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Cardiff School of Social Sciences, Cardiff University,
Glamorgan Building, King Edward VII Avenue, Cardiff CF10 3WT
Tel/Fax: 44(0)29 2087 0325 Email: learningaswork@cf.ac.uk

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Learning, Knowing and Controlling 'The Stock': The Nature of Employee Discretion in a Supermarket Chain

Alison Fuller, Kostas Kakavelakis, Alan Felstead, Nick Jewson & Lorna Unwin

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Address for Correspondence:
Alison Fuller,
School of Education,
University of Southampton,
Highfield,
Southampton,
SO17 1BJ
Tel: +44 (0)23 8059 8864
Fax: +44 (0)23 8059 3556
Email: a.fuller@soton.ac.uk

ABSTRACT

Ordering and managing stock is a key function to organisational performance in the retail sector in general and in food retail in particular. The advent of such technologies as EDI (electronic data interchange) and EPOS (electronic point of sale scanners) has allowed retail companies to synchronize sales with ordering and inventory replenishment. Subsequently, stock management has been centralised with the head office being responsible for the overall co-ordination of the process while the role of individual stores is merely viewed as the transmittal of customer demands through the supply chain. Reporting data from a case study of a British supermarket chain, this paper explores the nature of the relationship between head office and stores; how it is mediated by the range of technological tools available for managing the stock and also what its implications are for employee learning at store level. The evidence illustrates the dual role of artefacts in making possible long distance control from head office, on the one hand, but also opening up spaces for local discretion and intervention, on the other. Accordingly, the paper also shows how the relation between organisational centre and peripheries gives rise to different types of skills and expertise, providing the basis for a potentially expansive learning environment in the individual stores.

LEARNING, KNOWING, AND CONTROLLING 'THE STOCK': THE CHANGING NATURE OF EMPLOYEE DISCRETION IN A SUPERMARKET CHAIN

INTRODUCTION

Ordering and managing stock is a key function in the retail sector in general and in food retail in particular. In large chains such as supermarkets, the task is increasingly mediated and facilitated via information technology as corporate management seeks ways to optimise performance. By the end of the 1990s the combination of electronic data interchange (EDI) and electronic point of sale scanners (EPOS) allowed retail companies with geographically dispersed outlets to integrate 'front end', consumer contact functions with 'back end' functions of purchasing and distribution. From the perspective of Head Office, individual stores can be viewed as the transmitters of customer demands into the supply chain, thus enabling continuous replenishment of stock and feedback into purchasing strategy. As Kinsey and Ashman remark, the use of computerised information systems in retailing, 'begs for, and facilitates, more centralised management' (2000, p. 86). This paper explores how this centralising trend is being perceived and experienced by store employees and the implications for their ability to exercise discretion in the work process.

As part of our current research in to learning as work[1], we have been investigating employee learning in a British supermarket chain (Fuller *et al*, 2007). A pilot study in two stores suggested that the use of computerised systems was centralising the stock management function. This was having the effect of reducing local employees' involvement in the process and their ability to influence the range and quantity of products being ordered for their stores. Some longer-serving staff were concerned that having less personal and collective discretion to tailor stock requirements could have an adverse effect on the achievement of key performance indicators in the areas of sales, waste and availability. In addition, declining

[1] This research forms part of a larger project which investigates the links between workplace learning, the organization of work and performance in a range of economic sectors. It is funded under the Economic and Social Research Council's Teaching and Learning Research Programme (RES-139-25-0110A, see http://learningaswork.cf.ac.uk)

discretion was associated with less skill and therefore lower job satisfaction by some employees (ibid, 2007). During the pilot, we identified the 'symbol gun' as a key device in the 'stock store management' system and wanted to understand better the role this was playing in the mediation of the process. The symbol gun is used to check that the physical stock available on the shelves accords with what the computer states the store should have. It is also used to collate data on availability and to write off stock.

Following the initial study and discussion with personnel at Head Office, we have conducted further research in four different stores (in the same company) to examine employees' perceptions and experiences of the stock management system and the extent to which, and how, they can intervene in the process. In so doing, we hope to illuminate the relationship between local and central functions and how this is mediated, the distribution and nature of knowledge(s), and the implications for employee learning. This paper identifies a range of conceptual tools that we have found helpful in addressing this research focus and in making sense of our evidence. We argue that work organisation in stores reflects the tension between the top-down implementation of stock management mechanisms and technology, and the ongoing albeit contested scope for store staff discretion in the execution of work tasks such as stock control.

The paper is organised in five sections. Section one provides an overview of the conceptual approaches being used to explore the way in which control can be maintained over parts of the network or system which are geographically distant from the primary locus of control (Head Office); the relevance of artefacts, 'boundary objects', and different knowledge types. Section two outlines the research we have undertaken. In sections three and four we discuss our findings in terms of respondents' perceptions and experiences of the stock management system and employee learning. In the final section, we draw some conclusions about the relationship of different sorts of knowledge and the stock ordering system, and the nature of the workplace learning environment.

