 2 to evaluate BC indicators was undertaken through the exploration of the linkages between the established evaluation characteristics and the relevant identified BC indicators. Through content analysis of the BC documentation, the theoretical ability of each indicator to address adaptation was thus established.

Sharifi and Yamagata (2016) argued that an exploration of the relationships between indicators/criteria and resilience characteristics should be undertaken in order to understand the former's efficacy. Further, as acknowledged in chapter 2, adaptive capacity and resilience are two interconnected methods or concepts that are target CC adaptation. The approach thus advocated for assessing the adaptive capacity of the BC indicators is to apply not only those characteristics associated with RC but also those that relate to the other theoretical approaches.

Evaluating the indicators against each of these characteristics in a matrix can thus be useful to indicate the estimated performance of each indicator in each cell (Fox-Lent et al 2015). For both positive and negative scenarios, the degree to which each indicator promotes strategies for CC adaptation, can be differentiated, and some indicators may be found to show a higher degree of focus in promoting certain evaluation characteristics, while for other indicators, less focus may emerge. In order to enable the assessment process using the matrix approach effectively, a scale is applied so that the results of the matrix method application can be compared, and a combined evaluation across the identified characteristics for each

theme adopted. Table 4-1 below shows that there are 5 ranks in the scale of assessment applied, ranging from more positive scenarios, at +2, scaling down to -2, which is associated with strong hindrance of the adaptation process.

Table 4.1: Proposed categories for the application of a matrix approach method

Positive or Negative	**Categories for the resilience assessment framework**		
	Ranks	Scale	Description for the application in the assessment process
Positive (+): Promote Resilience	• More Potential to Promote Resilience	**+2**	Where the Indicator has a clear focus on the characteristic to address adaptation
Positive(+): Promote Resilience	• Potential to Promote Resilience	**+1**	Where the Indicator has a focus on the characteristic to address adaptation
Neutral: Neither Resilience Promoted nor Hindered	• No Real Potential to Either Promote or Hinder Resilience	**0**	Where the Indicator has no potential to either support or act against the adaptation characteristic
Negative (-): Hinder Resilience	• Potential to Hinder Resilience	**-1**	Where the Indicator doesn't have enough focus on adaptation characteristic
Negative (-): Hinder Resilience	• More Potential to Hinder Resilience	**-2**	Where the Indicator doesn't have enough focus on adaptation characteristic

Indicators are thus evaluated as having a positive, neutral, or negative influence on performance when applied against the 20 characteristics of the three theories (RC, AG, I) demonstrated in chapter two, (see table 2.10 on page 58). These indicators of BC are the main target for the evaluation process, and the main documentation used is the manual of BREEAM Communities (2012). However, other documentation is used relating to key studies found in the literature review and examples of the sustainability of communities and their adaptation to CC. These are referred to where appropriate in the evaluation chapter.

The BC manual offers a full description of the indictors of the BC, including implementation methods, and weighting approaches. For evaluation processes using this method (matrix approach), where the indicators show a sufficient focus, or information that relates to the characteristics of the three theories exists in that indicator clearly, the indicator is considered to have a clear focus on that characteristic with positive performance; that is, it is deemed to promote resilience. The lower the focus that the indicator has in relation to the investigated characteristic, the more negative this indicator is deemed to be. Therefore, when an indicator shows very limited focus on a certain characteristic in the BC documentation, such that it is

likely to be insufficient to ensure that a project would address this characteristic, then this indicator is evaluated as having a negative performance; that is, it hinders resilience. The degree or extent to which the indicators of BC have either positive or negative influence in relation to the characteristics of the three theories is, therefore, dependent on the extent to which the focus on each characteristic is manifest in the indicator description in the BC manual. Where there is a very limited mention or no mention at all for the characteristic in the BC indicator, this indicator is considered to have negative potential, ranked -1 or -2.

Finally, if the focus of the indicator shows neither a positive or negative influence on the focus of adaptation to CC regarding the investigated characteristic, the indicator is considered as having neutral performance and ranked as 0, as shown in the table and in figure 4-2.

4.4 Phase 2: Evaluation of the Practical Application of BC in the Media City case study

Berardi (2013) suggests that case study research undertaking analysis of the application of existing NSAs, including BC, in a range of case studies could help researchers to understand the limits of these tools. The next phase of this research responds to this need by exploring the practical application of the BREEAM communities NSA to the Media City regeneration and development project. Further, in line with Few et al's (2007) call for further work to explore actors' participation in this process, this work seeks to apply this important method in the investigation to practical research.

The inclusion of the responses from a wide range of actors is important for research associated with CC. However, it is still far from being the focus of much literature associated with adaptation to CC (Few et al 2007). In order to understand climate adaptation capacity in asocial context in relation to CC, research must begin to focus on the actors' perceptions in order to explore and determine actions and strategies that might be effectively applied to manage the impacts and the potential risks of CC (Simonsson et al 2011).

It is thus this work's contention that seeking to achieve an understanding of the actors' perceptions is very important, as the sustainability development process and adaptation planning and implementation are highly influenced by the various actors' opinions and roles. This also necessitates the incorporation of the views of various experts involved in the planning and implementation process; however, there is still a lack in this area in the current

research and literature in the investigation of resilience. For example, Stevenson and Petrescu (2016) demonstrated the lack of research on the role of designers as important collaborators in the organisation and capacity-building of resilient communities and on the processes and strategies associated with neighbourhood resilience.

Thus, the perceptions of both experts and community are deemed highly important for this investigation into the application of the evaluation characteristics related to the three theoretical approaches. Both qualitative and quantitative methods are also adopted to facilitate better investigation of these perceptions.

In terms of the enhanced analysis of BC indicators, integration between the theoretical stage and the practical stage is needed to decide on the final enhancements needed. Thus, the final decision regarding the scope and focus of the enhancement process cannot be decided until a practical evaluation has been undertaken. The discussion of the results and the implications for enhancement based on both theory and practice is thus important, as it is possible that the theoretical evaluation of an indicator and characteristic may be negative, while in practice its characteristic is positive.

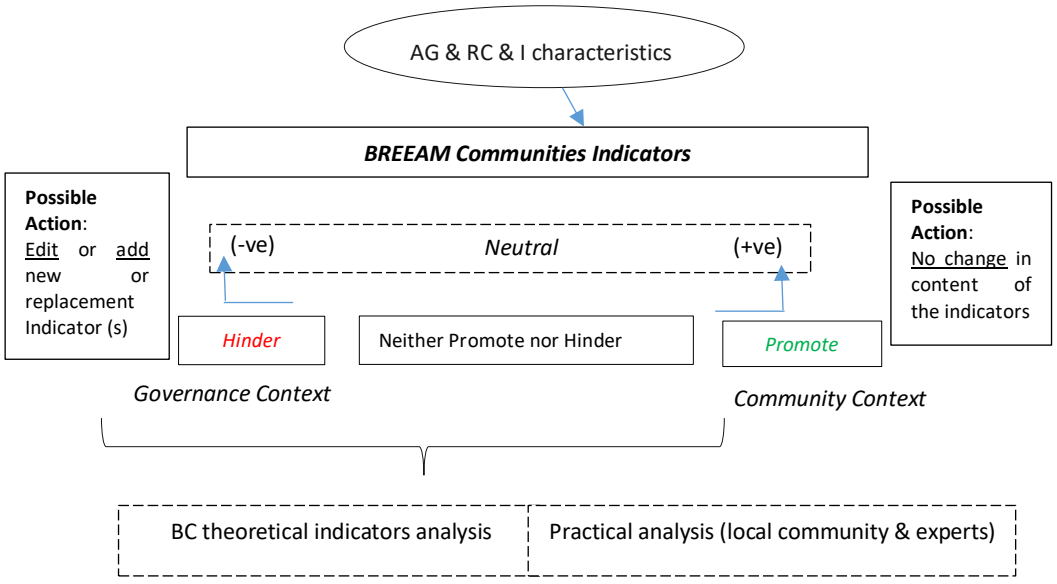


Figure 4. 2: Analysis of the matrix approach regarding the relationship between the BC indicators and the characteristics of the AG, RC, and I theories

An example of the application of the matrix approach for the theoretical evaluation of BC indicators against characteristics associated with a given theme is presented in table 4-2. The interpretation of the resulting evaluation matrices is undertaken first to identify the indicators with negative performance. Then, experts and the local communities'

identifications of indicators with negative performance are integrated, as table 4.2 shows. Then, indicators with negative performance are prioritised. Thus, in the example below, C.3 is prioritised, with indicators C.4, followed by C.2, taking part in the enhancement discussion. As C.1 is considered to have better performance, it is not prioritised for the discussion about enhancement. A practical application of this method is demonstrated in chapter five, and table 5-2 shows analysis of the characteristic C.1 of the AG, Broad inclusion of actors for Effective Management, which it belongs to the first theme, AG-1: Extended collaboration process. For this example, the mandatory indicators show a positive performance, while the optional indicators are neutral. Then for the practical investigation, the experts have positively indicated, while the community has referred to this issue negatively. In the Intermediary investigation part, as demonstrated in tables (5-56) & (5-58), the role of BC as intermediaries or mediators is identified if its positive or negative, which in this case it was neutral except the GO04 indicator(negative). Therefore, an enhancement will be proposed to the GO04 indicator regarding the C.1, as demonstrated in chapter 6, based on the experts' interviews and literature.

Table 4.2: An example for the application of the Matrix approach to the BC indicators

Theme	Ch.no	Scenario No. Context Name				Experts	Local Community
		Indicator1	Indicator 2	Indicator 3	Indicator 4		
Theme _ No. XXX	**C.1**						
	C.2						
	C.3						
	C.4						

4.4.1 Phase 2 Method: Actors' Perception Analysis

Qualitative research methods seek detailed descriptions of specific situations, and such research explores the meanings, concepts, definitions, characteristics, and descriptions of things (L Berg 2001). In this research the aim of using qualitative methods is to understand the performance of the characteristics that relate to the AG, RC, and I that influence the adaptation of the Media City neighbourhood project based on the perceptions of a breadth of actors, both experts and from the community. Qualitative research methods are important as they appropriately seek answers to questions by examining how humans arrange

themselves within their environments through mechanisms such as social structures and roles (L Berg 2001). In relation to certain findings, however, quantitative analysis of questionnaires was also undertaken in order to enable interpretation of the results. Such findings are embedded in the overarching qualitative approach to the research in a QUAL (Quant) format.

For this research, interviews, questionnaires and focus groups were used to gather the data from various actors. These methods were integrated to allow the flexibility in accessing data, which was linked and analysed based on the indicators of the BC. The use of questionnaires and interviews has been acknowledged as being useful in contributing directly to the evaluation of performance of indicators, as they allow the various participants such as experts, residents, or end users offer their views on the indicators (Hemphill et al 2004).

In the following sections, the methods used are discussed in more depth to allow development of an understanding of their application, structure, sampling, coding, data collection, and analysis.

4.4.1.2 Pilot study: Experts' Semi-structured Interviews

Before using the questionnaire and interviews within this research, a pilot study was conducted. A pilot study is part of the first phase of a research procedure, following the literature review, and the general goal of a pilot study is to provide information to contribute to the success of the research project as a whole by allowing useful amendments to the instruments used for data collection (Calitz 2009). According to Calitz (2009), a pilot study has the following advantages:

- It can give advance warning about where the main research project may fail;
- It indicates where research protocols might not be followed;
- It can identify practical problems associated with the research procedure; and
- It indicates where proposed methods or instruments are inappropriate or too complicated.

In general, the rationale for a pilot study can be grouped under several broad classifications: process, resources, management, and scientific. Conducting a pilot prior to the main study can enhance the likelihood of success of the main study and potentially help to avoid doomed main studies (Thabane et al 2010). It also allows pre-testing or 'trying out' of a particular research instrument design (Teijlingen and Hundley 2002).

Experts' perceptions are essential when investigating the practical assessment of sustainability practical development (Hemphill et al 2004). As a part of the pilot study for this phase of the research, two interviews were thus undertaken with the BRE Director and BC Assessor (August 2016) and the main Sustainability advisor and energy consultant for Media City (November 2016).

A semi-structured interview was conducted to understand whether the prepared questions or the main focus of these questions is right, or there is a need to change or add things. Mainly, a semi structured interview is conducted as there is a need have the interviews in a conversational way. The semi-structure is a verbal interchange wherein one person, the interviewer, attempts to elicit information from another person through asking direct questions. The interviewer prepares a list of questions in advance, but a semi-structured interview reveals answers in a conversational way, allowing the respondent the chance to explore issues they feel are important (Longhurst 2003). Semi-structured interviews and focus groups share some similar aspects in that they are conversational and informal in tone (Longhurst 2003). Therefore, the choice of this type of interviews is preferable, compared with the structured interviews, where the questions are predetermined and identified in advance, or unstructured interviews where there are no questions prepared. Whilst here, the interviews are as a mix of both.

It was important to have this initial conversation in order to check the relevance of the selection of experts as well as to identify appropriate ways of approaching them, as in context it can be very difficult, if not impossible, to identify the real users of NSA tools (Sullivan et al 2014). This initial discussion with the assessor can also be described as a '*preceding'* process, a scoping study that helped to structure the main questions in the identified categories. This was, however, still a challenge as the first phase of the Media City project had been completed for 12 years by the time this study began, and several key actors were thus no longer in the same professional posts.
Therefore, the pilot stage was important to address several questions for this phase of the research:

- to gain more insight into the tasks of the assessors during the development process;
- to identify the aspects of this research that still needed further investigation in relation to the case study; and

- to identify any questions proposed within the proposed questionnaire for professionals that were unclear, too complicated, or required further explanation; The findings of this pilot phase relating to the questionnaire(s) are discussed in section 4.4.1.2

The initial interview with the BRE director, who was also the BC assessor, was conducted as a preliminary step in the designing of the questionnaires. A semi structured interview was thus conducted with BC assessor to test the relevance of the proposed questionnaire methodology and to identify potential professional actors within the case study who might usefully be approached. The validity of the questionnaire was also examined in the pilot study research to test the validity of the questions. This *Expert Sampling* was important as a positive tool investigating whether the research questions were relevant as well as allowing the researcher to identify an appropriate sample. Expert sampling is particularly useful where research is expected to take a long time before it provides conclusive results or where there is no clear information about the topic yet; as such, it is usually undertaken in the very earliest stages of research (Etikan et al 2016). Importantly the interviewees both provided some points regarding the roles of the main parties involved and agreed that Media City would provide a useful case study as an important project addressing sustainability targets that still needs more research.

4.4.1.3 Method 1: Experts' Perceptions Questionnaire

Questionnaires are a traditional approach for collecting the data explorative research where the perspectives and views of respondents are most relevant. The questionnaire used in this research was cross-sectional in design, meaning that it collected the information at a single point in time (Mathers et al 2007). A questionnaire was selected as a means of data collection for this research as personal interviews with the experts proved not to be feasible, as most of the experts involved in the design and development of Media City had changed positions or even left the country after the first phase of the project was completed. Thus, as many were no longer working in organisations or posts associated with the project, they would have found it difficult to give time within work hours to the research work, and may not have been inclined to offer "free" or non-work time to a work-focussed subject. Thus, a questionnaire was considered to be an effective alternative tool, as this is were not limited by the geographical spread of the sample. Further, questionnaire surveys can be undertaken using a wide range of techniques, including postal and telephone interviews, and can still be

utilised to generate rich data which can be used to draw conclusions about a whole community or project from a relatively small sample (Mathers et al 2007).

Following the initial development of a draft questionnaire, the pilot phase reported above was undertaken, and as a result of discussions with the two experts in the pilot, the questionnaire was cut down, with some questions embedded that were not appropriate for experts to respond to were removed. However, most questions were considered to be relevant, albeit with further editing to clarify meaning and improve sense and readability. The structure for the pilot interviews is presented in Appendix (A), and the final questionnaire is reproduced in Appendix (B).

A final stage of piloting was then undertaken after the final questions for the professionals, 36 in total, were formulated. The validity of the questions was tested by undertaking a further pilot survey among 4 PhD students from a range of relevant disciplines. This pilot survey showed that the respondents understood what was asked by each question, and the time taken for each respondent to fill in the questionnaire was within a reasonable scale (20 mins). Some further modifications were made to the presentation of the questionnaire and the wording of some questions based on the feedback from this final testing phase, however.

The questionnaire was applied to investigate in practice the performance of the AG, RC, and I characteristics in the Media City case study. The questions were thus structured around these characteristics' context and meanings. Investigation of each of the 20 characteristics that were extracted in chapter 2 was undertaken within the questionnaire, and thus Likert scale questions were mostly used. There is wide usage of the Likert scale in the social science literature to test responses to various issues, such as in market research, with labels attached to each point (Garland 1991). A Likert scale comprised of 5 or 7 ranks is used widely, and this is considered a typical Likert scale. Usually, five ranks are considered convenient so as to not to have too many items at the end of the questionnaire (Oppenheim 2000). Thus, the respondent is asked to tick one of the choices (strongly agree, agree, uncertain, disagree, and strongly disagree) (Oppenheim 2000).

The analysis in this case is qualitative and not quantitative, and accordingly, the relevant comments of respondents for both positive and negative perspectives are illustrated. The 20 characteristics were embedded in the questionnaire, and the expert respondents were asked to address whether each characteristic (or aspect of a characteristic) was considered a positive, negative, or neutral issue in the development proposed for Media City.

Table 4.3: Professionals' Questionnaire Parts and Contents

Questionnaire Parts	Contents of the Parts/ Number of questions	
Part 1	Perceptions of CC and Adaptation process strategies, and Water sector	8
Part 2	General Perceptions of living in Media City and sustainability	8
Part 3	Perceptions and Knowledge about BC	8
Part 4	Perceptions of the implemented physical strategies for adaptation of facilities in their neighbourhood, and the delivery of social aspects	12

However, there were some limitations to this questionnaire, regarding the structure in particular. It is important to mention these limitations, and the next section thus offers an explanation of the scope of the questionnaire and the identified limitations of this methodology.

4.4.1.3.1 Professional Actors' Questionnaire: Scope and Limitations

This section aims to explore the scope of the questionnaire in more detail in order to explore and evaluate any limitations of this methodological approach in this context. As Oppenheim (2000) demonstrated, topics that are associated with social behaviours, awareness, learning, understanding, and similar topics are considered the most difficult topics when making questionnaires that aim for clear measurement.

Sample size:

In order to promote adaptation to CC in the social context at the neighbourhood scale, knowledge of the governance level or top-down perspective is highly important in terms of making decisions that influence the community and the development process. As seen in chapter 3 regarding the selection of the Media City case study, discussing the role of the governance in Salford for the development of Media City project showed that when the BC is included, central figures emerged that had a role in the planning and the delivery of the outcomes in Media City. The decision-making process was thus undertaken by actors with the following roles, for whom it was important to have representation during this phase of the research:

1. BC Actors
2. City Councillors

3. Urban Planners
4. Developers/Managers
5. Water experts
6. Professional Engineers
7. Architects

Questionnaires were sent to groups of these respondent types with the aim of getting responses from 21 respondents (3 of each of the 7 respondent types); however, in reality, responses were received from only 13 expert actors in total, as table 4-4 illustrates.

However, these experts' respondents had intimate engagement with the process of design for the project and the implementation of BC within this project was considered extremely important to the research findings; thus, their responses represent their knowledge, expertise, position, and influential involvement in the Media City project. Fortunately, all types were also represented in the sample.

Table 4.4: Respondents from the Media City case study

Case Study	Actual Number /Respondents	Experts Respondents	No.
Media City/ Salford UK	13	1. BC actors	2
		2. City Councillor	1
		3. Urban Planners	2
		4. Developers	2
		5. Water engineers	2
		6. Professional Engineer	2
		7. Architect	2

- **Question structure and analysis:**

Before identifying the questions and their relationship with the themes and characteristics of the theoretical approaches, the challenges and limitations in the approaches selected must be considered. One possible limitation of this study relates to the selected question structure and subsequent analysis and investigation of the characteristics' performance, whether positive, negative, or neutral. In order to reflect the evaluation of the process implemented in Phase 1, all the questions provided opportunities for a full range of

responses. However, it is sometimes argued that, for Likert scale analysis, it can be best to not to have too many neutral items or indeed too many extreme items (Oppenheim 2000). However, allowing a neutral point could add balance to the other scores, especially where extreme positive and extreme negative scores are available (Oppenheim 2000).

For questions with no obvious neutral option, the options provided were either “I do not know” or “Not applicable”. These response options provided opportunities for respondents to indicate where BC did not address a characteristic, in close alignment with the neutral response used in the evaluation in phase 1. This option gave them the freedom of not committing to answering a certain question, and, more importantly, did not force the respondents to give meaningless or false responses (Oppenheim 2000, P129).

However, where characteristics were found to be explicitly evident in BC documentation, the professionals were encouraged to decide whether the implementation of BC in practice had either a negative or positive impact. In the questionnaire, two types of questions were used, closed and ranked scale questions. The closed questions were used when the response was a specific, such as knowing the main parties that are responsible for initiating the measures that are responsible for CC adaptation, as Q10 & Q11 illustrate.

As understanding the positive and negative performance of the characteristics was the main aim, all the questions offered options that required positive and negative ratings based on Likert scale questions. However, there remained some mismatch between 3, 4, and 5 rank questions. Ideally, all ranked questions should be constructed with the same ranking scales, and typically, the five categories scale is the most common, as Jamieson (2004) indicates. Mainly the 5-rank questions were used for example, in Q26, when there is a need to understand the extent that the options that associate with (collaboration, communication, information availability…etc) through BC are available? Five ranks (Strangely Agree, Agree, Neither Agree or Disagree, Disagree, Strongly Disagree) were available.

For the 4 ranks questions, the questions mainly lack the neutral option. However, Oppenheim (2000) suggests that the neutral point on the scale is not necessarily the midpoint between the two extreme scale scores, and it is thus difficult to interpret. Brown (2000) believed that the decision belongs to the researcher with regard to the kinds of information sought from the questionnaire. For the 4-rank questions, for instance (Q30), to understand the influence of BC on knowledge and awareness through such options (address feedback, make workshops, monitoring reports and programs…etc), where the options (Never, Sometimes, Often, and Quite Often) were used. For analysing the data, both never and sometimes were deemed negatively points, while the other two options were positive points.

So, the response scales for these questions were crafted such that they enabled this interpretation. Notably, some questions were worded such that there is an implicit negative, neutral, or positive interpretation is associated with the multiple choices in the questions. Regarding this, Oppenheim (2000) provides the following example: “How much trouble have teeth and gums been to you throughout life?” The response options for the question are (1) A lot of trouble. (2) Some trouble. (3) Little trouble. (4) No trouble.

Similar situation were found for the other questions with four ranks However, there were no serious consequences for the final phases of this research from this, as the key aim of the work was to identify areas in need of enhancement by building upon those characteristics that actors considered to be negative, a goal supported by this methodological approach.

For the 3-rank question, these questions were used to understand whether certain outcomes are well delivered or not when BC is applied in MediaCity. For instance, in Q33, three ranks (Not well delivered, Well Delivered, Very Well Delivered, and I do not know) were utilised. For the analysis of this question, the options associate with the delivery of physical and social outcomes that associate with post occupancy are utilised such as: (quality of physical facilities, occupants’ responsibility to resources usage, community collaborative thinking on risks time…etc). For this question, it was not a priority to have wide range of ranks, as based on the literature, these options should be delivered in a sustainable context. However, the extent that that these options are positively considered was the aim, with identifying the negativity if existed as well. So, for the analysis of this questions, it was easy to use the ranking to identify the positive and negative aspects.

Another important issue that needed to be considered for this questionnaire was the engagement and maintenance of the co-operation of the respondents through making the mode of response more attractive (Oppenheim 2000). In order to promote engagement with this research, it was important to minimise the time taken to complete this questionnaire; thus, the majority of the questions involved ranking, due to the relative ease and speed of such responses (Oppenheim 2000). When using the closed questions, in order not to cause respondents feelings of irritation and injustice, the choice of providing an ‘other’ response or option can be important (Oppenheim 2000). Similarly, an “I do not know” option is important to acknowledge the possibility that the respondents do not know the answer. This was implemented where relevant.

For the questionnaire analysis, the main findings of the questionnaire were analysed using IBM SPSS. Descriptive statistics analysis was adopted for an analysis of the experts’ responses to the questionnaire, with the purpose of this analysis being to investigate the experts’ perceptions of the performance of the main applied characteristics of the Media City project,

in which BC was applied in the design and development process. As such, the analysis is considered to represent the perceptions of the governance actors. It should be noted that the appropriate sample size for such analysis is dependent on various considerations, such as comparisons of the sub-groups, estimated accuracy, problems of statistical significance, and time and resources (Oppenheim 2000). The main aim of issuing the questionnaire to the experts was to understand their perceptions of the various issues associates with the process of including BC in governance and community preparation processes for CC adaptation and sustainability. As such, the size of the sample itself is less important, as the sample accuracy is more important (Oppenheim 2000). This mirrors a study undertaken by Grade (2009) to examine the extent to which the category of Planning and Design was incorporated into LEED-ND projects; that study was based upon the responses of 11 experts to the issue. Similarly, a response rate of 13 can be deemed as a valid number for the current research.

In the descriptive analysis, the Mean was used in order to investigate the importance that the experts gave to the constituted options and to investigate whether the options that represented the associated characteristics were deemed to be either positive or negative in terms of their performance from the perspective of the experts. The aim of this type of study is to gather opinions and to draw predictions from this without over-interpreting the results or findings, as Oppenheim (2000) indicated. A full analysis of the results for the questionnaire is found in Appendix C.

- **Examples of the questions and their analysis:**

The relationship of the 20 characteristics with theories AG, RC, and I was thus linked to the questions' content. Despite the coverage of these characteristics by the questionnaire, it was necessary to structure the questionnaire in a way that eased the flow of understanding and themes from the respondents' perspective; thus, the approach taken in the questionnaire design was to place questions into thematically relevant sections rather than strictly adhering to the themes and characteristics, especially as many questions and their responses held relevance across characteristics. Table 4-8 below illustrates the relationship between the main themes and characteristics of the AG evaluation framework, including relevant questions and sub questions. The analysis and results chapter, chapter 5, offers the methodology for the characteristic analysis resulting from this complexity in full.

Table 4.5: AG themes and characteristics and the relevant question numbers and options

AG Themes & Characteristics and relationship to questionnaire contents				
Themes	**Characteristics**		**Question No.**	**Sub-Questions**
AG-1: Extended collaboration process	C.1	Collective and Broad Decentralization of Decisions for Effective Management	10	All
	C.2	Strong Local Institutions support	17	All
AG-2: Build knowledge and understanding	C.3	Focus/Incorporation of information and understanding the impacts of CC& Potential Risks	7 8 11	All All A
	C.4	Shared/Participatory Ways of Knowledge	26	B, E
	C.5	Include the ways that consider increasing the physical performance of facilities	29	All
AG-3: Continuous monitoring & evaluation	C.6	Inclusion of Risks Monitoring Tools for Continuous Evaluation of Development Facilities	34 30	C D,E
AG-4: Develop capacities with CC impacts	C.7	Develop the possible actions in facilities in response with the protection from flood risks	27	All

The approach to the relationships between the questions posed and the theoretical approaches' themes and characteristics is described further below.

Table 4.6: Example: AG-1: Extended collaboration process characteristics and associated questions

Example: AG-1: Extended collaboration process				
C.1: Collective and Broad centralization of Decisions for Effective management	**Q10**	**To the best of your knowledge, who are the main party/parties that have responsibility for initiating/addressing climate change adaptation measures? You can select more than one. Required**	Yes	No
	A	Municipal Government _ CCA		
	B	Non-Government Organisations _CCA		
	C	CC Institutions _CCA		
	D	Sustainability Assessment Tools_ CCA		
	E	Academic Organisations_ CCA		
C.2: Strong Local Institutions support	**Q17**	**What are the main sources for climate change information for community scale projects, such as Media City during the decision making? You can choose more than one option. Required**	Yes	No
	A	Government Agencies _CC		
	B	Non -Governmental organisations _CC		
	C	International Organisations _CC		
	D	Climate change institutions _CC		
	E	BC _CC		

In terms of the focus on AG characteristics for the first theme, AG-1, as seen in table 4.9, the two characteristics associated with the collaboration of various actors were C.1: Collective and Broad Decentralization of Decisions for Effective Management and C.2: Strong Local Institutions support. In the analysis process, it was important to understand that the first characteristic was associated with understanding the various parties included, to promote collective action toward addressing adaptive governance and management; the five points indicated in Q.10 were important for this purpose. Similarly, the options in Q17 were related to C.2 in terms of understanding the roles of various institutions in the governance process reacting to CC and the provision of information. These various institutions took on the role of parties that are linked to CC adaptation, as indicated in chapter two, and included government and non-government institutions, international institutions, and CC and BC institutions. Regarding the analysis for these two characteristics, "yes" indicated a positive response, while "no" was associated with a negative response. Thus, across these actors and questionnaire respondents, the more "yes" responses, the more these characteristics are considered to be positive. A detailed interpretation of the combined responses to the questions that constituted the respondents' perspective on each characteristic is presented in the analysis sections for each characteristic in chapter five. With regard to the second theoretical approach (resilient communities), as table 4-10 illustrates, there were five relevant characteristics that were correlated to three questions (Q11, Q33, and Q34):

Table 4.7: RC themes and characteristics and the relevant question numbers and options

RC themes & Characteristics and their relation to the questionnaire contents				
Themes	**Characteristics**		**Question No.**	**Sub-Question**
RC-1: Nature of Community	**C.8**	Community feeling of attachment & social engagement	11	D
RC-2: Community adaptive behaviour towards their facilities and built environment	**C.9**	Increase the Level of Learning and awareness knowledge and information accessibility	34	A, B
	C.10	Effective & Responsive Behaviour for Risks	33	A,B
RC-3: Community Well-being	**C.11**	Increased Satisfaction with Physical strategies	33	G,C, E
	C.12	Enhanced delivery of human Health and well-being	33	F

The approach to the relationship between the questions posed and the theoretical approaches' themes and characteristics is described below.

Table 4.8: Example: RC-2: Community adaptive behaviour towards their facilities and built environment characteristics and associated questions

Example: RC-2: Community adaptive behaviour towards their facilities and built environment							
C.10: Effective & Responsive Behaviour for Risks	**Q33: Please indicate the extent to which the following aspects have been delivered as outputs of the Media City project? Tick one box for each point**		**Not well delivered**		**Well Delivered**	**Very Well Delivered**	**I do not know**
	A	Community responsibility towards using the water resources					
	B	More collaborative thinking among the local community when problems occur regarding the climate change impacts					
	C	Sufficient amounts of good quality freshwater available for occupant's usage					
	D	Occupants Capability to understand the physical applied outcomes (water facilities in buildings)					
	E	Mechanisms for receiving technical support for the water facilities and services after the occupancy stage					
	F	Providing Public health Surveillance for the facilities and community					
	G	Long term efficiency of the water fixtures at the neighbourhood scale					
C.9: Increase the Level of Learning and awareness knowledge and information accessibility	**Q34: To the best of your knowledge, does BREEAM Communities need more focus to address the following issues for long-term adaptation**		**Not at all**	**Low Extent**	**Medium Extent**	**High Extent**	**I do not know**
	A.	Providing and accessing long term information regarding climate change impacts that are used by various social networks					
	B.	Ability of the local community to access the risk information when risks occur					
	C.	Organizing monitoring reports after the occupancy stage					
	D.	Inclusions of plans for health surveillance issue in PO					
	E.	Community responsibility for understanding the technical issues and fixtures in PO					

With regard to the focus on RC characteristics for the first theme RC-2, the two characteristics associated with Community adaptive behaviour towards their facilities and built environment are C.9: Increase the Level of Learning and awareness knowledge and C.10: Effective and Responsive Behaviour for Risks. For these two questions, both points A and B are linked to and associated with these characteristics, while the other points are linked to other characteristics, as table 4-11 shows. This compilation of associated sub questions across characteristics, rather than separating questions associated with each characteristic,

was intended to make the questionnaire as short as possible. In terms of the interpretation of responses, in the example of C.9, this related to the two options in question 34. Thus, where the experts' response was ''no need for enhancement" or "to a low extent", positivity was associated with this characteristic, while where the experts identified a "medium or a high level of enhancement" was needed, these responses were associated with a level of negativity with regard to this characteristic. Similarly, for C.10, Q33, if the experts thought that these points were "well delivered", then these characteristics were considered positive here, whereas, if the experts selected "not well delivered", these characteristics were deemed negative. Such negativity was the most important scenario, as this questionnaire aimed to identify this in all 20 characteristics. For the I evaluation analysis, the investigation of the BC's role as an intermediary in Media City, from Q30, is reproduced below. The characteristics are shown in table 4.9.

Table 4.9: I themes and characteristics and related question numbers and sections

Intermediaries' themes & Characteristics and their relation to the question's numbers and sections				
Themes	**Characteristics**		**Questions**	**Sections**
I-1: intermediaries' role in facilitate knowledge	**C.13**	Information availability & interpretation	16	All
	C.14	Communication between departments	26 30	C,D,E A,B
	C.15	Long-term programmes for community organisation capability and adaptive behaviour	30	E, F
	C.16	Bottom- up feedback from iterative process of adaptive social learning	30	B
	C.17	Training and educational programme	30	C
I-2: Mediators roles making the social change	**C.18**	Create the Network and identify the targets and strategies	26	A
	C.19	Understanding the nature of community and enable their active involvement & participation	34	B
	C.20	Information update and translate the information	30	F

The related questions options and numbers are shown in table 4-13, where it can be seen that for question 30, for instance, C.16 (Training and educational programme) was linked to theme I-1: Mediation between different actors to facilitate knowledge transfer & Learning, related to option (C) of this question, whilst options B and C of the same question were related to C.15 (Communication between departments).

Table 4.10: Example: I-1: Intermediaries' role in facilitating knowledge characteristics and associated questions

Example: I-1: intermediaries' role in facilitate knowledge								
C.13: Information availability & interpretation	**Q16: Which of the following points do you think need more Focus/consideration in BC?**		Yes			No		
	A	Objectives of adaptation mean here addressing CC as a leading environmental issue						
	B	Resilience targets - resilience means long term sustainability						
	C	Data availability and quality						
	D	Level of accuracy						
	E	Integration of short term and long-term horizons in the plans						
C.14: Communication between departments	**Q26: How much do you agree or disagree with the availability of following options regarding the issues that associate with actors' management process when BC is applied?**		Strongly Agree	Agree	Neither Agree nor disagree	Disagree	Strongly Disagree	
	A	Identification of professionals and their responsibilities in the decision making						
C.15: Long-term programmes for community organisation capability and adaptive behaviour	**B**	Provision of High degree of Collaboration among the various stakeholders such as climatologists, hydrologists, water engineers, designers, developers…etc						
	C	Facilitate the connection between the local community and other professionals						
	D	Availability of climate information for the various stakeholders and provision of access to this information when need						
	E	openness through discussions and meetings among local community and professionals to understand the planning issues regarding water management						
C.16: Bottom- up feedback from iterative process of adaptive social learning		**Q. 30: To the best of your knowledge, how often do you think sustainability tools such as BC when applied, are influencing the learning process and level of awareness among the varied actors, throughout the selected options?**	Never	Sometimes	Often	Quite Often	I do not know	
C.17: Training and educational programme	**A**	Organise workshops and meetings among the water experts and climate scientists and local community to promote effective communication						
	B	Address the feedback among local community and experts using easy translation language and simple communication methods						
	C	Training/programs for in service training of staff/experts in water resources management						
	D	Continuous Evaluation of the Decisions and methods Used						
	E	Continuous Monitoring & Re-evaluation reports to follow up the participation & communication of actors						
	F	Establishing an educational component to participation						

4.4.1.4 Method 2 (1): Questionnaire for Local Community

In order to collect useful data for this research regarding the process of BC application and to address the outcomes in relation to adaptation to CC, the perceptions of local communities were vital. As such, a questionnaire was designed for the local communities, that was similar in content and structure to that used for the experts, which included 37 questions, more than used for the experts. This corresponded to the greater scale and number of gaps associated with the local communities, as identified in the previous chapters, with regard to their understanding of the main CC impacts and adaptation processes, their incorporation within the Governance process promoted by BC, their opinions regarding their implementation of various strategies, their awareness level about adaptation and sustainability aspects, their well-being, and their management of facilities. Accordingly, this second questionnaire had four main parts, as seen in table 4-14.

Table 4.11: Questionnaire parts and contents for the local community of Media City

Questionnaire Parts	Contents/Number of questions	
Part 1	Perceptions of CC and Adaptation process strategies, and Water sector	8
Part 2	General Perceptions of living in Media City and sustainability	8
Part 3	Perceptions of and Knowledge about BC	8
Part 4	Perceptions of the implemented physical strategies for adaptation of facilities in their neighbourhood, and the delivery of social aspects	12

There was some resemblance in the contents of this questionnaire to that of the experts' questionnaire and indeed, in the first instance, the approach to consultation was initially to gather identical information to form comparable datasets. However, some questions were altered in order to ensure clarity and appropriateness in a community context, especially in terms of the use of language to avoid the use of professional jargon.

The target sample was 20 to 25 respondents in order to access a range of opinions and to talk to people with different experiences. Most qualitative methodologists perceive a lack of standards for sample size (Marshall et al 2013). Qualitative methods are rarely troubled by the lack of guidelines, however, with the vague nature of sample size guidelines reflecting the qualitative orientation of research where quality of interviews, number of interviews per participant, sampling procedures, and researcher experience are what matter (Marshall et al 2013).

The collection of the responses to this questionnaire was not implemented using online surveys but rather through the personal visits to Media City, approaching the people who live, work, and study there. Random methods were used in terms of applying the questionnaire and collecting the samples.

As with the professionals' survey questionnaire, a pilot study was conducted, with a particular focus on relevance to community perceptions was useful here. The reason for conducting a pilot study was thus to test the structure and the content of the questionnaire for its suitability for the local community. The structure of the initial pilot stage was very important for this research, as when the questionnaire was checked, it was found that most of the questions were too complicated or not relevant: the questionnaire had several questions that were associated with sustainability strategies and water facilities, but did not explain the meaning of these statements, and this type of question was found to be difficult for the target audience to understand. Many were also too long: some of the questions included 8 points to respond to, and respondents found these types of questions too long.

A reduction in the number of questions and the scope of coverage was also required. As suggested earlier, conducting a pilot prior to a main study can enhance the likelihood of success and potentially help to avoid doomed main studies (Thabane et al 2010), and this certainly happened in relation to the methodological approach in the Media City case study.

The actual number of respondents was also very limited in this phase (7). The recruitment of respondents in Media City was very difficult, as barriers to gathering respondents included factors such as

- local people were either not interested in responding to these questions or had no time to respond.
- identifying local occupants in Media City itself was difficult, as it was not possible to reach them in their residences due to limited accessibility for residents' own security.

Getting responses to the questionnaire from the local community proved challenging, and only seven respondents for the pilot questionnaire for the local community were found. These respondents were selected randomly; however, as noted in chapter 3, in terms of the local community, the target was the people who live, work, and study in the Media City project area, as these are the three main representative categories for the investigation process. Initially, it was thought that the questionnaire distribution process to the local community would be reasonably straightforward, as there is significant occupied public space. However, based on the initial pilot results, it was difficult to approach people, and in

particular, to find anyone who had had any part in the decision-making process. There was thus a concern that this might affect the results of this stage.

The results of the pilot study regarding the local communities appeared to highlight the fact that the local communities were not involved in the decision-making process, and had no information about BC; indeed, they were not aware of it at all or its role in the redevelopment of the Media City. Failing to get information from the local community through the use of a similar methodology to that used for the experts required the exploration and adoption of a methodology that would enable and attract a more open type of discussion with community representatives regarding the various aspects surrounding the development, and the approach selected was focus groups.

Such group discussions can generate more critical comments than interviews (Robinson 1999). Breen (2006) also mentioned that the focus group should be undertaken among a variety of participants, as it has been found that there is a need to share and compare the participants' experiences with each other to develop and generate ideas, and to explore issues of shared importance. However, researchers describe the data they attain from focus groups as "extremely rich" and "high quality" (Williams and Katz 2001). Therefore, as explained below, the focus group was identified as an appropriate methodology for this research.

4.4.1.5 Method 2 (2): Focus Group Methodology

Focus group methodology is a qualitative research tool that is frequently used in social sciences to explore meanings, ways of understanding, or experiences of a complex phenomenon. It is an approach that has seen widespread application in areas of social science as diverse as medical sociology, community development, nursing, and health sciences (Williams and Katz, 2001). It has also been utilised by geographers and environmentalists to examine people's experiences of specific applied assessment methods (Breen 2006). Focus groups, as demonstrated by Williams and Katz (2001), have thus become an established and important methodological part of social science, used mainly when a specific topic is being explored. It involves collecting and evaluating data on the topic based on questions designed for the purpose in order to investigate and determine both positive and negative aspects associated with the topic, often to determine success or progress (Nagle and Williams 2013).

For this research, four focus groups sessions were proposed among community groups in order to investigate the perceptions of the performance of the characteristics of the three theoretical approaches in the realisation of Media City. One of the major strengths of focus group methodology is its *exploratory nature*; focus groups are thus very useful in providing *context and depth*, which was required for investigation of the adaptation approaches among the community of Media City. As such, this approach offered significant opportunities over and above the initial questionnaires methodological approach.

According to Gibbs (1997), the focus group is considered an important method for producing significant information about a particular topic by promoting organised discussion within a selected group of individuals in order to generate information about their views and experiences of a topic. The benefits of focus group research include gaining insights into people's shared understandings of everyday life, a facet of core relevance to this phase of the research.

Focus groups promote a comfortable atmosphere for disclosure in which people can share their ideas, experiences, and attitudes about a topic (Williams and Katz, 2001). Therefore, these focus groups aimed to investigate participants' attitudes, feelings, beliefs, experiences, and reactions in a way which was not feasible using other methods such as observation, one-to-one interviews, or questionnaire surveys (Gibbs, 1997).

4.4.1.5.1 Application of Focus Group Methodology in Media City

Individual depth interviews are expensive and time-consuming and are not easy to arrange, and thus sessions with groups of participants are often preferred (Oppenheim 2000). In practice, the focus group methodology typically involves a series of group interviews about a given topic or phenomenon guided by a moderator (Poels et al 2007) to develop in-depth and open-ended group discussion that explores a specific set of issues around a predefined and limited topic (Robinson 1999).

Here, the aim of the focus groups was to explore the community's perceptions of the performance of all of the evaluation characteristics, in order to establish whether, from their perspective, these characteristics had had positive or negative effects in their neighbourhood, Media City. The local community pilot research findings suggested that there was little or no specific knowledge about the role of governance actors in the application of adaptation and sustainability strategies, and that there was an equal level of absence of knowledge about the BC as an intermediary sustainable tool. Therefore, the main focus of

the focus groups was around the characteristics associated with Resilient Communities, as the structure outlined in table 4-15 shows. The full guide for the focus groups, including the questions posed, is reproduced in Appendix D.

The main five characteristics, extracted based on the literature examined in chapter 2, framed the main subjects presented to community participant groups in the focus group sessions, with the aim being to determine the positive or negative performance associated with each of the characteristics as part of participants' experience of living, working, or studying in Media City.

Table 4.12: Structure for the focus groups sessions: Community investigation

Main Context	**Characteristics & questions**	
Social Context	Characteristic 1: Community engagement & empowerment	What are the positive aspects associated with each characteristic? What are the negative aspects associated with each characteristic?
	Characteristic 2: Community well-being	
	Characteristic 3: Community Knowledge & Awareness	
	Characteristic 4: Community management and the performance of facilities	

The resulting evaluation of the performance of these characteristics was dependent on the type of response elicited during conversation associated with each characteristic (whether positive or negative), which as being demonstrated earlier in this chapter that this research is a considered a qualitative research. Accordingly, the relevant comments from participants for both the positive and negative perspectives are illustrated. This was achieved by asking the participants two main questions to identify the positive and negative aspects relating to the specific characteristic.

Table 4.13: Example of focus group characteristics relationship to RC characteristics

Main focus groups categories/characteristics	**RC characteristics from (Chapter 2)**
Characteristic 1: Community engagement and empowerment	**RC-1: Nature of Community** C.8 Community feeling of attachment to neighbourhood & social engagement

Table 4-16 shows an example of the characteristic of community engagement and empowerment (C.8) and its association with the community engagement process. The

participants were also asked to provide information about intermediary and mediating actors who have had either positive or negative roles in influencing this characteristic.

Four sessions were undertaken, with the time for each session ranging from 60 to 90 minute; permission was elicited from all participants for the discussion in these sessions to be recorded. This was based on Robinson's (1999) proposals that focus groups should be open ended discussion of one to two hours' duration that aim to investigate various aspects associated with an established and limited subject, and it was found that 90 minutes was sufficient to ensure good coverage for the main aspects in this research. Papers that included the main questions were prepared in advance for the researcher, and short questionnaires asking about key personal information (including name, age, and occupation) were distributed for each participant to complete, as shown in Figure 4-3. Finally, a gift voucher was given to each participant in appreciation of their participation and the sharing of their information and experiences.

Figure 4. 3: Focus group session set-up in Media City

4.4.1.5.2 Focus Group Sampling

The focus groups were held in the Media City development (Salford) in February 2017. The anonymity of participants has been maintained and they are thus only identified based on their relationship with the Media City development. In this study, the perceptions of those people who live in the project (Occupants), work in the project (Employees), and who studying there (Students) were three target responses. These were based on the three main

communities present in the development as demonstrated in the description of Media City in chapter 3.

The sampling of the population used for the focus groups was a form of cluster sampling, a method whereby the total population is divided into groups or clusters (Singh and Masuku 2014). On visiting the relevant communities in Media City, invitation cards were distributed and circulated to relevant people. These invitation letters included information about the time, place, and the details for the sessions. The form distributed to the community participants is shown in figure 4-4.

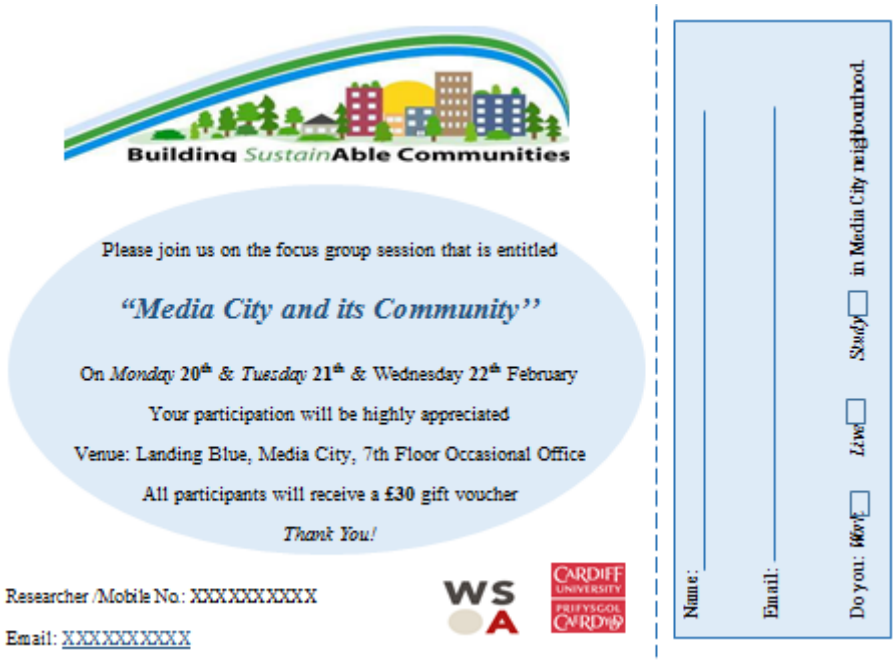


Figure 4. 4: Invitation card used for the focus groups sessions in the Media City case study

After gathering a few samples, *Snowball* sampling was then used in order to reach the necessary number of participants. This technique is used to develop a sample population without necessarily knowing the characteristics of populations (Oppenheim 2000), a process that assists researchers in enriching sampling clusters and gaining access to new participants and social groups (Noy 2008). It should be said that the snowball sample is not representative of the general demographics for the case study, but nevertheless contains representatives from each named sub-group. The focus group sessions thus all contained members from the three communities identified as present in Media City. In total, the number of participants was 23, with each group containing between five and seven participants. Over the four sessions, 10 occupants, six students and seven employees participated. Summary of the

information for these participants is shown in Appendix E. The outcomes and findings of the focus groups were analysed using the qualitative software program NVIVO, and this analytical approach is discussed in detail in the next section.

4.4.1.5.3 Focus Group Data Analysis: NVIVO

The focus group analysis was based on coding the responses that were given to the questions in the focus group sessions. NVIVO software was considered appropriate for this coding process, as it allows points to be were identified as ether positive or negative. NVIVO's Search Tool was used to conduct search queries (Auld et al 2007), allowing the researcher to investigate the data at various levels, which improved the rigour of the analysis process by validating some of the researcher's ideas about the data (Welsh 2002). Using software in the data analysis process adds to the rigour of data analysis and investigation of qualitative research, offering a greater level of accuracy than could be achieved without such software (Welsh 2002). NVIVO also aids analysis by enabling the researcher to code data according to a classification scheme that allows easy identification and indexing. NVIVO thus allows more sophisticated data coding and supports various methods of constructing theories based on a n improved understanding of the coding process (Ozkan 2004).

The software also provides increased capabilities for data management and coding text through creating nodes and examining the relationships among these nodes (Auld et al 2007). The process of coding is important, as categorising the data plays an important role in its analysis. After conducting the focus groups, information based on the answers of each respondent was thus transcribed into a Microsoft Excel spreadsheet. The full anonymised transcriptions are reproduced in the appendices.

The process of building case nodes based on respondents' answers is supported by the analysis mode of the NVIVO software. These nodes are constituted of all collected information, whether a full text or a sentence, that is likely to have meaning in terms of the results analysis. For instance, when the participants were asked about the positive aspects that they associated with community social engagement in Media City, the participants offered various aspects associated with characteristics related to community activities, as Figure 4-5 shows. These case nodes were created through coding responses for the investigated categories. The coding process is thus important in terms of developing an image of the connections among the data and the relationships thus identified. It allows the researcher to communicate and connect with the data to facilitate understanding of the current situation regarding the target phenomenon, producing a theoretically grounded map

for analysis (Basit 2003). The coding process is thus derived from the data collected, with common points among the data forming the main nodes.

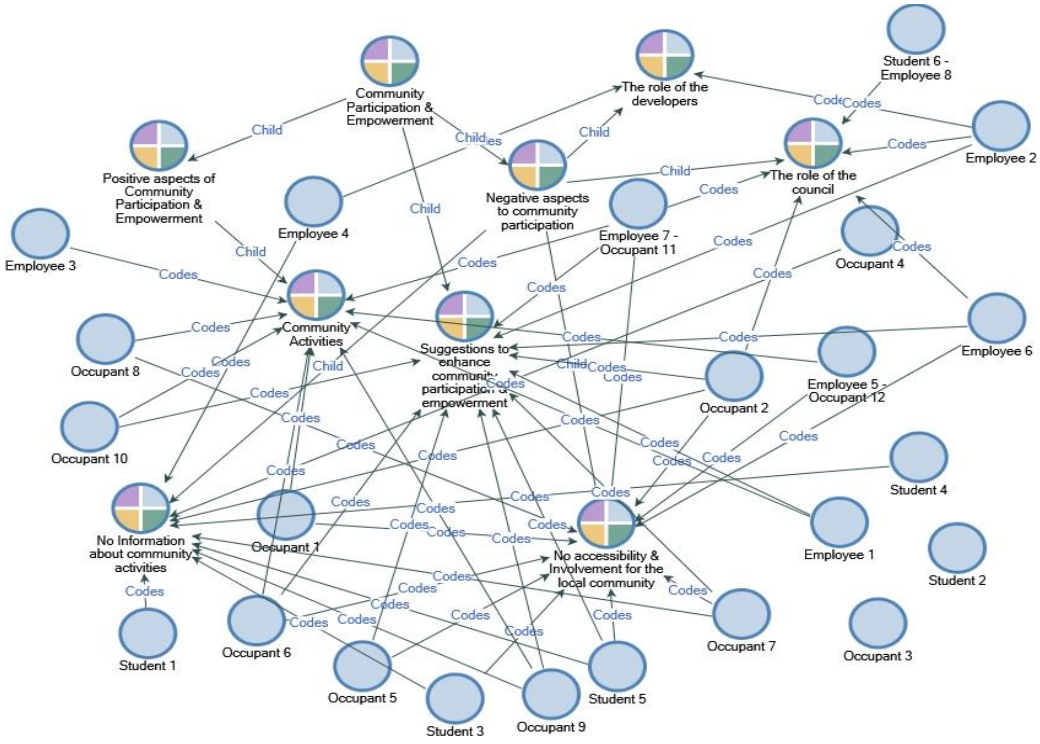


Figure 4. 5: An illustration of the results of the coding process for positive and negative aspects relating to characteristics of community engagement

NVIVO facilitates this process because it allows for the creation of case nodes; every time a distinct concept was identified from the focus group data, a node was created to represent it, and the relevant text pertaining to that concept stored at that node (Hutchison et al 2010).

