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Exploring the use of dual-processing in commercial property development decision making under conditions of risk and uncertainty

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Abstract

The commercial property sector makes a significant contribution to the UK economy. The central question addressed here is the degree to which decision-making in commercial real estate development is sophisticated and rational and the degree to which it relies on behavioural instincts and intuition. In doing so, decision making theories, including heuristics, are considered and their prevalence in the field of commercial real development examined. A 'dual-processing' decision-making model is proposed and examined as to whether it is an accurate representation of developers' behaviour and it can offer an effective lens through which to examine decisions under conditions of risk and uncertainty. The participants believed that they adopt a fairly objective and rational approach to complex real estate development decision making and related risks. However, analysis of the data suggests otherwise; with a number of clearly identifiable heuristics playing a significant role. The article concludes that the dual-processing model of commercial real estate development decision-making does provide a realistic representation of the decision-making approach adopted by commercial real estate developers in practice. The work extends existing research on behavioural influences on decision making into the commercial real estate sector and its results have clear implications for professional practice.

Keywords:

Decision making; Dual processing model; heuristics; real estate development; real estate developers; commercial property; risk and uncertainty

Introduction

With more than 2.4 million direct and indirect jobs (1 in 13 of all employees) and economic output of £116 billion (7% of U.K. GVA), the commercial property sector continues to make a significant contribution to the UK economy (British Property Federation, 2020). Commercial

real estate development (CRED) builds product, in the shape of commercial floorspace, in anticipation of potential, but unknown future demand (Fisher and Robson, 2006) making CRED particularly prone to risk and uncertainty. Taking a CRED project from inception to completion is a lengthy and complex process making it virtually impossible to forecast market conditions that will exist when a development is finally completed. For example, the Shard in London was designed in 2000 by Renzo Piano, with planning permission confirmed in 2003; construction commenced in 2009, with Practical Completion achieved in 2012 (Designing Buildings, 2021). Although the Shard is an unique building, the project duration of over twelve years from design to completion is not exceptional.

Investors and real estate developers need to definitively commit to property developments, despite all the surrounding risks and uncertainty. Given the combination of high stakes and uncertainty, it might be expected that highly complex and sophisticated decision-making processes would be employed to inform such decisions, however experience would suggest otherwise (Byrne, 2002; Fisher and Robson, 2006). For example, when describing his acquisition of the Heron Tower development site in London for £208m, the developer Gerald Ronson, in his 2009 biography, describes how he 'had a very strong gut feeling that we could make a lot of money out of this deal, so once we had agreed the price we stuck to it.' (Ronson, 2009, p. 217).

It is over two decades since Diaz (1999) systematically reviewed the first decade of behavioural research undertaken into real property and concluded, that whilst there had been research into the techniques of property valuation, investment and negotiation:

'many of the activity centres of (the property industry) lie securely unpenetrated. Important issues have yet to be confronted directly by behavioural researchers..... behavioural study is moving away from the security of convenient targets to embrace important topics in other activity centres.'

(Diaz, 1999, p. 331)

Over two decades later, many of these 'activity centres' remain under researched. Real Estate developers continue to use terms such as 'gut feel', 'instinct' and 'intuition' to justify decisions

related to property development projects. As Easen and Wilcockson (1996, p. 672) point out, such terminology serves to reinforce the 'black box' notion of the processes that take place when a professional is acting 'expertly'.

This article presents an investigation into decision-making in CRED, to determine whether it is sophisticated and rational and the degree to which it relies on gut feeling, behavioural instincts and intuition. In doing so, decision making theories, including heuristics, are contemplated and their prevalence in the field of CRED examined. A 'dual-processing' decision-making model of CRED is proposed and is tested to determine whether it can firstly, provide an accurate representation of developers' decision making behaviours, secondly, whether it offers a useful lens through which to examine their decisions, and thirdly, whether it assists in analysis of the quality of the decisions made.

The article is structured as follows: a comprehensive review and analysis of relevant literature is presented covering real estate development, uncertainty and risk, and decision making. From which a model of developer's decision-making process is proposed and then subjected to scrutiny using empirical data. The primary data collection and analysis was conducted from a qualitative and inductive perspective; the intention being to construct an improved understanding of CRED decision-making in the 'real world'. Empirical data was collected through semi-structured interviews with senior property development practitioners and analysed thematically. The research aims to provide an alternative lens through which decisions to invest considerable sums of equity capital and debt-based borrowing are made.

Review of relevant literature

Real Estate or property development has been defined by Wilkinson and Reed (2008, p. 2) as; 'a process that involves changing or intensifying the use of land to produce buildings for occupation.', and by Fisher and Robson (2006, p.18) as 'a complex stochastic process whose features vary with time and place'. The use of the term 'stochastic' implies a degree of randomness and conjecture. This is clearly the case with real estate development, which takes place in an uncertain and risky environment, with its product being produced in anticipation of unknown future demand. This prompted Costello and Preller (2010, p.186) to claim that

Property development is in many ways another form of entrepreneurship, in that it involves “creating the future”, not merely managing construction tasks.

