Knowledge management, organisational learning and memory in UK retail network planning

The forecasting of sales from potential store development opportunities is typically supported by quantitative modelling techniques which vary in their sophistication and practical application between retail firms. While previous research suggests analysts reach outcomes by blending modelled knowledge with intuition and experience, how this occurs in practice is only partially understood. By adopting a qualitative methodology involving interviews with experts, this paper makes an incremental contribution to the literature by detailing how tacit knowledge is synthesised with modelled, codified knowledge to affect the decision-making of senior management in UK-based retail firms. Analysis can also extend to post-opening reviews that offer the opportunity to improve local marketing and product ranging, and from which key lessons can be drawn for subsequent forecasting. Efforts are made by many large retailers to retain expertise and develop institutional 'memory' by codifying tacit knowledge, though these processes often rely upon the expertise embedded within broader intra- and extra-firm social networks. Success therefore appears to comprise structured but flexible forecasting routines alongside a focus on learning, continuity and communication within analyst teams.

Keywords: retail location; knowledge management; decision-making; organisational memory; tacit knowledge; modelling

Introduction and contribution of the study

In an increasingly competitive environment between retailers for attractive sites, the importance of accurately forecasting and appraising store development opportunities is widely accepted to be critical (Rogers, 2005). Successful store expansion can be achieved through organic development, or through acquisition, replacement and extension of existing units (Hernández & Bennison, 2000). A range of analytical techniques has been developed to assist retailers in anticipating the likely sales yields from such changes to the store portfolio which vary in their data requirements, the degree of expertise required of analysts, and ultimately their accuracy and reliability (Birkin, Clarke, & Clarke 2002). However, this process is complicated *in practice* as it is widely known that such tools are employed inconsistently within and between retailers (Simkin, Doyle, & Saunders, 1985; Reynolds & Wood, 2010) and may not always be easily applicable to all catchments, store formats or spatial scales of analysis (Wood & Browne, 2007). In the worst instances it is argued that some operators still base location decisions on little more than 'gut feel' (Pioch & Byrom, 2004).

Meanwhile, decision-making relating to store portfolio development even within well-resourced analysis functions of retail firms is not a mechanistic procedure solely governed by

the output of models. Instead, some techniques such as analogue comparison require a degree of subjective judgement and appraisal by the analyst (Clarke, Mackaness, Ball, & Horita, 2003a). In addition, analysis can also be affected by observation when visiting potential development sites (Wood & Tasker, 2008), by the organisational culture of the retailer (Hernández, Bennison, & Cornelius, 1998; Theodoridis & Bennison, 2009), along with the judgment of managers and analysts in assessing the evidence base (Clarke, Horita & MacKane, 2000). However, the thinking on the ways in which these different forms of knowledge practically inter-relate to form a forecast and recommendation remains under-developed in the research literature.

Given this background, in this paper we argue that the forecasting of potential store developments can usefully be conceptualised through the lens of knowledge management – a sub-discipline of business and management studies that has had influence across the social sciences (Amin & Cohendet, 2004; Amin & Roberts, 2008a). This paper therefore seeks to go beyond recognition that store location decision-making requires a blend of art and science to consider and conceptualise how these different forms of knowledge are practically organised and blended by decision-makers. In making these incremental contributions to the research literature, the paper specifically seeks:

1. To understand – in practical terms – how store forecasting synthesises codified knowledge from quantitative models alongside experiential and intuitive insights.
2. To conceptualise the ways in which retailers' location planning departments acquire and improve forecasting competence. In doing so, we seek insight into the ways in which forecasting 'memory' is retained and developed to inform subsequent analyses and decisions.

To achieve this we draw upon a qualitative study involving approximately 35 location planning analysts and managers across a range of retail sectors.

Our paper is structured as follows. First, we briefly review the knowledge management research relevant to conceptualising store development decision-making. Second, we explain the methodological approach adopted for this research, before - third - analysing our qualitative data to conceptualise the ways in which knowledge, learning and memory inter-relate within store development planning. Finally, we assess the contribution of this work for improving our understanding of the decision-making underpinning retail store expansion.

Framing store forecasting as a knowledge management problem

Store network planning has been an accepted sub-field of both retail management and economic geography ever since the pioneering work of William Applebaum in the 1960s, who persuasively argued for more data-driven and systematic approaches to appraising store development opportunities (see Applebaum, 1968). This led to the development of a wide array of increasingly sophisticated and complex analytical techniques (see Birkin, Clarke & Clarke, 2002; Davies & Rogers, 1984; Mendes & Themido, 2004; Wrigley, 1988 for summaries). Over the past two decades, the fall in cost and the increased power and practicality of information processing has supported the diffusion of such techniques, as well as facilitating the introduction of new tools such as geographical information systems (GIS) (Hernández, 2007).

The increased complexity of analysis has been demonstrated through a series of surveys of location planning teams across the retail industry (Simkin, Doyle & Saunders, 1985; Hernández & Bennison, 2000; Reynolds & Wood, 2010). While often noting the wide variation in approaches employed, these surveys have emphasised the gradually increased complexity of analysis undertaken – itself often relating to the increasingly professional organisational culture of the retailer and the resources allocated to site analysis (Theodoridis & Bennison, 2009; Wood and Reynolds, 2011a; 2011b). However, these surveys have also observed the degree to which formal techniques tend to be combined with experience and intuition. More specifically, tacit knowledge and observation from site visits co-exist and complement formal modelling (Wood & Tasker, 2008; Wood & Browne, 2007) though how this is practically achieved within the forecasting process, getting beyond simplistic descriptive dichotomies of ‘art and science’, is only now starting to be recognised.

Some research has already explored the decision-making procedures practiced within retailers and in the process contributed to developing improved techniques. Especially noteworthy is a wide ranging EPSRC project led by Ian Clarke focused on managerial judgment in store forecasting. The research employed a ‘cognitive map’ methodology with actors situated at various points within retail organisational hierarchies, who had varying degrees of influence on the location planning decision-making process (Clarke, Horita & MacKanness, 2000; Clarke & Mackanness, 2001). The project identified significant differences between actors in the degree of importance attached by them to the various factors contributing to store performance. In particular, senior management were found to rely more on non-factual information as they drew on their own experiences of ‘comparable exemplars’ which allowed them to compensate for their less detailed understanding of specific cases (Clarke & Mackanness, 2001). Given these differences, the research team argued that it allowed one to

‘begin to understand why quantitative analysis may not be integral to decision-making in the way one might pre-suppose’ (Clarke & Mackaness, 2001, p 166). With many site assessment tools unable to integrate intuitive insights, the research team utilised their findings to produce a tool that aided analysts in the selection of appropriate analogue stores to benchmark turnover expectations (Clarke, Mackaness, Ball & Horita, 2003; Clarke, Mackaness & Ball 2003). However, even with these developments, it was acknowledged that management would, when assessing analogues, still rely on experience and broader tacit-based insights to ‘discuss the nature of the differences and their potential implications, rather than giving the user ‘answers’’ (Clarke, Mackaness, Ball & Horita, 2003, p 181). Analysis therefore remained a nuanced blend of hard and soft variables.

