Towards a better understanding of capital investment decisions

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Abstract

Purpose – The purpose of this paper is to examine the capital investment process, guided by concepts from cognitive and social psychology. The intention is to gauge the extent to which managerial judgement can be detected by applying a psychological lens to the process. Initial fieldwork is subsequently reported on the extent to which managerial judgement is managed. Discovery of variations suggest an alternative perspective on understanding capital investment decisions (CIDs) that may be potentially worthwhile in understanding the long-term success and survival of modern commercial enterprises.

Design/methodology/approach – Following a systematic review, employing the psychological concepts of heuristics, framing and concensus to prior case and fieldwork studies, the CID process in three companies engaged in new market/site development projects is reported. The participants initially responded to a survey and subsequently agreed to be interviewed about their processes and involvement.

Findings – The psychological concepts provided a satisfactory gauge of managerial judgement. The fieldwork revealed variety in the management of the CID process and the influence of managerial judgement.

Research limitations/implications – There is an increasing call to examine the CID by case or fieldwork but, to date, the role managerial judgement plays has not been directly addressed. Applying psychological concepts to the CID process offers an opportunity to focus enquiries and improve understanding of corporate practices.

Practical implications – The relative reliance companies place on heuristics, framing and consensus within their specific organizational contexts ultimately may provide insights to the long-term survival of companies.

Originality/value – The paper provides useful information on the cognitive and social psychology in the capital investment process.

Keywords Capital, Investments, Managers, Decision making, Investment appraisal

Paper type Research paper

Introduction

Capital investment decisions (CIDs) are critical in managing strategic change and sustaining long-term corporate performance. Decisions such as acquisitions, investing in new facilities, new product development, employing new technology, adoption

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of new business processes, or some combination of these, have far reaching consequences for the organization and its future success. Each individual CID, however, represents a challenge in managing uncertainty. The level of uncertainty is likely to be greater in innovative projects, as past decisions may provide inadequate predictions for such proposals. Once taken, capital investments are largely irreversible and significant financial sums are at risk.

The continuing search for evidence of the adoption of sophisticated investment appraisal techniques that have a positive association with improvement in corporate performance is inconclusive (Christy, 1966; Klammer, 1973; Scholl *et al.*, 1978; Kim, 1982; Haka *et al.*, 1985; Ho and Pike, 1991). There is evidence of companies adopting simulation, CAPM, probability, sensitivity analyses and certainty equivalence (Pike, 1988; Drury *et al.*, 1993; Arnold and Hatzopoulos, 2000) and that the use of risk appraisal techniques is increasing (Pike, 1996). Yet the elusive connection between sophisticated analyses and improvement in corporate performance consistently fails to emerge.

This was predicted by Simon (1978) who recognised that advances in information processing would benefit procedural rationality but not necessarily substantive rationality. Substantive rationality addresses the way of choices are made subject to the context and experience in which human decision making takes place. Understanding the CID process requires the complexities of real-life situations to be acknowledged, to recognise explicitly the organizational context and to accept that sophisticated analysis and evaluation itself makes use of managerial judgement in determining assumptions and data regarded as relevant. With this wider perspective, managerial judgement has at least the same potential as analytic techniques to influence the CID (Hastie, 1974; Berry, 1984). Our initial concern is to gauge the presence and extent of managerial judgement (termed as the psychological environment by Simon (1947, 1957, 1976)) in CIDs in their specific organizational contexts. A review of relatively recent fieldwork is employed to detect examples of the use of heuristics, frames of reference and consensus which cognitive and social psychology identify as fundamentally contradicting the assumptions of economic rationality, namely, near-perfect knowledge, power and insight, where merely applying the necessary analysis results in the economic profit maximising decision being taken (Caplan, 1996; Tomkins, 1991). A more novel, if tentative, concern of this study is to gauge how managerial judgement is managed in the CID process by examining differing combinations of heuristics, framing and consensus in recently conducted fieldwork where three companies undertake the same type of investment.

The focus is, therefore, firmly on the managers involved in the process, the opportunities and constraints they face in exercising judgement within specific organizational contexts. In contrast to other studies of which we are aware, the concern is to gauge the extent to which managerial judgement is influential in the CID process. We are, therefore, responding to Northcott's (1991) plea' that alternative perspectives are necessary if capital investment theory is to develop. By drawing from the psychology discipline, in even a limited manner, a more polycentric understanding of the issues surrounding this important decision may emerge (Hopwood, 2009).

The sequence of the paper is as follows: initially, the organizational context in which the CID is taken is reviewed followed by a section identifying the role managerial judgement may play as seen through a psychology perspective. A detailed review of case and fieldwork studies is undertaken using this perspective. Although organizational contexts

are firm-specific the evidence suggests that managerial involvement and heuristics, framing and consensus are frequently present in the CID process. The next section then reports new market and site development projects in three companies in distinct industry sectors. Assessment of the role managerial judgement plays in the CID process indicates a range of combinations where psychological concepts interact within the organizational context. This provides a rich backcloth to examine the extent to which the CID process is managed. The paper ends with a discussion of implications for future capital investment research when managerial judgement is recognised as being of significant influence.

1. Organizational context

Economic rationality assumes that all managers privy to the same information will reach the same decision because each is committed to maximising economic profit. All relevant information is assumed to be readily available and managers agree the information that is relevant. Managerial judgement is effectively assumed to be passive because application of the "correct" analytic technique guarantees an "accept or reject" outcome. Critiques of economic rationality are well-established from the sociological (Cooper, 1975; Jones and Dugdale, 1994), behavioural (Cyert and March, 1963; Simon, 1978) and socio-political (Hargreaves-Heap, 1989; Hargreaves-Heap *et al.*, 1992) perspectives. In contrast, the management control and cognitive psychology literatures offer alternative constructions of the CID process.

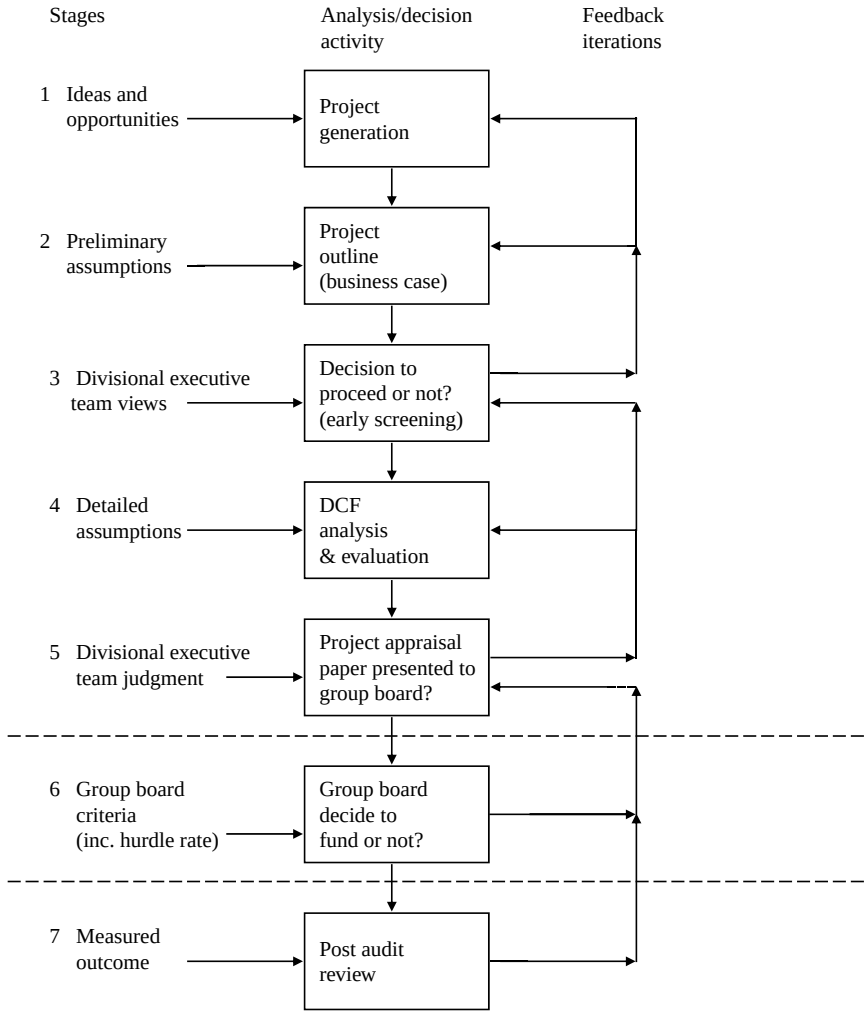
There is an empirical evidence to suggest that CIDs follow an integrated process comprising several stages with multiple feedback loops (Haynes and Solomon, 1962; King, 1975; Harris, 1999). The stages are not always formally acknowledged or documented by companies, especially in smaller firms. Neither is there total agreement on the precise number of stages in the process. However, there is growing agreement that the evaluation and analysis of projects is but one part of the process, which is preceded and followed by other stages (Figure 1).

