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Archetypes of translation: recommendations for engagement

Abstract

This paper reviews 128 works on translation in management studies and identifies four perspectives (diffusion, actor-network theory, Scandinavian Institutionalism, and organisational boundaries) which are argued to be underpinned by four relatively disparate theoretical archetypes (scientism, actualism, social constructivism, and symbolic interactionism). It is argued that, individually, these archetypes possess strengths and weaknesses in understanding translation, yet are relatively incommensurable, which mitigates against inter-perspective dialogue and the insights that this might promote. With illustrations, the paper suggests that the stratified and emergent ontology proposed by critical realism can provide a more inclusive foundation for inter-disciplinary engagement on translation, which combines many strengths and ameliorates several weaknesses of the individual archetypes.

Key words: translation, philosophy, communities of practice, boundary objects, critical realism, Scandinavian Institutionalism, social constructivism, interactionism, actor network theory.

Introduction

Over the last fifteen years, 'translation' has become a popular theoretical device in management and organisation studies for understanding how change is effected through temporal and spatial movement (Czarniawska, 2010; Doorewaard and Van Bijsterveld, 2001; Mueller and Whittle, 2011). Yet, there is considerable variation in what researchers claim translation is and does, in terms of both the object and process of translation (compare, for example Sterling, 2003; Roepke et al., 2000; Bartel and Garud, 2009). Some for example, use

the term metaphorically, as 'translating strategy into practice' (Sterling, 2003: 31); others see translation as creating 'a link that did not exist before' (Bartel and Garud, 2009: 108), and others still take the word to concern the process by which 'actors convince others to join their cause' (Luoma-aho and Paloviita, 2010: 50).

To some extent, this diversity is a strength - certainly, some forms of 'interpretative flexibility' are important in contributing to the spread of ideas (Astley and Zammuto, 1992). Yet, there are also potential disadvantages in different uses of a term: many studies, including those cited above, do not acknowledge alternative interpretations of 'translation'. Without clarifying exactly what is meant, this can cause confusion or misunderstanding concerning exactly what is being argued: in their analysis of re-readings of DiMaggio and Powell's (1983) classic paper, Mizruchi and Fein (1999: 658) argue that disparate interpretations 'do matter....If one fails to consider alternative accounts [this can] not only misrepresent the theory on which one's analysis is based, but also provide a limited and biased picture of the processes one is trying to describe'. Moreover, as those in communication studies have argued, when a word or concept is too strongly embedded in a particular philosophy, discourse or community, it not only becomes difficult for other traditions to engage with the term, but also for researchers within that community to gain novel insights from 'outside' their grouping (Lattuca, 1996).

This paper argues that an important reason for the differences in interpretations of translation is the variety of theoretical archetypes by which they are underpinned. By 'theoretical archetypes' I mean the assumptions which inform the ontological, epistemological, and methodological choices that researchers make (Parker, 1998: 33). These archetypes form guiding principles for researchers rather than strict templates, but provide relatively coherent logics by which the world is understood and described by researchers (Al-Amoudi and O'Mahoney, 2015). Although these archetypes are often implicit rather than explicit, it is often possible to tease out the theoretical assumptions of researchers by exploring their methodologies, language and theory building (for example, O'Mahoney, 2011). These archetypes are important, not only because they tend to inform the 'domain level' theorising and methodologies by which academics conceptualise their fields of study (Fleetwood, 2005) but also because differences in archetypes can lead to

'social scientists remaining in their methodological and philosophical siloes' (Kyriakidou and Èzbilgin, 2006: 306). Certainly, in studies of translation, a wide variety of philosophical and methodological traditions are drawn upon, from Latour (1987; 2007) and Sérres (1982), to Strauss (1959) and Blumer (1962), but, as we shall see, what these different foundations mean for translation is not always clear. I therefore seek to answer the following research questions: What are the theoretical archetypes of studies of translation? What are the consequences of these different archetypes for studies of translation? How can these archetypes of be developed to enhance translation studies?

To answer these questions 128 articles about translation are reviewed from which three arguments are generated. First, the paper identifies and describes four overlapping theoretical archetypes which underpin different interpretations of translation: the scientism archetype evident in diffusion studies, which tends to count management innovations and correlate this with independent variables such as geography, personal networks or adopter characteristics; the actualist philosophy of Latour's actor-network theory (ANT) which traces the networks that link and construct empirical events; the social constructivist archetype in 'Scandinavian Institutionalism' which emphasises the translation effects of local discourses and micro-politics; and the symbolic interactionist philosophy which underpins inter-group communication across organisational boundaries.

Second, I show that whilst each perspective emphasises something important about translation, each possesses weaknesses that stem from their philosophical assumptions. Moreover, these assumptions mean the archetypes are all but incompatible, and thus often fail to engage with each-other, missing opportunities for a richer and more inclusive understanding of translation in a variety of forms. Finally, the paper points to, and illustrates, the potential of critical realist philosophy as a foundation for more constructive dialogue between archetypes. Critical realism (CR) is based upon an emergent, stratified ontology which accepts epistemological relativism. This foundation allows it to incorporate many of the strengths of the archetypes (e.g. including different theoretical concepts such as discourse, social structure and networks) whilst ameliorating many of their weaknesses. CR, I argue, provides a basis upon which different types of translation might be studied through a

variety of different methods, encourages inter-disciplinary dialogue, and opens possibilities for new research directions.

The paper is structured as follows: after a detailing the methods, I review the literature and abduct four philosophical archetypes which underpin different perspectives on translation. It then details each archetype and illustrate how they often mitigate against constructive engagement with other perspectives. Finally, the paper argues that critical realism may offer a more ecumenical ontological foundation for translation studies, and detail three illustrations of critical realism engaging with themes of translation.

Methods

Literature Review

The research undertook a structured literature review (Tranfield et al., 2003) based on ABI/INFORM databases. The review used the search terms 'Translat*' (to cover translation, translating, translate) and 'Manag*' (to cover manager, managing, management) in *Anywhere But Full Text*. This returned 15,081 results, which were narrowed down by limiting the search parameters to scholarly peer-reviewed articles written in management and organisation journals between 1990 and 2014. This left 348 articles for which the title and abstract were read. This review identified and removed articles concerned with translation in a technical sense (e.g. 'the paper was translated into French'; 'foreign currency translation'). Book reviews were also removed from the results. The remaining 156 articles were reviewed in more detail. It became apparent that many (n=83) of the articles used 'translation' only in a colloquial or metaphorical sense - primarily passing statements (usually in the abstract) concerning the importance of 'translating' strategy (or vision or rhetoric) into practice (or action or reality) - these were set aside. This left 73 articles which focused on the translation of management knowledge in various forms.