Knowledge types and the limits to codification

This paper adopts a knowledge management perspective to conceptualise the forecasting process within retail location planning. This is a useful scholarly lens through which to examine the problem. The interplay between ‘hard’ and ‘soft’ knowledge is well-known to be a key foundation of business sustainability and success. Indeed, building upon the resource-based theory of the firm (Penrose, 1959), Nonaka & Takeuchi (1995) argue that innovation is the product of a continuous dialogue between tacit and codified knowledge. The former is ‘highly personal and hard to formalize, making it difficult to communicate or to share with others’ as it is ‘deeply rooted in an individual’s action and experience as well as in the ideals, values, or emotions he or she embraces’ (Nonaka & Takeuchi, 1995, p 8), while the latter is ‘something formal and systematic’ and ‘easily communicated and shared in the form of hard data, scientific formulae, codified procedures or universal principles’ (Ibid., p 8). Although some scholars argue that tacit knowledge lacks rigour and any significant benefit to the organisation – ‘a phenomenon that the observer does not understand; as such, it has no explanatory content’ (Perraton & Tarrant, 2007, p 354; see also Cowan, David, & Foray, 2000) – insights derived from such knowledge are widely accepted to be essential, given that they are underpinned by social interaction between actors and embedded within work practices and experiences (Balconi, Pozzali & Viale, 2007; Orlikowski, 2002).

A distinction between knowledge ‘types’ and their constituent flows has a clear parallel with the forecasting of retail locations, given the focus on the development and leverage of quantitative models, which place an emphasis on codified, objective outputs upon which to base decisions, in contrast to the role of tacit based knowledge emanating from individuals’ experience, intuition and observation. Clearly, a challenge exists in seeking to reconcile the two types of knowledge in terms of their contribution to a coherent and transparent store location decision.

Across the knowledge management literature, there is a widely held understanding of the need to codify tacit knowledge as far as possible (Coff, Coff & Eastvold, 2006). It is argued that such codification overcomes difficulties with knowledge re-use, transfer and its co-ordination between actors (Sambamurthy & Subramani, 2005), as well as in ensuring some degree of transparency within decision-making. However, there are limits to the practical codification of tacit knowledge. For the purposes of quantitative modelling, data has to be distilled into a structure conducive to the model selected – yet still retain its original meaning. The structuration process may not always achieve these goals and, in the process, the knowledge may lose some of its richness (Coff, Coff & Eastvold, 2006). Hence, some authors have regarded model building as an ‘art’ rather than a straightforward scientific endeavour (cf. Wierzbicki, 2007). As Tuomi (1999, p 107) reflected over a decade ago when discussing the development of data bases:

‘...the computer does not have access to the meaning of the content it processes, computer programmers have to represent meaning in a way that enables automatic processing’.

Much of this problem stems from the long-established understanding that some degree of tacit knowledge is required to extract meaning from words, formulae, maps and graphs (Polanyi, 1966). Indeed, numerous scholars note the difference between ‘data’ and ‘information’ (both of which lack context according to Nonaka (1994)) while ‘knowledge’ provides ‘cognitive categories, codes of interpretation that allow us to make sense of information, tacit skills and search and problem-solving’ (Balconi, Pozzali, & Viale, 2007, p 826). It is well-known that actors’ decisions are framed within their own world-view and that they often resort to heuristics – mental rules of thumb – in the absence of comprehensive knowledge (Strauss, 2009). This form of tacit knowledge has been long discussed within the management literature: ‘the knowledge that underlines a skilful performance is in large measure tacit knowledge, in the sense that the performer is not fully aware of the details of the performance and finds it difficult or impossible to articulate a full account of those details’ (Nelson & Winter, 1982, p 73). The ability to leverage such competency depends on the individual’s experiences which can provide a basis for a more reliable contextualisation of new knowledge (Turner & Makhija, 2006). There are consequently potential tensions and contradictions between the beneficial attributes of technology in terms of processing power, data capacity transferability and accessibility versus considerations of human agency, judgment, experience and intuition (cf. Orlikowski, 2010).

Routines and communities

The knowledge management literature also argues that technology (such as store forecasting models) can be embedded into work contexts and organisational routines (Alavi & Leidner, 2001). This allows synthesis between knowledge sourced from experts and the process of modelling. This is appropriate as models are consistent, while experts are known to possess highly organised and domain-specific knowledge. They are flexible and can identify which questions to ask – in the process identifying new variables and subjective evaluations of existing variables that may be difficult to measure objectively (Blattberg & Hoch, 1990). Consequently a blend between tacit and codified knowledge is necessary – even recognised within information systems research:

‘The notion that there is either a technology-based or people-based approach to KM needs to be discarded, as our understanding of how various tools can be appropriated to support either a content-based or collaborative-based system, or both, is advanced’ (Alavi, Kayworth, & Leidner, 2005, p 220).

Management research has focused attention upon those practices and routines within work communities which allow both for organisational learning and (as in the case of location forecasting process) the reconciling of the types of knowledge that emerge. There has been considerable scholarly interest in the notion of ‘communities of practice’ (Amin & Roberts, 2008b; Wenger, 1998; Duguid, 2008; Kwon, Clarke, & Wodak, 2009; Wood & Reynolds, 2011b). Such communities are important as they encourage ‘a common anthropology of socialization, social interaction, interest alignment, and community maintenance, which acts as a vital medium for learning’ (Amin & Cohendet, 2004, p 12). For location planners, for example, they might provide a platform for evaluating the utility of different forms of knowledge in the assessment process. In its turn, a community can be an essential element in establishing new learning and knowledge, and can also set boundaries within which these important issues can be communicated.

While it would be tempting to reduce organisational routines to straightforward process controls or forecasting procedures, such simplification is known to only be useful when employees ‘can be given clear and unambiguous direction as to the exact procedures in which to engage’ – by contrast, ‘tacit process-related knowledge cannot be broken down in such an unambiguous manner’ (Turner & Makhija, 2006, p 198). A balance is therefore required between conformity and autonomy. If the business insists on the former, learning is likely to be inhibited and the organisation may fall victim to its own rules. If only learning is encouraged without structure, there is a risk of a lack of thoroughness and of excessive autonomy (Duguid, 2008). Instead, it is argued that a community should be *reflexive*: while it may have a set of general procedures, it should also be continually refining its methods,

theories and logics as well as offering ‘a space for conversation and action isolated from the larger organization’ (Boland & Tenkasi, 1995, p 355). Through discussion, evaluation, and synthesis of the evidence, a mutually agreed perspective regarding a decision can be adopted but any distinction between individual and organisational memory can also be overcome:

‘In the process of conversion, during which individuals externalize their experiences, and during which individual knowledge is socially justified due to fragility’s adverse conditions, knowledge can indeed be shared with others. Other individuals combine the process of conversion with the organization’s knowledge system, socialize around it, and internalize the new knowledge. Knowledge creation can be regarded as moving up through different organizational levels, from the individual to the communities and the larger networks’ (Nonaka, von Krogh, & Voelpel, 2006, p 1184).

In the process, the dissemination and retention of knowledge is important. Many organisations fail to leverage new insights, skills or ways of working sufficiently widely and therefore risk losing that insight beyond the short term (Scarbrough & Swan, 2008).

We have argued that forecasting retail store developments can be framed as a knowledge management challenge whereby flows of codified and tacit knowledge need to be reconciled. While modelled (codified) knowledge provides objective measures, such insights may be partial. The research literature underlines the value of tacit knowledge both in understanding complex phenomena that may be challenging to represent in models but also in providing an environment, through the role of communities, in which insight can be leveraged across and between interested parties.

