

Managerial Involvement in Investment Decision: A Study of Hydropower Enterprises

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ABSTRACT

This study extends the extant scope of understanding investment decision, beyond the dominant 'technical' emphasis on the application of discounted cash flow techniques. The research methodology draws the positivist and interpretive research paradigms. It uses a deductive approach, survey strategy and principal component analysis for the analysis. Three key sets of factors emerged as important in the investment decision process in the hydropower sector. They are: group consensus (framing), influences on own judgment (heuristics), and application of knowledge & experience (intuition). The use of purposive and convenient sampling might have some unintended impact on the findings. Consequently, any generalizations of the findings to a wider population of organizations and managers need to be made with care. It is hoped that this paper will encourage other researchers to go beyond the analytic techniques of investment appraisal that have dominated investment decision research and seek to balance the emphasis by focusing on human involvement and behavioral aspects of investment decision.

KEYWORDS

Managerial Involvement • Investment Decision • Deductive Approach • Hydropower Enterprise

1. INTRODUCTION

Business managers formulate and executive various decisions in the course of their duties which are mostly related to financial consequences. Among these, the investment decisions are most challenging. Organizations need to invest continuously in diversified areas in order to create value for survival and growth. Investment is thus a lifeline for organizations only when an organization chooses the right projects. Investment decisions are concerning long term investment in assets to pursue of the organization's strategic objectives. Indeed the future success of an enterprise depends on investment decisions (Bierman & Smidt, 1993). Investment decisions are not only based on rigorous financial evaluations, but also considered non-financial aspects in the decision making process. According to Shank (1996), the investment decision process involves: (i) identifying spending proposals; (ii) quantitative analysis of the incremental cash flows; (iii) the assessment of qualitative issues that cannot be fitted into the cash flow analysis, and (iv) the making of yes or no decision.

Financial analysis is unable to examine all the variables related to capital investment decision-making and specifically marketing and strategic issues that may be difficult to quantify, but are key decision determinants (Barwise et al., 1989). Relying mainly on financial information for making investment decisions is of limited help (Carr & Tomkins, 1996). Nixon (1995) blamed financial methods such as return on investment or discounted cash flow techniques, for failing to incorporate qualitative and strategic parameters that may favour investments with long-term benefits for the organization.

The investment decision making process is arguably one of the senior manager's greatest challenges. Investment proposals are usually derived from lower hierarchical levels

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and are later promoted to the corporate financial staff for evaluation (Bower, 1986). Top management may wish to control the capital investment decision process, but their capabilities for direct control are rather limited. The formal planning and capital investment systems are acting as indirect control devices set at top hierarchical levels in order to impose compliance with their directives (Zanibbi & Pike, 1996). The role of financial analysis is secondary and is applied for achieving control and coherence in a group of divisional interests such as an organization.

There are a number of apparent flaws with traditional investment decision making techniques. Yet, in spite of these flaws, such techniques continue to be relied upon. As a consequence, there is the possibility not only for misguided investment decisions, but also the possibility of a perversion of senior managers' business imperative. This study extends the extant scope of our understanding of investment decision making, beyond the dominant 'technical' emphasis on the application of discounted cash flow techniques.

This study aims to explore the nature of managerial involvement in making investment decisions with reference to the Nepalese hydropower sector. It has been suggested that the study sought to balance the emphasis by focusing on human involvement and behavioral aspects of the investment decision (King, 1975) because the investment decision making process emphasizes strategic analysis over financial analysis, and therefore bears various biases that set it apart from a purely rational decision model (Boddewyn, 1983). Since, the investment decision making process involves individuals within organizations, the interactions between such individuals should be considered equally important.

2. THEORETICAL FRAMEWORK OF THE STUDY

Theory without practice is insufficient; practice unguided by theory is aimless (Guterk, 1988). Various theories have been applied to explain and meet the needs of the investment decision making process. Investment decision making is overtly interdisciplinary, explicitly and implicitly drawing from economic theories, finance theories, organizational theories, psychological theories, administrative theories etc.