The involvement of a potentially large number of managers is recognised by Scapens and Sale (1981), Berry (1984) and Bower (1986). Lower level managers are seen to exert considerable influence over the early stages of the CID process including the championing of the project within the organization. The significance of recognising the involvement of a potentially large number of managers in the organizational setting implies that information asymmetry becomes a real possibility both between managers and superiors, who each make their judgement within the bounded rationality of their own experiences (Simon, 1957). As a consequence, there is a need to examine the true nature of the decision maker's problems as seen from the perspective of the actors (Marsh *et al.*, 1988).

When the CID process is embedded in the organizational setting, we begin to see a more complicated, dynamic situation which differs substantially from the analysis and evaluation emphasis of the economic model. The management control view of the CID process allows managers with different functional skills occupying different levels of seniority to participate at different stages of the process. It is debatable whether they will all agree or have access to relevant information. In this more realistic setting, the exercise of managerial judgement gains greater significance.

2. Managerial judgement

Behavioural finance draws heavily upon concepts from cognitive psychology in seeking to understand bounded rationality in terms of an individual's beliefs and preferences



Source: Adapted from Harris (1999, p. 352)

Figure 1.
Capital investment decision process

in decision making (Barberis and Thaler, 2003). This body of work has provided insights into how judgements are made but is largely focused on the investor, analyst and stock market interface (Thaler and DeBondt, 1992).

Within strategic management, researchers continue to examine the interplay between non-conscious forms of cognition like intuition and social psychology in order to better understand judgement (Hodgkinson *et al.*, 2009). Building on Simon's bounded rationality, Kahneman and Tversky's (1979) prospect theory examines decision maker's behaviour when faced with uncertainties. A significant finding suggests managers may over-emphasise some relevant information and understate other relevant information thus distorting any rational economic analysis in human information processing.

Heuristics, such as "rules of thumb", intuition and industry experience, may be used to cope with uncertainty but they may also result in bias.

Decision makers tend to rely on memory to search for relevant information, which appears to focus more easily on recent or salient events, that is, availability introduces a form of bias. Decision makers use their own experience, and evaluate new opportunities by comparing them with a reference point from personal knowledge. This process is as termed anchoring and adjustment. There is also a tendency to classify knowledge and recall events which represent those of similar type, representativeness. These heuristics have been widely researched and extended (Bazerman, 2006). Heuristics offer a means of coping with uncertainty but at the expense of introducing bias through selective recollection and this suggests that multiple managers will have differing views on the relevance and the need to search for relevant information.

The second related concept, framing, is another form of cognitive bias which may be observed when decision makers react differently to the same basic information presented or framed in a different way (Tversky and Kahneman, 1986). This relates to personal expectations and preferences and the decision maker's attitude to risk. An example of a personal preference that often conflicts with economic rational analysis is that of preferring the status quo compared to significant change (Samuelson and Zeckhauser, 1988). The importance attached to the information relating to a decision may be influenced by self-interest, so that primacy of information varies between individuals as well as over time. Framing can also be seen as a way to guide or control decision making by pre-determining the identification of relevant information to the exclusion of other frames of reference.

The combination of heuristics and framing in any uncertain decision-making context highlights the potentially tortuous process of gaining agreement between members of a management group or project team. The value of group decision making is recognised by Hall (1971), whilst Janis (1982) examines the danger of "group think" where familiarity cocoons in-group managers from alternative views and paradigms. Hillson and Murray-Webster (2005) present group think as one of the number of group heuristics affecting attitudes to risk in decision making. Another of these is the "Moses factor" where one influential group member's view is adopted by other group members regardless of their own personal preferences.

Consensus draws attention to group composition and the dynamic interaction of group members. The *ad hoc* ways in which managers seek to influence others (Pettigrew, 1973) and the various means of reaching consensus (Mintzberg *et al.*, 1976; Schweiger *et al.*, 1986) are pertinent to understanding decision making involving multiple managers. Consensus may be defined as the group process of sharing interpretations of the proposal and its assumptions in reaching agreement as to the decision. Group members need not agree every aspect of the proposal or outcome but acceptance of cultural norms and corporate priorities and procedures allows some form of cognitive consensus to be reached (Mohammed, 2001).

Techniques have been developed which can elicit both individual views and views shared by a group, when discussing strategic issues in an organizational setting, such as brainstorming or the nominal group technique (Delbecq *et al.*, 1975). Cognitive mapping is a technique for building a visual representation of a strategic problem or decision that can be applied in a group situation to help managers reach consensus (Eden, 1989; Eden and Spender, 1998; Huff and Jenkins, 2002). Whilst there are debates about whether

group cognition of a problem is possible or if it is simply an aggregation of individual views, it is possible that managers sharing common experiences may construe strategic options in a similar way. The corollary may also apply leading to time-consuming negotiations to gain consensus.

These concepts from cognitive and social psychology indicate decision makers may or may not agree on what constitutes relevant information, but may overcome any disagreement in reaching consensus. The significance of the concepts relates directly to the CID in practice where the process involves multiple stages and managers. Together, they offer a more realistic, if more complicated, lens through which to examine the CID process.

3. Operationalising the psychology concepts

The concepts drawn from cognitive and social psychology offer differing perspectives on managerial judgement to those conventionally assumed in the CID process. There is, however, the awkwardness that heuristics, framing and consensus tend to overlap or relate to each other. For example, heuristics can include confirmation (Hillson and Murray-Webster, 2005) where the decision maker only seeks out information to confirm a preferred judgement and ignores conflicting evidence. This may overlap with framing if that person has a role in the selection and presentation of important information to others in the group. Personal preferences and attitudes to risk may inhibit or facilitate agreement on decisions (consensus).

This apparent confusion of concepts has led to on-going research to define more clearly, for example, intuition, insight and expertise, introducing results from neuroscience to give rise to the field of social cognitive neuroscience (Hodgkinson *et al.*, 2009). Our more limited aim is to discover whether managerial judgement, applying the three concepts of heuristics, framing and consensus are present in the CID process as reported by case studies drawn from the accounting and strategic management literature.

In order to gauge the presence of managerial judgement in these studies, evidence of the use of heuristics, frames of reference and consensus was collected and, in addition, reference to stages in the CID process and the involvement of multiple managers was noted. None of the studies expressly adopted a psychological focus but all examined the CID process in commercial enterprises.

Each member of the research team independently examined each case study report to assess the evidence against the three concepts comprising managerial judgement and the two aspects of organizational context. As indicated earlier, proxying for the psychological concepts poses difficulty in that overlaps are apparent between heuristics, framing and consensus. For example, the use of selective sources of information by a manager to influence another decision taker could be recorded as evidence of the use of heuristics or framing. After examining the same three sample cases the researchers developed a coding architecture. Coding, using key words and phrases within a sentence, helped to identify the relative frequency of each cognitive psychological concept. In addition, the properties and dimensions comprising each concept allowed a systematic approach to be taken. Table I offers an insight to these relationships with examples of the data recognised as an evidence.