The number of participants who spoke about items coded with the role of the developers was not the same as the number of participants who spoke about items coded with the role of the council, and quantifying the participants is not the main issue here. The type of case nodes identified from the participants' discussion is of most interest for this analysis. Each of these points are thus demonstrated in chapter 5 in the community analysis section to illustrate why certain characteristics showed a particular balance of positive and negative aspects.

From the analysis using NVIVO, it can be seen that, as in Figure 4-15, both positive and negative aspects were coded from the participants' responses regarding the example characteristic. These aspects are considered to be sub cases in terms of this software. The diagrammatic output summaries of the other characteristics produced using the software

are reproduced in Appendix E. Coding of these aspects was undertaken with tags or labels used for allocating units of meaning to descriptive or inferential information gathered during the study based on varying-sized groups of words, phrases, sentences, or paragraphs associated with the investigated issues (Basit 2003). The process of coding using this software is important not only to organise the data and add rigour to its analysis but also to avoid the risk of human error during searches for simple information within the data set as a whole; it thus makes the whole coding process safer (Welsh 2002).

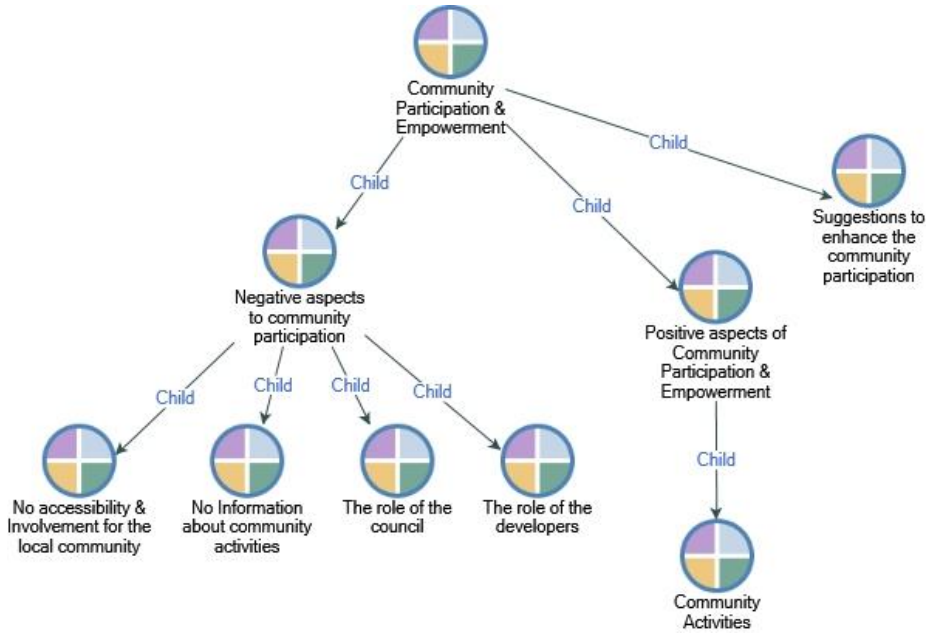


Figure 4. 6: NVIVO breakdown of positive and negative aspects relating to the characteristic of community social engagement

4.5 Phase 3: Face-to-Face Interviews: Expert Perceptions of the Results from the Community

After conducting phases 1 and 2 of this research, a final stage was undertaken based on integrating the findings of the two earlier phases. The investigation in the final stage aimed to address the AG, RC, and I characteristics identified as hindering adaptive capacity to respond to climate change, as well as the associated negative indicators of BC. The main purpose was to investigate the experts' views further and to develop more detailed perceptions of the negative performance of certain characteristics, to see whether there was any correlation between the potential enhancements of the two main areas of the BC indicator's role as an intermediary tool in relation to enhancement of the characteristics of

the AG & RC theoretical approaches. The final phase of the work thus aimed to propose potential enhancements to BC.

In order to further inform these proposals, face to face interviews with selected experts from phase 2 were undertaken. The questions for these face to face interviews are shown in Appendix F. In this case, the questions were designed after analysis of the questionnaires and focus groups, which revealed which characteristics performed negatively both in their theoretical relationship to the BC manual and also practically. Three interviewees were included in this stage:

1. The BREEAM director and BC assessor,
2. A sustainability advisor (on behalf of the developer), and
3. A water expert (on behalf of Salford City Council).

The full responses of these experts are reproduced in Appendix G. It should be noted that these three experts also participated in responding to the questionnaire and had thus expressed previously that they were willing to participate in this final stage. The final proposals for enhancement can, therefore, draw from the findings from all three participatory phases of this research: questionnaires, focus groups, and interviews

4.6 Sub-Conclusion:

In this chapter, the final methodology proposed to answer the research questions was defined; this involved the use of a matrix approach, with questionnaires, focus groups, and interviews combined. Together, these structured the three phases of the research in order to successfully collectively inform the final findings. Pilots were undertaken for the research methods to test the validity and relevance to the practical analysis of the adopted research methods regarding the actors' perceptions analysis. The pilot research methods led to the development of less complicated and more practically applicable questions for the experts of Media City, whilst for the community, they led to a beneficial change in method, with a focus group methodology adopted in phase 2.

Chapter 4: Research Methodology

The identification of the need for both theoretical indicator analysis and practical actors' perception analysis drove the main phases of the work to support the analysis of BREEAM Communities indicators and the Media City case study analysis. It was also decided to consider only qualitative research methods, as investigation of the characteristics of the availability and performance of Adaptive Governance, Resilient Communities, and Intermediaries theories are mainly dependent on exploring whether there is a certain level of information or answers that relate to the existence of these characteristics in both theory and practice.

Chapter 5: Results: Adaptive Governance & Resilience Community & Intermediaries analysis and BREEAM Communities

5.1 Introduction

The main aim of this chapter is to investigate the extent to which the themes & characteristics of adaptive governance, Resilience Community & Intermediaries are promoted within two parts of the BC tool (governance & social) in terms of both its theory and practice. The analysis constitutes the performance investigation analysis of the (9) main themes and associated (20) characteristics that were identified from literature in chapter 2, and their relation to the relevant governance and social/community indicators of BREEAM Communities that were identified in chapter 4. In order to address this aim, the chapter comprises three main parts that correspond to the analysis of the three theoretical approaches. Within these three parts, the analysis presented constitutes the following three sections: for the characteristics described:

1. **Theoretical Performance of BC Indicators:** the performance analysis of the characteristics of each approach in relation to the BREEAM Communities indicators. The matrix approach is used for the indicator's analysis here. This reports the findings of phase 1 of the research.
2. **Expert & Community Perceptions:** the performance analysis of the characteristics in relation to the actors' perceptions of Media City case study. The comparison between the perceptions of both the experts & community is presented here. This reports the findings of phase 2 of the research.
3. **Summary:** discusses the comparison of characteristics performance against the characteristics of both the BC indicators and actors' perceptions. The focus here is on identifying the negative characteristics performance in order to present the characteristics and indicators that require further enhancement in order for BREEAM communities to deliver and promote adaptation in theory & practice in relation to key indicators. This aims to inform phase 3 of the research.

5.2 Adaptive Governance & BREEAM Communities: analysis & recommendations

As demonstrated in chapter 2, there are four main themes that are related to the adaptive governance within the literature studies, as reported in table (5-1):

- AG-1: Extended collaboration process
- AG-2: Build knowledge and understanding
- AG-3: Continuous Monitoring & Evaluation
- AG-4: Develop capacities when dealing with the climate change

It is acknowledged that for these themes, that there are 7 related characteristics which are employed as the operational aspects within the analysis undertaken here. Table (5-1) shows the relationship between the themes and characteristics related to adaptive governance.

Table 5. 1: Adaptive Governance themes & characteristics

Adaptive Governance themes & characteristics		
Themes		**Characteristics**
AG-1	Extended collaboration process	**C.1:** Broad inclusion of actors for Effective Management
		C.2: Strong Local Institution Support
AG-2	Build knowledge and understanding	**C.3:** Focus/Incorporation of information and understanding the impacts of Climate Change & Potential Risks
		C.4: Shared/Participatory Ways of Knowledge
		C.5: Consider the physical performance of facilities during the consultation process
AO_3	Monitoring & Management	**C.6:** Monitoring and Continuous Evaluation of Development Facilities
AG-4	Develop capacities when dealing with the climate change	**C.7:** Develop the possible actions in facilities in response to and protection from flood risks

As identified in chapter 4, there are 4 main indicators relevant to the governance context in BC, namely:

No.	Indicator Ref:	Description	Indicator Type
1	GO 01	Consultation Plan	Mandatory
2	GO 02	Consultation and engagement	
3	GO 03	Design review	Optional
4	GO 04	Community management of facilities	

It should be noted again that the first two indicators of (GO01) & (GO02) are mandatory, while the indicators (GO03) & (GO04) are optional indicators.
The following sections will present the evaluation of these indicators against each of the adaptive governance themes and their constituent characteristics in turn.

5.2.1 AG-1: Extended collaboration process

C.1: Broad inclusion of actors for Effective Management

This characteristic is associated with both broad and wide participation, with an appropriate breadth of actors across the various stages of the development process; in order to address the needs and requirements of the various parties.

- **Theoretical Performance of BC Indicators:**

The findings of the analysis of this characteristic against the four BC indicators, is presented in table (5-2) below.

Table 5. 2: the analysis of C.1 in the governance context of BC

Theme	Characteristic	Governance Indicators			
		Mandatory		Optional	
		Consultation Plan	Consultation and engagement	Design review	Community management of facilities
AG_1	C.1	+1	+1	0	0

For the mandatory indicators GO01 & GO02, it is acknowledged that there are various actors that are encouraged to participate and are involved in the development process and

therefore that the decision-making process, when BC is applied, could thus be described as a 'de-centralised process'. This engagement constitutes the local authority, local representatives, developers, environmental agencies, and maintenance and management teams, as well as the community. This is considered a positive issue, since, as is mentioned in chapter 2, the inclusion of a variety of actors can enrich the development of information from various areas of expertise, to advance the sustainability and adaptation targets (Walker et al 2004; Agrawal 2008; Dewulf and Termeer 2015). Therefore, this expectation for wide engagement when BC is applied is important to find here, with inclusion of actors from both the *"top down"* governance level and *"bottom up"* community level in order to deliver the support needed to address innovative and flexible engagement.

Meanwhile, for GO03, an independent facilitator is the actor who is tasked with informing the local community about the main points of the development design process in order to ensure that the development process is achieving healthy and vibrant outcomes. GO04 is associated with the support given to the local community, in becoming involved in the management of facilities.

- **Expert & Community perceptions:**

Experts: The sources of the findings reported in this section are from the professional actors' questionnaire:

Question 10	Section: All
Question 11	Section: B

The results from consultation with experts demonstrated that there was a wide and vital collaboration process of actors in Media City when BC was applied, where the experts from various background and expertise sectors were involved in the governance process. This work has coincided with a study undertaken by (Oliver and Pearl 2018) of the Masthusen project/Sweden, which also explored the evaluation of the application BC, where a higher level of collaboration than on a conventional project was found, and BREEAM was found to have helped to maintain momentum over time to meet sustainability goals. However, as was found here, on its own, the BREEAM Communities tool cannot ensure widespread participation both within the project community boundaries and outside of these boundaries (Oliver and Pearl 2018).

The experts consulted here considered that role of the authority, whether at the national or local level, to be the main party in addressing Climate Change adaptation. The roles of academic institutions and Non-Governmental organisations or institutions were less important in this context, while the role of the organisations that represented the Sustainability assessment tools was considered the weakest. Table (5-3) shows the findings of question ten, associated with expert responses regarding whether these parties are considered important in addressing adaptation to CC, and the answer was either yes or no. The coding for the SPSS analysis of this question was (No=0) while (Yes=1).

This is a relevant finding, as this research seeks to explore the extent to which BREEAM communities, a sustainable assessment tool, might enable the delivery of climate change adaptation, and as such this finding point towards a need for enhancements. Nevertheless, the experts reported that there was a wide inclusion of actors involved in the Media City project, compared with other development projects.

Table 5. 3: Experts responses for the main parties and roles for adaptation to CC

Options	N	Mean	Influence on Performance
Municipal Government _ CCA	13	0.69	
Non-Government Organisations _CCA	13	0.23	
CC Institutions _CCA	13	0.15	
Sustainability Assessment Tools_ CCA	13	0.08	
Academic Organisations_ CCA	13	0.38	
Valid N (listwise)	13		

Primarily, the collaboration of the various sectors in the development process, such as water management processes, needs further focus. As with most environmental policy challenges today, the private provisioning of public adaptation demands complex governance, and will involve multiple actors and stakeholder groups in potentially innovative private–public partnerships. This idea can be labelled as the diversity hypothesis, as it assumes that institutional and organizational diversity is the most effective way to cope with complexity (Tompkins and Eakin 2012). This diversity and complexity were present in the governance process of Media City, as there were many parties influencing the decision-making process.

Community: The participants reported that they do not have sufficient information on the consultation processes and the discussion of the implementation of strategies, as they were not included in this consultation process, nor have they subsequently heard whether these types of consultation processes occurred. However, they did refer to the roles of Salford

Council & the Developers as the main institutions of importance with regards to the implementation of both sustainability and adaptation strategies. It is important to note at this point that the focus groups indicated that they had no knowledge about the role of BC within the development.

It is acknowledged that adapting to climate change involves cascading decisions across a landscape made up of agents, including individuals, firms and civil society, public bodies and governments at local, regional and national scales, and international agencies (Adger et al 2005). Therefore, there is a need to focus on including the local community as significant partners in the planning and implementation of strategies for CC adaptation and sustainability development application.

Summary – C.1:

Accordingly, the experts positively indicated the existence of wide collaboration processes between actors in Media City when BC is applied, while at the same the role of Salford City Council is acknowledged. For the community participants, there is no level of information indicated regarding the collaboration process, while participants negatively referred to their non-inclusion in the development. The perception was that the central roles were played by the developers and council only.

In BC, this issue is positively described regarding the actors' consultation related indicators.

C.2: Strong Local Institutional Support

It has been mentioned in chapter two that the relevant institutions include both formal and informal organizations, offering support for the application of sustainability strategies in the planning and implementation process.

- **Theoretical Performance of BC Indicators:**

The analysis of this characteristic against the four BC indicators demonstrated that the mandatory indicators are showing positive performance, while the optional indicators are showing neutral performance, as table (5-4) shows.

Table 5. 4: the analysis of C.2 in the Governance Context of BC

Theme	Characteristic	Governance Indicators			
		Mandatory		Optional	
		Consultation Plan	Consultation and engagement	Design review	Community management of facilities
AG_1	**C.2**	**+1**	**+1**	0	0

The first two indicators of GO01 & GO02 include various institutions related to the integration of the various actors, as demonstrated earlier with the community, authority and experts. That there is an inclusion of both formal and informal institutions participating in the decision-making processes to achieve support for the application of sustainability targets is positive. It is acknowledged that the role of the authority is central, being the one who is identifying the consultation plan and the participants as well. It is also argued that the process of participation of community and informing them of feedback also comes under the role of the authority. Finally, the selection of the aspects of design for the discussions is also identified as the authority's responsibility.

Therefore, the role and engagement of the authority appears to be more strongly addressed in relation to the support of the consultation plan. This is a positive matter, where, the importance of the authorities' role in translating the overall strategies for adaptation into tangible actions for community resilience is important through allowing the engagement to involve hard to reach community individuals (Jensen et al 2016). Which in BC, it is acknowledged that the local authority is in support of this issue.

The application of both mandatory indicators seems to be important for supporting the inclusion of community engagement and for the inclusion of the sustainable strategies. There is, however, a need to understand the process and the scale and depth of scope of such meetings and discussions, and whether these discussions are enabling wide community engagement.

The remaining two optional indicators, GO03 & GO04, are important in providing local support for the design review and feedback processes, and community management process of facilities respectively. Despite their importance, these indicators are optional. With indicator GO03, despite its mention that after the consultation process the feedback will be

sent to the community, there is no information on whether there is an interactive engagement that happens after sending the feedback, or any detail to support this engagement. For GO04, it is acknowledged that the developer is the party who is responsible for the community management process, and is the party that decides whether there is a need for a community management process or not.

Therefore, it seems that the two optional indicators are important, yet they demand more focus when it comes to engaging and developing community participation into sustainability and notably in promoting adaptive capacity, through the role of the local institutions. Thus, these two indicators seem to reflect this issue very lightly, and as the table shows have neutral performance in relation to this characteristic.

- **Expert & Community Perceptions:**

Experts: The sources of the findings reported in this section are from the professional actors' questionnaire:

Question 17	**Section: D**

The experts reported that the role of the various local institutions in supporting the issue of climate change and having strategies for the adaptation process related to CC is important, but this is not seen as positively as it should be in Media City. Regarding the role of the CC institutions, whether in Media City or in other projects in the UK, there has been a lacking role seen when it comes to providing enough support to manage uncertainties in community scale projects. However, at the same, time, they identify the role of the council as important, yet it is still not a positive in addressing the information required for the decision making and consultation process, and to promote effective adaptation to Climate Change in MediaCity. Table (5-5) shows the findings of question seventeen, associated with expert responses related to roles of importance and support, offered through the role of the main parties for the information provided during decision making. The coding for this SPSS analysis of the question (17) was (No=0) while (Yes=1). It can be seen that none of these parties present a positive role.

Table 5. 5: Experts responses for the role and support provided for the information about CC adaptation by the associated institutions

Options	N	Mean	**Influence on Performance**
Government Agencies _CC	13	0.38	
Non -Governmental organisations _CC	13	0.31	
International Organisations _CC	13	0.00	
Climate change institutions _CC	13	0.15	
BC _CC	13	0.23	
Valid N (listwise)	13		

Community: The participants, through the focus groups, mentioned again that they were not invited to meetings or other activities that are associated with the development process, addressing the consultation process, or were in any other manner vitally engaged with the other stakeholders, despite the continuous process of construction seen currently in Media City. They did refer to the need for wider consultation and engagement processes which include them in the development process of their communities, and to increase the availability of information about these engagement processes. It is acknowledged that ''*Multiparty processes that are not too tightly coupled to a formal decision-making and implementation process, which leaves more room for creativity and innovation because the participants may not start to negotiate from entrenched positions*'' (Pahl-Wostl et al 2007).

Summary – C2:

Accordingly, the experts have coded negative feedback about the role of various institutions, including the council, to provide support related to sustainability and adaptation processes. The community, on the other hand, referred to the negative role of the various institutions, and particularly that of the developers when it comes to supporting local adaptation through inclusion in the development process.

However, this role in the BC is positively indicated regarding support towards sustainability, as well as the engagement and provision of information, through the various institutions' engagement and support.

5.2.2 AG-2: Build knowledge and understanding

- **C.3: Focus/Incorporation of information and understanding the impacts of Climate Change & Potential Risks**

This characteristic is associated with the incorporation of information on Climate Change impacts and risks in the decision-making process of the development process, as an essential step towards increasing adaptation among the various participants.

- **Theoretical Performance of BC Indicators:**

The analysis of the characteristics across the four indicators of BC illustrates that the two mandatory indicators are showing positive performance, while for the two optional indicators, neutral and negative performance are seen respectively, as table (5-6) shows.

Table 5. 6: the analysis of C.3 in the governance context of BC

Theme	Characteristic	Governance Indicators			
		Mandatory		Optional	
		Consultation Plan	Consultation and engagement	Design review	Community management of facilities
AG-2	C.3	+1	+1	0	-1

Regarding the two mandatory indicators GO01 & GO02 which show positivity aspects of potential adaptation, it can be said that the indicator of GO01 has the potential to address discussion about Climate Change impacts with the participants in the decision making process, as it has mentioned that consultation processes should include a discussion of the impacts that affect the development areas. This is particularly the case for historical places, with the participation of the varied actors. It is acknowledged that flooding is the main issue discussed and where it might threaten the development, while discussion about the other CC impacts was not part of the consultation process. It is mentioned that a named person who is responsible for delivering the consultation activities and championing the outcomes in the project team, together with their contact details, is required by the GO01 indicator.

Discussion among experts regarding CC impacts and effects on the development was undertaken earlier, allowing the various experts to share knowledge about potential CC impacts and how they relate to the development process. In this regard, addressing the

connection among the various actors is important, as well as highlighting how the meetings are advanced across the whole development process.

For both optional GO03 & GO04 indicators, it is mentioned that when the experts complete the review process for the various development options, among the issues considered are the diversity and compatibility of uses in the development, and how design needs to be flexible and adaptable over time. However, there is no explicit mention of CC impacts, but the idea of adaptation in general is mentioned. For GO04, there is no reference to any focus on CC impacts or risk scenarios within the development measures, and only the discussion and implementation of the development stages are addressed, with no focus given to ways of increasing adaptation when it comes to implementing strategies.

- **Expert & Community perceptions:**

Experts: The sources of the findings reported in this section are from the professional actors' questionnaire:

Questions: 7	**Sections: All**
Questions: 8	**Sections: All**
Questions: 11	**Sections: A**

The experts reported that understanding of CC and its impacts within the development process of Media City is seen to have been considered, which will have a positive effect on the future adaptation process and capacity. However, having organised adaptation toolkits it is still not a clear matter in the Media City development process.

The experts identified that the CC impacts are important to be taken into consideration, depending on the type of impacts in that area. Regarding the effects of the CC, the experts indicate that the 'Extreme Weather Events' are considered having the highest effect, followed by the effects of flood & drought. They agreed on the existence of CC Risks as a threat that is caused by the CC. There is a lower level of agreement, however, for the effects of Sea Level Rise, Temperature changes, and Precipitation changes. Table (5-7) shows the findings on this issue here, regarding question seven. It should be said that the coding using SPSS for this question was: (Yes=1, No=0).

Table 5. 7: The Influences of Climate Change Impacts

Options	N	Mean	Influence on Performance
Extreme Weather events	13	0.77	
Precipitation Changes effects	13	0.54	
Flood Risks effects	13	0.54	
Drought Risks effects	13	0.54	
Sea Level Rise effects	13	0.38	
Temperature Changes effects	13	0.38	

Also, when it comes to the effects of Climate Change on the water infrastructure or resources, the experts referred to the importance of these matters. They have simultaneously demonstrated that the effects of the CC impacts of 'Extreme Weather Events' & CC Risks & 'Precipitation' are influencing water changes to a great extent. The 'Sea level Rise' and 'Temperature Changes' are having less of an effect on the water and the adoption of strategies that influence adaptation, as (5-8) demonstrates with the findings of question (8). It should be said that coding using SPSS for this question was: (Low extent=1, Moderate extent=2, Great Extent=3 & Very great Extent=4).

Table 5. 8: the effects of CC Impacts on Water Infrastructure

Options	**N**	**Mean**	**Influence on Performance**
Extreme Weather Events_ Water Infrastructure	13	3.31	
Flood Risks _Water Infrastructure	13	3.31	
Precipitation Changes _ Water Infrastructure	13	2.92	
Drought Risks _ Water Infrastructure	13	2.85	
Temperature Changes _Water Infrastructure	13	2.46	
Sea Level Rise	12	2.42	

Community: The participants mentioned that the role of the local authority or municipal institutions, represented by the Role of Salford City Council could be described as the main party, responsible for addressing the issues associated with sustainability and CC adaptation in Media City. Regarding this, four participants agreed on the importance of the practical aspects of environmental sustainability, and they agreed that in Media City there are useful available strategies for achieving environmental sustainability strategies.

Notably, in relation to recycling matters, Employee 6 commented '*In terms of sustainability, there is more focus on this issue, but definitely not climate change*.' The focus on sustainability is clearly greater in MediaCity than the focus on CC, as CC is not seen as one of the priorities for the authority and others in governance when it comes to making the community aware of this issue. However, this is what the MediaCity community have indicated during the sessions.

Another participant found that the role of the council is important in addressing the required documents that constitute knowledge about CC besides information about sustainability. '*In the council, the materials and the reports are probably there about the climate change aspects*' Employee 5 – Occupant 12. However, they do not have knowledge about this in any depth and do not express this with great certainty.

However, at the same time, the participants gave a negative response regarding the available information about CC and the awareness or knowledge that is required about CC and adaptation strategies through the websites or any other source for information. They referred to the need to focus more on CC information availability and also general information about the development itself, as well as adaptation with regards to developing information and existing access to knowledge which can raise awareness. One student has said *'I do not remember seeing anything around here as posts or anything related to sustainability. I feel we know just the general things'* Student 5. This means that being in MediaCity is not providing them with suitable knowledge about sustainability and adaptation, despite the project being developed to be an original sustainable community. Another respondent demonstrated that being in Media City has not changed their knowledge about sustainability or CC, stating: *'I wouldn't say my knowledge has changed – I get all my information from newspapers, websites and TV news. I'm not sure that information is readily available around Media City'* Employee 7, Occupant 11.

Summary – C.4:

Accordingly, for this characteristic, and as acknowledged in chapter three, the strategies used for the promotion of sustainability in the water sector have been successfully implemented in MediaCity.

The experts reported positive feedback about the information level relating to CC impacts, and their influences on water is acknowledged. However, the participants from the local community have indicated that while the sustainable strategies were implemented, they do not know about them, and communication and awareness of these strategies do not exist, indicating more attention is needed in this respect.

- **C.4: Shared/Participatory Ways of Knowledge**

This characteristic is associated with participation among actors in order to increase the sharing of information and knowledge transfer.

- **Theoretical Performance of BC Indicators:**

The analysis of this characteristic across the four indicators of BC indicates that this characteristic is differently presented across the indicators, where the first two indicators are evaluated as neutral in their coverage of this characteristic, while the optional indicators of GO03 & GO04 are considered as not promoting resilience aspects in association to this characteristic and might hinder resilience, as table (5-9) shows.

Table 5. 9: the analysis of C.4 in the governance context of BC

Theme	Characteristic	*Governance Indicators*			
		Mandatory		**Optional**	
		Consultation Plan	Consultation and engagement	Design review	Community management of facilities
AG-2	**C.4**	0	0	-1	-1

For indicators GO01 & GO02, as mentioned earlier, the consultation and engagement process present the community as an important party that needs to be involved. However, in these indicators, although an engagement process with the community is acknowledged, the methods used to invite the community to the consultation process are not indicated. However, it is important to publicise these meetings among the various groups in the community, in order to reach them. (Aalst et al 2008) demonstrated the importance of activities such as surveys, calendars, groups meetings, continued discussions and key information interviews in order to communicate these issues among the various actors. This has not happened in Media City yet.

There is also no information about the communication process among the various actors provided by the experts and the local community, nor is there information shared. Further, it is mentioned that the facilitator that empowers and leads these consultations should prepare plans and photos for the community related to the development to explain the final design. Despite the positivity of adopting these illustration means for communications, these consultations which they aim to present the final outcome of the design mean that the community input could be invalid, as the final designs are already decided and their opinions, personal beliefs and experiences might not be taken into account or align with the plans.

In other words, focusing on the process of sharing information through these two indicators seems to be built around informing the community about development and the design, without adopting a reactive engagement process, despite the fact that for building proactive approaches towards climate resilience, coordinated actions and new mechanisms for collaboration between the various parties are needed (Tylor and Moench 2012).

Therefore, these two indicators still need to be further demonstrated through understanding the actors and communication methods that are used to influence the communication among the communities and higher-level actors. This is considered to be a current challenge for CC adaptation, where it is argued that the uptake of decision support tools for local communities is challenging due to many factors, such as financial cost, top-down design of the tools, poorly designed participation processes and technical complexity (Nkoana et al 2018). Therefore, more focus is needed for the two indicators of GO01 & GO02, which are evaluated here to have a neutral performance against this characteristic.

For the optional indicators of GO03 & GO04, despite the fact that these two indicators explicitly focus on community development and management, no participatory approach for sharing information is embedded in them. They are both related to the role of experts in leading the process of producing feedback about the development, and the facilities management responsibility and implementation. No level of sharing information with the local community during the early engagement process or after occupancy is indicated. The focus is only on the role of the developers, and their central position in facilitating knowledge on the community management process as intermediaries, meaning that the community is neglected during the development process or the occupancy stage.

It is broadly acknowledged that the participatory approach is a more sustainable approach in project management because all actors, including the communities, are usually taken into

consideration and they participate in all the various phases of the project (Awa 2017). However, this issue is not fully addressed here, and needs more focus. In particular, it seems that the role of the developers as mediators is very strong here, with no real inclusion of the local community. Therefore, these two indicators are considered negative because they considered the professional actors' involvement in their procedures, but not the local community's.

- **Expert & Community Perceptions:**

Experts: The sources of the findings reported in this section are from the professional actors' questionnaire:

Question 26	Sections: B & E

The experts who participated in the Media City research demonstrate the process of sharing information during their participation, and this is considered to be no different from processes in other locations or in other conventional projects in the UK. The collaboration among the various actors during governance of the development process to lessen the gaps between the actors for transfer and sharing of knowledge (e.g. between climatologists, hydrologists, water engineers, designers, developers, and others) is considered as neither a positive or negative issue indicated to be 'Neutral' when BC is applied. Similarly, the experts indicate a neutral performance associated with the points that relate to the connection between the local community and the experts, and the openness through discussions and meetings among local community and experts to influence their knowledge and their awareness levels. This is seen across the planning stage or after the delivery of the development alike, as demonstrated in the related findings of question (26) in table (5-10). SPSS coding was (Strongly Disagree=1, Disagree=2, Neither Agree or Disagree=3, Agree=4, Strongly Agree=5, I do not know=88).

Table 5. 10: Expert responses related to the shared participation of knowledge ways in Media City

Options		N	Mean	Influence on Performance
A	BC _Experts Identification_ Responsibility	13	3.31	
B	BC _Experts Collaboration	13	3.15	
D	BC_ Information Availability_ Actors	13	3.15	
C	BC_ Experts & Local Community Connection	13	3.00	
E	BC _ Openness_ Discussions	13	2.92	

It seems that even in the context of sustainability projects in Media City, there is a need for more focus on the process of engagement with the necessary breadth of actors, including the adoption of methods applied to address the sharing process of information and transfer between the various actors. This means that there is a need for more focus on the characteristics that are associated with building resilient communities, through more involvement with the development process by communities, to increase their awareness and connection. At the same time, there should be more focus on the role of experts, particularly BC actors, and on influencing their role as both intermediaries and mediators in the development process. This is achieved through creating networks that have more openness and trust among the participants, and through maintaining the network itself.

Community: Regarding the level of information available to the local community or ways of sharing information and knowledge about CC or adaptation strategies and sustainability, the participants indicated that this was an area of weakness, with no acknowledgement of data availability or sharing. The majority of participants mentioned that they think that the focus on their priorities and needs in the context of organised meetings and consultations was, to their knowledge, not addressed in Media City.

However, the participants confirmed that despite the existence of the current stages of development in Media City, the process of informing them and sharing knowledge about the development process by any means continues to not be implemented, despite their interest and desire for involvement as reported in the focus groups. Regarding this, there were (9) respondents who reported this lack of information, associated negatively with community knowledge & awareness about CC and various strategies in their neighbourhood. One of the employees commented on this issue, saying: '*I don't know of any forum created to raise*

awareness about climate change and actions taken to contribute [to] tackle the global problem. To be quite honest, my awareness of environmental issues and concerns originated more from the national and international media and the public domain than working in the media city area' Employee 6.

Summary – C.4:

Accordingly, it can be noted that the experts provided a neutral response regarding this characteristic, in comparison with the Media City community who have made it clear that sharing of knowledge or wider participation did not occur at any stage.

C.5: Consider the Physical Performance of Facilities in Relation to Water Strategies

This characteristic is associated with the availability of information about strategies that address physical actions in the decision-making process, in connection with the collaboration of various actors.

- **Theoretical Performance of BC Indicators:**

Following the analysis of this characteristic against the four BC indicators, it was found that both mandatory and optional indicators are showing negative performance, as table (5-11) shows.

Table 5. 11: the analysis of C.5 in the governance context of BC

Theme	Characteristic	*Governance Indicators*			
		Mandatory		Optional	
		Consultation Plan	Consultation and engagement	Design review	Community management of facilities
AG-2	**C.5**	-1	-1	-1	-1

For the mandatory indicators GO01 & GO02, it is demonstrated that the discussions only focused on the flood risks. However, this discussion was only about informing the community that there is a risk and how the assessment is taken, with no discussion about the physical actions that are needed from the local community to prepare them for the flood risk. What was found to be reasonably effectively through these indicators was discussion of situations of development sites with potential risk of flooding, or in other designated areas of ecological

value. However, this discussion is incomplete and not demonstrated with regards to focusing on water as an issue and the provided strategies for water usage, consumption and other scenarios. The indicators do not show effective focus on water management strategies, because there is no mention of water issues as part of the consultation processes and engagement. It is acknowledged that in the face of CC challenges, the implementation of physical actions needs to widen public engagement and understanding of potential impacts of CC and how they affect the people's lives and needs, effectively addressed and included within the engagement process (Pahl -Wostl et al 2007). Therefore, these two indicators do not have any mention of water issues and their relation to CC impacts, and are considered to be negative here.

It should be said, however, that there are important strategies that relate to the water management process and sustainability targets that are applied with the inclusion of BREEAM Communities as an intermediary in the development process. However, these strategies seem to be applied and discussed on the top-down level by experts only.

For the optional indicators of GO03, & GO04, it was found that there was no demonstration of focus on addressing water development matters, nor anything in relation to the adaptation process, where there is little clarity in addressed aspects that are either enforcing or hindering resilience. There is no explicit information regarding the adoption of diverse options or strategies for water management provided, nor are there implementation targets or acknowledgement of potential linkages with the other environmental, social or economic impacts that are indicated within these indicators. For both indicators, it is acknowledged that the engagement process should have a focus on how the development design process should be addressed in terms of adaptability and flexibility over time, but currently there is no explicit requirement to focus on water management. This demonstrates that both indicators could be developed as intermediaries to promote the delivery of adaptive behaviour for the community during the implementation process and occupancy stages, but they are not currently ensuring this delivery. Therefore, these indicators are showing negative performance.

- **Expert & Community Perceptions:**

Experts:

The sources of the findings reported in this section are from the professional actors' questionnaire:

Question 29	Sections: All

The experts demonstrated that a focus on the physical performance of water facilities is considered among the strategies that are applied in Media City. However, a consultation and engagement process that involves the community and these strategies is not in place. The experts in Media City demonstrate that, when it comes to addressing the effective performance of all facilities and particularly the water facilities, there are important strategies in place that influence physical performance. These are based on water supply, consumption, ecological strategies, but they demand more focus, as table (5-12) shows. The experts indicated that the strategies associated with wastewater, sanitation and ecology are only considered slightly. The strategies related to water supply issues, through the adoption of flexible strategies or in association with water harvesting, were found by experts to not have been effectively considered in Media City. As demonstrated in the table of the experts' responses, they responded negatively. The SPSS coding for this question (29) was (Not at all Considered=1, Slightly Considered=2, Moderately Considered=3, Highly Considered=4, I do not Know=88).

Table 5. 12: Expert responses regarding the applied strategies which influence the physical performance of facilities (water)

Options	N	Mean	Influence on Performance
Diverse Strategies_ Flexibility_ Water Supply	12	1.25	
Water Harvesting_ Water Supply	12	1.25	
Efficiency _ Waste water Plan	12	1.75	
Efficiency_ Wastewater_ Reclamation	12	1.50	
Efficiency_ Facilities_ Sanitation	12	1.58	
Vital Ecology Strategy_ Mechanisms	12	1.58	

Community: The participants mentioned that there is no information regarding understanding the water facilities and their sustainability in the development, through the specific engagement processes or programs in Media City. However, they acknowledged the existence of sustainability in Media City regarding water specifically, where there is an acknowledged and observable focus on this issue in their buildings and facilities.

For instance, one of the participants commented on the water consumption strategies, saying: '*Regarding the water consumption, there is some red technology, when you want to have hot water, so there is equipment to control that, I think it's great. I still think it's a personal responsibility. And regarding the existence of anything to educate the community, I do not think so*.'. As seen, there is a level of positivity regarding the application physical strategies related to water consumption issues in Media City. However, they were not feeling obliged to use the water resources wisely, but they felt that the existence of the physical strategies in buildings is enough.

Also, there are other participants who have positively described the strategies related to water saving in their buildings. *'About the sustainability, I think the building has a lot working for you, like water, and recycling. Even if these things are automatic, I have to do things right elsewhere.'* Employee 4

Summary – C.5:

Accordingly, the experts here have referred to the existence of water strategies in the building and facilities in Media City in a slightly negative way. The community here found that the water sustainable strategies in their communities or neighbourhoods are implemented and performed in a positive way.

For BC indicators, the focus on the application of physical strategies of facilities is negatively indicated. This is because these consultations should be focusing on sustainability application process and strategies, including water sustainability, in the Media City project. However, there was only attention given to flooding.

5.2.3 AG-3: Continuous Monitoring & Evaluation

C.6: Monitoring and Continuous Evaluation of Development Facilities

This characteristic is associated with the availability of the central efforts and programs as intermediaries that are capable of addressing the monitoring process of the water facilities, and to address the adaptive behaviour of these facilities.

- **Theoretical Performance of BC Indicators:**

The analysis of this characteristic across the four indicators of BC shows that this characteristic is found to be negative in association with the two mandatory indicators, while

both negative and positive performance is coded for the optional indicators, as table (5-13) demonstrates.

Table 5. 13: the analysis of C.6 in the governance context of BC

Theme	Characteristic	*Governance Indicators*			
		Mandatory		**Optional**	
		Consultation Plan	Consultation and engagement	Design review	Community management of facilities
AG-3	**C.6**	-1	-1	-1	+1

For the mandatory indicators GO01& GO02, it is acknowledged that there is a focus on addressing the priorities associated with the performance of the development, and the evaluation process. However, there are no central efforts related to this issue up to the level of setting practical steps and considering monitoring procedures for the facilities, whether for professionals or local communities. It is mentioned that the monitoring process happens when the fourth indicator of community management GO04 is applied. Therefore, these two mandatory indicators are negative here, and not addressing this characteristic.

For the optional indicators GO03 & GO04, it is considered that the GO03 indicator only addresses the review process of the development proposal and integrates evaluation of the engagement of the local community regarding the opinions of the local community and deciding whether their opinions are considered or not. It is mentioned that the design review is defined as: ‘‘Design *review is a process where an independent and inter-disciplinary panel of built environment experts will review design proposals and assess the overall design quality*’’ (BREEAM COMMUNITIES, 2012, P72), but there is no inclusion of the monitoring process. Therefore, this is considered as a negative indicator. For GO04, it is acknowledged that if this indicator is applied, there are efforts made addressing the management issue in connection with the monitoring matter, addressed when it comes to identifying the party that is responsible for the management of facilities. This also allows the local community a chance to decide whether they want to be a part of the monitoring of facilities, in collaboration with the local authority and the developers. Therefore, this indicator seems to be important for this characteristic, and holds positive performance.

- **Expert & Community Perceptions:**

Experts:

The source of the findings reported in this section is the professional actors' questionnaire:

Question 34	Sections: C
Question 30	Sections: D & E

The experts of Media City have demonstrated that a focus on the risks tools and indicators is in existence, and they agreed that there is some negativity in the level of focus regarding risk assessment as tools in Media City.

The experts demonstrated that the BREEAM Communities has neutral performance regarding the influence of 'continuous monitoring reports to follow up the participation and communication of actors. Mainly, during the governance process, this intermediary role of BREEAM Communities sometimes influences the issue of 'continuous evaluation of the decisions and methods used', but not sufficiently. However, the experts demonstrated that the there is a need for more focus and enhancement in the BREEAM Communities regarding the importance of monitoring issues for communities after occupancy, particularly through more focus on 'Organising monitoring reports after the occupancy stage'. Thus, this issue is not sufficiently managed by BC, and it was reported negatively by the experts.

Community: The participants stated that there are no programs that they acknowledge were for facilities monitoring in their neighbourhood. They refer to these aspects as being 'taken care of by the developers. Some of the respondents have referred to the need to communicate with the developers about their neighbourhoods and about the management of facilities in their neighbourhoods.

It is acknowledged that there is a need to direct efforts towards applying methods which can enhance adaptive capacity of the population and to reduce exposure to CC. This is achieved by, not only through focusing on how certain impacts could affect a community, but also with the process of inclusion of the various communities in the process of preparing for and monitoring these impacts (Agrawal 2008). The communities monitoring and management plans are not excluded in this context, and this also demands opening communication

channels between the local communities and experts to make communication about the community management process an important part of the governance process as well.

Summary – C.6:

Accordingly, the experts indicated that the role of this characteristic when BC is applied in Media City associates with the monitoring in a negative matter. The community feedback about the existence of monitoring aspects through the inclusion of various actors in Media City is also negatively coded.

In BC, the indicators have negative outcomes, except for the optional indicator, GO04.

5.2.4 AG-4: Develop Capacities when Dealing with Climate Change

- **C.7: Develop Possible Actions of Facilities in Response to Risks**

  This characteristic is associated with addressing the physical actions related to the inclusion of strategies that influence the community well-being strategies, and developing the strategies to be effectively prepared.

- **Theoretical Performance of BC Indicators:**

  The analysis of this characteristic across the five indicators of BC shows that the mandatory indicators are more likely to show positive performance for this characteristic, while optional indicators are showing negative and positive performance respectively, as table (5-14) shows.

Table 5. 14: the analysis of C.7 in the governance context of BC

Theme	Characteristic	Governance Indicators			
		Mandatory		Optional	
		Consultation Plan	Consultation and engagement	Design review	Community management of facilities
AG-4	**C.7**	**+1**	**+1**	0	**+1**

For the mandatory indicators GO01& GO02, it is acknowledged that the first indicator focuses on the flood risks assessment issue, which is to be discussed with the community. It is acknowledged that the intermediary planning control measures for floods are planned without participation of the affected communities and other stakeholders are regarded as unsustainable as they do not meet the needs of relevant actors. This situation could be overcome by establishing participatory planning processes that require more participation

from various governments, non-governmental and private actors alongside public participation. However, as said earlier, discussion about this issue is brief, and does not cover the preparation strategies for community preparation and management of a flood. This would need more effort, time available, larger budget as well as more equipment, facilities and human resources, allowing for integration of flood risks management for both long term and short-term activities (Tingsanchali 2012). There is a level of positivity here, yet it still needs further enhancement regarding linking the community more, and not focusing on briefly mentioning the physical applied strategies only.

For the optional indicators, GO03 does not show any focus on this issue, with no single piece of information on the effects of the risks and the process of development through feedback between the community and other experts, during the development stages or afterwards. For GO04, it is acknowledged that management and maintenance of facilities regarding the environmental changes exists, through the training and user manuals provided to the responsible party on the operation and maintenance of the community facilities, particularly in relation to sustainable design and technologies with which users may be unfamiliar. This makes this a positive indicator.

- **Expert & Community Perceptions:**

Experts:

The sources of the findings reported in this section are from the professional actors' questionnaire:

Question 27	**Sections: All**

Regarding the priorities associated with protection from risks, the experts in Media City have demonstrated that the strategies associated with protecting people's lives and their health from the risks are seen neutrally, as table (5-15) shows. The implication of the strategies which influence adaptation to risks of the facilities or utilities and the management process is seen to be neutral as well. The experts demonstrate that there are strategies that relate to the physical performance of facilities, in association with the risks and CC impacts, related to the supply, sewerage, maintenance & management for the options of: 'Preparation _Water Supply_ Management', 'Sewerage Utilities Maintenance', 'Focus_ Risks Assessment_ Indicators', 'Focus_ Water Risks_ Human Health', and 'Flood Management_ Linkage_ CC

projection' found in Media City. However, none of these were considered as positive or negative points. The overall performance of these points is neutral. However, the point that relates to the Focus_ Risks Assessment_ Indicators is found to have a better level of performance than the other points. This is seen in the table below. The SPSS coding for (27) was (Strongly Disagree=1, Disagree=2, Neither Agree or Disagree=3, Agree=4 & Strongly Agree=5).

Table 5. 15: Expert responses on the strategies that influence capacity for risks

Options	N	Mean	Influence on Performance
Preparation _Water Supply_ Management	13	3.08	
Sewerage Utilities_ Maintenance	13	3.23	
Focus_ Risks Assessment_ Indicators	13	3.46	
Focus_ Water Risks_ Human Health	13	3.15	
Flood Management_ Linkage_ CC projection	13	3.23	
Valid N (listwise)	13		

Community: The participants mainly indicate that they have no concerns related to risks of flooding and drought. This is because they consider being in Media City makes them feel safer in this regard. One of the participants referred to the importance of the feeling of security in this area with the existence of the river. '*I'm not worried, although the water levels did get quite high two years ago. In general, I feel safer here than I would if was next to a river in somewhere like Berkshire'* (Employee 7/Occupant 11). Primarily, the community found that care and attention were given to the facilities, and with the existence of the ship's canal, the influence of flooding and its potential risks could be taken into consideration.

However, certain participants mentioned that they have seen a rise in the sea level, and while they have only slight concerns about it now, they thought it might be a serious concern in the future.

Summary – C.7:

Accordingly, experts attached both positive and neutral levels of response towards this characteristic. The community participants found that the strategies are in place to take care of the various facilities and buildings in the site, so they referred to this characteristic as being positively managed in Media City.

In BC, the performance of indicators was mostly positive. However, there is a need for further enhancement regarding community preparation to risks through the governance process.

5.3 Results & Discussion:

5.3.1 AG characteristics & BC Indicators:

The analysis above, as summarised in table (5-16), suggests that the characteristics of C. 1 & C. 2& C. 3 are showing a relatively positive performance across the indicators. C. 5 & C. 6 are the characteristics with most negative performance. It can also be noted that the optional indicators have been evaluated to present the most negative performance, particularly regarding C. 4 & C. 5. GO03 is the indicator that is showing the most negative performance, followed by GO04.

- **P:** Positive
- **Nu:** Neutral
- **Ne:** Negative

Table 5. 16: Adaptive Governance Characteristics & BC Indicators

Adaptive Governance Characteristics	**Mandatory Indicators**						**Optional Indicators**					
	GO1			**GO2**			**GO3**			**GO4**		
	P	**NU**	**NE**	**P**	**NU**	**NE**	**P**	**NU**	**NE**	**P**	**NU**	**NE**
C.1: Broad inclusion of actors for Effective Management												
C.2: Strong local Institution support												
C.3: Focus/Incorporation of information and understanding the impacts of Climate Change & Potential Risks												
C.4: Shared/Participatory Ways of Knowledge												
C.5: Physical performance of facilities regarding the water strategies												
C.6: Monitoring and Continuous Evaluation of Development Facilities												
C.7: Develop the possible actions of facilities for the protection from flood risks												

5.3.2 AG characteristics & Actor Perceptions:

The analysis discussed above shows that the experts have coded positive responses for C. 1, C: 2 & C. 3, while for the same characteristics, the community feedback was negative, as (5-17) shows.

Table 5. 17: perceptions of experts & local community on the Adaptive Governance Characteristics

Adaptive Governance Characteristic	Experts			Local Communities		
	P	Nu	Ne	P	Nu	Ne
C.1: Broad inclusion of actors for Effective Management						
C.2: Local Institution support						
C.3: Focus/Incorporation of information and understanding the impacts of Climate Change & Potential Risks						
C.4: Shared/Participatory Ways of Knowledge						
C.5: Consider the physical performance of facilities regarding the water strategies						
C.6: Monitoring and Continuous Evaluation of Development Facilities						
C.7: Develop the possible actions of facilities for the protection from flood risks						

Primarily, the community participants coded more negative responses associated with the adaptive governance characteristics than the expert respondents did. The only characteristics that are positively indicated by the community are C. 5 & C. 7.

It can also be noted from the table that both experts and community have indicated negative responses for C. 2 and have also agreed that there is positive performance for C. 7.

It should be said that from the integration of results of both tables (5-16) & (5-17), that despite a positive performance for the characteristics of C. 1 & C. 3 in both indicator analysis and expert analysis, the local community have coded these characteristics as negative, as demonstrated in table (5-18). It is also noticed that C. 5 & C. 6 are those characteristics with most consistently negative performance across the BC indicators. There is negative performance indicated by the experts for C. 5 and from both experts & community for C. 6. Accordingly, C. 6 is prioritised as the characteristic that requires enhancement most, followed by C. 2, both coded negatively by experts as well as community.

Further to C. 2, the characteristic C. 3 is also considered to be one that requires enhancement, as it is negatively coded in the fourth indicator and at the community context. In contrast to C. 7, this is considered the least prioritised indicator and requires enhancement.

Table 5. 18: integration of findings in BC indicators & actors' perception towards AG characteristics

AG characteristics	**Governance Indicators**				**Actors**	
	GO01	GO02	GO03	GO04	Experts	Community
C.1: Broad inclusion of actors for Effective Management						
C.2: Local Institution support						
C.3: Focus/Incorporation of information and understanding the impacts of Climate Change & Potential Risks						
C.4: Shared/Participatory Ways of Knowledge						
C.5: Include the ways that consider the physical performance of water facilities during the consultation process						
C.6: Monitoring and Continuous Evaluation of Development Facilities						
C.7: Develop the possible actions of facilities for the protection from flood risks						

5.4 Community Level

It is demonstrated in chapter 2 that there are three main themes related to the Resilient Community, based on the literature studies, which are:

- RC-1: Nature of Community
- RC-2: Community Adaptive Behaviour towards their Facilities and Built Environment
- RC-3: Community Well-being

It is acknowledged that for these themes there are 5 characteristics considered as the operational points for the analysis. Table (5-19) shows the themes and characteristics of Resilient Community

Table 5. 19: Resilience community themes & Characteristics

Resilience community themes & Characteristics	
Theme	**Resilient Communities Characteristic**
RC-1: Nature of Community	**C.8**: Community feeling of attachment & social engagement
RC-2: Community adaptive behaviour towards their facilities and built environment	**C.9:** Increase the Level of Learning and awareness knowledge
	C.10: Effective & Responsive Behaviour for Risks
	C.11: Increased Satisfaction with sustainable Physical building strategies
RC-3: Community Well-being	**C.12:** Enhanced delivery of human Health and well-being

There are 15 indicators that relate to the local community context a, as demonstrated in table (5-20). As mentioned earlier, the focus of these indicators can be addressed through dividing these indicators into three main groups.

Table 5. 20: the indicators of BC for the social context

Indicators		**Abbreviation**	**Optional/Mandatory**
Group 1 PCC	Flood Risk Assessment	**FRA**	**Mandatory**
	Adapting to Climate Change	ACC	Optional
	Microclimate	M	Optional
	Flood Risk Management	FRM	Optional
Group 2 CSW	Demographic Needs and Priorities	**DNP**	**Mandatory**
	Noise Pollution	**NP**	**Mandatory**
	Delivery of Services, Facilities and Amenities	DSFA	Optional
	Utilities	Us	Optional
	Green Infrastructure	GI	Optional
	Local Parking	LP	Optional
	Local Vernacular	LV	Optional
	Housing Provision	HP	Optional
	Inclusive Design	ID	Optional
	Public Realm	PR	Optional
	Light Pollution	LP	Optional

5.4.1 RC-1: Nature of Community

- **C.8: Community Feeling of Attachment & Social Engagement**

This characteristic is associated the feeling of belonging a community has with their neighbourhood, through inclusion of the various community members in meetings and activities which empower the community to be involved in their development, facilities adaptation and sustainability.

- **Theoretical Performance of BC Indicators:**

The analysis of this characteristic across BC indicators shows that for both groups 1 & 2 there are indicators from both groups that have positive and neutral performance, but the majority of indicators present neutral performance, as table (5-21) shows.

Table 5. 21: the analysis of C.8 for the social indicators of BC

Theme	Ch.	**Community/Social Indicators**													
		Group 1				**Group 2**									
		Mandatory	Optional PPC			Mandatory		Optional CSW							
		FRA	ACC	M	FRM	DNP	No	DSFA	Us	GI	LP1	LV	ID	PR	LP2
RC_1	**C.8**	**0**	**0**	**0**	+1	+1	**0**	+1	**0**	0	0	0	**0**	+1	**0**

For group 1's mandatory indicator FRA, it is acknowledged that this indicator is important for the prevention of flood risks at the development site. However, for this characteristic, it is seen that information about flood risks is gathered from the local community, which is important for the authority and other experts. It is also acknowledged that this information is not gathered or developed through any community engagement. Therefore, this indicator shows room for improvement.