The concept of rationality has been widely applied to economics-based research on investment decisions to assume that decision makers are rational when they make judgments. Simon (1957) identified three models of rationality: economic man, social man and administrative man. The economic man is one with a complete and consistent system of preferences. He is assumed to have all relevant information and is able to conduct intricate probability calculations and select options that are economically optimal. In contrast the social man considers human issues during decision making. He would acknowledge self-interest and

the role that reward has to play in influencing managerial decisions. Conversely the administrative man is more expedient, completing a sufficient analysis until a satisfactory outcome is found when making decisions.

Simon (1976) considered psychological and organizational influences on choice and recognized that personal preferences influence managerial judgment/involvement. Kahneman & Tversky (1982) defined intuitive judgment as judgment reached through 'an informal and unstructured mode of reasoning, without the use of analytic methods or deliberate calculation'. It is based on the bright ideas arising from people's hunches (Emery, 2002) rather than a lot of facts and figures. Schwenk (1988) provides the background theories to suggest that managers' strategic cognition and key psychological concepts are relevant to investment decision making. Three main concepts of heuristics, framing and consensus informed by the cognitive psychology and organizational behavior literature are potentially important when managers exercise managerial judgment during investment decisions.

2.1. HEURISTICS

The concept of heuristics deals with the psychological influences on judgment under uncertainty (Tversky & Kahneman, 1974). It is the application of experience-derived knowledge to a problem, i.e. the use of heuristic. It pertains to the process of acquisition of knowledge by intelligent guesswork rather than by following some pre-established procedure. Barnes (1984) and Tversky & Kahneman (1974) identified that when decision makers make decisions under uncertainty, they employ heuristics and biases may occur. The simplification of complex problems through rule-of-thumb instead of solving the problem by constructing a sophisticated mathematical model is common during decision making. Normally, heuristics that decision makers use are based on their own knowledge and experience (Tversky & Kahneman, 1974). Epley & Gilovich (2002) have posited that the effectiveness of anchoring and adjustment may vary significantly between different decision making situations. The intuitive cognitive system can be distinguished from a reflective system of reason whereby there is the conscious application of rules in a deductive and controlled way (Kahneman & Frederick, 2002).

2.2. FRAMING

Framing is closely related to the concept of heuristics and suggests that decision makers respond in different ways to the same basic information presented or framed in a different way (Tversky & Kahneman, 1986). Decision makers react differently because of their personal expectations,

preferences and attitudes to risk. Tversky & Kahneman (1986) found that decision makers emphasized the initial information about the choice (the concept of primacy), or the most recent information (the concept of recency), more than a balanced view of all the data. The influence of primacy and recency in the human processing of information made an important contribution. Decision makers reactions to proposals also draw quite heavily on the emotive or intuitive (right) side of the brain; a process that happens rather subconsciously in even the most ethical and assiduous managers (Claxton, 1998).

2.3. TEAM AND GROUP PROCESSES

The concept of consensus deals with team and group processes and the ways in which managers may seek to influence others during decision making. It draws from organizational studies on managerial behaviour and is therefore a combination of psychological, sociological and political perspectives. Narayanan & Fahey (1982) noted that organizational decision outcomes are the end result of political power and coalition. Given that investment decision making takes place within the organizational context, it would be very rare for an individual decision maker to identify, evaluate and decide upon investments in isolation from others. Therefore the participation of organizational members and related parties in the making of investment decisions introduces the issue of team and group processes and the view that some degree of consensus is necessary to agree investment decisions. Consensus draws attention to group composition and the dynamic interaction, or otherwise, of the group members. The adhoc ways in which managers seek to influence others (Pettigrew, 1973) and the various means of seeking consensus (Schweiger et al., 1986) are also pertinent to understanding decision making involving multiple managers.

