

**Impact of Decision Characteristics, Extent Of Scanning And Information Processing
Capacity On Investment Decision Making Quality**

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ABSTRACT

Successful decision-making strategies emerged from a decision making process where individuals and organizations seek out and process the information effectively in situations of uncertainties. Environmental scanning is beneficial when decision is complex and requires a large body of information. Hence, decision success or quality decision requires a keen strategic understanding of external influences, capacity to process the information and the characteristics of the decision itself. While this research focuses on strategic investment decision making, the first question arise concerning whether the decision characteristics influence the quality of

decision made and the extent of environmental scanning behavior of the decision maker?

Secondly, will the extent of scanning done give rise to quality of investment decision? And does the information processing capacity (IPC) enhance the relationship between environmental scanning and quality investment decision? Hypothesis testing method of research design was used in this present study. A cross-sectional survey through personal contact and personally distributed questionnaires was carried out to the CEOs and higher level managers of all industries located all over Malaysia. The usable questionnaire of 118 collected via convenient sampling was used for the analysis of the study. The result shows that decision characteristics influence the quality of decision but does not impact scanning behavior of the CEO and higher level managers. The implication of the study was CEO and higher level manager could make quality decision when accompanied with appropriate amount of environmental scanning.

Keywords: Environmental Scanning, Decision Quality, Nature of Decision, Information Processing Capacity

INTRODUCTION

Today's corporate world is undergoing unprecedented changes. The accelerating pace of technology, markets integration, and highly competitive market, place an increasing demand to get strategic investment decision right. Malaysia like the rest of the world is doubling its efforts in transforming the economy towards achieving higher value-added growth. Therefore, more efficient decision mechanisms are required to support this transformation. Several studies such as Daft and Weick (1984), Hambrick (1981), and Venkatraman (1989) found a positive relationship between scanning and performance. According to Dess, and Davis, (1984) environmental

scanning is the primary strategy and is necessary in establishing organizational goals. In addition, it has been discovered that successful firms differ from unsuccessful firms because they do more scanning and they also have a broader pattern of scanning (Daft, Sormunen, & Parks, 1988) as scanning will help decision makers make better decision and ultimately quality decision.

Decision characteristics on the other hand also impact quality of decisions as according to Rajagopalan, Rasheed, and Datta (1993), relationship exists between decision characteristics and the decision making process. The more difficult, irreversible and risky the decision, the more scanning is needed to achieve quality decision. Leonard, Beauvais and Scholl (2005) added that differences in decision task and decision situation can be attributed to decision making processes or the environment where the decision was made. Thus, quality decision-making in a highly competitive environment today needs a significant amount of information to resolve different characteristics of the decision. Environmental scanning is one tool in an organization's arsenal that can be used to gain this information. It is especially true when decision is complex and requires a large body of information. Therefore, getting the right information to the right person at the right time to produce the right processed information is of critical importance. Thus, the adaptation of technology, skills and knowledge synthesis within environmental scanning should occur.

Similar research on environmental scanning and investment decision-making were found done by Ekamen (2005). However his study looked at how investment decision was made and mainly descriptive in nature. Another study was found done by Leroy and Bernard (2004), who posited environmental scanning as a moderator to enhance productive investment decision and reduce the risk-averse attitude of the managers. Hence in the knowledge of the researchers, no study

was found to directly relate whether decision characteristics influence decision quality and scanning behavior and moreover to comprehensively analyze how managers scan the environment, the source of information they use, the sector of environment they seek out, and the influence of information processing capacity to enhance their investment decision-making quality. Therefore, this research aims to fill such gap in the research of strategic decision making and environmental scanning by investigating how scanning is done by the top management in all types of firms in Malaysia, and how it should be done to ensure quality decisions.

LITERATURE REVIEW

Decision Characteristics

Decision Characteristics encompasses of decision task, decision situations and individual indifference (Harris, 1998).