After independently interrogating and coding the studies, the researchers jointly compared their analyses and identified whether the evidence to uphold an individual

Concepts	Properties	Dimensions
Heuristics	Representativeness	Use of stereotypes to classify projects
	Availability, experience	Use of industry or other benchmarks
	Anchoring and adjustment	Use of base value and tolerance ranges
Framing	Primacy, risk preference	Information preferences, e.g. strategic fit
	Intuition	Fast human information processing
Consensus	Group decision making	Formal, established teams
	Socio-political progress	Canvassing support in the organization
	Group composition, leadership	*Ad hoc* teams, corridor meetings, coalitions

Table I.
Psychological concepts

psychological concept was present. The accuracy of this procedure is, therefore, subject to researcher bias and the exact classification of evidence to heuristic, framing, consensus may be questioned. However, the main concern is to detect evidence of psychological concepts being recognised in real-life CID studies in order to gauge the presence of managerial judgement. Distinguishing heuristics, framing and consensus in a meaningful way would require a more controlled approach, like a true experiment, but such an approach jeopardizes recognition of the organizational context in which CIDs are taken.

In terms of organizational context, evidence of multiple manager involvement plus their functional expertise or experience can be recorded in the best examples. Not all the studies identified or reported stages of the CID process and none offered insights matching cognitive psychological concepts to specific stages. Again the researchers independently coded evidence of organizational context with subsequent joint discussion to agree the presence of multiple manager involvement and stages of the CID process.

The analysis was conducted on case studies and fieldwork research in CIDs where the primary focus was not necessarily to detect the stages in the CID process nor the extent of managerial judgement. Our selection criteria were:

- The study should be relatively recent, published in the last 20 years or so.
- In-depth studies of CIDs in the context of large organizations.
- Either described by the authors as case study research, or with the essential characteristics of case study research (Yin, 1994).
- A focus on CIDs, not confined to the evaluation stage.
- Sufficiently detailed, using multiple sources of evidence to provide insight into the CID-making process.

Application of the sample selection criteria resulted in 16 studies being analysed although the first criterion was not rigidly applied. For example, Bower's work referenced as 1986 was first published in 1970. Similarly, Mintzberg *et al.* (1976) and King (1975) are included because of their importance as reflected in the frequency of subsequent citations.

The majority of the studies occurred in the 1990s in the UK and USA. The sample cannot be regarded as randomly selected or representative but no intentional bias has been introduced by the researchers other than to ensure all reports are accessible. In total,

the fieldwork reports on over 300 CIDs from 16 studies. The aim is to gauge whether the psychological lens helps to illuminate the extent of managerial judgement in the process.

4. Analysis of prior case studies

The intention is to use the psychological lens to gauge the extent of managerial judgement in prior studies accepting that none of these studies were specifically investigating these aspects.

The fieldwork and case studies are analysed and discussed under the five aspects comprising managerial judgement (psychological concepts) and organizational context. These are summarised in Table II, with the studies listed in alphabetical order.

4.1 Organizational context

4.1.1 CID process. Bower (1986) conducted a ground breaking field study in a large US company, examining the CID process. Four projects were tracked from inception to acceptance/rejection, over a period of 15 months, which gives an insight into the process and life cycle of a project. The three main phases, initiation, integrating (defined as divisional planning incorporating sub-unit plans and alignment with corporate goals) and corporate (defined as setting goals and targets to maximise returns and preserve strength), indicate the different levels of managers involved in the organization and depict a bottom-up process. There were three main stages in the CID process recognised (definition, impetus and determination) in a 2 dimensional process model (Bower, 1986, Exhibits 3-4, p. 80). Sub-processes were observed for definition and impetus (rate of progress of the proposal upward through the organizational hierarchy). Definition closely matches the framing concept, and impetus identifies the importance of internal politics and persuasion to gain consensus.

Employing a multiple case research design, King (1975) discovered a six-stage process, from triggering, screening and definition to evaluation, transmission and decision. The transmission stage equates with Bower's impetus, by recognising a build up of commitment through discussion and wider organizational involvement.

Mintzberg *et al.* (1976) reported evidence from 25 CIDs collected over a five-year period which captured the CID process and sub-routines. Six main steps (recognition, diagnosis, search, design, evaluation/choice and authorization) and interruptions in the process are reported. The total number of steps in each case was noted and averaged 9.7. Most of the steps or sub-routines were found as part of design and evaluation, but the most interesting was a sub-routine labelled "political", which is discussed under "consensus" below.

An UK study undertaken by Butler *et al.* (1993) investigated CIDs in 12 companies (five large, five medium and two small). The a priori model of the CID process used in the study was a four-stage process, which the authors attributed to Mintzberg *et al.* (1976) comprising of identification, development, selection and control. These broad descriptions were induced from the detailed routines observed. Data for the case studies were collected for 17 real-life investment decisions. The analysis led the authors to develop the a priori model to a more iterative process, combining computational and inspirational sources in a non-linear reflective action process, following Schön (1983).

Harris (1999) reported a seven-step CID process, from project generation (ideas and opportunities) through project outline (preliminary assumptions for the business case), early screening (divisional decision on whether to proceed) to analysis and evaluation,

Table II.
Analysis of fieldwork and case studies

Case study details	Organizational context: CID process	Organizational context: Multi-manager	Psychological concepts: Heuristics	Psychological concepts: Framing	Consensus
Bower (1986) first published 1970 four CIDs in four divisions of one US company industrial materials data collected 1966-1967	Definition impetus determination p. 80	Context and the large number of purposive managers, pp. 71-4		Sources of information required at definition stage pp. 53, 67 and 74	Progress of a project up the hierarchy impetus pp. 57 and 68
Butler *et al.* (1993) 55 managers 17 CIDs in 12 UK firms various industries data collected 1990-1991	From Mintzberg (1976) stages to Schön (1983) reflective action	Four types of strategies used by managers p. 52		41% computation 34% judgement 17% negotiation 8% inspiration	Bargaining and negotiation p. 181
Carr and Tomkins (1996) 26 UK CIDs in 21 companies 25 German CIDs in 23 companies motor components data collected late 1980s/early 1990s			"Judgements gained weight from track records over decades", p. 214	Challenge for FDs to bridge the gulf between intuition and analysis, p. 215	
Collier and Gregory (1995) six UK hotels (small, medium and large) CIDs including new builds, acq/disp and refurbishments data collected 1993	Four out of six cases had a post audit stage in the CID process, pp. 50-1		Rules of thumb – build cost per room, occupancy and room rates, p. 53		
Eisenhardt (1989) Grounded theory with eight management teams 53 participants in eight US microcomputer firms (one small, two medium, five large) ten CIDs: new product/ strategic direction/alliance		CEOs and heads of sales, finance and engineering in eight teams of average seven managers	Fast cognitive processing. Experienced VPs used as expert counsellors, p. 560	Simultaneous consideration of alternatives in seven of ten cases, pp. 557	Four firms used active, two passive consensus to resolve conflict, p. 563

(*continued*)

Table II.