2.4. REVIEW OF LITERATURE

Various conclusions have been drawn from the available empirical research and literature in this area. The literature has mainly focused on the evaluation of new investments, which is considered the path which organizations take to create value for their owners. Current investment decision making practices, in contrast to early practices (which relied on the owners' business knowledge and intuition), focus on capital employed and use various financial tools. Today, investment decisions are normally made by managers rather than owners. The context in which investment decisions take place ought to be taken into account the influence of contextual variables, such as organizational structures and consensus building, on decision processes (Bower, 1970;

Fredrickson, 1986; Kingsley & Reed, 1991). Some important findings are summarized below:

Author/(s)	Findings
Simon, 1960	Investment decisions involved the exercise of judgement by the decision maker concerned depending on experience, insight intuition and creativity.
Welsch & Cyert, 1970	Organizations are a function of co-operative coordination of human actions.
Cooper, 1975	Concluded that a firm cannot behave as a decision making unit apart from the individuals within it, economic rationality does not hold.
King, 1975	Found that organizational, environmental, and human factors are important in capital investment decisions
Bass & Ryterband, 1979	Investment decisions involved the use of psychological processes, i.e. the theories of decisions borrow from psychology.
Bass, 1983	Found that the decision making process to include 'activation of individuals and units, mobilization of others into coalition, negotiation with other units and coalitions and compromise, accommodation or consensus to reach final choice'.
Jeffcutt, 1983	An organization is a social phenomenon, i.e. an artifact of human intervention.
Bower, 1986	Showed that organizational design and human factors influence capital project advancement.
Marshall & McCormick, 1986	Observed the role of intuition and heuristics in the stages of the investment decision making process was important. Furthermore, uncertainty of outcomes may lead to fluctuating; management would attempt to introduce flexibility by having a reserved capacity.
Northcott, 1991	Showed that decision making can be seen as a social process and that as a result, managers may not always behave in an economically rational.
Madsen, 1998	Studied about the knowledge and the experience dimension of managerial decision making and argued that 'knowledge about the phenomenon ultimately is personal because knowledge originates from mapping of experience gathered under specific circumstances'.

Simon & Holyoak, 2002	Looked at how managers exercise managerial judgement at various stages of the investment decision process, and the impact of framing of the information on their judgement.
Regel, 2003	Found that most experienced professionals employ intuition in exercising judgement.
Cooper & Dart, 2009	Showed that all members in an organization behave in a way that results into one 'well ordered preference function'.

gerial involvement in investment decision attempts to make a contribution in those areas. It builds on psychology work (intuition, heuristics and group processes) and explores the factors which enhance or inhibit managerial involvement in investment decisions and the nature of such involvement.