Decision Task

Decision task would include the dimensions of complexity of the task, difficulty and familiarity of the task and ambiguity of the task (Leonard et al., 2005). Empirical findings suggest that an increase in decision time when the task is unfamiliar or ambiguous, and also an increase in the amount of information needed when the task is complex or difficult. According to Wood (1986), complex tasks require significantly more processing of information cues (where the cues are interrelated to decision task) than simple tasks.

Decision Situation/Environment

Characteristics of the decision situation or decision environment include time pressures, irreversibility and significance of the decision and accountability of the decision makers. Time pressures on the decision will lead to a structured, rule based decision process that will reduce the number of alternatives generated and considered. Irreversibility of the decision and significance of the decision and accountability of the decision maker are linked to an increase in decision time (Abelson & Levi, 1985).

Decision making theory

In strategic decision making model, many theorists see the analysis of the decision making processes as the key to understand how organizations function. Simon (1957) introduced rational decision theory into organization theory. He uttered that the decision making process is the core of all organization theory, which should therefore address questions such as “How are decisions made?” and “How can decisions be made more rationally?” According to rationality theory, the decision making process is goal-oriented and rational. However, the rational Model or “economic man” is the ‘ideal’ model for decision making, but it is not practical, because of the limitations in human information processing capability and the ability to predict all alternatives which is termed as ‘Bounded rationality’ by Simon (1957).

The concept of bounded rationality suggests that individuals have perceptual and information-processing limits. Although managers may want to act rationally, they must accept the limits. This limited function includes acting upon sufficient rather than complete knowledge. Hence, there’s a tendency for managers to use simple rather than complex search strategies for problems and consistently using shortcuts (Miller & Ireland, 2005). Judgmental perspective of decision making was introduced by Simon in the late 50s. “Intuitive” decision making is the type of

decision-making that involves interpersonal interaction (Simon, 1987). It relates to irrational or judgmental decision-making that involves the behavior and emotions of the decision maker.

The need for quick decisions, the need to cope with demands created by complex market forces, and the assumed benefit of applying deeply held knowledge, create strong perceived value for the intuitive approach. However, Miller and Ireland (2005) in their study conclude that, drawing from the evidence of behavioral decision making, strategic decision making, and mental modeling; intuition is a troublesome decision tool unless it is combined with more orderly sequential analysis of the situation. Many studies also found that decision-making styles involve an intimate combination of the two kinds of decision making, analytical and intuitive (e.g. Simon, 1987; Miller and Ireland, 2005).

Extent of Environmental scanning

Efforts by executives or decision makers to assess uncertainty and identify opportunities in their environment are called “extent of scanning behavior”. As environmental changes have increased in their rapidity, scanning has become one of the most important duties for executives. Many literatures documented that scanning is used for a variety of strategic purposes; to reduce uncertainty in the environment (Elenkov, 1997; May et al., 2000), to achieve competitive advantage through superior information gathering (e.g. Beal, 2000; Kumar, et al., 2001), to gain knowledge about stakeholder priorities and demands that can be used to develop effective response strategy (e.g. Kumar et al., 2001), and to develop strategies that improve financial performance (e.g. Kumar and Subramaniam, 1998; Venkatraman, 1989). Hambrick (1981) was the first who set the methodological archetype in measuring scanning behavior. He identifies three behavioral dimensions of scanning; frequency of scanning, managerial/organizational

interest in scanning and time devoted to scanning activity. Researchers after Hambrick (1981) have tried to empirically identify other dimensions of scanning behavior in order to measure how scanning was being conducted. Most researchers looked at source or mode of scanning, and method of scanning. Those attributes are the conceptualization of the extent of environmental scanning behavior.