It later became evident that this 'top down' structured review was not entirely representative of the translation literature, for three reasons. First, because many influential pieces on translation in management studies had been published in books rather than

journals; second because the ABI/INFORM database of management journals excluded some fields which have made important contributions; third, because several pertinent papers did not include the key words 'translat*' or 'manag*' in their title or abstract¹. To ameliorate this, a bottom up 'snowball' search for influential articles was made (Greenhalgh and Peacock, 2005) using a manual search of the bibliographies of the 73 articles to identify other work on translation (which generated 45 new pieces), the recommendations of three seminar audiences (six new pieces) and two reviewers of this paper (four new pieces). In total, this added a further 55 pieces (28 articles and 27 books or chapters) which included the influential edited collection by Czarniawska-Joerges and Sevón (1996) and many articles published in communications journals focused on boundary objects². The full details of these publications may be found in the online version of this article on the publisher's web site.

Analysis

In order to answer the first research question, the 128 publications were coded in three ways (Appendix 1). First, according to their metadata (i.e. date, journal, author etc.). Second, around the statements they made about the process, target and outcome of translation. The latter was achieved by recording instances of *what* was being translated (e.g. material entity; an idea), *how* it was being translated (e.g. by being copied; evolving) and the *outcome*. Similar instances were grouped together and given higher level codes. Third, the theoretical assumptions of the pieces were elicited through in-vivo coding and abduction (O'Mahoney and Vincent, 2014): in most cases, papers were explicit in their assumptions (for example claiming an anti-essentialist position or by citing Latour), and these claims were recorded as in-vivo codes. Where papers were less than explicit, the author undertook abduction (interpreting the assumptions made in the papers with reference to extant literature on social science research and theory³). From this process, four slightly overlapping theoretical

¹ I am grateful to an anonymous reviewer for emphasising this point and pointing me in the direction of new material.

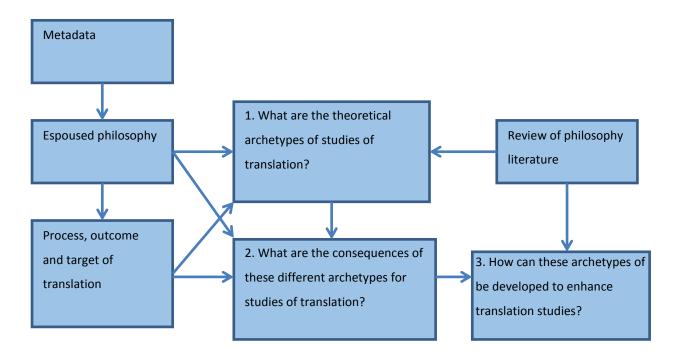
² It should be noted that including a bottom-up 'snowballing' approach to a literature review can mean more analyses are included, but the replicability of the study is decreased.

³ The abductive process involves examining the 'most plausible explanation' of why events occur, usually drawing on extant theorising. In this instance, recent social science theory and research texts such as Porpora

archetypes were abducted which accounted for 85% of the publications – the remainder either did not engage sufficiently with theory to be categorised, or overlapped two positions. The overlap generally concerned two areas. Firstly, some papers claimed one position usually a Latourian-inspired ANT analysis (for example, Lindberg and Czarniawska, 2006; Malsch et al., 2011) but actually performed something else - usually a social constructivist analysis. Secondly, three papers combined Scandinavian Institutionalist and Organizational Boundaries approaches. For the most part, however, there was a fairly clear distinction between positions that could be seen in the paper's own claims, the terminology used, and authors cited.

⁽²⁰¹⁵⁾ and Al-Amoudi and O'Mahoney (2015) were drawn upon and compared to the assumptions made in the sample to identify the theoretical bases upon which they built.

Figure 1 Coding and Analysis Process



To answer the second question, the papers were examined to see how different theoretical archetypes enabled and constrained the studies in question. This involved a descriptive step examining how the ontology, epistemology and methodology of any archetype were related, and how these influenced the focus of researchers in their analyses. This was achieved by describing how the codes for each archetype were linked with the relevant process, outcome and target of translation. For example, social constructivist studies often expressed anti-essentialist claims to study the discursive translation of management ideas into a local context, often conflating discourse (epistemology) with reality (ontology), and generally using discourse or conversation analysis to study these phenomena.

The final research question was answered in two stages. First, using the outcomes from the second research question, a comparative step examined the differences between the archetypes to explore their similarities and differences. For example, both ANT and diffusion studies prioritised the empirical events that occur, but neither tended to focus upon less visible factors such as communication or discourse, that were prioritised by the other perspectives. Secondly, opportunities for developing and engaging the archetypes were examined abductively in a review of the extant literature on social and organisational

philosophy and theory (e.g. Marxism; Bourdieu; network analysis) with a view to finding theoretical positions that might provide a basis for combining, reconciling or extending the archetypes detailed above. This also involved examining theories that had proved useful in overcoming siloes in other debates. It was through this process that critical realism was identified as having potential to contribute, partially due to its inclusive ontology, but also because elsewhere it had bought disparate perspectives together (e.g. Chouliaraki and Fairclough, 2010; Bentall and Pilgrim, 1999)

In the next section I examine the four overlapping theoretical archetypes in more detail explaining what each means for translation, and the opportunities and limitations of each position.

Archetypes of Translation

Diffusion studies: the archetype of scientism

Statistical studies of the diffusion of management innovations accounted for fourteen of the papers identified in the search. Most of the fourteen texts, reflecting much of the wider work in this area, studied the diffusion of management innovations from a statistical perspective, using 'extensive' methods (Sayer, 2010) such as surveys, and often paralleling studies of diffusion in the natural sciences such as pathology, epidemiology or demography (Rahmandad and Sterman, 2008). Studies typically count instances of say, TQM, ISO standards, or BPR, in journals, newspapers or internet searches (e.g. Ehigie and McAndrew, 2005) and correlate their temporal and geographic spread against independent variables such as geography, personal networks, or the characteristics of the adopters (e.g.Ceci and lubatti, 2012). The innovation itself, generally presented at the population level, is often depicted as, or assumed to be, relatively unchanging. When change to an innovation does occur in these articles, it is generally through the evolutionary process of variation, selection, and replication (e.g. Scarbrough et al., 2015). It is in this context of Darwinian or 'memetic' evolution, that 'translation' is used in this sample, though often in a colloquial or undefined manner (e.g. O'Mahoney, 2007). As noted by others (e.g. Czarniawska, 1998), this form of 'translation' concerns changes to the properties of an innovation at a population level as it diffuses through what is often presented as the rational choices of managers (e.g. Iwai, 1984).