Case study details	Organizational context CID process	Multi-manager	Heuristics	Psychological concepts Framing	Consensus
Grundy and Johnson (1993) Grounded theory with eight participants in four UK firms drinks, engineering, transport, financial services single £1bn CID, data collected 1991			Underlying steady-state view of the world revealed, p. 260	Reliance on acts of faith, belief and judgement vs economics, p. 263	
Harris (1999) Action research with 16 participants 12 CIDs in one UK company in logistics industry data collected 1997	seven-step iterative model from ideas to post audit, Figure 1, p. 352	Two teams of eight with various job roles, Appendix 2, p. 371	Risk constructs based on industry experience and project type, p. 361	Corporate factors project, external, and competitive in framework, p. 363	Formal team meetings and group cognitive process, pp. 355-7
Hickson *et al.* (1986) 150 cases in 30 UK organizations (11 manufacturing, 11 service and eight public sector) data collected 1970-1984	Three types of CID process, depends on complexity and politicality, p. 175	14 categories of interest units, including three external and 11 internal, p. 50			Politicality and managerial pluralism of interests, p. 238
Hirst and Baxter (1993) single case study (made up CID) to invest in technology in Australian manufacturing/dist. Company data collected 1991-1992	Initiation, elaboration discussion, decision/ deferral	Many managers at four stages. Fluidity of participation, p. 200	Substantial bounded rationality captured, p. 198	Information used strategically to promote his preferences, p. 199	Advocacy, p. 200 used to influence appropriations committee
Hodgkinson *et al.* (1999) 52 participants in one banking org in UK Field experiment using a Case vignette Investment in technology development			Cognitive maps used as simplified models of reality	Mapping found to reduce positive/ negative framing bias p. 983	
King (1975) three CIDs in two large divisionalised UK firms data collected 1972-1973	Six stages from triggering to decision, Figure1, p. 80				"Transmission" part of a complex social process

(*continued*)

Case study details	CID process	Organizational context Multi-manager	Heuristics	Psychological concepts Framing	Consensus
Lumijärvi (1991) 69 managers in three divisions in one large firm in Finland CIDs inc. advanced manufacturing technology data collected 1988/1989	Focus on single stage of getting top management approval	Five categories of decision maker identified at top level, p. 177		Focusing and filtering of information to sell a project, p. 178	Nine out of ten managers said projects had to be "sold", p. 176
Marsh *et al.* (1988) three CIDs in three large diversified UK firms data collected over >2 years (mid-1980s)	Focus on formal systems and organizational hierarchy			Group – division information asymmetry, p. 106	Strong evidence of selling behaviour, p. 107
Mintzberg *et al.* (1976) 25 CIDs in various organizations in Canada (ten public and 15 private sector) data collected over >5 years by student groups	Recognition, diagnosis, search design, choice, authorization				Eight cases involved intense political activity, slowed decisions, p. 262
Nixon (1995) 35 participants in three US and three UK cases data collected 1989-1992	Data collection and analysis and investigations	Involvement of managers and external parties		Numbers were necessary but never sufficient	Co-development with third parties in five of six cases, p. 281
Smith and Murray (1997) six UK cases (food, engineering, dist. and retail) data collected 1995-1996			Looking back to experience in five of six cases	Querying assumptions in five of six cases	Negotiations and soundings taken in four of six cases

Table II.

presentation of proposal to the corporate board for a group decision, followed by a post-audit review stage. In depicting the process, Harris (1999) showed numerous feedback loops across the steps indicating that managers' adjusted their views in an iterative process.

Hickson *et al.* (1986) published their analysis of 150 CIDs observed in 30 organizations without subscribing to any single process model. They identified three models of the CID process determined by a combination of the complexity and politicality of the decision (Hickson *et al.*, 1986). First, the familiar or recurrent decision, the least complex, with a low level of politicality will follow a "constricted" process. The second, a vortex (weighty and controversial) decision, that is, the most complex and the most political, will follow a "sporadic" process (iterative and messy). Finally, a tractable decision (unusual but uncontroversial) is less complex and the least political which can follow a more fluid process (more sequential and possibly more rational).

There is also an evidence of a sequential process from Hirst and Baxter (1993) and Nixon (1995), and a focus upon the negotiation (socio-political) stage by Marsh *et al.* (1988) and Lumijärvi (1991). These studies are discussed further under consensus. There is specific mention of a post-audit stage by Collier and Gregory (1995). However, most of the process models reported end at the decision stage.

There is no universally accepted CID process with a definite number of formal stages. The process is specific to the individual company or to the type of project (Hickson *et al.*, 1986), and tends to be sequential with some iteration between stages. On the basis of the evidence, it seems that the CID process is formal, multi-staged but the preferred process will be firm-specific.

4.1.2 Involvement of multiple managers. Bower reported the role of the purposive manager in determining the context of the CID (Bower, 1986). Hickson *et al.* (1986) did not identify managers as individuals involved in CIDs, but counted the number of "interest units" by using 14 categories of interest groups (11 internal and three external) in the cases they studied. These totalled 1,021 interest units for 150 cases (Hickson *et al.*, 1986, p. 50). Nixon (1995) also identified external parties who might be consulted in the CID process, including customers, suppliers, financiers, research bodies and strategic alliance partners.

Further evidence of multiple manager involvement is offered by Eisenhardt (1989) who interviewed 53 managers in eight firms about ten CIDs. The managers were members of eight top management teams (an average team size of seven). Their job roles included chief executive officer (CEO), directors or heads of sales, finance and engineering and included vice-presidents with considerable experience. Often these experienced managers were treated as "expert counselors" (Eisenhardt, 1989, p. 560).

Similarly, job roles were reported for the 16 members of two management teams (eight in each) by Harris (1999) and these included operations managers (OMs) and business development managers as well as managing directors (MDs) and finance directors (FDs). One team included a personnel director, which is not mentioned in other studies. Additional evidence is provided by Lumijärvi (1991) who identified five categories of decision takers at top management level. Hirst and Baxter (1993) refer to many managers at each of the four stages in the CID process, and speak of the "fluidity of participation", where the composition of teams changes.

Half of the studies reviewed and reported on this aspect of organizational context. Again a variety of involving managers of differing seniority, with different functional

expertise in teams that may or may not change composition at different stages in the process is apparent. Some use of external parties and/or "expert counsellors" is noted. Together, the multi-stage structure of the CID process and the involvement of a variety of managers suggest that there is significant potential for the inclusion of managerial judgement in the investment decision.

4.2 Psychological concepts

4.2.1 Heuristics. Employing a grounded theory approach with companies producing microprocessors, Eisenhardt (1989) found strong evidence of "decision integration" which related current CIDs with past and other current CIDs. Eisenhardt also reported the use of internal "counselers" whose experience is drawn upon regularly by decision takers. The sheer volume of decisions that these executives faced allowed them to learn from the experience of past decisions more readily, and to generate more alternatives in order to make comparisons. The "counselers", therefore, provided a source of available benchmarks and cognitive anchors. This increased their confidence to make quick decisions concerning future CIDs.

In another industry-specific study examining CIDs in six UK hotel companies of different sizes, the use of "rules of thumb" was apparent (Collier and Gregory, 1995). The common use of performance measures such as occupancy rates, average room rates and building costs per room is reported. Although none of the companies used sophisticated risk analysis techniques, four employed discount cash flow (DCF) analyses and also used a form of sensitivity analysis but the greater influence is given to the importance of management experience of the hotel sector in making judgements on projects.

Carr and Tomkin's (1996) study examined the role of cost management in 51 CID cases investing in technology in the motor component industry. In 44 UK and German companies investigated they found that successful companies placed five times as much attention on competitive advantage, three times as much on value chain considerations, twice as much on cost drivers, than on capital budgeting appraisal techniques. The managers placed more value on sound industry knowledge (experience and sector benchmarking) than on formal analytical techniques.

The notion that the use of sophisticated analytic techniques were not driving CIDs in practice prompted Smith and Murray (1997) to explore alternative approaches, which they called "coping mechanisms". They analysed practice in six case companies in the East Midlands, UK from a range of business sectors. Initially four "coping mechanisms" were identified:

(1) adjustments (to inputs, producing extra conservative cash flow forecasts);

(2) experience (to question unrealistic assumptions, using rules of thumb);

(3) checking out (by cross-examination of proposers and their assumptions); and

(4) sharing (team-based discussions around problems or specialist inputs).

Further into the study, a fifth mechanism, "political behaviour" and a sixth, which they called "strategic context" emerged. The research found strong evidence to support the use of "experience" (five out of six cases), and "checking out" (five out of six cases), concluding that managers develop coping strategies, including the learned pessimism and rules of thumb of their industry.