The need to make decisions in this uncertain environment is a central focus of this paper. At the heart of the development process is the ‘real estate developer’. Healey (1991, p224) regarded developers as the key coordinator and catalyst for development Brett and Schmitz (2001, p. 11) likened the property developer to the ‘conductor of an orchestra’ suggesting that: ‘the developer’s role is to orchestrate the development process’.

Unless a development is entirely pre-let (e.g. let to tenant(s) in advance of floorspace and buildings being constructed) a degree of uncertainty will always exist. The main ‘known unknown’ is the ability of a development to attract occupation by a rent-paying tenant. Even when a tenant has been attracted, there is further uncertainty around the lease terms, rent and incentives to be negotiated to secure their occupation. As indicated earlier, commercial developments can take anywhere from two to ten years or more to progress from initial inception to effective completion. During the development period there may be a significant fluctuation in any one of the independent variables that feed into the development appraisal calculation that is used to determine viability and profitability of a given development proposal. For example, commercial rents can fluctuate, as can the cost of borrowing and construction costs, depending on strength of market demand, relative to supply, and competition for resources.

Determining when to commence a development is fraught with difficulty. Ideally, a developer will try to forecast when occupational demand and market rent will be close to their peaks and commence a development in sufficient time to coincide with this. This tension is well illustrated by Guy and Henneberry (2002), who suggest that,

‘To achieve completions in financially the most propitious periods, developments need to be started in the early stages of upturns before growth trends are clearly established. Developers will find it difficult to justify the commitment of funds to schemes, especially if the funds are derived externally, in these circumstances. Conversely, apparent profitable development

opportunities which offer themselves near the peak of the market cycle must be ignored. No easy task.'

Guy and Henneberry (2002, p. 111 – 112)

The development process can be divided into a series of, often overlapping, stages from initiation and evaluation to implementation and disposal. The likely returns from alternative projects are modelled, and the risks and returns compared (Byrne 1996). Fisher and Collins (1998), based on case studies in the UK and South Africa, developed a model of the property development process based on the four dimensions of structure, actors, site and events. The model illustrates the flexible, non-linear, nature of property development which precludes the adoption of a prescriptive approach. The authors even caution against the comprehensive descriptive value of the model, conceding *that in commercial development, rational project planning is not well-advanced and decisions are often taken in private, based more on experience and instinct than on good information and research* (Fisher and Collins 1998).

This perspective has been supported by Adams et al. (2011), who found only a limited understanding of the drivers of the development process and the motivations of developers, concluding that a more thorough understanding of the development industry is required, particularly to inform effective policy-making, a view upheld by Henneberry and Parris (2013, p. 242) who found that 'relatively little is known about the perspectives, actions and strategies of property developers.'

'Property development displays the hallmarks of a 'complex adaptive system', comprising different parts, connected in multiple ways, interacting serially and in parallel. Actors operate on established norms and practices that provide stability, yet are sufficiently flexible to adapt to change.'

(Fisher, 2010, p. 120)

Development Risk and Uncertainty

The management of risk and making risk-related decisions is central to the real estate development process. For developers and investors, risks exist across a wide breadth of domains, such as reputational risk, financial risk, project specific risk, legal risk and

environmental risk. The concept of risk, responses to risk, and consequently how to deal with them, attract competing perspectives, the most fundamental of which centres around whether an objective, positivist position, or a relativist and socially-constructed one, best represents reality. Influential authors such as Rosa (2003) and Aven & Renn (2009) consider such arguments to be an unhelpful impediment to proper understanding, and support a theoretical framework that accepts both, in terms of risk and risk response: risk itself can be objectively measured, whilst perception of risk and, by extension, risk response, are social, cultural, contextual and individual constructs.

The use of the term risk has changed over time, from a total focus on negative impacts, to a concept that embodies both threat and opportunity and that 'one person's risk may be another's opportunity to profit' (Edwards and Bowen, 2005, p.11). This is echoed by Gehner (2008) whose work on real estate options recognised that uncertainty is not intrinsically negative and may provide value. Hargitay and Yu (1993, p. 35) suggest that risk can be represented as a spectrum, from certainty to total uncertainty, depending on whether the outcome is known, whether other outcomes can be identified, and whether the probabilities of these outcomes can be estimated. Raftery (1994) and others, advocate a systematic approach to risk, i.e. risk management, which whilst not eliminating unanticipated events, should mean that 'few crises should come totally out of the blue' (DeMeyer et al, 2002, p. 61).

Frosdick (1997) proposes that the risk management process should commence with the identification and assessment of risks, followed by a decision on how to respond to the risk, and finally a monitoring and control phase. There are four basic forms of risk response: retention, reduction, transfer and avoidance. An important factor that influences decisions regarding risk response and allocation is the decision maker's attitude to risk (Wisniewski 2006, McMillan 1996). Much of the risk assessment literature that relates specifically to real estate is focused on how to respond to uncertain changes in the external environment, be they environmental (Smith, 2003), market/economic (Jadhav, 2012), or financial (Fernández-Villaverde, et al., 2011). In addition to uncertainty about the external environment, decisions can also be influenced by underlying heuristics: 'simple procedures that help find adequate, though often imperfect, answers to difficult questions' (Kahneman, 2011, p. 98). Indeed, in

many cases, it is clear that decision-makers are subject to various heuristics when they are using what they describe as their 'intuition'. Although the use of intuition and heuristics can lead to 'adequate' decisions being made, there is evidence that their use can result in bias and mistakes.