Methodology

The overall research project that provides the context for this article employs a three-part data collection process. An initial online survey of named store development/property managers from 102 individual retailers generated 43% of usable responses. All retailers were based in the UK, although some were foreign-owned firms. While the survey is not the focus of research for this particular paper, it served to contextualise many of the issues and aided us in devising an appropriate interview protocol. The main data collection exercise comprised semi-structured interviews with 35 analysts and managers responsible for store development across a range of retail and related consultancy firms (see Table 1). Our interview sample was mainly drawn from the survey respondents but also benefited from access to the membership list of an industry support body, the Society for Location Analysis (SLA). Over a two year period, the authors participated in SLA meetings and became part of an extra-firm network dedicated to the study and discussion of best practice in the analytics supporting store

development. This provided both direct access to a wide range of relevant individuals as well as word-of-mouth recommendations for interviews with others.

[Take in Table 1 about here]

Provisional conclusions from the interviews were discussed in the third and final stage of the work. A focus group of 10 analysts in April 2010 discussed whether our findings fairly represented the complexity of the issues involved. None of the focus group participants had featured in the previous stage of the research and ranged from location planning managers responsible for assessment teams to analysts with a minimum of three years' experience. The discussion was conducted as part of an executive education residential development programme for store development planning. The group discussion and interaction was deliberately informal and the session was therefore not recorded, although written notes were taken.

While most medium to large-sized retailers operate a store development planning function of some form, sometimes these are not organised as wholly independent analytical departments, but are instead units, or even single individuals, situated within property or marketing departments. Consequently, some of our interview subjects had job titles relating to property management or, in some instances, country-wide management (as in the case of some smaller firms). Interview structures remained consistent to ensure comparability: organised around themes related to retail store development and specific network planning issues before broadening out to discuss the individual manager's wider role.

The data collection process was designed to ensure a representative sample of operators across different retail sectors and sizes, and differing degrees of forecasting experience. Usefully, respondents often had extensive experience not only at their current employer but also from a career history of domestic and international involvement in store development within a number of other retailers and consultancies. Interviews, typically held at each firm's head or regional office, were of between 45 and 90 minutes duration and were conducted on the basis of complete confidentiality at both the company and individual level. They were recorded, transcribed and then subject to thematic coding and subsequent analysis in line with accepted qualitative research practice by both authors (Bryman & Bell, 2003). The research approach adopted therefore aimed to reproduce the kind of qualitative rigor commonly referred to as 'close dialogue' with relevant corporate actors (Clark, 1998). In our analysis, we have included quotations to illuminate our discussion relating to the perceptions, beliefs and experiences of the executives consulted. In common with numerous other instances of

qualitative research that draws on commercially sensitive information, we have obscured the identity of individual respondents but noted the retail sector within which they are employed.

Findings

Figure 1 displays a composite model of the store forecasting process and the flows of knowledge that appear to characterise decision-making across the majority of location planning departments encountered. In common with the knowledge management research discussed earlier, we found that most retailers were moving towards a structured routine of forecasting:

‘You know, the further along you go, the more you do ‘process’..., the more established they become, and it just becomes the way you do business, and we’re getting to that point’ (Discount Retailer).

[Take in Figure 1 about here]

While the academic literature refers to robust multi-criteria decision-making methods such as the analytic hierarchy process (AHP) and the analytic network process (ANP) (Cheng, Li & Yu, 2005), no location planner that we met mentioned such concepts. That said, it is clear that many of them operated rigorous structured approaches to blend qualitative and quantitative forecasting challenges. These routines tended to separate the analytical modelling procedure operating within the office from ‘external’ knowledge – usually a visit to the proposed development site. There was then typically some synthesis between the two distinct pieces of research whereby elements of observation, which could be codified as model inputs, were introduced to the model and it was re-run. In addition, there was an opportunity for analyst and management teams to reflect and discuss the forecast and recommendation, possibly introducing amendments based on experience, observation and intuition. We examine these discrete components in greater depth below.

Codified knowledge from modelling

A range of modelling techniques is employed by retailers, with recent research finding that over half location planning departments utilise multiple regression and spatial/gravity models, while other popular techniques include ratio, analogues and checklists (Reynolds & Wood, 2010). Despite the sophisticated nature of some of these tools, analysts were conscious that there was a range of factors beyond the predictive capabilities of models in customer

decision-making¹. As one site research manager noted with regards to other phenomena difficult to quantify:

‘the factor we can’t put into the model, which we know has a big impact on sales, is management quality and sales staff quality, because so much of our sales is driven by direct interaction with the customer in a way that it’s not in a lot of other retailers. So we can account for all the location factors as we understand them, but it’s very difficult for us to account for that people element in the store’ (Electrical Retailer).

The systematic approach to managing knowledge typically led to a distinct separation between codified and tacit knowledge. In some of the more extreme circumstances the executives required to model potential sales performance were different from the analysts who visited the site, though such an arrangement tended to be the exception in most of the organisations consulted. It was more common was for a single analyst to assume responsibility for all components of the site analysis and strategic recommendation. In all but one of the cases observed, a model formed the bedrock of the sales forecast and was then set against existing tacit knowledge to develop a final forecast and recommendation.

Tacit knowledge from experience, intuition and observation

Most analysts understood the wide array of factors that models were unable to practically consider and recognised the need to draw on ‘those softer elements you can capture with...[the] experts in site location ...not just how do you model a catchment’ (Food Retailer). Commonly the modelling procedure was only the start of the forecasting process, as it was complemented by a range of tacit insights that served to modify sales expectations: ‘Once you’ve got a model output, you know, you’re into the wonderful world of adjustments’ (Food Retailer). As Figure 1 suggests, amendments beyond the model were more likely to be informed by comparisons with analogous store performance or observation of the site in person. Therefore, while the modelled knowledge was supplemented by ‘softer’ knowledge, analysts insisted that there should be transparency between the two knowledge bases:

‘I needed the number that came out to be transparent ... we never put the raw model output in as our sales forecast. We will always kind of process that. I need to understand what... the model was doing, as my start point, before we then kind of layered in some assumptions on top’ (Non-Food Retailer).

The observation and analysis that came with visiting the proposed development site was regarded as critical for ‘sense checking’ any modelled output. For example, the analyst who visits the catchment can confirm the standard of competition and the quality of the site pitch.

Meanwhile, such observation can also provide detailed advice at the micro scale (for example, the visibility of the store from main roads or a proposed car park arrangement). As one location planning manager reflected:

‘it will be mostly the kind of micro location factors, because the model is bad at picking those up. So, small things like access into and onto the park, or into and off the park, could be very important’ (Electrical Retailer)

Often, visiting the site led experienced analysts to reflect on the geography of the catchment and to manually adjust modelled output at a later date. The justification for such changes frequently lay in experience and intuition – something difficult to codify or quantify:

‘you get there and you think actually the people round here aren’t our customers, our core customers, you would then obviously lower the forecast, because, with anything, gut feel is sometimes better than what a system tells you’ (DIY Retailer)

The ability to utilise the ‘softer’ elements of knowledge often depended on an analyst’s experience of a range of analogous forecasting situations which permitted the individual to employ expert judgement in amending outcomes (cf. Clarke & Mackaness, 2001). There was a close relationship between experience and the utilisation of intuitive thinking within location decisions. As Sadler-Smith (2008, p 495) notes in a wider strategic decision-making context:

‘The processes that lead to intuitive judgment occur beneath the level of conscious awareness (i.e. they are tacit). The knowledge and skills on which such judgments are based *are acquired through explicit and implicit learning processes through extensive experience, often accompanied by intense, focused, and deliberate practice, in a specific domain*’ (Sadler-Smith, 2008, p 495, our emphasis).