PREPARING THE CONCEPTUAL GROUND

In the 'learning as work' project we are utilising and developing the idea of 'productive systems' to capture the scope of the relevant context and the connectedness of its various levels, micro (e.g. individual workplaces), meso (e.g. complex organisations, sectors) and macro (e.g. national and international legislative and regulatory frameworks). The notion of 'productive systems' has been developed by institutional economists dissatisfied with neoclassical theories that neglect the impact of social, political and cultural forces on economic life. To date the concept has been applied at the macro-level to an understanding of the historical trajectories of major economies (Wilkinson, 2002) and has informed some sector-based studies (Birecree *et al*., 1997). However, it remains a relatively underdeveloped idea and, moreover, has not until now figured in the workplace learning literature at all (e.g. Felstead *et al*, 2006; Jewson *et al*, 2007).

Productive systems refer to the totality of social relationships entailed in processes of commodity production. They comprise the multiple, interlinked social networks through which economic activity is organized and commodities are produced and consumed within capitalist societies. Productive systems, then, are networks of networks, worlds within worlds (Unwin *et al*, 2005). A key issue emerging from our pilot study was how to identify and make sense of the mechanisms and processes of control between Head Office and its geographically dispersed stores. In terms of the productive systems model, we were interested in the vertical interconnections between networks (eg the Board of Directors, Head Office, Regional Management, Stores) or 'structures of production'. From the perspective of stock management in the food retail sector, this drew our attention not only to the relevance of the vertical relations of regulation and control between the constituent networks but also to the stages of production (horizontal interconnections) by which raw materials are transformed into goods bought by supermarket shoppers (see Appendix 1 for a diagram of the productive system). The contribution of the productive systems approach is that it enables us to view any particular group of workers as a distinctive intersection of horizontal and vertical relationships, or put another way as in relation with, earlier and later stages in the sequence of production and higher and lower locations in the hierarchy of regulation and

control. Our interest here is in better understanding the relationship between where store management teams are positioned in the productive system, the way their work is organised and the opportunities for discretion and learning that are generated.

In this case study, Actor Network Theory (ANT) has provided a useful conceptual orientation. A central concern of ANT is explaining how control is established and reproduced in diffuse networks (*inter alia* Law 1994, Mutch 2002). ANT suggests that such networks comprise and are held together by the relationships between human and non-human 'actants'. This insight seems highly relevant to the situation relating to 'long distance control' of stock management that we were investigating in the supermarket chain. In particular, we have been intrigued at the role played by the symbol gun (see picture at appendix 2) and started to think about this in an earlier paper (Fuller *et al*, 2007) where we suggested that the device can be seen as an important 'member' of the network relations in this particular productive system. This quote by one of the store manager's is illustrative:

> '…these little guns obviously are controlling…obviously we're putting all the information in to that which takes it to the computers, so I mean without these in this store, we wouldn't know what our stock levels were and we'd be in a bit of a mess, we do rely on those'.

ANT allows us to address the relationship between different aspects of the productive system and, in particular, how it is mediated in a distributed and dispersed process, such as stock management in a large-scale supermarket business. When an actor network is produced, the networks of human and non-human elements of which it consists are, in some cases, hidden from view for an outside observer and the network seems to act as a single entity. This is what ANT writers call 'punctualised order', which signals that 'order' should be conceived as contingent and precarious. It is possible for control to be lost over network constituents, for example, through forms of resistance. Law (1986) argues that long distance control (and thus punctualised order in a network) is afforded by three elements: texts, machines or other devices and drilled people. Although in his analysis, he illustrates how various artefacts can facilitate control, what is less obvious in his work and that of other ANT writers is how

artefacts can not only be tools of control but also, as we suggest our evidence will show, provide opportunities for local intervention.

In terms of our supermarket case study, we wanted to see how the relationship between Head Office and local stores might be mediated through devices such as the symbol gun, conceived (in terms of ANT) as non-human elements in the network and also as having the role of 'boundary object' (Star, 1989). According to Tuomi-Grohn, Engeström and Young the concept of a boundary object denotes a tool used to join activities together and more specifically refers to artefacts that 'inhabit several intersecting social worlds that satisfy the informational requirements of each of them' (2003, p.5). Including the lens of the boundary object enables us to extend our analysis into the areas of knowing and learning, and how they are embedded in the interaction between Head Office and stores, and are mediated by boundary objects such as the symbol gun.

Coming from the discipline of economic geography, Steve Wood (2002) discusses the relationship between knowledge and 'spatial scales' in the retail sector. He identifies two contrasting perspectives to illuminate the role of knowledge in organisations such as department store chains. The first focuses on the opportunity afforded by new information and communication technologies to manage networked outlets by lessening the effect and significance of dispersed geographical locations. This approach is associated with codified, explicit and 'context-free' knowledge that is captured in centralised systems, including computerised 'sales based ordering' and 'networked supply chains' which can be distributed throughout the business via electronic data devices (Wood, 2002: 15). The second perspective is associated with local and more 'de-centralised' forms of work organisation and spatial scale. This model relies on the context-dependent and situated knowledge which is created and reproduced through and in shared practice. In this regard, Wood argues that 'prior to the development of complex technological infrastructures, knowledge was acquired and decisions made largely at the divisional, decentralised spatial scale' (ibid: 13). However, the possibility of new diffuse forms of organisational configuration depend, at least to some extent, on the conversion of tacit and localised forms of knowledge into explicit and codified knowledge which can be managed, distributed and applied on a large scale. This relates to

Nonaka *et al*'s (2005) concept of 'knowledge conversion' whereby tacit knowledge is 'externalised' and turned into an explicit form, then expanded, and then re-internalised through practice.