Employing an action research approach, Harris (1999) captured the risk constructs of divisional board members in CIDs by using the repertory grid technique. The reference

points managers used when making judgements about the riskiness of projects was revealed by comparing and contrasting sets of three recent CIDs (12 cases in all) in a group discussion process. A set of constructs is inductively agreed and defined by participants as a language by which they share an understanding of the comparative riskiness of the projects. The set of constructs was then used as a framework for assessing the level of risk attaching to CIDs each time a new proposal is generated. This allowed "representativeness", "anchoring and adjustment" and other heuristics to be included in an explicit and informed way, thereby operationalising the managers' own cognitive risk measures.

Other studies offering evidence of the presence of heuristics are Hirst and Baxter (1993) which highlighted evidence of bounded rationality and Grundy and Johnson (1993) which revealed an underlying "steady-state" view of the world. The Hodgkinson *et al.* (1999) study utilized participants' heuristics by developing cognitive maps pre- and post-decision making.

The credibility of heuristics appear associated with industry benchmarks, accepted "rules of thumb", anchoring and adjusting based on experience and the expertise of long-serving managers. From the cases, the use of heuristics feature in a range of industries and across a variety of CIDs.

4.2.2 Framing. The extensive fieldwork of Butler *et al.* (1993) provides evidence of variables affecting the framing of projects:

- computation (use of hard financial data);
- judgement (use of more qualitative and intuitive data);
- negotiation (alliance-building); and
- inspiration (creative, breathing of life into a project).

They suggest these frames of reference are integrated to ensure "judgement is applied in assessing the reliability of data underlying the appraisal, fit with corporate strategy and track record of the project sponsor" (Butler *et al.*, 1993, p. 57). The study estimated the relative importance of these frames as judgement (34 per cent), negotiation (17 per cent) and inspiration (8 per cent) which, in total, appear to have more influence in CIDs than computation (41 per cent) (Butler *et al.*, 1993).

Grundy and Johnson (1993) explored the link between strategic and financial analysis in CIDs. A group learning approach with eight managers, two from each of four UK firms was adopted. They observed the presence of "subjectivity which involves reliance on more intuitive acts [...] within the appraisal process that cannot be fully articulated within a rational economic framework" (Grundy and Johnson, 1993, p. 263). Managers spoke of "acts of faith" and the use of intuition.

Further support of the influence of framing is offered by Hirst and Baxter (1993) who investigated the descriptive validity of theoretical models of choice and the role of information in a single CID in a single Australian company. It was found that information at the "elaboration" or framing phase was used both instrumentally and strategically to promote preferences (primacy).

Nixon (1995) in a series of embedded case studies exploring investment in R&D projects clearly linked the adoption of sophisticated risk analysis techniques (as defined by Pike (1988)) with the nature of the decision. All six companies made some use of probabilistic methods, and three used not less than ten techniques, including

simulations, linear programming and probability analysis, as well as sensitivity, scenario analysis and critical path analysis. The use of multiple frames of reference by which to view the CIDs, therefore, seems common practice in this sample of companies.

Smith and Murray (1997) found that managers overcome any bias in the framing of decisions by what they call "checking out" whereby the decision makers question and query the assumptions made by the project's proposer(s). Proposers were called upon to explain the basis of their judgements by corporate bosses, whether as part of the formal proposal document, or verbally at management meetings. Thus, framing is not a static phenomenon, but part of the iterative CID process, which may impact on managerial judgement at different stages of the CID process.

In the second of two studies reported by Hodgkinson *et al.* (1999), the role of bias in the framing of decisions is explored with 52 senior managers in a banking organization. They were given a CID scenario typical in banking at the time, with roughly half receiving the scenario negatively framed and the others receiving it positively framed. Half were briefed to use causal mapping, a form of cognitive analysis, before making the CID and half undertook post-choice mapping. The results from this field study supported the hypothesis that causal mapping (depicting the inter-relationships between variables) reduced the effect of bias in the framing of decisions. Consistent with the earlier experiment conducted in a laboratory setting, framing need not have a detrimental effect on decision making provided managers are aware of helpful cognitive techniques and multiple frames are employed.

One telling statement from a participant in the Carr and Tomkins (1996) study succinctly describes the significance of framing:

> [. . .] the real challenge (for FDs) in more strategic decisions is sometimes to bridge the gulf between the two separate worlds of intuition and analysis. (Carr and Tomkins, 1996, p. 215).

The use of multiple frames of reference appears to be popular and allows assumptions to be "checked out" and alternative possible outcomes to be considered. Certain of the studies indicate that different managerial preferences can be revealed (Hirst and Baxter, 1993) and intuition recognised (Grundy and Johnson, 1993) in this way. Conversely, framing that embeds certain heuristics, preferences within formal procedures and documentation may confine or limit "checking out" and possibly enshrine a form of group-think.

4.2.3 Consensus. Bower's (1986) study undertaken in the late 1960s provided early evidence of the socio-political process of negotiating a project through the management hierarchy in a large divisionalised organization. The "impetus" stage of a CID is seen as vital in the context of high internal competition for group resources.

In the UK, King (1975) carried out a similar study in two large diversified companies by tracking CIDs from conception to approval. The "transmission" phase, equivalent to Bower's "impetus", related to the "build up of commitment and wider organizational involvement" (King, 1975, p. 80) and reinforced the need to gain consensus. Hickson *et al.* (1986) placed a great deal of emphasis on the intervention of various interested parties and the relative pressure of influence each may have in the "politicality" of the CID process. They found that an imbalance was often caused by a conflict of objectives, especially in a "vortex" type decision.

The need to gain consensus and the effect on the time taken to secure project approval is recognised by Mintzberg *et al.* (1976). The step in the CID process labelled "political" provides evidence of the socio-political dimension of consensus:

> Their political activities serve to clarify the power relationships in the organization; they can also help to bring about consensus and to mobilize the forces for the implementation of decisions (Mintzberg *et al.*, 1976, p. 262).

Gaining the commitment of others (strong evidence found in at least eight cases) extends the whole CID process to an average of 3.6 years, where other CIDs averaged 1.6 years. This is explained in some cases by the context of the company, for example, organizations with multiple and diverse stakeholders.

Marsh *et al.* (1988) tracked three CIDs in large UK firms over more than two years. They viewed their data through four perspectives; evolution of the project (learning and innovation), forms of analysis used (financial, strategic and operational), CID as a political process (negotiation) and impact of formal systems and hierarchy. They found strong evidence of how managers in an organization argue the case for their project through the hierarchy until agreement and project approval at the top is achieved, suggesting "selling behaviour" or consensus is an important part of managerial judgement.

The political roles played by managers in the CID process is further evidenced by Lumijärvi (1991), where the process of the "selling of capital investments to top management" is observed. He found that using economic arguments to sell the case is rarely as effective as the strategic and other non-economic arguments. Even more effective are the technology-based arguments. Lumijärvi (1991, p. 181) maps out the "selling" process he found which showed the roles managers play in reaching consensus. This was also shown in Hirst and Baxter's (1993) study where advocating lower level managerial support for a project was used to sway higher management levels.

Nixon's (1995) study offered an insight into the involvement of interested parties in the project appraisal and risk assessment process, and demonstrated that the politics of CIDs can go beyond the bounds of the organization and right along the value chain. This extends the consensus-seeking element of the CID process to group composition, and who is consulted and involved in the decision. Two of the three UK companies in the study and all of the three US companies developed risk assessments in collaboration with external parties. Significantly, co-development of risk assessments with customers and suppliers, existing and/or potential and research organizations were part of at least four companies' procedures, and sometimes involved financiers. This indicates a desire to work towards a consensus with a wide variety of stakeholder groups.

The idea of sharing project information with a fluid group of participants is also apparent in Smith and Murray's (1997) study, with evidence of "sharing" in three out of the six companies as well as evidence of political behaviour in four cases and the checking out of assumptions in five cases. The Harris (1999) study indicated a more formal group process, with divisional management teams holding regular meetings to discuss, assess and agree the risk profile of CIDs.

Again a variety of consensus seeking properties can be seen. Gaining the commitment of a wide group of managers, sometimes including external parties, by "selling" the proposal to top management on non-economic or strategic grounds, joint identification of risks, canvassing support in the organization, creating temporary alliances can be viewed as part of the socio-political environment of the firm.