Often a lack of experience would lead to analysts being unable to actively question the legitimacy of modelled output and therefore amend sales forecasts:

‘I think that sense-checker only comes after a year or so of experience really... I think it is a real problem and it certainly is a problem here, in that maybe there is a bit too much reliance on the number that the model spits out’ (Food Retailer).

Unsurprisingly the presence of forecasting experience within the team was a resource that was widely valued by the analysts interviewed, as well as a focus of management concern given its role in underpinning credibility across the wider retail business. As one analyst acknowledged:

‘if you’ve got no kind of experience or feel for it, then all you’re going to do is kind of spit out the gravity model numbers into the rest of the business, and they’ll always be one or two that are just obviously wrong... If you just kick those out, then, you know, people in Property will kind of see that and you’ll lose credibility and the whole process kind of unravels a bit’ (Non-Food Retailer).

Indeed, analysts consistently noted a distinction between learning the ‘two sides’ of the site assessment process: in the short term, establishing the mechanics of how to operate the model, while over the longer term building the experience base to inform decision-making – often making up for ‘complete’ knowledge of a catchment and its customers. This underlines the distinction between ‘knowing what’ and ‘knowing how’, the latter representing a deeper level of understanding and engagement emanating from time and experience (see Johnson, Lorenz & Lundwell, 2002).

Synthesis between the knowledge bases

The mediation between codified and tacit knowledge in the forecasting process obviously depended on the sophistication of the models employed, the quality of the data underpinning the models, and, in each specific forecast, the degree to which the model was perceived as realistically representing the dynamics of the catchment. The extent to which dialogue between analysts could emerge as part of this synthesis was often restricted by the small size of many analyst teams. A recent survey of retailers suggested that location planning departments suffered from considerable under-resourcing with 9% of the sample consisting of single analysts and a further 48% consisting of teams of between 2-4 analysts (Reynolds & Wood, 2010).

For many retailers it was widely accepted that a model output merely represented the start of the analysis procedure due to the output’s inherent inaccuracy or, more commonly, its failure to fully represent a specific catchment sufficiently well. This necessitated manual adjustments. For example, in one instance a retailer acknowledged that it had let the data underpinning its spatial interaction model become obsolete which required considerable manual alterations:

‘It [the model] was 18 months old, and bear in mind that the data that had built the model was therefore a year older than that and we’d just gone into a recession, so we were kicking out sales forecasts that were reflective of a market that no longer existed. So when we went through that phase, we were moderating our forecast manually a lot’ (Electrical Retailer).

The partial reality represented by catchment modelling appears widely accepted and supports the belief across much of the knowledge management literature that codification of *all*

variables within open systems is unrealistic and therefore we should only ‘talk of the degree of codification of tacit knowledge’ (Balconi, Pozzali & Viale, 2007, p 833).

The process of evaluating the validity of the modelled output alongside any observations at the proposed development site and comparison with analogous stores often displayed more judgment and experience than scientific rigour. However, observations from site visits could sometimes be immediately fed into the model to replace often inaccurate or out-of-date in-office database entries. This allowed the model to be re-run and a revised output to be produced. Examples of such data included those relating to road speeds, competitor store sizes or the access point of the proposed unit being incorrectly recorded within geographical information systems (GIS) (cf. Wood & Tasker, 2008).

When gravity and other spatial interaction models were employed by retailers, analysts were better able to critique the modelled forecast trade geography due to the highly visual nature of GIS in presenting spatial data. Often an indication of whether such a model ‘understood’ the catchment sufficiently well came from running a known store through the model – commonly the retailer’s own branch (assuming there was one present in the locale). This, in turn provided evidence upon which to adjust the model if it was felt necessary by the analyst:

‘So, all the data goes in, a number comes out... [along with] geographical representations of market penetration, trade areas and so on, and there’d then be a process of actually fine-tuning some of the inputs in the model to get what ... might be a more realistic result. At that point, obviously, the experience is coming into play’ (Food Retailer).

Other elements at this synthesis stage included the comparison of the site, its situation and the proposed size of the new store with the trading performance of analogous stores in the retailer’s current portfolio (cf. Applebaum, 1968). While such an approach relies on codified data, the selection of analogue stores and the subsequent *interpretation* of that data along with its *implications* for forecasting are fraught with subjectivity – in particular, the limited nature of the analyst’s knowledge of the portfolio alongside their experience, biases and perceptions (cf. Clarke, Mackaness, Ball, & Horita, 2003; Clarke, Mackaness, & Ball 2003). To overcome the difficulties of an extensive dataset of analogous stores, one retailer reduced its analogue choice-set, yet ensured that it still represented all of the different ‘types’ of location that a forecaster was likely to encounter:

‘we’ve got over a thousand stores, and we’re narrowing that down to 200 that we’re going to use as analogues, which will be the analogue dataset for [the store format], ... those 200 will represent all the types of locations that we have’ (Small Store Retailer).

More challenging were instances where it was felt that the model simply failed to adequately capture the reality of the economic, population and transport geography of the catchment. As one location consultant reflected on one such experience:

‘it became very apparent to me that one part, a side of the town, was excruciatingly badly accessible. So despite the fact that the site itself, with its excellent multi-storey car park integrating directly into the site, with a very good catchment... *there was something fundamental there on the ground that no amount of weighted modelling would actually address*’ (Retail Location Consultancy, our emphasis)

Under such circumstances there tended to be a relatively greater reliance on the experience of colleagues in discussion. The confidence required to make such significant changes to modelled output on the basis of assumptions required a clear rationale and commonly the support of senior members of the analyst team.

A reliance on tacit knowledge was also disproportionately greater in circumstances when retailers were attempting to forecast yields from new store formats. Given that there were few benchmarks upon which to calibrate sales expectations, and in the absence of tailored models to accurately forecast them, there was an increased focus upon experience, intuition, the usage of elementary techniques and pragmatism. One retailer reflected on forecasting a new format:

‘So it’s a kind of balance, trying to come up with a reasonable view that has got some basis in customer behaviour and then, on top of that, just making some other assumptions about what people might do. So that was the starting point’ (Department Store Retailer).

While established models were often employed to provide an indication of a likely sales yield, they were limited in their practical usage in such circumstances:

‘we are trialling two high street stores at the moment, and our model was built as an out-of-town model... but we’d use it much more as a kind of guide to narrow down [the sales expectation]’ (Electrical Retailer)

For some retailers operating internationally, the tendency to transfer their formats to new countries meant that there was sometimes scope to bring learning back about the ways in which specific formats traded spatially – serving to leverage intra-firm knowledge internationally (cf. Currah & Wrigley, 2004).