The table shows that, for optional indicator PPC, there is neutral performance in association with this characteristic, except for the indicator FRM. This indicator is primarily employed in the planning process by the authority and other experts. There is no mention of the availability of routes to involve the local community in across the adaptation process related to Climate Change impacts or various risks scenarios, either through specific programs or

through the risks being addressed as isolated scenarios. This is more likely dependent on information considered by specific external professionals, without an allowance for the local communities to access intermediary information resources or to interact, which is weakly addressed here, and does not seem to allow any outcome change for the communities.

For the FRM, chapter 3 shows that this indicator is important when it comes to supporting communities' active involvement in developing, managing and/or owning selected facilities. These points are important for the development of a sense of belonging in the community, through understanding overall development, working together in managing their facilities, and partnerships with developers.

For group 2, the mandatory indicator DNP is important, where it is acknowledged that the local demographic and priorities of the communities are considered the basis for building development plans related to the provision of facilities and amenities. The positivity of this indicator in relation to this characteristic is related to the consultations and meetings which involve members of the local community from citizens, schools and business workers. In these situations, they discuss their local needs regarding the proposed development and sustainability matters. The opinions of community members are gathered and then discussed with the local authorities, to ensure delivery of required functions on an appropriate timescale and to ensure that demands are fulfilled. Therefore, this engagement of community in the development of their neighbourhood and facilities is what makes this indicator positive. The other mandatory indicator NP is important for noise mitigation, but there is no information on the ways noise can be mitigated in the indicator in relation to this characteristic.

Finally, for the optional CSW indicators of this group, the indicators do not have a focus on this characteristic, except for the PR indicator. The latter is considered important, which encourages social interaction between the community members through the design of the social spaces. Thus, this indicator is considered positive, because its application is vital in connecting community members across various events and activities.

- **Expert & Community Perceptions:**

Experts:

The source of the findings reported in this section id the professional actor questionnaire:

Question 11	**Sections: D**

The experts were asked if there were applied strategies in the governance process and the development in Media City that have involved community engagement or participation as main strategies implemented to increase the feeling of belonging in Media City, and the response was negative.

Community: The participants have discussed the sense of community and feeling of belonging from different perspectives. Some of them felt that these aspects exist in Media City, while the majority had negative perceptions on this matter. This majority has provided various reasons for not have a sense of belonging and sense of being in a community. There are seven participants from the three groups who have identified the idea that there is no sense of community, as the area itself is not suitable for families. Instead, it is considered an area for professionals only. One of the respondents who lives in Media City commented on this issue, saying: *'I live here, and I do not see a lot of families here. It is more for couples'* (Occupant 5). Another participant identified that this area does not have the characteristics of a location suitable for families, with its changeable nature of the place and focus on business, saying: *'I don't think it's a 'kid friendly place'. Media City is primarily a work place and phase 2 development will greatly expand this. An increasing number of people will come into Media City to work and leave at the end of the day. This is likely to add to road congestion and overcrowding on trams. And there are not many shops in here' (*Occupant 8)

Certain participants also indicated that, despite the project being still under development, they did not feel that future development will change the image of the Media City project. They thought the development has been for professionals mostly and particularly young professionals, instead of families. This is a main reason for the respondents deciding not to want to settle in Media City.

They considered that the changeability of the place makes it feel like the area is complex, which is a different perspective to the image of the community that they have in their mind. There are four participants who have addressed that living in this area has also made them feel that they do not belong to this area… *'This site is complicated, and it gathers media people and students, who are busy all the time. People are coming and going and it is a challenge to create a community environment here. The people of the BBC think that the place is 'Cold' and 'Soulless'* (Employee3).

The participants mentioned that there is no inclusion of local community in the development and decision-making process. However, there is a desire from the local communities to be involved in such events. For instance, a participant mentioned a need for involvement of the local community in the development process, particularly when it comes to the environmental aspects. He said that: '*I think it would have been wise to involve the community, like for example having a say in keeping more green areas, through effective communication of environmental protection strategies, meetings, social events, surveys etc*.' (Employee 6). The participants demonstrated, however, that there is a need to make facilities for such events, and through producing more intermediary publications and available information to publicise these events and meetings.

On the other hand, there are participants who have commented on this characteristic in general and considered it as being positive. Some of the participants thought that there were good points to Media City, which made them feel they had the sense they were living in a special place, particularly regarding the natural environment. Two of these participants considered that the existence of water is important for making this place special and make them feel a sense of community in this place: '*The 'Water' is quite significant. Not everybody is living/working next to this big water. I feel sometimes it is a 'sea' to me''* (Employee 2). Fig (5-1) shows the view of the river in Media City.

Figure 5.1 View of the river in Media City- taken by the researcher

Another participant found that the gardens were what made this place special, saying: '*the square is very nice in the summer and everyone comes out, and walks in the gardens, which makes the project really special''* (Employee 3). The respondents also mentioned that living here were also encouraging of a healthier life style, to practice sport in these areas. The

existence of green spaces among the residential areas is important and has improved people's lifestyle and opportunities, and this has increased interaction among residents, as fig (5-2) shows.

Figure 5.2 open green spaces in Media City – photo taken by the researcher

In this regard, when the participants were asked whether they had suggestions for enhancements, there were three of the respondents who agreed that there was a need to enhance the area in relation to the physical built environment, through having more facilities such as open areas, areas for kids and entertainment areas. For instance, one of the participants said:

'*We need more green places to gather and more little shops such as local newsagents, beauty shops or butchers where there is personal service and the owners get to know you. These are considered as barrier to an emerging sense of community. It's a new place to live in and needs more people living locally and then more facilities will come'* Occupant 2.

Furthermore, the participants indicated that this characteristic is strongly related to the efforts of Salford Council and the developers in the area. It was thought that these parties were the powers that manage the area. In total, 7 participants agreed that the role of the Council was negative with regards to community empowerment and engagement aspects, despite the success of the City Council in addressing the environmental and physical aspects, as they pointed out. The focus on the environmental aspects in Media City is considered as positive. Current positive outcomes are as a result of the continuous efforts of the Salford City Council, with one employee saying:

'*Salford City council plays a good role in developing new eco-friendly homes in Salford. This is not the case for community participation issues*.' (Employee 3)

Similarly, another employee from another group commented: '*For Salford City Council's role, the new council houses here in Salford are nice, they are really gorgeous. And they are environmentally friendly. But they do not regard the community.*' (Employee 1)

Summary – C.8:

Accordingly, experts have mentioned that there is no sense of community and engagement in Media City, and this considered as a negative issue. While for the local community, the majority thought this is a negative issue, and they have attached positive responses as well. Therefore, the performance of this characteristic is coded as both positive and negative.

In BC, the majority of indicators show neutral performance, except for four indicators which show positive performance.

5.4.2 RC-2: Community Adaptive Behaviour towards their Facilities and Built Environment

- **C.9: Increase the Level of Learning and Awareness Knowledge**

This characteristic is associated with an increase of the level of learning among communities, when the associated indicators are applied here.

- **Theoretical Performance of BC Indicators:**

The analysis of the characteristic across the four relevant indicators of BC shows that this characteristic is more likely neutrally indicated, as table (5-22) shows.

Table 5. 22: the analysis of C.9 of the social indicators of BC

Theme	Ch.	Community/Social Indicators													
		Group 1				Group 2									
		Mandatory	Optional PPC			Mandatory		Optional CSW							
		FRA	ACC	M	FRM	DNP	No	DSFA	Us	GI	LP1	LV	ID	PR	LP2
RC_1	**C.9**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Both groups of indicators are constructed on the basis of incorporating local knowledge from the community in the design of strategies which can influence the community and environmental sustainability. However, the ways that the engagement and collaboration among the community is undertaken when gathering the information are ineffective. These engagements through the intermediary of the consultation plan do not depend on interactive learning and feedback from community members, whether at the planning stage or afterwards. This is because the applied strategies through the indicators are considered in isolation from the local communities, and with no incorporation or real involvement of the local communities in the development stages of post occupancy. Therefore, all the indicators are more likely to be of a neutral influence regarding awareness knowledge and learning among the community members. The development of these indicators is more likely to depend on the experts' knowledge. However, as discussed earlier, the adoption of the language of experts limits the discovery of indigenous resources and reduces the likelihood of people interacting and collaborating with each other (Perkins and Zimmerman, 1995).

The involvement of communities doesn't seem to be presented as a vital outcome of these indicators, despite the importance of collaborative groups aiming to develop and sustain new organizational structures, processes, and strategies (Cheng and Sturtevant 2012). This is not the case in BC, where there is no focus on creation collaboration and interaction environment among the communities, to develop the learning skills and strategies.

- **Expert & Community perceptions:**

Experts:

The source of the findings reported in this section is the professional actors' questionnaire:

Question 33	**Sections: B**

For the experts, this characteristic is considered as not being well delivered. After the inclusion of BC in Media City, when the experts were asked whether there is a level of enhancement needed regarding community access to information, the majority of experts responded that 'no knowledge is available'. This indicated that this characteristic is not sufficiently considered in MediaCity in general.

Community: Regarding awareness knowledge in association with CC and sustainability in Media City, the participants indicated that there is still a need to focus on this issue, as they thought that there is a lack of information available for these aspects.

There were three participants who referred to the negative role of PEEL (the Developer) towards focusing on sustainability and climate change issues in Media City. They have suggested that the developers, as mediators, are not making sufficient efforts towards providing the community with the necessary level of awareness towards their environment. '*I feel PEEL is working hard for a lot of issues, to make things look and work great, but, not regarding the climate change issue, as we do not feel the directors or managers of PEEL are encouraging [the community] to know information about climate change. There is information about sustainability, but about climate change, nothing*.' Employee 1

Therefore, more focus on the collaboration and engagement process of the community is required, as the respondents stated. There is one participant who commented on the importance of the collaboration process among the community and other parties, saying: '*I think there is a need for better relations or collaboration among the council, developers, and the community and to be involved with the developments and issues which impact my residence*.' (Employee 5/ Occupant 12). These efforts by the various leading actors in the area need to be centred on the involvement of the communities, and to be extended to all the community individuals, not just with the young experts. This is of particular relevance given the ongoing nature of the development project of Media City, which will house more families eventually.

The participants reported that this issue in general needs enhancement regarding the existence of coordinated efforts between the developers and Salford City Council, to contribute towards addressing climate change concerns. Most of the participants indicated that they want to be a part of these plans or the strategies that could be applied in this regard. They refer to the importance of having information available in Media City.

However, at the same time, three participants have highlighted the role of Salford City Council as being positive in influencing an increase in knowledge about the sustainability, through applying some strategies and enforcing them. '*For the role of Salford City Council, they enforced a lot of things here. The recycling here is also enforced' (*Employee 3). The learning by doing approach is a strategy that is importantly encouraged in Media City,

including regarding the recycling issue, and these are positive aspects for community resilience development.

Summary – C.9:

Accordingly, experts have attached a negative response to this characteristic, compared with the local community who have attached both positive & negative responses.

- **C.10: Effective & Responsive Behaviour for Risks**

This characteristic is associated with addressing the aspects that encourage various people to be effectively prepared when risks occur.

- **Theoretical Performance of BC Indicators:**

The analysis of this characteristic across the two groups of BC indicators shows all the indicators here are classified as having neutral performance in relation to this characteristic, except M_FRA & O_FRM where they are showing positive performance, as table (5-23) demonstrates.

Table 5. 23: the analysis of C.10 of the social indicators of BC

Theme	Ch.	Community/Social Indicators													
		Group 1				Group 2									
		Mandatory	Optional PPC			Mandatory		Optional CSW							
		FRA	ACC	M	FRM	DNP	No	DSFA	Us	GI	LP1	LV	ID	PR	LP2
RC_1	**C.10**	+1	0	0	+1	0	0	0	0	0	0	0	0	0	0

For group 1, regarding the mandatory indicator FRA, it is acknowledged that this indicator is applied to ensure that flood risks are taken into consideration in the development, through the application of measures that aim to reduce the risks of flooding. It is associated with acknowledging that the assessment process is built based on the inclusion of the minimum knowledge of the local community, integrated with the local authority strategic assessment role.

It is recognised that there is best practice and an intermediary planning policy regarding the avoidance of the developing sites that have risks of flooding, and if it's not possible to avoid the flooding, measures are taken to defend or protect the development. With the addition

of the safety measures, an emergency plan is started when the flooding occurs. It appears that the preparation of physical measurements, assessment & calculation are efficiently completed, but do not regard community responsiveness or response to them.

Similarly, for the optional FRM, this issue is also constructed around the discharge, volume run-offs and flow rate as important physical indicators. However, the homeowners of the community, and other actors in community organisations and facilities, are not taken into account when it comes to the implementation of insurance and the extent to which this is affordable for all the community, nor is any input on how these areas can be efficiently addressed. It is demonstrated that effective calculations are completed by a qualified professional who provides design criteria for all elements regarding the surface water run-off drainage system. Therefore, for this indicator, there are effective strategies that are applied to minimise the risk of localised flooding on and off site, as well as watercourse pollution and other environmental damage. This means this indicator has positive performance in relation to this characteristic. For the other two optional indicators, there is no information that influences responsive behaviour towards risks.

Finally, for group 2, the mandatory indicators of DNP & No are not showing a level of information related to this characteristic. Similarly, for the optional indicators, there is no information on raising this characteristic. These indicators are more likely of neutral influence here.

- **Experts & Community Perceptions:**

Experts:

The sources of the findings reported in this section are from the professional actor's questionnaire:

Question 33	**Sections: A, B**

The experts identified that the level of responsibility in the local community towards the resources at the individual level, and the effective behaviour that is associated with collaborative thinking that happens at the community levels, are not positively viewed.

Community: Regarding this characteristic, the participants have identified that building their adaptive behaviour towards their building and facilities has not been influenced by their

existence in the BREEAM communities-enabled development. Nine of the participants agreed on raising the issue that there is no influence towards changing behaviour of communities in MediaCity, which happen as a result of the application of sustainable strategies.

Four of the participants mentioned that being in MediaCity has not changed their behaviour or made them more responsible, even though the buildings are found to be sustainable. They mentioned that their behaviour is mainly associated with their personal intersts of being sustainability-conscious people. For instance, one of the respondents said: '*For me, I have cared about the idea of recycling since I was 5 years old. Not [because] of being here.' (*Student5).

Two participants referred to the fact that their responsible behaviour towards water is mainly based on economic reasons and expensive bills. *'I find the electricity and water bills very high in my apartment. I am careful with consumption of both water and electricity to keep my bills as low as possible. It is saving on costs that makes me be careful, not altruistic principles.'* Occupant 8

Finally, some of the participants stated that the building performance is not different from that of others in other places, regarding applied strategies. Besides, the management process and addressing of feedback after the post occupancy stage is a troublesome issue, which the respondents indicated needs enhancement. Three respondents have raised these issues.

*'There is no difference from any other building. I think the whole process of 'Feedback' does not exist. There is always a need to change things, new features requests or otherwise making things better'. (*Employee 5 /Occupant 12). Therefore, it seems that there is a need to focus more on ways oft empowering communities towards behaving in a more responsible and adaptive way towards the facilities.

Summary – C.10:

Accordingly, for this characteristic, the experts indicated that this issue is negatively addressed in MedaCity, compared with the local community who have expressed a neutral response here for this characteristic.

C.11: Increased Satisfaction with Sustainable Physical building strategies

This characteristic is associated with the sustainable strategies that the buildings constitute to make the users more satisfied with the performance of the buildings.

- **Theoretical Performance of BC Indicators:**

The analysis of this characteristic shows that the mandatory indicators from both groups are have positive performance, while the optional indicators seem to have neutral performance, as table (5-24) shows.

Table 5. 24: the analysis of C.11 of the social indicators of BC

Theme	Ch.	Community/Social Indicators													
		Group 1				Group 2									
		Mandatory	Optional PPC			Mandatory		Optional CSW							
		FRA	ACC	M	FRM	DNP	No	DSFA	Us	GI	LP1	LV	ID	PR	LP2
RC_1	**C.11**	+1	0	0	0	+1	+1	0	0	0	0	0	0	0	0

For group 1, it is acknowledged that the two indicators FRA & FRM are important for the people's safety, and they hold some important potentials for resilience. These indicators are associated with the protection of development sites and their surroundings from flood risks, where present.

FRA is a significant indicator that comprises strategies that are important for sustainability and resilience in buildings. It is demonstrated that, as part of this indicator, there are resilient measures incorporated in building designs to the satisfaction of the relevant statutory body which address safety for the community. In this indicator, it is demonstrated that the planned ground level of the buildings and access to the buildings and the site are designed so they are at least 600mm above the design flood level of the flood zone in which the assessed development is located. These points are important to be addressed when applying this indicator. In addition, as demonstrated earlier, an emergency plan is in place in the event of flooding, as a strategy that is applied through this indicator, whether for buildings or entire sites. It is also acknowledged that part of this indicator is the relation in place with the protection of the infrastructure and saving water in times of risks. Mainly, it is expected, with the application of physical characteristics when BC has sustainability strategies applied, that

the facilities will have better performance whether for the quantity or quality of water. This is for all seasons with higher potential for flooding, with maintenance and management plans available.

However, despite the importance of FRM in managing flooding, the relation of this indicator with the adoption of buildings' resilience strategies regarding the occupants during flooding events is not clearly indicated. For the other indicators, there is no specific information to influence this characteristic in a clear way. However, these indicators are more likely focusing on addressing the impacts and strategies for adaptation.

For group 2, the first indicator DNP is found to be important in relation to this characteristic. It was discussed in chapter 3 that this indicator is applied to guarantee that the houses and various facilities in the neighbourhood are planned and deigned on the basis of local demographic trends and priorities. The provision of important strategies for suitable delivery mechanism has been established to ensure delivery of required functions on an appropriate timescale and to ensure that demands are fulfilled whilst avoiding the creation of facilities unsustainable in the short-term. Therefore, this indicator is important, and has positive performance in relation to this characteristic. The other mandatory indicator NP is important as it comprises the strategies in buildings, related to the location and orientations of buildings. These strategies are influenced by the results of the noise impact assessment for the sites. This is mainly undertaken to ensure that the occupants in these buildings and in the wider development are satisfied and that there is no potential for problems and inconvenience as a result of the noise levels.

Finally, for the optional indicators of this group, there is no clear information associated with this characteristic, and so there is a neutral performance evaluation.

- **Experts & Community Perceptions:**

Experts:

The sources of the findings reported in this section are from the professional actors' questionnaire:

Question 33	**Sections: G,C, E**

The experts indicated that there are sustainable strategies integrated in the buildings in Media City, whether for energy or water sustainability issues.

The experts indicated that accessibility to water resources with sufficient water quality & quantity, and the enhanced level of the technical support that is provided to the facilities for the community of Media City are considered to be well-delivered issues. However, at the same time, the experts have identified that there is still a need for further enhancement of the performance of the physical strategies that are associated with water issues. They identified that in Media City, aspects associated with the easy use & efficient delivery of the fixtures for the occupants and the long-term efficient usage of water resources are not well delivered. The SPSS coding for question thirty-three which constitute 3 points scale was (Not that well delivered=1, Well Delivered=2, Very Well Delivered=3 &I do not Know=88).

Table 5. 25: Experts perceptions on sustainability strategies in buildings

Options		N	Mean	Influence on Performance
A	Responsibility_ Water Use	11	1.36	
B	Local Community_ Collaborative thinking_ CC	11	0.64	
C	Easy Use & Efficient Delivery_ Fixtures_ Occupants	10	1.20	
D	Long Term_ Efficiency_ Water Fixtures	10	1.30	
E	Enhancement_ Health Surveillance	11	1.64	
F	Enhancement_ Technical Support_ Water Facilities	11	1.64	
G	Sufficiency _ Water Quality	11	1.55	
	Valid N (listwise)	10		

Community: For this characteristic, the participants identified that the use of resources, regarding the water in particular, is considered a positive issue in Media City. They indicated that that they have experienced no issue with accessibility to resources. It was also demonstrated that if a problem were to happen, they are confident that these issues would be addressed.

Four participants agreed on the importance of the sustainability strategies that exist physically around them in Media City, particularly in the context of the buildings. They demonstrated that the water usage sustainability in their building through the use of water saving taps and toilets is considered a positive issue.

'I like how the buildings are sustainable here. *I think you can know about sustainability issues from the BBC. That essentially, we know from the BBC that these buildings are sustainable and relatively environmentally friendl*y' Employee 2.

There is also a participant who lives in Media City and comments about living in this neighbourhood, describing it as better compared with their old house in Manchester, saying: '*I can feel sustainability, in the differences between my house here and my other old house in Manchester, in terms of insulation. Here you can feel the energy efficiency, or maybe because it's new*' Occupant 1

One of the students mentioned that in the university, these strategies are found regarding energy, but not for other strategies. *'In the University there are things we can see in using the automatic lights, and how they save energy. Other than this, there is nothing more than what has [already been] said.'* Student 1

However, the only concern that they raised was regarding the poor level of information that is associated with the management of facilities in their buildings.

Summary – C.11:

Overall, the experts identified that there is positive performance associated with the physical strategies in Media City, with a need for further enhancement of these as well. The local community has shown that this issue has positive performance.

For the BC indicators, mandatory indicators show positive performance regarding this characteristic, where optional indicators show neutral performance.

5.4.3 RC-3: Community Well-being

- **C.12: Enhanced Delivery of Human Health and Well-Being**

This characteristic is associated with community health and well-being regarding various neighbourhood facilities.

- **Theoretical Performance of BC Indicators:**

The analysis of this characteristic across the five relevant indicators of BC shows that these indicators in total are more likely to have a 'positive performance in association with this characteristic, as (5-26) shows.

Table 5. 26: the analysis of C.11 of the social indicators of BC

Theme	Ch.	Community/Social Indicators													
		Group 1				Group 2									
		Mandatory	Optional PPC			Mandatory		Optional CSW							
		FRA	ACC	M	FRM	DNP	No	DSFA	Us	GI	LP1	LV	ID	PR	LP2
RC_1	**C.12**	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1

For group 1 indicators, it is recognised that the FRA indicator is important in reducing the risks of flooding in the development, and to protect people's lives through setting up energy plans in the events of flooding. Thus, this indicator is considered to be positive for community well-being. Similarly, indicator FRM is important in avoiding and minimising risks of flooding and to protect from water pollution and environmental damages, through strategies of reduction and delaying of the discharge of rainfall to the watercourses.

The other two optional indicators in this group are considered important in relation to this characteristic. The ACC application is essential to ensure resilience of development for CC impacts, through considering the known and predicted CC impacts of increased temperatures, flood risk, increased weather volatility, impacts on water resources, and changes in ground conditions.

It is acknowledged that there is no doubt that these effects have direct impacts on people's lives and wellbeing, and it is widely acknowledged that the increase of temperature and rainfall, heat waves, floods, and drought have direct and immediate impacts on mortality rates and other longer-term effects (Haines et al 2006). At the same time, the M indicator is important in confirming the provision of a comfortable outdoor environment, through minimising the negative microclimatic factors of temperature/thermal comfort, solar exposure, air movement and wind speed, dust and pollution, and the acoustic environment. Therefore, the indicators of this group are all considered important for well-being, and are thus evaluated as positive for this context.

For group 2, the mandatory indicators DNP & NO are both considered to be important in relation to this characteristic, in a positive way. DNP is applied and focused on community wellbeing for all the constituted community groups, including children, the elderly, students, workers, and the disabled. The focus is also on areas associated with community wellbeing and social care services such as pharmacies, medical centres and GP surgeries, banks,

nurseries and children's playgrounds, communication services such as public internet access, community buildings, apartments and houses, libraries and schools, green spaces, leisure facilities and shops. The other mandatory indicator is also important for people's health and their satisfaction regarding the levels of noise control. Accordingly, both mandatory indicators of this group are considered positive for this characteristic.

The optional indicators of this group also seem to be important for influencing human health and well-being, whether through the availability of natural healthy open green spaces with GI, or through the enhancement of the performance of physical built environments. The indicators DSF, Us, PR & LP are essential for the enhancement of pedestrian routes, accessibility to the site, movement and connecting people in the neighbourhood, and parking areas respectively. Therefore, these indicators associated with the physical built environment have solid, positive performance for this characteristic.

Finally, the other two indicators, PR & LP2, show importance related to the issues of social interaction among the community through vibrant public spaces and protecting the streets and walking areas from glare and light pollution.

- **Expert & Community Perceptions:**

Experts:

The sources of the findings reported in this section are the professional actors' questionnaires:

Question 33	**Sections: F**

The experts identified that the delivery of the health aspects in Media City is well-executed.

Community: Regarding health and well-being, the participants have mixed opinions about this issue in Media City. Some of the opinions were positive, while others were negative.

For the positive community perceptions of this characteristic, there were four participants who indicated the importance of nature to their health and well-being, through the existence of the river and the open public green spaces. They described being in this area as important for their physical and psychological health. They agreed on the importance of the aspects associated with the site and its facilities. One of the participants has found that the importance of this aspect is directly related to the presence of water and the quays; '*I feel*

that living in media city has a great positive impact on my personal and emotional well-being. From the morning the view of the sunrise with the river gives you a nice feeling to start your day. Also, at night all the colourful lights give a really nice view to look at.' (Occupant10). Figure (5-3) shows the beautiful water view in Media City.

Another participant commented and mentioned the issue of air quality compared with the other areas of Manchester, and he considered this issue as crucial in Media City. He commented: '*The air is better quality, and that makes people's healthier and allows them to have a good life style*.' Occupant 1

Figure 5.3 view of the walk areas and river in Media City- taken by the researcher

There were 11 participants who identified aspects that they considered to be negatively associated with health and well-being in Media City. These perceptions were different, and mainly associated with either physically built environments or social matters.

Five respondents raised the issue of having no health centres or clinics, seen where two of them said: '*There is a need for a pharmacy definitely.' (*Employee 2) and, *'I think a GP is important to have here. Other GPs are really far from here.' (*Occupant 1). However, addressing these health aspects is important for the principles of adaptation to CC. Prevention through health aspects aims to alleviate the various illnesses or injuries, with clinical examples including immunization, smoking cessation efforts, and the use of bicycle helmets. This is also achieved through adopting health sciences & practices which can

contribute useful information regarding the choice of safe, healthful technologies (Frumkin et al 2008).

Regarding this, one of the participants also commented that: '*The place lacks the facilities that people need such as post office and pharmacy, schools, parks, pharmacy, library, and activities organisation which create a community and their address their needs' (*Employee 4).

Furthermore, there were participants who mentioned the issue of water pollution, and its effect on Media City. They considered that there is a need for more care, and for cleaning the water. One of the respondents added: '*The water is becoming increasingly polluted with junk thrown in it (fast food packaging, plastic bottles). The pollution of water needs to be addressed' (*Occupant 8). The other participant mentioned that this issue could be better managed, and referred to this issue as being a result of the increase of the population in the area, as well as visitors to Media City.

Six participants agreed on the negativity of the social aspects that relate to their needs and priorities in Media City. They felt that the social aspects in general are lacking. They considered that there is a need for more enhancements in order to improve their well-being, particularly when it comes to facilities available in their daily life. The four participants raised the issue of not having a good social life as a problem, for them and for their families.

The participants demonstrated that there is a need for greater levels of socialising through facilities and activities in their neighbourhood. They consider the community of MediaCity to be in need of more interaction and socialisation, and there is a need to be seen as part of the Salford community as well. '*We do not have a chance to socialise more, or have open spaces, it's probably the dock yard.' (*Student 2). This is affecting local communities, including students.

Finally, nine of the participants have mentioned accessibility to the site and buildings through the 'Parking' areas as a negative in their daily life and their well-being. This issue has been a problem not only for students and workers, but for the occupants as well. The participants consider parking a problem that affects people who come to visit the area as well. For instance, some of the comments were:

'*The car parking here is a 'nightmare' & a (massive issue), which hinders the gathering of the public in varied activities*.' (Occupant 6).

'*The parking is a problem for the student. It's an expensive place. If I have the chance to work here in the future, I will definitely choose to live elsewhere*.' (Student 4).

However, it could be said that the intention is to reduce the use of cars, in order to design cities of such quality and at a suitable scale that people would not need to have a car (Banister, 2008), which might be the case in Media City.

This issue could be negative for the well-being of the communities, but at the same time, it could be important for addressing sustainable mobility, environmental protection and a healthier life style.

However, while reducing car usage is admirable, it must be undertaken in conjunction with effective public transport, walking and cycling options. Fig (5.4) shows some of the parking areas in Media City.

Figure 5. 4 Parking areas in Media City – taken by the researcher

Summary – C.12:

Accordingly, experts have indicated that this characteristic is positively described in Media City, where the local community has attached mixed opinions, both positive and negative.

It can be noticed that the indicators of this category are showing positive performance in relation to this characteristic. This issue is expected to have a central focus in this category of BC.

5.5 Discussions:

5.5.1 Resilient Communities Characteristics & Indicators

The analysis above, as summarised in table (5-27), suggests that the characteristic C. 12 shows positive performance across all indicators associated with this category. The other characteristics show neutral performance in relation with the BC indicators. However, characteristic C. 11 is shown to have positive performance across five indicators as well.

Table 5. 27: Resilience Communities Characteristic & Role of BREEAM Communities

Theme	**Ch.**	**Community/Social Indicators**													
		Group 1				**Group 2**									
		Mandatory	**Optional PPC**			**Mandatory**		**Optional CSW**							
		FRA	ACC	M	FRM	DNP	No	DSFA	Us	GI	LP1	LV	ID	PR	LP2
RC_1	**C.8**	**0**	**0**	**0**	+1	+1	**0**	+1	**0**	**0**	**0**	**0**	**0**	+1	**0**
RC_2	**C.9**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	C.10	+1	0	0	+1	0	0	0	0	0	0	0	0	0	0
	C.11	+1	0	0		+1	+1	0	0	0	0	+1	0	0	+1
RC_3	**C.12**	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1

5.5.2 Resilient Community Characteristics & Actor Perceptions

The analysis discussed above shows that the experts have coded positive responses for C.11 & C.12, while for the other characteristics, community feedback was both positive and negative, as (5-28) shows.

The local community has coded both positive and negative responses regarding the same characteristics of C. 8 & C: 9 & C. 12.

It can be further noted that the table shows both the experts and the community have indicated negative responses for C.8 & C. 9; and have also agreed on positive performance for C. 11 & C. 12.

Table 5. 28: experts and community perceptions on Resilience Communities Characteristic

Theme	Resilient Communities Characteristic	Experts			Local Communities		
		P	Nu	Ne	P	Nu	Ne
RC-1:	**C.8**: Community feeling of attachment & social engagement						
RC-2:	**C.9:** Increase the Level of Learning and awareness						
	C.10: Effective & Responsive Behaviour for Risks						
	C.11: Increased Satisfaction with sustainable Physical building strategies						
RC-3:	**C.12:** Enhanced delivery of human Health and well-being						

It should be said that the integration of results of both tables (5-27) & (5-28) seen in table (5-29) shows that both experts & the community agree on their negative feelings towards C. 8 & C.9, while the indicators analysis shows negativity regarding the three demonstrated indicators.

It can be noticed that for C.12, the community has indicated negative performance, while the experts have not. However, in this characteristic, 5 indicators show negative performance.

It can further be noticed that the DNP indicator has the most negative performance among indicators, in relation to the four characteristics: C. 8, C.9, C. 11 & C.12

Table 5. 29: experts and community perceptions on Resilient Communities Characteristic

Ch.	Community/Social Indicators															
	Group 1				Group 2										Ex.	Co.
	Ma.	Opt			Ma.		Opt.									
	FRA	ACC	M	FRM	DNP	No	DSFA	Us	GI	LP1	LV	ID	PR	LP2		
C.8																
C.9																
C.10																
C.11																
C.12																

5.6 Intermediaries

As demonstrated in chapter 2, there are two main themes related to the role of intermediaries in terms of governance and community, based on the literature studies. These are:

- *I-1: Intermediary role in Facilitating Knowledge*
- *I-2: Mediator Role in Making Social Change*

5.6.1 I-1: Intermediaries' Role in Facilitating Knowledge Transfer

As acknowledged earlier, this theme has 4 relevant evaluation characteristics considered to be the main characteristics for analysis here. Table (5-30) shows the themes and characteristics relevant to the intermediaries' roles. These characteristics are both considered negative. However, this issue is considered to be limited for current local adaptation planning, where the learning process and addressing of feedback among the various stakeholders has been conceptualised in a more mechanical way, and thus lacks the communication methods needed to address the necessary reactive management (Measham et al 2011).

Table 5. 30: Intermediaries characteristics- governance

I-1: Intermediaries role in facilitating knowledge transfer	
C.13	Information availability & interpretation
C.14	Communication between departments
C.15	Long-term programmes for community organisation capability and adaptive behaviour
C.16	Bottom- up feedback from the iterative process of adaptive social learning
C.17	Training and educational programme

- **C.13: Information Availability & Interpretation**

This characteristic is associated with the potential impact of BC as an intermediary on the availability of information and data relating to CC adaptation and sustainability strategies, and passing this information to the various other actors in the Media City network.

- **Theoretical Performance of BC Indicators:**

As table (5-31) demonstrates, mandatory indicators promote positive performance, compared with the optional indicators, which have a neutral impact on performance. The social indicators seen in table (5-32) show neutral performance.

Table 5. 31: the analysis of C.13 of governance in BC

Theme	**Ch.**	***BC Governance Indicators***			
		Mandatory		**Optional**	
		GO 01: Consultation Plan	GO 02: Consultation and engagement	GO 03: Design review	GO 04: Community management of facilities
I-1	**C.13**	+1	+1	0	0

Table 5. 32: the analysis of C.13 of governance in BC

Theme	***Ch.***	**Community/Social Indicators**													
		Group 1				**Group 2**									
		Mandatory	Optional PPC			Mandatory		Optional CSW							
		FRA	ACC	M	FRM	DNP	No	DSFA	Us	GI	LP1	LV	ID	PR	LP2
I-1	**C.13**	0	0	0	0	0	0	0	0	0	0	0	0	0	0

For both mandatory indicators GO01 & GO02, it is acknowledged that there are methods applied to engage the various actors in the consultation plan, including the community. It is acknowledged that for making information easy to be understood and interpreted, particularly with the inclusion of community, it is important that jargon is avoided during the consultation exercise. It is also mentioned that as a result of the discussions about the development they were involved in, the views and opinions of the community will be used in the plans. Thus, there is positivity associated with this characteristic under this indicator. However, there is no information about the data produced after the discussions, nor about how accessible this information is for the various actors.

For the optional indicators GO03 & GO04, it is shown that there is no real support made available for building and addressing an open and effective engagement and collaboration process amongst the various engaged parties. Thus, accessibility of information and related interpretation do not seem to be influenced by these two indicators.

While for the Community indicators, for both groups, it is noticed that there is no influence from these indicators to affect the process of information provision for CC among the various actors. There is no effort from these indicators to include the community or other actors in an engagement process that addresses the interpretation of information.

- **Experts & Community Perceptions:**

Experts:

The source of the findings reported in this section is the professional actors' questionnaire:

Question 16	**Sections: All**

The experts demonstrated that data availability and quality regarding climate change and sustainability are considered as important aspects that are empowered through the role of the BC, which is a positive matter. As (5-33) shows, this issue is considered as not needing further focus. However, in general, the issues in this question were negatively indicated by the experts as needing more focus, which is positive in BC as a result here. Under SPSS, the coding for this question was: (No=0, Yes=1).

Table 5. 33: Experts Identification through the BC

Mean						
Participants Occupation	Objectives of Adaptation	Resilience targets	Existing indicators	Data availability & quality	Accuracy Level	Short & Long term _ Planning
Architect	0.00	**0.50**	0.00	**0.50**	0.00	0.00
Assessor	0.33	0.33	0.33	0.33	0.33	**0.67**
Urban Planner	0.00	0.00	0.00	0.00	0.00	0.00
Developer/ Manager	0.00	**0.50**	0.00	0.00	0.00	0.00
Professional Engineer	0.00	**0.50**	0.00	0.00	**0.50**	0.00
Water Engineer	0.00	0.00	0.00	0.00	0.00	**0.50**
City Councillor	0.00	**1.00**	0.00	0.00	0.00	**1.00**

It should be said that despite the important role of BC as a source of information, there is a need for enhancement in association with the accessibility of data, in order to increase the methods used and potential for information and knowledge transfer. The experts agreed

that there is a need for enhancement of BC and its focus on adaptation to climate change, achieved through developing more indicators that influence the adaptation process of the communities.

The experts' responses here suggested that there may be differences in identifying the particular fields that require more focus in BC. For instance, the Architects, Developers, Engineers & City Councillors found that the 'Resilience Strategies' required more focus in the application of BC as a potential intermediary party for advancing sustainability. At the same time, there is a need for more focus on information, whether for 'Data Availability & Quality' or 'Accuracy Level', as indicated by Architects and Engineers, respectively. The 'Integration of both short- & long-term horizons into the planning' also requires further focus as well, as referred to by the Assessors, Water Engineers, & City Councillors.

Community: The participants indicated that they do not have any information on this issue, which as demonstrated in the previous characteristic, can reflect the negativity associated with making the community aware of the strategies applied here.

Summary – C.13:

Accordingly, the analysis results of this characteristic show that experts find this characteristic to have positive and negative performance in association with the role of BC. The community has a negative response towards the overall idea of applying this characteristic in relation to the sustainability process.

The focus on the indicators of the governance process of BC has shown a positive result regarding the first two indicators, and neutral performance for the other two optional indicators. While for the community indicators, the indicators were neutral.

- **C.14: Communication between Departments**

This characteristic is associated with the potential of BC to address the communication process among the various actors, through meetings and organised workshops.

- **Theoretical Performance of BC Indicators:**

For this characteristic, it can be noticed in (5-34) that the indicators in the governance context have been evaluated as having a neutral impact on performance. Similarly, the indicators of the social context have neutral performance as well, as table (5-35)

Table 5. 34: analysis of C.14 of the Governance in BC

Theme	*Ch.*	***BC Governance Indicators***			
		Mandatory		**Optional**	
		GO 01: Consultation Plan	GO 02: Consultation and engagement	GO 03: Design review	GO 04: Community management of facilities
I-1	**C.14**	0	0	0	0

Table 5. 35: analysis of C.14 of the Governance in BC

Theme	*Ch.*	**Community/Social Indicators**													
		Group 1				**Group 2**									
		Mandatory	Optional PPC			Mandatory		Optional CSW							
		FRA	ACC	M	FRM	DNP	No	DSFA	Us	GI	LP1	LV	ID	PR	LP2
I-1	**C.14**	0	0	0	0	0	0	0	0	0	0	0	0	0	0

For the first two mandatory indicators GO01& GO02, it is acknowledged that it is good practice to approach and to cooperate with community and individuals during the design process of development, and then provide them with feedback about the suggestions chosen. Nevertheless, there is no information within these indicators regarding the intermediary communication processes and mechanisms in these workshops which can help the communication process.

GO03 & GO04, as mentioned earlier, are indicators not currently influencing communication and collaboration among the various actors to address sustainability and adaptation knowledge production For GO03, the participants were only informed whether their opinions are considered or not, while for GO04, the focus is on how the community could actively manage facilities, through the developers' role.

For both groups of social indicators, the mandatory and optional indicators do not constitute information that relates to this characteristic. There is no mention in any of the indicators on

the role of BC as an intermediary which can influence the communication processes of the various actors, including the community.

- **Expert & Community Perceptions:**

Experts:

The source of the findings reported in this section is the professional actors' questionnaire:

Question 26	**Sections: C, E**
Question 30	**Sections: A, B**

The experts indicated that the role of BC is neutral when it comes to the aspects associated with communication among the various actors. The experts identified that there was neutral performance relating to the effects of BC on the 'experts' collaboration', 'experts & local community connection', &' openness through the discussions. These results are associated with question twenty-six, as table (5-36) illustrates.

However, at the same time, they attached negative responses regarding the influence of BC on the issues of 'organisation of meetings' and 'Feedback among the Local Communities & Experts'. These findings are indicated in question thirty, related to the influence of BC on these characteristics, as table (5-36) shows. The coding of this question was (Never =1, Sometimes=2, Often=3, Quite Often=4 I do not know=88).

Table 5. 36: the role of BC in collaboration, training and learning across Media City

Options		**N**	**Mean**	**Influence on Performance**
A	BC_ Organising_ Meetings_ Experts	7	2.29	
B	BC_ Feedback_ Local Community_ Experts	8	1.88	
C	BC_ Training_ Experts	6	1.83	
D	BC _ Continuous_ Evaluation & Monitoring	6	1.83	
E	BC _ Monitoring _Actors Communication	7	2.14	
F	BC _ Educational_ Participation	7	2.14	
	Valid N (listwise)	6		

Community: The participants indicated that they do not have information on this issue. This is demonstrated in the RC characteristics section, where the communication between the experts and community is negatively reported by the community, based on the negative engagement procedure in place in Media City.

Summary – C.14:

The analysis results of this characteristic show that experts reported neutral and negative responses towards this characteristic, related to the coverage of aspects that this characteristic constitutes. The community associates a negative response with the overall idea of applying this characteristic in relation to the communication process. A focus on the indicators of the governance and the community contexts of BC, however, has shown neutral performance for the mandatory and optional indicators, as seen above.

C.15: Training and Educational Programme

This characteristic is associated with the role of the indicators in addressing training and learning principles and processes across the short and long term, amongst the various intermediary actors.

- **Theoretical Performance of BC Indicators:**

The analysis of this characteristic across the four indicators of BC in the governance context and social context are neutrally indicated across the indicators, as tables (5-37) and (5-38) show below.

Table 5. 37: analysis of C.15 of the Governance in BC

Theme	Ch.	*BC Governance Indicators*			
		Mandatory		**Optional**	
		GO 01: Consultation Plan	GO 02: Consultation and engagement	GO 03: Design review	GO 04: Community management of facilities
I-1:	**C.15**	0	0	0	0

Table 5. 38 analysis of C.15 of the Governance in BC

Theme	Ch.	**Community/Social Indicators**													
		Group 1				**Group 2**									
		Mandatory	Optional PPC			Mandatory		Optional CSW							
		FRA	ACC	M	FRM	DNP	No	DSFA	Us	GI	LP1	LV	ID	PR	LP2
I-1:	**C.15**	0	0	0	0	0	0	0	0	0	0	0	0	0	0

For this characteristic, there is no information available regarding the ways that the indicators of both contexts influence the experts and the local community regarding the availability of programs on CC and sustainability. The availability of training and educational aspects to maintain the role of BC is not influenced in either contexts here.

- **Expert & Community Perceptions:**

Experts:

The source of the findings reported in this section is the actors' questionnaire:

Questions 30	Section: C

The experts demonstrated that the intermediary role of BC can sometimes affect this characteristic. This occurs in association with the issues attached to the training and educational programmes of the various actors or the experts in the process regarding sustainability and climate change impacts issues. There is a need to give this aspect more attention. The role of BC as an intermediary tool that influences education of the various experts through the collaboration and engagement process in meetings and workshops designed by BC is in need of more focus, as demonstrated in the outcomes of question thirty.

Moreover, one of the experts identified that this role needs to be in place on a wider scale or process, in order to increase focus on the role of BC in advancing sustainability and adaptation to CC aspects within the network. This is particularly the case as the position of BC in the governance process is strong. It can be noticed that having respondents see the role of BC as a main source of learning and knowledge is still not acknowledged by the experts as an issue.

Community: The participants indicated that they do not have information on this issue.

Summary – C.15:

Accordingly, the analysis results of this characteristic show that experts had negative responses on the matter, in relation to BC indicators. The community had a negative response to the overall idea of applying this characteristic as well. As a result, it is considered that this characteristic needs additional focus in BC. This is because the role of BC as an

intermediary is essential regarding the empowerment of training and education programs among the various participants within the governance process.

The focus on the indicators of the governance process of BC was seen to have neutral performance across the four mandatory and optional indicators.

- **C.16: Long Term Programmes for Community Organisation Capability and Adaptive Behaviour**

This characteristic is associated with the development of the community's adaptive behaviour.

- **Theoretical Performance of BC Indicators:**

The indicators are evaluated as having neutral performance, except GO 01 & GO02 of the governance indicators, and FRA & DNP of the community indicators, which have shown positive and negative performance respectively. The results are seen in tables (5-39) & (5-40).

Table 5. 39: analysis of C.16 in the governance context in BC

Theme	Ch.	*BC Governance Indicators*			
		Mandatory		**Optional**	
		GO 01: Consultation Plan	GO 02: Consultation and engagement	GO 03: Design review	GO 04: Community management of facilities
I-1:	**C.16**	+1	+1	0	0

Table 5. 40: analysis of C.16 in the social context in BC

Theme	*Ch.*	**Community/Social Indicators**													
		Group 1				**Group 2**									
		Mandatory	Optional PPC			Mandatory		Optional CSW							
		FRA	ACC	M	FRM	DNP	No	DSFA	Us	GI	LP1	LV	ID	PR	LP2
I-1:	**C.16**	-1	0	0	0	-1	0	0	0	0	0	0	0	0	0

For the governance indicators, it can be seen that the mandatory indicators have a positive influence on this characteristic, compared with the other two optional indicators, in which they show neutral performance. For GO01 & GO02, the advantages of the strategies of

integrating the community with the actors in the governance process are clear. For instance, there are social developments designed to help the poor to reduce environmental health stresses (such as clearing up waste, flooding, coping strategies deposits, improving sanitation flows), which could have the double effect of minimising risks too (health impacts of flood events) and building up organizational capacity/social networks (social capital assets) to withstand shocks through cooperative efforts (Few 2003). The development and integration of social programs as intermediaries in the risk's reduction indicators is seen as potentially important in increasing awareness levels. Another example is seen with fostering community-based technologies for risk reduction, where interventions can aim to strengthen the social and organisational capacities of the local community (Few 2003).

For the social context indicators, the mandatory indicators which should directly influence this characteristic are lacking focus. For FRA, it is acknowledged that this indicator is important for the protection of humans in the event of flooding. However, this indicator still lacks the capacity to enable community social and organisational coping processes. Similarly, for the DNP, there is a lack of focus on the long-term programs that include vital community involvement and management. It is argued that there is a level of neglect seen relating to the urgent need for community involvement in the identification of measures to monitor and manage being identified as an essential part in the delivery of sustainable development and environmental management objectives (Fraser et al 2006).

- **Expert & Community Perceptions:**

Experts:

The source of the findings reported in this section is the professional actors' questionnaire:

Questions: 12	**Section: F**
Questions: 30	**Section: F**

The experts indicate that there is negative performance seen in providing and accessing long term information about CC. Mainly, the experts demonstrate that the integration of both short term and long-term horizons in the planning process regarding adaptation strategies through the role of BC is an issue that requires focus.

Generally, it is recognised that the influence of BC in promoting the monitoring reports at various stages of the governance, and providing educational components for the various actors, is inconsistent and requires clarity and detailed plans.

Community:

The participants mentioned that there are no programs with an intermediary role identified in either the short or long term for the development of any specific programs or processes to develop their skills, or which might engage them in a learning process about their environment.

The participants want to be engaged in an ongoing process where knowledge exchange and learning are developed through meetings (formal and informal), administered by the local council as an intermediary. Here, the role of BC can be important in filling gaps and lessening the distance between governance and the community. This can allow them to act as a real intermediary party but this is not the case, in the current situation.

Summary – C.16:

Accordingly, the analysis results of this characteristic show that experts reported negative responses regarding this characteristic, in association with BC. Also, the community has shown a similar negative response towards this characteristic. There is a need to increase levels of awareness among the community, through involving them as partners in the process, rather than dealing with them in a receptive way. The intermediaries' role is essential here, as demonstrated earlier, when it comes to lessening the gaps among the actors, and specifically regarding the community participation process.

However, it has been seen that there is neutral performance for all indicators, except with the mandatory indicators in both contexts as the table demonstrated above.

- **C.17: Bottom- Up Feedback from Iterative Process of Adaptive Social Learning**

This characteristic is associated with the development of coping capacity in a community's adaptive behaviour.

- **Theoretical Performance of BC Indicators:**

The indicators are evaluated as having neutral performance, except GO04 in the governance context, which shows negative performance. The results are shown in table (5-41) & (5-42).

Table 5. 41:analysis of C.17 in the governance context in BC

Theme	Ch.	*BC Governance Indicators*			
		Mandatory		**Optional**	
		GO 01: Consultation Plan	GO 02: Consultation and engagement	GO 03: Design review	GO 04: Community management of facilities
I-1:	**C.17**	0	0	0	-1

Table 5. 42: analysis of C.17 for the social context in BC

Theme	Ch.	**Community/Social Indicators**													
		Group 1				**Group 2**									
		Mandatory	Optional PPC			Mandatory		Optional CSW							
		FRA	ACC	M	FRM	DNP	No	DSFA	Us	GI	LP1	LV	ID	PR	LP2
I-1:	**C.17**	0	0	0	0	0	0	0	0	0	0	0	0	0	0

For the governance context, the three indicators GO01 & GO02 & GO03 do not present a clear focus on the issue of addressing feedback from the local community in order to influence the social learning. This would allow the role of BC to be maintained when it comes to promoting CC adaptation and sustainability strategies. In the case of GO04, this indicator as part of the update process of the long-term management is considerably lacking when it comes to including the communities' feedback as a crucial component of the management process and dealing with development issues.

For the two groups of indicators under the social context, there is no information which specifically focuses on this characteristic, and so these indicators are more likely to have neutral performance.

- **Expert & Community Perceptions:**

Experts:

The source of the findings reported in this section is the professional actors' questionnaire:

Question 30	**Sections: B**

For this section, experts indicated that BC can sometimes show influence, for example when address[ing] the feedback among local community and experts using easy translation

language and simple communication methods. However, in most cases, this issue is viewed negatively with regards to BC focus.

Community:

The participants said that this issue is not addressed. Respondents mentioned feeling isolated despite living, working and belonging to the same community, as information accessibility is not in place, which is a clear issue. This comment relates to the need society has to access various sources of information. This is important with regards to informing the local community about happenings in their area '*The only experience that I have is that where I live, there was building of another block, and there was a form for complaint/vote , but the online process to fill it out was 'crazy', and you have to go through 20 or 30 steps to complete it . It was so complicated*.' (Employee/Occupant12)

Other participants confirm the negativity associated with addressing feedback about their neighbourhoods and facilities in interactive engagement process. For instance, one respondent said: '*I came across an online community for the building that I'm living in, where if they have complaints about the speed of the internet, noise, fire alarms, or regarding things that you do not want, they can post about these kinds of issues. But it was not easy to find these forms, and it was not available 'on the surface', you have to dig around to find it.' (*Student3).

Summary – C.17:

The analysis results of this characteristic show that experts reported negative feelings about this characteristic, in association with BC. It is important to note that the community also showed a negative response towards this characteristic as well. This issue of Bottom- up feedback from the iterative process of adaptive social learning definitely requires enhancement. It is demonstrated that intermediaries are not only providing immediate and short-term intermediary services to the community, but are importantly seeking to offer longer term for the development of capabilities as well. These collaborations can last for many months, and often years (Howells 2006). However, this is not happening in Media City as far as BC is concerned.

The BC indicators have shown neutral performance for all indicators except the GO04 in the governance indicators context. There is no relation to this characteristic whatsoever as part of the focus of these indicators.

5.6.2 I-2: Mediating Roles Promoting Social Change

As acknowledged, for this theme there are 3 relevant evaluation characteristics which are considered as the main characteristics for analysis here.

- **Theoretical Performance of BC Indicators:**

These characteristics are related to the ideas of network creation, and making changes through information update and involvement activation in the community. Table (5-43) shows the themes and characteristics relevant to the mediators' roles.

Table 5. 43: Mediator characteristics

I-2: *Mediators roles making the social change*	
C.18	Create the Network and identify targets and strategies
C.19	Understanding the nature of community and enable their active involvement & participation
C.20	Information update and translate the information

- **C.18: Create the Network and Identify Targets and Strategies**

It is acknowledged that an important role of mediators is the identification of actors and their roles, in order to create the network and to make everyone familiar with the role of mediators. With regards to the inclusion of BC related roles in addressing this characteristic, table (5-39) shows that there is positive performance associated with the BC indicators.

Table 5. 44: analysis of C.18 of Governance context in BC

Theme	**Ch.**	*Governance Indicators*			
		Mandatory		Optional	
		GO 01: Consultation Plan	GO 02: Consultation and engagement	GO 03: Design review	GO 04: Community management of facilities
I-2	**C.18**	+1	+1	+1	+1

Table 5. 45: analysis of C.18 of Governance in BC

Theme	Ch.	Community/Social Indicators													
		Group 1				Group 2									
		Mandatory	Optional PPC			Mandatory		Optional CSW							
		FRA	ACC	M	FRM	DNP	No	DSFA	Us	GI	LP1	LV	ID	PR	LP2
I-2	C.18	**0**	0	0	0	+1	0	0	0	0	0	0	0	0	0

For both mandatory indicators GO01 & GO02, it is acknowledged that appropriate actors various and the local community have been identified for consultation. A mediator's consultation plan is in place and the local authority has been consulted about the plan. So, for these two indicators, the identification of actors and their influences on the decision making is recognised.