Tversky and Kahneman (1974) originally identified three primary heuristics employed in decision making under uncertainty : *availability*, where events are treated as more significant if they are more memorable; *representativeness*, where significance is suggested by similarity with stereotypes; and *anchoring and adjustment*, where marginal variations are made around an initial estimate which has no objective basis; to which confirmation bias, which is a tendency to seek out and apply greater weight to evidence which substantiates a prior conviction, is often added. Humans therefore use heuristics to cope with limited cognitive capacities, but that this comes with a cost, as information and options are ignored and 'real-world cognitive behaviours deviate from those posited by perfect rationality.' (Wofford et al, 2010, p.269).

Decision-making under uncertainty

Because decision makers do not possess either the level of knowledge or the powers of reason ascribed to the unrealistic neo-classical model of 'economic man', they adopt courses of action that are perceived to be satisfactory. Herbert Simon (1959) defined such behaviour as 'bounded rationality', understanding of which forms the foundation of the behavioural approach. Whereas 'economic man' is an optimiser, his/her real-world equivalent is a satisficer ... models of satisficing behaviour are richer than models of maximising behaviour because they treat not only of equilibrium but of the method of reaching it as well. (Simon (1959) cited in Castles et al., 1976, p. 44)

Simon (1956; 1959; 1979) coined the term 'satisfice' to describe sub-optimum decisions made within boundaries and constraints (bounded rationality) where the 'best' decision is foregone and an 'acceptable' or 'reasonable' decision is made. This is evident when developers undertake appraisals using, what are considered to be, 'sophisticated' software packages, the final output of which appears to result from a quasi-scientific process, however in reality

many of the input variables will have been determined in a subjective, perhaps even arbitrary, way influenced by some of the above-mentioned heuristics.

Real Estate development specifically, and risk management more generally, are processes that require a series of interlinked decisions, some of which will result from rational processes or models, whereas others will be based on what might amount to intuition. Birrell and Bin (1997) note that while many property developers profess to adopting a 'logical' decision-making style there is evidence that 'intuition' plays a major role.

Review of the literature on what is meant by 'intuition' reveals a significant lack of clarity, consistency and coherence in the use of the term. A number of terms are used in an interchangeable and indistinct way; including 'gut feeling', 'crazy hunch', 'perceptual awareness', 'pattern recognition', 'know-how', 'tacit knowledge' and 'implicit knowledge'. For example, some of the professionals questioned by Easen and Wilcockson (1996, p. 668) sought to distance themselves from what they saw as an irrational and unprofessional approach, whereas others saw it as a valid and distinctive part of professional effectiveness. Epstein (2007, p.23) states that intuition 'can be explained by a system, that automatically learns from experience'; and Simon (1987, p. 63) that intuition and judgment – at least good judgment – are simply analyses frozen into habit and into the capacity for rapid response through recognition.

However, Kahneman (2011 p.201-202), has concerns over the language used to describe past experience, citing 'the illusion that we understand the past, which implies that the future should also be knowable'.

Preveden (2015, p.4) observed that where real estate appraisers could not provide an explanation of how parameters were weighted, or adjusted, they referred to their 'professional intuition' and 'gut feeling'. This accords with Gallimore & McAllister (2005, p. 21) who refer to a financial forecaster who believed that 'gut feeling' actually drew on many years of experience. Baylor (2001) has proposed that the development of intuition follows a U-shaped curve with the x axis representing 'level of expertise' and the y axis representing 'availability of intuition'. The suggestion is that the novice decision maker will use immature

intuition; as they become more experienced, they will make decisions based on knowledge; and then in the later stages of experience the decision maker will make more use of intuition drawing on their 'domain specific experience'. Mowen (1994 p. 230), has a consistent view, contending that decision-making appears more intuitive the 'higher up you go in the organisation'.

Dual Processing

A significant amount of work undertaken in the fields of neuroscience, behavioural economics, and psychology supports the theory that the human mind is capable of deploying both 'rational' and 'intuitive' approaches to the making of individual decisions. Haidt (2001, p. 828) suggests that the divide between rationalism and intuitionism is not unbridgeable but that the challenge is how these processes fit together. In the article 'The Emotional Dog and Its Rational Tail' Haidt (2001) criticises 'rationalist models' for starting with reasoning and then exploring the effects of other variables. In fact, he concludes that emotions and intuitions drive reasoning 'just as surely as a dog wags its tail.' (2001, p. 830). Haidt is concerned here with looking at moral judgements, but could it be argued that this is the case for real estate developers as well?

Epstein observed that people apprehend reality in two fundamentally different ways, one variously labelled intuitive, automatic, natural, nonverbal, narrative, and experiential, and the other analytical, deliberative, verbal, and rational (1994, p. 710) and that if we fail to understand this 'our rationality will be undermined by our inherently experiential nature' (1994, p. 721). Moreover, according to participant studies by Novak and Hoffman (2009), the cognitive and experiential systems are most useful in different situations. Stanovich (1999) introduced the terms 'System 1' and 'System 2' to differentiate between the two processes. System 1 being automatic, quick, requiring little or no effort, and with no sense of voluntary control. System 1 accesses knowledge stored in memory without intention and without effort. System 2 is described as requiring effortful mental activities, and may involve complex computations, associated with agency, choice and concentration. Kahneman (2011, p. 13) discussed how the two systems can interact, switching between System 1 and System 2 as conditions require.