When forecasting new store formats the location planning department was likely to embark upon considerable inter-departmental communication and explanation regarding the forecast -

in order to underline the unique nature of the project and the risk inherent in the forecast. As one department store retailer experimenting with a new format suggested:

‘Partly through self-preservation, one wants to explain the risk and uncertainty associated with the way you forecast on this occasion, as opposed to the more confidence that you have around the department store model. So more people probably got involved in more discussions about what’s happening ‘under the bonnet’, if you like, than they might have done for a [conventional] department store’ (Department Store Retailer).

Given the inherent difficulty with such forecasts, some operators extended their engagement with wider stakeholders, working on the basis of *ranges* of likely sales figures and suggested probabilities of sales yields for the project. Such an approach, it was argued, was more in tune with the requirements of the business at the time that was concerned with effectively understanding the nature of the risk inherent in the new investment:

‘I prefer to run it as a...a way of mitigating risk, rather than coming out with a number that everyone’s going to sign up to. So...[there is debate] with us and Finance and Property, but, you know, if you tell me that the store needs to do £6 million to break even... then I’ll tell you how likely it is or not to do £6 million or £7.5 million’ (Non-Food Retailer).

The role of forecasting routines and intra-departmental debate

Earlier in this paper we noted the importance that the knowledge management literature has attached to knowledge communities or communities of practice. Among the majority of retailers consulted, there was an air of pragmatism that it was the job of managers, supported by analysts, to lead intra-departmental debate and to draw on all of the sources of knowledge at their disposal:

‘the only thing that we can say with 100% confidence about your forecast is that it’s going to be wrong. ... it’s not an adherence to a black box, it is this smart interrogation of all of the information that we’ve got available. So that’s the culture that we’ve... bred’ (Non-Food Retailer).

Given that an individual analyst typically ‘owned’ a sales forecast, there was a need to maintain a transparent inventory of the model output, the modifications made due to observations from the site, as well as the adjustments made to the sales forecast. These might be made on the basis of comparison to analogue stores or from outside the modelling process arising from tacit knowledge (e.g. experience, observation, intuition). The analyst would usually justify their forecast and strategic recommendation at a decision-making meeting which would consist of department managers, but also commonly the wider analyst team.

This would be a testing period but one where the validity of the analysis could be interrogated at a depth likely beyond that capable by a single analyst:

‘the senior locational analyst will have to... come up with the reason for why the model might not have predicted the same as what they are doing. Often... it will come down to what’s not in the model, that he’s been able to capture when he’s on-site’ (Food Retailer).

With the small size of many analyst teams (as noted earlier), there were limits to the realisation of such community interaction by comparison with some larger operators. Even in larger teams, however, the ability to engage in internal discussion and undertake sophisticated refinement of codified/modelled knowledge was often restricted by the sheer workload demanded of the location planning division:

‘there is some collaboration upon our decisions, from time to time, but ...we’ve standardised [the process]... due to the sheer volume... So there’s not as much [discussion] – I mean, it would be nice if we were able to do, you know, complete collaboration on every deal, but... the nature of the business and the company prohibits us from that’ (Discount Retailer).

Teams exhibiting this view had a high level of dependency on modelling. However, often such retailers were seeking expansion of standardised, modestly sized formats (with relatively limited investment in each specific unit) which might tolerate some slippage in individual store forecast accuracy. By contrast, expansion of non-standardised department stores or more complex formats such as hypermarkets involved capital expenditure concentrated in relatively fewer stores. This meant that an accuracy to within approximately 10% of actual store turnover for each unit was generally expected, demanding greater forecasting resource, discussion and refinement.

Retaining location planning ‘memory’ within the firm

Given the clear importance of tacit knowledge as a valued element of the forecasting process, it is essential that location planning departments incrementally learn from previous forecast experience, spread that knowledge throughout the team and ensure that there are systems and structures in place to retain knowledge in the event of analysts leaving the retailer (cf. Amin and Cohendet, 2004). The potential loss of tacit forecasting experience was a material consideration for managers:

‘the danger would be if you lose all of that or too much of that tacit knowledge, you know, that experience, in a churn that’s perhaps too fast. If you’ve ended up with only the junior people ...you’d have a danger that the model needs to be really good,

otherwise you're in danger of not really understanding why a forecast has come out the way [it has]' (Food Retailer).

Indeed, the management studies literature concerned with issues relating to the preservation of organisational memory has noted the importance of 'a continuous link to its 'old timers' to ensure adequate organization memory acquisition and controlled retrieval processes' (Walsh & Ungson, 1991, p 78; see also Scalzo, 2006). In particular there is a risk of 'organizational forgetting' 'until knowledge has been stored in organizational memory systems' (Holan & Phillips, 2004, p 1609). However, knowledge and memory are not simply located within individuals but are also organisational level constructs: embedded within organisational cultures, transformations (procedures, routines, systems within the firm) and ecology (the physical structure of the workplace) (Walsh & Ungson, 1991). As Ferriani, Corrado, & Boschetti (2005) note, knowledge is therefore retained in practical terms through documents, operating procedures, culture, and in the shared perceptions of 'the way things are done around here''. This, they argue, is part of a system of socialisation and control that can facilitate organisational remembering.

While the research literature advocates the conversion of tacit knowledge into explicit/codified knowledge to mitigate against knowledge loss, it is widely accepted that the firm relies on social networks given the experiential insight that they offer (Olivera, 2000; Scalzo, 2006). Such networks can be situated both within the organisation (for example through mentoring) (intra-firm) but also extend beyond the firm to include engagement with external seminars or industry support bodies (for example, the Society of Location Analysis) (extra-firm) (Wood & Reynolds, 2011b).

Information and communication technology (ICT) offers potential to successfully codify tacit knowledge – in the form of databases, intranets, electronic bulletin boards and email (Olivera, 2000; Scalzo, 2006) – though perceptions regarding practical usefulness and ease of access are known to influence take up (Kankanhalli, Tan, & Wei, 2005). As such, codification mechanisms may not provide a rich medium for communication (Daft & Huber, 1987). More recently the development of such techniques as webcasting and blogs offer opportunities for making tacit knowledge explicit using more accessible media (Baxter, Connolly, & Stansfield, 2010).

Table 2 summarises the knowledge sharing and retention mechanisms within location planning, according to our respondents. We do this by developing Boh's (2007) work that

contrasts *individualised* and *institutionalised* with *personalised* and *codified* knowledge sharing and retention mechanisms.

[Take in Table 2 about here]

Knowledge is retained across all mechanisms identified in the research literature focused on organisational memory. The trend toward codification at its most elementary saw the vast majority of retailers maintain some form of training manual (sometimes located within an intranet) detailing the mechanics of the forecast process which was useful in spreading basic location planning expertise to new analysts. Other forms of codification of tacit knowledge came in the form of documents produced during the execution of forecasts that were subsequently retained, and also through institutionalised forecasting meetings that facilitated knowledge sharing and produced published minutes. However, as indicated in the literature and by the evidence presented in this paper, knowledge was also spread and retained through personalised interaction via existing social community networks. For example, extensive expertise was acquired through junior analysts shadowing experienced colleagues to understand the craft in practice, ongoing discussions, and more formalised meetings.