Although there are exceptions (e.g. Rogers, 1995), these studies tend towards what some might call a 'positivist' ontological underpinning. However, as 'positivism' means many things, some have argued that 'adopting this label may embroil us in a distracting debate about which version of positivism we have in mind' (Fleetwood and Hesketh, 2006: 1979), and instead use the word 'scientism' to describe the effort to describe the application of natural science methods to social science. Certainly, the methods used in these papers are empiricist and atomist, focusing on the recording of discrete events, and often assuming a relatively unproblematic correlation between epistemology (data such as citations) and empirical reality. This 'naïve realism' is such that 'the appeal to facts...involves collapsing statements into their referents, thought objects into real objects. It thereby appears to appeal to the facts themselves, the way the world is, in an unmediated fashion' (Sayer, 2010: 42). This perspective also tends to assume a degree of objectivism - an unproblematic match between empirical reality and the reporting of that reality (through surveys or citation counts) to the researcher. Methodologically, the analyses in the sample tend to be based upon statistical regression or correlation analyses, which take the relationship between empirical variables to illustrate generalisable laws that would be expected to apply to other examples of diffusion (for example, Schmittlein and Mahajan, 1982).

For translation, the diffusion framing often implies that change is 'subject to the laws of physics' (Czarniawska, 2012: 12), such that when variables A, B and C are in alignment, an innovation or idea will spread, or be implemented, 'successfully'. For example, Waarts and van Everdingen (2005) argue that national culture – or more precisely, Hofstede's (2001) measures of national culture - 'highly significantly' *explain* variance in the diffusion and adoption of ERP systems, with the generalisation that 'we can safely conclude that national culture does influence the individual adoption decisions of companies' (p.608). Even ignoring the fact that most of Hofstede's measures were taken in 1980 and in this paper are used to explain adoption rates in 1998, there are at least three more issues with the research assumptions in the paper. First is that the proxy measures of ERP diffusion are 'explained' by their correlation to measures of culture. Regardless of the accuracy of both these measures

(and for the latter there is considerable critique) the correlation or relation between two sets of events (reports of ERP and completed questionnaires about culture) are taken to be causal with no understanding of *why* or *how* the two may be related. This form of empiricism can only generate 'thin' (Fleetwood and Hesketh, 2010) explanations based upon the conjunction of events rather than an explanation of *why* these events might be related.

Second, this empiricist conception of culture also misses its recursive implications influencing the (self-reported) categories that are being measured by the authors. For example, if we found that national culture influenced the way people completed questionnaires, or even reported innovations, then the potential of the analysis to achieve its aims is questionnable. Absent too is a discussion of reverse causality such that the factors which may be associated with ERP (such as large profitable companies, developed economies, educated managers, neo-liberal governance) may have an impact on culture. Finally, the conception of the individuals implied in this studies (the person that fills out the questionnaire, decides to adopt the innovation, or reports on the innovation) is particularly one-dimensional, or often invisible - it is assumed that the individual acts according to the cultural mores of their society. Such a depiction of culture is an example of what Archer (2000) terms 'downwards conflation' – the theoretical derivation of personal characteristics (such as decision-making) from macro-level entities such as culture or social structures. All this is not to say, of course, that regressions are not useful – the paper certainly points to phenomena that are worth further investigation, however, the underpinning empiricism in studies of diffusion means it is often of limited use in *explaining* why an idea or innovation is translated (or otherwise).

Actor Network Theory (ANT): the archetype of actualism

Latourian ANT studies take a very specific approach to translation, which is represented in around 33 articles in our sample.⁴ Here, translation primarily concerns the attempts of actors to change the interests or representations of other actors in order to enrol them into

⁴ It should also be noted that a few papers that used translation in the full Latourian sense did so, not for illustration, but for critique (e.g. Letiche and Hagemeijer 2009).

an empirical network (e.g. Luoma-aho and Paloviita, 2010; Greener, 2006). Translation for ANT is profoundly anti-essentialist, acting on empirical relations (seen as temporary 'events') between actors that are accorded properties through these connections (Latour and Woolgar, 1986; Latour, 2007). The ontology of ANT, therefore, is 'proudly' actualist (Harman 2009: 16), rejecting social structures or invisible motivations in favour of highly empiricist commitments to tracing 'what happens' in local contexts (Latour, 1987). Whilst, *ontologically* realist, ANT is epistemologically constructivist (Lee and Hassard, 1999; see also, Elder-Vass, 2008), in that whilst real objects exist 'out there' they come *into* being through the practices of science (Latour and Woolgar, 1986). Indeed, as it is the *network* which lends properties and powers, humans and non-humans are treated *symmetrically*: things are only what they 'come to be in a relational, multiple, fluid, and more or less unordered and indeterminate (set of) specific and provisional practices' (Law and Mol, 2008: 365). For this reason, ANT often de-centres the human from its accounts, and emphasises the agency of 'material actors'.

In our sample, ANT studies used intensive methods such as ethnomethodology (Sayer, 2010) suited to 'following the network'. For translation, this often resulted in an emphasis on *interessment* - the translation and institutionalisation of the interests of actors to enable the spread or implementation of innovations. *Interessment* in our sample primarily concerned the use of rhetoric, persuasion, and argument to shift the interests of actors in order to build alliances that enabled 'successful' implementation of innovations (e.g. Robinson et al., 2010). Often such efforts involved the creation of an 'obligatory point of passage' whereby the representation, and thus construction, of actors is colonised by one group (e.g. Luoma-aho and Paloviita, 2010). Other ANT papers focus on the translation of an entity *through* an actor-network. For example, Sandhu et al. (2008) detail the differentiated translation of a balanced scorecard implementation through a network of human and non-human actors. This approach is consistent with ANT, but focuses not on the establishment of an actor-network, but the subsequent spread of 'tokens' across that network (Latour, 2007).