Early work on such dual processing concentrated on distinguishing between the two systems, whereas Salas et al. (2010) argue that the 'major challenge for future research is to better understand how these (two) systems work together'. Following on from this, Kahneman (2011) sought to describe how the two systems interact; contending that when we are awake both Systems 1 and 2 are active; for the majority of the time System 1 runs automatically and System 2 operates in relaxed mode exerting little effort. When the systems are operating in this 'comfortable' way, System 1 constantly initiates 'impressions, intuitions, intentions and feelings' for System 2. If accepted by System 2, impressions and intuitions become beliefs, and impulses become voluntary action. In other words, most of what is thought and done originates in System 1, but System 2 takes over when things get difficult, and normally has the last word. Generally, this works smoothly and 'you generally believe your impressions and act on your impulses.' (Kahneman 2011, p. 24).

The operation and interaction between System 1 and System 2 is therefore very efficient in minimising effort and maximising performance. Generally, the process works well because System 1 is 'generally very good at what it does: its models of familiar situations are accurate, its short term predictions are usually accurate as well, and its initial reactions to challenges are swift and generally appropriate.' (Kahneman 2011, p. 24).

The drawback with the process is that System 1 is prone to bias (see heuristics) which can cause systematic errors in specific circumstances. This problem is compounded by the fact that System 1 cannot be turned off and does not generate a warning signal even when such circumstances become apparent. Intuitive answers are presented quickly and confidently with no indication as to whether they result from skill or heuristics.

Kahneman and Klein (2009) recognised that some intuitions arise from genuine skills, but that others can result from the inappropriate use of heuristics with skilled professionals and experts generally being unaware of the source of their intuitions. Kahneman (2011) alluded to the fallibility of experts' intuition in situations they not previously dealt with, while Klein (2010, p.6) agrees and expressed concern about 'leaders in complex situations who don't have enough experience, who are just going with their intuition and not monitoring it, not thinking about it'.

In summary, the literature suggests that dual-processing operates smoothly and automatically, and generally efficiently and effectively most of the time. The literature does however highlight a major concern in that System 1 decisions are prone to bias and error and may be accepted in a dual-processing process without verification.

How might such bias and error be avoided? Kahneman (2011, p. 9) advises the conscious postponement of intuition and the systematic acquisition of high quality information as early in the process as possible. However, even Kahneman (2011) is not confident that significant improvements can be made in the elimination of errors, admitting that despite his own immersion in the decision-making discipline for decades, he is still prone to overconfidence and extreme predictions. The areas in which he has improved are awareness of the situations in which errors are likely and recognising the errors of others.

Dual-processing theory does not explicitly feature in real estate research to date; Xu (2000, p. 1) did recognise that real estate investment decisions are based on 'experience and intuition together with some portfolio information and market information'. Norman and Flanagan (1993, p. 56) indicate that dual-processing is used by construction managers when considering the consequences of risk occurring by relying on 'expert judgment ... tempered with some information, if it is available...'. In their work on real estate investment decision-making, French and French (1997, p. 231) conclude that decision makers will be judged in diligence on both process and results; i.e. on whether the process demonstrates a rational consistency, and on whether the results are good.

The authors propose that a theoretical model of how System 1: System 2 dual-processing could apply to CRED decision making, as illustrated in Figure 1 below. The arrows on the periphery of the model represent the environment and drivers for the development project. At the top are the company and project drivers. Company drivers include the size of the real estate development company, its status and reputation, access to equity and debt finance, availability of joint venture partners etc. Project drivers include the type of development to be undertaken and the geographic location in which the company operates. At the base of the figure are the external economic factors which include the state of the national economy

and how this translates into costs of borrowing, government economic, sectoral and spatial policies, local property markets, specifically including occupational demand and supply, both existing and in the development pipeline.

The two concentric rings represent the interaction between System 1 and System 2 processing, resulting in the 'dual processed' decision being made at the centre of the diagram (purple circle). The small yellow circles, linking the System 1 and System 2 rings illustrate the interfaces between the two systems, representing the operation of dual processing. The model is not intended to suggest that CRED decision makers necessarily use one or other of the Systems in the first instance, indeed the rings representing System 1 and System 2 could be reversed. Furthermore, the terms within the rings are not intended to be comprehensive - other terms could be added – nor are their relative locations fixed. A more representative illustration of the interaction of the 'Systems' in real estate development decision-making would be achieved if the diagram could be animated to show the spheres pulsating to indicate that the proportions of System 1 and System 2 utilised will vary from scheme to scheme, time to time and decision to decision.