As we will see from the evidence of our case study, Wood's identification of these two perspectives and their association with different conceptions of knowledge is helpful. In particular, his recognition that the two can conflict resonates with the comments of our research participants that the range of stock over which store staff have ordering discretion is changing as more products are controlled through centralised promotion and replenishment strategies and mechanisms. Wood comments:

> 'the extent to which basic merchandise can be put on automatic replenishment, and not ordered manually by the buyers, has become a contested issue within these organisations' (2002: 16).

The data we have collected provide examples of tension in the stock management system and draw attention to the ways in which changing forms of work organisation facilitated by technology are affecting levels of discretion, skills, learning and knowing in the contemporary supermarket chain. From the company's perspective, our findings raise the important question of where the optimum balance for performance lies between centralised control and localised intervention. If aspects of both are important, then what are the implications for work organisation, workplace learning and the creation of an effective learning environment?

THE RESEARCH

The company involved in this research runs a nationwide chain of supermarkets in Britain, employing over 50,000 staff and with a turnover of more than four billion pounds. For the purposes of our initial study, we conducted interviews with personnel at all levels in two similarly sized stores in the east midlands of England, as well as with the area manager who has overall responsibility for several outlets. For the purposes of our main study (the focus of this paper) we conducted two interviews with staff at Head Office to obtain their

perspective on the issues surrounding stock management and the relationship between individual stores and the centre. These were followed by interviews in four stores, two in south east Wales and two in central southern England as well as with the area managers responsible for the stores in these two localities. Overall, we conducted 13 store level interviews including with store managers, trading managers, and stock management supervisors.

Depending on the size of the store, there are around three trading managers, each responsible for a major area of stock such as 'ambient' (e.g. tins and dry goods) and 'fresh' (meat, diary, fruit and vegetables), or for 'customer service'. They report directly to the store manager. In addition, we had the chance to 'shadow' some of the research participants in stores as they performed their day-to-day jobs, and to collect a range of documents such as planograms (instructions on how stock should be laid out and presented, see Appendix 3 for an example) and weekly stock offers and promotions. The interviews were all transcribed and coded using the qualitative software analysis package Atlas ti, with a focus on identifying evidence about stock ordering and management and the implications for learning. These are discussed below under two headings: 'stock control in context', and 'learning'.

STOCK CONTROL IN CONTEXT

As mentioned in the Introduction, the stock management function is key to organisational performance in the supermarket sector. The importance of managing and controlling stock availability became evident by the wide range of technological tools and mechanisms that have been implemented by Head Office with the aim of improving efficiency. These initiatives have largely been introduced to increase Head Office control over stock ordering and availability. Currently, ambient products that have a relatively long shelf life and do not require refrigeration, as well as items that are on promotion in stores, are ordered through a system called Event Stock Management (ESM). ESM allows Head Office to distribute ambient and promotional stock to the various stores throughout the country, based on their sales history on particular products. Apart from occasional exceptions, stores cannot adjust the quantity of products ordered through ESM.

Similarly, through market research the company has identified 500 core lines that are always in demand and thus should be available at all times to maximise sales. The 'lockdown' (non-adjustable orders) of these lines is implemented through a system called SUCCOR (store unique centrally controlled orderable range) which displays the range of stock scheduled to be sent to individual stores. Finally, centralised stock control is facilitated by a process called Gap Two, which is implemented in-store by staff working at supervisory and management levels. Gap Two aims to identify the reasons for and subsequently to eliminate gaps on the shelves. This strategy allows the system to generate orders automatically, avoiding store interventions that might slow down stock replenishment and thus affect availability. Interviews with supervisors in stores indicated that sorting out gaps and ensuring availability dominates their role rather than adjusting orders. Therefore from the Head Office's point of view, centralising stock management is justified by the performance gains to be made across the 'ordering through to sales process', through the exercise of more tightly controlled and timely purchasing and throughput decisions. Moreover, increasing central control over stock extends to how the stock is presented in store. As a trading manager in store A remarked: 'Beforehand we used to be able to juggle it about a bit, but they don't want that anymore, they want they want basically, they're telling you what they want in there and that's what you put in there [cabinet]'. Each store is required to present its stock according to the format specified in a centrally designed 'planogram'.