Following an actor-network, however, requires methods sensitive to chains of empirical instances of translation, often spanning geographical and temporal distance. As such methodological largesse is beyond the scope of many papers, some (e.g. Bruce and Nyland,

2011) focused instead on the translation of agentic interests in enrolling one specific actor. More importantly, however, the ontological strictures of ANT caused many of the reviewed papers to encounter difficulties. Harrisson et al. (2002), for example, use ANT to examine a change project at a multinational company. Based on a view of ANT that, 'to obtain the consent of actors and form an alliance with them, their desires and needs must be interpreted', the analysis sought to understand how the innovation was 'presented, discussed and debated' and how the interests of actors were translated using 'appeals, persuasion and use of convincing language' (p.148). To achieve this, the authors highlight how interessement was attempted by emphasising messages of job security and higher wages. However, the highly actualist ontology of ANT, which rejects the concept of social structure, results in an analysis which excludes the wider social forces that might play a significant role in understanding the workers' capacity for resistance such as national culture, employment levels, firm ownership, national laws, and class. For example, the ability of, say, migrant workers to resist a change in China (Smith and Pun, 2006) is probably significantly less than the skilled engineers Harrisson et al. studied in Canada - yet as the analysis focused solely on how the innovation was presented and debated, we are given little idea of if, and why, this might be the case.

In highlighting the importance of empirical networks in enabling and constructing change, ANT's methodology provides powerful insights into *how* translation happens; However, by rejecting social structures, and the power which this implies, *why* translation happens is often left unanswered⁵ (Elder-Vass, 2008; Porpora, 2005). For example, both Guilloux et al. (2013) and Strong and Letch (2013) use ANT to describe *how* the translations of interests that enabled IT-led change in their cases. Yet, both struggle to explain *why* key actors such as regulators played such a powerful role without recourse to structural explanations. Others, such as Harrison et al. (2002) struggle to restrict their analysis only to actual events, often using emergent concepts such as roles, routines or social structures which Latour explicitly rejects. This limitation is especially evident when seeking to understand the complexities of

⁵ This is a tension that Latour embraces and 'very deliberately seeks to elide "how" and "why" questions' Bijker WE and Law J. (1992) *Shaping Technology/building Society: Studies in Sociotechnical Change,* USA: MIT Press.. Yet, clearly the answer to (for example) 'how was TQM implemented?' provides little insight into the question 'why was TQM implemented?'

change in organisations, which are by their nature highly structured and emergent phenomena (Mutch, 2007).

Scandinavian Institutionalism: the archetype of social constructivism

Another common perspective in our sample, with 41 publications, was that of 'Scandinavian Institutionalism', a term created by Czarniawska and Sevón (1996). This perspective tends to focus on the local (re)construction or institutionalisation of management innovations or fashions, often through micro-politics or discourse (e.g. Czarniawska, 2012). Whilst many of these pieces claim a Latourian heritage (e.g. Lindberg and Czarniawska, 2006; Malsch et al., 2011) they are actually much closer to social constructivist theorising rejecting empiricism and focusing on the discursive and political re-embedding of knowledge in local contexts. Empirically, some focus on the translation activities of 'carriers' of management ideas such as management consultants, publishers, gurus and business schools as they seek to (re)package and sell ideas (e.g. Sahlin-Andersson and Engwall, 2002); whilst others have explored the processes that agents enact when translating, for example the rules that inform 'editing' activities when translating ideas into practice (e.g. Morris and Lancaster, 2006). Translation for these writers, therefore, is understood 'as a process wherein new practices or fashions become institutionalized in different fields at different points of time and space' (Morris and Lancaster, 2006).

Social constructivism in these papers encompasses a range of approaches but ones which generally adhere to a relativist epistemology which rejects the 'grand narratives' or generalisable laws associated with scientism, and suggests that knowledge of an extradiscursive 'external' world is not possible, 'either because it is claimed there is no external reality outside of texts or discourses (strong social constructivism) or because if there is an objective reality, we can know nothing about it (weak social constructivism)' (O'Mahoney and Vincent, 2014: 724). Here, discourse is emphasised through the inclusion of many social constructivist theorists in these papers, especially Foucault (e.g. Bruce and Nyland, 2011; Mueller and Whittle, 2011; Malsch et al., 2011). Such an inclusion emphasises that it is not just management ideas that are subject to the anti-essentialism of social constructivism: organisations, subjects, and indeed the social world are also subject to the constructive

effects of discourse. As such, Scandinavian Institutionalism often shares implicitly with ANT a commitment to decentring or deconstructing the anthropocentricism of other perspectives.

Using intensive methods suited to identifying and understanding discourses, such as interviewing or discourse analysis, this perspective enabled important insights into translation. For example, understanding management innovations as constructed through local discourses, as well as having constructive effects, calls attention to translation as dependent on the politics and rhetorics of legitimation that actors deploy in organisations (e.g. Czarniawska-Joerges and Sevón, 2005). However, this focus, especially if kept within the bounds of social constructivism, can be limiting as well as enabling. The focus on the local and discursive for example, can miss the non-local, structural and population-level framing of an innovation that can help explain its success or failure (Fleetwood, 2005). For example, Frandsen (2010) when examining the translation of accounting practices to a hospital, show how discourses of accounting 'discipline' nurses' work and 'create truths about them as individuals and their abilities' (p.338). Whilst enlightening, this argument misses not only some of the important structural aspects of the case that we discussed regarding ANT (such as unionisation), but its anti-essentialist ontology means that the characteristics of any particular innovation - its price, whether it works, whether it is easy to implement - are sacrificed to the discursive representation of the innovation: such as whether management say it works. Moreover, this anti-essentialism also applies to the nurses themselves whose 'truths' are created by the accounting discourse. As many have argued (e.g. Thompson and Ackroyd, 1995; Sayer, 2010) this form of social constructivism makes resistance to these translated ideas difficult to conceptualise as it empties the individual of non-discursive properties.

Organisational Boundaries: the archetype of symbolic interactionism

21 papers from our sample used translation to explore how groups communicate and cooperate across organisational boundaries (Wenger, 1999; Bechky, 2003). Translation, for these papers, is necessary as 'objects and methods mean different things in different worlds [and] actors are faced with the task of reconciling these meanings if they wish to cooperate' (Star and Griesemer, 1989: 388). Methodologically, these papers tended towards interpretivist methods such as ethnography or participant observation, which are suited to understanding the meanings which different communities generate. Empirically, the sample focused on different professional, hierarchical, or occupational 'communities of practice' that have disparate understandings of concepts such as the customer (Sturdy and Fleming, 2003), innovation (Dougherty, 1992) or project deadlines (Yakura, 2002). In the sample, translation often involved 'boundary objects' which provided a basis for communication as they 'inhabit several intersecting social worlds *and* satisfy the informational requirements of each of them' (Star and Griesemer, 1989: 393). Boundary objects might include engineering diagrams (Henderson, 1991), accounting systems (Briers and Chua, 2001) or strategy tools (Spee and Jarzabkowski, 2009). The sample also included work on boundary brokers – usually individuals acting as translators between different communities (e.g. Pawlowski and Robey, 2004) - and common spaces which promote communication between team members (Kellogg et al., 2006).