Based on Aguilar's work, Daft and Weick (1984), have developed a general model of organizational scanning behavior looking at two dimension; analyzability ('can we analyze what is happening in the environment?') and intrusiveness ('do we intrude actively into the environment to collect information?'). Daft and Weick (1984) suggest that organizations differ in their modes of scanning, depending on management's beliefs about the analyzability of the external environment, and the extent to which the organization intrudes into the environment to understand it. An organization that believes the environment to be analyzable, in which events and processes are determinable and measurable, might seek to discover the 'correct' interpretation through systematic information gathering and analysis. Conversely, an organization that perceives the environment to be non-analyzable might create or enact what it believes to be a reasonable interpretation that can explain past behavior and suggest future actions (Choo, 2001). According to Choo (2001), besides environmental uncertainty, the level of knowledge and information available about the environment may also be an important factor for choosing the scanning approach. Scanning approach can be passive, active, formal or informal and an organization that intrudes actively into the environment is one that allocates substantial resources for information search and for testing or manipulating the environment. A passive organization on the other hand takes whatever environmental information comes its way, and tries to interpret

the environment with the given information. Usually it involves informal method of scanning and relies more on personal sources of information.

Amount of Scanning

The amount of scanning done by managers is one of the common dimensions of scanning behavior used in earlier studies (Elenkov, 1997; May et al., 2000; Sawyerr, 1993). Most of the previous research conceptualized amount of environment scan based on frequency of scanning, interest in scanning and the time spend in scanning the environment (e.g. Ebrahimi, 2000; Elenkov, 1997; Hambrick, 1981; May et al., 2000). However, for the present study, the concept of the amount of scanning is operationalized by measuring the amount of information the managers scan on each type of information needed for the decision they have made.

Method of Scanning

According to many researchers, the method of scanning will impact the quality of decisions made (e.g. Subramaniam, Fernandez, and Harper, 1993) popular dimension used to measure method of scanning is formal versus informal systems and regular versus irregular basis. The formal system consists of a specialized unit and personnel dedicated to the tasks of acquiring, interpreting, and internally communicating information on different aspects of the firm's environment (May et al., 2000). With formal system, scanning is usually done on routine or regular basis where the information will be stored and used whenever needed. An informal system is built around the day-to-day scanning activities of individual managers and is done on an ad-hoc basis by either middle or top level executives in the organization. The information that is obtained on a non-routine or informal basis and it is usually gained through chance

encounters that do not seek comprehensive hard data. Information seeking is thus casual and opportunistic, relying more on irregular contacts and casual information from external, people sources (Choo, 2001).

Sources of Scanning

Another dimension of environmental scanning behavior is sources of scanning used. Many literatures have identified several sources of information that can be drawn on in the scanning process. Typically, the sources can be categorized as internal and external sources and personal and impersonal sources (Aguilar, 1967). Internal sources of information about the external environment includes memos, output from management information systems, and direct contact with managers and employees within the organization (McGee & Sawyerr, 2003), while external sources of information includes trade publications, direct contact with customers, suppliers, and executives from other companies as well as attendance at industry-related meetings and seminars as well as the internet (Wood, 1986). Personal and impersonal sources on the other hand, are operationalized by looking at the types of contacts. Personal sources of information originate from personal contacts involving direct communication with other individuals either within or outside of the organization, such as friends, family members, and close business associates. On the other hand, impersonal sources originate from non-personal sources typically written communications such as formal reports, trade publications, newspapers, government reports, output from management information system and etc. (Aguilar, 1967; Daft & Weick, 1984).

Information Processing Capacity

Information processing approaches to modeling organizations have been extensively developed in organization theory (Daft & Weick, 1984; Egelhoff, 1982, 1991, Egeihoff and Sen, 1992; Galbraith, 1973; Huber, 1991; Tushman & Nadler, 1976), but this work has had little influence on the environmental scanning literature. Although a great deal of exploratory research exist on environmental scanning, it is generally difficult to integrate them with information processing capacity because there is lack of underlying theoretical framework that facilitates both situations. Organizational information processing, views organizations as a system that need to balance the organization's information processing capacities against the information-processing requirements inherent in its strategy and environment. It encompasses organizational structure and organizational design. Given the high level of uncertainty, complex decisions and the shortage of useful information, there is often considerable need for "cognitive elaboration" on the part of decision maker that is skill and experience and decision support systems (Egelhoff & Sen, 1992).