Within the limits of this sample of case studies and our psychological lens, it is difficult to ignore the role managerial judgement plays in the CIDs. Employing the lens allows identification of the use of heuristics, framing and consensus-seeking to be gauged.

These aspects of managerial judgement appear to be common place in a wide variety of industries in several countries. Whilst the number of stages in the process varies, the evidence testifies to a complex, sometimes iterative, sequence in which a number of managers exhibiting different skills participate. We, therefore, argue that to understand the CID process, managerial judgement should be included as an endogenous variable in future research studies.

5. Management of managerial judgement

Examination of the interaction between managerial judgement and organizational context seems essential if understanding of CIDs is to progress. The interrogation of the 16 field studies suggests that both organizational context and psychological concepts play important roles in CID process. The combinations and permutations of these influences are many and present a challenge to any modern, complex commercial enterprise as to how the CID process should be managed. To gain an initial insight to the management of the CID process within specific organizational contexts fieldwork at three companies was undertaken.

As a result of a postal questionnaire (Harris *et al.*, 2009) three companies who agreed to further discussion on the CID process were interviewed. Although each company operated in different industries, namely utilities, chemicals and healthcare provision, they all recognised new market and/or site development as the most frequent focus of their CID process. All are located in the UK with overseas operations but they vary in size and ownership in that the smallest is a family-owned private company. The following report of their practices makes use in total of six interviews with follow-up telephone discussions and seven survey responses involving the same participants. In the best instances, participants provided details of their formal CID process with pro-forma and related documentation. Authentification and clarification of the collected data and interpretations of the researchers were handled by feedback telephone meetings in all three companies.

The interview protocol was semi-structured and intended to explore the interaction of psychological aspects of managerial judgement within the organizational context. The interviews began by corroborating and elaborating on the survey questionnaire responses, and participants explaining their own CID process with reference to the model shown in Figure 1. The conversation developed around their particular model, and the extent to which managerial judgement applied at each stage, which was recorded and transcribed. New diagrams of the CID process were drawn up and verified by interviewees.

5.1 The utility Company A

Both interviewees have over 16 years experience with this multinational company which has six million customers. The participants are located in the UK divisional headquarters and both are trained, professional engineers.

Nine formal stages in the CID are recognised in Company A (Figure 2) and overlaying these are several written policies that need to be followed. These include the group investment directive, group investment framework and principal delegation of authority policy and group directive on risk. Together, these determine who is recognised as the sponsor/champion and other project team members (Stage 2), whose involvement required approval and their responsibilities identified (Stage 3). The directive on risk

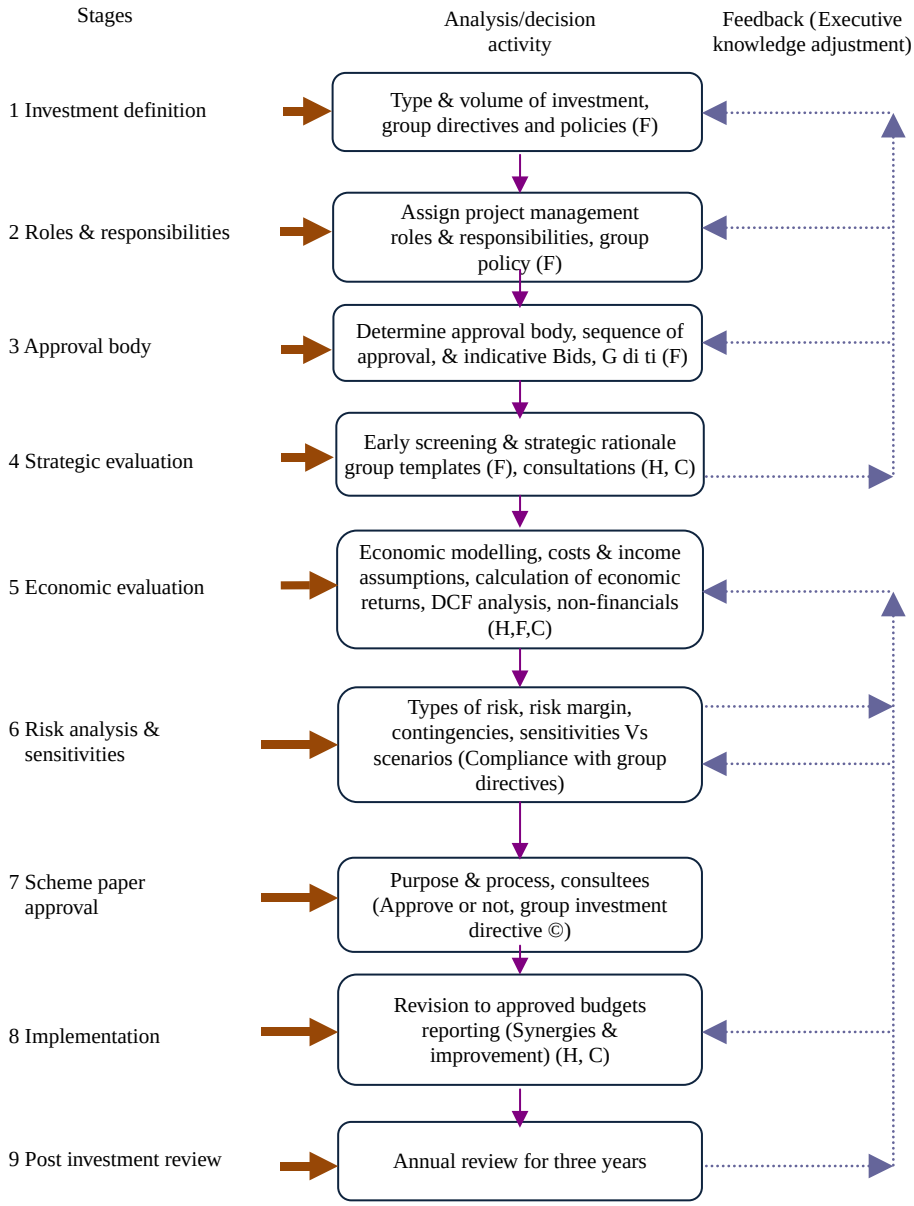


Figure 2.
CID process in Company A

Notes: H = Heuristics; F = Framing; C = Consensus

determined the form of presentation of the project at Stage 6. Formal meetings were held at most stages with presentations consistent with templates developed by the group risk team and the entire process is overseen by corporate finance and planning. The project team is made aware of the company's expected return on the investment

and the risk associated with past projects and current industry trends are incorporated in company-approved templates that are formally discussed at stage meetings. The company maintains a risk register that is reviewed at project team meetings. This register is up-dated quarterly and provides comprehensive coverage of financial risk, health, safety and environmental risk, legal risk, employment and contractual issues plus any risk related to the company's reputation. Each division of the company has a risk control department that enforces directives on risk management and commodity risk control with which all project teams should comply. Generic Excel spreadsheets and any project-specific models are checked for compliance by the risk team, finance and planning and/or the leadership team or audit committee. The last two functions, in particular, are seen as a natural consequence of delegating project responsibilities to lower level managers and the functions ensure that regular reviews are conducted and adequate controls are in place on behalf of the board of directors.

The interviewees identified opportunities for intuition, experience and anchoring and adjustment at early screening (Stage 4), cash flow assumptions (Stage 5) and budget adjustment (Stage 8), brainstorming and the use of temporary alliances are utilized prior to formal submission of the project. Informal soundings are taken of the views of likely non-participating managers and top management, if possible, to gauge strategic fit and the possible level of support. Once submitted, the company's policies and the involvement of specialist functions are activated to ensure a smooth passage to approval, compliance with these must be demonstrated.