In contrast to approaches that seek either to atomise or decentre humans, interactionism focuses on the construction of meanings though human relationships and related emergent phenomena such as consciousness and language (Blumer, 1986). Interactionism has its theoretical roots in the American pragmatist tradition (Peirce, 1998) which emphasises an epistemological emphasis on the usefulness of truth statements to the groups using them. The heritage of the 'boundaries' school can be traced through citations in the papers to the symbolic interactionism of Strauss (1959) and Blumer (1962), extending the ethnomethodological approach of Mead and Dewey. Such approaches prioritise rather than decentre the human from their analyses and often imply some form of realism (see, for example, Annels, 2010: 21; Weigert and Gekas, 2003; Denzin, 2008: 53). In our sample, most analyses also implied a realist stance, accepting that things such as roles, production systems, or technology impinged upon social interactions, sense-making and meaning construction. For example, boundary objects were taken to be 'both concrete objects and abstract concepts' (Swan et al., 2007) and were argued to be 'embedded in social structures' (Pawlowski and Robey, 2004). However, the focus of the articles was much less on external realities but on the local construction of shared meaning by different groups, thus, epistemologically, the papers tended towards relativism. As understanding human meanings

is important here, such approaches tended to use methods from ethnomethodology, anthropology, or other in-depth qualitative research.

Empirically, the interactionist research in the sample allowed insights into the processes by which meanings are translated between groups to enable their co-operation, and especially the role of different boundary objects in achieving this. However, the emphasis on the distinct communities of practice within organisations, as opposed to its wider social and cultural context, can mean that important commonalities are over-looked. For example, Bechky (2003), sought to 'link the misunderstandings between engineers, technicians and assemblers on a production floor to their work contexts, and demonstrate how these communities overcome such problems co-creating common ground' (p.312). Her ethnography shows how employees 'demonstrat[ed] that their understanding of a problem could be integrated into the context of other communities' whilst her analysis emphasises that 'the words [of one group] were incomprehensible to those who did not share an understanding of the context of the situation' (p. 317) because 'engineers has a conceptual, schematic understanding... while assemblers has a physical, spatio-temporal one'. Yet, Bechky's analysis, and those of others in the review, tends to neglect the wider context as it fails to include many commonalities of these groups. They are English-speaking - not only from the USA, but, more specifically, Silicon Valley - degree educated and professional, and most likely from a similar class background. Moreover, they are all employed by the same company, and as such are constrained by common social structures, for example, organisational rules, cross-departmental routines and employment contracts. Such commonalities not mean not only that there are many other opportunities for creating shared meanings but also that wider social structures might play an important part in enabling the communicative practices that the paper seeks to highlight.

Table 1Theories of Translation

Archetype (# of	Underlying	Ontological	Epistemological	Methodological	Translation as	Human as	Strengths	Weaknesses
papers)	theory	concepts	assumptions	preferences				
Diffusion (14)	Scientism	Essentialism;	Objectivism	Quantitative	Spread / evolution	Rational	Macro-level view;	Confuses survey / citation data with
		Atomism; Naïve		extensive methods;	of an entities such	decision-makers	rationality of the agent;	empirical reality; Produces 'thin'
		realism;		regression analysis,	as innovations in	(often treated as	evolutionary dynamic.	explanations; Humans excluded or
				correlations;	time or space.	a variables).		presented as rational actors.
Actor-Network	Actualism	Entities as	Constructivist	Intensive methods;	Modification of	A 'symmetrical'	Empirical networks; De-	Treats humans as equivalent to
Theory (33)		events; Change		'Follow the	actors interests or	actor enacted	centres the human;	non-humans; Difficulty with 'why'
		through		network';	representations /	through the	Agency of the material;	questions; Excludes non-empirics
		empirical		Ethnomethodology;	passing of 'tokens'	network.	Obligatory points of	(e.g. motivations; interests;
		networks;			though a network.		passage.	structures)
		Realist.						
Scandinavian	Social	Discourse; anti-	Relativism	Intensive methods;	The local re-	Constructed and	The socially	Focus on the local can miss the
Institutionalism	constructivism	essentialism;		Discourse analysis;	embedding and	constructing	constructed nature of	wider macro-level view; Focus on
(41)				Deconstruction;	(re)construction of	subjects	innovations; micro-	discourse means structure and the
				Interviewing;	management		level politics.	material get ignored; Difficulties
					knowledge			conceptualising resistance.
Organisational	Symbolic	Realism;	Relativism;	Interpretivist	Construction of	The focus for	Boundaries; Inter-group	Ignores commonalities from wider
Boundaries (21)	interactionism	Communicative	Pragmatism;	intensive methods	meanings between	generating	communication ; The	social & cultural context; Tends to
		relationality;		(e.g. anthropology;	groups through	communication,	power of objects in	under-play social structures (e.g.
		Construction of		ethnography)	boundary-spanning	meaning and	enabling co-operation;	rules; routines; roles)
		meaning.			/ boundary-objects	understanding		

The ontological origins of archetypal difficulties

The limitations of each archetype detailed above originate, I argue, from the ontological and epistemological principles of each archetype which not only limit their methodological power, but also their ability to engage with each-other. The naïve realism of scientism which equates epistemology with ontology means that, for many diffusion studies, explanations only come in the form of statistical correlations (Fleetwood and Hesketh, 2010; Lawson, 2003). The actualist ontology and constructionist epistemology of ANT denies any reality other than events and their relations, and treat all actors as 'symmetrical'. This means that the translation of actors' interests can only be explained with reference to their actions rather than their thoughts, interests, identities or motivations (McLean and Hassard, 2004). The anti-essentialist ontology and constructivist epistemology of the Scandinavian Institutionalists means that non-discursive factors get downplayed and the potential of workers to resist the translations of managers and consultants are often ignored (Fleetwood and Ackroyd 2004). Finally, the relativism inherent in symbolic interactionism and its focus on communication, means that it is often overly focused on the 'micro-level' and misses the macro-level structures that can influence the ability of groups to communicate (Porpora, 2015).