Information processing in organization is generally defined as data gathering, transformation of data and communicating data into information. An organization processes information to make sense of its environment, to create new knowledge, and to make decisions (Choo, 1993).

Information processing is also defined as how the information is modified so that it eventually influences the decision making. Most empirical research identifies four dimensions of IPC, namely 1) organizational structure (e.g. Galbraith, 1973; Ochi, 1981; Wiliamson, 1981;); 2) decision experience and skill (e.g. Flynn and Flynn, 1999; Kraiger, 1988; Levitt and March, 1988; Nass, 1994); 3) managerial style (e.g. Driver et al.,1996); and 4) decision support systems

(e.g. Culnan, 1983; Daft and Lengel, 1986; King, 2006). However, since the main focus of the study is on the impact of scanning on decision making quality and not on the manager or the organization, only two dimensions is appropriate to be used, that is decision experience and skill and decision support system brought to bear on the decision made.

Investment Decision Quality

In measuring or evaluating capital investment decision, there are many techniques currently being discussed in the literature such as traditional mainstream techniques (discounting cash-flow (DCF) and payback period) which are said to be inadequate in certain situations especially for the evaluation of investment in research and development (R&D) and technological innovations (Ekamen, 2005) Both situations are intangible in nature in terms of the benefits involved and the environmental uncertainties that need to be dealt with (Thomas, 2001). Study by Demeyer, Nakane, Miller, and Ferdows (1989), found considerable evidence available to support the claim that the financial appraisal methods (e.g DCF, payback) used by industry to evaluate capital investments may be inappropriate for today's high technology business environment. A manufacturing strategy survey of senior managers of large manufacturers in Europe, North America and Japan revealed that the competitive priorities of those executives are dimensions of cost (productivity), quality, flexibility, and dependability/delivery (Demeyer et al., 1989). Other surveys (e.g. Proctor and Canada. 1992) also indicate product quality as a top priority in America. According to Proctor and Canada (1992), other less tangible benefits most widely cited are: (1) improved competitive position, (2) increased manufacturing flexibility, (3) reduced delivery time, and (4) reduced product development time. Therefore, strategic evaluation of capital investment which used to be performed by top management beyond the

range of financial appraisal are now brought in line with justification of investment in advanced manufacturing system and other high technology, long-range capitalization projects.

Leroy and Bernard (2004) on the other hand added that in an uncertain environment, that is when the parameters that influenced the future states of nature are unforeseeable, the question is not so much whether it is profitable to invest but whether it is opportune to invest immediately instead of waiting. According to them, “decision is not whether to invest, but also when to invest”.

Environmental scanning is a tool that can be used to identify the opportunities and prospects available.

THEORETICAL FRAMEWORK AND RESEARCH METHODOLOGY

The theoretical framework of the current study has five major relationships. It is decision characteristics as independent variables, environmental scanning as intervening variables, information processing capacity as moderating variables and decision quality as dependent variable. The framework started by exploring the relationship between decision characteristics and decision quality. The second part of the analysis examined the relationship between decision characteristics and environmental scanning. The third part of the analysis examined the mediating effect of environmental scanning and decision quality, the fourth analysis examined the decision characteristics and the inclusion of the mediating variable of environmental scanning with decision quality and the final analysis is on the moderating effect of Information Processing Capacity on the environmental scanning and decision quality. The five main hypotheses of this study attempt to answer the central research issue of whether the characteristics of the decision influence the decision quality and whether it is mediated by the scanning behavior of the decision maker. Furthermore the current study also interested to know

if information processing capacity enhances the environmental scanning behavior and the decision quality.