In addition to the specialist functions already mentioned, other financial, marketing, legal and tax professionals in the company are present at different stages in the process, but external consultants are rarely used. The inclusion of specialists adds to the already intentionally diverse membership of the project team and can occasionally lead to personal agendas causing problems. The training managers receive on negotiating skills is viewed ambivalently by the interviewees. At Stage 7, "scheme paper" approval, all the relevant departments are involved as required under the group investment directive before the project can be authorized by the subsidiary MD or the main company board when the financial investment is substantial. Our interviewees described the consensus generating at this stage as an exercise in gaining constrained agreement.

The formal meetings, comprehensive documentation and the precise recognition of individual and team responsibilities arguably frame the way in which the CID is to be taken. Reinforcing the importance of these framing reference points is the use of specialist functions such as corporate finance and planning, and risk control whose role is to ensure compliance with detailed company policy. The scope for managers to exercise judgement through heuristics and consensus is essentially constrained because any deviation from procedures will be detected and the deviation will need to be justified to convince several specialists and top managers of its merit. Owing to the vast sums involved the procedures can be justified as the interviewees independently stated, but the over-reliance on one aspect of cognitive behaviour, in this instance framing, can crowd out other psychological considerations, such as heuristics and consensus that may be limited to certain stages of the CID process or to discussions prior to formal submission of the project.

5.2 The chemicals Company B

This UK headquartered multinational company has 15 main subsidiaries operating in more than 50 countries worldwide with a mainly industrial client base. Each subsidiary

has a board of directors and there can be several business units within any one subsidiary. Our interviewee and respondent to the survey is a senior manager, a director of a UK subsidiary, who is a professionally qualified accountant with ten years experience with the firm. CIDs are typically focused on new site/market development projects.

The formal CID process follows nine stages (not dissimilar to Company A) (Figure 3) and iterations between individual stages occur as assumptions are refined or amended. Managers at business units generate initial ideas and then consult the group corporate finance team to gauge compatibility with the overall corporate strategy. Financial and

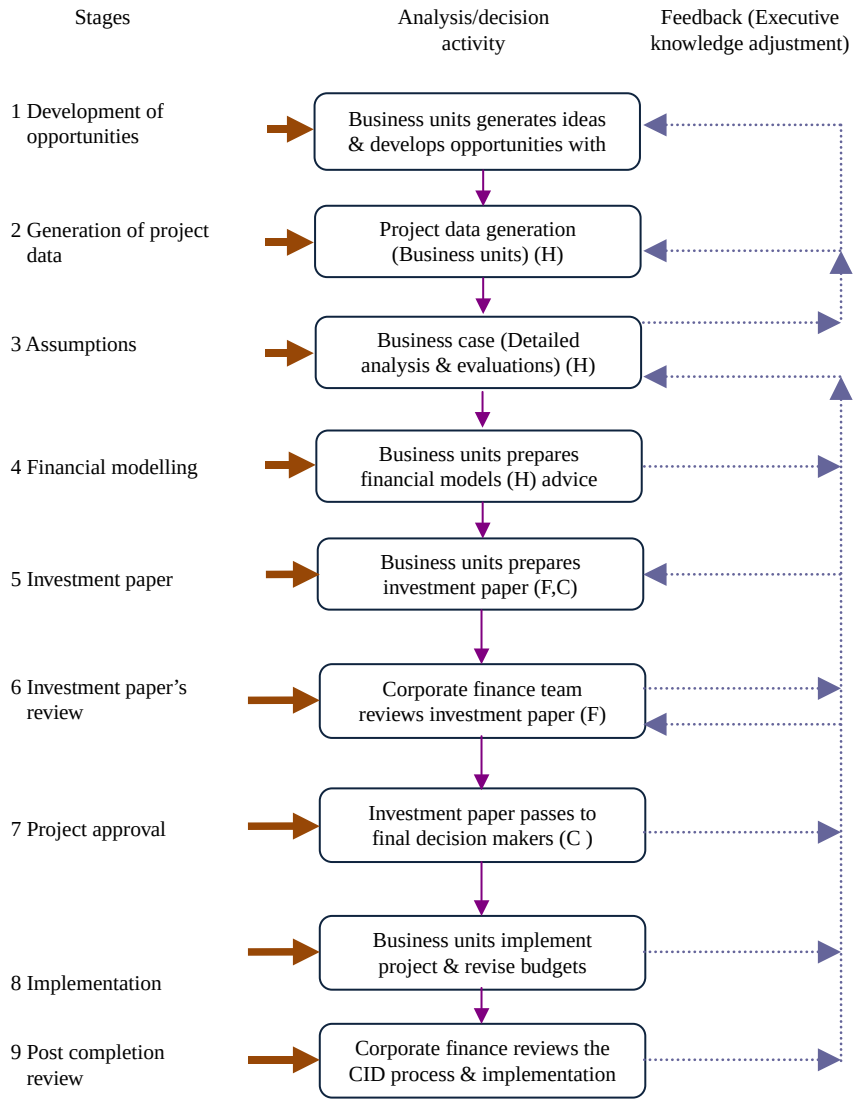


Figure 3.
CID process in Company B

non-financial data for the project, detailed assumptions, DCF computations and risk analysis are undertaken by the business unit managers (Stages 2-4) and the resulting model is reviewed and evaluated by the corporate finance team. The finance team recommendations are evaluated at the business unit (Stage 5) and the model refined and re-worked before finance undertake a final review (Stage 6) and the investment paper is submitted to senior managers for decision. Management at the business unit is responsible for implementing the project and, at the post-completion stage, a corporate finance review that enables managerial learning to inform future CID projects. The size and complexity of the investment influenced selection of the managers involved in the process.

Business unit managers may be joined by development, ICT, finance or project managers or even senior group directors at different stages. No use of external consultants or stakeholders was made and no project champion is identified but it is likely that the business unit managers will participate at each stage of the process.

Our interviewee stated that top management encouraged managers to exploit their experience and managerial judgement throughout the CID process. One indication of this is the use of generic spreadsheets and tailor-made decision-support software when developing the project model. All the business units have bespoke software linked by means of intranet to the group system where the central risk management team can advise business unit managers to up-date or amend their stand alone systems. The central team reports material risks to the board quarterly and also provides up-dates to business units on the tools and techniques of risk analysis. The company also delivered more than 80 workshops on understanding the strategic risk-process annually. These encourage business unit managers to qualitatively assess strategic risk based on their own managerial judgement. The aim is to ensure their experience is incorporated at the earlier stages of the CID process. Little use is made of risk registers but the sensitivity of expected returns as measured by net present value and internal rate of return are required to recognise risk. Hence, at the review and approval stages, the risk and sensitivity analysis, evaluation of returns and financial models are expected to be presented in a specific format.

Our interviewee offered several illustrations of where business unit managers employ the use of heuristics like anchoring and adjustment, recency and availability of data to include their experience in the early stage discussions especially. Surprisingly, little use of brainstorming or temporary alliances appears to be made although personal agendas can be problematic on occasions. The most important characteristics for project team participants appear to be their different skills and experience plus an appreciation of the views of superiors.

The role of the central specialist functions appears to be the greatest contrast with the CID process adopted by Company A. The central risk management team in Company B appears to have a mentoring rather than monitoring role, a concern for service and learning, and delegates the early stages of the CID process to the business unit managers. This enables heuristics to be admitted to the process and, to some extent, to be embedded in the bespoke software each unit develops. Reviews are undertaken at certain stages and formal approval presentations are required to be framed in particular formats to meet corporate norms. Taken overall, there appears to be a balance whereby heuristics and consensus are admitted to the process but within an overall frame of reference and set of formal procedures that recognises their importance.

5.3 The healthcare provision Company C

This family-owned private company is a smaller multinational operating in Africa, the USA and the UK with a clear focus on new site/market development projects. The main clients are government health ministries and growth is one of its primary strategic aims. Three managers were interviewed who responded to the survey and of these two are experienced OMs and the third is the financial controller. They hold professional qualifications in business technology, engineering and accounting and have ten years or more experience of the healthcare sector. All knew the MD before joining the company but, in contrast, with Companies A and B, the MD of Company C was the sole shareholder.