One consequence of these ontological strictures is that in our sample, there were few examples of papers in one archetype citing those from another. As researchers from each tradition come to a problem with an *a priori* assumption of what exists, how it can be known, and what, for example, humans are, it is perhaps not surprising that inter-archetype engagement is rare. These siloes matter because they have resulted in a 'colonisation' of translation types by archetype: evolutionary or population-level forms of translation are the domain of scientism, the translation of actors' interests is dominated by actor-network theorists, the translation of management ideas into local contexts is primarily undertaken by social constructivists, and the translation of meanings across disparate groups seeking to cooperate is colonised by interactionists. As Joseph and Roberts (2003) note, philosophical incommensurability can mean some perspectives miss out on important or useful analytical insights that their own perspective cannot provide.

The potential of critical realism

As critical realism has been used elsewhere to provide a foundation for ontological dialogue (e.g. Chouliaraki and Fairclough, 2010; Bentall and Pilgrim, 1999), we explore its potential to act in a similar manner here. Critical realism (CR) is an ontology which holds that reality at exists at different emergent 'levels' which are dependent upon, but irreducible to each-other (for example, atoms, cells, organisms, minds, teams, organisations, society). It argues that reality is stratified, and distinguishes between the real (underlying causal mechanisms), the actual (empirical epiphenomena) and the empirical (perceptions of the actual). It therefore distinguishes between the 'transitive' (our theories and talk about the world) and the 'intransitive' (the world itself). Whilst CR is ontologically realist, it is epistemologically relativist, but with a commitment towards judgemental rationality (the ability to judge between better and worse theories about the world). CR holds that entities (e.g. organisations, ideas, money) have properties and powers (e.g. to employ, to change behaviours, to purchase) which affect other entities, and exist independently of our talk about them. Moreover, we should note that with reference to methodology and 'domain level theory' (i.e. theorising at a field or subject matter level), CR is quite ecumenical: 'there are no specifically CR methods of research....there is a valid and important place for all the methods sociologists have employed - although not necessarily in the way they have employed them' (Porpora 2015: 63).

CR theorising is useful for translation theory because it helps integrate the strengths of our different archetypes whilst ameliorating the weaknesses. If we take the strengths first, we can see from Table 2, that each strength (taken from Table 1) relates to a different theoretical aspect of critical realism with which it can engage.

Archetype	Archetypal	Theory	Critical realist engagement
(underlying theory)	Strengths	category	
Diffusion	Macro-level view	Emergent	Emergence accepts the population view of ideas / innovations, and,
(Scientism)		levels	suggests these are dependent on but irreducible to individual
			instances.
	Rationality of the	People &	People are entities that possess a number of properties and powers,
	agent	relations	one of which is rationality (e.g. Archer, 2000)
	Evolutionary	Domain level	CR is agnostic to domain level theorising providing there is sufficient
	dynamic	theory	evidence to generate the theory.
Actor-Network	Empirical	Stratified	The empirical networks in ANT are, for CR, the domain of the 'actual'.
Theory	networks	ontology	
(Actualism)	De-centres the	People &	CR promotes a complex view of the human as emergent (cells,
	human	relations	organs, minds, action, rationality etc.).
	Agency of the	Entities,	As above, CR accepts that material entities have powers and
	material	Powers &	properties.
		Mechanisms	
	Obligatory points	Domain	CR is agnostic to domain level theorising providing there is sufficient
	of passage	level theory	evidence to generate the theory.
Scandinavian	The socially	Transitive vs.	CR accepts that ideas and innovations are partially, but not entirely
Institutionalism	constructed	Instransitive	socially constructed. CR would also argue that ideas have a material
(Social	nature of		and structural nature (Porpora 2015).
constructivism)	innovations		
	Micro-level	Emergent	CR accepts the local, micro-level politics whereby ideas are
	politics	levels	negotiated. However, it would also add that these activities
			(re)produce structural relations (e.g. of power).
Organisational	Boundaries	Domain level	CR is agnostic to domain level theorising providing there is sufficient
Boundaries		theory	evidence to generate the theory.
(Symbolic	Interactions	People &	CR holds that relationality is a key emergent property of people and
interactionism)	between	relations	groups. This includes discursive, structural and material interactions
	different groups		(Donati and Archer, 2015).
	The power of Entities,		CR accepts both the (intransigent) material reality of objects, and the
	objects in enabling co-	Powers & Mechanisms	properties and powers that this implies, as well as the (transigent)
	operation		shared discourses and theories by which these objects are
			understood.

Table 2The possibilities of CR for engaging the strengths of translation archetypes

Here, we can see that CR's proposition of reality existing at different emergent levels allows its acceptance of macro-level entities such as social structures and populations of management ideas / innovations, as well as micro-level entities such as people, identities, and actions. Its commitment to a stratified ontology means that it accepts the domain of the actual favoured by scientism and ANT, but also the 'empirical' domain of discourse and communication. Moreover, CR's conception of people accepts the powers of agency suggested by ANT, but also the potential to be rational suggested by scientism. Yet CR also accepts that what *appears* rational to people is affected by discourse, culture and communication (Archer, 2000). Finally, we should note the agnosticism CR has for methodology and domain-level theorising: unlike the other archetypes, CR does not have a preference for any specific approach to studying or theorising translation. Thus, CR can integrate at least some of the strengths of the different archetypes.

Concerning the weaknesses in the four archetypes (taken from Table 1), these can be grouped into five areas which CR addresses (Table 3). The first concerns a reductionist ontology which accepts only one form of reality. For ANT and diffusion studies, this is the empirical actor-network, whereas for social constructivism, it is discourse⁶. The critical realist commitments to an emergent ontology, to entities (with properties) and to causal mechanisms, means that discourse, events, materiality, people and relations are all ontologically permissible but *not* conflated. The second, is the exclusion of either a micro (diffusion studies) or macro (ANT, Scandinavian institutionalism, organisation boundaries) view on reality. As we saw earlier, both are important in understanding the processes of translation. For CR, the macro and micro are not conflated, but are mutually dependent (for example, actors are distinct from, but reproduce, social structures). The third, related to the first two, is an inadequate conceptualisation of humans, which are either ignored or reduced to a single phenomenon such as action (ANT), rationality (diffusion) or discourse (Scandinavian institutionalism). By committing to emergence, CR accepts that humans are

⁶ This statement is subject to an ongoing debate concerning the ontological commitments of social constructivism (e.g. Fleetwood 2005). My simplified position on this is that if an author acknowledges the influence of an extra-discursive realm, they commit to some form of realism, and the onus is on them to be as precise as possible as to these commitments.

multi-layered complex entities, with properties and powers that cannot be reduced to one dimension.