The data in the current study relates to capital investment decision, which therefore forms our unit of analysis. Capital investment involves decision that relates to the purchase of plant, machinery, building, business, market expansion and product development. Therefore, information about specific decision made by the decision maker is crucial for this study. The respondents were asked to choose only one specific decision that they have made within the last two years. This specific decision that they have selected will be the main focus of the analysis. The quality of the decision by the respondents depends on two factors. One is the importance of achieving each of the listed objectives, and secondly the extent the objectives were achieved. The Decision Quality Index (DQI) measure used is a weighted sum of the achieved objectives, where the weights were represented by the importance attached to the each of the objectives. We measured the importance (rank 1 to 10) by forming the weights attached to each of the quality. Since the ranks differ from decision to decision, the quality of the decision was rated based upon the respondent's importance attached. Since the weights summed up to 55

(10+9+8+7+6+5+4+3+2+1 = 55), the denominator is 55. Therefore the Quality index formula is:

$$DQI = \frac{\sum (\text{importance of objective } i \times \text{achievement of objective } i)}{\sum \text{importance of objective } i}$$

$$= \frac{\sum (\text{importance of objective } i \times \text{achievement of objective } i)}{55}$$

This unit of analysis is also chosen to enhance internal validity as choosing the manager or the organization making the decisions will only confuse the issues to be addressed. This is due to the fact that managers and organizations make many decisions, some would involve a great amount of scanning, and some none at all, and the associated quality is high for some and low in

others. Therefore, isolating the focus on a specific decision, measuring the associated scanning behavior and quality, will strengthen the validity of the relationship thus established.

The population of the study is the investment decision per se which is in the researcher's point of view, cannot be easily identified. It is due to the fact that the decisions were made by almost every executive. Due to the unidentified population and sampling frame as well as the nature of the study itself, the most appropriate sampling method to be used was convenient sampling. The data was obtained from various sources based on the researcher's personal contact and networking. According to McGrath (2001), the major advantage of using personal contacts and the promise of useful feed back was that, the respondents were professionally interested in the results and committed to making sure the data were accurate. Moreover, convenient sampling is also used commonly in many marketing and strategic management studies (e.g. Annamalai, 2006; Chan, 2005; Jaworski and Kohli, 1993; McGrath, 2001; Syed Mohamed, 2004). Based on that argument, the researcher has the confidence to proceed with the convenient sampling although the generalizability of the findings might be limited as it may be valid only for the sample we have obtained. Therefore the 345 questionnaires were sent to the decision maker of all industry sector all over Malaysia.

FINDINGS

Various levels of decision makers who make capital investment decisions in the last two years from various types of companies were analyzed. Out of 345 questionnaires distributed, 126 were received and 118 were usable. Thus, the total response rate was 37%. The achieved response rate compares favorably to other studies in environmental scanning conducted in other countries, where it ranges from 17% to 30% only (e.g. Choo, 1993; May et al., 2000).

Sample Profile

Respondent profile

In terms of who made the decision, the majority of the decision-makers in our sample hold managerial position (39%) designated in most of the business units such as, regional manager, branch manager, operation manager, financial manager and etc. followed by CEOs (33%). 58% of them have a Bachelor's degree and about 32% holds Masters and Doctorate degrees. The majority of them have management and business background, but there are also a significant number of respondents with IT and engineering background. Thus, we can conclude that the respondents are sufficiently well versed with their company operations and are able to comprehend the needs of the questionnaire.

In terms of their experience, the majority of the decisions are made by respondents who have been in the industry for more than 6 years (32%). The important trend is that slightly more than 50% of them have more than 10 years of experience in the industry. Although 65% of the respondents have been in their position for less than 5 years, most of them have been with their respective companies for more than 6 years (40%). It can be seen here that generally the decisions involved in this study are made by people with long tenure and vast experience in their respective businesses and companies.