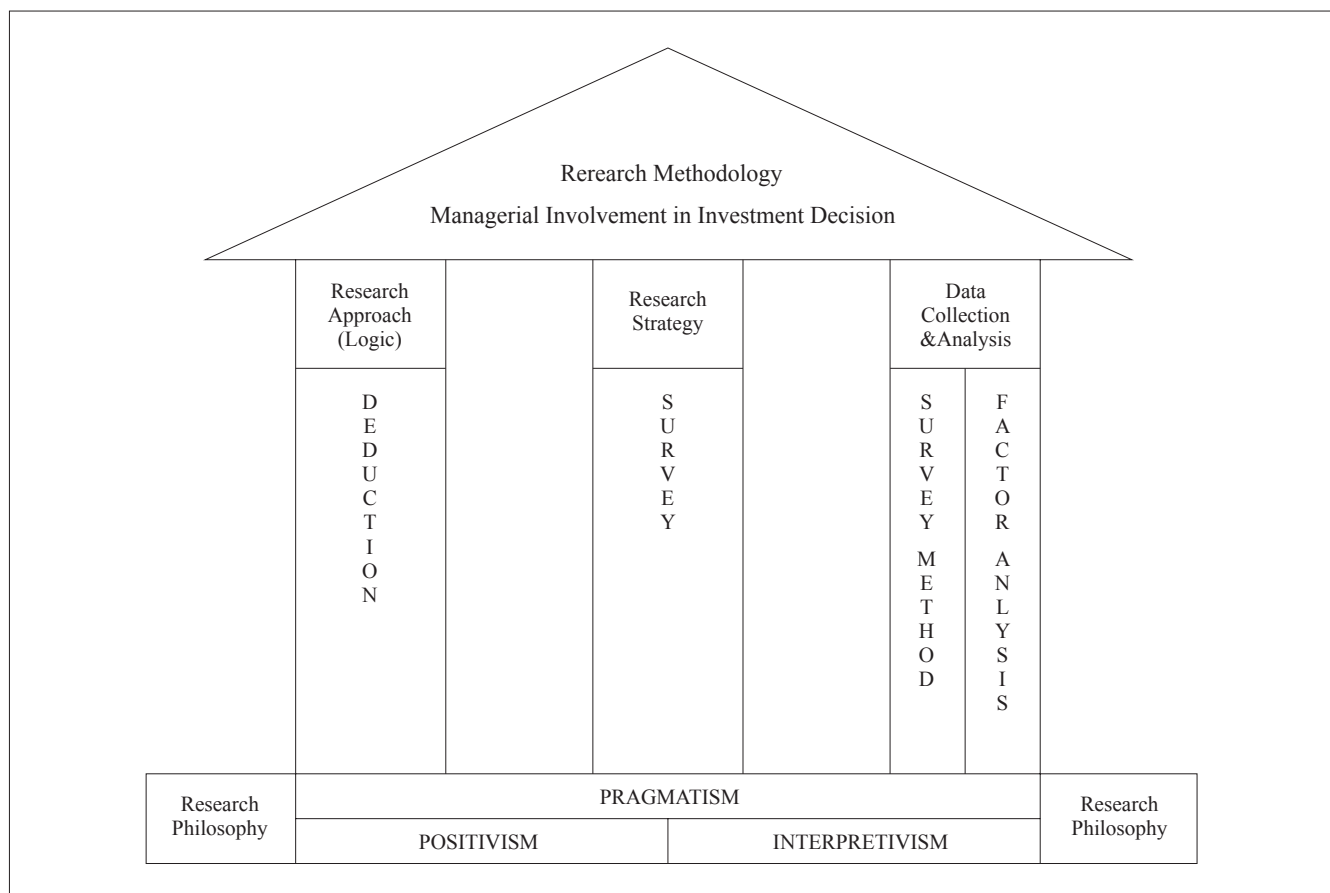
3. METHODOLOGY

The methodology to investigate the study employed a survey method. It drew the positivist and interpretive research paradigms. Investment decision scenarios are a consequence of a set of situations and individuals. Interpretivists' arguments were very relevant to such scenarios and therefore persuasive. This study followed a deductive approach. The deductive element of the approach involved the design of a 24-item research instrument, developed from the review of relevant literature, and analyzing the data collected using the survey research strategy. The methodology followed by this study is depicted below:

This study employed survey method for collection and various statistical methodologies for analysis of data to improve the quality of the data collected and analysis undertaken. The data collected was mostly quantitative,

The above reviewed has identified a number of areas that are lacking from the investment decision literature. Knowledge adjustment during the investment decision process seems not to be documented. Literature on the application of intuition, heuristics and group processes during the investment decision making and factors that enhance/enable or inhibit managerial involvement appear to be fragmented. Literature on the extent of the use of more intuitive rather than analytical judgement during the investment decision process is also fragmented. There is therefore a need to investigate these areas and this study on the nature of mana-

FIGURE 1.1: Pictorial Presentation of Research Methodology



though some of the qualitative data was translated into quantitative data. The population comprised all the managers in Nepalese hydro power companies categorized into small, medium and large based on the installed capacity of the plant. A list of 134 hydro power projects/companies was extracted from the Department of Electricity Development (DoED) at the end of January 2011. Out of them, 25 were operational, 24 were under construction and 85 were under the process of Power Purchasing Agreement (PPA). There are no standard criteria for recognizing managers in Nepalese hydro power companies. Although, based on the conversation with various concerned people during the data collection stage, the researcher identified 160 managers in the Nepalese private hydropower sector.