It should be said that the developers are considered as the main parties with key responsibility or the main role when it comes to reviewing major decisions, and decide on management plans and processes, with the advice of experts.

For the optional indicators GO03 & GO04, it is demonstrated that for the former an independent and inter-disciplinary panel has been used to undertake a design review of the development proposal, while for the latter the role of the developer is seen to involve support for community management as well. Therefore, during the governance process, BC as a tool constitutes practical indicators considered important when it comes to enabling the identification of actors and their roles. In this consultation process, the panel has the role of mediator in discussions of information sharing among the various actors, and to make changes for the communities regarding sustainability strategies and community development. Accordingly, it seems that BC actors, developers and authority are all considered as main mediators that influence the consultation process. It should be mentioned that the influence of mediators on is happened through both human and non-human actors, regarding the application and implementation of sustainability strategies.

- **Experts & Community Perceptions:**

Experts:

The source of the findings reported in this section is the professional actor's questionnaire:

Question 26	Sections: A

For the process of identifying the actors and their roles clearly through the BC mediator's role, the experts indicated that BC has a neutral role on the issue of identification of actors and roles. As demonstrated in chapter two, this issue should be acknowledged under the mediators' roles in order to add a level of clarity and reduce the level of ambiguity surrounding the whole process of sustainability and adaptation strategies application and identification. For question twenty-six, the coding was (Strongly Disagree=1, Disagree=2, Neither Agree or Disagree=3, Agree=4, Strongly Agree=5).

Table 5. 46: Identification of actors & their roles through the BC

Options		N	Mean	Influence on Performance
A	BC _Actors Identification_ Roles	13	3.31	
B	BC _Experts Collaboration	13	3.15	
C	BC_ Experts & Local Community Connection	13	3.00	
D	BC_ Information Availability_ Actors	13	3.15	
E	BC _ Openness_ Discussions	13	2.92	
	Valid N (listwise)	13		

Community:

The participants indicated that they do not have information on this issue, but they acknowledged the situation based on their experiences, where they would identify Salford City Council as the main responsible intermediary for this characteristic. This means that there is a negative view of BC as another intermediary here, as it has not been acknowledged as a process by the community in the first place. However, Salford City Council seems to be the most important intermediary party in their eyes. This issue requires enhancement, as it is an important part of the intermediaries' role to have the responsibility and the leadership skill to lead the process towards transparent and less ambiguous engagement processes. It is argued that intermediaries influence the development process towards more sustainable targets, through linking actors and activities, skills and resources connected to these actors, developed and enhanced ideas, as well as collaborations and technologies (Kivimaa et al 2014 &Kivimaa et al 2018).

Summary – C.18:

Accordingly, the analysis results of this characteristic show that experts find this characteristic to have neutral performance, while the community has negative response towards the overall idea of applying this characteristic in relation to the sustainability process.

The focus of the BC indicators of the governance process present a positive response, while the community indicators present neutral performance, except DNP as seen above.

- **C.19: Understanding the Nature of Community and Enabling their Active Involvement & Participation**

This characteristic is associated with understanding the community's nature and the empowered position of them being involved and participating in the adaptation and sustainability plans and strategies.

- **Theoretical Performance of BC Indicators:**

For this characteristic, the governance indicators seem to hold neutral performance, as table (5-46) demonstrates. The social indicators seen in table (5-47) show that the majority of the indicators have neutral performance, except for FRA in Group 1 & DNP in group2, which show negative and positive performances respectively.

Table 5. 47: analysis of C.19 for Governance context in BC

Theme	**Ch.**	*Governance Indicators*			
		Mandatory		Optional	
		GO 01: Consultation Plan	GO 02: Consultation and engagement	GO 03: Design review	GO 04: Community management of facilities
I-2	**C.19**	0	0	0	-1

Table 5. 48: analysis of C.19 for social context in BC

Theme	Ch.	Community/Social Indicators													
		Group 1				Group 2									
		Mandatory	Optional PPC			Mandatory		Optional CSW							
		FRA	ACC	M	FRM	DNP	No	DSFA	Us	GI	LP1	LV	ID	PR	LP2
I-2	C.19	-1	0	0	0	+1	0	0	0	0	0	0	0	0	0

The governance indicators still do not influence community involvement when it comes to the development of sustainability strategies and processes throughout the development period, and after the occupancy stage. When it comes to making changes in the neighbourhood through community involvement when BC is applied, it is important that the BC actors are involved with the community and have special programs and connections.

As the table shows, the majority of social indicators have neutral performance. For group 1, the mandatory indicator FRA mentions the assessment of flooding, wherein the knowledge of possible flood risk is gathered from the local community. However, there is not enough information included regarding engaging the community in a broader governance, particularly through understanding the community itself and how they can act during these events. It is argued that there is a need to understand the engagement of the community and various actors and agencies in relation to the interventions that need to be addressed to strengthen the resilience of the poor against the impacts of environmental hazards (Few 2003). This applies to the BC context as well, which requires more focus. Primarily, the link between community participation and risks assessment and management is still weak and has serious deficits, according to the literature (Few 2003). There is also no mention on this characteristic in the other optional indicators.

For group 2's DNP, it is demonstrated that the community is consulted regarding local needs and requirements desired as part of the proposed development, which can allow for these elements to be prioritised. In this indicator, it is demonstrated that understanding the demographic profile of the community regarding gender, age, employment, education are all considered to understand the community structure and nature, and to understand the key influences impacting the development. Therefore, it seems that this indicator is positive in

relation to this characteristic. For the N0, there is no information that influences this characteristic. Similarly, for the optional indicators, no information exists.

- **Experts & Community perceptions**

Experts:

The source of the findings reported in this section is the professional actors' questionnaire:

Question 34	Sections: B

The experts demonstrated that BC requires focus on this issue and must address the *'ability of the local community to access information, particularly at times of risk'.* However, they have reported that the level of focus here is needed to *a low extent*. It should be said that this issue is in need of improvement. The majority of experts have stated that there is no knowledge indicated or existing on this issue.

Community: The participants commented on this characteristic, saying that the role of the developers is considered negative when it comes to making the community feel like a vital part of the physical neighbourhood and one that is connected to the process of development and to access any information relating to this. One participant commented: *'PEEL developers' people are really practical people, and it's difficult to access them.'* (Employee 4)

The focus group participants were critical of the way that developers are managing the project and controlling its different aspects. They have created no space for the local community to take part in any matter, and everything is enacted without their approval. One participant mentioned that the local community should have a voice and a clear role for delivering their needs, saying: '*I think it is important for the community to have a say to try to make sure the developers are being responsible and think about the people living here and not just the workers*.' (Occupant 2)

The role of the developers was not the only negative here, as the role of the council as an intermediary was negatively perceived as well when it came to making the community feel connected to the development. Therefore, there is a need to find new ways to address community participation and empowerment through the developers themselves.

Summary – C.19:

Accordingly, the analysis results of this characteristic show that the experts reported negative responses regarding this characteristic, in association with BC, and it was indicated that no level of knowledge was required as well. The community presents a negative response towards the various actors in the processes happening in Media City as well. There must be a greater focus on understanding the community's nature, and enabling their active engagement process during their sustainability efforts and community development.

The focus on the indicators of the governance level presents positive performance for the mandatory indicators, and neutral performance for the optional ones. While, for the community indicators, the majority of the indicators, except the mandatory indicators, as seen above.

- **C.20: Empower Community Knowledge Awareness and Social Learning**

This characteristic is associated with empowering the community to be acknowledged and to learn about CC and sustainability.

- **Theoretical Performance of BC Indicators:**

This characteristic is neutrally presented through the BC indicators in both contexts, except for the GO01 & DNP indicators, where there was negative performance, as table (5-49) shows.

Table 5. 49: analysis of C.18 for the Governance context in BC

Theme	**Ch.**	*Governance Indicators*			
		Mandatory		Optional	
		GO 01: Consultation Plan	GO 02: Consultation and engagement	GO 03: Design review	GO 04: Community management of facilities
I-2	**C.20**	0	0	0	-1

Table 5. 50: analysis of C.18 for the social context in BC

Theme	Ch.	**Community/Social Indicators**													
		Group 1				**Group 2**									
		Mandatory	Optional PPC			Mandatory		Optional CSW							
		FRA	ACC	M	FRM	DNP	No	DSFA	Us	GI	LP1	LV	ID	PR	LP2
I-2	**C.20**	0	0	0	0	-1	0	0	0	0	0	0	0	0	0

It is acknowledged that GO01, GO02 and GO03 are considered neutral, as they do not have any information which influences the role of BC indicators which could boost the community learning process throughout their community and development process, and thus address adaptation to CC. It is mentioned that there is an alteration in the design process based on the community engagement process, where communities have an opinion in the selection of the preferred design option. Nevertheless, these changes do not constitute learning.

With GO04, as part of the update process regarding long term management, there is a clear lack of inclusion for communities when it comes to making them feel like a vital part of the management process, and they do not learn about the development issues. It is acknowledged that the role of BC as mediators allowing for learning and empowerment in communities is important, particularly in relation to sustainable design and technologies with which users may be unfamiliar.

Finally, the social indicators mostly show neutral performance. For group 1, the mandatory and optional indicators do not offer information that relates to this characteristic.

For group 2, DNP is the only mandatory indicator that has information on the consultation of community needs and priorities and their desirability. However, this indicator is clearly lacking a focus on the development and application of strategies related to community social learning. There is no focus on anticipatory learning in the face of CC and future risks, where people could be learning about the future dangers before the negative impacts happen (Tschakert and Dietrich 2010). This situation is in line with the current scarcity of climate learning tools that build resilience into people's livelihoods, institutions, and ecosystems, which is particularly evident at community levels (Tschakert and Dietrich 2010).

- **Expert & Community Perceptions:**

Experts:

The source of the findings reported in this section is the professional actors' questionnaire:

Question 30	**Sections: F**
Question 34	**Sections: A&B**

As acknowledged earlier, a focus on community itself is needed in BC, through engagement in the planning, consultation, and post occupancy stages. As table (5-36) shows with question thirty, the role of BC in addressing knowledge awareness and learning aspects through the education and participatory approach is a negative issue. Also, as the other question demonstrates, this is a reasonably high priority area for enhancement, as it relates the level of community participation with the knowledge presented about the process's various possible risks. For example, in the case of farmers' participation in the UK 'Making Space for Water' flood policy, a lack of systemic knowledge was hypothesized to be an obstacle in farmers' willingness to participate (Tompkins and Eakin 2012). In particular, there are challenges associated with the provision of sufficiently well-rounded information about climate change and the high uncertainty which accompanies it (Tompkins and Eakin 2012).

Community: The participants attaches a negative response to this characteristic. They link this with a sense of isolation as a negative issue that might impede their social interactions as well. This is because there are new barriers to making a connection, which is certainly seen as a negative when trying to establish collaborative, interactive communities. They also referred to the lack of participation as a problem when it comes to accessing or finding information.

Summary – C.20:

Accordingly, the analysis results of this characteristic show that experts reported negative responses regarding this characteristic, in association with BC. The community presents a negative response to the overall idea of this characteristic as well. There is a need to increase the levels of awareness throughout the community through making them partners in the process, rather than dealing with them in a receptive way. The intermediaries' role is essential here, as demonstrated earlier, when it comes to lessening the gaps among the actors and for the community participation process.

The BC indicators have shown neutral performance for all cases, with the exception of the DNP indicator, which presents negative results.

5.7 Discussion:

5.7.1 Intermediary Characteristics & BC indicators:

The analysis above, as summarised in table (5-51), demonstrates that the characteristic C. 13 is showing positive performance across the mandatory indicators, while C.14 & C.15 show neutral performance across the four indicators.

Table 5. 51: Intermediary Characteristics & relations to BC indicators of the governance context

Ch.	*Governance Indicators*											
	GO 01			GO 02			GO 03			GO 04		
	p	Nu	Ne	p	Nu	Ne	p	Nu	Ne	p	Nu	Ne
C.13												
C.14												
C.15												
C.16												
C.17												

The analysis, as summarised in table (5-52) demonstrates that C.16 & C.17 show neutral performance across all indicators, except the two identified indicators of FRA & DNP, in relation to characteristic C.16.

Table 5. 52: Intermediary Characteristics & relations to BC indicators of the social context

Ch.	**Community/Social Indicators**													
	Group 1				**Group 2**									
	Mandatory	Optional PPC			Mandatory		Optional CSW							
	FRA	ACC	M	FRM	DNP	No	DSFA	Us	GI	LP1	LV	ID	PR	LP2
C.13														
C.14														
C.15														
C.16														
C.17														

5.7.2 Intermediary Characteristics & Actor Perceptions:

The analysis shows that the experts have coded negative responses for five characteristics, with positive responses for C.13 only, as table (5-53) shows. For the community, they have reported negative responses for all 5 characteristics as well, mentioning that these issues are not well delivered, whether through the role of BC or through the other parties.

Thus, in general, there was a level of agreement in the negative feedback reported regarding the performance of these characteristics in the Media City development process.

Table 5. 53: expert and community perceptions on Intermediary characteristics at governance level

The role of BC as Intermediary party in the Governance	**Experts**			**Local Communities**		
	Positive	Neutral	Negative	Positive	Neutral	Negative
C.13: Information availability & interpretation						
C.14: Communication between departments						
C.15: Training and educational programme						
C.16: Long Term Programmes for community organisation capability and adaptive behaviour						
C.17: Bottom- up feedback from iterative process of adaptive social learning						

It should be said that from the integration of results above, as demonstrated in table (5-54), it is seen that both experts and the community have both presented negative responses towards all the characteristics, while the indicators analysis shows negativity for GO04. This issue needs to be investigated to make sure of the way this issue relates to the role of BC, because as can be seen here, none of the governance indicators in BC as intermediaries have a negative role in relation to these characteristics, except with GO04. However, the experts reported levels of negativity in relation to the BC, for certain aspects of the governance in relation to the characteristics here. For the social indicators, as table (5-55) shows, the indicators DNP & FRA have negative performance in association with C.6.

Table 5. 54: the integration of findings in BC indicators & actor perceptions of Intermediary characteristics

The role of BC as Intermediary party in the Governance	**Governance Indicators**				**Actors**	
	GO01	GO02	GO03	GO04	Experts	Community
C.13: Data collection & Interpretation						
C.14: Communication between departments						
C.15: Training and educational programme						
C.16: Long Term Programmes for community organisation capability and adaptive behaviour						
C.17: Bottom- up feedback from iterative process of adaptive social learning						

Table 5. 55: the integration of findings in BC indicators and actors' perceptions on Intermediary characteristics

The role of BC as Intermediary party in the social context	**Community/Social Indicators**															
	Group 1				**Group 2**										Ex.	Co.
	Mandatory	Optional PPC			Mandatory		Optional CSW									
	FRA	ACC	M	FRM	DNP	No	DSFA	Us	GI	LP1	LV	ID	PR	LP2		
C.13																
C.14																
C.15																
C.16																
C.17																

5.7.3 Mediators' Characteristics & Actor perceptions regarding Community:

The analysis above, as summarised in table (5-56), demonstrates that characteristic C.18 has positive performance across the four governance indicators. GO04 has shown negative performance in association with characteristics C.19 & C.20, compared with the other three indicators, which show neutral performance.

Table 5. 56: Mediators' characteristics & relations to BC indicators of the governance context

The role of BC as mediators in the Governance	***Governance Indicators***											
	GO 01			**GO 02**			**GO 03**			**GO 04**		
	p	Nu	Ne	p	Nu	Ne	p	Nu	Ne	p	Nu	Ne
C.18: Create the Network and identify targets and strategies												
C.19: Understanding the nature of community and enabling their active involvement & participation												
C.20: Empower Community Knowledge Awareness and social Learning												

When it comes to the social indicators' analysis, the DNP indicator is positively indicated in association with the two characteristics C.18 & C.19, as (5-57) demonstrates. However, the same indicator has shown negative performance in relation to C.20. It is also seen that for C.19, the FRA has shown negative performance. Therefore, it is noticed here that the optional indicators all had a neutral position in association to these characteristics, while there was a level of negativity indicated in the mandatory indicators.

Table 5. 57: Mediators' characteristics & relations to BC indicators of the social context

Ch.	**Community/Social Indicators**													
	Group 1				**Group 2**									
	Mandatory	Optional PPC			Mandatory		Optional CSW							
	FRA	ACC	M	FRM	DNP	No	DSFA	Us	GI	LP1	LV	ID	PR	LP2
C.18	0	0	0	0	+1	0	0	0	0	0	0	0	0	0
C.19	-1	0	0	0	+1	0	0	0	0	0	0	0	0	0
C.20	0	0	0	0	-1	0	0	0	0	0	0	0	0	0

5.7.4 Mediator Characteristics & Actor perceptions:

The analysis shows that the experts and the community have coded negative performance for the four characteristics here, as table (5-58) shows.

Table 5. 58: expert and community perceptions on mediators Characteristics at the community level

The role of BC as mediators in Community	**Experts**			**Local Communities**		
	Positive	Neutral	Negative	Positive	Neutral	Negative
C.18: Create the Network and identify targets and strategies						
C.19: Understanding the nature of community and enable their active involvement & participation						
C.20: Empower Community Knowledge Awareness and social Learning						

It should be said that from the integration of results in the three tables (5-56) & (5-57) & (5-58), table (5-59) shows that both the experts and the community have shown a level of negativity towards the role of BC as potential mediators here in Media City. The GO04 indicator shows negativity at the governance context, regarding the role of mediators through the characteristics of understanding the nature of the community and enabling their active involvement, as well as participation and empowering community knowledge awareness and social learning. The mandatory indicators have also shown negativity towards the mentioned two characteristics, as table (5-60) shows.

Table 5. 59: integration of findings in BC governance indicators & actors' perceptions of Mediators characteristics

Mediators Characteristics	**Governance Indicators**				**Actors**	
	GO01	GO02	GO03	GO04	Experts	Community
C.18: Create the Network and identify targets and strategies						
C.19: Understanding the nature of community and enable their active involvement & participation						
C.20: Empower Community Knowledge Awareness and social Learning						

Table 5. 60: integration of findings in BC social indicators & actor perceptions of mediators' characteristics

Ch.	Community/Social Indicators														
	Group 1				Group 2									Ex.	Co.
	Ma.	Opt			Ma.		Opt.								
	FRA	ACC	M	FRM	DNP	No	DSFA	Us	GI	LP1	LV	ID	PR	LP2	
C.18															
C.19															
C.20															

5.8 Sub-Conclusion:

This chapter builds on the previous chapters and presents an analysis of the results from phases 1 & 2 of this thesis. These findings resulted from the application of an integrated analysis of both the selected BREEAM Communities indicators and the actors' perceptions of Media City in relation to the themes and characteristics of the three theoretical approaches: Adaptive Governance, Resilient Communities & Intermediaries. The analysis was presented for each of these three theoretical approaches in the three sections of this chapter.

In summary it was found that the community presented negative responses in relation to both the Adaptive Governance characteristics and the Intermediaries characteristics analysis in both the governance and the community levels; while they were found to show even stronger negative responses in relation to the Resilient Communities characteristics. It can therefore be suggested that the community participants demonstrated a low level of engagement, awareness, empowerment, adaptive behavior, and learning throughout the governance processes, as employed within the Media City development; and in the context of the application of BREEAM Communities as an intermediary.

While, on the whole, the expert respondents were found to have also reported negative performance in relation to two of the Resilient Communities characteristics. Further, the experts have agreed with the community and associated negative performance with regards the Intermediaries characteristics that are associated with the inclusion of BREEAM Communities in the development process. However, they attached less negative responses to the Adaptive Governance characteristics than the community did; while at the same time,

they presented more negativity than the community regarding the Resilient Communities characteristics.

With regards to the analysis undertaken of the BREEAM communities' governance indicators, negative performance was found in relation to the Adaptive Governance characteristics; while neutral performance was found with regards the Intermediaries characteristics. For those social indicators, similarly to the governance level: it was seen that the they were found to have negative performance in relation to the Resilient Communities characteristics. Finally, regarding the role of BREEAM Communities indicators in enabling intermediary characteristics to be delivered, a neutral performance was found.

Following this analysis, those BREEAM Communities indicators that were found to have a negative performance in association with the three theoretical approaches Adaptive Governance, Resilient Communities and Intermediaries, in the governance and social contexts, were identified. Having established this scope for the next phase of this work, it is then argued that it is important to investigate in practice, through further interviews, the experts' perceptions, of the potential for enhancement of those BREEAM Communities indicators that have been identified as requiring enhancement. The next chapter presents a discussion of this analysis, and proposes enhancements that can be made in particular to BREEAM Communities Indicators and actors in their roles as intermediaries and mediators. This final phase of the research, will thus explore the extent to which the proposed enhancement of BREEAM Communities indicators might also enhance the performance associated with Adaptive Governance and Resilient communities' characteristics at both governance and community levels is discussed, and thus promote the resulting adaptive capacity of communities.

Chapter 6: Implications and Potential for Enhancement of key Governance and Community Levels in BREEAM Communities

6.1 Introduction:

This chapter discusses the implications of BREEAM Communities' role as an intermediary party as well as the potential for enhancement of this role to address and respond to challenges identified both at governance (top-down) and community (bottom-up) levels in relation to key indicators. This chapter discusses the relationship between the intermediaries' characteristics of Adaptive Governance and Resilient Communities that were identified in Chapter 5 as hindering adaptation performance. In order to discuss the implications of BREEAM Communities' potential intermediary role to enhance these identified characteristics through key indicators, three main points are explored here:

- Experts' perceptions about the negative performance of these characteristics
- The potential role of BREEAM Communities as an intermediary to address negative adaptive capacity performance in relation to the two levels of governance and community
- Identification of the indicators that should be further enhanced

These points will be discussed in this chapter for each of the characteristics previously identified as hindering performance. Firstly, the perceptions of the experts are presented, exploring the relationship with negative community feedback. Then the role of the intermediaries' characteristics that are represented in BREEAM Communities is discussed to ascertain the extent to which the enhancement of these characteristics may address the negative performance of each of the Adaptive Governance and Resilient Communities characteristics. It should be noted that only those characteristics identified as negative have been presented to the experts, not the intermediaries' characteristics, nor any characteristics that were evaluated as having a neutral or positive impact on adaptation.

During the interviews with experts that were reported in Chapter 5, the researcher identified the characteristics of the intermediaries that the experts collectively considered required enhancement in relation to the Adaptive Governance and Resilient Communities

characteristics. Following the interviews and at this stage of the research it was found that there is agreement that the enhancement of the intermediaries' characteristics is linked to and could lead to the enhancement of the performance of both the Adaptive Governance and Resilient Communities characteristics. Finally, the relationship of this to the key BREEAM Communities indicators that perform negatively and their related enhancement is also considered.

6.2 The Role of BREEAM Communities as an Intermediary

By their nature, intermediaries have an important role in promoting better outcomes in relation to sustainability goals, community capacity and community goals. Intermediaries also have a significant role as main mediators that contribute to the development and advancement of sustainability targets and strategies, whether through considering the main needs, strategy development, or the application of the technologies for amenities and facilities (Kivimaa et al 2018). Furthermore, Bush et al.'s (2017) study demonstrated the real potential of the intermediaries to positively influence empowerment strategies for communities by supporting the reframing process of the institutional framework to enable empowerment actions.

Bird and Barnes (2014) indicate that an important part of addressing collective action of communities through intermediaries has been associated with the assessment and evaluation of various matters (whether technological or social) as well as providing the consultation and support needed during the process. In addition, this should happen in parallel with creating the circumstances through which education, the learning process and the dissemination of knowledge and awareness can be achieved. Moreover, Bush et al.'s (2017) study argues that intermediaries can play a role in supporting and enabling the development processes, while Singh and Butler (2015) demonstrate that they can also work towards addressing the enhancement of community health care and social sectors.

When successful, intermediaries can add significant leadership capabilities and organisational skill sets to achieve community goals, for instance, in the contexts of improving community well-being and health goals (Singh and Butler, 2015). As Bush et al. (2017) demonstrate, intermediary organisations have an important role in helping to shape stronger action by connecting across and beyond existing activity in ways that put communities first, as seen in the case of community local energy intermediaries. Therefore, intermediaries play an essential role in addressing these aspects throughout the whole

development process, addressing certain negative outcomes from the beginning of the initial engagement and not only setting the plans and advancing them in practice but also enhancing the ability to sustain them in the long term.

In this chapter, the role of BREEAM Communities' indicators as intermediary actors that have the potential to positively influence the performance of the negative characteristics in both governance and community has been discussed. Table 6.1 presents the Adaptive Governance, Resilient Communities and intermediaries' characteristics that have been identified as hindering adaptation performance, along with their association with negatively-evaluated BREEAM Communities' indicators.

Table 6. 1 Characteristics & key BC indicators with the negative performance that are identified in Chapter 5

AG Characteristics	**BC indicators**
C.3: Focus/Incorporation of information and understanding the impacts of CC & Potential Risks	GO04
C.4: Shared/Participatory Ways of Knowledge	GO03, GO04
C.5: Include the ways that consider the physical performance of water facilities during the consultation process	GO01, GO02 GO03, GO04
C.6: Monitoring and Continuous Evaluation of Development Facilities	GO01, GO02 GO03
IA Characteristics of governance level	**BC indicators**
C.14: Information availability & interpretation/governance level	-
C.15: Communication between departments /governance level	-
C.16: Training and educational programme /governance level	-
AG Characteristics	**BC indicators**
C.8: Community feeling of attachment & social engagement	DNP, DSFA, Us
C.9: Increase the Level of Learning and awareness knowledge	DNP, ACC
C.12: Enhanced delivery of human Health and well-being	DNP, DSFA, Us PR, LP1
IA Characteristics of community level	**BC indicators**
C.17: Understanding the nature of community and enable their active involvement & participation /community level	FRA
C.18: Empower Community Knowledge Awareness and social Learning/community level	DNP
C.19: Long Term Programmes for community organisation capability and adaptive behaviour/community level	FRA & DNP
C.20: Bottom- up feedback from iterative process of adaptive social learning/community level	-

6.2.1 BC Governance Indicators & AG Characteristics

Regarding the application of the AG characteristics analysis in Chapter 5, the AG and the I characteristics of the negative performance are presented in Table 6.2 for discussion in this chapter. The table also presents the relationship of the relevant BC indicators to these characteristics.

Table 6. 2 the AG & I characteristics of negative performance and associated governance indicators of BC

		BC Indicator			
		Mandatory		**Optional**	
AG characteristics		**GO01**	**GO02**	**GO03**	**GO04**
C.3	Focus/Incorporation of information and understanding the impacts of CC and potential risks				X
C.4	Shared/Participatory ways of knowledge			X	X
C.5	Include the ways that consider the physical performance of water facilities during the consultation process	X	X	X	X
C.6	Monitoring and continuous evaluation of development facilities	X	X	X	
Intermediaries' Characteristics					
C.13	Information availability and interpretation				
C.14	Communication between departments				
C.15	Training and educational programme				
C.16	Long-term programmes for community organisation capability and adaptive behaviour				
C.17	Bottom-up feedback from iterative process of adaptive social learning				X
C.18	Create the Network and identify the targets and strategies				
C.19	Understanding the nature of community and enable their active involvement & participation				X
C.20	Empower community knowledge awareness and social learning				X

6.2.1.1 C.3: Focus/Incorporation of Information and Understanding the Impacts of CC & Potential Risks

With the level of negativity that is indicated in the findings in association with the need to focus on CC impacts and potential risks during the consultation plans, as well as the engagement and management aspects of the governance process, it was found that CC is not currently a priority or a concern among the various actors in the built environment. As Maguire and Cartwright (2008) argue, this is unlikely to make CC among the key concerns of a community and in many cases, they may not even be aware of it.

Any consultations or engagements need to incorporate CC as a central issue and ensure not only that there is an adequate focus on it but also that this occurs within a wider participation process with a breadth of relevant actors. The Media City experts in the interview process confirmed that these issues are linked, as they suggested that the intermediary role of key BC indicators could be to enable the promotion of necessary communications in the consultation process. According to Interviewee 2:

> *"BC needs to focus on connecting the community with the top-down governance actors. It is important to undertake and enhance early engagement through [the] BC role, particularly regarding the process of connecting them and getting feedback is really important too."*

Thus, the Media City experts have suggested that if the role of BC indicators was enhanced during the consultation plans, this could have a role in positively influencing appropriate focus on CC, as well as sustainability more broadly. In addition, the experts identified that in terms of the way it is currently promoted through key BC indicators, the role of the developer is not sufficient and this could be one of the main impediments to the vital incorporation of actors and community in the consultation process, whether during the planning stage or after the occupancy stage.

It should be said that in the collaboration process of actors and to address the targets for the management process for communities, collaborative platforms may, ideally, become de facto a permanent part of the governance structure, which was the case for BC here as used in Media City. Nevertheless, despite the importance of the role of formal institutions here, this does not imply that such programmes have to or should be entirely formalised in terms

of collaboration, social networks, procedural rules, roles and the distribution of decision-making power, as this formalisation may destroy the very characteristics of the open programmes embedded in dynamic networks that render them so valuable in adaptive governance (Pahl-Wostl et al 2007). This is because the planning of effective adaptation processes requires the provision of the information by or to all potentially concerned and affected actors that could vitally influence the decision-making process and planning processes (Roseland 2012). This demands better focus on making CC adaptation plans a vital issue, as the need to integrate CC measures into all areas of policymaking has become a clearer issue now (Urwin and Jordan 2008). Furthermore, flexibility and change must be provided through learning from discussion and collaboration processes in the dynamic actor networks related to BC, in order to continually increase the level of awareness and change information available through the governance procedures (Pahl-Wostl et al 2007).

Increasing the engagement with CC through consultation, engagement and management processes through communication among actors from the top-down and bottom-up levels related to key BC indicators needs more focus in terms of the interpretation of information and communication in an easy and clearly understood way. However, in relation to this issue, the experts of Media City suggested that this would not be a concern if the consultations were better implemented and therefore became a familiar process to the various actors in relation to the BC indicators. For instance, Interviewee 1 mentioned that:

> "*The communication between the community and experts is not an issue in terms of the technical language and interpretation of ideas. However, this process is still dependent on the experts' personalities and their way of accepting the ideas*."

So, with better focus and efforts, this issue of communication and engagement with CC can be overcome. However, the issue is not only associated with the role of BC indicators as intermediaries but also with the role of other policymakers as both intermediaries and mediators. Stevenson and Petrescu (2016) argue that policymakers need to invest more time, effort and finance into learning how to co-produce new knowledge and new neighbourhoods, by working together with local actors. Therefore, this situation needs to be supported in the development implication and enhancement plans, as well as within BC indicators, in order to lessen the knowledge gaps between the various actors regarding adaptation planning and processes for CC.

Crucially, the focus on CC also requires continuous efforts in the process of community engagement and management after the occupancy stage in building developments, in order to ensure that the community is both informed and responsible. This requires enabling the community to have a vital intermediary role in communicating their ideas and providing feedback. It should be noted that even this may be considered a challenge in some projects, including Media City, due to difficulties in identifying and accessing the community. This is especially true for new build projects as well as for those like Media City that include a changeable and transitory community. Despite this, the experts confirmed in the interviews that the local community needs to be aware that their opinions are valuable at any time and by making this possible, positive progress can be made in relation to CC and sustainable development implication and enhancement.

Accordingly, the consultation and engagement process should be enhanced by using the relevant BC associated indicators (GO01 and GO02) and through a better focus on CC and actors' wider engagement process within the network. In addition, increasing the role of the BC assessors as intermediary actors in these processes may be beneficial. Meanwhile, for the process of addressing feedback and management, which are related to the optional indicators (GO03 and GO04); making these indicators mandatory as intermediaries would support this enhancement. Likewise, as intermediary actors, containing clearer focus and the necessity for effective community engagement processes after the occupancy stage can bring better outcomes for the community, as well as for climate change adaptation and sustainability implication processes. Therefore, the enhancement of this characteristic is directly associated with the enhancement of the intermediary role of relevant BC indicators and their embedded actors, particularly regarding the characteristics C.13 and C.14.

6.2.1.2 C.4: Shared/Participatory Ways of Knowledge-(GO03 & GO04)

The evaluation of the Media City project presented in Chapter 5 demonstrates that this characteristic is negatively indicated and requires enhancement. There is a need to conduct a greater number of meetings or workshops for the various actors, including the community. It is acknowledged that conducting meetings and workshops is considered essential for increasing learning among stakeholders such as local communities, as these workshops act in a non-human intermediary role, which can provide a space for actors to articulate their preferences about governance and management plans and thus progress towards addressing adaptation targets for CC (Tompkins et al 2008). For example, in the context of Media City,

the role of other major stakeholders such as the BBC and ITV media organisations could be more mobilised, as could other intermediaries, in working towards lessening the gaps between local communities and the governance authorities or responsible parties. Indeed, it could be argued that the media more widely has a potential role in this scenario. Specifically in Media City, these physically local, national media outlets might help in advancing the adaptation policies by shedding light on CC and embedding this issue within the local community; this would enable pressure on the local governance structures, as intermediaries, to address more active roles and leadership in terms of both policy and adaptation, where the openness and interactive process among these actors is vital (Tanner et al., 2009). Achieving this level of openness can be promoted by creating an atmosphere in the engagement process where participants are encouraged to expose misperceptions of various thoughts and behaviours, for example, regarding the issues of water demand and usage or energy saving (Littlewood et al 2017). It is further suggested that when community development processes are implemented through practical and achievable participatory projects (e.g., improving a neighbourhood or service), in which community groups consider themselves as the main actors through participatory actions (Berkes and Ross, 2013); such dynamic intermediary processes can build cohesion and a sense of community while achieving tangible outcomes (Berkes and Ross 2013).

During the experts' final interview phase, Interviewee 1 reported that: "*Having BC has meant that the architects and the engineers do not have the sole word in the development, but the tool actors also have an influence through their interactions with those professionals. In particular, BC for building has done a lot to break things down, by enforcing the idea in the design team that every decision may have a big impact, whether as an architect, engineer or ecologist*." This suggests that the indicators in the BC tool can and do play this intermediary role in relation to the sharing of knowledge, but a necessary enhancement may be to push this beyond experts and professionals and to engage with stakeholders more widely.

Moreover, enhancement is needed in relation to enabling the process of knowledge-sharing, especially with regard to addressing adaptation actions; this demands that channels of communication are opened between experts and decision-makers in the network, as well as that the participating professionals are able to grasp, understand and make use of the knowledge from each other during and after these meetings or sessions (Cash et al 2003). Notably, this might demand the use of novel ways of learning and for the presentation of information as new intermediaries; Interviewee 1 from Media City mentioned that the current BC embedded consultation plan was not at all effective:

> "*The consultation process was very poor. It only comprised a few pictures and a simple explanation of the project, while there was no feedback later on. So, these consultations are not effective at all. Not through the role of BC assessors or actors."*

This confirms that even where wider consultation does occur at present as a result of BC's role as an intermediary, it is ineffective. However, enhancement in the aims, expectations, timing and standards of consultation would be conceivable.

This coincides with Oliver and Pearl's (2018) research, which demonstrated that when the BC was applied in *Masthusen* in Sweden, the community consultation aspect once again did not yield the results that it could have done. In the end, the feedback from the community consultations and focus groups had minimal, if any, impact on the resulting design; in addition, the consultation plan was described as occurring 'late' and happening after the design process was finished. It is important to ensure communication among the various actors by disseminating the information and communication strategies through the various BC indicators as intermediaries. In this regard, one of this paper's experts confirmed the associated challenges and suggested using technological means to identify the intermediary role of BC indicators by saying:

> "*BC got a 'stationary' position from the government; however, it's still optional, but it is a long, slow slog to get there. So, with the governance actors, communication is not easy, but the work regarding community involvement requires a huge amount of effort. To make the community think seriously about their environment, and therefore become more engaged, this requires the publication of information and even perhaps making a TV reality show about it."*

Moreover, this also requires a focus on education factors during these community sessions, particularly through the BC indicators. As Interviewee 1 suggests:

> *"I think that communication and education are the two most important things that are needed in BC."*

However, it should be said that when BC was included in Media City, there was a wider collaboration of experts than might otherwise have been anticipated for this scale of project, but this did not include the local community. Again, this finding concurs with Oliver and Pearl's (2018) study regarding the investigation of BC's role in collaboration and community participation in the *Masthusen* project in Sweden. Their study concluded that there was a gap between the aspirations of the BC tool and its indicators, which aim for genuine community involvement that can lead to substantial alterations in the development process,

as well as building awareness and knowledge among the communities. At the same time, as an intermediary, the BC tool was found to require extensive collaboration between the client group, the city, and the internal and external consultants, as well as to maintain a strong dialogue among them all in maintaining the network over time regarding matters of sustainability assessment and environmental development (ibid).

Therefore, in order for the enhancements summarised above to be achieved in both the GO03 and GO04 indicators in the BC tool, they need to become mandatory. This would make feedback provision about the development an achievable and core matter, as well as creating and embedding an iterative learning process. The role of BC indicators as intermediaries is, therefore, essential here and the three characteristics of C.14, C.15 and C.16 must be implemented in order to enhance their role and achieve better outcomes for the whole process.

6.2.1.3 C.5: Include the Ways that Consider the Physical Performance of Facilities during the Consultation Process

The experts mainly indicated that the top-down governance role played by Salford City Council was positive in regard to the provision of sustainable aspects such as water and energy facilities in Media City. However, learning about the sustainability of the performance of facilities in the neighbourhood among the various communities is also important, as this makes individuals and communities aware and able to have the skills, understanding and resilient adaptive behaviour to comprehend the risks and impacts. In relation to this, as mentioned earlier, support for learning or education is the most necessary enhancement here; where community involvement and coordination with municipal officials are all present in the development process (Mathews et al 2014). Facilitating the education process demands experts' understanding of this issue and their cooperation in its enhancement. Therefore, while the role of BC as the main mediators that enable the learning process and changing of strategies to promote sustainability and adaptation is important, this also requires enhancement, particularly for the communities involved.

Interviewee 1 gave the following feedback on the process in the Media City project:

> *"I think it's a missed opportunity, the consultation process, or the community consultation side of things. There was a consideration of sustainability strategies in the planning and the construction process, but the application of these sustainability strategies through a wide collaboration process of actors did not happen. Mainly, it*

should happen by enabling the community to lead their own way into the development through their engagement, but this did not happen."

It should be said that the role of BC in promoting education cannot be done on its own but requires organisational change in policy and planning in local governance, which facilitates greater community involvement in the planning and decision-making processes (Cuthill 2001). A top-down governance focus is needed, perhaps through the local council ensuring that sustainability learning is part of the community consultation and management processes. By identifying actions that the community can grasp and become involved in, learning can be promoted, thus enabling the development of practical development by achieving the target of making sustainable development and adaptation possible. In relation to this, the experts confirmed that the intermediary role of the council should indeed be to encourage this issue, as Interviewee 3 commented:

"I think maybe the local communities will not know anything about adaptation to CC, because there is nothing required from them. If they were being told to do something or to know something about adaptation, that would make it different."

However, the developers also have a role to play in this process, which the experts in this case identified was not the case in Media City, where the developers did not pay attention to disseminating knowledge or preparing the community for sustainability issues and potential CC impacts. Developers could promote learning about the physical built environment and sustainability, by including the new tenants in the management of both the operational phase and the process of the place, which may, in turn, encourage an iterative learning cycle about the physical facilities in the neighbourhood.

Therefore, the role of BC actors, again as intermediaries and mediators, is important here and requires further encouragement and support. This relates to all of the relevant characteristics and requires specific focus by the council, experts and developers to address it. The role of the GO04 BC indicator is of particular importance in this scenario, thus in order to influence the community management process effectively, a simple enhancement to BC indicators that would promote their role as mediators would be to make this indicator mandatory. Regarding this last point, one of the experts, Interviewee 2, said that:

"…*the management of communities' facilities indicator and process, if applied, is implemented through a process that does not appear to be dynamic enough to address the necessary shared ways of learning. However, in order to increase the social learning that is needed for adaptive capacity and for more effective*

> *management processes, there should be a steady relationship between the stable and changing parts of the governance process."*

Enabling this would necessitate integrating the local views of the Media City community into the development process, as local views are clearly pivotal in order to not only address the sustainable management process (Tompkins et al 2008) but also to guarantee the flexibility and change that must be provided through learning to build adaptive behaviour in the various participants (Pahl-Wostl et al 2007).

6.2.1.4 C.6: Monitoring and Continuous Evaluation of Development Facilities- (GO01, GO02, GO03)

With regard to the evaluation and monitoring of facilities and neighbourhoods, the experts in this research identified that this characteristic was not influenced by the role of BC but in Media City, this characteristic is related to the role of the developers.

Nevertheless, the experts mentioned that the monitoring and management of building performance is a part of BREEAM tools at the building scale. They also identified that the management company that the developer selects is the one that is responsible for the monitoring and evaluation process, as a specific intermediary maintaining the network.

However, the experts also identified that BC actors still have the potential to enhance their role, by ensuring that relevant materials are published and available for the communities with regard to the management and performance of the facilities and associated ways to effectively act in an adaptive way. However, it would still be the developer's role to enable enhancement for this issue. For instance, one expert, Interviewee 3, said that:

> "…*for the developers, I think they should play a greater role in influencing sustainability issues, so I think they should focus on making the information accessible to the people and managers, rather than focusing on the economic and business aspects. As a result, they should then make the changes in the management teams, which will positively affect the process of sustainability.*"

The issue of focusing on updating information is important for community awareness about the sustainability of their neighbourhood. Adger et al (2005) mentioned that what appears successful in the short-term may turn out to be less successful in the longer-term. The community needs to be informed and responsible at the same time in relation to the decisions that relate to their behaviour in, around and for facilities. In order for this to be

effective, collaboration is required between the main actors in the network. The implication of this suggests that partnership between the developers and the council is put in place, as one expert, Interviewee 3, commented:

> *"Good developers should perhaps initiate a partnership with Salford Council with the intention of enabling the translation of issues with the local people in both the short and longer-term. It would be even better if both contractors and developers could do this, so people can see that both of them are making these efforts."*

Therefore, communication is essential with the community about this characteristic and this requires the community to find representatives to work with on the development of management and monitoring plans and processes in order to ensure that this is not solely the responsibility of developers and councils. In this regard, it seems that BC does not have a positive influence on this issue.

However, it is also important to make information and materials available to communities about the performance of facilities and what makes the place sustainable, through the provision of accessible and meaningful reports around sustainable outcomes. As Interviewee 2 suggested:

> *"In terms of enhancement, this could be done [by] reporting on the development, using elements such as monthly reports about the strategies that have been implemented, with statistics to show the local communities. This could also be done by sending emails, linking to websites, or using an app (it could be a Media City App) to tell people, for example, that the water quality was measured this week and it is better this year than last year. However, we do not have that communication and that's the failing really*."

It is therefore acknowledged here that the role of BC (as both intermediaries and mediators) in establishing programmes for community management and monitoring and maintaining these is important and requires enhancement.

6.2.2 BC Communities and RC characteristics:

With regard to the application of the analysis of RC characteristics presented in Chapter 5, the RC and relevant I characteristics that have been identified as hindering adaptation performance are presented in Table 6.3 for discussion in this chapter.

This table also represents the relationship between the BC indicators and the negative performance of the RC characteristics, while for the AI approach, it can be seen that the main negative indicators here were DNP and FRA.

Table 6. 3 the RC & relevant AI characteristics evaluated as negative community indicators of BC

AG characteristics		BC Indicator						
		Mandatory		Optional				
		DNP	FRA	DSFA	ACC	Us	PR	LP1
C.8	Community feeling of attachment and social engagement	X		X		X		
C.9	Increase the level of learning and awareness knowledge	X			X			
C.12	Enhanced delivery of human health and well-being	X		X		X	X	X
I Characteristics								
C.13	Information availability and interpretation							
C.14	Communication between departments							
C.15	Training and educational programme							
C.16	Long Term Programmes for community organisation capability and adaptive behaviour	X	X					
C.17	Bottom-up feedback from iterative process of adaptive social learning							
C.18	Create the Network and identify the targets and strategies							
C.19	Understanding the nature of community and enable their active involvement and participation		X					
C.20	Empower community knowledge awareness and social learning	X						

6.2.2.1 C.8: Community Feeling of Attachment & Social Engagement (DNP, DSFA & Us)

The community had reported the negativity associated with this characteristic and this was confirmed by the Media City experts. In particular, there was agreement in relation to the importance of including the local community in social events and meetings, aside from the public and entertainment events that happen in their areas. In addition, they confirmed that entertainment and social events do take place in Media City.

With regard to the main engagement issue, it was suggested that there was a need for specific advertisements and publication for any such meetings, according to Interviewee 2:

> "*There is still a need to advertise engagement initiatives and meetings that are organised after the occupancy stage, particularly in projects where the development is still ongoing. What actually happens is that the people give their opinions and the developer ignores it."*

This respondent also went on to suggest that, to their knowledge, any consultation that has happened to date has not resulted in any positive impact.

It is acknowledged that Media City is a regeneration project and that this large-scale project is still ongoing. However, the experts confirmed that there continues to be no community involvement in the activities that relate to the development process; in some part, this may be due to concerns that such a process could cause a delay. Furthermore, it was suggested that this process is not currently a part of the developers' agenda. There is evidently a need to widen the engagement process and evidence its value, in particular to those actors that are key decision-makers, including the developers. Littlewood et al (2017) argue that one way to increase individual engagement is via focused, community-wide engagement. In both of these regards, the role of BC indicators can be important and effective. The three experts interviewed at this stage of the research agreed on the need for BC to promote the engagement process, potentially by focusing on the importance of forming links between individuals in the community themselves. They suggested that this engagement could be widened through linkages with other community actors in the wider network, including the wider Salford community and even the Manchester community more broadly.

Focusing on the community needs and their priorities from the beginning is essential here, but it is clear that this issue was not considered by Media City in its consultation process through BC as the main mediators that focus on this issue. It is suggested (and confirmed by the experts) that this is probably one of the main reasons that the community reported that the area is not suitable for families and that it is primarily a business area. Thus, if the cultural dimensions of CC are ignored, it is likely that both the adaptation and mitigation responses will fail to be effective because they simply do not connect with what matters to individuals and communities (Adger et al 2013).

The experts suggested some relevant and potentially important enhancements in relation to this issue, some of which relate to the need for community partnership, as suggested by Interviewee 1:

"It's important to look for community partners, a community who have been there and know about the place, not in connection with the developers, but the community themselves, to

discuss the plans and the development phases, and [its] effects on their lives and needs. So, having these community groups is important, but it is also key to have other groups that belong to the community, but operate at a professional level."

Another suggestion from Interviewee 2 is related to the need for a greater focus on learning and improving sources of knowledge awareness about the development and community, through the incorporation of the actors, including the BC tool, in this:

"…about the importance of the Media City website for [promoting] knowledge-building and awareness for the community about their development and community matters. Salford City Council should embrace opportunities for the whole of Salford to be sustainable.

It is important that the strategies about the sustainability of the place and the choice of living here are well communicated and advertised and the message about living in a sustainable world should be central to this strategy."

If this characteristic is to be effectively enhanced, the experts suggest that the interaction and active engagement between the various communities of Media City (which could largely be described as a privileged mixed community development) must be embedded in the agenda of BC indicators. This requires having community programmes that are decided at the beginning of the consultation plan as powerful mediators, as such programmes and their outputs can play a role in emboldening the local council to support and enable the empowerment of community involvement.

Finally, with regard to the negativity that was reported by the community about their engagement in the management process of facilities and with the ongoing development more broadly, the experts agreed that there was a need for further consideration of the feedback of the community in order to make them feel involved in their neighbourhood. Stevenson (2009) contends that it is important to address the systematic feedback to inform future decision-making at the level of policy, design and delivery.

It is suggested that informing the residents about the development outcomes is key, in order to ensure that they understand that they belong to this physically sustainable place. For example, Interviewee 2 commented on this issue:

> "*Certainly, the buildings are constructed with sustainable strategies. BC definitely holds credit for that, however, regarding the operations of building and facilities, there are changes happening with the management companies. Where good*

management exists, there will be a rapid response to complaints or if there are problems and they will also tell people about the performance of the building, what energy system we are using, water consumption and the site's carbon emissions …and that's not happening. I agree with the community that there is no information for residents about the strategies of these buildings for the residents, there is nothing."

Accordingly, there is a need to consider the understanding of community needs and priorities regarding the social interaction and engagement processes and the physical understanding of facilities. This is rooted within the three associated indicators (DSFA, DNP & Us) of BC and in order to address adaptation effectively and to have better roles of BC actors as real intermediaries and mediators, the four characteristics of C.17, C.18, C.19 & C.20, should be considered as part of the sustainable development process.

6.2.2.2 C.9: Increase the level of Learning, Knowledge and Awareness

Regarding this characteristic, both experts and the community indicated negative performance with regard to the increased levels of learning, knowledge and awareness in the community about CC and adaptation strategies in their neighbourhood. The Media City experts agreed with the community's feedback and highlighted the need to have better focus, which has enhancement implications.

In relation to this, the need to make the information available and accessible to the community is key; indeed, as residents in a developed country, they should have opportunities to be made aware of CC and the potential impact that it may have on their lives. According to Interviewee 2:

"*Focusing on developing community knowledge and awareness about their place is important; however, unemployment and taxes are the priorities for the council to focus on. While these things are important, Salford City Council should be doing more when it comes to making the community more aware of sustainability and encouraging the whole development to be sustainable, for a better future. However, there is a problem regarding knowledge and awareness and when it comes to individuals, some people like the developers do not want to listen because they are busy doing other things*."

For CC adaptation, people like to be well-informed and they watch or listen to local sources of information; although in this context, there are challenges associated with the provision of sufficient and quality information about climate change and the high uncertainty that accompanies this subject (Tompkins and Eakin 2012). As a result, the provision of information about CC impacts and communicating them is an issue that could be addressed beneficially through the BC intermediary role and its indicators; while being essential for the large community of Media City, this has been found not to be enabled at the moment. There was agreement among the experts consulted in this phase of the research regarding the lack of information available to the communities and the associated demands that the strategies that are applied through the planning process in Media City. In particular, information regarding water, energy and flood should be communicated and applied during the operational stages to address the adaptive management targets. It has been demonstrated elsewhere that continued dedication to on-the-ground, experimental research, while mechanisms that facilitate deliberate learning on how to implement adaptive management would be helpful and relevant in several natural resource sectors, such as habitat conservation, fisheries, forestry and marine protected area management (Moser, 2010). Enhancement to BC indicators in this area could therefore enable BC-enabled projects to provide just such grounds for learning.

Therefore, more efforts are needed to increase levels of community awareness and develop learning programmes that enable this issue to be resolved. Two of the experts consulted in this phase of this research agreed with this issue, Interviewees 1 and 2 respectively said:

> "*…there is no capacity of BC regarding learning issues about development, risks and potential for adaptation and there are no actions, processes or rules that can influence this issue. There is nothing in BC. However, there is a need to make people able to take part by flipping the assessment of extreme events and risks, as we can see a lot of them nowadays. It's more likely now than at any time in the past. It's more likely one hundred or two hundred year's events*."

> "*I agree about the lack of information concerning the impact of this development on the climate. The enhancement can be enacted by drawing more attention to the sustainable factors and ensuring that the whole development, PEEL, management and others should follow sustainable practices. So, more focus is needed on the BC operational process. I think BC operations should be followed, not only for the design and development.*"

Thus, there is a need to have better strategies concerning the social context that are applied through the role of BC indicators and not only regarding the physical strategies of Media City. The community also needs to be aware of these physical strategies, especially that the more active technological systems need to be provided in housing; that more maintenance and care is required; and that appropriate maintenance also requires awareness of what is required in terms of adequate feedback (Stevenson and Baborska-Narozny, 2014). What is particularly important, however, is to decide when and how much detailed monitoring is actually necessary, based on an initial diagnosis of whether or not the facility is meeting performance standards (Stevenson 2009).

However, it should be said that there is the potential to have a better focus on education and learning in regard to CC and sustainability in Media City, especially as BC is applied in the relationship with relevant wider stakeholders in the broader project network. For example, the existence of Salford University and its training programmes, as well as the work opportunities that are provided by the BBC and other media and advertising companies in the site. These organisations could play a clear and effective role in the transfer of information and also in providing information, which could be enabled through an enhancement to BC to seek stakeholder collaboration during the occupation phases of a project, thus lessening the gaps identified here.