Company Profile

In terms of where the sampled decisions are made, 64% are made in the services sector, which includes trading, tourism, property development, construction, plantation, finance company, telecommunication industry, education and government agency; while the remaining 36% are

made in the manufacturing sector, such as automotive, petroleum, gas and biotechnology.

Various types of companies are expected to be more representative of the scanning behavior among Malaysian firms.

Furthermore, 45% of the sampled decisions are made in companies that have been in operation for more than 15 years but there are also an equal proportion of those which have been in operation between one to fifteen years. Thus, our sampled decisions are appropriate for the current study to investigate the environmental scanning behavior in relation to their investment decision quality. In terms of the size of the companies that made our sampled decisions, there are also a sufficient number of small and large responding companies. About 34% are small enterprises and 30% are moderate in size. The remaining 36% are large companies with the number of employees exceeding 500, lending credence to subsequent results from analysis.

Decision Profile

It was argued that different decisions need different types of information involving different methods and sources. Therefore, it is crucial to scrutinize the decision profile as it might point towards different scanning behavior. The data shows that most of the decisions in the sample are related to capital acquisitions (35%) involving decisions to acquire plant, machinery, building, land, computers, and etc., and 28% are related to decisions about research and development, developing new product and new market and etc. Another 22% are decisions related to business acquisition and mergers while 14% are related to market expansion. Hence, the study covers a whole spectrum of decisions which hopefully will reflect the various types of scanning behavior.

The size of investment involved in the decisions was seen to be more on the low end, with 40% involving an investment of RM1 million or less, and only 20% are of investments value RM20 million or more.

Decision Objective

Table 1 displays the importance of the objectives of the capital investment decisions involved in this study. Improving profitability through enhancing product quality and cost efficiency are the three most important objectives of the decisions made. Improving knowledge development and the dissemination was the least important consideration of the decisions.

Table 1: Profile Of Importance Of The Objectives Achieved

Decisions (N=118)	
Objective	MEAN RANK
Improve quality of product	3.84
Improve cost efficiency	3.90
Improve production time	5.58
Improve productivity	4.19
Improve profitability	3.61
Enlarge market share	5.36
Develop new product	7.19
Enhance employee motivation	6.70
Increase innovation capacity	7.12
Develop and disseminate knowledge	7.49
Note: Rank of 1 = most important; 10 = least important	

In summary, it can be concluded that the sampled decisions in the study are quite varied not only in terms of its nature (objectives, investment value, etc.) but also in terms of where and who made these decisions. It therefore provides useful basis for the subsequent analysis and inference.

Descriptive analysis

Overall Descriptive Analysis

The main objective of the survey is to have a broad overview of how investment decision was made among Malaysian decision makers. Decision makers use various information sources and various scanning methods for decision making and different decision characteristics will lead to different level of decision quality. Descriptive statistics for the final list of variables of the study are shown in Table 2.

Table 2: Descriptive Statistics of Moderating, Control and Dependent Variables

Decision N =118		
Variables	Mean	Std. Deviation
X1: Decision situation	3.36	0.67
X2 : Decision task	2.90	1.38
Y1: Extent of scanning	3.32	0.76
Y2: Method of scanning	3.46	0.62
Y3: Source of scanning (Personal/Impersonal)	2.97	0.65
Y4: Source of scanning (External/Internal)	2.93	0.64
M: Information Processing Capacity	3.87	0.61
Z: Decision quality	3.73	0.71

Notes: X scale range:1 (less complex) to 5 (very complex)

Y1 scale range: 1(not at all) to 5 (great amount)

Y2 scale range:1 (informal) to 5 (formal)

Y3 scale range: 1(impersonal) to 5 (personal)

Y4 scale range: 1(external) to 5 (internal)

M scale range: 1(low) to 5 (high)

Z scale range: 1(low) to 5 (high)

In gaining insight into how and how much of the business environment was scanned when making investment decisions, the overall sample was examined. The mean level of environment being scanned and its dimensions are slightly above 3 indicating a moderate level of scanning behavior (mean = 3.32). Similarly, the methods used to scan the environment are moderately formalized (mean = 3.46). Thus, one can conclude that a combination of both formal and informal methods was used to scan the environment. Sources used to gather information indicates that slightly more impersonal and external sources were used to gain the information.