Based on these, the final survey sample for this study was purposive to ensure that the sample chosen represented the managers and activities necessary to provide relevant information on managerial involvement in investment decisions. According to Krejcie and Morgan's (1970) generalized scientific guideline for sample size decision, 113 survey questionnaires were given to managers in Nepalese hydropower companies. 73 survey questionnaires were returned from the respondents, out of them only 62 samples were properly filled up by the managers from 34 different projects/companies (a response rate of 54.86 %). The participants were from 9 different functional positions, the most common position being Engineers and Managers – Account & Finance. The questionnaire included 24 questions on the context and types of investment decisions; stages and the nature of the investment decision process; involvement of managers in the decision making process; and application of psychological concepts of heuristics, framing and group consensus. In most cases, questionnaires were provided to respondents and they were collected within a week. Collected data were analyzed with the help of SPSS software to produce descriptive statistics representing relationships among concepts investigated. The resulting statistics were then interpreted to produce factors. As part of the factor analysis of the data, descriptive measures and reliability statistics were calculated.

4. ANALYSIS

Of the 34 hydropower projects, 16 were from operational projects, 8 were from projects under construction and 10 were from the projects under the process of Power Purchasing Agreement (PPA). Of the 62 managers from 34 projects/companies, 30 responses were collected from operational projects, 17 responses from the projects under construction and 15 from the projects under the process of PPA. The sample comprised mainly managers from an engineering background, though managers were from

account & finance, general management as well as legal & administration played significant role in the investment decision making process. The researcher identified two types of jobs in investment decisions: technical and non-technical. The investment decision process would inevitably take place through some identifiable 11 stages. Similarly, the researcher identified three types of involvement in

V1	Sharing initial ideas/concepts
V2	Presenting information
V3	Promoting the project
V4	Uses of industry's rule of thumb
V5	Comparing and constructing new with previous
V6	Your professional background
V7	Knowledge of strategy formulation
V8	Reconnaissance surveys and hydraulic studies
V9	Pre-feasibility study
V10	Feasibility study
V11	System planning and project engineering
V12	Project risk factors
V13	Ownership and maintenance
V14	Discussion during formal meetings
V15	Views of the project's top management

the investment decision process: Technical (knowledge) Involvement; Economic & Financial (knowledge) Involvement; and Leadership (role) Involvement.

The data were reduced to extracting key factors and the relationships between and within these factors were examined. The strength and direction of the relationships that have emerged was also established. The following 15 variables were included in this analysis. The analysis produced Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy of 0.818, with a significant Bartlett's test statistic of 0.0001.

The factors extracted from data based on rotated solution are shown in table 1.1. Factor loadings less than 0.3 have not been displayed because the author, instructed SPSS to suppress any loading less than 0.3.

Table 1.2 gives eigenvalues, variance explained, and cumulative variance explained for factor solution. The factor 1 accounted for considerably more variance than the remaining two (38 % compared to 13 % and 10 %), however after extraction it accounted for only 22 % of the variance (compared to 21 %, and 18 %).

An oblique rotation was conducted and pattern matrix as well as the structure matrix obtained. The same 3 factors emerged from these computations. These arguments were used as a basis of including all the three factors as key, and

TABLE 1.1: Rotated Component Matrix^a

	Component		
	1	2	3
Sharing initial ideas/concepts	0.614	0.436	
Presenting information	0.334	0.826	
Promoting the project		0.596	0.355
Uses of industry's rule of thumb		0.650	
Comparing and constructing new with previous			0.577
Your professional background	0.360	0.359	0.614
Knowledge of strategy formulation		0.506	0.491
Reconnaissance surveys and hydraulic studies	0.809		
Pre-feasibility study	0.821		
Feasibility study	0.755		
System planning and project engineering	0.807		
Project risk factors			0.865
Ownership and maintenance			0.778
Discussion during formal meetings		0.709	
Views of the project's top management		0.726	

EXTRACTION METHOD: Principal Component Analysis.