In contrast to ambient products and promotions, local store managers have more discretion to adjust fresh produce orders. This is because the scope for creating and reducing waste is high as fresh food can only be displayed for limited periods. Fresh food ordering is accomplished under a system called SSM (storage scope management). Additionally, when the promotional period for specific lines ends, they are also ordered through SSM. In principle, orders for products falling under the SSM umbrella are automatically generated, but staff are given the opportunity to alter or cancel them using the symbol gun. This device allows store and trading managers to view the quantities of lines that are scheduled to come into the store, how much of these lines are currently in stock and their rate of sale (what quantities are usually sold). Based on this information, a local decision can be made to override the system, as this example illustrates:

> ‘So what it’s got on it [the symbol gun] is it’s got your stock controls, your orders, availability, stock counting. They’ve all got various functions. The one we’re going to use is ‘view orders’. The majority of the time I don’t need to amend it. But sometimes I do… Now I’ve got 26 coming in, I’ve got 37 in stock and I’m selling roughly 35. So I would look to order I would say two of those. So to adjust the order press Y, yeah, how many do I need, press 2 and enter, 1 and enter, and you’ve just ordered two cases of that’ (store manager, store B).

Further latitude for intervention is also provided by the fact that store and trading managers can edit and tailor the range of products even before they actually place their final SSM orders. This is achieved through SUCCOR (mentioned above), which tracks the sales and waste of each product in stock. Head Office issues the relevant reports fortnightly enabling store managers to make ‘evidence-based’ decisions to include or delete a specific product from the stock list (this does not apply to the 500 ‘must stock’ lines). A produce supervisor describes this process:

> ‘Head Office they track the sales of each product and they track the waste of each product and then every two weeks they send you a whole list out of this, broken down into departments… Yeah of what you’ve sold, how much money you’ve sold in those two… in that two-week period and how much waste. And you need then to decide … there’s one there, ceasar salad. The average sales weekly were £29.82 and the waste was £9.20. So we’ve wasted £9.20 but we sold nearly £30 worth. Now I need to take a decision. Now is that really worth having it in the building because of the waste or… It’s just a decision you need to make ‘cause I’ve got a tick in the box. I decided to keep it’’ (produce supervisor, store C).

As the discussion so far has indicated, overall the locus of control over stock ordering sits above individual stores in Head Office. However, there are areas of stock (e.g. fresh produce) where control is more evenly distributed between the centre and local stores, and is contestable. Indeed, there are specific mechanisms and situations which enable store managers to exercise discretion, and the quality of their judgements can make a direct difference to store performance. In recent years, the trend has been towards increasing centralisation of stock management. However, the debate about the advantages and disadvantages (e.g. from the perspective of organisational performance, skill levels of groups of employees, job satisfaction) of this and how far it should be extended or resisted are

ongoing. Our data reveal contrasting views. On the one hand, there is the argument that all orders (even those relating to fresh food) should be left to run automatically. Compliance with the Gap Two process should ensure accurate book stock levels, which in turn should produce efficient (re-)ordering and negate the need for 'post-hoc' intervention. In this scenario ordering would be 100 per cent automated and the role of individual stores restricted to transmitting customer demands through the supply chain and the continuous replenishment of stock (Frances and Garnsey 1996). The need to intervene and adjust can be removed if book stock errors are avoided.

> 'And I think there's more benefit to managing the book stock integrity than there is to adjusting orders every day. So I think if the book stock is right, you know, theoretically the system should generate good orders. The system will go through a process overnight to generate you an order and the order generation's based on what stock is in the store. So if the information based on what's in the store is incorrect, it just generates incorrect information. So what I'm saying is if there's a need to adjust the quantity, the root cause of that is generally the book stock being incorrect. So what I say is if you're going to have to make an amendment to order stock or take stock off, make sure you check the book stock because by correcting the book stock, it should prevent you having to adjust it in the future' (manager, store C).

However, the day-to-day experience suggests that book stock errors are hard to eradicate and continue to occur, as the following example illustrates:

> '…there's an offer on the rolls a lot of the time, five for 99p, and I know a lot of cashiers just put one roll five times 99p, I mean the price is right, but obviously that affects the book stocks, because they're not typing through every single different roll. I've got bakery counting rolls three times a week, and sometimes you can find variances from two days of like 100 rolls. Yeah and obviously if those counts weren't being done, the system doesn't know those rolls are sold out because they've been put through as a different roll, and it won't order enough of them in, and then you have to modify your orders every day and pay more attention, which is time-consuming. Whereas if they were accurately put through the tills, there's your ability in the system will automatically generate the next case or next two cases (trading manager, store D)'.

The pragmatic alternative view, therefore, is that the system should have the capacity and flexibility to deal with book stock errors and the unexpected through enabling in-store

intervention. For example, even if the system generates the right quantities based on sales data, it is unlikely to be able hard to predict circumstances that might signal an opportunity to increase sales:

> '…even [highly centralised control of] stock management in terms of ambient would work, but when you come into fresh foods I think there's a more volatile area that the norm. So you could have an absolutely rubbish day in terms of weather today, but know on Saturday, it's going to be absolutely glorious, it's going to be 30 degrees outside, you need a different thought process in there' **(**store manager, store A).

> 'For that [complete centralisation of stock control] to happen you would have to count your stock every single day, on a single product count. You'd have to check your book stock every single day. So the system knows exactly how much stock you've got and the system can also track it through the checkouts, how much is selling, and the system would know how much you're wasting. I don't think it's a hundred per cent foolproof. I think there needs to be some sort of interaction. Anything… if stuff is stolen and you're not aware of it after the order generates, then the system is not going to know for the short period of time, once you count it again then it will know. But for a short period of time that system's not going to know, so it probably won't generate enough stock. Well there you'd have to step in and physically order it…' (supervisor, store C).