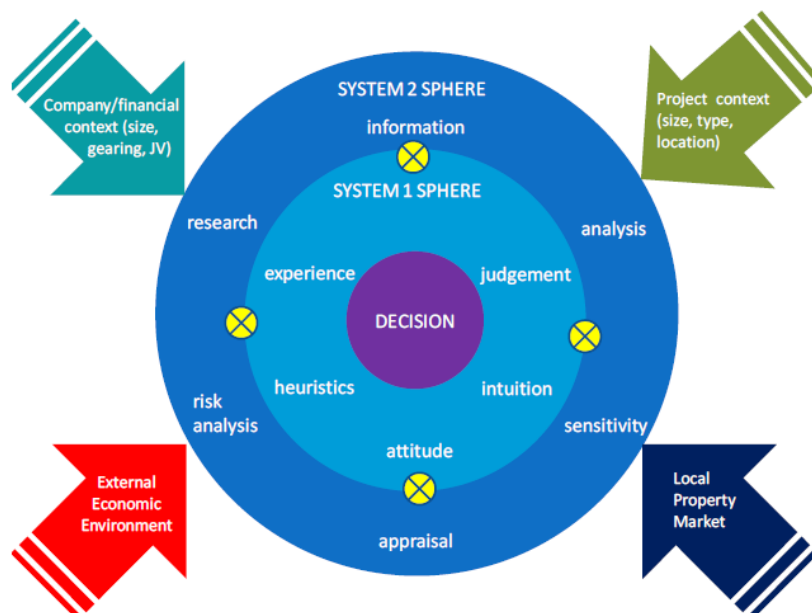


Figure 1: Dual Processing Model of Commercial Real Estate Development Decision Making Processes (Source: Author's own)

Methodology and Data collection

The central research question investigated by the researchers is whether a dual processing decision making model is an accurate representation of commercial real estate developers' behaviour. To answer this question involves examining the relative use of intuition and evidence-based rationale in CRED decision-making in conditions of risk and uncertainty, and the implications of this for professional practice. The study pursues an inductive approach, whilst adopting a social constructionist stance, within which different people are recognised as constructing meaning in different ways, even in relation to the same phenomenon (see Crotty, 1988). Semi-structured interviews were the chosen method of data collection, enabling the same topics to be covered with all interviewees, but allowing interviewees to pursue areas of specific interest. A convenience sample of twelve very senior real estate developers were interviewed, with the level of seniority of the interviewees being critical to the credibility of the research, as it was important that those interviewed had made, or played, a major role in significant 'high level' real estate development decisions.

Both types of real estate development companies were represented, namely 'investor-developers', who develop and retain completed projects, and 'trader developers' who liquidate the asset upon completion; as were developers of both speculative and bespoke developments, respectively when the occupier is unknown (hence speculative) or when the end user is known, typically when a scheme is pre-let or pre-sold. The real estate development companies varied in size, but all were lead developers for the major schemes with which they were involved; they included a company with a UK wide market exposure, a regional developer that had completed a prime mixed-use scheme in London, and developer of one of the largest mixed-use schemes in Edinburgh during the last decade.

The job titles of the participants illustrate their seniority in their organisations, described as follows: Chief Officer and Executive Officer; Managing Directors; Joint Managing Directors (with additional roles as Development Manager and Development Director); Development Directors; Commercial Property Development Director; Regional Director; and Director. Whilst the participants' job titles and roles in their respective companies vary, they are all involved in decision-making at a very senior corporate level.

It was recognised that empirical research into the property development process raises challenging problems because it involves 'research arenas where many powerful actors operate, where secretive strategies are part of the battle for competitive success, where data is scarce and produced in ways which are often difficult to penetrate, and where publicly available documentation and public talk is often deliberately distorted for the purposes of competitive advantage' (Healey and Barrett, 1990, p. 99). Healey and Barrett, however, do acknowledge that the 'sensitised investigative researcher' can penetrate real estate development processes with considerable success.

The semi-structured interview approach allowed the interviewees to tell their 'stories' about development projects and how decision-making is done in their organisations, whilst ensuring that information about the key areas of the research was obtained. This included: the role and experience of the interviewee; attitude to risk and impact on decision making; whether risk attitude has changed over time and why; an understanding of the development process and where the key decisions are made and by who; whether/when intuition may be used as opposed to rationality; and, where intuition has developed from and whether it's use has increased over time. The final questions were framed around whether the developer believed that they had made any mistakes and whether these resulted from the use of intuition or rationality. Non-rational or vernacular terminology was avoided in the formulation of interview questions to avoid leading interviewees into the use of such terms.

The interviews yielded a huge amount of valuable insight into developers' decision making practice that required analysis and interpretation to produce coherent conclusions without diluting the richness of the data. To achieve this the results were analysed using template analysis, a process described by King (2004) as:

'... the researcher produces a list of codes ('template') representing themes identified in their textual data. Some of these will be defined a priori, but they will be modified and added to as the researcher reads and interprets the texts. The template is organised in a way which represents the relationships between themes, as defined by the researcher, most commonly involving a hierarchical structure.'

King (2004, p. 256)

King (2004, p.269) warns that the fundamental tension of using template analysis is between the need to be sufficiently open to the data and the need to structure the process of analysis: 'Too much openness and the product is likely to be chaotic and incoherent; too much structure can leave the researcher with all the drawbacks of quantitative research but none of its advantages.'