Meanwhile, there are challenges in relation to the communication of strategies in Media City regarding the 'changeability' of the community in this big mixed development project, as discussed previously. This is further challenged by the experts' description of most of the community in Media City as a 'transient community'; a community which remains for a short or temporary period in the development and thus might not feel obliged to commit to these engagement programmes, even if they did exist. Therefore, thinking and communication about transferring the actual strategies into adaptive behaviours and actions is needed, but the translation of the strategies into behaviour is challenging in this context.

One of the experts explained that an initial step toward this could be by having physical posts as new tools for illustration, comprising elements such as an explanation of the strategies and sustainability; for the locals, this would be like a 'museum' to show what is special about Media City. This idea could be important for communicating the 'historical issues' of the place with the community. Interviewee 3 explained this issue:

> "*I think when telling people about the impact of sustainable strategies, that will make people 'proud' & 'knowledgeable' to see why this approach is right for everyone. However, we do not know, I do not know! But we should know*."

For example, this strategy was applied in the sustainable development at Hafen City, Hamburg, where this served to inform both occupants and visitors to the site in an attractive and engaging manner (www.hafencity.com 2019).

Moreover, it is also acknowledged that even if the local community knows that this is a sustainable place, they still may not know how to use it in a sustainable way. This issue requires monitoring and feedback to guarantee that the learning process regarding the implication of strategies has happened in practice. The 'learning by doing' approach is encouraged to some extent in Media City, in particular regarding waste recycling, to encourage the community to act in a sustainable way. One of the experts consulted here explained that if this learning issue were to be enabled in Media City, by including local community engagement and feedback during the ongoing construction phases, then benefits would be achieved for both the community and the experts.

Therefore, the inclusion of communities' feedback before, during and after the development, together with the provision of the available information, may enable the processes necessary for the community to increase their learning, knowledge and awareness around both sustainability and climate change adaptation. In order to achieve this, it will be necessary to undertake enhancement to the ACC indicator in BC to better influence practice, in particular by transforming this into a mandatory indicator. Furthermore, throughout the relevant BC indicators, the learning process about CC, adaptation and sustainability requires more explicit focus for community actors and would benefit from the addition of a new and additional mandatory indicator as a new intermediary that focuses explicitly on influencing the learning process and increased awareness levels in the community. Thus, the role of BC as both intermediary and mediator party can again become important in influencing this characteristic regarding the focus on awareness, knowledge and learning positively.

6.2.2.3 C.12: Enhanced Delivery of Human Health and Well-being (PR, Us, DNP, LP1 & DSFA)

With regard to the negativity that was found to be attached to some points related to this characteristic; during this final interview phase, the experts generally reported that they considered that there were significant points associated both with the positive aspects of community well-being, as well as agreement with some of the negative aspects identified by the community.

The experts here agreed on the importance of the role of BC and the other actors, particularly Salford Council, to influence how issues including orientation, open spaces, plants and sunlight availability have been considered in Media City and how these and other factors combine to deliver a good natural environment that can have positive impacts on occupants and visitor health. Furthermore, they mentioned as Media City continues to develop through further stages, there is a need for more parks and open spaces to increase the greenery in the area.

Regarding the negative community feedback regarding social infrastructure, in particular that associated with access to car parking areas, schools, nurseries, clinics and the quality of apartments; the experts disagreed with the community feedback about the need for more car parks, while they agreed on the need to have nurseries, schools and clinics for the Media City community.

In relation to the parking areas, the experts confirmed that this is one of the main design points that promotes sustainable living in this development, in order to reduce car use and associated carbon emissions in the environment. The community needs to know that addressing sustainable performance is an important target of the development and this not only relates to the physical features embedded in the building design but also to the quality of interaction that is offered to the occupants or users (Stevenson and Baborska-Narozny 2014). Therefore, a greater level of understanding of these physical aspects is needed and this suggests a need to develop collective learning to improve home use understanding (Littlewood et al 2017), as well as broader neighbourhood and urban design strategies. This is not a simple problem, but communities need to be able to trust the participative process if they are to respond positively to the aspects that relate to the various changes in their future and their community (Dodman and Mitlin 2013).

Meanwhile, with regard to the availability of schools and nurseries in Media City, the experts agreed on the need for them, however, they identified that having schools in the neighbouring community may be sufficient. Interviewee 1 commented on this issue, saying:

> "*I think it's important to place the social infrastructure as an important part of the development. I think in Media City, it's like Manchester City Council - lots of housing, lots of apartments, lots of people living there, but somehow the social infrastructure is still not there."*

On this issue, Interviewee 1 further added that if enhancement is needed for these services, BC indicators should consider the importance of having such services in projects and the other surrounding communities. This is important in order to create equity and satisfaction for the various communities and the responsibility of engagement with communities about requirements, as well as communicating this issue upwards to the top-down governance structures. This again reinforces the idea of the BC tool and its indicators as having enabled intermediary roles, however, in this case, it might be argued that the delivery and funding for such infrastructure would largely need to be supported by the local government.

On this issue, Interviewee 2 added that it is necessary to consider connections among the communities that are close to Media City, suggesting that:

> "*It is a part of BC to address the link between the community and other districts or communities, by having the gym across the Lowry, this will extend the community to other parts and enable it to become one big and connected community.*"

Regarding the availability or provision of health centers and clinics, there is a need to have access to such services, including pharmacies and wider health services. Both interviewees identified that the lack of such services, together with the prevalence of apartment buildings, could be important points that contributed to the negative feedback from the community about well-being matters. There is thus a need for enhancement in this regard. One of the experts mentioned that this could be related to the idea that this project was developed for the young professionals of the BBC and other similar jobs, for whom such services may be perceived as less vital or urgent. Interviewee 2 reinforced this perception:

> "*I think when they [designed the project] they put up apartment buildings to satisfy the young professionals who work in the media industry so that the BBC people who came from London were able to work here. However, it's not developing into a proper community… there is a need for a family base, so I think the apartments should perhaps be more appropriate for children. Currently, I do not think the Media City*

apartments are suitable for children and there are certainly no schools here for young students."

Essentially, this demands that the breadth of existing local communities and the evolution of communities should be seen as equal partners in the development process, in which the adaptive capacity building process emphasises the need to build on what exists throughout the process and not just at the phase of outcome, while this must consider both the community's nature and its needs (Nyong et al 2007).

Therefore, regarding this characteristic, there are points that relate to the role of BC indicators in the planning process about the understanding of the nature of communities and their needs and demands. The influence of this understanding and engagement should be felt throughout the wider indicators, particularly the DNP, which can particularly be seen to demand enhancement. Meanwhile, for the other physical aspects, communication is key to enable understanding in the community as to why these strategies have been implemented in this way and not in another. Thus, the role of BC indicators is again found to be important in addressing these challenges, by making 'education' an embedded issue.

6.3 Sub - Conclusion:

This chapter has discussed the implications and potential for enhancement of the key BC indicators in association with the governance and social and wellbeing indicators in Media City. Chapter 6 has shown that in terms of addressing the challenges that are associated with the governance level and to promote the adaptive governance characteristics, the role of BC intermediaries' characteristics requires enhancement and this should be applied for each characteristic in relation to the relevant BC indicators. It is concluded that enhancing the role of BC as an intermediary role through the characteristics:

- C.13: Information availability and interpretation;
- C.14: Communication between departments;
- C.15: Training and educational programme;
- C:16: Long-term programmes for community organisation capability and adaptive behaviour

is important to overcome the negativity that is associated with the AG characteristics of:

- C.3: Focus/Incorporation of information and understanding the impacts of CC and potential risks;

- C.4: Shared/Participatory ways of knowledge;
- C.5: Include the ways that consider the physical performance of facilities during the consultation process

in order to have better performance towards CC adaptation in the social context. This suggests not only transforming GO03 & GO04 into mandatory BC indicators but also indicates the need to better focus on the BC indicators GO01 & GO02, regarding the intermediaries' characteristics in relation to the process of inclusion.

For the resilient community characteristics, it is concluded that the role of BC as a mediator through the main three characteristics of:

- C.18: Create the Network and identify the targets and strategies;
- C.19: Understanding the nature of community and enable their active involvement and participation;
- C.20: Empower community knowledge awareness and social learning

are important to address the negativity that is associated with the resilient community characteristics of:

- C.8: Community feeling of attachment and social engagement;
- C.9: Increase the level of learning and awareness knowledge;
- C.12: Enhanced delivery of human health and well-being.

However, there is a need to better focus on the role of BC as an intermediary that maintains the work towards sustainability and adaptation by focusing on the intermediaries' characteristics that relate to the provision of information and to the bottom-up feedback from the iterative processes of adaptive social learning. For the relevant indicators, it is therefore concluded that a greater level of enhancement is needed in DNP, that ACC should be made a mandatory indicator and that new indicators are added into BC that focus increasing community awareness, knowledge and social learning.

Chapter 7: Conclusions

This thesis aimed to investigate the role of a Neighbourhood Sustainability Assessment tool (BREEAM Communities) in enabling adaptation in the social context; through its role as an intermediary actor in neighbourhood development projects. This specific study examined the role of key indicators in BREEAM Communities that integrate the characteristics of adaptation in the (top-down) and (bottom-up), and the intermediation processes in the social context. The purpose was to focus on the potential and challenges that the BREEAM communities has as a case study neighbourhood sustainability assessment tool regarding the social adaptation process to Climate Change in the context and scale of neighbourhood development projects, and in relation to specific indicators. The focus on the social adaptation process to Climate Change throughout the governance process when sustainability tools are involved is limited in the literature. The literature review in chapter 2 identified a gap in the research relating to the need to investigate adaptation to Climate Change in the social context, both top-down and bottom up and especially in their potential role as intermediary, throughout the process of the application of NSAs. This highlights the importance of this study in contributing to the understanding of the advantages that these tools proffer for communities. In particular this study identifies the negative aspects that could be improved upon to promote enhanced performance of key indicators in NSAs in terms of communities' adaptive capacity in relation to climate change, consequential to neighbourhood development processes.

The study used the BREEAM Communities assessment tool as an NSA case study, that represents one of the most important and popular neighbourhood scale sustainability assessment tools in use globally. This tool was found to comprise specific existing indicators, both mandatory and optional, associated with the social adaptation process of both the governance and communities' levels, which became the focus of this study. The study of these BREEAM Communities indicators constitutes the application of this tool in practice, in the MediaCity case study in Salford, as a significant example of these indicators' sustainability performance in neighbourhood development. In this chapter, the importance of the BREEAM Communities role in influencing the process of building social adaptation for communities in both the governance and the community levels, through some of their specific sustainability indicators, and the role of BREEAM Communities as an intermediary actor in both levels is discussed.

Results from the study identified the importance of key BREEAM Communities indicators in the social adaptation process both in theory and practice. The performance of those indicators selected, according to the extracted characteristics of the theoretical approaches of Adaptive Governance, Resilience Community and Intermediaries were evaluated. The expert and community perceptions of the performance of MediaCity in relation to these characteristics and in correlation with the BREEAM Communities indicators roles were also collected and analysed. In addition to the presentation and analysis of the selected theoretical indicators findings and the actors' perceptions findings; these were integrated to reveal the most negatively performing evaluation characteristics and as a result those specific Indicators that require enhancement were identified. The findings were informative to the proposition of enhancement strategies that can be promoted through the role of selected BREEAM Communities indicators as intermediary tools. Results were collected regarding the final stage, whether the enhancement of BREEAM Communities indicators as intermediary actors have potential in enhancing negative characteristics at both levels. The enhancement of selected BC indicators as the main applied strategies in the governance and communities' levels was proposed as well.

The outcomes of the thesis point to where key BREEAM Communities indicators can influence the adaptation in the social context, and their real potentials in this context. Despite this, there remains substantial further work required to further understand this research topic. However, this work provides an effective overview of the potentials that key indicators in NSA tools have for promoting and enhancing the development process and the delivery of adaptive capacity embedded in its outcomes. In this chapter, the main findings of this research are discussed. In addition, it also summarizes the strengths and limitations of the work presented in this thesis. Finally, in this chapter responses to the research questions and presents recommendations for further work.

7.1 Contribution of the research

The five main objectives identified for this research, were previously stated as:

1. To establish a theoretical framework for the evaluation of adaptation in the social context through identifying the main theoretical approaches and their associated characteristics.

2. To identify the importance of Neighbourhood Sustainability Assessment tools as the tools that hold potential for adaptation in the social context in both theory and practice.
3. To evaluate the theoretical capacity of the Case Study NSA (BREEAM Communities) in enabling adaptation through analysis of relevant constituent indicators in relation to the three identified theoretical approaches.
4. To investigate the impact of the Case study NSA (BREEAM Communities) in application to the project case study (Media City) to promote the adaptation; through the analysis of the actors' perceptions in relation to the three identified theoretical approaches.
5. To evaluate the implication of key findings that can potentially be applied in enhancing the role of BREEAM Communities in the governance and community levels, and through proposing strategic implications for the enhancement potential.

These will now be considered in turn.

7.1.1 Objective - 1: Integrated Approaches to promote Social Adaptation in the Sustainability Context of Neighbourhoods

This research objective '*To establish a theoretical framework for the evaluation of adaptation in the social context through identifying the main theoretical approaches and their associated characteristics*', has been addressed through establishing an integrated approach for an evaluation framework to be adopted for the investigation of social adaptation in neighbourhood developments in the sustainability context. It is argued that Climate Change adaptation and sustainability should be investigated as two integrated concepts, and not separated ones, for this purpose. Further, in this context, it was discussed that exploring the potentials of the Neighbourhood Sustainability Assessment Tools as representative tools for sustainability is key here, to address adaptation, despite the lack of research regarding the social dimension in sustainability in relation to these tools. It was argued that in order to build adaptation in the social context, governance (top down) and community (bottom up) and as intermediaries (between these two) are considered as the two main levels for the process of addressing adaptation at the social context.

Importantly, it was established that in order to promote adaptation to Climate Change; resilience and adaptive capacity should be considered as the two main interconnected theoretical approaches that would be required. As, both resilience and adaptive capacity aim to address the ability of any context to prepare for impacts and potential risks, such as those posed by Climate Change through characteristics or strategies that are planned and applied. Regarding the focus on building and promoting an evaluation of the social context, it's proposed that an integrated theoretical approach is needed. Regarding the need to focus on the three levels of governance, community and intermediaries, and with the significance of the adaptive capacity and resilience as two evaluated methods, three theoretical approaches were identified to provide a framework for the investigation of social adaptation, namely:

i. Adaptive Governance
ii. Resilient Community
iii. Intermediaries

For these three approaches, sustainability is considered as the main context that combines them, and that provides grounding for all three. In terms of the utilisation of these three theoretical approaches, the study suggested a framework of themes and characteristics that needs to be promoted, in order to achieve adaptation targets. For their investigation, 9 main themes and 20 characteristics were identified from the literature.

7.1.2 Objective – 2: BREEAM Communities as an important tool with the potential to promote social adaptation in theory and practice

To identify the importance of Neighbourhood Sustainability Assessment tools as the tools that hold potential for adaptation in the social context in both theory and practice.

To address this objective, its acknowledged that the application of neighbourhood sustainability assessment tools to regeneration and / or development processes would provide an appropriate scale and process for the investigation to be undertaken here. In particular due to its inherent integration of both physical strategies and various actors' engagement in the development process. It was clearly established through literature review that NSA tools have significant impacts upon built environment development processes in which they are applied in terms of ensuring the application of the sustainability strategies.

However, it was argued that the main operational contents, the 'indicators', which are described as simple measures that are applied to achieve sustainability in the economic, social and environmental aspects of the development process, are still not fully evaluated regarding the focus on Climate Change adaptation process. In particular in terms of the evaluation of the outcomes of development.

The study selected BREEAM Communities as the case study assessment tool as it can be considered as a tool that has the greatest current potential towards promoting adaptation, with respect to its mandatory Indicators, applicability, actors' engagement & Community inclusion. All of which are considered positive, in comparison with the two alterative NSA tools considered for application in this research, namely, LEED-ND & CASBEE-UD. These three tools having been shortlisted as they are reportedly the three most popular tools currently applied internationally in the built environment development process. Initial further evaluation of the BREEAM Communities too in theory established that it has focus on both the governance and community levels through the inclusion of both relevant optional and mandatory indicators, which were subsequently selected as the particular indicators to evaluate in this study.

It was further argued that a practical case study approach would provide an essential context for the other proposed methods in order to investigate the potential role of the selected BREEAM Communities indicators to influence, in practice, the governance and community levels, as main sustainability applied strategies, and as potential intermediaries, through the role of the BREEAM Communities actors. The case study 'Media City' in Salford UK was selected to be an "exemplar" case study due to the importance of this project to the community development and sustainability of Salford and the UK, and having been rated as 'Excellent' through the BREEAM Communities tool certification process. As argued by Gustafsson (2017), when a single case study is used, as is this case in this research, it is important to deliver a focus on the roles of institutions or organisations, in order to support the delivery of sustainability and effective adaptation.

The research proposed that the combined analysis of the selected BREEAM Communities indicators in theory and practice, which encompasses both theoretical indicators analysis and practical case study investigation of the same indicators, would provide an efficient specific context for the investigation of the social adaptation process regarding the previously identified three main theoretical approaches embedded in the evaluation framework of Adaptive Governance, Resilient Communities & Intermediary Approach.

7.1.3 Objective – 3: Application the Integrated Approach for the Analysis of BC to address adaptation to CC in theory

To evaluate the theoretical capacity of the Case Study NSA (BREEAM Communities) in enabling adaptation through analysis of relevant constituent indicators in relation to the three identified theoretical approaches.

For the application of the integrated approach to BREEAM Communities, a combination of a matrix approach and qualitative research methods were developed and applied, in order to undertake the analysis in both theory and practice. A combination of a matrix approach, questionnaires, focus groups and interviews methods were used. Together these provide the methodological structure for the three phases of this research, in order to successfully inform the final findings. It was decided to focus upon qualitative research methods here, since the investigation of the characteristics of the availability and performance of Adaptive Governance, Resilient Communities and Intermediaries theories are mainly dependent on exploring whether there is or is not a level of performance that relates to their hindering impact or promotion of each of the evaluation frameworks constituent characteristics both in theory and in practice.

From the perspective of the analysis of the governance and community indicators, and through applying the matrix approach, it was found that there was a negativity level found to be associated with both the Adaptive Governance & Resilient Communities characteristics. While for the Intermediaries theory, it was found that the BC indicators in both governance and social contexts are more likely showing a neutral performance.

7.1.4 Objective – 4: Application the Integrated Approach for the Analysis of BC to address adaptation to CC in practice

To investigate the impact of the Case study NSA in application to the project case study (Media City) to promote the adaptation; through the analysis of the actors' perceptions in relation to the three identified theoretical approaches.

The analysis undertaken addresses the three theoretical approaches and aims to evaluate the extent to which the selected indicators in the BREEAM Communities tool, in practice

through expert actors and the community, actually work. Notably, negative community feedback was found in association with Adaptive Governance and intermediaries' characteristics. Experts' responses suggested negative adaptive capacity for the Resilient Communities and to a lesser extent the Adaptive Governance. Finally, regarding the role of selected BREEAM Communities indicators as intermediaries, both experts and community have reported negative feedback with regards the intermediaries and mediators' characteristics.

These results have informed the selection of priorities for the characteristic and selected indicators that need more focus in the final phase (3) of this research. It was concluded that the relationship between the negative indicators at the governance and community levels that resulted through the Adaptive Governance and Resilient Communities analysis and the role of these BREEAM Communities indicators needs wider investigation. This investigation can also show whether the enhancement of BREEAM Communities indicators as intermediaries have the capacity to influence enhancement in the Adaptive Governance and Resilient Communities results outcomes as well.

7.1.5 Objective – 5: Proposing potentials for enhancement through BREEAM Communities indicators to address the challenges in the social context

To evaluate the implication of key findings that can potentially be applied in enhancing the role of the NSA case study in the governance and community levels, and through proposing strategic implications for the enhancement potential.

This objective has been achieved through the discussion of the implications of and the potentials for enhancement that selected BREEAM Communities indicators have as intermediaries, particularly in their application in Media City. This phase of the work found that in order to address the challenges associated with the governance level and to promote the Adaptive Governance process, the role of BREEAM Communities intermediaries' characteristics require enhancement and to be applied for each characteristic. It's concluded that the enhancement of intermediary characteristics in BC is important to influence the negative characteristics of adaptive governance. This was accompanied by the finding that the selected BREEAM Communities indicators Design Review & Community Management of Facilities, both currently optional should be made mandatory and with the need to better

focus on the Consultation Plan and Consultation & Engagement indicators, regarding the Intermediaries' characteristics inclusion and embedding within the process and thus the outcomes.

For the community level, it can be concluded that the intermediary role of key indicators of BREEAM Communities, particularly, represented by the mediator's characteristics are important to be enhanced throughout in order to influence the enhancement of the three Resilient Communities characteristics. It was suggested that for this to be achieved, the enhancement could be targeted at the mandatory indicator Demographic Needs and Priorities indicator, as well as the translation of the currently optional Adapting to Climate Change indicator into one that is mandatory. A need to focus on risks preparation is also needed regarding both indicators of Flood Risks Assessment & Flood Risk Management. It was also concluded that new indicators should be proposed that focus on the increase of community awareness and knowledge and social learning.

List of recommendations in relation to BREEAM Communities

To conclude, the list of recommendations in relation to BREEAM Communities indicators that are suggested, are as follows:

- A need for a better focus on the mandatory indicators: Consultation Plan (GO01) & Consultation & Engagement (GO02), in particular regarding enhancement associated with the intermediary characteristics that relate to: information availability, Communication process, Training and educational & long-term programs available for addressing sustainability and adaptation to climate change.
- There is a need to make the two optional indicators at the governance level, Design Review (GO03) & Community Management of Facilities (GO04), mandatory.
- There is a need to make the optional indicator, Adapting to Climate Change (ACC), mandatory, due to its potential role in promoting attention to Climate Change and the adaptation process at the community level.
- A need to ensure that there is consideration of community preparation for various risk scenarios and on the risk management process within the mandatory indicator, Flood Risk Assessment (FRA), and through making the optional indicator, Flood risk management (FRM), mandatory.
- Additional focus on issues that relate to Community feelings of attachment & social engagement within the mandatory indicator, Demographic Needs Priorities (DNP) as

well as within the currently optional indicators, of the Public Realm (PR) and the Delivery of Services, Facilities & Amenities (DSFA).

- Adding focus on issues that relate to enhanced delivery of human health and well-being to the mandatory indicator, Demographic Needs Priorities (DNP) as well as to the optional indicators: Delivery of Services, Facilities and Amenities (DSFA), Utilities (Us) & Local Parking (LP).
- Adding an indicator at the governance level that is directly associated with education characteristic(s): in particular relating to enhancing the focus on community learning about Climate Change, sustainability and the adaptation process.
- Adding an indicator that has specific focus and relates to the process of community knowledge and awareness enhancement regarding their climate, environment and the sustainability process as well as associated strategies.

7.2 Limitations of the research

Although the results of the research are important, some limitations in the study need to be acknowledged. These include the following:

- This study considered results obtained from one case study, Media City only. This approach nevertheless remains valid, especially when the field of research remains in its exploratory phases, and could give wide range of indicative results according to the inclusion of various experts and community individuals. This approach is recommended in the context of adaptation to Climate Change and sustainability literature, as it involves the perceptions from both top-down and bottom-up levels.
- The study focused on the impacts of application of certain BREEAM Communities indicators only to influence social adaptation. It aimed to investigate the performance of these through considering the performance of both the indicators and actors in the network associated with the indicators.
- The study was limited to a single case study NSA tool and did not explore the potential associated with other neighbourhood sustainability assessment tools. However, the selection of BREEAM Communities as a representative NSA was a part of the study, based on its importance and potentials in the social context, compared to the other two neighbourhood sustainability assessment tools.
- The practical case study investigation has considered the water sustainability focus as the main aspect of the physical context for the questionnaire and the interviews

with the experts and community respectively. Therefore, the focus was on water only, and did not address other important aspects including materials, energy or transport to any significant extent. However, this enabled a narrower focus within limited resources of a PhD and water was selected as this sector is most significantly impacted and related to climatic change impacts and risk, and it was focused on as the main sustainable strategy identified in the Media City development process.

- Regarding the sample limitation, the questionnaires were distributed to the experts that were available at the time of the research. The number of valid respondents was, as a result of accessibility of individuals, limited to 13. Approaching larger samples number was difficult according to their changing working place or leaving the country after being involved in MediaCity.
- Finally, regarding the community participants in the focus groups sessions. The participants only included those people who live, work and or studied in MediaCity. However, the people who are living in neighbouring areas to MediaCity were not involved and as such, could be considered a limitation of the scope of the work presented. This limitation was again associated with the inherent resource limitations associated with PhD study.

7.3 Directions for further research

Addressing adaptation to climate change at a neighbourhood level in the social context is not an easy task, yet it is a necessary issue, and could be addressed through a successful application of sustainability tools at the community scale. It should be said, that these tools are still nascent, and their development is an ongoing process. However, investigating these tools potentials in theory and practice can be a beneficial matter in diagnosing and presenting the problems that are associated with planning and delivering the outcome.

This research has touched on a variety of issues related with adaptation to Climate Change and sustainability assessment tools, particularly associated with indicators in the BREEAM Communities NSA. Based on the findings from this work, further research may be considered that focuses on some of the specific issues raised by this work and in order to provide a more in-depth inquiry. Possible future research directions may include:

- **Neighbourhood design (new development)**

An important area for future research is related with comparing the NSA potentials in the governance of the new development neighbourhood development and comparing this role with the regeneration neighbourhood development. This area is important to show the interventions, strategies, and processes that relate to the engagement of actors and the influences on the decision-making process.

- **Risks evaluation**

Further evaluation of the impacts of the neighbourhood sustainability assessment tools, especially in terms of evaluation of their potential to enable appropriate response to risk resilience in theory and practice, is required. A deeper exploration of the neighbourhood sustainability assessment tools role on risk assessment and management to influence people lives before, during and after risks, is needed. This area is important regarding identifying the strategies and methods for adaptation to risks through the integration of resilience and sustainability.

- **Economic issues**

Further work is required regarding the focus on the economic aspects of the application effects of the NSAs. In this area of research, economic sustainability is important and remains weak in the current literature despite its importance to adaptation to Climate Change. There is a need to understand what areas are important and what areas require further focus in NSAs to make communities economically stronger, in association to the various types of communities. This study should be undertaken in different communities with different economic status. Further, it is likely to be beneficial to compare communities who relied on local resources in their daily life and others which do not. This study would be really important to inform the necessary addition of other indicators or probably categories to NSAs to positively influence the economic sustainability.

- **Additional indicators**

A very important line of research would also be to examine the effects of these characteristics and theoretical approaches in relation to other sectors regarding the application of NSAs. The study of various sectors such as: Energy, Transportation, Ecology that the NSAs constitute would likely inform greater understanding of the performance and impacts of NSAs on various sectors in relation to Climate Change in both theory and practice. This study would be important to diagnose the sector that has greater challenges or negative aspects among the others, to provide enhancement in structure, coverage and performance.

- **Community engagement & management**

Further studies on pathways to increase engagement of the community in the planning and decision-making of neigbourhood sustainability, in addressing better adaptation outcomes to Climate Change is needed. In this area of study, different communities need to be included, and their differences regarding the social attributes such age, gender, education, and employments can be included to influence the various social matters in communities. Further studies on the development of pathways for the community management of facilities in the physical, social & economic aspects in the sustainable neighbourhoods, are also needed, and these studies should be linked to the community engagement process outcomes as well.

- **Research methods**

An important issue for further research on the impacts of NSAs on adaptation in the social context is to consider the implementation of different methodologies in the research process. For instance, using both the quantitative and qualitative research methods, and using the qualitative methods in depth to investigate the psychological, cultural and the well-being and health in greater depth. This research should cover a wide range of community, in order to identify the real impacts of the neighbourhood sustainability assessment tools on these issues and important aspects. On the other hand, other methods could be used such as quantitative methods regarding the potential focus on the NSAs impact in the physical context regarding the sectors such as water sectors, energy, transportation, and other important sectors that can enhance adaptation to Climate Change.

References

- Adebayo, A.A., Mubi, A.M., Zemba, A.A. and Umar, A.S., 2013. Awareness of climate change impacts and adaptation in Adamawa state, Nigeria. *Int J Environ Ecol Family Urban Stud*, *3*(1), pp.11-18.
- Adger, W.N., 2000. Social and ecological resilience: are they related?. Progress in human geography, 24(3), pp.347-364.
- Adger, W.N., 2001. Scales of governance and environmental justice for adaptation and mitigation of climate change. *Journal of International development*, *13*(7), pp.921-931.
- Adger, W.N., 2006. Vulnerability. *Global environmental change*, *16*(3), pp.268-281.
- Adger, W.N., 2010. Social capital, collective action, and adaptation to climate change. In *Der klimawandel* (pp. 327-345). VS Verlag für Sozialwissenschaften.
- Adger, W.N., Arnell, N.W. and Tompkins, E.L., 2005. Successful adaptation to climate change across scales. *Global environmental change*, *15*(2), pp.77-86.
- Adger, W.N., Barnett, J., Brown, K., Marshall, N. and O'brien, K., 2013. Cultural dimensions of climate change impacts and adaptation. Nature Climate Change, 3(2), p.112.
- Adger, W.N., Brown, K., Nelson, D.R., Berkes, F., Eakin, H., Folke, C., Galvin, K., Gunderson, L., Goulden, M., O'Brien, K. and Ruitenbeek, J., 2011. Resilience implications of policy responses to climate change. Wiley Interdisciplinary Reviews: Climate Change, 2(5), pp.757-766.
- Adger, W.N., Hughes, T.P., Folke, C., Carpenter, S.R. and Rockström, J., 2005. Social-ecological resilience to coastal disasters. Science, 309(5737), pp.1036-1039.
- Adger, W.N., Dessai, S., Goulden, M., Hulme, M., Lorenzoni, I., Nelson, D.R., Naess, L.O., Wolf, J. and Wreford, A., 2009. Are there social limits to adaptation to climate change?. *Climatic change*, *93*(3), pp.335-354.
- Adger, W.N., Brooks, N., Bentham, G., Agnew, M. and Eriksen, S., 2005. New indicators of vulnerability and adaptive capacity. Norwich: Tyndall Centre for Climate Change Research.
- Agrawal A (2008) The role of local institutions in adaptation to climate change. In: Papers of the Social Dimensions of Climate Change Workshop. The World Bank, Washington DC, March 5–6, 2008

- Agrawal, A., 2010. Local institutions and adaptation to climate change. Social dimensions of climate change: Equity and vulnerability in a warming world, 2, pp.173-178.
- Akter, T. and Simonovic, S.P., 2005. Aggregation of fuzzy views of a large number of stakeholders for multi-objective flood management decision-making. Journal of environmental management, 77(2), pp.133-143.
- Amundsen, H., Berglund, F. and Westskog, H., 2010. Overcoming barriers to climate change adaptation—a question of multilevel governance?. Environment and Planning C: Government and Policy, 28(2), pp.276-289.
- Apostolopoulos, N., Newbery, R. and Gkartzios, M., 2018. Social enterprise and community resilience: Examining a Greek response to turbulent times. Journal of Rural studies.
- Armitage, D., 2005. Adaptive capacity and community-based natural resource management. Environmental management, 35(6), pp.703-715.
- Armitage, D., Béné, C., Charles, A.T., Johnson, D. and Allison, E.H., 2012. The interplay of well-being and resilience in applying a social-ecological perspective. Ecology and Society 17(4): 15. http://dx.doi.org/10.5751/ES-04940-170415
- Arnadottir, H. ; Hreggvidsdottir, H. (2016). Urridaholt neighbourhood Iceland - Sustainable drainage solutions interwoven in the urban pattern - a cooperative approach. Novatech 2016, 28.06 – 01.07 2016, Lyon, France.
- Arora-Jonsson, S., 2011. Virtue and vulnerability: Discourses on women, gender and climate change. *Global Environmental Change*, *21*(2), pp.744-751.
- Arayici, Y., 2014. Knowledge intensive regeneration for knowledge societies and economies. Global Built Environment Review, 9(1), pp.68-85.
- Arnott, J.C., Moser, S.C. and Goodrich, K.A., 2016. Evaluation that counts: A review of climate change adaptation indicators & metrics using lessons from effective evaluation and science-practice interaction. Environmental Science & Policy, 66, pp.383-392.
- Auld, G.W., Diker, A., Bock, M.A., Boushey, C.J., Bruhn, C.M., Cluskey, M., Edlefsen, M., Goldberg, D.L., Misner, S.L., Olson, B.H. and Reicks, M., 2007. Development of a decision tree to determine appropriateness of NVivo in analyzing qualitative data sets. Journal of nutrition education and behavior, 39(1), pp.37-47.
- Aytur, S.A., Hecht, J.S. and Kirshen, P., 2015. Aligning climate change adaptation planning with adaptive governance: Lessons from Exeter, NH. Journal of Contemporary Water Research & Education, 155(1), pp.83-98.

- Bakar, A.H.A. and Cheen, K.S., 2013. A framework for assessing the sustainable urban development. *Procedia-Social and Behavioral Sciences*, *85*, pp.484-492.
- Bahadur, A.V., Ibrahim, M., Tanner, T., 2010. The Resilience Renaissance? Unpacking of Resilience for Tackling Climate Change and Disasters. In: Strengthening Climate Resilience Discussion Paper 1. IDS, Brighton available at: http://community.eldis. org/.59e0d267/resilience-renaissance.pdf
- Balkema, A.J., Preisig, H.A., Otterpohl, R. and Lambert, F.J., 2002. Indicators for the sustainability assessment of wastewater treatment systems. *Urban water*, *4*(2), pp.153-161.
- Banister, D., 2008. The sustainable mobility paradigm. Transport policy, 15(2), pp.73-80.
- Barnett, J., 2003. Security and climate change. *Global environmental change*, *13*(1), pp.7-17.
- Barrett, R. and Maglio, P.P., 1999. Intermediaries: An approach to manipulating information streams. IBM Systems Journal, 38(4), pp.629-641.
- Barros, V.R., Field, C.B., Dokke, D.J., Mastrandrea, M.D., Mach, K.J., Bilir, T.E., Chatterjee, M., Ebi, K.L., Estrada, Y.O., Genova, R.C. and Girma, B., 2014. Climate change 2014: impacts, adaptation, and vulnerability-Part B: regional aspects-Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change.
- Basit, T., 2003. Manual or electronic? The role of coding in qualitative data analysis. Educational research, 45(2), pp.143-154.
- Bates, B., Kundzewicz, Z.W., Wu, S. & Palutikof, J. (eds), *Climate Change and Water: Technical Paper vi,* Intergovernmental Panel on Climate Change IPCC: Geneva, 2008.
- Berkes, F. and Ross, H., 2013. Community resilience: toward an integrated approach. Society & Natural Resources, 26(1), pp.5-20.
- Bennett, N.J., 2016. Using perceptions as evidence to improve conservation and environmental management. Conservation Biology, 30(3), pp.582-592.
- Berardi, U., 2012. Sustainability assessment in the construction sector: rating systems and rated buildings. Sustainable Development, 20(6), pp.411-424.
- Bierbaum, R., Smith, J.B., Lee, A., Blair, M., Carter, L., Chapin, F.S., Fleming, P., Ruffo, S., Stults, M., McNeeley, S. and Wasley, E., 2013. A comprehensive review of climate adaptation in the United States: more than before, but less than needed. Mitigation and adaptation strategies for global change, 18(3), pp.361-406.

- Bird, C. and Barnes, J., 2014. Scaling up community activism: the role of intermediaries in collective approaches to community energy. People, Place & Policy Online, 8(3).
- Blewitt, J., 2008. *Community, empowerment and sustainable development*. Green books.
- Bond, A., Morrison-Saunders, A. and Pope, J., 2012. Sustainability assessment: the state of the art. *Impact Assessment and Project Appraisal*, *30*(1), pp.53-62.
- Boyle, L., Michell, K. and Viruly, F., 2018. A Critique of the Application of Neighborhood Sustainability Assessment Tools in Urban Regeneration. *Sustainability*, *10*(4), p.1005.
- Brenkert, A.L. and Malone, E.L., 2005. Modeling vulnerability and resilience to climate change: a case study of India and Indian states. Climatic Change, 72(1-2), pp.57-102.
- Bronk, K.C., 2012. The exemplar methodology: An approach to studying the leading edge of development. Psychology of Well-Being: Theory, Research and Practice, 2(1), p.5.
- Brooks, N., Adger, W. N., & Kelly, P. M. 2005. The determinants of vulnerability and adaptive capacity at the national level and the implications for adaptation. *Global environmental change*, *15*(2), 151-163.
- Brown, J.D., 2000. What issues affect Likert-scale questionnaire formats. Shiken: JALT Testing & Evaluation SIG Newsletter, 4(1).
- Brown, K. and Westaway, E., 2011. Agency, capacity, and resilience to environmental change: lessons from human development, well-being, and disasters. Annual review of environment and resources, 36, pp.321-342.
- Broto, V.C., 2017. Urban governance and the politics of climate change. World development, 93, pp.1-15.
- Brugnach, M., Craps, M. and Dewulf, A.R.P.J., 2017. Including indigenous peoples in climate change mitigation: addressing issues of scale, knowledge and power. Climatic change, 140(1), pp.19-32.
- Bruni, A. and Teli, M., 2007. Reassembling the social—An introduction to actor network theory. *Management Learning*, *38*(1), pp.121-125.
- Burn, S.M., Winter, P.L., Hori, B. and Silver, N.C., 2012. Gender, ethnic identity, and environmental concern in Asian Americans and European Americans. Human Ecology Review, pp.136-145.
- Bush, R.E., Bale, C.S., Powell, M., Gouldson, A., Taylor, P.G. and Gale, W.F., 2017. The role of intermediaries in low carbon transitions–Empowering innovations to unlock district heating in the UK. Journal of cleaner production, 148, pp.137-147.
- Butler, J.R.A., Wise, R.M., Skewes, T.D., Bohensky, E.L., Peterson, N., Suadnya, W., Yanuartati, Y., Handayani, T., Habibi, P., Puspadi, K. and Bou, N., 2015. Integrating top-

down and bottom-up adaptation planning to build adaptive capacity: a structured learning approach. Coastal Management, 43(4), pp.346-364.

- Cannon, T., & Müller-Mahn, D. (2010). Vulnerability, resilience and development discourses in context of climate change. *Natural hazards*, *55*(3), 621-635.
- Carpenter, S., Walker, B., Anderies, J.M. and Abel, N., 2001. From metaphor to measurement: resilience of what to what? Ecosystems, 4(8), pp.765-781.
- Carrasco, J.A., Hogan, B., Wellman, B. and Miller, E.J., 2008. Agency in social activity interactions: The role of social networks in time and space. Tijdschrift voor economische en sociale geografie, 99(5), pp.562-583.
- Carter, J.G., Cavan, G., Connelly, A., Guy, S., Handley, J. and Kazmierczak, A., 2015. Climate Change and the city: Building capacity for urban adaptation. Progress in Planning, 95, pp.1-66.
- Chandra, A., Acosta, J., Howard, S., Uscher-Pines, L., Williams, M., Yeung, D., Garnett, J. and Meredith, L.S., 2011. Building community resilience to disasters: A way forward to enhance national health security. *Rand health quarterly*, *1*(1).
- Chapin III, F.S., Hoel, M., Carpenter, S.R., Lubchenco, J., Walker, B., Callaghan, T.V., Folke, C., Levin, S.A., Mäler, K.G., Nilsson, C. and Barrett, S., 2006. Building resilience and adaptation to manage Arctic change. AMBIO: A Journal of the Human Environment, 35(4), pp.198-202.
- Chapin III, F.S., Peterson, G., Berkes, F., Callaghan, T.V., Angelstam, P., Apps, M., Beier, C., Bergeron, Y., Crépin, A.S., Danell, K. and Elmqvist, T., 2004. Resilience and vulnerability of northern regions to social and environmental change. *AMBIO: A Journal of the Human Environment*, *33*(6), pp.344-349.
- Charlton, M.B. and Arnell, N.W., 2011. Adapting to climate change impacts on water resources in England—an assessment of draft water resources management plans. *Global Environmental Change*, *21*(1), pp.238-248.
- Chelleri, L., Schuetze, T. and Salvati, L., 2015. Integrating resilience with urban sustainability in neglected neighborhoods: Challenges and opportunities of transitioning to decentralized water management in Mexico City. Habitat International, 48, pp.122-130.
- Chilaka, Marcus A 2011, MediacityUK: A health impact assessment, Project Report, University of Salford. (Unpublished) (available at: http://usir.salford.ac.uk/id/eprint/18987. Accessed 23.05.19)

- Choguill, C.L., 2008. Developing sustainable neighbourhoods. Habitat International, 32(1), pp.41-48.
- Cash, D.W., Adger, W.N., Berkes, F., Garden, P., Lebel, L., Olsson, P., Pritchard, L. and Young, O., 2006. Scale and cross-scale dynamics: governance and information in a multilevel world. Ecology and society, 11(2).
- Chaskin, R.J., 2008. Resilience, community, and resilient communities: Conditioning contexts and collective action. *Child Care in Practice*, *14*(1), pp.65-74.
- Chilaka, M.A., 2011. MediacityUK: A health impact assessment.
- Cohen, S., Demeritt, D., Robinson, J. and Rothman, D., 1998. Climate change and sustainable development: towards dialogue. Global Environmental Change, 8(4), pp.341-371.
- Collet, L., Ruelland, D., Estupina, V.B., Dezetter, A. and Servat, E., 2015. Water supply sustainability and adaptation strategies under anthropogenic and climatic changes of a meso-scale Mediterranean catchment. *Science of the Total Environment*, *536*, pp.589-602.
- Communities, B.R.E.E.A.M., 2009. Technical Manual. BREEAM Communities assessor manual development planning application stage SD5065B, BRE Global Ltd.
- Conrad, C.C. and Hilchey, K.G., 2011. A review of citizen science and community-based environmental monitoring: issues and opportunities. Environmental monitoring and assessment, 176(1-4), pp.273-291.
- Cote, I.M. and Darling, E.S., 2010. Rethinking ecosystem resilience in the face of climate change. *PLoS biology*, *8*(7), p.e1000438.
- Cote, M. and Nightingale, A.J., 2012. Resilience thinking meets social theory: situating social change in socio-ecological systems (SES) research. Progress in Human Geography, 36(4), pp.475-489.
- Council, J.G. and Japan Sustainable Building Consortium, 2007. CASBEE for urban development (CASBEE-UD).
- Council, J.G. and Japan Sustainable Building Consortium, 2014. CASBEE for urban development (CASBEE-UD).
- Council, U.G.B., 2009. LEED for neighborhood development. a prescription for green healthy communities. Available at: http://www. greenhomeguide. org/ living reen/led_for_neighborhood_ development. html. Accessed March, 15.

- Cundill, G. and Fabricius, C., 2010. Monitoring the governance dimension of natural resource co-management. Ecology and society, 15(1): 15. http://www.ecologyandsociety.org/vol15/iss1/art15/
- Cutter, S.L., 2016. Resilience to what? Resilience for whom?. The Geographical Journal, 182(2), pp.110-113.
- Cutter, S.L., Barnes, L., Berry, M., Burton, C., Evans, E., Tate, E. and Webb, J., 2008. A place-based model for understanding community resilience to natural disasters. Global environmental change, 18(4), pp.598-606.
- Crona, B.I. and Parker, J.N., 2012. Learning in support of governance: theories, methods, and a framework to assess how bridging organizations contribute to adaptive resource governance. Ecology and Society, 17(1): 32. http://dx.doi.org/10.5751/ES-04534-170132
- Dal, B., Ozturk, N., Alper, U., Sonmez, D. and Cokelez, A., 2015. An analysis of the teachers' climate change awareness. *Athens Journal of Education*, *2*(2), pp.111-122.
- Dalziell, E.P. and McManus, S.T., 2004. Resilience, vulnerability, and adaptive capacity: implications for system performance. International Forum for Engineering Decision Making (IFED), Switzerland. pp.1-17.
- Danilovic, M. and Sandkull, B., 2005. The use of dependence structure matrix and domain mapping matrix in managing uncertainty in multiple project situations. International journal of project management, 23(3), pp.193-203.
- Dankelman, I., 2002. Climate change: Learning from gender analysis and women's experiences of organising for sustainable development. Gender & Development, 10(2), pp.21-29.
- Davoudi, Simin, Keith Shaw, L. Jamila Haider, Allyson E. Quinlan, Garry D. Peterson, Cathy Wilkinson, Hartmut Fünfgeld, Darryn McEvoy, Libby Porter, and Simin Davoudi. "Resilience: a bridging concept or a dead end?"Reframing" resilience: challenges for planning theory and practice interacting traps: resilience assessment of a pasture management system in Northern Afghanistan urban resilience: what does it mean in planning practice? Resilience as a useful concept for climate change adaptation? The politics of resilience for planning: a cautionary note: edited by Simin Davoudi and Libby Porter." Planning theory & practice 13, no. 2 (2012): 299-333.
- Dempsey, N., Bramley, G., Power, S. and Brown, C., 2011. The social dimension of sustainable development: Defining urban social sustainability. Sustainable development, 19(5), pp.289-300.

- Derissen, S., Quaas, M.F. and Baumgärtner, S., 2011. The relationship between resilience and sustainability of ecological-economic systems. Ecological Economics, 70(6), pp.1121-1128.
- Deppisch, S., & Hasibovic, S. 2013. Social-ecological resilience thinking as a bridging concept in transdisciplinary research on climate-change adaptation. *Natural hazards*, *67*(1), 117-127.
- Dewulf, A. and Termeer, C., 2015. Governing the future? The potential of adaptive delta management to contribute to governance capabilities for dealing with the wicked problem of climate change adaptation. *Journal of Water and Climate Change*, *6*(4), pp.759-771.
- Djalante, R., Holley, C. and Thomalla, F., 2011. Adaptive governance and managing resilience to natural hazards. International Journal of Disaster Risk Science, 2(4), pp.1-14.
- Dodman, D. and Mitlin, D., 2013. Challenges for community-based adaptation: discovering the potential for transformation. Journal of International Development, 25(5), pp.640-659.
- Döll, P., 2009. Vulnerability to the impact of climate change on renewable groundwater resources: a global-scale assessment. *Environmental Research Letters*, *4*(3), p.035006.
- Drummond, A., Hall, L.C., Sauer, J.D. and Palmer, M.A., 2018. Is public awareness and perceived threat of climate change associated with governmental mitigation targets?. Climatic change, 149(2), pp.159-171.
- Duit, A., Galaz, V., Eckerberg, K. and Ebbesson, J., 2010. Governance, complexity, and resilience. Global Environmental Change 20 (3), 263-546.
- Eakin, H. C., & Wehbe, M. B. (2009). Linking local vulnerability to system sustainability in a resilience framework: two cases from Latin America. *Climatic Change*, *93*(3-4), 355-377.
- Ebi, K.L. and Semenza, J.C., 2008. Community-based adaptation to the health impacts of climate change. American journal of preventive medicine, 35(5), pp.501-507.
- Edwards, A.R., 2010. *Thriving beyond sustainability: Pathways to a resilient society*. New Society Publishers.
- Elala, D., Vulnerability assessment of surface water supply systems due to climate change and other impacts in Addis Ababa, Ethiopia, 2011.
- Elander, I., 2002. Partnerships and urban governance. *International social science journal*, *54*(172), pp.191-204.

- Eisenman, D.P., Adams, R.M. and Rivard, H., 2016. Measuring outcomes in a community resilience program: a new metric for evaluating results at the household level. *PLoS currents*, *8*.
- Engle, N.L., 2011. Adaptive capacity and its assessment. *Global Environmental Change*, *21*(2), pp.647-656.
- Engle, N.L., 2013. The role of drought preparedness in building and mobilizing adaptive capacity in states and their community water systems. *Climatic change*, *118*(2), pp.291-306.
- Engle, N.L., de Bremond, A., Malone, E.L. and Moss, R.H., 2014. Towards a resilience indicator framework for making climate-change adaptation decisions. Mitigation and Adaptation Strategies for Global Change, 19(8), pp.1295-1312.
- Engle, N.L. and Lemos, M.C., 2010. Unpacking governance: building adaptive capacity to climate change of river basins in Brazil. Global Environmental Change, 20(1), pp.4-13.
- Ensor, J. and Harvey, B., 2015. Social learning and climate change adaptation: evidence for international development practice. Wiley Interdisciplinary Reviews: Climate Change, 6(5), pp.509-522.
- Eriksen, S., Aldunce, P., Bahinipati, C.S., Martins, R.D.A., Molefe, J.I., Nhemachena, C., O'brien, K., Olorunfemi, F., Park, J., Sygna, L. and Ulsrud, K., 2011. When not every response to climate change is a good one: Identifying principles for sustainable adaptation. *Climate and Development*, *3*(1), pp.7-20.
- Eriksen, S.H. and Kelly, P.M., 2007. Developing credible vulnerability indicators for climate adaptation policy assessment. *Mitigation and adaptation strategies for global change*, *12*(4), pp.495-524.
- Etikan, I., Musa, S.A. and Alkassim, R.S., 2016. Comparison of convenience sampling and purposive sampling. American Journal of Theoretical and Applied Statistics, 5(1), pp.1-4.
- Fehren, O., 2010. Who organises the community? The university as an intermediary actor. Gateways: International Journal of Community Research and Engagement, 3, pp.104-119.
- Fernandez-Gimenez, M.E., Ballard, H.L. and Sturtevant, V.E., 2008. Adaptive management and social learning in collaborative and community-based monitoring: a study of five community-based forestry organizations in the western USA. Ecology and Society 13(2): 4: http://www.ecologyandsociety.org/vol13/iss2/art4/

- Ferrara, I. and Serret, Y., 2008. Household behaviour and the environment, reviewing the evidence. Organization for Economic Cooperation and Development: Paris, France, pp.153-180.
- Few, R., 2003. Flooding, vulnerability and coping strategies: local responses to a global threat. Progress in Development Studies, 3(1), pp.43-58.
- Few, R., Brown, K. and Tompkins, E.L., 2007. Public participation and climate change adaptation: avoiding the illusion of inclusion. Climate policy, 7(1), pp.46-59.
- Fiksel, J., 2006. Sustainability and resilience: toward a systems approach. *Sustainability: Science, Practice and Policy*, *2*(2), pp.14-21.
- Fitzpatrick, J.L., 2004. Exemplars as case studies: Reflections on the links between theory, practice, and context. American Journal of Evaluation, 25(4), pp.541-559.
- Fleischhauer, M., 2008. The role of spatial planning in strengthening urban resilience. In *Resilience of Cities to Terrorist and other Threats* (pp. 273-298). Springer, Dordrecht.
- Flyvbjerg, B., 2006. Five misunderstandings about case-study research. *Qualitative inquiry*, *12*(2), pp.219-245.
- Folke, C., 2006. Resilience: The emergence of a perspective for social–ecological systems analyses. *Global environmental change*, *16*(3), pp.253-267.
- Folke, C., Colding, J. and Berkes, F., 2003. Synthesis: building resilience and adaptive capacity in social-ecological systems. *Navigating social-ecological systems: Building resilience for complexity and change*, *9*(1), pp.352-387.
- Folke, C., Carpenter, S., Elmqvist, T., Gunderson, L., Holling, C.S. and Walker, B., 2002. Resilience and sustainable development: building adaptive capacity in a world of transformations. *AMBIO: A journal of the human environment*, *31*(5), pp.437-440.
- Folke, C., Hahn, T., Olsson, P. and Norberg, J., 2005. Adaptive governance of social-ecological systems. *Annu. Rev. Environ. Resour.*, *30*, pp.441-473.
- Frumkin, H., Hess, J., Luber, G., Malilay, J. and McGeehin, M., 2008. Climate change: the public health response. American journal of public health, 98(3), pp.435-445.
- Füssel, H.M. and Klein, R.J., 2006. Climate change vulnerability assessments: an evolution of conceptual thinking. *Climatic change*, *75*(3), pp.301-329.
- Gallopín, G.C., 2006. Linkages between vulnerability, resilience, and adaptive capacity. *Global environmental change*, *16*(3), pp.293-303.
- Gargiulo, M. and Benassi, M., 2000. Trapped in your own net? Network cohesion, structural holes, and the adaptation of social capital. *Organization science*, *11*(2), pp.183-196.