The following quotation from one area manager acknowledges that there has to be scope, even in a centralising system, for some local intervention and discretion.

> 'In the main, we would like to keep it non-adjustable and then just keep the books stocks correct and then just drive your availability through correct book-stocks and let the system learn. Okay, but there are times where you need to intervene' (area manager).

Tools like ESM, SUCCOR (in the case of the 500 core lines) and devices such as the symbol gun, provide ways in which Head Office can increase its (at a distance) control over stock management. Employees' implementation of processes like Gap Two at store level and their compliance with the procedures laid down in manuals and the planogram provide another. In this regard, the findings resonate with Law's argument that network order is maintained through the deployment of texts, devices and trained people.

However, the case study offers some evidence that artefacts are not only operating as tools of central control but are also providing the means for local intervention, discretion and improvisation. Store level decisions about whether to intervene in the stock ordering system are based, at least in part, on the context-specific or situated knowledge of staff (for example, knowledge of local events and customer groups), but the means of executing this discretion relies on their ability to use the tools designed by Head Office. Thus, devices like the symbol gun and SUCCOR function as boundary objects that help to co-ordinate the activities of Head Office and the individual stores, and distribute and redistribute knowledge across different parts of the organisation. They are able to do this in part because the stock management process unfolds in relatively stable conditions characterised by a significant amount of shared codified knowledge (Carlile 2004) between the constituent elements of the productive system, and the deployment of mechanisms of 'long-distance control'. However, there is tension and dynamism in the relationship between Head Office and stores which is indicative of the indeterminacy of productive systems and their divergent priorities. For Head Office the focus is on integrating the overall business process from 'order management, to inventory replenishment, physical handling and transport' (Frances and Garney 1996), while the stores are concerned with meeting their performance targets (defined in terms of sales, waste and availability). The significance of negotiation skills becomes clearer in the next section which examines how this relationship influences what is learned and how by managers at store level.

LEARNING

Our exploration of learning at store level is informed by a view of learning and knowing as processes afforded by participation in everyday practice (*inter alia* Lave and Wenger 1991, Cook and Brown 2005, Fuller *et al* 2007). Our data indicate that store managers primarily learn about stock control procedures and issues through participating in the practices required of their work role and which afford the opportunity for them to acquire two broad types of knowledge. Their learning revolves around their ongoing development of local, context-specific knowledge that, for example, relates to knowing the customer base, patterns of demand, being aware of and responding to unusual or one off events, and

anticipating changes in customer purchasing habits. At the same time, their practice includes engagement with and understanding of codified knowledge (often in the form of numerical and statistical data and analytical reports), and the use of this knowledge to make judgments about how stock levels and how performance can be improved. Although, then, store management teams have limited discretion over the conception of their work, in that they are not in a position to specify the aims and objectives of their work process, they do have some discretion in how they execute their work tasks. Their ability to exercise this discretion draws on both the broad sources of knowledge outlined: deciding if, and when, to use the symbol gun to adjust an order provides one example of this. In the following quotation a trading manager points out that 'rough judgements' utilising only on-the-job experience can be inadequate:

> 'More or less it's done on judgement that how much is on the shelf to how much has gone the previous week, and we sort of like roughly judge of how much we would need to get in compared to last week, whether we've sold enough of it… Doing that way has its pluses but it also has its minuses …it does need I think more analytical information to judge to say right this is actually how much you've sold, this is what percentage you've done, you know, and then get more accurate figures to say right, that is a good selling line let's get that in, that's a bad selling line so lets get rid of it rather than keeping it on the shop floor…' (Trading manager, store B).

Working on the basis of 'the facts' is important and requires analytical skills to be combined with retail and local know how:

> '…what you got to then do is go and say right okay, so that's actual fact, we are trading this much down, why is that? Was this time last year a stronger promotional period? And again what's happening on that individual department, are we driving waste too hard and not achieving sales? You did talk about getting that balance [balance between product availability, sales and waste] and it is looking at that and saying have we got the balance' (Manager, store A).

The above comments resonate with the view that making judgements in the course of dealing with specific tasks forms an important aspect of workplace learning. The stock-related judgements reported in the quotations indicate that context-specific knowledge, derived from the local context of action, and codified knowledge, cascaded down the

hierarchy of regulation and control, were being utilised and, therefore, were also being learned through participation in the relevant work tasks.

As we have suggested, taking a more holistic, productive systems view of context, includes identification of the vertical interconnections between the levels of control that structure production (eg between Head Office and individual stores); it also includes recognition of the horizontal interconnections between the stages or sequences of production. This perspective reminds us that customers are an important constituent as the 'end user' in the steps that make up the production process, and also that the relationship between the stages should be conceived as dynamic and reflexive. This insight is illustrated by our research participants awareness that consumers are an important source of knowledge about stock needs, and that this can 'wash back' along the chain to influence future 'production'.