QSR NVivo was used to assist with the analysis of the interview transcripts. The use of this textual analysis software helps with the organisation, retrieval, inspection and manipulation of the data. The software enables linkages to be explored and the surrounding context from which passages are extracted to be subsequently viewed. NVivo offers huge benefits in dealing with large amounts of data and examining possible relationships between themes however it does not make judgements as such. NVivo was therefore employed as a tool to aid the analysis, not replacing the need to interpret the data.

Results and discussion

The findings, by way of reporting, interpretation and, where appropriate, verbatim quoting of the responses of interviewees, are presented in accordance with the themes that emerged from the NVivo analysis and triangulated with pre-existing knowledge articulated through relevant literature. The responses to the initial questions about the interviewees themselves, their attitude to risks and the development process were primarily analysed using a priori themes. The discussion that developed from the questions regarding the use of rationality and intuition in decision making was more wide ranging and less predictable. The themes used in the analysis of this material emerged from the data and were iteratively refined in an attempt to identify patterns and recurring or essentially synonymous language.

Risk and Uncertainty

It has already been established that CRED is conducted under conditions of uncertainty and that the greater the level of uncertainty, the higher the risk. Development risk is considered by developers to be the main focus of their role and 'top of our agenda, in just about everything we do'. The majority of interviewees acknowledged that it is the very presence of

risk that creates the opportunity for them to generate profit. One interviewee believed that 'if you didn't have risk, you probably would have such little intrinsic value', although another suggested that 'it is all about *not* taking risk; it's about finding an opportunity and then de-risking that opportunity'. At first read these appear to be oppositional views, however on closer consideration they are entirely consistent: the 'ability' to make profit being down to developers using their knowledge, intuition, skills and experience to identify risks, take decisive actions to reduce or ameliorate such risks; the success of doing so being rewarded with increased profit.

The participants mentioned a wide range of risks involved in CRED including: 'letting (or tenant) risk'; 'planning risk'; 'political risk'; 'land related risk'; 'design risk'; 'construction risk'; and 'financial risk'. Whilst there was no unanimity as to what constituted the single main area of risk, there was consensus about the quantum and complexity of the process: '*it is all about risk management*' and '*just about everything we do is focussed on mitigating risk*'.

Developers are often perceived as serial risks takers. Although some participants indicated that they believe themselves to be risk-averse, one admitting that:

'on a personal level I've always been a relatively risk-averse person - that sounds incompatible with the career in property development, but it's not at all because there are means of identifying the risk and mitigating the risk through the appropriate due diligence'

Another developer indicated that they had moved to the more risk-averse end of the risk attitude spectrum as they became more experienced: '*I would say it has definitely become more tempered, as I have become more experienced because I am more aware of the pitfalls and for what the consequence of those pitfalls*'

With another suggesting that: '*it's just learning from (your) mistakes and I think that affects your attitude to risk*'.

Decision Making

This section explores interview evidence of participants acting rationally, intuitively or adopting a mixed approach. Because of the inherent nature of CRED, some decisions are highly subjective: One developer stated:

'you take account of all factors and you then score them different people do it in different ways one person's ten might be another person's four there's a bit of science behind the gut feel (that) enables you to say whether or not I disagree with that'.

The majority of developers claimed that they followed rational decision-making processes. Most of the examples provided related to the use of development appraisal software at feasibility stage of development projects, with a consensus that the need to undertake detailed financial appraisals increases as the project proceeds; particularly important when trying to lever debt finance into a project. One interviewee indicated that, in effect, decisions are made early in the process using some intuitive judgement, and then rational analysis is used to support the decision, revealing a combination of confirmation and choice supported biases: *'you know very early on whether you want your appraisal to land on heads or tails'.*

User of vernacular terminology

Throughout the interviews, participants frequently used a variety of terms that suggest a less than-formal approach to their decision making, with approximately fifty different expressions of a vernacular nature being used by interviewees, which have been organised into the following loose and overlapping groupings of development terminology:

Appraisal

Most interviewees professed to following rational appraisal processes and used sophisticated development appraisal software to model and test the viability of development project in order to improve the quality of outcomes. However, there was also significant evidence of less formal analysis being undertaken. Terms indicating such an approach include 'back of a fag packet'; 'back of an envelope'; 'not rocket science'; 'in our 'heads'; 'twist or break' and 'will it fly?'.

A particularly telling observation explained that:

'if you get a very junior person driving a very detailed appraisal, they are perhaps less likely to overlook things than someone who is more experienced (who) can go through a back of a fag packet (appraisal calculation) and be actually much clearer about where the risks lie, where the commercial risks lie'.

Forecasting

Real estate developers employ a variety of sophisticated forecasting techniques, yet also use quite imprecise language to describe how they approach forecasting in practice, for example: 'crystal ball', 'read the market', 'foresight', 'vision' and 'pan out'.

Emotions

Some developers indicated that emotional factors influence how they approach decision-making regarding CRED. Interviewees used the following 'emotional' terms in describing how they may approach decision making: 'feeling', 'uncomfortable', 'good feel', 'nervousness', 'mad' and 'morality. which reveal use of 'affect heuristic', where judgments are guided directly by feelings of liking and disliking, with little deliberation or reasoning Kahneman (2011, p. 12).