Organisational learning in the practice of location planning

Organisational learning is a widely accepted capability required of firms as they critically reflect on the experiences and insights logged within organisational memory (Argote & Miron-Spektor, 2011). Our interviews suggested that generating learning from reflection on sales forecast accuracy was a challenging process. Indeed, post-implementation reviews of investment are known to be theoretically important, though the research literature has rarely tracked their employment within retailing in practice (Morgan and Tang, 1992). This process was more straightforward within the sophisticated location planning teams often found at larger retailers, where there were strong linkages with marketing departments. Such teams undertook systematic reviews of forecast accuracy, tracked customer views, and analysed trading performance spatially (see Figure 2).

[Take in Figure 2 about here]

At such retailers these lessons extended beyond reviewing the direct implications for the forecasting department to influencing the subsequent marketing and product ranging of the store:

‘we would review the financial performance, the sales performance, but also try and diagnose the reasons, for two reasons really: one, for our internal accuracy review, feeding back the learnings; and, secondly, to identify opportunities for the business to optimise the performance of that particular store. So, it’s underperforming in a certain area which [has a high ethnic penetration of the population]...is there anything we can do – have we got our ranges a bit wrong for that group, and can we do anything about it?’ (Food retailer)

By introducing the habit of post-investment reflection within location planning teams, learning points relating to model calibration/accuracy could be identified and perhaps fed into decision support software. Alternatively, there were often learning points for the analyst to consider relating to performance of stores in certain ‘types’ of location (see Figure 2). However, this form of tacit learning was more challenging to codify and embed within models and so risked becoming lost unless there was a continued focus on the issue from management within the department:

‘we take the post-investment reviews to the regular team meetings. We have monthly team meetings to look at this. But, I would say that there’s no formalised process of getting those learnings back into the model or anything like that; it’s more just that you clock it mentally and then say, ah, well, next time I see a site like this, then I’m only going to put a 13% [market] share on it and not a 20% share’ (Food Retailer).

Within well-developed forecasting teams, some analysts pro-actively identified short-to-medium term projects from the findings of post-opening reviews. As one manager for a general merchandise retailer noted:

‘Subjectively, the team just sort of pick off little questions they want to tackle – so maybe it’s ‘retail parks’ this week or this month, or maybe it’s ‘maturity curves’, and if we haven’t looked at maturity curves for a couple of years, I might remind somebody it would be good if they did it. So we sort of just look at them on an ad-hoc basis and we chat about them internally’ (General Merchandiser).

Critically, the ability to interrogate post-opening data relied on available analyst time but also a management culture that encouraged such introspection. For smaller location planning teams this represented a challenge. Within one retailer, there was a concern that management and cultural change within the retail organisation prevented such activity:

‘...you should be taking those learnings, feeding them into a cycle, you know, feeding that back in to the front end, but ...what you tend to find – it’s the reality ...of the workload I suppose – is that the objectives of the business often change, so what was important is no longer the flavour of the month, so that does actually affect what location planners do’ (Electrical Retailer).

Such a view contrasts markedly with a positive and constructive approach to inaccurate forecasts – one where failure is seen as an *opportunity* to learn and change practice:

‘...some of the best learnings will come from perhaps sometimes the worst forecasts in terms of accuracy, but not necessarily done badly, just missed something that then throws up some new learning’ (Food retailer).

Conclusions

This paper has sought to represent the process of locational decision-making within retailers as a knowledge management challenge. In doing so, we have been able to examine and interpret the flows of tacit and codified knowledge that contribute to the construction of accurate sales forecasting (Figure 1). We have also started to develop a more nuanced understanding regarding how forecasting ‘memory’ and subsequent learning are embedded within store development routines, systems and procedures (Figure 2; Table 2), while recognising the perceived impediments to further improvements. These are the two important incremental contributions of the paper. More specifically, we have established findings that are relevant for the discipline of retail management, retail geography and the management practice of retail location planning:

First, despite store forecasting becoming increasingly objective and scientific, decision-making continues to be a nuanced and continually evolving blend of ‘hard’ and ‘soft’ knowledge. While modelling typically remains the bedrock of any forecast, codified outputs are complemented by tacit knowledge. In instances when the model fails to conceptualise the trading patterns of the catchment or is incorrectly calibrated for a new store format, analysts rely on intuitive insights (which often relate strongly to the individual’s experience) as well as more elementary forms of analysis, to construct a forecast from ‘the bottom-up’. Under such circumstances, it is common for analysts to produce conservative forecasts given their concern with mitigating the risk associated with retail investment. Learning and the generation of new insight is not solely dependent on any one type of knowledge but is the product of a blend of the two and represents: ‘a rich bricolage of human and non-human inputs which, in combination, and through situated practice, make knowing and its use for invention and innovation possible’ (Amin & Roberts, 2008, p 20). Therefore despite a marked increase in forecasting sophistication, the conclusions from a research study over 25 years ago remain apposite:

‘There must not be a total rebuke for the intuitive assessment of experience, for a great deal of ‘subjective’ research is soundly based’ (Simkin, Doyle, & Saunders, 1985, p 26).

Second, this research has underlined the role of the analyst community – effectively a ‘community of practice’ – as an important interpretive forum that leverages the experience, intuition and judgment of a body of analysts. This has an important role not only in drawing on the expertise of a wider base of experts but also spreads learning, organisational memory and best practice amongst the team. In doing so it underlines the likely disadvantage that small location planning teams are likely to incur.

Third, given the importance of tacit knowledge in complementing quantitative modelling, knowledge retention is critical to sustaining organisational memory within analyst teams. This is not to denigrate the importance of modelling. Instead, a *balance* between experience, intuition, observation and analytics are required. Unsurprisingly, managers were conscious of the risk of the firm losing experiential tacit knowledge with analyst staff turnover. While a certain degree of knowledge loss is inevitable in such situations, it was clear that tacit knowledge can be embedded (with varying success) across a range of knowledge sharing and retention mechanisms (see Table 2). These include ICT tools such as intranets, hosting training manuals and storing minutes from meetings as well as emails. However, the strategic exploitation of newer social media was less in evidence. Basic codification included the retention of physical paper notes and model outputs from forecasts to provide an audit trail of analyst thinking and justification that could be revisited and interpreted accordingly. Finally, amendments to models, established routines and databases (where this was possible) represented an incremental, but potentially resilient and codified stock of knowledge.

Finally, larger and better-resourced location planning departments can ensure that there is provision within analyst workloads to revisit forecasts after store opening to improve practice. This has the advantage not only of developing lessons for subsequent forecasting that lead to amendments to models but also tacit-based learnings that are retained and communicated between analysts. In addition, such post-opening assessments can lead to wider benefits for the retailer in terms devising amended strategies for local marketing or revised product ranging. Location planning teams currently neglecting post-forecast analysis potentially risk foregoing a range of benefits that could improve store development planning and marketing.

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Note

1. For example, these may include the visibility of a site from a main road, the role of perceptions of store accessibility and trade barriers (including effects of bridged rivers and motorways dividing a catchment).