ROTATION METHOD: Varimax with Kaiser Normalization.

^a Rotation converged in 5 iterations.

TABLE 1.2: Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.743	38.289	38.289	5.743	38.289	38.289	3.322	22.146	22.146
2	2.022	13.478	51.768	2.022	13.478	51.768	3.179	21.191	43.337
3	1.436	9.576	61.344	1.436	9.576	61.344	2.701	18.007	61.344
4	.944	6.292	67.636						
5	.782	5.211	72.848						
6	.708	4.722	77.570						
7	.674	4.494	82.064						
8	.551	3.672	85.736						
9	.427	2.850	88.586						
10	.408	2.721	91.307						
11	.366	2.441	93.748						
12	.344	2.292	96.040						
13	.229	1.524	97.564						
14	.190	1.267	98.832						
15	.175	1.168	100.000						

EXTRACTION METHOD: Principal Component Analysis.

TABLE 1.3: Total Variance Explained

Factors & Variables		Factor Labels
Factor 1	Sharing initial ideas/concepts	Group Consensus (Framing)
	Reconnaissance surveys and hydraulic studies	
	Pre-feasibility study	
	Feasibility study	
	System planning and project engineering	
Factor 2	Presenting information	Group Consensus (Framing)
	Promoting the project	
	Uses of industry's rule of thumb	
	Knowledge of strategy formulation	
	Discussion during formal meetings	
	Views of the project's top management	
Factor 3	Comparing and constructing new with previous	Application of Knowledge & Experience (Intuition)
	Your professional background	
	Project risk factors	
	Ownership and maintenance	

EXTRACTION METHOD: Principal Component Analysis.

the labels assigned to them are depicted in Table 1.3.

Some findings related to the nature of managerial involvement, respondents, and decision process in the Nepalese hydropower sector can be pointed out as:

- i. Nearly half of the managers were from an engineering background, one quarter have had a masters degree in management education and 14 percent had additional qualification in the hydropower sector of Nepal who played significant role in the investment decision making process.
- ii. Around 80 percent managers of the hydropower sector had less than 5 years work experience, and irrespective of the sizes of the organization they took 11 stage investment decisions. Nearly 94 percent managers were involved in formal meetings with other managers outside the company before making final investment decisions.
- iii. Two-third of investment decision processes required technical knowledge, and more than 75 percent projects had been reviewed due to technological issues; social issues and the impact of financial projections in the implementation stage.

In relation to factors & patterns in the data collected, the study has revealed interesting relationships. Three key sets of factors emerged as important to the investment decision making process in hydropower sector from the Principal Component Analysis of the data viz.: Group Consensus,

Influences on Own Judgment, and Application of Knowledge & Experience. Levels of reliability of these factors were satisfactory; Cronbach's α coefficient exceeding 0.7 for all of the three variable sets; and the Spearman's ρ showed strong and statistically significant (at 99% & 95% level) correlations among the variables included in each set. The following key findings have emerged from the analysis of data.

- 1) Group Consensus (Framing) was greatly important during the investment decision in the hydropower sector. Sharing initial idea/concept played significant role in the investment decision making process and guided to reconnaissance surveys and hydraulic studies of the project. Pre-feasibility study followed by feasibility study and system planning and project engineering built a platform of investment decision to every potential investor in the hydropower sector. The findings on group consensus support the observations by Bower (1986) and King (1975) that human factors influence investment decisions. In addition, there appears to be fresh evidence that technical knowledge based on engineering background are important to gaining consensus and framing the investment decision in the hydropower sector.
- 2) Influences on Own Judgment (Heuristics) altered managerial opinions considerably during the investment decision making process. Knowledge of strategy formulation by using the industry's rule of thumb was particularly very important in influencing the investment