Many of the developers referred to the importance of feelings of 'confidence' in their approaches to decision making, with several indicating that the confidence they had in their own ability enabled them to make decisions that competitors may not have made.

'you have got to have quite a bit of confidence when you are going away from what everybody else is doing and that is what separates you from the rest of the pack'.

Risk Taking/Management

Developers used the terms 'punt', and 'sticking your neck out' when talking about risk management, in anticipation of a favourable outcome in the future; consistent with optimism bias, where one believes the future will be much better than the past (Sharot, 2011).

Biases

Various biases were explicitly referred to by participants, perhaps because they are biases developers recognise in themselves, using terms such as: 'colours your thought', 'blinkered', 'greed', and 'playing hard ball'. For example: 'I wasn't at the same level last recession so (was) probably aware of a different picture this time (around) which colours your own thoughts'. This suggests that had the developer been at a more senior level at the last economic downturn, they would have used that experience of making decisions during an economic downturn that could have been drawn upon in the future. In the absence of such experience, they are suggesting that they will draw upon more recent information in decision making. This is evidence of the 'availability heuristic' at work, which suggests people are more likely to use information in decision-making that is more 'readily' available to the memory (Tversky and Kahneman, 1974; and Bazerman and Moore, 2009).

There is evidence of developers exhibiting overconfidence and the tendency to get carried away. This can result in developers ignoring evidence that might contradict their views and use less than rigorous analysis in scheme evaluation.

Conjecture

In talking about carrying out appraisals for speculative commercial developments, one interviewee accepted that many of the inputs into complex development appraisals are no more than 'guesstimates' at best and therefore the output from the appraisal can be highly flawed, due to 'all those huge elements ... are based on judgement and advice and guesstimates and all the rest of it or whatever you want to call it, so the that figure produced at the end is not a factual figure'.

There was evidence that guesswork plays a significant role in undertaking development appraisals, with developers alluding that appraisals can be adjusted to arrive at whatever figure they want, with the end result owing much to conjecture. This was corroborated by statements such as:

'you don't need to tinker with the development appraisal very much to adjust the returns significantly and that tinkering is an educated guess at the end of the day'.

Gut Feel, Intuition and Instinct

The most heavily used vernacular term, used by all but two of the participants, was 'gut feel'. The term 'gut feel' is not referred to frequently in decision making theory and literature, although Easen and Wilcockson (1996), found that a variety of terms were used in an interchangeable including 'gut feel' and 'intuition'. One developer described a situation where the advisors were advocating a risk averse 'do nothing' approach and the developer had to take, what they considered to be, a gut feel, intuitive decision to move the development forward.

Simon (1992) indicates that 'intuition' enables an expert to access information stored in memory, with Betsch (2008) explaining that intuition allows a large quantity of information to be processed simultaneously rather than the sequential approach adopted in more rational decision-making processes. Some participants took the view that the ability to be intuitive or use gut feel develops with experience. For example: 'I think if you are looking at a development opportunity, the intuitive, the gut feel, is crucially important and that is where experience comes in'. This view is consistent with the principles of the 'U-Shaped Model for the Development of Intuition' (Baylor 2001) which suggests that mature intuition requires the decision maker to draw on their 'domain specific' experience.

Jumping to Conclusions

The next group of terms relate to the speed of making decision and what can be termed as 'jumping to conclusions' i.e. making decisions without following a logical or rational process. The following terms were identified in this respect: 'no brainer', 'looked wrong', 'quick look', and 'what springs out of the page'. The term 'no brainer' was used on a number of occasions by interviewees, for example:

'it is time to look at that plot of land (be)cause we finished this one, let's roll on to the next one, so what would you put on that key plot of land and, by and large, it is an almost no brain decision'.

Thought Process

Participants used a variety of terminology to describe the thought processes employed in decision making, including: 'chew on advice'; 'filter'; 'schools of thought'; 'thinking outside the box', and 'holistic Skills'. One suggested that 'the advice, you get to chew on, and make sure that that is the advice you are willing to live by'. There appears to be a possible contradiction here, in that the developer takes professional advice because it is an area in which they lack expertise, and then 'chew' on this advice in deciding whether to accept it or not.

Luck

In addition to using vernacular and subjective terminology to describe their decision-making processes, interviewees also made several references to luck having played a large part in successful project outcomes. Although there is no evidence of developers taking any 'credit' for their luck, the recognition that luck can play a part opens up the possibility of 'hindsight bias' occurring (Hawkins and Hastie, 1990). Kahneman (2011) warned that instead of punishing lucky leaders for taking too much risk they are, instead, praised for their 'boldness'.

Dual System

In addition to participants demonstrating use of both rational decision-making and intuitive/heuristic decision-making, there was significant evidence of the use of dual processing, where developers use a combination of System 1 and System 2 thinking in reaching a specific decision. For example: 'it has to be informed by quantified and qualified research, but at the end of the day it's still just a judgment and part of that we refer to as gut feeling.' The developer went on to explain that 'it would be dangerous to do one without the other' and 'it is a heart and head thing I think there is room for both in commercial property development'.