The fourth is that by failing to distinguish between epistemology and ontology both Scandinavian institutionalism and scientism generate 'flat' views of the world which struggle to find an explanation for why change occurs in their measures (either discourse or statistics) other than by referencing back to those entities. By making a distinction between the two, CR can not only posit that changes to discourse or statistics occur because of change at the level of the real, but also that our discourses or statistics may be mistaken or simply wrong. Explanation for CR comes from generating approximations of the causal mechanisms that exist through retroduction and abduction. This provides critical realism with the capacity to provide richer explanations of *why* empirical events occur without resorting to mere correlations or descriptions, our last issue.

Archetype	Weaknesses	Problem category
(underlying theory)		
Diffusion (Scientism)	Confuses survey / citation data with empirical reality;	No distinction between
		epistemology and ontology
	Produces 'thin' explanations	Lack of explanatory power
	Humans excluded or presented as rational actors.	Limited conception of humans
Actor-Network	Treats humans as equivalent to non-humans	Limited conception of humans
Theory (Actualism)	Difficulty with 'why' questions	Lack of explanatory power
	Excludes non-empirics	Reductionist / conflationary ontology
Scandinavian	Focus on the local can miss the wider macro-level	Reductionist / conflationary
Institutionalism	view;	ontology
(Social		
constructivism)	Focus on discourse means structure and the material	No distinction between
	gets ignored	epistemology and ontology
	Difficulties conceptualising resistance.	Limited conception of humans

Table 3: Categorising the weaknesses of	of translation archetypes
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Organisational	Ignores commonalities from wider context;	View limited only to the micro-
Boundaries		level
(Symbolic	Tends to under-play social structures	View limited only to the micro-
interactionism)		level

Yet, the inclusiveness of critical realism should not be seen as a mere umbrella term or a garbage bin. CR's ontology allows it to accept entities and processes from a variety of other perspectives, but it insists that none of these are adequate by themselves – that an answer to *why* things are translated necessitates a multi-level, non-conflationary answer. Such a statement prompts us to explore what form a CR approach to translation might take.

What might a critical realist approach to translation look like?

If we examine the CR's claims detailed above, we can see that these can generate questions for the different archetypes with which they may traditionally struggle (Table 4).

Table 4 Examples of critical realist questions for the archetypes of translation

	CR Commitments			
Archetype	Stratification (transitive /	Complex view of the human	Emergence, Entities and	
(underlying	intransitive)		properties	
theory)				
Diffusion	Why do different instances of	What role does human agency	What is the thing that is	
(scientism)	translation vary? How is the	have in mediating observed	being diffused / evolved /	
	name of different innovations	correlations? How do humans	translated? What are its	
	understood differently in	which contribute to the study	properties and how are	
	different contexts? What	(e.g. by completing	these changed when it is	
	causes the claimed	questionnaires) vary?	diffused?	
	correlations? What factors			
	inhibit and enable these?			
ANT	Why do actors involved in	In what ways does human	What is the thing being	
(actualism)	translation act the way they	agency differ to that of non-	translated? How and why	
	do? How does power	humans in the translation	does it change when it is	
	influence the process of	process? Prior to their	moved over a network?	
	translation? What causes	translation, how are human		
	translation to occur?	interests formed?		
Scandinavian	What are the non-discursive	What role does the human play	Is the thing being	
institutionalism	factors that are important in	in translation? What powers	translated entirely	
(social	the case? What contextual	does this role entail and upon	discursive? Does it have	
constructivism)	factors allow discourses to act	what are these dependent? How	any (e.g. material,	
	the way they do? What wider	do workers resist the translation	structural or psychological)	
	social and structural factors	activities of managers?	pre-conditions or	
	that contribute to translation?		dependencies?	
Organisational	What social, cultural and	What properties of humans and	What are the ontological	
boundaries	organisational mechanisms	groups enable and constrain	properties of a boundary	
(symbolic	enable and inhibit the ability	communication? Why are some	object? How do these	
interactionism)	of groups to communicate	humans better than others at	change over time? Upon	
	and translate?	communication?	what are they dependent?	

These questions are, of course, not necessarily ones that have not been asked (or indeed, answered) by the different archetypes. However, they emerge from CRs stratified and emergent ontology and challenge the archetypes to be more explicit about their theoretical

assumptions. It is important to note that CR does not question the focus of, or even the arguments made by, these archetypes. Rather it questions the ontology and epistemology of translation: what is the thing being translated? What are its properties and which of these change? What causes these changes to occur? What are the possibilities and limits of the translation process – and how are these known? These both challenge the archetypes to ask what makes a difference? Rather than starting with an a priori answer (i.e. discourse, communication or networks), and also encourage a greater variety of methods to provide insights into a number of potential causal factors, not simply those that are traditionally important within that archetype. In order to achieve these, a CR methodology seeks to use data that is suitable for the research question rather than start with specific methods (O'Mahoney and Vincent, 2014). Such methodological pluralism can incorporate material, discursive and communicative aspects of translation at different levels, enabling for example, a management ideas which is not only sensitive to the micro-politics of the company which seeks to appropriate them, but crucially how these are inter-related with the structural socio-economic context in which that company is embedded. This is achieved, in CR, thought retroduction and abduction, which allows the 'best guess' the causes of the events that are researched.

Below, I provide three differing examples of how this might work in practice. An illustration of the potential of CR to engage disparate traditions is provided by Ocasio et al. (2015). They explicitly use CR in arguing that translation is one of four causal mechanisms 'that shape the constitution of institutional logics'. They show that translation enables narratives to 'establish linkages across local practices that either reproduce or challenge....existing logics' (p.32). The stratification and emergence in CR allows their theorisation that 'although institutional logics scale up and thereby emerge from situated communicative events distributed throughout organizations and institutional fields, they have an ontological reality distinct from communication' (p.30). Crucially for the authors, CR allows 'practices', 'narratives' and 'sense-giving' to be distinguished and causally linked but without conflation – concepts, as we have seen, that tend to be embedded in social constructivism, symbolic interactionism, and actualism. The integration of these disparate ontological phenomena within a CR framing provides an illustration of the potential for a similar project for

translation that may combine but not conflate discourses, events, sense-making and social structures.