> Interviewer: 'so when you talked about fresh meals, ready meals, and that you were able to bring some new lines on that, how did you know what…to bring in?'
>
> Trading Manager, store A: 'Listening to customers …it's called GSM, it's called Great Store Management… and that gives you the opportunity to add lines or take lines out which are poor performers. So I decided to go in there and highlight all our company stocks with all the Quorn or the Linda McCartney … and put it in as a total range…you'll give it a trial basis…and all the stock I did bring in before Christmas is still available now. And that shows it wasn't just a couple of customers that asked me for that, it was obviously more people, and more people are buying it.

Finally, whilst increasing Head Office control over stock management limits employee discretion in relation to how the task is executed, it also requires the development of further knowledge and skills in terms of how to negotiate with the centre. If managers have this capacity, then it is possible for them to adjust stock ordering to meet local conditions even where the system is apparently inflexible. Take the example of Minimum Presentation Levels (of stock), where a trading manager explained that it was possible to get an ESM order altered if you made a phone call to Head Office and explained the reasons that an alteration was needed:

> '…you can phone them up, you can tell them the reason why you're doing it and why you need it done, and they'll change it over the phone for you…they can do it instantly for you, just a flick of a switch...so you phone up head office, head office will send a message to your systems and say increase your…increase the MPL, and then the next time your order generates, it will increase the order by well two-fold, three-fold, depending on what the MPL is so, and then that'll send a message to the depot saying well they've ordered eight cases instead of four now, and then the depot will send you eight cases' (trading manager, store A**).**

However, the capability to interact with Head Office in this way requires a) knowledge about which product orders can be adjusted b) the knowledge of what method to use and whom to call; c) how to express the problem and provide convincing reasons why adjustment is needed. Put another way, tacit, analytical, negotiation and social skills are all needed. This example raises the questions of how consistently such skills are available amongst store management teams, and whether the company realises the extent of knowledge and skill employees need to identify and address stock problems effectively.

DISCUSSION AND CONCLUSION

The evidence collected in this case study has indicated that despite recent moves to shift further the locus of control of the stock management system upwards to Head Office, there is still scope for store employees to intervene in the process, including via the symbol gun. Importantly while the symbol gun is perceived as an artefact of control (of the stock management function) it can also be used to adjust stock levels, particularly in relation to fresh produce. Employees draw on their context-specific knowledge to provide a rationale for intervention and on the basis that their 'insider knowledge' is likely (at times) to outperform the centrally determined automatic replenishment procedures. The example of the trading manager's action to change the minimum presentation levels for bottled water in his store provided one example of this. However, there was the perception, particularly from some longer serving employees who have seen a continuing decline in the scope and extent of their discretion, that their local expertise is becoming less valued. This can undermine job satisfaction and occupational identities (Felstead *et al,* 2006). Wood, in his work on US department stores touches on these themes too:

> ‘Products that are ordered regularly are candidates for automatic replenishment based on sales information interpreted through ‘expert systems’ without express input from the buyer…Buyers are hesitant to give up control of a portion of their budget as this diminishes their responsibility within the organisation’ (Wood 2002: 16).

From a Head Office perspective, one of the advantages of centralising stock control is that decision-making can be justified on the basis of ‘hard’ performance data at the same time as reducing the risk of ‘emotional buys’ where ‘personal tastes and preferences are overvalued’ by staff embedded in their local setting and becoming over-reliant on taken-for-granted tacit knowledge (Wood, 2002: 18). However, there was recognition from Head Office as well as the individual stores of the need to combine the codified knowledge captured, for example, in reports on sales, availability and waste, with the situated knowledge and expertise of store staff. In this regard, there was acceptance that (designated) employees should have a continuing facility to exercise discretion, such as through manipulation of the symbol gun and negotiation with the appropriate part of the productive system. We would argue that these underlying features related to the organisation of work and opportunities for learning that characterise the store workplace as a learning environment.

Evidence from this case study suggests that Wood (2002) is right to argue that both codified and tacit knowledge are important to the operations of retailers with geographically dispersed outlets, and which have to manage the need to centralise with the need to gain the benefits of local expertise. From the perspective of organisational restructuring and its implications for performance in US department stores, Wood argues for a ‘blending’ of the two types of knowledge associated with contrasting spatial scales: ‘knowledge acquired at any one spatial level is likely to be inaccurate’ (ibid: 25) or, on the basis of our evidence, is likely to be insufficient.

Drawing on ANT, including ‘non-human’ elements as part of the network of relations which underpins stock ordering and management, has focused our attention on the role being played by devices such as the symbol gun, and the importance of the relationship between them and employees. ANT stresses the role such devices have in allowing the centre to control (at-a-distance) the behaviour of the actants in a diffuse network. Our evidence has

drawn attention to this but has also indicated the contrary opportunity they afford for local intervention and/or resistance. This latter emphasis depends, of course, on employees' knowledge and learning as well as their willingness to engage with and even challenge the codified knowledge embodied in reports and artefacts such as the symbol gun.

The conception of devices such as the symbol gun as boundary objects which join activities together and, in this case, mediate between different elements in the (productive) system) is also helpful. It orients us to the different types of expertise and knowledge that are brought together and which provide an opportunity for learning for those engaging with, at and beyond these boundaries and intersections. Creating a learning environment which recognises the potential for extending knowledge and capability afforded by gaining better understanding of the role of such boundary objects, and the elements of the system that they connect, would be one way of extending employees' understanding of the stock management system and when it might be appropriate or not to intervene. Put another way, it is important to view boundaries and boundary objects as integral features of the learning environment and as positive resources for teaching and learning (Fuller and Unwin 2004).