A particularly insightful and sophisticated explanation of how dual processing works, specifically in respect of feasibility studies, was as follows:

'there is a little bit of intuition built into it, knowing a site and perhaps figures of previous work that you have done, you know, back of the old fag packet scenario; you will have a rough feel in your head (as) to whether something's gonna (sic) fly or not, so that will be the intuitive

approach that is then backed up with the much more formal sit down and work it through analysis, feasibility costing, a typical market standard appraisal.'

One developer regarded every decision as a 'sort of judgement, but some are based on fact, some are not based on fact, they are based on experience and gut reaction and the vast majority are, I suppose, a combination of both'. Kahneman (2011) proposed the idea that whenever someone is awake, they will constantly be undertaking multiple computations. Whether one uses System 1 or System 2 will partially be determined by whether you are cognitively at ease or strained. Kahneman (2011) likened this to a cockpit dial where the pointer can swing from cognitive ease to cognitive strain.

One interviewee indicated that the use of System 2 would generally follow System 1, but that it generally corroborates the initial view:

'we'd be scientific, but the scientific analysis, does it ever prove our gut instinct wrong? Which is more pertinent to the sort of thought processes you're going through, not often. And that's not any clever indictment it just happens to be the facts of the matter I suppose.'

Summary and conclusions

So what was learnt from the literature? CRED is complex, with the need for multiple decisions to be made in a risky and uncertain environment. Although developers would prefer to base decisions on models populated by precise inputs (the conscious System 2) the lack of complete data means that developers are forced to 'satisfice' and make sub-optimum decisions. These decisions can be influenced by heuristics and intuition (the unconscious System 1) and result in bias and mistakes.

The interaction between System 1 and System 2 is referred to as dual-processing and this theory is not explicitly explored in Real Estate research. The authors proposed a theoretical model of how dual processing can be applied to CRED decision making. The primary research conducted via semi-structured interviews with senior property development decision making professionals effectively tested whether dual processing operates in CRED decision making.

Most of the commercial real estate developers who participated in the research claimed to be risk-averse and their approaches to risk management both rational and methodical. All interviewees recognised that a degree of risk taking is required to progress a development, but that risk mitigation should be employed whenever possible. However, there was considerable evidence of CREs using non-rational, subjective approaches in their decision making. The majority of these processes can be recognised as heuristics or intuition.

Developers use a variety of heuristic approaches such as 'crystal ball' and 'back of a fag packet'. Several participants referred to the ability to use intuition (and essentially synonymous terms such as gut-feel), and this increasing as they become more experienced. In claiming to use rational decision-making processes in combination with a variety of heuristic and intuitive approaches, commercial real estate developers demonstrate that dual processing has been taking place. Whilst heuristics are not necessarily irrational, nor unconscious, Tversky and Kahneman (1974) suggest that they largely exist in the subconscious and their use can result in bias and systematic error.

The dual-processing model of commercial property development decision-making presented earlier (see Figure 1) provides a useful and realistic representation of the decision-making approach adopted by CREs in practice. The research provides clear evidence that although real estate developers claim to be rational and make evidence-based decisions (System 2 as represented by the outer sphere), all exhibit System 1 (inner sphere) behaviour. The research has revealed dual processing decision-making occurring at the interfaces represented by the four yellow circles in Figure 1.

The importance of CRE to the UK economy in terms of jobs, returns on investment, and economic output is significant. As it has been established that the use of System 1 heuristics and intuitions in CRE can lead to biases, fallacies and error this has the potential to have serious consequences for society in general.

So how should CRE professional practitioners respond? It would be unrealistic to expect developers to stop using System 1 processing, given how deeply ingrained it is in their behaviours and decision-making processes, how wedded developers appear to be to their

instincts and intuition when exercising judgement, and the suggestion that many of the System 1 decisions are taken automatically and unconsciously. In fact, the absence of System 1 processing to problems and challenges would likely lead to decision-making stagnation given the absence of the complete data sets required for the operation of System 2 on its own.

It therefore seems inevitable that real estate developers will continue to use System 1 thinking, usually in tandem with System 2. The important message to developers, and real estate investors, is that they need to be self-aware; that no matter how rational and quasi-scientific their decision making processes aspire or claim to be, they will remain reliant to some degree on intuition and instinct that influence their judgements that inform their decision-making. Perfect information can never exist and decision making inertia would be an inevitable consequence of demanding that all decisions are supported by thorough and rigorous 'System 2' processing and analysis of all data and options. Real estate developers would be wise however, to heed the advice of Kahneman (2011, p. 9) who advised that the decision maker should 'try to postpone intuition as much as possible ...[and] ...do as much homework as possible beforehand so that the intuition is as informed as it can be.'

Given the relative paucity of contemporary behavioural studies into the decision making of real estate developers, under conditions of uncertainty, there remains significant opportunities for further research in this vein. For example, the potential to more formally adopt and deploy the dual processing model, as the lens through which decisions are made in respect of individual or multiple commercial real estate developments, could be explored. The interview and analysis protocols developed and employed for the subject research could also be deployed across a wider range of actors, including investors, funders, contractors, joint venture partners and other stakeholders who participate in the complex and stochastic process of real estate development.

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