An empirical example is provided by Ferner et al. (2012) who take a critical realist approach to theorising how different forms of power inform the cross-national spread of employment practices in multi-nationals – but avoid using the term 'translation'. Crucially, their literature review does not focus only on one form of translation but provides a multi-level, contingent and historical overview of the transfer of practices by multi-nationals. This allows a view of translation which is contingent rather than prescriptive: 'transfer is not an either/or issue; there may be degrees of transfer. The transferred practice may be modified in the course of implementation, or it may be 'hybridized', that is, combined with host practices. The paper then goes on to detail what this contingency depends upon. Moreover, the stratified ontology of CR allows a multi-dimensional view of the key causal mechanism (power) which includes resource, process and discursive formations, operating at a macro-institutional and micro-organisational level. Their analysis can be seen to incorporate dimensions from ANT (in the importance of actors' interests in shaping management practices), Scandinavian Intuitionalism (in how discursive power has effects on transfer), and interactionism (showing how meanings 'collide', and are negotiated between headquarters and subsidiaries). Again, the integrative capacity of CR is emphasised.

Finally, for an example of how critical realism might augment a quantitative approach to understanding management innovations, we can examine the Workplace Employment Relations Survey (Kersley et al., 2013) which has been undertaken six times since 1980 in an attempt to trace changes in HR practices in the UK. Although the central methodological feature of the projects is a survey of HR practices, the design of the research is aimed at understanding the empirical reality of workplace practices and why they change. Concerning the first aim, the self-completion survey of HR directors is supplemented with face-to-face interviews to ensure that the categories are well understood. This is in contrast to many surveys which assume that diverse respondents understand a phrase the same way. Aware of the slippage between ontology and epistemology, especially when the latter is framed form a position of power, researchers also interview union representatives, and a sample of up to 25 employees at each workplace. This methodological sensitivity allows the

researchers to distinguish between epistemology and ontology, for example, that whilst HR Directors frequently state that team-working is commonplace, it is rarely the case in practice (Collinson et al., 1998). Finally, we can emphasise that the analyses of the results combine descriptive statistics (avoiding regression analyses) with retroduction and abduction to argue that changes in the adoption and implementation of management ideas is contingent not only on macro-level mechanisms, such as the state of the economy, union representation, and forms of employment (Wanrooy et al., 2013) but also micro-level factors such as leadership and management skills (Whitfield, 2000).

In these examples, the ontological commitments of critical realism to stratification and emergence enable a wider and more inclusive forms of analysis. This allows, not only an inclusion of different types of translation (interests, ideas, populations, meanings) through a variety of methods (surveys, interviews, case-studies, ethnographies), but also using a variety of analytical themes working at macro-, meso-, and micro-levels.

Conclusion

This paper has argued that there are four meanings underpinning 'translation' in the management literature, each based upon relatively distinct theoretical archetypes. The incommensurate assumptions of these positions means that potential insights from alternative traditions are often overlooked. Further, the paper has argued that as an emergent, stratified and non-conflationary philosophy, critical realism can provide a foundation which accepts, and does not conflate, insights from the four archetypes whilst overcoming some of their weaknesses. For translation theory, this is important for three reasons. Firstly, because it clarifies extant theorising on translation, identifying common ontological, epistemological and methodological groupings in the literature, and identifying their strengths and limitations. Second, because the proposal to use CR allows different forms of translation to be included in the same analysis, and for different perspectives to be included to generate insights. This enables possibilities for greater engagement between disparate traditions. Finally, because this more ecumenical underpinning means that authors are less likely to transgress the philosophical position they claimed: network analysts may

legitimately may talk of roles or routines and discourse theorists of social structures and objects.

There are limitations to this analysis which may prompt further research. First, it should not be assumed that CR provides any panacea for philosophical incommensurability, for it is itself an evolving, and often difficult philosophy, and one which has received some criticism (e.g. Parker, 1998). It may be useful to undertake an empirical 'stress-test' of CR in relation to different forms of translation to ascertain if its theoretical promise is fulfilled. Moreover, as CR is a relatively nascent project, especially in this field, I would urge CR theorists to engage in empirical studies of translation and its causes. Nor should it be assumed that CR is the only ontology that may offer novel theoretical insights into translation, there are several theoretical perspectives in the philosophical literature which may have promise for developing our understanding of translation, for example negative ontologies, sociomateriality, and postcolonialism. Finally, it should be noted that the proposal of using CR as the basis of greater engagement may not appeal to purists in any of the theoretical positions that have been described. For these, there is perhaps a challenge to respond to the critiques detailed in this paper to develop their positions in creating a more inclusive basis for future translation studies.

Appendix 1 Coding Structure

1. Important cited	Czarniawska; Callon; Latour; Bechky; Hargadon; Sutton; Boje; Schultz; Giddens;		
authors	Bourdieu; Sérres; Foucault; Harré; Potter; Letiche; Rorty; Weick; Berger &		
	Luckmann; Durkheim; Archer; Wittgenstein; Goffman; Garfinkel; Searle;		
	Rescher; Carlile; Strauss.		
2. Process of	Transformative translation (i.e. one entity or population is changed)		
translation	Mimetic translation (i.e. one entity is copied, but changed)		
	State translation (i.e. one entity's state is changed) e.g. rhetoric into reality		
	Interest translation (i.e. one entity's interests are changed)		
	Representation translation (i.e. one entity defines / speaks for another)		
	Meaning translation (i.e. the meaning of one entity is changed, but it is		
	assumed that non-discursive elements do not change)		
	Evolution (i.e. change through replication, selection and reproduction)		
	Other / ambiguous		
3. Outcome of	The original entity is (un)changed by the translation		
translation	A copy of the entity is (un)changed by the translation		
	The translator is (un)changed by the translation		
	The translated entity is (un)changed by the translation		
	The network / sociality is (un)changed by the translation		
	Translation as implementation (e.g. of strategy into practice)		
	The population changes or evolves.		
	Other / ambiguous		
4. Target of	Material entity; idea; actant; meaning (only); meaning (all); interests;		
translation	spokesperson; actor; population / evolution.		
5. Theoretical	Essentialism; anti-essentialism; Constructionism; Constructivism; Discourse;		
assumptions	Processual; Human interaction; sense-making; meaning-making; Emergence;		
	Actualism; structuralism; post-structuralism; epistemological relativism;		
	positivism; empiricism; stratification; open-systems; closed-systems;		
	experimentation; complexity; systems / systemic; meaning-making; socio-		
	materiality; statistical modelling; absence; social structure; agency / actors;		
	interpretivism; subjectivism, objectivism; realism; open systems; closed		
	systems; extensive / intensive methods.		

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