In feeding back our findings to the company, we drew attention to both the importance of tacit knowledge as well as codified evidence about the performance of the stock system. We indicated that some aspects of learning relating to stock control is experiential and revolves around knowing the demand for products and anticipating changes in demand patterns throughout the year – in particular localities. However, we also pointed out that area managers and store management teams have to combine this with their knowledge and understanding of facts and figures to make sound judgements. The workplace learning environment in stores is therefore potentially expansive in nature, in that there are opportunities for boundary crossing and access to different sorts of knowledge (Fuller and Unwin 2004). However, currently, the ability of staff to understand and utilise both types of knowledge effectively is uneven and they would benefit from some focused training. As we saw from the example of the trading manager who was able to get the minimum presentation levels of the bottled water changed, when staff are able to combine knowledge of how the stock ordering system works with their knowledge of local sales conditions, and with the

social skills necessary to make an effective case over the telephone, then intervention is not only possible but organisationally desirable. Creating and managing a more expansive learning environment, could help generate the conditions for the distribution of such behaviour more evenly across the business. It could also help store employees recognise the extent of their role discretion and give them the confidence to utilise it more fully.

Finally, employees' ability to communicate stock requirements through their utilisation of the sorts of boundary objects and artefacts described above, does not alter the asymmetrical relationship between them and Head Office, but it does indicate some of the ways in which hierarchical relations can be influenced, challenged or resisted. It also reinforces the importance of viewing productive systems as indeterminate with influence able to flow upwards and downwards and forwards and backwards along both vertical and horizontal dimensions. Thus, the continuous development of expertise at local level is, to a great extent, dependent on the ability and willingness of the centre to recognise the need for and to support the development of an expansive workplace learning environment.

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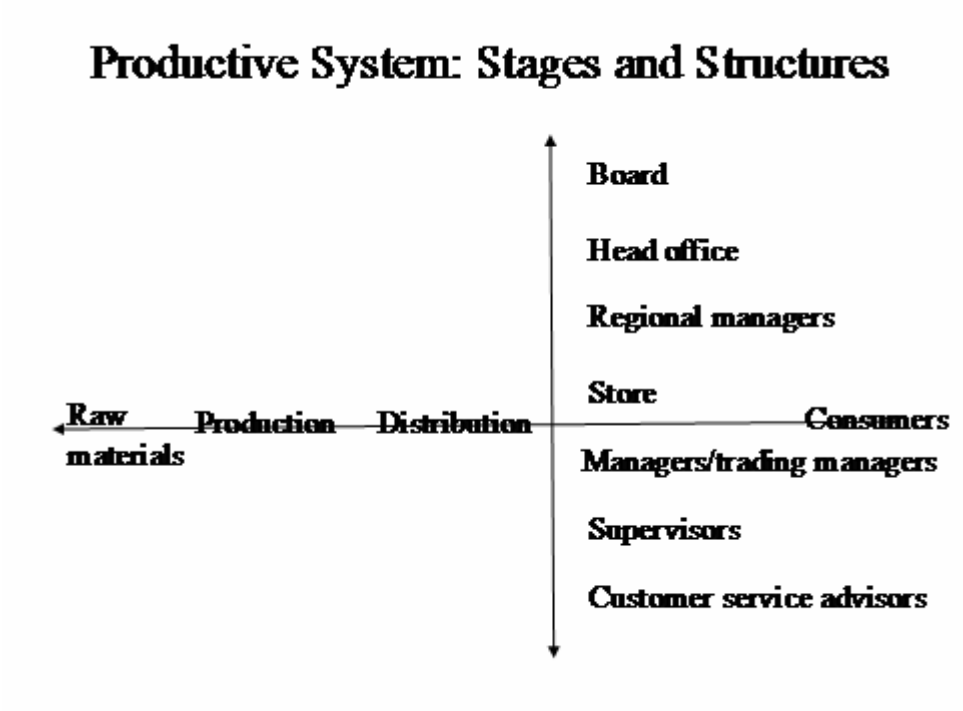
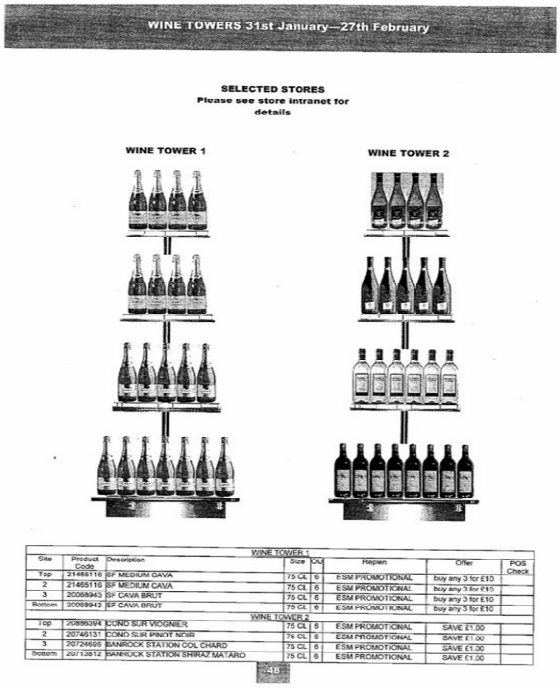
Appendix 1:


Productive System: Stages and Structures
Board
Head office
Regional managers
Store
Raw materials
Production
Distribution
Consumers
Managers/trading managers
Supervisors
Customer service advisors

Appendix 2: Photograph of symbol gun

Appendix 3: Example of pages from planogram



WINE TOWERS 31st January—27th February

SELECTED STORES
Please see store intranet for details

WINE TOWER 1

WINE TOWER 2

Site	Product Code	Description	Size	QU	Replen	Offer	POS Check
WINE TOWER 1							
Top	21465116	SF MEDIUM CAVA	75 CL	6	ESM PROMOTIONAL	buy any 3 for £10	
2	21465116	SF MEDIUM CAVA	75 CL	6	ESM PROMOTIONAL	buy any 3 for £10	
3	20068943	SF CAVA BRUT	75 CL	6	ESM PROMOTIONAL	buy any 3 for £10	
Bottom	20068942	SF CAVA BRUT	75 CL	6	ESM PROMOTIONAL	buy any 3 for £10	
WINE TOWER 2							
Top	20899394	CONO SUR VIOGNIER	75 CL	6	ESM PROMOTIONAL	SAVE £1.00	
2	20746131	CONO SUR PINOT NOIR	75 CL	6	ESM PROMOTIONAL	SAVE £1.00	
3	20724698	BANROCK STATION COL CHARD	75 CL	6	ESM PROMOTIONAL	SAVE £1.00	
Bottom	20713812	BANROCK STATION SHIRAZ MATARO	75 CL	6	ESM PROMOTIONAL	SAVE £1.00	

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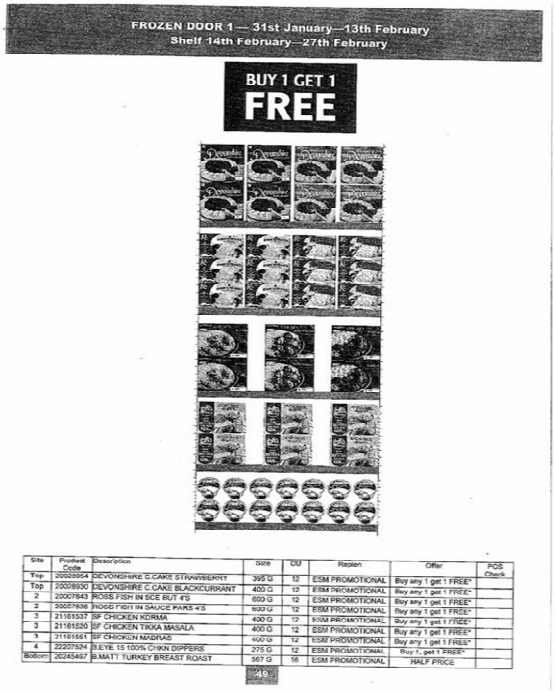

FROZEN DOOR 1 — 31st January—13th February
Shelf 14th February—27th February

BUY 1 GET 1 FREE

Site	Product Code	Description	Size	QU	Replen	Offer	POS Check
Top	20028954	DEVONSHIRE C.CAKE STRAWBERRY	395 G	12	ESM PROMOTIONAL	Buy any 1 get 1 FREE*	
Top	20028930	DEVONSHIRE C.CAKE BLACKCURRANT	400 G	12	ESM PROMOTIONAL	Buy any 1 get 1 FREE*	
2	20007843	ROSS FISH IN SCE BUT 4'S	600 G	12	ESM PROMOTIONAL	Buy any 1 get 1 FREE*	
2	20007836	ROSS FISH IN SAUCE PARS 4'S	600 G	12	ESM PROMOTIONAL	Buy any 1 get 1 FREE*	
3	21161537	SF CHICKEN KORMA	400 G	12	ESM PROMOTIONAL	Buy any 1 get 1 FREE*	
3	21161520	SF CHICKEN TIKKA MASALA	400 G	12	ESM PROMOTIONAL	Buy any 1 get 1 FREE*	
3	21161561	SF CHICKEN MADRAS	400 G	12	ESM PROMOTIONAL	Buy any 1 get 1 FREE*	
4	22207524	ILEYE 15 100% CHKN DIPPERS	275 G	12	ESM PROMOTIONAL	Buy 1, get 1 FREE*	
Bottom	20245467	B.MATT TURKEY BREAST ROAST	567 G	16	ESM PROMOTIONAL	HALF PRICE	

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All above available from:

Suzanne Beazer
Project Administrator
Cardiff School of Social Sciences
Cardiff University
Glamorgan Building
King Edward VII Avenue
Cardiff. CF10 3WT
Tel: + 44 (0)29 2087 0325
Email: suzannebeazer@cardiff.ac.uk

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