- Garland, R., 1991. The mid-point on a rating scale: Is it desirable. Marketing bulletin, 2(1), pp.66-70.
- Garmestani, A.S. and Benson, M.H., 2013. A framework for resilience-based governance of social-ecological systems. Ecology and Society 18(1): 9. http://dx.doi.org/10.5751/ES-05180-180109
- Gentle, P. and Maraseni, T.N., 2012. Climate change, poverty and livelihoods: adaptation practices by rural mountain communities in Nepal. Environmental science & policy, 21, pp.24-34.
- Gillard, Ross, Andrew Gouldson, Jouni Paavola, and James Van Alstine. "Transformational responses to climate change: beyond a systems perspective of social change in mitigation and adaptation." Wiley Interdisciplinary Reviews: Climate Change 7, no. 2 (2016): 251-265.
- Glosinska, E. (2014) Floodplain Management in the Context of Assessment and Changes of Flood Risk and the Environment - a Review. Polish Journal of Environmental Studies. 23 (6). pp. 1895-1904
- Gluchshenko, O., & Foerster, P. (2013, June). Performance based approach to investigate resilience and robustness of an ATM System. In *Tenth USA/Europe Air Traffic Management Research and Development Seminar*.
- Godschalk, D.R., 2003. Urban hazard mitigation: creating resilient cities. *Natural hazards review*, *4*(3), pp.136-143.
- Graugaard, J.D., 2012. A tool for building community resilience? A case study of the Lewes Pound. *Local Environment*, *17*(2), pp.243-260.
- Goodman, R.M., Speers, M.A., McLeroy, K., Fawcett, S., Kegler, M., Parker, E., Smith, S.R., Sterling, T.D. and Wallerstein, N., 1998. Identifying and defining the dimensions of community capacity to provide a basis for measurement. health education & Behavior, 25(3), pp.258-278.
- Gorod, A., White, B.E., Ireland, V., Gandhi, S.J. and Sauser, B., 2014. Case studies in system of systems, enterprise systems, and complex systems engineering. CRC Press.
- Green, L.W. and Mercer, S.L., 2001. Can public health researchers and agencies reconcile the push from funding bodies and the pull from communities?. American journal of public health, 91(12), pp.1926-1929.
- Grothmann, T. and Patt, A., 2005. Adaptive capacity and human cognition: the process of individual adaptation to climate change. *Global Environmental Change*, *15*(3), pp.199-213.

- Guest, J.S., Skerlos, S.J., Barnard, J.L., Beck, M.B., Daigger, G.T., Hilger, H., Jackson, S.J., Karvazy, K., Kelly, L., Macpherson, L. and Mihelcic, J.R., 2009. A new planning and design paradigm to achieve sustainable resource recovery from wastewater.
- Gustafsson, J., 2017. Single case studies vs. multiple case studies: A comparative study. Academy of Business, Engineering and Science, Halmstad University Sweden, pp. 1–15.
- Haapio, A. and Viitaniemi, P., 2008. A critical review of building environmental assessment tools. Environmental impact assessment review, 28(7), pp.469-482.
- Haapio, A., 2012. Towards sustainable urban communities. *Environmental Impact Assessment Review*, *32*(1), pp.165-169.
- Haasnoot, M., Middelkoop, H., Offermans, A., Van Beek, E. and Van Deursen, W.P., 2012. Exploring pathways for sustainable water management in river deltas in a changing environment. *Climatic Change*, *115*(3-4), pp.795-819.
- Haimes, Y.Y., 2009. On the definition of resilience in systems. Risk Analysis: An International Journal, 29(4), pp.498-501.
- Haines, A., Kovats, R.S., Campbell-Lendrum, D. and Corvalán, C., 2006. Climate change and human health: impacts, vulnerability and public health. *Public health*, *120*(7), pp. 585-596.
- Hallegatte, S., 2009. Strategies to adapt to an uncertain climate change. *Global Environmental Change,* 19(2), pp. 240–247.
- Hallegatte, S. and Corfee-Morlot, J., 2011. Understanding climate change impacts, vulnerability and adaptation at city scale: an introduction. *Climatic Change*, *104*(1), pp.1-12.
- Hallegatte, S. and Engle, N.L., 2019. The search for the perfect indicator: Reflections on monitoring and evaluation of resilience for improved climate risk management. Climate Risk Management, 23, pp.1-6.
- Hamedani, A.Z. and Huber, F., 2012. A comparative study of DGNB, LEED and BREEAM certificate systems in urban sustainability. The Sustainable City VII: Urban Regeneration and Sustainability, 1121.
- Hanjra, M.A, & Qureshi, M.E., 2010. Global water crisis and future food security in an era of climate change. *Food Policy*, 35(5), pp. 365–377.
- Hemphill2, L., McGreal, S. and Berry, J., 2004. An indicator-based approach to measuring sustainable urban regeneration performance: Part 2, empirical evaluation and case-study analysis. *Urban Studies*, *41*(4), pp.757-772.

- Hansen, A., Bi, L., Saniotis, A. and Nitschke, M., 2013. Vulnerability to extreme heat and climate change: is ethnicity a factor?. *Global health action*, *6*.
- Hatfield-Dodds, S., Nelson, R. and Cook, D.C., 2007, February. Adaptive governance: an introduction, and implications for public policy. In Paper provided by Australian Agricultural and Resource Economics Society in its series 2007 Conference (51st) (No. 10440).
- Hayes, N. and Westrup, C., 2014. Consultants as intermediaries and mediators in the construction of information and communication technologies for development. Information Technologies & International Development, 10(2), pp.19.
- Hinkel, J., 2011. "Indicators of vulnerability and adaptive capacity": towards a clarification of the science–policy interface. *Global Environmental Change*, *21*(1), pp.198-208.
- Hinkel, J., Bisaro, S., Downing, T., Hofmann, M.E., Lonsdale, K., Mcevoy, D., Tabara, J.D., 2009. Learning to adapt. Narratives of decision makers adapting to climate change. In: Hulme, M., Neufeldt, H. (Eds.), Making Climate Change Work for Us: European Perspectives on Adaptation and Mitigation Strategies. Cambridge University Press, pp. 113–134.
- Hodson, M. and Marvin, S., 2010. Can cities shape socio-technical transitions and how would we know if they were?. Research policy, 39(4), pp.477-485.
- Holling, C.S., 1973. Resilience and stability of ecological systems. *Annual review of ecology and systematics*, *4*(1), pp.1-23.
- Holman, I.P. and Trawick, P., 2011. Developing adaptive capacity within groundwater abstraction management systems. *Journal of environmental management*, *92*(6), pp.1542-1549.
- Howells, J., 2006. Intermediation and the role of intermediaries in innovation. Research policy, 35(5), pp.715-728.
- Hordijk, M., Sara, L.M. and Sutherland, C., 2014. Resilience, transition or transformation? A comparative analysis of changing water governance systems in four southern cities. *Environment and Urbanization*, *26*(1), pp.130-146.
- Hughes, T.P., Baird, A.H., Bellwood, D.R., Card, M., Connolly, S.R., Folke, C., Grosberg, R., Hoegh-Guldberg, O., Jackson, J.B., Kleypas, J. and Lough, J.M., 2003. Climate change, human impacts, and the resilience of coral reefs. science, 301(5635), pp.929-933.

- Hutchison, A.J., Johnston, L.H. and Breckon, J.D., 2010. Using QSR-NVivo to facilitate the development of a grounded theory project: an account of a worked example. International Journal of Social Research Methodology, 13(4), pp.283-302.
- Hyytinen, K., Gallouj, F. and Toivonen, M., 2014, July. A multi-criteria and multi-actor perspective for the evaluation of sustainability services. In 5th International Conference on Applied Human Factors and Ergonomics AHFE 2014.
- Ikeme, J., 2003. Equity, environmental justice and sustainability: incomplete approaches in climate change politics. *Global environmental change*, *13*(3), pp.195-206.
- Ivey, J.L., Smithers, J., de Loë, R.C. and Kreutzwiser, R.D., 2004. Community capacity for adaptation to climate-induced water shortages: linking institutional complexity and local actors. Environmental management, 33(1), pp.36-47.
- Jamieson, S., 2004. Likert scales: how to (ab) use them. Medical education, 38(12), pp.1217-1218.
- Janssen, M.A., Schoon, M.L., Ke, W. and Börner, K., 2006. Scholarly networks on resilience, vulnerability and adaptation within the human dimensions of global environmental change. *Global environmental change*, *16*(3), pp.240-252.
- Johnstone, J.F., Chapin, F.S., Hollingsworth, T.N., Mack, M.C., Romanovsky, V. and Turetsky, M., 2010. Fire, climate change, and forest resilience in interior Alaska. *Canadian Journal of Forest Research*, *40*(7), pp.1302-1312.
- Johnson, R.B., Onwuegbuzie, A.J. and Turner, L.A., 2007. Toward a definition of mixed methods research. Journal of mixed methods research, 1(2), pp.112-133.
- Jones, L., Harvey, B. and Godfrey-Wood, R., 2016. The changing role of NGOs in supporting climate services. *BRACED Resilience Intel Paper*, *4*.
- Jordan, J., 2009. Rethinking community resilience to climate change: Does a social capital lens help. In *Development studies association conference*.
- Kakumanu, K.R., Kaluvai, Y.R., Balasubramanian, M., Nagothu, U.S., Kotapati, G.R. and Karanam, S. 2018, ADAPTATION TO CLIMATE CHANGE: IMPACT OF CAPACITY BUILDING, INDIA. *Irrigation and Drainage*.
- Kang, H., Lee, Y. and Kim, S., 2016. Sustainable building assessment tool for project decision makers and its development process. Environmental Impact Assessment Review, 58, pp.34-47.
- Kearns, A. and Parkinson, M., 2001. The significance of neighbourhood. *Urban studies*, *38*(12), pp.2103-2110.

- Keim, M.E., 2008. Building human resilience: the role of public health preparedness and response as an adaptation to climate change. *American journal of preventive medicine*, *35*(5), pp.508-516.
- Kelly, P.M. and Adger, W.N., 2000. Theory and practice in assessing vulnerability to climate change and facilitating adaptation. *Climatic change*, *47*(4), pp.325-352.
- Kinnunen, T. and Koskinen, K. (eds), 2010. Translators' agency. Tampere University Press, Tampere.
- Kivimaa, P., 2014. Government-affiliated intermediary organisations as actors in system level transitions. Res. Policy 43 (8), 1370–1380.
- Kivimaa, P., Boon, W., Hyysalo, S. and Klerkx, L., 2018. Towards a typology of intermediaries in sustainability transitions: A systematic review and a research agenda. Research Policy.
- Kooiman, J. (2005) Governing as Governance. Sage Publications, London.
- Kooiman, J. ed., 1993. *Modern governance: new government-society interactions*. Sage.
- Krasny, M.E. and Tidball, K.G., 2009. Applying a resilience systems framework to urban environmental education. Environmental education research, 15(4), pp.465-482.
- Kreimer, A., Arnold, M. and Carlin, A. eds., 2003. *Building safer cities: the future of disaster risk*. The World Bank.
- Kundzewicz, Z.W., Mata, L.J., Arnell, N.W., Döll, P., Jimenez, B., Miller, K., Oki, T., Şen, Z. and Shiklomanov, I., 2008. The implications of projected climate change for freshwater resources and their management.
- Kwok, A.H., Doyle, E.E., Becker, J., Johnston, D. and Paton, D., 2016. What is 'social resilience'? Perspectives of disaster researchers, emergency management practitioners, and policymakers in New Zealand. International Journal of Disaster Risk Reduction, 19, pp.197-211.
- Kyrkou, D. and Karthaus, R., 2011. Urban sustainability standards: predetermined checklists or adaptable frameworks. *Procedia Engineering*, *21*, pp.204-211.
- L BERG, B.R.U.C.E., 2001. Qualitative research methods for the social sciences.
- Larson, K.L., Polsky, C., Gober, P., Chang, H. and Shandas, V., 2013. Vulnerability of water systems to the effects of climate change and urbanization: A comparison of Phoenix, Arizona and Portland, Oregon (USA). *Environmental management*, *52*(1), pp.179-195.
- Latour, B., 1990. On actor-network theory A few clarifications plus more than a few complications. Soziale Welt, 47(4), pp.1-14.

- Latour, B., 1996. On actor-network theory: A few clarifications. *Soziale welt*, pp.369-381.
- Latour B (2004) On using ANT for studying information systems: A (somewhat) Socratic dialogue. In: Avgerou C, Ciborra C and Land F (eds) The Social Study of Information and Communication Study. Oxford: Oxford University Press, 62–76.
- Latour B (2005) Reassembling the Social: An Introduction to Actor-Network-Theory. Oxford: Oxford University Press.
- Latour, Bruno and Weibel, Peter. 2005. Making Things Public. Cambridge, MA: MIT Press.
- Laukkonen, J., Blanco, P.K., Lenhart, J., Keiner, M., Cavric, B. and Kinuthia-Njenga, C., 2009. Combining climate change adaptation and mitigation measures at the local level. Habitat international, 33(3), pp.287-292.
- Lebel, L., Anderies, J.M., Campbell, B., Folke, C., Hatfield-Dodds, S., Hughes, T.P. and Wilson, J., 2006. Governance and the capacity to manage resilience in regional social-ecological systems. Ecology and Society 11(1): 19 http://www.ecologyandsociety.org/vol11/iss1/art19/
- Lee, K.N., 1999. Appraising adaptive management. Conservation ecology, 3(2).
- Leichenko, R., 2011. Climate change and urban resilience. *Current opinion in environmental sustainability*, *3*(3), pp.164-168.
- Leiserowitz, A. and Akerlof, K., 2010. Race, ethnicity and public responses to climate change. *Yale Project on climate change communication, New Haven*.
- Lendvai, Noemi, and Paul Stubbs. "Assemblages, Translation, and Intermediaries in South East Europe: rethinking transnationalism and social policy." European Societies 11, no. 5 (2009): 673-695.
- Liddle, B. and Lung, S., 2010. Age-structure, urbanization, and climate change in developed countries: revisiting STIRPAT for disaggregated population and consumption-related environmental impacts. *Population and Environment*, *31*(5), pp.317-343.
- Likens, G. and Lindenmayer, D., 2018. Effective ecological monitoring. CSIRO publishing.
- Lim, B., -Siegfried, E., Burton, I., Malone, E. and Huq, S., 2005. Adaptation policy frameworks for climate change: developing strategies, policies and measures. Cambridge University Press, UNDP.
- Lindner, M., Maroschek, M., Netherer, S., Kremer, A., Barbati, A., Garcia-Gonzalo, J., ... & Marchetti, M. (2010). Climate change impacts, adaptive capacity, and vulnerability of European forest ecosystems. *Forest Ecology and Management*, *259*(4), 698-709.

- Lindsay, A., 2018. Social learning as an adaptive measure to prepare for climate change impacts on water provision in Peru. Journal of Environmental Studies and Sciences, 8(4), pp.477-487.
- Littlewood, J., Spataru, C., Howlett, R.J. and Jain, L.C. eds., 2017. Smart Energy Control Systems for Sustainable Buildings (Vol. 67). Springer.
- Loucks, D.P., 2000. Sustainable water resources management. *Water international*, *25*(1), pp.3-10.
- Lockwood, M., 2013. The political sustainability of climate policy: The case of the UK Climate Change Act. Global Environmental Change, 23(5), pp.1339-1348.
- Loftus, A.C., Anton, B. & Philip, R., Adapting Urban Water Systems to Climate Change: A Handbook for Decision Makers at the Local Level, ICLEI European Secretariat Gmbh, 2011.
- Longhurst, R., 2003. Semi-structured interviews and focus groups. Key methods in geography, 3, pp.143-156.
- Lutz, W., Muttarak, R. and Striessnig, E., 2014. Universal education is key to enhanced climate adaptation. Science, 346(6213), pp.1061-1062.
- Lützkendorf, T. and Balouktsi, M., 2017. Assessing a sustainable urban development: Typology of indicators and sources of information. *Procedia Environmental Sciences*, *38*, pp.546-553.
- M. Wiernik, B., S. Ones, D. and Dilchert, S., 2013. Age and environmental sustainability: a meta-analysis. *Journal of Managerial Psychology*, *28*(7/8), pp.826-856.
- MacDonald, G.M., 2010. Water, climate change, and sustainability in the southwest. *Proceedings of the National Academy of Sciences*, *107*(50), pp.21256-21262.
- Maguire, B. and Cartwright, S., 2008. Assessing a community's capacity to manage change: a resilience approach to social assessment. Canberra: Bureau of Rural Sciences.
- Magis, K. 2010. Community resilience: an indicator of social sustainability. Society and Natural Resources, 23(5), 401-416.
- Manzi, T., Lucas, K., Jones, T.L. and Allen, J. eds., 2010. *Social sustainability in urban areas: Communities, connectivity and the urban fabric*. Routledge.
- Martine, G. and Schensul, D., 2013. *The demography of adaptation to climate change*. UNFPA, IIED, and El Colegio de México.
- Mathers, N., Fox, N. and Hunn, A., 2007. Surveys and questionnaires. Trent: RDSU.

- Matthews, E.C., Sattler, M. and Friedland, C.J., 2014. A critical analysis of hazard resilience measures within sustainability assessment frameworks. Environmental Impact Assessment Review, 49, pp.59-69.
- Matthew, R.A. and Hammill, A., 2009. Sustainable development and climate change. *International affairs*, *85*(6), pp.1117-1128.
- Measham, T.G., Preston, B.L., Smith, T.F., Brooke, C., Gorddard, R., Withycombe, G. and Morrison, C., 2011. Adapting to climate change through local municipal planning: barriers and challenges. *Mitigation and adaptation strategies for global change*, *16*(8), pp.889-909.
- Melville, N.P., 2010. Information systems innovation for environmental sustainability. MIS quarterly, 34(1), pp.1-21.
- McCright, A.M., 2010. The effects of gender on climate change knowledge and concern in the American public. *Population and Environment*, *32*(1), pp.66-87.
- McCarthy, J.J., Canziani, O.F., Leary, N.A., Dokken, D.J. and White, K.S. eds., 2001. *Climate change 2001: impacts, adaptation, and vulnerability: contribution of Working Group II to the third assessment report of the Intergovernmental Panel on Climate Change* (Vol. 2). Cambridge University Press.
- McCrea, R., Walton, A. and Leonard, R., 2014. A conceptual framework for investigating community wellbeing and resilience. Rural Society, 23(3), pp.270-282.
- Middelkoop, H., Van Asselt, M., Van't Klooster, S.A., Van Deursen, W., Kwadijk, J.C. and Buiteveld, H., 2004. Perspectives on flood management in the Rhine and Meuse rivers. *River research and applications*, *20*(3), pp.327-342.
- Miller, F., Osbahr, H., Boyd, E., Thomalla, F., Bharwani, S., Ziervogel, G., Walker, B., Birkmann, J., Van der Leeuw, S., Rockström, J. and Hinkel, J., 2010. Resilience and vulnerability: complementary or conflicting concepts?. Ecology and Society 15(3): 11. http:// www.ecologyandsociety.org/vol15/iss3/art11/
- Mokhtar, M.B., Aris, A.Z., Munusamy, V. and Praveena, S.M., 2009. Assessment level of heavy metals in Penaeus monodon and Oreochromis spp. in selected aquaculture ponds of high densities development area. *Eur J Sci Res*, *30*(3), pp.348-360.
- Moss, T., 2009. Intermediaries and the governance of sociotechnical networks in transition. Environment and Planning A, 41(6), pp.1480-1495.
- Moss, T., Medd, W., Guy, S. and Marvin, S., 2009. Organising water: The hidden role of intermediary work. Water Alternatives, 2(1), pp.16-33.

- Mulyana, W., Setiono, I., Selzer, A. K., Zhang, S., Dodman, D., & Schensul, D. 2013. Urbanisation, demographics and adaptation to climate change in Semarang, Indonesia. Human Settlements Group, International Institute for Environment and Development. Urbanization and emerging population issues: Working Paper 11. London:
- Murphy, B.L., 2007. Locating social capital in resilient community-level emergency management. Natural Hazards, 41(2), pp.297-315.
- Muttarak, R. and Lutz, W., 2014. Is education a key to reducing vulnerability to natural disasters and hence unavoidable climate change?. Ecology and Society 19(1): 42. http://dx.doi.org/10.5751/ES-06476-190142
- Ness, B., Urbel-Piirsalu, E., Anderberg, S. and Olsson, L., 2007. Categorising tools for sustainability assessment. Ecological economics, 60(3), pp.498-508.
- Nelson, D.R., Adger, W.N. and Brown, K., 2007. Adaptation to environmental change: contributions of a resilience framework. Annual review of Environment and Resources, 32, pp.395-419.
- Norris, F.H., Stevens, S.P., Pfefferbaum, B., Wyche, K.F. and Pfefferbaum, R.L., 2008. Community resilience as a metaphor, theory, set of capacities, and strategy for disaster readiness. American journal of community psychology, 41(1-2), pp.127-150.
- Noy, C., 2008. Sampling knowledge: The hermeneutics of snowball sampling in qualitative research. International Journal of social research methodology, 11(4), pp.327-344.
- Nyong, A., Adesina, F. and Elasha, B.O., 2007. The value of indigenous knowledge in climate change mitigation and adaptation strategies in the African Sahel. Mitigation and Adaptation strategies for global Change, 12(5), pp.787-797.
- Oberlack, C., 2017. Diagnosing institutional barriers and opportunities for adaptation to climate change. Mitigation and adaptation strategies for global change, 22(5), pp.805-838.
- O'Brien, K., Eriksen, S.E., Schjolden, A. and Nygaard, L.P., 2004. What's in a word? Conflicting interpretations of vulnerability in climate change research. *CICERO Working Paper*.
- Olatumile, A., 2013. Assessment of environmental professional awareness of climate change: Implication for climate change education. *International Education Research*, *1*(3), pp.38-50.
- Oliver, A. and Pearl, D.S., 2018. Rethinking sustainability frameworks in neighbourhood projects: a process-based approach. Building Research & Information, 46(5), pp.513-527.

- Olmstead, S.M., Climate change adaptation and water resource management: a review of the literature. *Energy Economics,* 46, pp. 500–509, 2013.
- Olsson, P., Galaz, V. and Boonstra, W.J., 2014. Sustainability transformations: a resilience perspective. Ecology and Society 19(4):1. http://dx.doi.org/10.5751/ES-06799-190401
- Oppenheim, A.N., 2000. Questionnaire design, interviewing and attitude measurement. Bloomsbury Publishing.
- Ozkan, B.C., 2004. Using NVivo to analyze qualitative classroom data on constructivist learning environments. *The qualitative report*, *9*(4), pp.589-603.
- Ozturk, Z., Arayici, Y., Sharman, H. and Egbu, C.O., 2010. Improving communities through knowledge intensive regeneration-Mediacity. Salford University, Salford, UK.
- Quinlan, A.E., Berbés-Blázquez, M., Haider, L.J. and Peterson, G.D., 2016. Measuring and assessing resilience: broadening understanding through multiple disciplinary perspectives. Journal of Applied Ecology, 53(3), pp.677-687.
- Pahl-Wostl, C., 2007. Transitions towards adaptive management of water facing climate and global change. Water resources management, 21(1), pp.49-62.
- Pahl-Wostl, C., 2009. A conceptual framework for analysing adaptive capacity and multi-level learning processes in resource governance regimes. Global Environmental Change, 19(3), pp.354-365.
- Pahl-Wostl, C., Craps, M., Dewulf, A., Mostert, E., Tabara, D. and Taillieu, T., 2007. Social learning and water resources management. Ecology and society, 12(2).
- Pahl-Wostl, C., Sendzimir, J., Jeffrey, P., Aerts, J., Berkamp, G. and Cross, K., 2007. Managing change toward adaptive water management through social learning. *Ecology and society*, *12*(2).
- Palmer, M.A., Lettenmaier, D.P., Poff, N.L., Postel, S.L., Richter, B. and Warner, R., 2009. Climate change and river ecosystems: protection and adaptation options. Environmental management, 44(6), pp.1053-1068.
- Pan, Y., Birdsey, R.A., Fang, J., Houghton, R., Kauppi, P.E., Kurz, W.A., Phillips, O.L., Shvidenko, A., Lewis, S.L., Canadell, J.G. and Ciais, P., 2011. A large and persistent carbon sink in the world's forests. *Science*, p.1201609.
- Parry, M., Parry, M.L., Canziani, O., Palutikof, J., Van der Linden, P. and Hanson, C. eds., 2007. *Climate change 2007-impacts, adaptation and vulnerability: Working group II contribution to the fourth assessment report of the IPCC* (Vol. 4). Cambridge University Press.

- Paton, D. and Johnston, D., 2017. Disaster resilience: an integrated approach. Springfield, IL: Charles C Thomas Publisher.
- Pecl, G.T., Araújo, M.B., Bell, J.D., Blanchard, J., Bonebrake, T.C., Chen, I.C., Clark, T.D., Colwell, R.K., Danielsen, F., Evengård, B. and Falconi, L., 2017. Biodiversity redistribution under climate change: Impacts on ecosystems and human well-being. Science, 355(6332), p.eaai9214.
- Pelling, M. and Manuel-Navarrete, D., 2011. From resilience to transformation: the adaptive cycle in two Mexican urban centres. Ecology and Society 16(2): 11. [online] URL: http://www.ecologyandsociety.org/vol16/iss2/art11/
- Perry, H., 2013. An approach to assessing the resilience of the water service in England and Wales–Can we answer the question: is the service resilient or brittle? (Doctoral dissertation, University of Birmingham).
- Perrings, C. and Stern, D.I., 2000. Modelling loss of resilience in agroecosystems: rangelands in Botswana. *Environmental and Resource Economics*, *16*(2), pp.185-210.
- Petrescu, D., Petcou, C. and Baibarac, C., 2016. Co-producing commons-based resilience: lessons from R-Urban. *Building Research & Information*, *44*(7), pp.717-736.
- Pham, T.T., Campbell, B.M., Garnett, S., Aslin, H. and Hoang, M.H., 2010. Importance and impacts of intermediary boundary organizations in facilitating payment for environmental services in Vietnam. Environmental Conservation, 37(1), pp.64-72.
- Platts-Fowler, D. and Robinson, D., 2013. Neighbourhood resilience in sheffield: getting by in hard times. Report for Sheffield City Council, Centre for Regional Economic and Social Research.
- Poortinga, W., 2012. Community resilience and health: The role of bonding, bridging, and linking aspects of social capital. Health & place, 18(2), pp.286-295.
- Preston, B. L., Yuen, E. J., & Westaway, R. M. (2011). Putting vulnerability to climate change on the map: a review of approaches, benefits, and risks. *Sustainability Science*, *6*(2), 177-202.
- Reed, M.S., Fraser, E.D. and Dougill, A.J., 2006. An adaptive learning process for developing and applying sustainability indicators with local communities. Ecological economics, 59(4), pp.406-418.
- Reith, A. and Orova, M., 2015. Do green neighbourhood ratings cover sustainability?. Ecological Indicators, 48, pp.660-672.
- Rhodes, R.A.W., 1996. The new governance: governing without government. *Political studies*, *44*(4), pp.652-667.

- Ricart, S., Olcina, J. and Rico, A., 2019. Evaluating public attitudes and farmers' beliefs towards climate change adaptation: Awareness, perception, and populism at European level. Land, 8(1), p.4.
- Roberts, D., 2010. Prioritizing climate change adaptation and local level resilience in Durban, South Africa. Environment and Urbanization, 22(2), pp.397-413.
- Rodriguez, R.S., Ürge-Vorsatz, D. and Barau, A.S., 2018. Sustainable Development Goals and climate change adaptation in cities. Nature Climate Change, 8(3), p.181.
- Rojas Blanco, A.V., 2006. Local initiatives and adaptation to climate change. Disasters, 30(1), pp.140-147.
- Romero-Lankao, P., Bulkeley, H., Pelling, M., Burch, S., Gordon, D.J., Gupta, J., Johnson, C., Kurian, P., Lecavalier, E., Simon, D. and Tozer, L., 2018. Urban transformative potential in a changing climate. Nature Climate Change, 8(9), p.754.
- Roseland, M., 2012. Toward sustainable communities: Solutions for citizens and their governments (Vol. 6). New Society Publishers. Vancouver
- Rydin, Yvonne (2012). "Using Actor-Network Theory to understand planning practice: Exploring relationships between actants in regulating low-carbon commercial development". Planning Theory. 12 (1): 23–45.
- Sapountzaki, K., 2007. Social resilience to environmental risks: A mechanism of vulnerability transfer? Management of Environmental Quality: An International Journal, 18(3), pp.274-297.
- Seidl, R., Rammer, W., & Lexer, M. J. 2011. Climate change vulnerability of sustainable forest management in the Eastern Alps. Climatic Change, 106(2), 225-254.
- Schilderman, T. and Lyons, M., 2011. Resilient dwellings or resilient people? Towards people-centred reconstruction. Environmental Hazards, 10(3-4), pp.218-231.
- Schneider, S.L., 2007, November. Measuring educational attainment in cross-national surveys: The case of the European Social Survey. EDUC workshop of the EQUALSOC network, Dijon.
- Schuldt, J.P. and Pearson, A.R., 2016. The role of race and ethnicity in climate change polarization: evidence from a US national survey experiment. Climatic Change, 136(3-4), pp.495-505.
- Schweber, L., 2013. The effect of BREEAM on clients and construction professionals. Building Research & Information, 41(2), pp.129-145.
- Schwarz, A.M., Béné, C., Bennett, G., Boso, D., Hilly, Z., Paul, C., Posala, R., Sibiti, S. and Andrew, N., 2011. Vulnerability and resilience of remote rural communities to shocks and

global changes: Empirical analysis from Solomon Islands. *Global Environmental Change*, *21*(3), pp.1128-1140.

- Scott, D., McBoyle, G., Minogue, A. and Mills, B., 2006. Climate change and the sustainability of ski-based tourism in eastern North America: A reassessment. Journal of sustainable tourism, 14(4), pp.376-398.
- Sharifi, A., Sustainability at the Neighborhood Level: Assessment Tools and the Pursuit of Sustainability, Diss. Nagoya University, 2013.
- Sharifi, A. and Murayama, A., 2013. A critical review of seven selected neighbourhood sustainability assessment tools. *Environmental Impact Assessment Review*, *38*, pp.73-87.
- Sharifi, A. and Murayama, A., 2014. Neighbourhood sustainability assessment in action: Cross-evaluation of three assessment systems and their cases from the US, the UK, and Japan. Building and Environment, 72, pp.243-258.
- Sharifi, A. and Yamagata, Y., 2014, March. Major principles and criteria for development of an urban resilience assessment index. In *Green Energy for Sustainable Development (ICUE), 2014 International Conference and Utility Exhibition on* (pp. 1-5). IEEE.
- Sharifi, A. and Murayama, A., 2015. Viability of using global standards for neighbourhood sustainability assessment: insights from a comparative case study. *Journal of Environmental Planning and Management*, *58*(1), pp.1-23.
- Sharifi, A. and Yamagata, Y., 2015. A conceptual framework for assessment of urban energy resilience. *Energy Procedia*, *75*, pp.2904-2909.
- Sharifi, A. and Yamagata, Y., 2016. Urban Resilience Assessment: Multiple Dimensions, Criteria, and Indicators. In Urban Resilience (pp. 259-276). Springer, Cham.
- Sharifi, A. and Yamagata, Y., 2018. Resilience-Oriented Urban Planning. In Resilience-Oriented Urban Planning (pp. 3-27). Springer, Cham.
- Shaw, A., Burch, S., Kristensen, F., Robinson, J. and Dale, A., 2014. Accelerating the sustainability transition: Exploring synergies between adaptation and mitigation in British Columbian communities. *Global Environmental Change*, *25*, pp.41-51.
- Slee, S.M., Bowker, S.L., Hamilton, A. and Wilkie, T., 2010. The hive in the cliff: an innovative case study for culturally led, cross-sector approaches to sustainable socio-economic development.
- Simpson, M.C., 2007. An integrated approach to assess the impacts of tourism on community development and sustainable livelihoods. Community development journal, 44(2), pp.186-208.

- Simonsson, L., Swartling, Å.G., André, K., Wallgren, O. and Klein, R.J., 2011. Perceptions of risk and limits to climate change adaptation: Case studies of two Swedish urban regions. In *Climate change adaptation in developed nations* (pp. 321-334). Springer, Dordrecht.
- Singh, A.S. and Masuku, M.B., 2014. Sampling techniques & determination of sample size in applied statistics research: An overview. International Journal of Economics, Commerce and Management, 2(11), pp.1-22.
- Smit, B. and Pilifosova, O., 2003. Adaptation to climate change in the context of sustainable development and equity. Sustainable Development, 8(9), p.9.
- Smit, B. and Wandel, J., 2006. Adaptation, adaptive capacity and vulnerability. *Global environmental change*, *16*(3), pp.282-292.
- Somerville, P., Van Beckhoven, E. and Van Kempen, R., 2009. The decline and rise of neighbourhoods: The importance of neighbourhood governance. *European Journal of Housing Policy*, *9*(1), pp.25-44.
- Spence, A., Poortinga, W., Butler, C. and Pidgeon, N.F., 2011. Perceptions of climate change and willingness to save energy related to flood experience. Nature climate change, 1(1), p.46.
- Stephenson, J., Newman, K. and Mayhew, S., 2010. Population dynamics and climate change: what are the links?. *Journal of Public Health*, *32*(2), pp.150-156.
- Stevenson, F., 2009. Post-occupancy evaluation and sustainability: a review. Proceedings of the Institution of Civil Engineers-Urban Design and Planning, 162(3), pp.123-130.
- Stevenson, F. and Baborska-Narozny, M., 2014. Designing resilient housing for co-evolutionary adaptivity. In Proceedings of 8th Windsor Conference: Counting the cost of comfort in a changing world (pp. 436-445).
- Stevenson, F., Baborska-Narozny, M. and Chatterton, P., 2016. Resilience, redundancy and low-carbon living: co-producing individual and community learning. *Building Research & Information*, *44*(7), pp.789-803.
- Stevenson, F. and Petrescu, D., 2016. Co-producing neighbourhood resilience. Building Research & Information, Vol. 44, No. 7, 695–702
- Sullivan, L.J., Rydin, Y. and Buchanan, C., 2014. Neighbourhood sustainability frameworks-a literature review.
- Swart, R., Robinson, J. and Cohen, S., 2003. Climate change and sustainable development: expanding the options. *Climate Policy*, *3*(sup1), pp.S19-S40.

- Szibbo, N.A., 2016. Assessing neighborhood livability: evidence from LEED® for Neighborhood Development and New Urbanist Communities. *Articulo-Journal of Urban Research*, (14).
- Tanner, T., Lewis, D., Wrathall, D., Bronen, R., Cradock-Henry, N., Huq, S., Lawless, C., Nawrotzki, R., Prasad, V., Rahman, M.A. and Alaniz, R., 2015. Livelihood resilience in the face of climate change. Nature Climate Change, 5(1), p.23.
- Tanner, T., Mitchell, T., Polack, E. and Guenther, B., 2009. Urban governance for adaptation: assessing CC resilience in ten Asian cities. IDS Working Papers, 2009(315), pp.01-47.
- Taylor, A.L., Dessai, S. and de Bruin, W.B., 2014. Public perception of climate risk and adaptation in the UK: a review of the literature. Climate Risk Management, 4, pp.1-16.
- Taylor, R.G., Scanlon, B., Döll, P., Rodell, M., Van Beek, R., Wada, Y., Longuevergne, L., Leblanc, M., Famiglietti, J.S., Edmunds, M. and Konikow, L., 2013. Ground water and climate change. Nature Climate Change, 3(4), p.322.
- Termeer, C.J., Dewulf, A., Breeman, G. and Stiller, S.J., 2015. Governance capabilities for dealing wisely with wicked problems. *Administration & Society*, *47*(6), pp.680-710.
- Thomas, D.S. and Twyman, C., 2005. Equity and justice in climate change adaptation amongst natural-resource-dependent societies. Global environmental change, 15(2), pp.115-124.
- Tompkins, E. and Adger, W.N., 2004. Does adaptive management of natural resources enhance resilience to climate change?. Ecology and Society 9(2): 10. http://www.ecologyandsociety.org/vol9/iss2/art10/
- Tompkins, E.L., Few, R. and Brown, K., 2008. Scenario-based stakeholder engagement: incorporating stakeholders' preferences into coastal planning for climate change. *Journal of environmental management*, *88*(4), pp.1580-1592.
- Tompkins, E.L. and Eakin, H., 2012. Managing private and public adaptation to climate change. Global environmental change, 22(1), pp.3-11.
- Tribbia, J. and Moser, S.C., 2008. More than information: what coastal managers need to plan for climate change? Environmental science & policy, 11(4), pp.315-328.
- Tschakert, P. and Dietrich, K.A., 2010. Anticipatory learning for climate change adaptation and resilience. *Ecology and society*, *15*(2).
- Turner, B.L., Kasperson, R.E., Matson, P.A., McCarthy, J.J., Corell, R.W., Christensen, L., Eckley, N., Kasperson, J.X., Luers, A., Martello, M.L. and Polsky, C., 2003. A framework for

vulnerability analysis in sustainability science. *Proceedings of the national academy of sciences*, *100*(14), pp.8074-8079.

- Turner Ii, B.L., 2010. Vulnerability and resilience: Coalescing or paralleling approaches for sustainability science?. *Global Environmental Change*, *20*(4), pp.570-576.
- Tyler, S. and Moench, M., 2012. A framework for urban climate resilience. *Climate and development*, *4*(4), pp.311-326.
- Uda, M., 2016. *Sustainable and Resilient Neighbourhood Design* (Doctoral dissertation).
- Uda, M. and Kennedy, C., 2015. A framework for analysing neighbourhood resilience. Proceedings of the Institution of Civil Engineers-Urban Design and Planning, 168(3), pp.129-145.
- Uitto, J.I. and Shaw, R., 2006. Adaptation to changing climate: promoting community-based approaches in the developing countries.
- Urwin, K. and Jordan, A., 2008. Does public policy support or undermine climate change adaptation? Exploring policy interplay across different scales of governance. *Global environmental change*, *18*(1), pp.180-191.
- Van Aalst, M.K., Cannon, T. and Burton, I., 2008. Community level adaptation to climate change: the potential role of participatory community risk assessment. Global environmental change, 18(1), pp.165-179.
- Vella, K., Dale, A., Cottrell, A. and Gooch, M., 2012. Assessing community resilience to climate change. In:12 International Coral Reef Symposium. Cairns, p.5.
- Vignola, R., Locatelli, B., Martinez, C. and Imbach, P., 2009. Ecosystem-based adaptation to climate change: what role for policy-makers, society and scientists? Mitigation and adaptation strategies for global change, 14(8), p.691.
- Vincent, K., 2007. Uncertainty in adaptive capacity and the importance of scale. *Global Environmental Change*, *17*(1), pp.12-24.
- Viscusi, W.K. and Hersch, J., 2005. The Generational Divide in Support for Climate Change Policies: European Evidence. *Harvard Law and Economics Discussion Paper*, (504).
- Vogel, C., Moser, S. C., Kasperson, R. E., & Dabelko, G. D. 2007. Linking vulnerability, adaptation, and resilience science to practice: Pathways, players, and partnerships. *Global environmental change*, *17*(3), 349-364.
- Vörösmarty, C.J., Green, P., Salisbury, J. and Lammers, R.B., 2000. Global water resources: vulnerability from climate change and population growth. *Science*, *289*(5477), pp.284-288.

- Wall, E. and Smit, B., 2005. Climate change adaptation in light of sustainable agriculture. *Journal of sustainable agriculture*, *27*(1), pp.113-123.
- Walker, B., Carpenter, S., Anderies, J., Abel, N., Cumming, G., Janssen, M., Lebel, L., Norberg, J., Peterson, G.D. and Pritchard, R., 2002. Resilience management in social-ecological systems: a working hypothesis for a participatory approach. *Conservation ecology*, *6*(1).
- Walker, B., Holling, C.S., Carpenter, S.R. and Kinzig, A., 2004. Resilience, adaptability and transformability in social–ecological systems. Ecology and Society 9(2): 5. [online] URL: http://www.ecologyandsociety.org/vol9/iss2/art5
- Wamsler, C., Brink, E. and Rantala, O., 2012. Climate change, adaptation, and formal education: the role of schooling for increasing societies' adaptive capacities in El Salvador and Brazil. *Ecology and Society*, *17*(2).
- Welsh, E., 2002, May. Dealing with data: Using NVivo in the qualitative data analysis process. In Forum Qualitative Sozialforschung/Forum: Qualitative Social Research (Vol. 3, No. 2).
- Westman, L., 2017. Top-Down, Bottom-Up and Beyond: Governance Perspectives on Urban Resilience and Environmental Justice in the People's Republic of China. In Environmental Justice and Urban Resilience in the Global South (pp. 17-35). Palgrave Macmillan, New York.
- White, G.F., 2000. *The hidden costs of coastal hazards: Implications for risk assessment and mitigation*. Island Press. H. John Heinz III Center for Science, Economics, the Environment. Panel on Risk, the True Costs of Coastal Hazards, 2000. The hidden costs of coastal hazards: Implications for risk assessment and mitigation. Island Press.
- Wilder, M., Scott, C.A., Pablos, N.P., Varady, R.G., Garfin, G.M. and McEvoy, J., 2010. Adapting across boundaries: climate change, social learning, and resilience in the US–Mexico border region. *Annals of the Association of American Geographers*, *100*(4), pp.917-928.
- Williams, S.E., Shoo, L.P., Isaac, J.L., Hoffmann, A.A. and Langham, G., 2008. Towards an integrated framework for assessing the vulnerability of species to climate change. *PLoS biology*, *6*(12), p.e325.
- Winner, L. (1993). "Upon Opening the Black Box and Finding It Empty: Social Constructivism and the Philosophy of Technology Science, Technology, & Human Values" (Vol. 18, pp. 362-378).

- Wisdom, J. and Creswell, J.W., 2013. Mixed methods: integrating quantitative and qualitative data collection and analysis while studying patient-centered medical home models. Rockville: Agency for Healthcare Research and Quality.
- Yaneva, Albena (2009). "Making the Social Hold: Towards an Actor-Network Theory of Design". Design and Culture. 1 (3).
- Yigitcanlar, T. and Dur, F., 2010. Developing a sustainability assessment model: The sustainable infrastructure, land-use, environment and transport model. Sustainability, 2(1), pp.321-340.
- Yin, R.K., 1999. Enhancing the quality of case studies in health services research. Health services research, 34(5 Pt 2), p.1209.
- Zainal, Z., 2007. Case study as a research method. Jurnal Kemanusiaan, (9), pp.1-6.
- Zautra, A., Hall, J. and Murray, K., 2008. Community development and community resilience: An integrative approach. Community Development, 39(3), pp.130-147.
- Zheng, H.; Shen, G.; Sun, Y.; Hong, J. Neighborhood sustainability in urban renewal: An assessment framework. Environ. Plan. B 2017, 44, 903–924
- Zheng, H.W., Shen, G.Q., Song, Y., Sun, B. and Hong, J., 2017. Neighborhood sustainability in urban renewal: An assessment framework. Environment and Planning B: Urban Analytics and City Science, 44(5), pp.903-924.

Websites

- (http://www.breeam.com/communities)
- (http://www.breeam.com/communities)
- (http://www.bre.co.uk/filelibrary/pdf/Brochures/The_case_for_BREEAM_Communities.pdf
- (http://www.wsp-pb.com/Globaln/UK/WSPPB%20Biodiversity%20whitepaper.pdf)
- (http://www.undp.org/content/dam/undp/library/corporate/brochure/SDGs_Booklet_Web_En.pdf)
- (http://www.mediacityuk.co.uk/space/sustainability)
- (http://www.skyscrapercity.com/showthread.php?t=1476319&page=2)
- (www.mediacityuk.co.uk)
- (www.mediacityuk.co.uk)
- (https://upload.wikimedia.org/wikipedia/commons/2/25/MediaCityUK_aerial_view_April_2011.jpg)
- (http://www.jtp.co.uk/projects/urridaholt).
- (http://www.jtp.co.uk/projects/urridaholt)
- (http://www.breeam.com/case-study-urridaholt-gardabaer-iceland)
- (http://www.breeam.com/case-study-urridaholt-gardabaer-iceland)
- (http://www.jtp.co.uk/cms/pdfs/Urridaholt.pdf).
- (http://www.breeam.com/case-study-urridaholt-gardabaer-iceland).
- (http://www.jtp.co.uk/projects/urridaholt)

Appendix

Appendix A

Initial Interviews

Points from the interview with BRE director are:-

Governance & role of Local authority:

When it comes to the engagement of the local authority, for instance with local planning authority, the connection with the sustainability stakeholders is happening as a separate process in linkage with the community participation. That the local planning authority would have to make sure that the community engagement is proportional, yet still not as detailed and prescribed process. For BREEAM COMMUNITIES team, there is information on the link between the authority and the developer, but no information on the link between the local authority and community engagement process.

Understanding and the inclusion of climate change impacts:

In relation to adaptation to climate change issue, for BREEAM COMMUNITIES, this considers as a part of the story, in line with other issues. So, the planners' authority are having the main role in dealing with this adaptation process based on reports from local government association and other local studies from other departments such as housing. However, the climate change considers as important matter, in dealing with different development context, new community development, re-use and refurbishment. The adaptation plans are imbedded with other categories or indicators of BREEAM COMMUNITIES, there is no need to name them as climate adaptation indicators. And in linkage to adaptation to climate change, it can be found that in BREEAM COMMUNITIES, issues as infrastructure, density, urban heat, …etc. are all be treated with a way that can adopt climate adaptation principles. However, making all the required indicators that associate with climate change adaptation as mandatory indicators will cause to push the developer away. Because the developer will find the tool as too complicated or too expensive .And the aim of the tool design to make as flexible as possible. Moreover, other issues as health, economic crisis and others are found to me important to consider in some decisions context more than climate change if we can say this.

Also, one important point should be mentioned is that in the context of the need to really deep evaluation process and in cases of climate sensitive projects, may be the need will be here to adopt a more sophisticated tools to face the adaptation challenges. Because, in the context of BREEAM COMMUNITIES, if there are available information on the location of the development, this will change the assessment process and the rating issue as well.

So, BREEAM COMMUNITIES can be of value to climate change adaptation, but yet there is still no available other tools for climate change adaptation that existed to be integrated with it, or others. Maybe in the US, there is more familiarity with the existence of other tools for climate change adaptation.

In regards to the context of Media City project, and with regarding to its scale, there is definitely no adaptation plan for these projects, but it's directed to whole Salford city.

Finally, it should be said, that there is still no enough recourses to make BREEAM COMMUNITIES cover the various climate areas in the same country or others in regarding to the climate impacts of that area and how to adapt to it with an accurate way. It is still needs a work on this issue, particularly regarding the linking the assessment process with the geographical areas and their impacts with organized and accurate process.

- *Learning and education:*

There is still no potentials that available to consider teach people or making them more aware about their environment. However, there is a question if BREEAM COMMUNITIES involvement process can be as learning process for the various participants. But, when it comes to the local community education or learning, this is not a part of the tool agenda.

And if some of the local community is having strong opinions about the environment based on their knowledge on the environment, they can campaign against the developer.

Long-term management:

Mainly for the water issues, the focus is not only on the water supply, but on other issues, however it is not clear why the focus on wastewater management is less than others, but sometimes this belongs to the paced regulation of the UK or the UK scheme and felt no additions are needed. While in the case of adopting BREEAM COMMUNITIES internationally, this will be done through bespoke process. But, with LEED-ND this issue can be lighter as each

state has its own regulation, and generally these regulations are lighter than the existed regulation in the European countries' context.

For community management of facilities, it's not a required issue, it's optional. There is a need to study the BREEAM COMMUNITIES development and search the problems that happen after the delivery. Usually the developers are the one who ask if there is a need to post occupancy reports. But usually monitoring is not a required issue. But maybe for some countries, it's the local authority to have a longer relationship with the occupants to evaluate the performance of the development or the buildings. But this is unusual process.

In England, annual monitoring has been implemented or considered until 2010, but this issue has been cancelled recently. So, no monitoring is required, but is not happening.

- *Local community participation:*

Regarding the community participation, this issue is regarded as a very important issue in BREEAM COMMUNITIES, and in the training courses of this tool, community consultation, engagement and management as can be seen in the tool's manual are essential for the application of this tool. However, in practice the application of these three categories is depending on the circumstances of each development. The importance of the community participation lies in the significance of the local community role and their knowledge of the place more than the designers, developers and consultants.

In Media City, the use of BREEAM COMMUNITIES was in addressing whether if the developers have achieved the requirements that were/ are mentioned in BREEAM COMMUNITIES pilot to get the certification.

Further, design team consultants should follow the practice of community engagement, which BREEAM COMMUNITIES is not who invents this issue, but there are community organisations which can decide the community engagement issues and what is better for them. Yet, planners, designers and consultants teams should hold workshops to make the community as part of the consultation phases, and it is important for them to access the various community groups and to talk to them about the used measures in the development, and how these measure can be fitted.

But, as in the real life and in practice, the planning process is a democratic process, and the people involvement is happening through formal planning sessions or through elected representatives. So, the challenges id still difficult in making the development process as bottom-up process. Also, the economic makes these challenges to lead this case.

Therefore, the context is not as what is happening in some European countries, that the local communities is saying what their needs is in the development process or if they have a choice in picking the developers.

Development stages and sustainability assessment process: BC as an Iintermediary party

The role of the BC actors is as intermediary party between the developer and the local authority, in relation to BREEAM COMMUNITIES, especially that the assessors are independent party, and still needs proof from the local authority and also from the developer.

Also as the assessors are independent people, it's not their responsibility to be in direct contact with local community during the decision making process. The people that can deal with local community are either engagement consultants or they are developer's employee. Sometimes, the developers can hire consultations or specialists that can do the design, engineering, engagement issues, and all other needed surveys for the development. For the various stages as design, implementation and facilities management, climate change is a factors or issue among other things, because BREEAM COMMUNITIES is a broad method, and it covers poverty, health, security and other issues.

Sustainability advisor & energy consultant/ Media City few points:

In Media City, sustainable design approach pushed design beyond 'normal' levels,

- BREEAM COMMUNITIES is considered 'Quite Good' as a mean of adaptation to climate change, however it still needs to avoid being too specific and encourage strategic approaches

- Media City/UK is an exemplar of BREEAM Communities as it has embodied BREEAM principles from the outset - to achieve a truly leading-edge modern low carbon and environmentally friendly city,

- It has mentioned that the use of the BREEAM Communities assessment system in Media City was a very useful tool which helped direct the design team and developer toward all of the key issues resulting in an excellent outcome for the community as a whole.

- The consultation and the engagement of the local community in the decision making process was so important and vital for the development.

- For long term risks assessment, an absolute requirement for developers to undertake a long term flood risk assessment as a basic compliance item and implementation of recommended measures is required (just to pass).

- BREEAM Communities, or equivalent targets for developments, is actually enforced, and monitored afterwards, the majority of developers will only ever pay lip service.

Appendix B

1. Ethics Approval & Questionnaire

WELSH SCHOOL OF ARCHITECTURE
ETHICS APPROVAL FORM FOR STAFF AND PHD/MPHIL PROJECTS

Tick one box:	☐ STAFF ☑ PHD/MPHIL
Title of project:	Using BREEAM COMMUNITIES assessment tool to explore the ways of enhancing adaptation to climate change in the neighbourhood development process.
Name of researcher(s):	Sally Naji
Name of principal investigator	Dr. Julie Gwilliam Dr. Joanne Paterson
Contact e-mail address:	najiSA@cardiff.ac.uk
Date:	10/10/2016

Participants		**YES**	**NO**	**N/A**
Does the research involve participants from any of the following groups?	• Children (under 16 years of age)		√	
	• People with learning difficulties		√	
	• Patients (NHS approval is required)		√	
	• People in custody		√	
	• People engaged in illegal activities		√	
	• Vulnerable elderly people		√	
	• Any other vulnerable group not listed here		√	
• When working with children: I have read the Interim Guidance for Researchers Working with Children and Young People (http://www.cardiff.ac.uk/archi/ethics_committee.php)				

Consent Procedure	**YES**	**NO**	**N/A**
• Will you describe the research process to participants in advance, so that they are informed about what to expect?	√		
• Will you tell participants that their participation is voluntary?	√		
• Will you tell participants that they may withdraw from the research at any time and for any reason?	√		
• Will you obtain valid consent from participants? (specify how consent will be obtained in Box A)[6]	√		
• Will you give participants the option of omitting questions they do not want to answer?	√		
• If the research is observational, will you ask participants for their consent to being observed?	√		
• If the research involves photography or other audio-visual recording, will you ask participants for their consent to being photographed / recorded and for its use/publication?	√		

Possible Harm to Participants	**YES**	**NO**	**N/A**
• Is there any realistic risk of any participants experiencing either physical or psychological distress or discomfort?		√	
• Is there any realistic risk of any participants experience a detriment to their interests as a result of participation?		√	

Data Protection	**YES**	**NO**	**N/A**

[6] If any non-anonymous and/or personalised data be generated or stored, *written consent* is required.