decision. Similarly, discreet presentations of information for the purpose of promoting the project were also significant during the decision making process. Discussions during formal meetings between managers involved in the decision making process were influential in altering the opinions of the managers. In the same way, the views of the project's top management were also the cases of changing managerial decisions. These findings are similar to the evidence of Abele et al. (2004) that two crucial elements of information processing are the data-driven inputs and the knowledge that is brought to the situation. Carr & Tomkins (1996) and Bierman & Smidt (1988), for example, noted that strategy plays an important role in investment decision making. The importance that respondents attached to knowledge of strategy formulation in influencing the investment decision is in line with the theory that, most investments follow from the organization's strategies; which reflect special skills and abilities, or comparative advantage of the company over others. The findings on influences on managers' own judgement provide new insight into managerial judgement during investment decision.

- 3) Application of Knowledge & Experience (Intuition) was important in influencing investment decisions. The professional background of the managers for comparing and constructing new project opportunities with previous projects were important during the investment decision making process. The top management compared the project(s) on the basis of the risk profile and took responsibilities regarding success/failure of the project. Such factors had not been explicitly identified within literature relevant to investment decisions. Butler et al. (1993) identified that one source of influence in the managerial decision making process is top management's guidance and control over the process. The distinction in this study is that comparing and constructing new project opportunities with similar projects the manager was involved in emerged as more important. The findings also support Simpson's (2003) observation that abundant past experiences would allow managers to comfortably make reasonable decisions otherwise they have to consult others.

5. CONCLUSION

This study provides the evidence that investment decision making is overtly interdisciplinary, explicitly and implicitly drawing from economic theories, finance theories, organizational theories, psychology theories, administrative theories, etc. By the nature of investment decision, it is guided by the theories of economics and finances. Normally, investment decisions are approved after proving economic and financial

rationality. The administrative theory is more expedient, completing a sufficient analysis until a satisfactory outcome is found when making decisions. Besides, such theoretical considerations, investment decision is guided by organizational and psychological theories. This study supports Simon's (1976) findings 'psychological and organizational influences on choice and recognized that personal preferences influence managerial judgment/involvement'. Similarly, it supports the findings of Kahneman & Tversky (1982) that was intuitive judgment as judgment reached through 'an informal and unstructured mode of reasoning, without the use of analytic methods or deliberate calculation'. In this respect, investment decision is multi-disciplinary.

The study shows that in exercising managerial judgement during the investment decision making process, managers employ cognition and different types of heuristics (e.g. industry rule of thumb, discussion during formal meetings etc.). It identifies that group consensus having with technical knowledge is required at the time of framing the investment decision in the Nepalese hydropower sector. Intuition guided by prior learning is employed by managers exercising judgement during investment decision making. The study also shows that the widespread consultation of external parties during the investment decision making process, which impact on managerial judgement.

Finally, the study recognizes the importance of managerial involvement in the investment decision making process. It reveals that for managers, the level of managerial involvement in investment decisions is high across all sectors, though it is more idiosyncratic in small and medium sized organizations. This highlights the insufficiency of the objective processes of investment decision making process, which needs to be augmented by managerial judgment, exercised individually and collectively. This study extends the extant scope of our understanding of investment decisions, beyond the dominant 'technical' emphasis on the application of discounted cash flow techniques.

6. ROOM FOR FUTURE RESEARCH

This study looked at managerial involvement in investment decisions. There are still a number of questions not addressed by the study and provides room for further work in this area. The research might be replicated using alternative research methods, e.g. Bower (1986) type case studies, observing and tracking real investment decisions as they occur. Secondly, future research might seek to explain how enabling framework of intuitive processes and inhibiting structure that have been identified in this study impact on decision performance of organizations. Thirdly, further research might be conducted to investigate the application of the affect heuristic during investment decision making

though this would be more likely to be investigated through an experimental study.

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