References

- Alavi, M., & Leidner, D. (2001). Review: Knowledge management and knowledge management systems: conceptual foundations and research issues. *MIS Quarterly*, 25(1), 107-136.
- Alavi, M., Kayworth, T.R., & Leidner, D.E. (2005). An empirical examination of the influence of organizational culture on knowledge management practices. *Journal of Management Information Systems*, 22(3), 191-224.
- Amin, A., & Cohendet, P. (2004). *Architectures of knowledge. firms, capabilities, and communities*. Oxford: Oxford University Press.
- Amin, A., & Roberts, J. (Eds.). (2008a). *Community, economic creativity, and organization*. Oxford: Oxford University Press.
- Amin, A., & Roberts, J. (2008b). Knowing in action: Beyond communities of practice. *Research Policy*, 37(2), 353-369.
- Applebaum, W. (1968). *Store location. Strategy cases*. New York: Addison-Wesley.
- Argote, L., & Miron-Spektor, E. (2011). Organizational learning: from experience to knowledge. *Organization Science*, Published online in Articles in Advance, March 23, 2011 DOI: 10.1287/orsc.1100.0621
- Balconi, M., Pozzali, A., & Viale, R. (2007). The 'codification debate' revisited: A conceptual framework to analyze the role of tacit knowledge in economics. *Industrial & Corporate Change*, 16(5), 823-849.
- Baxter, G.J., Connolly, T.M., & Stansfield, M.H. (2010). Organisational blogs: Benefits and challenges of implementation. *The Learning Organization*, 17(6), 515-528.
- Birkin, M., Clarke, G., & Clarke, M. (2002). *Retail geography and intelligent network planning*. Chichester: John Wiley & Sons.
- Blattberg, R.C., & Hoch, S.J. (1990). Database models and managerial intuition: 50% model + 50% manager. *Management Science*, 36(8), 887-899.
- Boh, W.F. (2007). Mechanisms for sharing knowledge in project-based organizations. *Information and Organization*, 17(1), 27-58.
- Boland Jr, R.J., & Tenkasi, R.V. (1995). Perspective making and perspective taking in communities of knowing. *Organization Science*, 6(4), 350-372.
- Bryman, A., & Bell, E. (2003). *Business research methods*. Oxford: Oxford University Press.
- Cheng, E., Li, H., & Yu, L. (2005). The analytic network process (ANP) approach to location selection: A shopping mall illustration. *Construction Innovation: Information Process Management*, 5(2), 83-97.
- Clark, G. (1998). Stylized facts and close dialogue: Methodology in economic geography. *Annals of the Association of American Geographers*, 88(1), 73-87.

- Clarke, I., & Mackaness, W. (2001). Management 'intuition': An interpretative account of structure and content of decision schemas using cognitive maps. *Journal of Management Studies*, 38(2), 147-172.
- Clarke, I., Horita, M., & MacKaness, W. (2000). The spatial knowledge of retail decision makers: capturing and interpreting group insight using a composite cognitive map. *International Review of Retail, Distribution & Consumer Research* 10(3), 265-285.
- Clarke, I., Mackaness, W., Ball, B., & Horita, M. (2003). The devil is in the detail: Visualising analogical thought in retail location decisionmaking. *Environment and Planning B-Planning & Design*, 30(1), 15-36.
- Clarke, I., Mackaness, W., & Ball, B. (2003). Modelling intuition in retail site assessment (MIRSA): Making sense of retail location using retailers' intuitive judgements as a support for decision-making. *International Review of Retail, Distribution & Consumer Research*, 13(2), 175-193.
- Coff, R.W., Coff, D.C., & Eastvold, R. (2006). The knowledge-leveraging paradox: How to achieve scale without making knowledge imitable. *Academy of Management Review*, 31(2), 452-465.
- Cowan, R., David, P.A., & Foray, D. (2000). The explicit economics of knowledge codification and tacitness. *Industrial and Corporate Change*, 9(2), 211-253.
- Currah, A., & Wrigley, N. (2004). Networks of organizational learning and adaptation in retail TNCs. *Global Networks*, 4(1), 1-23.
- Daft, R.L., & Huber, G. (1987). How organizations learn: A communication framework. *Research in the Sociology of Organizations*, 5(2), 1-36.
- Davies, R. & Rogers, D. (eds.) (1984) *Store location and store assessment research*. London: John Wiley & Sons.
- Duguid, P. (2008). Prologue: Community of practice then and now. In A. Amin & J. Roberts (Eds.), *Community, economic creativity, and organization* (pp. 1-10). Oxford: Oxford University Press.
- Hernández, T. (2007). Enhancing retail location decision support: The development and application of geovisualization, *Journal of Retailing & Consumer Services* 144, 249-58.
- Hernández, T., & Bennison, D. (2000). The art and science of retail location decisions. *International Journal of Retail & Distribution Management*, 28(8), 357-367.
- Hernández, T., Bennison, D., & Cornelius, S. (1998). The organisational context of retail locational planning. *GeoJournal*, 45, 299-308.
- Holan, P.M.D., & Nelson, P. (2004). Remembrance of things past? The dynamics of organizational forgetting. *Management Science*, 50(11), 1603-1613.
- Johnson, B.R., Lorenz, E., & Lundwell, B.Å.K. (2002). Why all this fuss about codified and tacit knowledge? *Industrial & Corporate Change*, 11(2), 245-262.
- Kankanhalli, A., Tan, B.C.Y., & Wei, K.-K. (2005). Contributing knowledge to electronic knowledge repositories: An empirical investigation. *MIS Quarterly*, 29(1), 113-143.
- Kwon, W., Clarke, I., & Wodak, R. (2009). Organizational decision-making, discourse, and power: Integrating across contexts and scales. *Discourse & Communication*, 3(3), 273-302.
- Mendes, A.B., & Themido, I.H. (2004). Multi-outlet retail site location assessment. *International Transactions in Operational Research*, 11(1), 1-18.

- Morgan, E. & Tang, Y.L. (1992). Reviewing investment after completion: An exploratory analysis. *The International Review of Retail, Distribution and Consumer Research* 2(2), 217-232.
- Nelson, R., & Winter, S. (1982). *An evolutionary theory of economic change*. Cambridge, MA: Harvard University Press.
- Nonaka, I. (1994). A dynamic theory of organizational knowledge creation. *Organization Science*, 5(1), 14-37.
- Nonaka, I., & Takeuchi, H. (1995). *The knowledge-creating company. How Japanese companies create the dynamics of innovation*. Oxford: Oxford University Press.
- Nonaka, I., von Krogh, G., & Voelpel, S. (2006). Organizational knowledge creation theory: Evolutionary paths and future advances. *Organization Studies*, 27(8), 1179-1208.
- Olivera, F. (2000). Memory systems in organizations: An empirical investigation of mechanisms for knowledge collection, storage and access. *Journal of Management Studies*, 37(6), 811-832.
- Orlikowski, W. J. (2002). Knowing in practice: Enacting a collective capability in distributed organizing. *Organization Science*, 13(3), 249-273.
- Orlikowski, W. J. (2010). The sociomateriality of organisational life: Considering technology in management research. *Cambridge Journal of Economics*, 34(1), 125-141.
- Penrose, E. (1959). *The theory of the growth of the firm*. New York: John Wiley and Sons.
- Perraton, J., & Tarrant, I. (2007). What does tacit knowledge actually explain? *Journal of Economic Methodology*, 14(3), 353-370.
- Pioch, E., & Byrom, J. (2004). Small independent retail firms and locational decision-making: Outdoor leisure retailing by the crags. *Journal of Small Business and Enterprise Development*, 11(2), 222-232.
- Polanyi, M. (1966). *The tacit dimension*. London: Routledge.
- Reynolds, J., & Wood, S. (2010). Location decision-making in retail firms: Evolution and challenge. *International Journal of Retail & Distribution Management*, 38(11/12), 828-845.
- Rogers, D. S. (2005). Developing a location research methodology. *Journal of Targeting, Measurement & Analysis for Marketing*, 13(3), 201-208.
- Sadler-Smith, E. (2008). The role of intuition in collective learning and the development of shared meaning. *Advances in Developing Human Resources*, 10(4), 494-508.
- Sambamurthy, V., & Subramani, M. (2005). Information technologies and knowledge management. *MIS Quarterly*, 29(2), 193-195.
- Scalzo, N. J. (2006). Memory loss? Corporate knowledge and radical change. *Journal of Business Strategy*, 27(4), 60-69.
- Scarbrough, H., & Swan, J. (2008). Project work as a locus of learning: The journey through practice. In A. Amin & J. Roberts (Eds.), *Community, economic creativity, and organization* (pp. 148-177). Oxford: Oxford University Press.
- Simkin, L., Doyle, P., & Saunders, J. (1985). How retailers put site location techniques into operation: An assessment of major multiples' practice *Retail & Distribution Management*, 13(3), 21-26.
- Strauss, K. (2009). Cognition, context, and multimethod approaches to economic decision making. *Environment and Planning A*, 41, 302-317.