• Will any non-anonymous and/or personalised data be generated or stored?			√	
• If the research involves non-anonymous and/or personalised data, will you:	• gain written consent from the participants	√		
	• allow the participants the option of anonymity for all or part of the information they provide	√		

Health and Safety	**YES**	
Does the research meet the requirements of the University's Health & Safety policies? (http://www.cf.ac.uk/osheu/index.html)	√	

Research Governance	**YES**	**NO**	**N/A**
Does your study include the use of a drug? You need to contact Research Governance before submission (resgov@cf.ac.uk)		√	
Does the study involve the collection or use of human tissue? You need to contact the Human Tissue Act team before submission (hta@cf.ac.uk)		√	

Box A **The Project** (provide all the information listed below in a separate attachment)

1. **Consent and participation information arrangements - please attached consent forms if they are to be used**

The proposed study doesn't represent a real risk to the participant whether to professionals or the local community. The questionnaire only constitutes points that are associated with getting information on understanding climate change impacts in the selected case study, and associated adaptation activities and policies. The research mainly aims to understand the perceptions and attitudes of various professionals and local community towards the adaptation to climate change in the sustainability context. This issue will be investigated in in the physical (water facilities and services) and social (people perceptions and attitudes towards the adaptation) context. So, there will be no sensitive data required from the participants' that might affect the participants' psychological conditions, and cause any kind of anxiety or depression. Further, the information in the questions are direct and will mislead the participant. It should be mentioned that the emails have been sent to the potential professionals and they agreed to participate.

For more information on the questionnaire, I have attached with this document the Professionals questionnaire to further illustrate the questions nature.

Signed: Sally Naji

Date: 10/10/2016

2. **A clear and concise statement of the ethical considerations raised by the project and how is dealt with them**

   The personal information provided from the professionals or local community such as their names, address…etc. will not be used in the research for any reason.

3. **Estimated start date and duration of project**

   I'm planning to send the questionnaire straightway after getting the approval from the School Research Ethics Committee.

All information must be submitted along with this form to the School Research Ethics Committee for consideration

esearcher's declaration (tick as appropriate)	
• I consider this project to have **negligible ethical implications** (*can only be used if none of the grey areas of the checklist have been ticked*).	√
• I consider this project research to have **some ethical implications**.	
• I consider this project to have **significant ethical implications**	

Signature Sally	**Name** Sally Naji	**Date** **10/10** **/2016**
Researcher or MPhil/PhD student		
Signature	**Name** Dr. Julie Gwilliam Dr. Jo Patterson	**Date**
Lead investigator or supervisor	GwilliamJA@cardiff.ac.uk	

Advice from the School Research Ethics Committee

STATEMENT OF ETHICAL APPROVAL		
This project had been considered using agreed Departmental procedures and is now approved		
Signature	**Name**	**Date**
Chair, School Research Ethics Committee		

Dear Sir/Madam,

I hope you are doing well.

My name is Sally Naji and I'm a third year PhD student in the Welsh School of Architecture. My PhD topic is entitled ''*Neighbourhood Sustainability Assessment Tools and Their Use in Building Adaptive Capacity to Climate Change*''.

The aim of this study is to better understand how the assessment tools- in particular BREEAM Communities tool as a chosen case study- has influenced the neighbourhood development with respects to adaptation to climate change. To understand how the BREEAM Communities tool influences neighbourhood development it is important to receive feedback from different professionals involved in the planning, development and those living. The questionnaire aims to understand the perceptions and attitudes of various professionals towards the adaptation to climate change in the sustainability context.

We hope that you help with this research by filling the questionnaire which will be send to you after your agreement to participate.

The questionnaire will take about 15-20 minutes of your time.

Your participation in this project is entirely voluntary and you can withdraw from the study at any time. If you would like to receive the results of the survey you can write down your contact information at the end of the questionnaire.

This information that you provide will be totally confidential and will not be shared with other parties or used for other purposes other than this research. The survey has been approved by the Research Ethics Committee of the Welsh School of Architecture (reference number)

Thank you very much in advance for your help.

Sally Naji
Welsh School of Architecture
Cardiff University Bute Building, King Edward VII Avenue
Cardiff, Wales, CF10 3NB
Email: xxxxxxxxx

2. Experts Questionnaire

Producing Sustainable Neighbourhoods _ MediaCity case study_ Professionals Perceptions Analysis

Dear Participant:
This questionnaire is part of a PhD study focusing on Media City as sustainable neighbourhoods. A special tool, BREEAM Communities, was used during the development process.
To understand how the BREEAM Communities tool influences neighbourhood development it is important to receive feedback from different professionals involved in the design and development those living. This questionnaire aims to understand the perceptions and attitudes of various professionals towards the adaptation to climate change in the sustainability context.

Climate change will limit abilities to achieve sustainable development pathways, and therefore it is important to enable appropriate adaptation in the physical and social contexts. For example, in terms of physical adaptation this will require the capability of water facilities and services to adapt to climate change and risks. While in the social adaptation this will require addressing how the stakeholders can collaborate and learn from each other to make decisions that affect water adaptation process.

It should take 15-20 mins of your time to complete. Your kind support to this research is greatly appreciated.

1. QUESTION _ One: What gender are you? Please tick the relevant * response Required

- ◯ Male
- ◯ Female

2. QUESTION _ Three: What is your occupation? Please tick more than one response if appropriate. Required

- ◯ Architect
- ◯ Assessor
- ◯ Urban Planner
- ◯ Developer
- ◯ Professional Engineer
- ◯ Water Engineer
- ◯ University Academics
- ◯ City Council

3. Question _ Five : How long have you participated in the Media City project? Please tick the relevant response. Required *

- ◯ I'm still working with this project
- ◯ Less than 6 months
- ◯ Between 6 months and 1 year
- ◯ Between 1 year to 2 years
- ◯ More than 2 years
- ◯ I didn't participate in this project

4. QUESTION Seven: Which of the following do you think will affect the UK as a consequence of climate change? You can choose more than one. Required *

- ◯ Temperature Changes
- ◯ Precipitation Changes
- ◯ Sea levels Rise Changes
- ◯ Increasing Intensity and Frequency of Extreme Weather Events
- ◯ Floods Risks
- ◯ Drought Risks

5. QUESTION Eight: Please, Identify to what extent the following climate change impacts are likely to have direct effects on the water infrastructure? Tick one box on each line.

	Low Extent	Moderate Extent	Great Extent	Very Great Extent	I do not Know
Temperature Changes	○	○	○	○	○
Precipitation Changes	○	○	○	○	○
Sea Level Changes	○	○	○	○	○
Increasing Intensity and Frequency of Extreme Weather Events	○	○	○	○	○
Flood Risks	○	○	○	○	○
Drought Risks	○	○	○	○	○

6. QUESTION Nine: To what extent do you think that adaptation to climate change is important at the neighbourhood/community scale? Please select one option. Required

- ○ Very important
- ○ Important
- ○ Not that Important
- ○ Not Important at all
- ○ I do not know

7. QUESTION Ten: To the best of your knowledge, who are the main party/parties that have responsibility for initiating/addressing climate change adaptation measures? You can select more than one. Required

- ○ A. Municipal governmental organisations
- ○ B. Non-governmental Organisations
- ○ C. Climate Change Institutions
- ○ D. BREEAM COMMUNITIES
- ○ E. Universities/Research organisations

8. QUESTION Eleven: To the best of your knowledge, what strategies are there currently in place to ensure the effective Community adaptation to climate change impacts? You can choose more than one option. Required

- A. Integration of climate change impacts into water resource management
- B. Collaboration of different sectors to ensure effective response since water resources are utilized by numerous sectors
- C. Improved Research on Climate Change Adaptation
- D. Community Participation
- E. Development of Sustainability Assessment tools/ BREEAM Communities

9. QUESTION Fifteen: To what extent do you agree with the statement "BREEAM COMMUNITIES needs to increase its focus on climate change adaptation issues by increasing the number of "Indicators"?

- Strongly Agree
- Agree
- Neither Agree or Disagree
- Disagree
- Strongly Disagree

10. QUESTION Sixteen: Which of the following points do you think need more Focus/consideration in BREEAM COMMUNITIES? You can choose more than one option. Required

- A. Objectives of the adaptation- the objectives of adaptation mean here addressing climate change as a leading environmental issue
- B. Resilience targets - resilience means long term sustainability
- C. Data availability and quality
- D. Level of accuracy
- E. Integration of short term and long term horizons in the plans

11. QUESTION Seventeen: What are the main sources for climate change information for community scale projects, such as Media City during the decision making? You can choose more than one option.Required

- A. Government Agencies
- B. Non Governmental organisations
- C. International Information
- D. Climate Change Institutions
- E. BREEAM COMMUNITIES tool
- F. No specific sources of climate change information

12. QUESTION Twenty Six: How much do you agree or disagree with the availability of following options regarding the issues that associate with actors management process when BREEAM Communities is applied? ?Please tick one box for each point. Required

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree	I do not Know
A. Identification of professionals and their responsibilities in the decision making	○	○	○	○	○	○
B. Provision of High degree of Collaboration among the various stakeholders such as climatologists, hydrologists, water engineers, designers, developers and others	○	○	○	○	○	○
C. Facilitate the connection between the local community and other professionals	○	○	○	○	○	○
D. Availability of climate information for the various stakeholders and provision of access to this information when need	○	○	○	○	○	○
E. openness through discussions and meetings among local community and professionals to understand the planning issues regarding water management	○	○	○	○	○	○

13. QUESTION Twenty Seven: In the context of applying risk assessment and management plans with BREEAM Communities, how much do you agree or disagree with each of the following statements? Please tick one box for each point.

	Strongly disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree	I do not know
A. Preparation of Water Supply emergency plans for use during risks times	○	○	○	○	○	○
B. Clear Plan for Sewage utilities maintenance	○	○	○	○	○	○
C. Adequate focus on flood risks assessment and the use of practical indicators	○	○	○	○	○	○
D. Focus on integrating Human health with water risks in specified strategies and categories	○	○	○	○	○	○
E. Flood Management plan that has efficiently addressed the linkage with projected climate impacts in the long term	○	○	○	○	○	○

14. Question Twenty Nine: As you have become involved in Media City project. Please Identify to what extent the following strategies are considered for the natural/human-made water resources context?

	Highly Considered	Moderately Considered	Slightly Considered	Not at all considered	I do not know
A. Using diverse strategies for ensuring flexible and functional system components for water supply management	○	○	○	○	○
B. Sufficient focus on using various water harvesting equipment for water supply	○	○	○	○	○
C. Efficient waste water management plans	○	○	○	○	○
D. Wastewater reclamation in facilities using local collection and treatment	○	○	○	○	○
E. The existence of management for sanitation facilities	○	○	○	○	○
F. Vital ecology strategy that has addressed the ecological impact assessment and ecological protection mechanisms	○	○	○	○	○

15. QUESTION Thirty: To the best of your knowledge, how often do you think sustainability tools such as BREEAM Communities when applied, are influencing the learning process and level of awareness among the varied actors, throughout the selected options? Please tick one box for each point.

	Never	Sometimes	Often	Quite Often	I do not know
A. Organise workshops and meetings among the water experts and climate scientists and local community to promote effective communication	○	○	○	○	○
B. Address the feedback among local community and experts using easy translation language and simple communication methods	○	○	○	○	○
C. Training/programs for in service training of staff/experts in water resources management	○	○	○	○	○
D. Continuous Evaluation of the Decisions and methods used	○	○	○	○	○
E. Continuous Monitoring & Re-evaluation reports to follow up the participation and communication of actors	○	○	○	○	○
F. Establishing an educational component to participation	○	○	○	○	○

16. QUESTION Thirty three: Please indicate the extent to which the following aspects have been delivered as outputs of the MediaCity poject? Tick one box for each point

	Not that well delivered	Well Delivered	Very Well Delivered	I do not Know	
A. Community responsibility towards using the water resources	○	○	○	○	○
B. More collaborative thinking among the local community when problems occur regarding the climate change impacts	○	○	○	○	○
C. Sufficient amounts of good quality freshwater available for occupants usage	○	○	○	○	○
D. Occupants Capability to understand the physical applied outcomes (water facilities in buildings)	○	○	○	○	○
E. Mechanisms for receiving technical support for the water facilities and services after the occupancy stage	○	○	○	○	○
F. Providing Public health Surveillance for the facilities and community	○	○	○	○	○
G. Long term efficiency of the water fixtures at the neighbourhood scale	○	○	○	○	○

17. QUESTION Thirty Four: To the best of your knowledge, Does BREEAM Communities need more focus to address the following issues for long term adaptation in the water sector?

	No extent at all	Low extent	Moderate Extent	High extent	I do not know
A. Providing and accessing long term information regarding climate change impacts that are used by various social networks	○	○	○	○	○
B. Ability of the local community to access the risks information when risks occur	○	○	○	○	○
C. Organising monitoring reports after the occupancy stage	○	○	○	○	○
D. Inclusion of plans for health surveillance issue as available indicators, to be monitored and evaluated after occupancy stage	○	○	○	○	○

Thank You for your time!

Appendix C

Results / Questionnaire

Q: 7)

Options	N	Mean
Temperature Changes effects	13	0.38
Precipitation Changes effects	13	0.54
Sea Level Rise effects	13	0.38
Extreme Weather events	13	0.77
Flood Risks effects	13	0.54
Drought Risks effects	13	0.54
Valid N (listwise)	13	

Participants		Temperature Changes effects	Precipitation Changes effects	Sea Level Rise effects	Extreme Weather events	Flood Risks effects	Drought Risks effects
Architect	Mean	0.00	0.00	0.00	1.00	0.00	0.00
	N	2	2	2	2	2	2
Assessor	Mean	0.33	0.33	0.33	0.33	0.33	0.33
	N	3	3	3	3	3	3
Urban Planner	Mean	1.00	1.00	1.00	1.00	1.00	1.00
	N	1	1	1	1	1	1
Developer/Manager	Mean	1.00	1.00	1.00	1.00	1.00	1.00
	N	2	2	2	2	2	2
Professional Engineer	Mean	0.50	0.50	0.50	0.50	0.50	0.50
	N	2	2	2	2	2	2
Water Engineer	Mean	0.00	0.50	0.00	1.00	0.50	0.50
	N	2	2	2	2	2	2
City Councillor	Mean	0.00	1.00	0.00	1.00	1.00	1.00
	N	1	1	1	1	1	1
Total	Mean	0.38	0.54	0.38	0.77	0.54	0.54
	N	13	13	13	13	13	13

Q: 8)

Options	N	Mean
Temperature Changes _Water Infrastructure	13	2.46
Precipitation Changes _ Water Infrastructure	13	2.92

Sea Level Rise	12	2.42
Extreme Weather Events_ Water Infrastructure	13	3.31
Flood Risks _Water Infrastructure	13	3.31
Drought Risks _ Water Infrastructure	13	2.85
Valid N (listwise)	12	

Q:9)

Descriptive Statistics			
point	N	Mean	Std. Deviation
Importance of CCA_ Community Scale	13	4.00	0.913
Valid N (listwise)	13		

Participants	Mean	N
Architect	3.50	2
Assessor	4.67	3
Urban Planner	5.00	1
Developer/Manager	5.00	2
Professional Engineer	3.50	2
Water Engineer	3.00	2
City Councillor	3.00	1
Total	4.00	13

Q: 10)

Descriptive Statistics			
Options		N	Mean
A	Municipal Government _ CCA	13	0.69
B	Non-Government Organisations _CCA	13	0.23
C	CC Institutions _CCA	13	0.15

D	Sustainability Assessment Tools_ CCA	13	0.08
E	Academic Organisations_ CCA	13	0.38
	Valid N (listwise)	13	

Q: 11)

		N	Mean
A	Integration_ CCI_WRM	13	0.62
B	Collaboration_ Sectors	13	0.38
C	Improved Research_ CCA	13	0.15
D	Community Participation	13	0.08
E	Sustainability Assessment Tools	13	0.38
	Valid N (listwise)	13	

Participants		Municipal Government _ CCA	Non-Government Organisations _CCA	CC Institutions _CCA	Sustainability Assessment Tools_ CCA	Academic Organisations_ CCA
Architect	Mean	0.00	0.00	0.00	0.00	0.00
	N	2	2	2	2	2
Assessor	Mean	1.00	0.67	0.33	0.00	1.00
	N	3	3	3	3	3
Urban Planner	Mean	1.00	1.00	0.00	0.00	1.00
	N	1	1	1	1	1
Developer/ Manager	Mean	0.50	0.00	0.00	0.50	0.00
	N	2	2	2	2	2
Professional Engineer	Mean	1.00	0.00	0.50	0.00	0.50
	N	2	2	2	2	2
Water Engineer	Mean	0.50	0.00	0.00	0.00	0.00
	N	2	2	2	2	2
City Councillor	Mean	1.00	0.00	0.00	0.00	0.00
	N	1	1	1	1	1
Total	Mean	0.69	0.23	0.15	0.08	0.38
	N	13	13	13	13	13

Q: 16)

Descriptive Statistics			
Options		N	Mean
A	BC _Objectives of Adaptation	13	0.08
B	BC _ Resilience targets	13	0.38
C	BC_ Existing indicators	13	0.08
D	BC_ Data availability & quality	13	0.15
E	BC_ Accuracy Level	13	0.15
F	BC_ Short & Long term _ Planning	13	0.31

Q: 17)

Options		N	Mean
A	Government Agencies _CC	13	0.38
B	Non -Governmental organisations _CC	13	0.31
C	International Organisations _CC	13	0.00
D	Climate change institutions _CC	13	0.15
E	BC _CC	13	0.23
	Valid N (listwise)	13	

Participants		Government Agencies _CC	Non-Governmental organisations _CC	International Organisations _CC	Climate change institutions _CC	BC _CC
Architect	Mean	0.00	0.50	0.00	0.00	0.50
	N	2	2	2	2	2
Assessor	Mean	1.00	0.67	0.00	0.33	0.00
	N	3	3	3	3	3
Urban Planner	Mean	1.00	0.00	0.00	0.00	0.00
	N	1	1	1	1	1
Developer/ Manager	Mean	0.00	0.50	0.00	0.00	0.50
	N	2	2	2	2	2
Professional Engineer	Mean	0.00	0.00	0.00	0.00	0.00
	N	2	2	2	2	2
Water Engineer	Mean	0.50	0.00	0.00	0.50	0.00
	N	2	2	2	2	2
City Councillor	Mean	0.00	0.00	0.00	0.00	1.00
	N	1	1	1	1	1
Total	Mean	0.38	0.31	0.00	0.15	0.23
	N	13	13	13	13	13

Q: 26)

Options		N	Mean
A	BC _Experts Identification_ Responsibility	13	3.31
B	BC _Experts Collaboration	13	3.15
C	BC_ Experts & Local Community Connection	13	3.00
D	BC_ Information Availability_ Actors	13	3.15
E	BC _ Openness_ Discussions	13	2.92
	Valid N (listwise)	13	

Participants		BC _Experts Identification_ Responsibility	BC _Experts Collaboration	BC _ Experts & Local Community Connection	BC_ Information Availability_ actors	BC _ Openness_ Discussions
Architect	Mean	4.50	4.50	4.00	4.00	4.00

	N	2	2	2	2	2
Assessor	Mean	2.67	2.33	2.67	2.67	2.33
	N	3	3	3	3	3
Urban Planner	Mean	0.00	0.00	0.00	0.00	0.00
	N	1	1	1	1	1
Developer/ Manager	Mean	4.50	4.50	4.50	4.00	3.50
	N	2	2	2	2	2
Professional Engineer	Mean	3.00	3.00	3.00	3.00	3.00
	N	2	2	2	2	2
Water Engineer	Mean	4.00	3.00	3.00	3.50	4.00
	N	2	2	2	2	2
City Councillor	Mean	3.00	4.00	2.00	4.00	2.00
	N	1	1	1	1	1
Total	Mean	3.31	3.15	3.00	3.15	2.92
	N	13	13	13	13	13

Q: 27)

Options		N	Mean
A	Preparation _Water Supply_ Management	13	3.08
B	Sewerage Utilities_ Maintenance	13	3.23
C	Focus_ Risks Assessment_ Indicators	13	3.46
D	Focus_ Water Risks_ Human Health_ Indicators	13	3.15
E	Flood Management_ Linkage_ CC projection	13	3.23
	Valid N (listwise)	13	

Participants		Preparation _Water Supply_ Management	Sewerage Utilities_ Maintenance	Focus_ Risks Assessment Indicators	Focus_ Water Risks_ Human Health_ Indicators	Flood Management_ Linkage_ CC
Architect	Mean	4.50	4.50	5.00	4.00	4.00
	N	2	2	2	2	2
Assessor	Mean	1.67	1.67	2.33	1.67	2.67
	N	3	3	3	3	3
Urban Planner	Mean	0.00	0.00	0.00	0.00	0.00
	N	1	1	1	1	1
Developer/Manager	Mean	3.00	4.00	4.50	4.50	3.50
	N	2	2	2	2	2
Professional Engineer	Mean	3.00	3.00	3.00	3.00	3.00
	N	2	2	2	2	2

Water Engineer	Mean	5.00	5.00	4.50	4.50	4.50
	N	2	2	2	2	2
City Councillor	Mean	4.00	4.00	4.00	4.00	4.00
	N	1	1	1	1	1
Total	Mean	3.08	3.23	3.46	3.15	3.23
	N	13	13	13	13	13

Q: 29)

Descriptive Statistics			
Options		N	Mean
A	Diverse Strategies_ Flexibility_ Water Supply	12	1.25
B	Water Harvesting_ Water Supply	12	1.25
C	Efficiency_ Waste water Plan	12	1.75
D	Efficiency_ Wastewater_ Reclamation	12	1.50
E	Efficiency_ Facilities_ Sanitation	12	1.58
F	Vital_ Ecology Strategy_ Mechanisms	12	1.58
	Valid N (listwise)	12	

Participants		Diverse Strategies_ Flexibility_ Water Supply	Water Harvesting_ Water Supply	Efficiency_ Waste water Plan	Efficiency_ Wastewater_ Reclamation	Efficiency _ Facilities_ Sanitation	Vital_ Ecology Strategy_ Mechanisms
Architect	Mean	3.00	3.00	3.00	3.00	3.00	3.00
	N	2	2	2	2	2	2
Assessor	Mean	1.33	1.00	2.00	2.00	2.00	2.00
	N	3	3	3	3	3	3
Urban Planner	Mean	0.00	3.00	3.00	3.00	3.00	0.00
	N	1	1	1	1	1	1
Developer/ Manager	Mean	1.00	1.00	1.50	1.00	1.50	1.00
	N	2	2	2	2	2	2
Professional Engineer	Mean	3.00	0.00	0.00	0.00	0.00	3.00
	N	1	1	1	1	1	1
Water Engineer	Mean	0.00	0.00	0.00	0.00	0.00	0.00
	N	2	2	2	2	2	2
City Councillor	Mean	0.00	1.00	3.00	1.00	1.00	2.00
	N	1	1	1	1	1	1
Total	Mean	1.25	1.25	1.75	1.50	1.58	1.58
	N	12	12	12	12	12	12

Q: 30)

Options		N	Mean
A	BC_ Organising_ Meetings_ Experts	7	2.29
B	BC_ Feedback_ Local Community_ Experts	8	1.88
C	BC_ Training_ Experts	6	1.83
D	BC _ Continuous_ Evaluation & Monitoring	6	1.83
E	BC _ Monitoring _Actors Communication	7	2.14
F	BC _ Educational_ Participation	7	2.14
	Valid N (listwise)	6	

Participants		BC_ Organising Meetings_ Experts	BC_ Feedback_ Local Community Experts	BC_ Training_ Experts	BC _ Continuous_ Evaluation & Monitoring	BC _ Monitoring _Actors Communication	BC Educational Participation
Architect	Mean	2.50	2.50	2.50	2.50	2.50	2.50
	N	2	2	2	2	2	2
Assessor	Mean	3.00	2.50	1.00	1.00	2.50	2.50
	N	2	2	1	1	2	2
Developer/ Manager	Mean	2.00	2.00	2.00	2.00	2.00	2.00
	N	2	2	2	2	2	2
Professional Engineer	Mean		0.00				
	N		1				
City Councillor	Mean	1.00	1.00	1.00	1.00	1.00	1.00
	N	1	1	1	1	1	1
Total	Mean	2.29	1.88	1.83	1.83	2.14	2.14
	N	7	8	6	6	7	7

Q: 33)

Options		N	Mean
A	Responsibility_ Water Use	11	1.36
B	Local Community_ Collaborative thinking_ CC	11	0.64
C	Easy Use & Efficient Delivery_ Fixtures_ Occupants	10	1.20
D	Long Term_ Efficiency_ Water Fixtures	10	1.30
E	Enhancement_ Health Surveillance	11	1.64
F	Enhancement_ Technical Support_ Water Facilities	11	1.64
G	Sufficiency _ Water Quality	11	1.55
	Valid N (listwise)	10	

Participants		Responsibility _Water Use	Local Community_ Collaborative thinking	Sufficiency _ Water Quality	Enhancement_ Health Surveillance	Enhancement _ Technical Support_ Water Facilities	Easy Use & Efficient Delivery_ Fixtures_ Occupants	Long Term_ Efficiency_ Water Fixtures
Architect	Mean	2.00	2.00		2.00		2.00	2.00
	N	1	1	2	1	2.00	1	1
Assessor	Mean	1.00	0.67	1.00	1.33		0.33	0.67
	N	3	3	3	3	1.33	3	3
Urban Planner	Mean	0.00	0.00	0.00	0.00	1.155	0.00	0.00
	N	1	1	1	1	0.00	1	1
Developer/ Manager	Mean	1.00	1.00	1.00	1.00		1.00	1.00
	N	2	2	2	2	1.00	2	2
Professional Engineer	Mean	2.00	1.00					
	N	1	1					
Water Engineer	Mean	2.00	0.00	3.00	3.00	3.00	3.00	3.00
	N	2	2	2	2	2	2	2
City Councillor	Mean	2.00	0.00	1.00	1.00	1.00	1.00	1.00
	N	1	1	1	1	1	1	1
Total	Mean	1.36	0.64	1.55	1.64	1.64	1.20	1.30
	N	11	11	11	11	11	10	10

Q: 34)

Options		Mean	Std.	Total responses No.	Do not Know
A	Long term Information	1.2	1.5	13	**8**
B	Local Community_ Information Accessibility	1.6	1.6	13	**8**
C	Health Surveillance & Monitoring_ Indicators	1.4	1.6	13	**8**
D	Monitoring reports _ Occupancy stage	1.6	1.7	13	**8**

Appendix D

Focus groups contents: Questions

- ***Sense of community***

  The expression of sense of community refers here to main feelings that the community individuals have towards their built environment and towards each other.

- ***Community knowledge & awareness***

  "Community knowledge & awareness" in the context of this study refers to issues that associate with how/to what extent the local communities are aware of sustainability principles and their built environment.

- ***Community empowerment & participation***

  Community participation and empowerment are important and interconnected concepts in developing a sustainable community. It addresses how/ what extent the local community are able/willing to participate in the design plan, development projects, and programs to influence the sustainable development and resources management.

- ***Community well-being and quality of life***

  The feeling of well-being is considered as a result of the quality of life characteristics that are existed in both community and the built environment, regarding life satisfaction, health and well-being life conditions.

- ***Post occupancy and Community management of facilities***

  The investigation in this point includes the experiences of community on their daily life regarding the performance of facilities and buildings strategies.

Contents: Questions

CATEGORY ONE: SENSE OF COMMUNITY

1.1 Is there a 'Sense of Community' in Media City?

A. What does that manifest itself as? What happens that brings the community together?

B. What positive action is there to prompt a sense of community/ advantages?

C. What is there about this project / area that is a barrier to an emerging sense of community/Negative/ challenges

CATEGORY TWO: COMMUNITY KNOWLEDGE & AWARENESS

1.1 *The media city was developed along environmentally sustainable principles in particular this aimed to reduce its environmental impact.*

To what extent are you aware of these principles and aspects of this project? Did they attract you to this area?

1.2 What is your understanding of the likely impacts of climate change in this area?

Prompt: As a part of this project, has this influenced your knowledge about climate change?

Supplementary Question:

Is information 'available' and 'accessible' in Media City about sustainability, climate change and adaptation to climate change?

CATEGORY THREE: COMMUNITY EMPOWERMENT & PARTCIPATION

1.1 When community members co-operate together and constantly feed their natural resource observations, knowledge about their built environment and about their personal/ social ideas and needs to the decision makers, this will enable communities to have a greater 'voice' and 'responsibility' in municipal and national decision-making process.

What do you think of 'Community participation' issue in Media City?

How important is the role of local community participation in deciding, implementing the development programs and in addressing the environmental sustainable strategies**?**

If possible, can you share with us some of your knowledge and experiences?

1.2 To what extent do you think that the local community is 'empowered' to act/participate in the decision making process of Media City? For instance, regarding the inclusion of the marginalised people in the decision making process?

Please, can you share with us some of your knowledge and experiences? For instance, regarding the role of Salford City council, or other local organisations in encouraging the community participation?

Supplementary question:

In your opinion, how can/could the 'Community empowerment & participation' issues be further addressed/enhanced in Media City?

CATEGORY FOUR: COMMUNITY WELL-BEING & QUALITY OF LIFE

1.1 There are various positive aspects of well-being regarding the sustainable resources management in built environment of Media City project. How satisfied are you with current usage of water facilities, and with the availability/ protection of water quantity and quality in your area?

1.2 In terms of social well-being aspects, could you please identify how satisfied are you with your personal well-being, social interaction, and emotional well-being in your daily life experiences in Media City area?

Supplementary question:

What are your concerns about aspects of well-being and quality of life in relation to predicted impacts of climate change and flood risks?

CATEGORY FIVE: POST OCCUPANCY & COMMUNITY MANAGEMENT OF FACILITIES

1.1 *As mentioned, that in Media City, the adoption of sustainable facilities and fixtures is essential in the achievement of sustainable management of the water resources and adaptation to climate change.*

Does this influence your adaptive behaviour and make you more responsible?

1.2 What do you think of the current available management approaches for the water resources in the post-occupancy stage, regarding the availability of the support from the local agencies, monitoring, technical advice, and the performance of the water facilities for the risks times, involving feedback from the building occupants, through questionnaires, interviews and workshops,….etc.?

What do you think of the roles of Salford City council and local community organisations in 'directing' and 'supporting' the community management of facilities in the short term and long term?

Supplementary question:

What are your concerns post occupancy and community management in relation to future impacts of climate change and flood risks? And how do you think it can be enhanced?

Appendix E

Focus groups results & Analysis

- **Focus group respondents**

Respondents	Age	Gender	Nationality	Educational specialization	Education level
Employee 1	18	Female	British	Student	Level 5
Employee 2	33	Male	British	Philosophy, Politics & Economics	Level 7
Employee 3	55	Female	British	Technology/Diploma	Level 5
Employee 4	35	Female	British	-	Level 5
Employee 5 - Occupant 12	34	Male	British	Business Studies	Level 6
Employee 6	50	Female	British	-	Level 7
Employee 7- Occupant 11	44	Male	British	Literature	Level 6
Occupant 1	61	Male	British	Dental Surgery	Level 7
Occupant 10	30	Female	Saudi	PhD student – Biology science	Level 7
Occupant 2	49	Female	Spanish	-	Level 7
Occupant 3	35	Male	Hungarian	Information Technology	Level 7
Occupant 4	31	Female	Hungarian	Law	Level 6
Occupant 5	32	Female	British	Information Technology	Level 6
Occupant 6	38	Male	British	Business	Level 7
Occupant 7	36	Male	Iraqi	PhD student- Computer Engineering	Level 7
Occupant 8	61	Male	British	Chemical Engineering/ Business	Level 7
Occupant 9	33	Male	Lithuanian	PhD Student- Electronic Engineering	Level 7
Student 1	18	Male	British	Student	Level 5
Student 2	19	Male	British	Student	Level 5
Student 3	22	Male	British	Student	Level 5
Student 4	25	Female	French	Student	Level 5
Student 5	18	Male	British	Student	Level 5
Student 6 - Employee 8	20	Male	British	Student	Level 5

	Participants	Question 1: What is your general experience of the Media City project?	Question 2: Is there a 'Sense of Community' in Media City?	Question 3: A. What positive action are you aware of that encourages a sense of community/ advantages?	Question 4 : C. What is there about Media City that is a barrier to an emerging sense of community?	Question 5: Do you think that there is something should be done to enhance the sense of community in MediaCity?	Question 7:To what extent do you know or/ What is your understanding of the sustainability aspects of MediaCity project/ And did they attract to this area?	Question 8: As a result of living in Media City, has your knowledge about climate change changed? And what is your undestanding about climate change issue?	Question 8: Is information 'available' and 'accessible' in Media City about sustainability, climate change and adaptation to climate change?
Participant-1	Employee 3	Its attractive place. Working here is Good.	Despite many things and activities here, but for the sense of community, we can say NO, and that really touching.	The square is very nice in the summer and everyone comes out, and walk in the gardens, which this make the project really special. owever, this is not the case in winter. It's a 'Summer Place'.	this site is complicated, and it gathers the media people, students, which they are busy all the time. The people of the BBC thinks that the place is 'Cold' and 'Soulless'. People are coming and going and that's a challenges to create community environment here.	There should be things done here to enhance the sense of community, to aim for, outside the entertainment side.	As being a BBC member, I got the update about what is happening in this place and about PEEL group. I do know about the local residents.	No, It's a very much 'seasonal' place and controlled by season. In the summer, it's really nice place not like winter.	For sustainability, the developers are good on the recycling side, for the environmental part. That for the BBC, they told to do the recycling, for the bottles, cups, food, and it's expected that the shops are told the same. Finally, PEEL will tell you what they need you to know.

Participant-2	Employee 7-Occupant 11	Attractive. Yes, in general it is a very pleasant place to live. The high rise buildings are generally attractive	No, I live here but am not really aware of any real community events apart from those that take place within my small community area, which is in Salford Quays but just outside Media City. I have made have come through walking my dog but would not have happened otherwise.		I think the fact that there are so many workers and so many visitors there's always a state of flux and you don't know who lives here.	But are there are newsletters promoting events or groups??	We have recycling bins at the BBC, where I work, and we also have lights that go off if there's nobody in, but I would expect some kind of sustainable principles in new buildings. They didn't really attract me to the area although it's nice to have a clean, new building to work in – far better than the old heap we had in London!	I wouldn't say my knowledge has changed – I get all my information from newspapers, websites and TV news.	There's probably info on social media outlets and on the Peel Group's Media City website, but I tend to ignore these. But, I'm not sure that the information is that readily available around Media City.
Participant-3	Student 4	I think MediaCity is an expensive city or place	No	In the university we know each other well, and that's also nice, like in a way we have our own community sometimes.	I feel separated from the students of the campus, that they are called the 'MediaCity Students'. We feel here more isolated.	there is still a feeling of needing to mix with other students communities.	I know that regarding the energy, thereare good attempt to save the energy particularly the lighting in university building.		
Participant-4	Employee 1	Its attractive place. is its really 'Safe' place to live, in comparison with Manchester city.	No	I feel this issue is important because of the location of MediaCity.	There is a feeling of the isolation of MediaCity with the Salford city, that less than a mile from MediaCity, and you can see the difference.	In that sense of the isolation from whole Salford, I feel they should be more together.	we do not feel the directors or mangers of PEEL, are encouraging on knowing information on climate change	they are promoting climate change very little. In terms of sustainability, there is a more focus on this issue, but definitely not climate change	all the buildings belong to PEEL, they are main responsible of having the information on the energy uses and protection. I feel PEEL is working hard for a lot of issues, to

									make things look and work great. But, not regarding the climate change issue
Participant-5	Occupant 6	Its attractive place. Its Safe place. There is a sense of wealth in this area.	No sense of community in the apartments blocks, which it's the style of the area. It's a Massive Chinese investment.	PEEL is doing a good job in keeping this place safe.	People are coming and going here, which this makes no sense of community here. And, The other parts of Salford are isolated from MediaCity.	Here things need to be more enhanced to achieve a good sense of community, as there are no places for kids. So, we do not see kids quiet often.	But regarding sustainability or climate change, I do not feel there is a difference here than UK. Ultimately, it goes to the land owner to make what you can do and what to know. I know that it's here now cleaner.		There is some aspects regarding the development or the regeneration to Salford. But all in all, what happens here is no difference to what happens elsewhere.
Participant-6	Occupant 4	it's nice place. It's a dynamic place.	No, especially in the blocks.		In my blacks, and in my floor, there are 8 flats, I do not know anyone	I think if you can't find it in a small place, you will never find it when it becomes bigger. If you build a community, you should think about this issue from the start.			
Participant-7	Student 1	Its expensive place.	No						

Participant-8	Employee 2	Attractive. It nice because of the water and the fresh air.	No	The 'Water' is quite significant. Not everybody is iving/working next to this big water.			I think you can know about sustainability issues from the BBC. That essentially, we know from the BBC that these buildings are sustainable and relatively environmentally friendly.	About the climate change, I remember last year, there was a flood warning from the place where I lived from the Irwell. Then I thought of MediaCity and the canal, but not here. I felt safe. Because, I said this place is new. I should worry about the other places in Manchester, which built in 1900. But this area is well designed, so, we should be OK.	I do not know whether I see anything from PEEL regarding this. Especially, for the students or residents. I expect in this regard the university should have a deal in that.
Participant-9	Student 2	Attractive. It's a fantastic place. But I miss the students' social life.	No						

Participant-10	Employee 4	Its attractive. It's clean and tidy place.	in terms of sense of community, I think no.	I feel this place can be a clinical place that it is very clean and very tidy.	I feel regarding the sense of community, it's quite 'Isolated' in some way.		Here, we try to in digital production to do carbon (CO2) assessment for each production, so, for me being here it makes things easier to understand these aspects, especially recycling.I felt that PEEL are already putting good strategies and ethos for sustainability anyway in buildings.		we are knowing the general information about sustainability. And not deep information. Like a furry thought, in general.
Participant-11 **Participant-12**	Student 5	I thinks it isolated place from the bigger Salford.	No. I do not like the idea of living here. I do not see myself here in the long term.	It's very special place to study, work, socialise maybe.	It's not a good place for living. it's similar to the small bubbles in the city centers. And you feel here is a place and Salford is the other.				I do not remember seeing anything around here as posts or anything relate to sustainability. I feel we know just the general things.

Participant-13	Occupant 1	Its attractive place. Its healthy place.	No, the sense of community is lost here.	I live here and in the old city. It's a 'Modern' place.	here it's a mixture of the working people and living people, so you lose this sense of local community here. They have no time to talk to each other.			For me, I do not have any worries about the impacts of climate change here, even if we are living by the river here. I think they designed the place high enough –about 2 meters- with a way is not going to affect, even by the worst scenario of climate change impacts. I think the design is quite good.	I think accessing the information about sustainability or climate change is part of the planning permission these days.
Participant-14	Occupant 9	There are some negative aspects, but at the moment, I think it's (good). Its attractive	It's a nice place here.	The good thing about my apartment here is having the balcony and the water next to me, which gives the feeling of freshness, and the closeness to nature.	I think its different from Salford area, especially salford is a poorish area.				
Participant-15	Occupant 7	Sustainable. For me it's the feeling that this place is sustainable what makes me stay here.	No				I know that besides sustainability, security, services that are provided		

							to the area, and building insulations are important.		
Participant-16	Occupant 2	Its nice place and popular, and Attractive. I think it looks different to other areas of the city.	Not really there is a sense of community here, because there are a lot of businesses here and cannot see that there is a community like other areas.	Not sure who the local councilor is and whether they are working to create a better community.	We need more green places to gather and more little shops such as local newsagent, beauty shop or butchers where there is personal service and the owners get to know you.				
Participant-17	Student 3	It's a popular place. For me and as I want to be currently in a bubble, studying, I will put (Excellent) at the moment. But when including others in my life, and if I want to add peoples to my area, I have a limitation on this rating.	I think about the sense of community in MediaCity, it's fostered as institutions, and that you see the BBC as an institution, the University.	I wouldn't say that I feel that I'm a part of described as a 'Local community' here. This place is a place of 'Business', is not more of 'Residents'.	It's not a traditional urban settlement which breeds communities. It's more as rise buildings, which that you are not necessarily facing people's residences. we do not see a street with houses, schools or, post offices, or anything like that.		Buildings here are environmentally sustainable . There are nice natural features, green, and less concrete around. Even if the buildings here are environmentally sustainable, I do not think it's overly helping the environment. I thinks it's still a place to live and the resources are being used, and certain drain on the environment. So, I would not say instinctively that it gives out, or takes	Buildings here are climate neutral.	

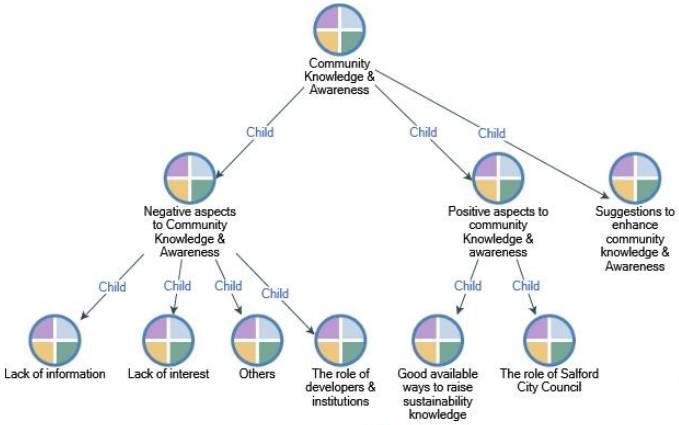
							more. This is a small and compact area. I'm sure it has been built on these principles, but I'm not sure how marvelously this jump is doing.		
Participant-18	Occupant 3	Its attractive place	No						
	Occupant 5	It is very attractive area to live in. Its secure, safe, vibrant, it's lovely. For me it's 'ideal' as its 10 minutes from work.	No, I live here, and I did not see a lot of families here. It more for couples.	Everyone is driven to succeed and do well. Young professionals reside here. Its very secure.	And I think a lot of families are not living here, maybe because it's the apartments. it's more for couples, with the existence of the apartments. No shops here.		I was attracted as it has all the amenities I require, central location. Very scenic. Concerned about new developments around the area, dust pollution.	For climate change adaptation, I think there is a need to more focus globally, not only MediaCity. I feel that the winds are trapped here	

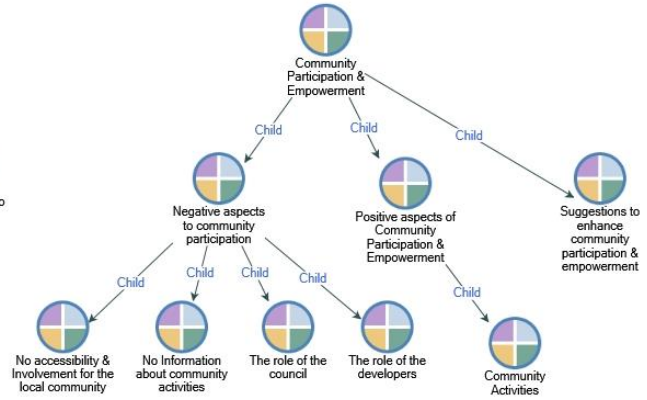
Participant-19	Employee 5 - Occupant 12	I agree with the others. Where I come from business, I feel it's here a business area, it's a 'good area' for people to work together in one place.	No				About environmental issues awareness, I do not agree with Peter and Harry, I think it's really interested. It was on Friday that I heard about the existence of the energy centre here in MediaCity.	I do not know about the climate change. Here in the meeting we have not discussed this issue, We talk here about technology aspects, but not about the climate change.	the materials and the reports are probably there in the council about the climate change aspects.
Participant-21	Occupant 8	Socially attached, yes. I feel I belong here. I'm recently a retired and there are a lot of business here around.	I think the 'community' in Media City is still at an early stage of development. Maybe it's a community if you want to use the sense of community in the context of going for a drink with your friends/mates, but it's not a community in terms of families and kids.	the water front is the anchor around which Media City is developing. This makes activities such as open air swimming, kayaking, Dragon Boat racing unique to MediaCity	It's a community for 'professionals' not for 'families and kids'. It's a community for 'young professionals'. I do think it's a 'kid's friendly place'. Media City is primarily a work place and phase 2 development will greatly expand this. An increasing number of people will come into Media City	To be a community, we need people to live in Media City. There is a lot of new construction of apartments going on which will greatly increase the local population, but many of these are small flats bought by property investors (often Chinese) which could result in a large part of this	I'm not surprised about the existence of these energy centres and initiatives as a part of this development in this area. I am not really aware of this - it is something I would automatically expect for such a major new development. Sustainability principles were of no relevance to my decision to move to Media	About climate change, I remember last year, the water level in Salford quays was quite high, I saw it. And I worked carefully. If the properties get flooded, the insurance will get high. To be a flood area, the insurance will be high. It was a new thing here. The DOCKs have controlled it, it	I have no interest to access or find out more about this – I just expect that this sort of thing is done

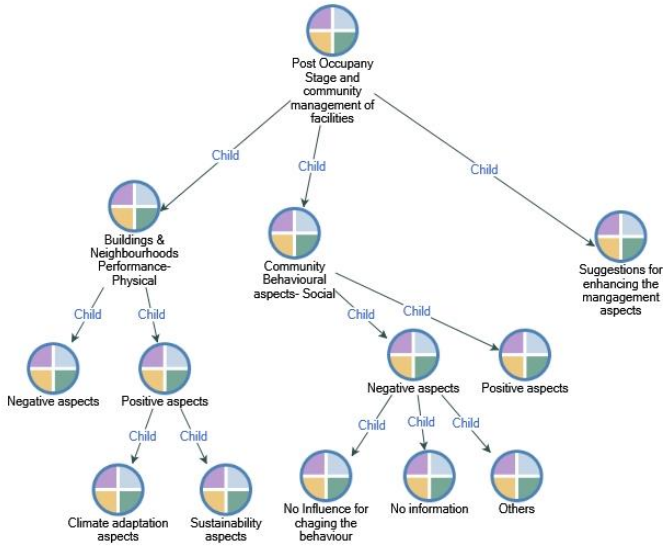
					to work and leave at the end of the day. This is likely to add to road congestion and overcrowding on trams. And there are no many shops in here.	population growth being transient short term tenants, without any sense of community and belonging.	City.	was alerting as there is no history of flood in this area.	
Participant-22	Employee 6	I think it is attractive.	The fact that it is a new area that attracts a diverse young professionals group, it gives a sense acceptance and identification with the group. There is a community, but it's a different form of community, it's a community of the young and international different form of community.	The building of new residential areas, variety of entertainment venues like the theatre, cinema, bars, and restaurants are some of the things that attract these group. It is safe to walk, jog. Social, charity and sport activities are quite regular in the area. We feel we are diverse community that lives in harmony.	It more expensive area for a community, you see the price is doubled there. Its more beacuet the prices are suiting or for the tourists not for the community, which its considered a challenge for the local community, and for thir future here. Somehow the ever increasing cost of living, entertainments costs, supermarket prices. Even in BOOTHS, Its double price.				

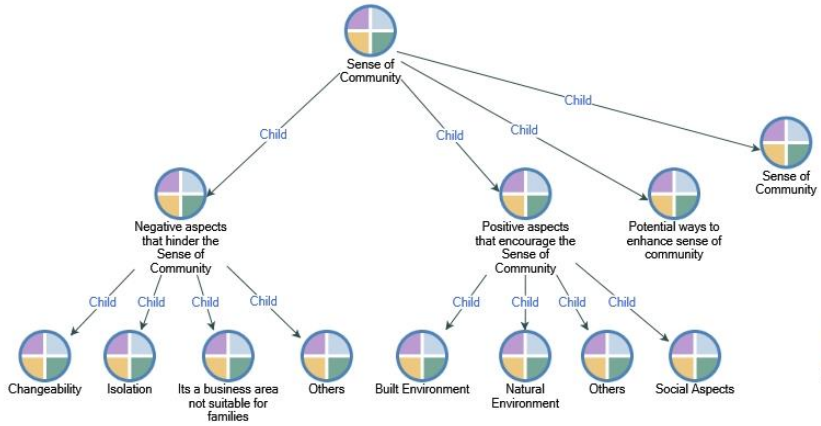
Participant-23	Occupant 10	I feel more comfortable and I am really socially attached to this place and I couldn't imagine myself in any other place.	No						
Participant-24	Student 6 - Employee 8	For me I can describe MediaCity as a 'Different' from other parts of Manchester.	No		this place is new and modern, the cost price for everything is higher.		I think influence of the environmental issues are served globally. And how these changes affect our lives, I do not feel much worried about that.	I do not know how they have designed this place, it floods very well. The water can access the buildings very. I think climate change is new case, and in Salford the houses are really old, and to adapt them, it can cost, so I do not how can this happened.	