Informality seems to be the over-riding characteristic of the CID process. Whilst there is no documentation of the CID process, our interviewees indicated that eight stages are identifiable (Figure 4). These are not universally applied and there are no formal feedback loops or iterations. Initially the MD or an OM might generate ideas or opportunities. This is an important distinction because those generated by the MD undergo a different process in reality. We will report the CID process when projects are instigated by OMs and make reference, where appropriate, to deviations when projects are MD generated.

The instigators (OM) of the project chose the team of managers to be involved and their continued participation over successive informal stages depended on their technical expertise and experience. The MD tends to involve other managers as the implementation is approached. OM projects can invite external parties such as government agencies, supplier and/or customer organizations, financing organizations to participate particularly when compliance, technical equipment, terms of sale or finance are potentially important issues. The OM project team collects data believed to be relevant to the project and at the next stage, formulates preliminary assumptions. These are presented to senior managers and if necessary revised before an informal evaluation and risk analysis is undertaken (The MD generated projects may selectively present assumptions on those aspects where there is some doubt.). Presentations do not seem to follow any routines or frames and written reports may be requested after the meeting but not in advance. At the virtual sixth stage, the OM "sells" the project to the MD who takes the ultimate decision and there is no post-audit after implementation (When MD projects are presented to senior managers they are able to question and respond negatively if necessary but their views must be fully justified.). However, the company does not use sophisticated evaluation techniques and little use is made of decision-support software whether generic or tailor-made, alternatively, instinct and industry knowledge appear to be used extensively.

To fill the void of no written company policies, managers participating in OM projects employ brainstorming, visualizing or mapping, anchoring and adjustment and experience in the CID process. Informal discussions with other managers in the team also seem common place outside scheduled meetings but temporary alliances are of little consequence when it is the thinking of the MD that ultimately matters. This unavailability of information extended to managers being unaware of the hurdle rate or minimum expected return leading one interviewee to query whether the company has a more ethical or philanthropic goal than profit-making. A risk evaluation is not an essential requirement when seeking approval but managers effectively kept their own risk registers and used industry benchmarks or comparisons with past projects to inform their commitment to a new project.

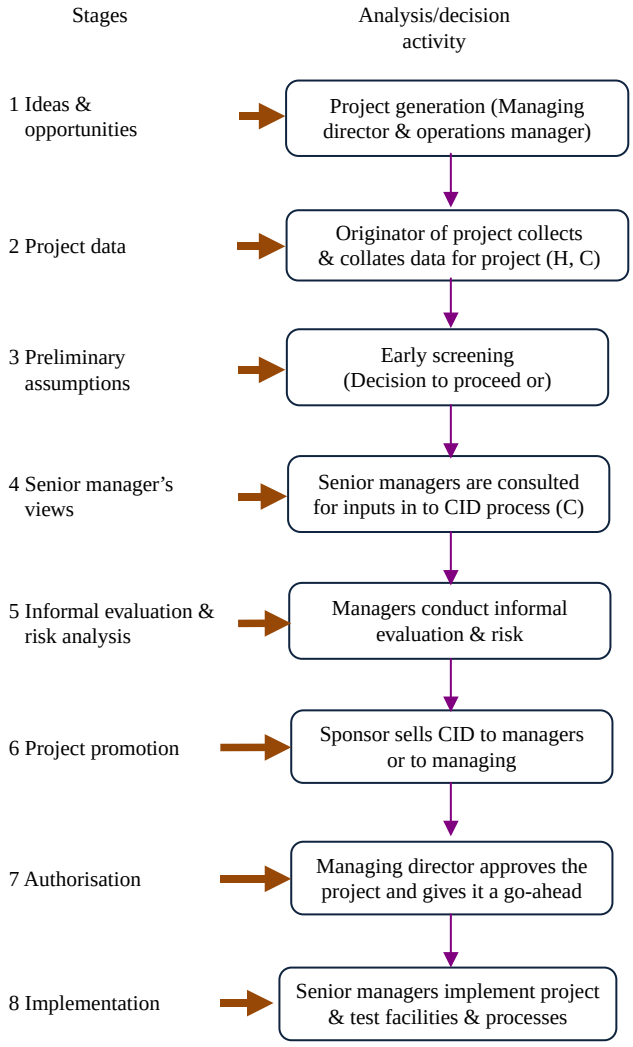


Figure 4.
CID process in Company C

Company C illustrates that a virtual total absence of formal policies or frames of reference result in discussions becoming ultra-important as the means for managers experience and other heuristics to be shared. The company has grown successfully over a number of years in a dynamic environment and the informal CID process seems to operate even if the final judgement on whatever grounds is that of the MD. In contrast with Companies A and B where framing may constrain or enable the influence of heuristics and consensus, here in Company C, the CID process cannot be undertaken without the project team sharing and agreeing relevant experiences in order to develop frames of reference.

6. Implications

To understand more about fully the CID-making process, the influence of managerial judgement requires investigation within organizational contexts. Prior thinking suggests that the context may influence the extent of multiple manager inclusion in the process. However, in itself inclusion offers little expansion in understanding the process unless aspects of managerial judgement can be identified. Cognitive and social psychology offer an alternative perspective and, a review of past case and fieldwork studies allowed heuristics, framing and consensus to be gauged. We recognise that this gauge of managerial judgement is limited but the systematic search for evidence of heuristics, framing and consensus offers consistency in the interrogation of past fieldwork. By applying the psychological lens, the extent of managerial judgement being present in the CID process was recognised.

The variety of forms heuristics, frames of reference and consensus within the organizational context can take provides a rich research landscape in which to understand the CID process. However, the landscape is unexplored especially in terms of interactions between managerial judgement and organizational context, and between the psychological concepts comprising managerial judgement. Understanding the possible interactions will help to explain the extent managerial judgement is managed.

A preliminary investigation using the psychological lens was conducted in three UK companies where the focus of investment proposals is new site/market development. We find that with the psychological concepts it is possible to discern variety in the influence of managerial judgement within different organizational contexts.

Across the three companies practices range through the CID process selecting a champion who has formal responsibilities for a project (Company A) to a non-documented informal process relying on a team of managers who determine relevant data and how it is presented (Company C). Potentially due to the degree of reliance on formal documentation, the CID process can limit (Company A), enable (Company B) or necessitate (Company C) the introduction of managerial judgement. This variety suggests an interaction between the psychological concepts within a particular organizational context. For example, frames of reference provided by detailed company policies that are actively monitored tend to reduce the scope for the use of heuristics and consensus building (Company A). Written corporate policies that require managers to introduce heuristics at certain stages in the CID process also enable team consensus to develop (Company B). In the absence of written documentation and limited corporate guidance, assumption building in teams by sharing data based on experience in an informal, dynamic manner becomes necessary if not essential (Company C). There also appear to be different practices in selecting CID team members at different stages of the process and in the mentoring or monitoring roles of group service functions concerned with risk, for example. In total, these differences suggest that the extent to which managerial judgement is managed varies appreciably and potentially provides a more realistic research domain in which to understand the CID process. Some caution must be exercised, however, before this avenue is followed at this stage.

The overlap between measuring the heuristic, framing and consensus concepts is a valid concern in providing construct validity for research in this important area. There is also scope for other psychological concepts to be used in order to refine more precisely the meaning of managerial judgement. Further refinement of recognising the dynamics of organizational context may require discovering whether the CID process applies to all

projects or selectively, and whether the process changes over time. The selection of project leader or champion may also influence the extent to which managerial judgement is managed. Ultimately, we may be able to discern patterns between the management of managerial judgement and the long-term performance of companies, but care must be taken with advocating a further quest for the Holy Grail, least we fall into the parsimonious but simple mindset of the past that the use of sophisticated analytic techniques conditions performance. Meaningful understanding of the complexity of the CID process encompasses an appreciation of organizational context, and, the role managerial judgement is allowed or required to play. There are early signs from this research that opening up the CID process by means of the psychological lens may help to understand the management of the entire organizational context.

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