- Theodoridis, C., & Bennison, D. (2009). Complexity theory and retail location strategy. *International Review of Retail, Distribution & Consumer Research*, 19(4), 389-403.
- Turner, K.L., & Makhija, M.V. (2006). The role of organizational controls in managing knowledge. *Academy of Management Review*, 31(1), 197-217.
- Walsh, J.P., & Ungson, G.R. (1991). Organizational memory. *The Academy of Management Review*, 16(1), 57-91.
- Wenger, E. (1998). *Communities of practice: learning, meaning, and identity*. Cambridge, UK: Cambridge University Press.
- Wierzbicki, A.P. (2007). Modelling as a way of organising knowledge. *European Journal of Operational Research*, 176(1), 610-635.
- Wood, S., & Browne, S. (2007). Convenience store location planning and forecasting: A practical research agenda. *International Journal of Retail & Distribution Management*, 35(4), 233-255.
- Wood, S., & Reynolds, J. (2011a). The intra-firm context of retail expansion planning. *Environment and Planning A*, in press.
- Wood, S., & Reynolds, J. (2011b). Managing communities and managing knowledge: Strategic decision making and store network investment within retail multinationals, *Journal of Economic Geography*, in press.
- Wood, S., & Tasker, A. (2008). The importance of context in store forecasting: The site visit in retail location decision-making. *Journal of Targeting, Measurement & Analysis for Marketing*, 16(2), 139-155.
- Wrigley, N. (Ed.). (1988). *Store choice, store location and market analysis*. Andover: Routledge.

Table 1: Interview respondents by retail sector

Date of interview	Job title of respondent	Sector
November 2009	Location Planning Manager	Food Retailing
November 2009	Analyst	Department Store Retailing
November 2009	Analyst	Food Retailing
November 2009	Customer Analysis Manager	Department Store Retailing
November 2009	Location Planning Analyst	DIY Retailing
November 2009	Commercial Information Manager	Electrical Retailing
December 2009	Director of Store Development	Non-food Retailing
December 2009	Location Planning Manager	Food Retailing
December 2009	Head of Retailing	Charity Retailing
December 2009	Location Planning Consultant	Electrical Retailing
December 2009	Head of Site Location Services	Location Planning Consultancy
January 2010	Director	Location Planning Consultancy
January 2010	Head of International Development	Location Planning Consultancy
January 2010	Head of Retail Research & Consultancy	Retail Property Firm
January 2010	Location Planning Manager	Electrical Retailing
January 2010	Director of Retail Location	Location Planning Consultancy
January 2010	Real Estate Market Research Manager	Discount Retailing
January 2010	Store Forecasting & Development Manager	General Merchandiser
February 2010	Manager of Distribution Strategy	Retail Banking
February 2010	Retail Location Analysis Manager	Food Retailing
February 2010	Country Manager	Clothing Retailing
March 2010	Director of Location Planning	Food Retailing
March 2010	Property & Development Manager	Sports Retailing
March 2010	Property & Development Director	Opticians
April 2010	Focus Group with 10 location analysts from different retailers/location planning consultancies: <ul style="list-style-type: none"> • Food Retailing (2 Analysts); • Non-Food Retailing (5 Analysts); • Location Analysis Consultants (3 Analysts) 	
April 2011	Marketing Manager	Food Retailing

NB: Interviews listed here include those that were audio recorded and fully transcribed. A number of others were conducted with executives who declined for our conversations to be recorded. In these instances, research notes were made immediately following the exchange and consequently informed the study and its subsequent findings.

Figure 1: The mediation between tacit and codified knowledge in forecasting the sales potential of retail development sites (TK = Tacit Knowledge; CK = Codified Knowledge)

Source: Current study

Table 2: Knowledge sharing and retention mechanisms in retail location planning

	Individualised	Institutionalised
Personalisation	1. Individualised-personalisation mechanisms	4. Institutionalised-personalisation mechanisms
	describes mechanisms that create opportunities for individuals to share knowledge at the individual level in an ad-hoc and informal manner	describes personalisation knowledge-sharing mechanisms that are institutionalised in the routines and structure of the organisation
Examples	Accompanied site visits; formal mentoring ; one-to-one emails/meetings/discussions	Seminars (internal and external to retailer), group meetings
Representative interview data	<i>'there's the ability to have a senior and a junior member effectively in a buddy system so the senior person is able to pass on their knowledge...The junior comes up through the system, and then should that senior person move, well, you know, if the junior person has been there long enough, he would have absorbed a fair bit' (Food retailer)</i>	<i>'we take the post-investment reviews to the regular team meetings. We have monthly team meetings to look at this' (Food retailer)</i> <i>'we're members of DUG, the Demographic User Group, which have quarterly meetings and conferences, and... I went on the Oxford [University retail location analysis] course (Department Store retailer)</i>
Codification	2. Individualised-codification mechanisms	3. Institutionalised- codification mechanisms
	describes mechanisms where documents and other project artefacts are shared at the individual level, in an informal and ad hoc manner	describes codification knowledge-sharing mechanisms that are institutionalised in the routines and structure of the organisation
Examples	Print-outs of model output, analogues & notes from sales forecasts; personal emails	Databases (e.g. of competition size & location); models (e.g. spatial interaction models); analogue data; intranets; training manuals; project reports
Representative interview data	<i>'we do try and keep as much of our stuff and...anything we're working on, we've got a lot of records on what's been done for that particular project. A lot of the stuff is then actually printed and we'll have things that we've annotated on maps to try and help us understand why something would work, and we would then get those scanned in and saved onto the system, so people can actually go back and refer to them again.'</i> (Electrical retailer)	<i>'There is a written document that tells you how to go through the Excel program that we've got and describes each tab and what the aim of it is and what you should be looking for. So there is a training manual. It's probably not been updated for a year or so' (Food retailer)</i> <i>'we have quite a lot of training documentation which is on our shared [computer] drive.'</i> (Food retailer)

Source: Developed from theoretical underpinnings of Boh (2007)

Figure 2: The theoretical learning process within location planning forecasting

Source: Current study