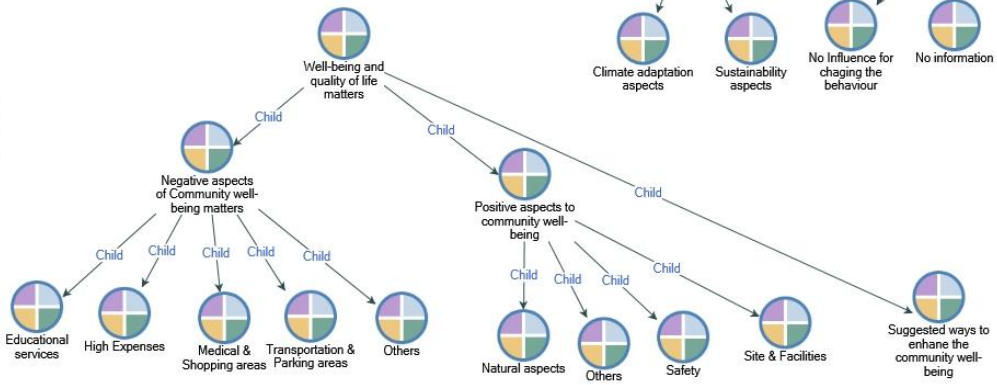
Themes coding using NVIVO- Focus groups' results analysis



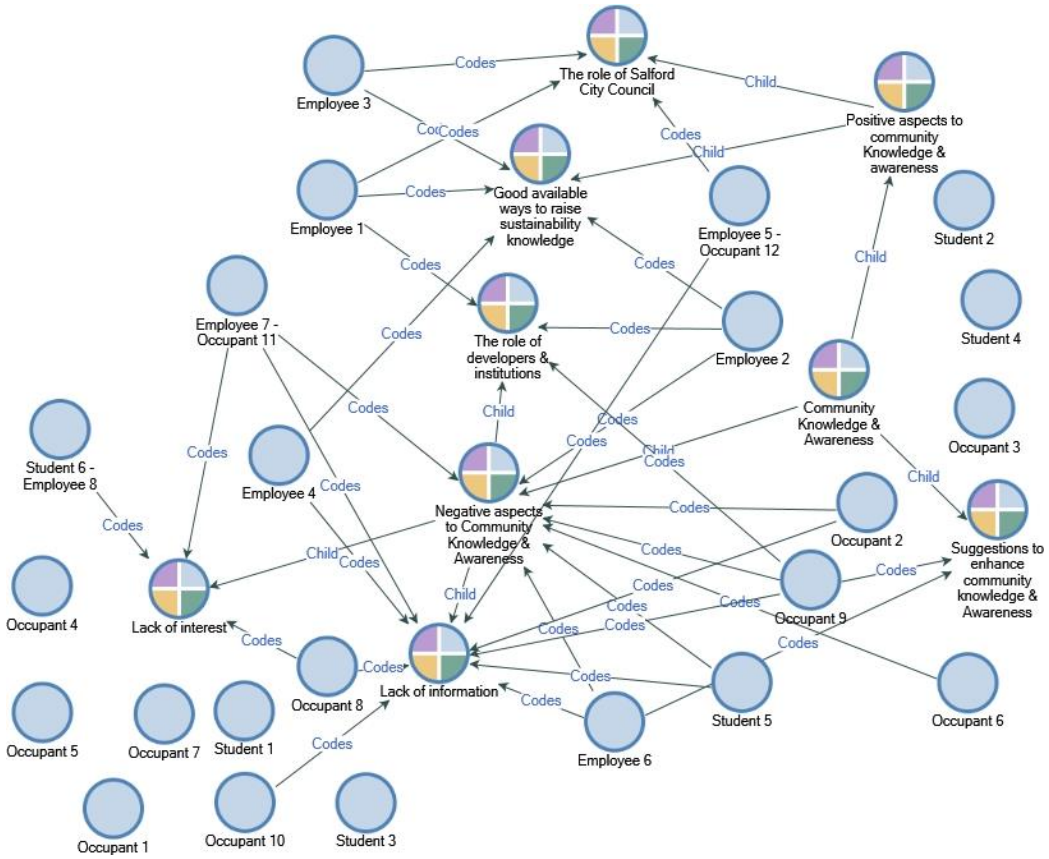


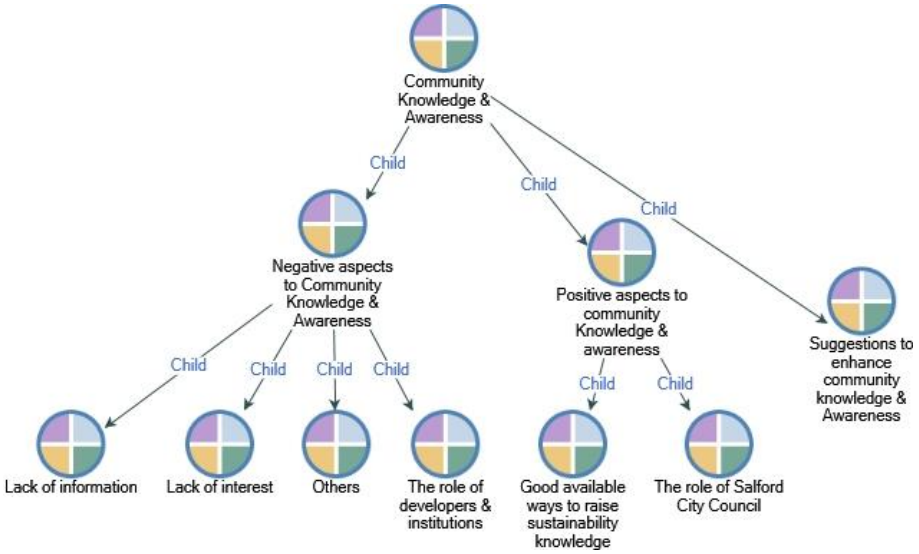




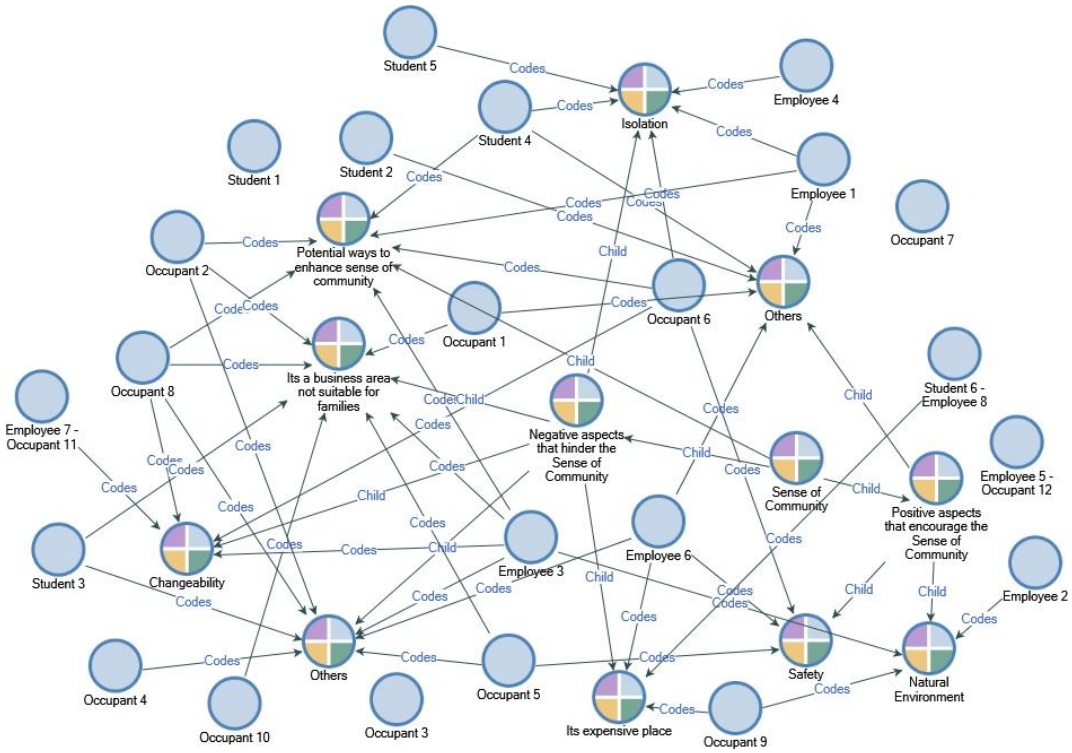


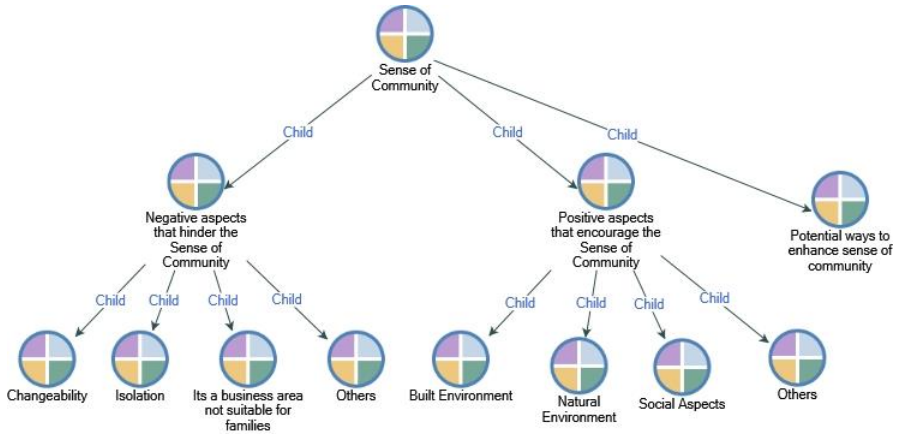
1. Community knowledge and awareness



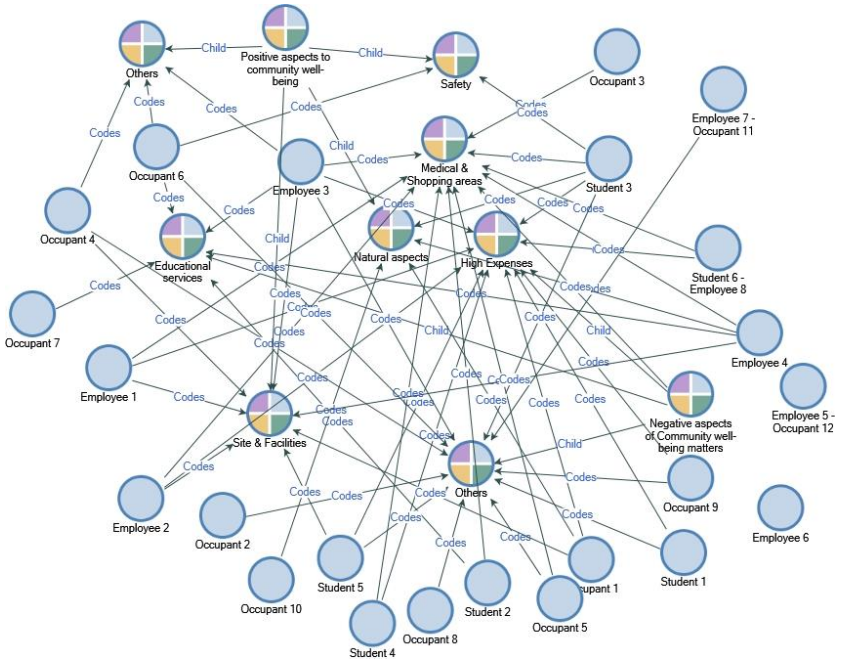


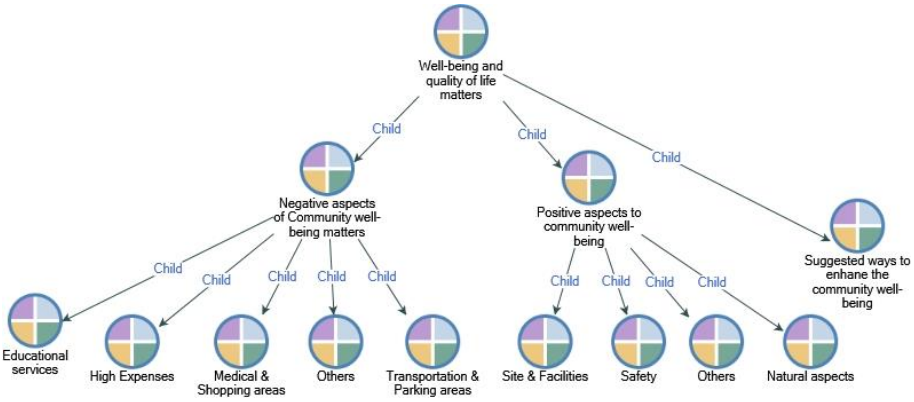
2. Community feeling of belonging & Sense of community



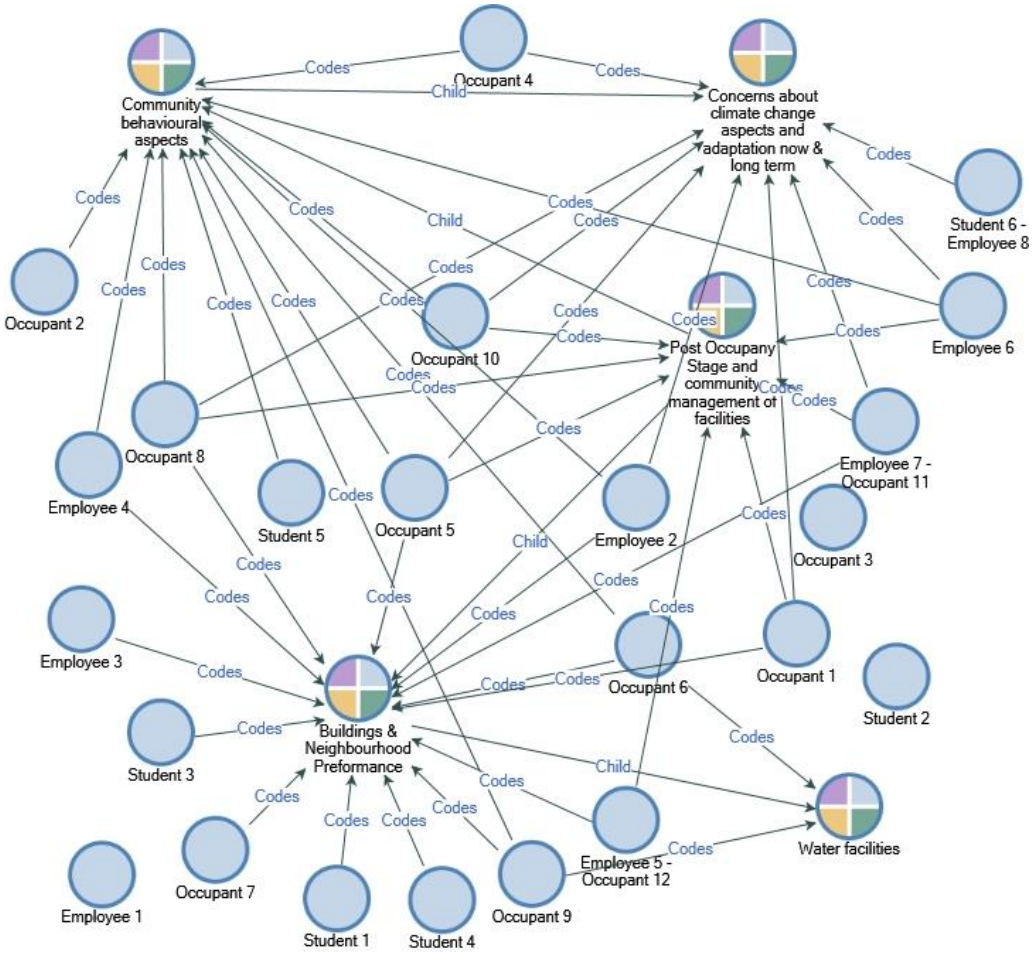


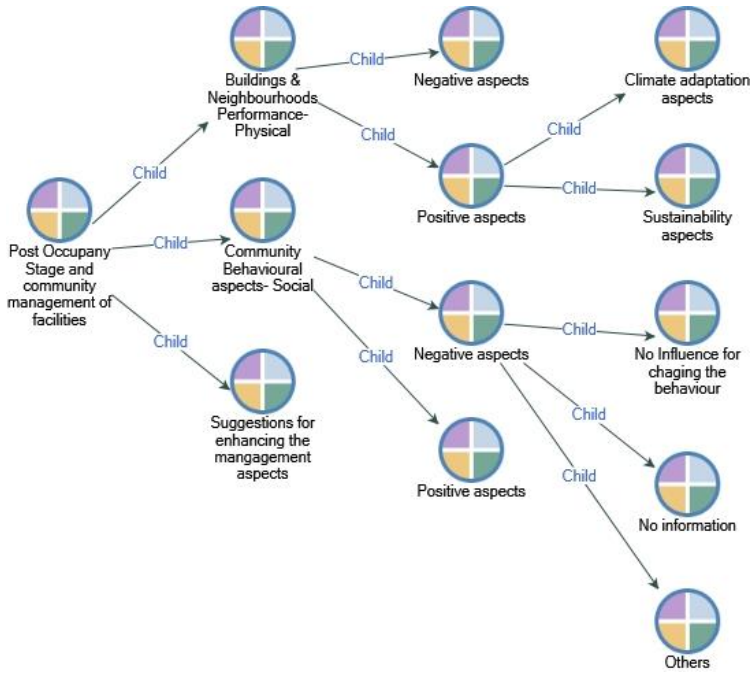
3. Community Well-being



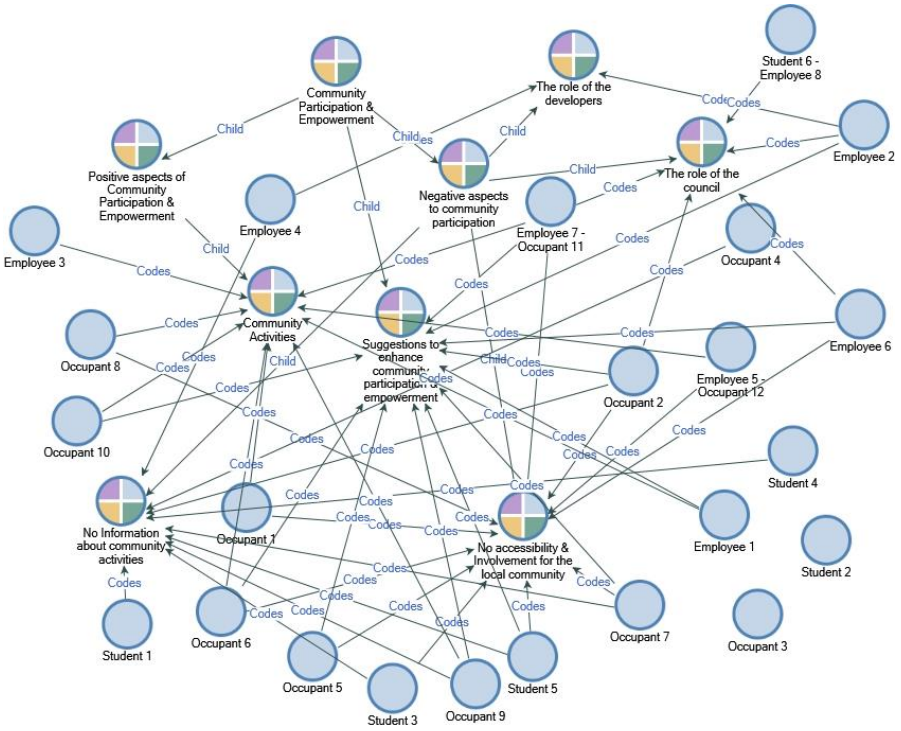


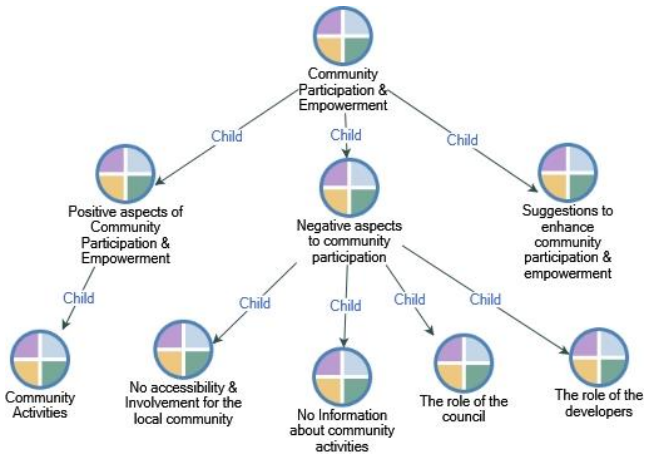
4. Community sustainability & Adaptive behaviour





5. Community participation





Appendix F

Ethics

WELSH SCHOOL OF ARCHITECTURE
ETHICS APPROVAL FORM FOR STAFF AND PHD/MPHIL PROJECTS WS

Tick one box:	☐ STAFF ☑ PHD/MPHIL
Title of project:	The Evaluation of BREEAM Communities Potentials to address the Adaptive Capacities to Climate Change in the Governance & Social Contexts
Name of researcher(s):	Sally Naji
Name of principal investigator	Dr. Julie Gwilliam Dr. Joanne Paterson
Contact e-mail address:	najiSA@cardiff.ac.uk
Date:	06/12/2018

Participants		YES	NO	N/A
Does the research involve participants from any of the following groups?	• Children (under 16 years of age)		√	
	• People with learning difficulties		√	
	• Patients (NHS approval is required)		√	
	• People in custody		√	
	• People engaged in illegal activities		√	
	• Vulnerable elderly people		√	
	• Any other vulnerable group not listed here		√	
• When working with children: I have read the Interim Guidance for Researchers Working with Children and Young People (http://www.cardiff.ac.uk/archi/ethics_committee.php)				

Consent Procedure	YES	NO	N/A
• Will you describe the research process to participants in advance, so that they are informed about what to expect?	√		
• Will you tell participants that their participation is voluntary?	√		
• Will you tell participants that they may withdraw from the research at any time and for any reason?	√		
• Will you obtain valid consent from participants? (specify how consent will be obtained in Box A)[1]	√		
• Will you give participants the option of omitting questions they do not want to answer?	√		
• If the research is observational, will you ask participants for their consent to being observed?	√		
• If the research involves photography or other audio-visual recording, will you ask participants for their consent to being photographed / recorded and for its use/publication?	√		

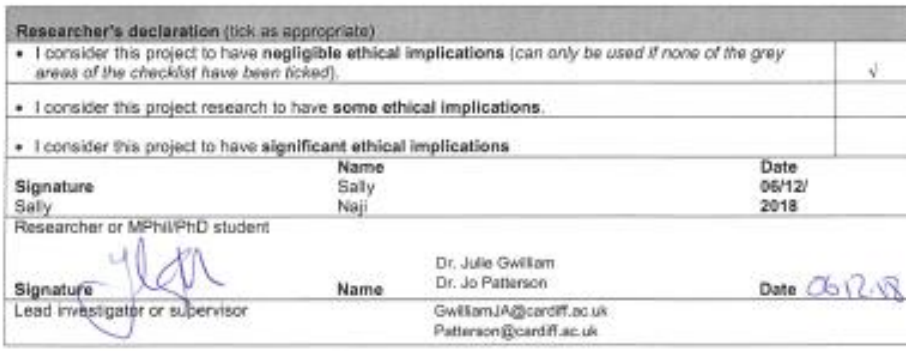
Possible Harm to Participants	YES	NO	N/A
• Is there any realistic risk of any participants experiencing either physical or psychological distress or discomfort?		√	
• Is there any realistic risk of any participants experience a detriment to their interests as a result of participation?		√	

Data Protection		YES	NO	N/A
• Will any non-anonymous and/or personalised data be generated or stored?			√	
• If the research involves non-anonymous and/or personalised data, will you:	• gain written consent from the participants	√		
	• allow the participants the option of anonymity for all or part of the information they provide	√		

Health and Safety	YES
Does the research meet the requirements of the University's Health & Safety policies? (http://www.cf.ac.uk/oshe/index.html)	√

Research Governance	YES	NO	N/A
Does your study include the use of a drug? You need to contact Research Governance before submission (resgov@cf.ac.uk)		√	

[1] If any non-anonymous and/or personalised data be generated or stored, written consent is required.



Researcher's declaration (tick as appropriate)	
• I consider this project to have **negligible ethical implications** (*can only be used if none of the grey areas of the checklist have been ticked*).	√
• I consider this project research to have **some ethical implications**.	
• I consider this project to have **significant ethical implications**	

Signature Sally	**Name** Sally Naji	**Date** 06/12/ 2018
Researcher or MPhil/PhD student		
Signature	**Name** Dr. Julie Gwilliam Dr. Jo Patterson	**Date** 06/12/18
Lead investigator or supervisor	GwilliamJA@cardiff.ac.uk Patterson@cardiff.ac.uk	

Media City_ BREEAM Communities: Professionals perceptions on the Community feedback

(Evaluation & Enhancement)

The aim of this survey is to establish the views of key professional stakeholders as to the following in the context of the water sector:

1. The success of the development in promoting adaptive capacity and resilience with respect to community and governance
2. The local community feedback regarding the MediaCity as built, informed by their experiences of working and / or living and / or studying there.
3. The role that BREEAM Communities (in terms of its implementation process, and its constituent indicators) currently influenced the development, as built and its occupant's experience of the above themes?
4. Their opinions on the research findings regarding proposed enhancement of BC

This interviews comprises two main parts, are:

Part One: Community resilience & sustainability characteristics & the Influence of BC in MediaCity. Addressing the following three themes:

- ***Theme _ One:*** *Community management and performance of facilities*
- ***Theme _ Two:*** *Community Improving Wellbeing or Livelihoods*
- ***Theme _ Three:*** *Community knowledge Awareness and learning*

Part Two: *Governance* Process Impacts & Actors involved & the influences of BC Addressing the following three themes:

- ***Theme _ Four:*** *Effective Flexible Collaborative Actions*
- ***Theme_ Five:*** *Continuous Evaluation & Monitoring*
- ***Theme_ Six:*** *Knowledge, Awareness & Learning*

Theme _ One: Community management and performance of facilities

Q_ 1: To What extent do you feel MediaCity has delivered effectively with respect to '*Community management and performance of facilities? '*

As a result of the (Focus Group) with the local community of MediaCity, the local community identified the following as positive and negative aspects in association with this theme:

P.A_ 1	Sustainability Strategies in Buildings
N.A_1	No Influence for changing behaviour
N.A_2	No Information
N.A_3	Building performance & Management

Q _ 2: What are your views on this feedback?

Regarding the BC application in Media City and its influences on the process and the feedback:

Q_3: To what extent do you think that the BC indicators of the social focus have influenced the outcome results here, such as Climate Change Adaptation, Demographic Needs & Priorities & Delivery of physical facilities?

Q_4: How do you think BREEAM Communities has influenced this category to address CC adaptation of Media City as an intermediary party?

Q_5: From your experience, what would you propose as actions / processes / roles that would promote enhancement of resilience and adaptive capacity of the resulting neighbourhood and its constituent communities? Could these be embedded in B.C? Or elsewhere?

Theme _ Two: Community Improving Wellbeing or Livelihoods

Q_ 1: To What extent do you feel MediaCity has delivered effectively with respect to 'Community Improving Wellbeing or Livelihoods*?'*

As results of the (Focus Group) with the local community of MediaCity, the local community identified the following as positive and negative aspects in association with this theme:

Positive Aspects	*P.A_ 1*	Natural Environment
	P.A_ 2	Site & Facilities
Negative Aspects	*N.A_1*	Health aspects
	N.A_2	Social aspects
	N.A_3	Accessibility to the site and buildings

Q _ 2: What are your views on this feedback?

Regarding the BC application in MediaCity and its influences on the process and the feedback:

Q_3: To what extent do you think that the BC indicators of the social focus have influenced the outcome results here, such as Climate Change Adaptation, Demographic Needs & Priorities & Delivery of physical facilities?

Q_4: How do you think BREEAM Communities has influenced this category to address CC adaptation of MediaCity as an intermediary party?

Q_5: From your experience, what would you propose as actions / processes / roles that would promote enhancement of resilience and adaptive capacity of the resulting neighbourhood and its constituent communities? Could these be embedded in B.C? or elsewhere?

- ***Theme _ Three: Community knowledge Awareness and learning***

Q_ 1: To What extent do you feel MediaCity has delivered effectively with respect to 'Community knowledge Awareness and learning? '

As results of the (Focus Group) with the local community of MediaCity, the local community identified the following as positive and negative aspects in association with this theme:

Positive Aspects	***P.A_ 1***	Practical aspects for environmental sustainability
	P.A_ 2	Role of Salford City Council
Negative Aspects	***N.A_1***	Lack of Information
	N.A_3	Role of developers & institutions

Q _ 2: What are your views on this feedback?

Regarding the BC application in MediaCity and its influences on the process and the feedback:

Q_3: To what extent do you think that the BC indicators of the social focus have influenced the outcome results here, such as Climate Change Adaptation, Demographic Needs & Priorities & Delivery of physical facilities?

Q_4: How do you think BREEAM Communities has influenced this category to address CC adaptation of MediaCity as an intermediary party?

Q_5: From your experience, what would you propose as actions / processes / roles that would promote enhancement of resilience and adaptive capacity of the resulting neighbourhood and its constituent communities? Could these be embedded in B.C? or elsewhere?

Part Two: *Governance* Process Impacts & Actors involved & the influences of BC addressing the following three themes:

- ***Theme _ Four: Effective Flexible Collaborative Actions***

Q_ 1: To What extent do you feel MediaCity has delivered effectively with respect to '*Effective Flexible Collaborative Actions*? '

As a result of the (Focus Group) with the local community of MediaCity, the local community identified the following as positive and negative aspects in association with this theme:

Positive Aspects	**P.A.1**	Natural Environment
Negative Aspects	**N.A_1**	No Community Participation in the Community Development & Activities
	N.A_2	It's a business area not suitable for families
	N.A_3	Role of Council
	N.A_4	Role of Developers
	N.A_5	Isolation

Q _ 2: What are your views on this feedback?

Regarding the BC application in MediaCity and its influences on the process and the feedback:

Q_3: To what extent do you think that the BC indicators of (Consultation Plan, Consultation and engagement, Design review, & Community management of facilities) influenced this perceived outcome?

Q_4: How do you think BREEAM Communities has influenced this category to address CC adaptation of MediaCity as an intermediary party?

Q_5: From your experience, what would you propose as actions / processes / roles that would promote enhancement of resilience and adaptive capacity of the resulting neighbourhood and its constituent communities? Could these be embedded in B.C? or elsewhere?

- ***Theme_ Five: Continuous Evaluation & Monitoring***

Q_ 1: To What extent do you feel MediaCity has delivered effectively with respect to 'Continuous Evaluation & Monitoring? '

As a result of the (Focus Group) with the local community of MediaCity, the local community identified the following as positive and negative aspects in association with this theme:

Aspects	No level of information is addressed by the local communities here regarding this theme as part of the governance process

Q _ 2: What are your views on this feedback?

Regarding the BC application in MediaCity and its influences on the process and the feedback:

Q_3: To what extent do you think that the BC indicators of (Consultation Plan, Consultation and engagement, Design review, & Community management of facilities) influenced this perceived outcome?

Q_4: How do you think BREEAM Communities has influenced this category to address CC adaptation of MediaCity as an intermediary party?

Q_5: From your experience, what would you propose as actions / processes / roles that would promote enhancement of resilience and adaptive capacity of the resulting neighbourhood and its constituent communities? Could these be embedded in B.C? or elsewhere?

- ***Theme_ Six: Knowledge, Awareness & Learning***

Q_ 1: To What extent do you feel Media City has delivered effectively with respect to 'Knowledge, Awareness & Learning? '

As results of the (Focus Group) with the local community of MediaCity, the local community identified the following as positive and negative aspects in association with this theme:

Aspects	No level of information is addressed by the local communities here

Q _ 2: What are your views on this feedback?

Regarding the BC application in Media City and its influences on the process and the feedback:

Q_3: To what extent do you think that the BC indicators of (Consultation Plan, Consultation and engagement, Design review, & Community management of facilities) influenced this perceived outcome, with focus on the water sector?

Q_4: How do you think BREEAM Communities has influenced this category to address CC adaptation of MediaCity as an intermediary party?

Q_5: From your experience, what would you propose as actions / processes / roles that would promote enhancement of resilience and adaptive capacity of the resulting neighbourhood and its constituent communities? Could these be embedded in B.C? Or elsewhere?

Appendix G

Experts Interviews

(Interviews)

Media City_ BREEAM Communities: Professionals perceptions on the Community feedback

(Evaluation & Enhancement)

Interviewee One _ BREEAM Communities Assessor in MediaCity

Collaboration Actions

Natural environment: It's probably because that it's such a fast improvement from the previous development, and that it has all these big, lovely, open public spaces with a green areas, besides, the project is lying near the ship canal. It's a win for Media City to be in this location. So, the perceptions of the natural environment as a positive issue is because the local of Media City.

Business area not suitable for families: that's right. Mainly, the participation of the local community in the development process and the planning is not happening. At the beginning of the development, there were letters that were ditibuted for the consultaion, which wording the BREEAM communities aims. However, the consultation process was very poor. It only constitutes few pictures, and with simple explanation of the project, and with no feedback letter on. The problem is that PEEL is dealing with BREEAM as a check list, as not as a process. The consultation is mandatory and should be happened. But it happens as the developer wants to. So, these consultations are not effective at all. Not through the role of BREEAM assessors or actors.

I agree that there is no community participation, or even consultation. However, with the current phases in MediaCity, they should do this, but they want. It's not a priority for the developers.

I agree that the area is not suitable for families. That's a fair criticism. However, there are social events that happen in Media City near the Lowry, which it's really nice. They put a fence near the Plaza for some events across the year, and the families can go out, socialise. These events are happened that the developers have ideas about the events, or the local authority is having plans for the events, like the Olympics. But, these events are not happening on the grounds of asking the people what do you want or think.

It's important to look for community partners, a community who have been there and know about the place, not in connection with the developers, but the community themselves, to discuss the plans and the development phases, and effects on their lives, needs. So, having these community groups is important. In others having groups of community that are belonging to the community, but operate on a professionals level is a key.

Evaluation and monitoring

BREEAM requires using evaluation for the Buildings. But, BREEAM communities 'no', it is not a part of the management team of facilities or communities. There is a requirement for the BREEAM to use a building scale guide, and stuffiest maintaining, then the building management team, to operate them. The management company is the one that is responsible to the stuff of the monitoring, evaluation.

I think there could be a published requirement about water and energy in association to BREEA Communities to focus on making the management plans for communities. However, about water, I think it's rather than say to the people about using a less water, it's easier to give them joy flush toilets, or no water use fitting, rather than telling the exact on a topic from BBC.

In general B.C. has improved the communication between different players. Although a decent lecture of the Building Service for students when you ask them to do BREEAM, they said that the only important is the water and energy. The rest we can say anything about it. So, the BREEAM Communities trainees do not see that there is a need to understand all these categories, and associated professionals. But, it's important of the actors that work with the tool to understand that they are dealing with the various experts, engineers, and architects to interact with them. However, talking with the architects is not that easy. Having BREEAM Communities, has made that not the architects and the engineers are having the only word in the development, but, the tool actors are as well, through the interaction way with those professionals. Particularly BREEAM for building has done a lot, and broke things down, through enforcing the idea in the design team that every decision is having a big impact whether as an architect, engineers, ecologist.

But, we got a 'stationary' position from the government; however, it's still optional. But, its slow long slogs to get there. So, with the governance actors, the communication is not easy. But the efforts that need to be do regarding the community, needs huge amount. It needs a publication of information, and even through making a TV reality show about it, to make the community think seriously of their environment, and through engaged more.

The communication with the council is important. But the priority is for sure to be in developing the deprived areas when compares to sustainability and encouraging the new developers to that.

The communication and education, I think is the most two things that are needed in BREEAM Communities. This should be as central issue in B.C., not only in the developing countries, but everywhere.

'I think it's important to think with a way of not saying that the community are stupid, they do not understand the questions why should we ask them….Well, go and explain to them'

So, we can't expect anything from the community without giving them. We have to give them the input and at least the basic information, to get the outcome that is desired. It's important that to give the useful, informative, updated information, and to interpret it to the community, and if possible make the information as a part of the education system, if necessary.

I think it's a missed opportunity, the consultation process, or the community consultation side of the things. There was a consideration of sustainability strategies in the planning and the construction process, but the application of these sustainability strategies through a wide collaboration process of actors did not happen. Mainly, it should be happened through making the community leading their own ways into the development through their engagement, but it did not happen.

There are still ways to do consultation, whether in the re-generation development or the new designed development. The thing that can make the difference is when you have the construction phase assessment. So the same that happen with the buildings, that you can get the BREEAM right, until you do the construction assessment. That because, when it happens, during the construction phase, people are failing, and falling down, and realise that they did not do the things that they have said actually, and when they start to do this on one or two, or three of them, then they start learning, and doing these things properly. But, also, being more prescriptive about what constitutes good consultation, and I do not think that there is anything near enough about these consultation right application, despite the great knowledge of people about them, and in doing them right. There is a fear from the big developers to do these consultations, and also the council itself is not pushing the developers to do the consultation, because they want the development.

The consultation need to be happened as a learning cycles, and not happen through setting the questions that need to be asked and distributed earlier, and also setting the answers earlier as well. So, the consultation needs to 'Consulted'.

I think BREEAM Community could play a part in that, and emboldening the local council to be more doing this…they can do it in a governmental level, through putting the building rags, but, it's difficult, for any kind of restriction that could be happening, especially with something that is 'open ended' and 'expensive' like the consultation process.

As a professional, I do not think the Quays are considering as natural environment at all, but it's a reclaimed piece of industrial heritage, but there is nothing natural. But, I think for the site and the community facility, compared to before, in 30 years ago, so, it's interesting that the people having the perception of the natural environment.

However, I'm not surprised about the social aspects; Salford Quays has been a place for high quality jobs, with relatively high quality housing, and well paid jobs for professionals. I think the community should not think that they should send their kids for school in their neighbourhood only, what it should be only MediaCity? When the benefits should be for society as a whole, behind the MediaCity. However, I think this is still a challenge. Which this question is important to be asked however, that after 30 years of working on this site and the infrastructure, are the communities alongside the sustainable project benefited from the development? I think perhaps, but how their lives improved, and whether that because of the sustainability of or the Quays development, I really do not know. So, I think it's important to put the social infrastructure as important part of the development, and I think in MediaCity, it's like Manchester city council lots of housing, lots of apartments, lots of people living there, but how the social infrastructure is still not there.

I'm not surprised if the people think that this place is not suitable for families or children, however, I think this thing is still a challenge in MediaCity and elsewhere.

I think in B.C. this thing should be considred not only in MediaCity, but in the communities around MediaCity, through making facilities for the MediaCity community and for the external community as well, to be both benefited. Because, for the people of MediaCity, they have a challenge which/where the schools that they should send their kids to?

Interviewee Two_ Media City Developer:

Theme _ one: Community management and performance of facilities:

For this theme, I think Media City can affectively deliver this theme.

I think the mechanisms are in place to happen. PEEL are the main developers and owners of this project. They rent places for tenants like the BCC, ITV and offices, people are bought here like Holiday Inn, and people who bought apartments the PEEL sold apartments, and like this building the Heart. So, the combination of people who rent the property and who own it, and there are another category, the people who work here, or the people who study. So, with combination of people, PEEL have different management companies on site, supplementary companies who are responsible for operating the cleanliness of the site, safety, the energy systems, all these kind of things, people come to us, who live and work here, basically they come to us to tell us what is happening, reported to us, sending to us bills to pay these things.

So, there are these mechanisms in place. In terms of they are working, I think there are problems, in terms of (leak) in the buildings, which good construction should be happened, but, unfortunately, there are in these years reports back to the management companies and developers from the residents, they want to deal with it. Communication process is in place to manage/maintain facilities. However, it should be said that because this place is sustainable, many people are buying apartments/investments in this place, but they do not live here, they rent it for tenants. They do not worry about the property, but they worry about the tents when they do not pay rents! So, communication can break down. Some landlords can text the tenants, for example when the water leak happen in the lift, so they were told that the problem solving will be done in two days, to be informed. Otherwise, people want to know how these thing are happening, who they can call and how these problems are fixed. So, the communication is extremely important, for maintain performance.

About the feedback on this theme, I think they are all correct. Certainly, the building are constructed with sustainable strategies. Which, definitely, B.C. holds credits for that, however regarding the operations of building and facilities, there are changes happen with the management companies, because the developer was not happy with the management company, and the new management company seems to be community orientated, and communication information, however, to what degree that on a sustainable issue, I doubt, I think we should do better, and not only reporting problems. So, the response to complain if you like or problems, will be where a good management existed, by telling the people about performance of the building, what ex, energy system we are using, water consumption, carbon emission in site...etc. and that's not happening. I agree with the community there is no information about the strategies of this buildings for the residents, there is nothing.

For the adaptive behaviour, I think there is an encouragement for the people on the recycling issue, which the idea behind B.C. is to have three recycling in the kitchen area, where you have to recycle regularly, and separate the rubbish, and take down to the recycling point down on a daily basis. But, no encouragement on the water use, just the recycle. I think the idea of changing behaviour is difficult. But the idea of BRE is difficult. I do not know how we should influence the behavioural change to become more sustainable.

We got low energy light in the buildings, and more effective controls, but I think for the occupant's behaviour, I think the building has failed by not having enough automatic operation in apartments. As the lights go off in the corridor, that doesn't require the people to do anything. But I think the heating controller is disappointed, as the other parts of the UK. About 'water' there was a leak happened in my apartment in the tap, I have been told by the water company that my water consumption was higher than normal, so, I think that was interesting. And they told me to look out, so, then the water reduced. However, this is general information, not something detailed.

I think B.C has really make good job for the building sustainability, but for the social part, I do not think. But, I think at least, there should be on the ground, posts, saying that there should be explanation for the strategies and the sustainability, for the locals, like a 'Museum' to show what is special about, for example the 'Plant' in MediaCity, why its important. The people do not know that, only the experts know. I think with having these posts, we will know the feedback, and the support, and that's will be good for the people who reported that there is no information. Which in this case that will make us know the 'Historical' issues, which are import part for the sustainability solutions. I think when telling people about the impact of sustainable strategies, that will make people 'proud' & 'knowledgeable' to see why this approach is right for everyone. However, we do not know, I do not know! But we should know.

Therefore, I agree, about no information for the impact of this development on the climate. The enhancement can be done through more attention on the sustainable factors, and that the whole development, PEEL, management and others should follow the sustainable practices. So, more focus need on BREEAM operational process. I think B.C. operations shod be followed, not only for the design and development only. Second, I think, there should be a communication of the success with other sites/cities; communicate these strategies with whole Manchester, to show them what we were doing, this is results.

So, the management companies should have monthly, or even annual reporting systems to say this is the criteria, and this is how we were doing. I think these feedback should be sent to the local community first. I think the council should be more involved with the development and the outcomes, to know whether should follow the same criteria for the other stages here.

However, there is a difficulty in communicating this issue with other developments and communities, because of the changes in PEEL, and in the staff of BRE. So, the communication of sustainability issues is still depending on individuals, and not on organisation that can kept the work and to make it better for the next time. Besides, the people are changing their jobs, addressed, the economy, all these can affect the development process and the communications.

Theme _ Two: Community Improving Wellbeing or Livelihoods:

I think despite people are coming and going in MediaCity, but there is an atmosphere for community. There is a social media going on the feedback platforms. I think for the health aspects, there is positive feedback from the people regarding that they can run walk, have pleasant atmosphere that encourage the people to do the sport, along the qeuys, and parks besides the gymnasium and other facilities not in this site, but close to here. Which that is a part of B.C., that to address the link between the community with other districts or communities, by having the gym across the Lowry, so as to extend the community to the other parts, to make it big and connected community.

However, as Mediacity is about technology or digital world, there is a UCT (University Technical College) for students to focus on digital learning technology designs, so education is available. However, I still agree that this area is not suitable for families. I think when they done it they put the apartments buildings, to satisfy the young professionals who work in the Media industry, so that the BBC people who come from London to able to work here, however, it's not developing to a proper community, and there is a ned to a family base. I think the apartments maybe should be children apartment. So I do not think the MediaCity apartments are suitable for children, and certainly no schools here for young students.

I disagree about the canal is not clean, I think it's clean, It's much better, It was really dirty, before, if any person drink from the canal, when he should be taken to the hospital, or probably you will die. Now, it's cleaner. Now the water is oxygenated, and that to kill LG and other kinds of plants, so the risks in the water of bacteria growth is reduced. And the docks are using for swimming, and now the water is continued to improve. Even for the heating system of MediaCity, the renewable strategy, the water should be filtered before putting back to the canal, because we don't want dirty water for our

equipment, and also we oxygenated as well. So, the result is that we use the water to cool our equipment and give us low carbon energy, and in so, we clean the canal deliberately, which is part of the outcome.

For enhancement, it could be done reporting on the development, with monthly reports about these implemented strategies with statistics to show for the local communities here. by sending emails and websites, or using an app, it could be (MediaCity App) , to tell the people for example that the water quality is measured this week, and it's found that its better this year than last year., however we do not have that communication, and that's the failing really.

I think there is a business here in the Lowry, and they should be think of MediaCity as a one community, and not with a way that have a competition, so they should benefit from the site here. And that what B.C. is all about. So, even if there is no nursery here, and it's near the site. For the parking, there is parking, but it's very expensive. It to drive people to not to use the cars, I love car however. There are excellent busses, trains, walkways, shops and everything, so no need to drive around the site. However, they should think of transferring or buying furniture or having visitors. And that's why the developers have misuse the ide, through becoming more stringent, with the fine on cars parking, and the people feel ripped off as a result.

For the effects of the risks, particularly, the flood, people think that the building are built in the right place, flood risk are dealt with it, and I do not think Media City is in risk of the flood. However, Liverpool could be in the risk of flood, when high rise level is above 3 meters, and that could back up here. But, still sea level rising is a big problem.

Theme _ Three: Community knowledge Awareness and learning:

I think in general, in MediaCity, there is a level of training people and for delivering special programs or internships, so more work opportunities here for the young people, and to get in the industry.

For the knowledge issues, there is a need to make all Salford as a sustainable city or community. I think the council needs to be more supportive and insisted on the importance of sustainability that if you want to make a development in Salford this development should be sustainable, to encourage people on living in a sustainable way, and that if you want to live here, then it should be in a sustainable world, and there is a training and education that should be available for this purposes.

So, I think Salford City Council should be doing more when it comes to make the community more aware of sustainability matters and to encourage the whole developments to be sustainable, for better future, and not to focus on employment issues, and taxes..etc.

However, there is a problem regarding the knowledge and awareness, when it comes to individuals, that some people like the developers, they do not want to listen, its correct, because they are busy doing other things.

I think because the developers here are staying for five years, and the to another project, but the local community are staying for longer term, so, the engagement with the local community early one, to know what they think, what's there feedback, is important, about what sustainability means is really important. However, here, through the people are not fully aware of sustainable features and how they can use them, and the developers probably do not listen to things that ….

Theme _ Four: Effective Flexible Collaborative Actions

BC needs to focus on connecting the community with the top-down governance actors. through the early engagement is important to be undertaken and enhanced through BC role. Particularly regarding the process of connecting them and to get the feedback is really important. The engagement through the developers is not valid. However, despite that the community changeability, having a general opinion an apply that, that can make things going forward positively. However, this could not be done without 'Educating' people about what is sustainability and how they can use the facilities, they will not be aware. Otherwise, this will make sustainability work against you.

There is still a need to advertise the engagement and the meeting organized after the occupancy stage, particularly in projects when the development is still on. What happens is that the people say their opinion, and the developer ignores it. However, these meetings ae not 'interactive', but they are 'informative'. The community is only listening. However the engagement process is not good. In BC, the consultation plan is good, but whether the people following it. I do not think so.

Even the people are staying for few years, they still have opinions, and they are the community, and their input is important. The community needs to communicate their ideas, and if they have plans, or something they did not like to speak about it, however in general the consultation process is not enough.

The communication between the community and experts is not an issue in terms of the technical language and interpretation of ideas. However, this process is still dependent on the experts' personality and their way of accepting the ideas.

Theme_ Five: Continuous Evaluation & Monitoring

The buildings are built in the right place, and the flood risk assessment is done. The protection from flood is done, through the ship canal. This is the importance of BC. That considering the avoidance of risks through selecting development site. Media City is not at risk at all. However Liverpool is and that could be back up here. Media City is designed to face and get rid of rain

Theme_ Six: Knowledge, Awareness & Learning

Regarding the learning in general, BBC and ITV are important to encourage the learning for the Salford Students here, through learning and training programs and work opportunities, which this is important for the economic aspects of this project. Not only BBC. There are small companies here. This is important for the students to make jobs available for them.

I agree about the importance of MediaCity website for the knowledge building and awareness for community about their development and community matters. Salford City council should have embracing opportunities for the whole Salford to be sustainable. The ways that the strategies are communicating and advertised about the sustainability of the place and the choice of living here means that you are living in sustainable world, is important. Focusing on developing community knowledge and awareness about their place is important; however the unemployment and taxes are having the priorities for the council to focus on these matters. However, for the sustainable future, we need a sustainable world. Another challenge is the communication.

BC needs to create better sources for community awareness through the engagement process. Building orientation and open spaces, plants, sun-light are all considered in MediaCity and make good natural environment. The parks here are important regarding the linkage among the spaces and for the site connection and movement. However, there is a need to more focus, and to have more open spaces and parks here and having green roofs on the car parks. So, there is a need to more greenery.

- **Interview Three _ Behalf of Salford City Council:**

Theme _ one: Community management and performance of facilities:

I think it depends on defining what a community is. I believe I'm part of MediaCity team and design and I also live near MediaCity, few miles away.

I think the biggest challenge for BREEAM community as well as for buildings is the sustainable strategy whether water or another sector, is that you put the plan and then communicating the strategies, and that's is difficult. The community population is changing, particularly at the beginning, you lost that bit. So, the strategies are there, but how they influence behaviour, this is not existed. However, the biggest challenge we have is translating the strategy into behaviour. I think even if the information is given about sustainability for the population, people are moving, thee community is transit community, so they will take their information when they are moving. So, I think even if people are knowing that this is a sustainable pace, but they are still not know how to use it in a sustainable way. Which I think the feedback is by the community or when giving it to them is important, but it's a challenge for any sustainable strategy, for the level of to use things or should not use.

I think here is an information, but it might be in a position where the users cannot get to them and use them, if it's, they can be very technical, or brief for the engineers or contracts or architects, and not appropriate for the users. These are technical specifications. And these things are changing, so, finding the new things and update could be not available for the users. It should be said that the management of site and building are changing, and it takes time for the new management to know what are the needs, and the users, and how to adapt to this, besides there are tenants, who might also have another understanding of sustainability. So, every time, the users or tenants of the building are changed or the managers, which this is normally back how things are normally doing, and that the essential things at the start might get lost. It's not always like this, but this is the natural play.

I suspect that the main drivers for risks assessment are the responsible for the delivery of facilities and strategies. For the adaptation to C.C., I think it's addressing by BREEAM Communities, which this thing should be a part of the development process. While the flood risks assessment is part of the planning requirements to do. However, I'm not saying that the other are not part in there, but, they are less explicit. The Quays themselves are not that difficult in flood risks assessment, they are very dependent on how the ship canal maintained, because the ship canal are part of the flood defense systems for greater Manchester, so if things are not there, then the site will get flooded. So, the key here is the water quality. Which to compare the water quality with the 1990s, It's much better than it used to be, so there is a real emphasis on this issue for a while. There is a distinction between water qualities in the Quays itself, which have been decreased very dramatically, and the water quality in the canal, and the water quality in MediaCity, however, the decreased could not be done withouht the collaboration between all the partners, however, there is an emphasis on doing that. However, I do not think that the inclusion of B.C. has helped in this issue, because, MediaCity is not depending on the water quality issue, but they can influence.

For enhancement, and necessarily in B.C, I think coming with a strategy that is simple to use is important, and that with thinking of the people, and how they are doing these strategies without thinking, is an important issue, So, making information that is easy to understand and to be accesses should be done ultimately, because the more complex the thing to be, the less sustainable it can be.

Theme _ Two: Community Improving Wellbeing or Livelihoods:

For me as a professional, I do not think the Quays are considering as natural environment at all, but it's a reclaimed piece of industrial heritage, but there is nothing natural. But, I think for the site and the community facility, compared to before, in 30 years ago, so, it's interesting that the people having the perception of the natural environment.

However, I'm not surprised about the social aspects, Salford Quays has been a place for high quality jobs, with relatively high quality housing, and well paid jobs for professionals. I think the community should not think that they should send their kids for school in their neighbourhood only, what it should be only MediaCity? When the benefits should be for society as a whole, behind the MediaCity. However, I think this is still a challenge. Which this question is important to be asked however, that after 30 years of working on this site and the infrastructure, are the communities alongside the sustainable project benefited from the development? I think perhaps, but how their lives improved, and whether that because of the sustainability of or the Quys development, I really do not know. So, I think it's important to put the social infrastructure as important part of the development, and I think in MediaCity, its like Manchester city council lots of housing, lots of apartments, lots of people living there, but how the social infrastructure is still not there.

I'm not surprised if the people think that this place is not suitable for families or children, however, I think this thing is still a challenge in MediaCity and elsewhere.

I think in B.C. this thing should be considred not only in MediaCity, but in the communities around MediaCity, through making facilities for the MediaCity community and for the external community as well, to be both benefited. Because, for the people of MediaCity, they have a challenge which/where the schools that they should send their kids to?

Theme _ Three: Community knowledge Awareness and learning:

I think regarding the feedback of the communities that it's good to hear that Role of Salford City council is positive here, I think regarding sustainability aspects, the council has been always proactive in enhancing the water quality and the sustainability of the Quays as an important central part of Salford. And for the developers, I think they should have a better role to influence the sustainability issues, that I think they should focus on making the information accessible or available to the people, and managers, rather than focusing on the economic aspects, and then to make the changes in the management teams, as a result, which will affect the process of sustainability. Most the time, the developer business scheme is built to address s the benefits of the scheme in the short term, so, maybe, a partnership with the Salford Council on the intentions of making the translation of issues with the local on both shorts term and longer, which I thing good developers should make this thing happen. And maybe both contractors and developers can do this, so, people can see that both are doing this.

And I think a good developer should make a good relationship with the local communities. However, finding a representative of the local communities maybe an important issue, and not the responsibility of the developer.

I think for knowledge, interaction, wellbeing, I think the connection between the various communities is important thing to be considered through the role of B.C. so, its not only the connection between the Media City community, but with Salford, and even with Manchester, however, this is difficult. But I think its part of B.C. role.

However, this is a mixed development, with a previallged setting of people, and with benefits that to be get from this variety. I think it's like a city centre, but its still not as the city center, when there is a lively way of living in the night.

Theme _ Four: Effective Flexible Collaborative Actions

I think for the planning, or the development, it's like Manchester, It's a business place. I think there are competing opinions about the process that some people want to be involved in these buildings. So, I think the idea of having a community is not existed and it's harder to be found, rather it's a re-generated projects with implemented sustainable strategies. I think it's a dynamic issue, and that the

ways the things are developed, it will be changed on its own, because it's hard to see how things are happening in 30 or 50n years. There is nothing surprising in the people feedback here, and the project is new.

It's all about what people are expecting when they moved to MediaCity.

Even I was working on the behalf of SCC, but I do not know about the areas of consultation plan, engagement, and management explicitly.

About BREEAM Communities

I think they should be as Intermediaries, especially now, the development is neighbourhood is still under development and constructions, and local communities are still a part of the process. I think they should more involved with the communities of different phases, starting from the communities of phase one, and how that influences the development and the community identification. B.C. should help with that, through creating a stable community, which I think this was difficult issue in MediaCity.

So, this will back on what is a community? What to expect in living in this place? How to be involved in the community? And with other communities? And how to communicate your needs, demands, and experiences for a better community?

Theme_ Five: Continuous Evaluation & Monitoring

I think about adaptation to C.C. maybe the local communities will not know anything, because there is nothing is required from them. If they were been told to do something or know anything about adaptation that will make it different.

I think MediaCity is not that big ion these issues, I think making better lives for people and better built environment is what are there.

I thing if the new tenants that are not part of the initial consultation phase, there should be an operational phase, where they can participate in.