For the level of information processing capacity brought to bear on the decisions, the complexity of the decision made and the extent of the decision achieved its objectives, the result shows that decisions made by the decision maker having high capacity in processing the information (mean = 3.87), the characteristics of the decision (decision situation/decision task) was perceived to be moderate (mean=3.3) and the quality decision was rated high with the average mean of 3.73.

Validity and Reliability Test

Result from the preliminary analyses to determine the goodness of data on the independent, mediating and moderating variables obtained from the application of factor analysis and scale reliability testing gave satisfactory output.

Multiple Regression Analysis***Determinants of Decision Characteristics, Extent of Scanning and Decision Quality***

Overall, the model depicting the framework representing the interrelationships between the study variables is strongly supported by the data for extent of scanning behavior and information processing capacity acting as the moderator to decision quality. It explained a high proportion of the variations in the investment decision quality. However, for decision characteristics, the results concluded that a model does not exist as no significant relationships were found between the variables. Table 3 below depicted the result.

Table 3: Multiple regression: Contextual factors and extent of environmental scanning behavior
(Beta Coefficient)

Independent variables	Mediating Variables			
	<i>Extent</i>	<i>Method</i>	<i>Source(P/IP)</i>	<i>Source (I/E)</i>
X1 Decision Task	.054	.009	-.074	.011
X2 Decision Situation	-.036	-.075	.000	-.091
R	.064	.075	.074	.091
R square	.004	.006	.005	.008
F value	.233	.329	.313	.484

With regards to the extent of scanning behavior, result of regression analysis indicates that extent of scanning was significant and has positive relationship with investment decision quality.

Further, the higher beta value shows that amount of scanning has significant impact in explaining the variance in decision quality. Its positive direction indicates that the more amount of scanning done; the better will be the quality of decision. Method of scanning and sources of scanning either personal/impersonal or external/internal on the other hand shows no significant relationships. Therefore, what ever method or sources used to get the information, will not influence the quality of the decision. The most important factors influencing decision quality is only how much information being sought (see Table 4).

Table 4: Multiple Regressions: Extent Of Environmental Scanning And Quality Of Decision

Mediating Variables	Decision Quality
Extent of Scanning	.264***
Method of Scanning	.172
Source of scanning (Personal/Impersonal)	-.128
Source of Scanning (External/internal)	-.020
R	.422
R square	.178
F value	6.108***

***significant at the .001 level ** significant at the .05 level * significant at the 0.1 level

Mediating Effect of Extent of Scanning, Method of Scanning and Sources of scanning to Decision Quality

Our framework posits that the extent of environmental scanning does not mediate the relationships between contextual factors and the quality of the decision although the mediating variables affect the dependent variable. This is due to that the independent variable must affect mediating variable and the dependent variables in order to hold the mediation effect. Table 5 to 8 depicts the result of mediating effect. Therefore, the level of decision complexity either task or situation does not influence the amount, method and sources of scanning. Furthermore, it will not also influence the decision made.

Table 5: Hierarchical Regression : Mediating Of Extent Of Scanning

Independent variables	DECISION QUALITY				
	<i>Unstandardized Beta</i>		<i>R square</i>	<i>R square change</i>	<i>Effect</i>
	Step 1	Step 2			
Decision task Extent	.018	.008 .350***	.001 .141***	.139	No effect
Decision situation Extent	.127	.140 .355***	.014 .158***	.143	No effect

***significant at the .001 level ** significant at the .05 level * significant at the 0.1 level

Table 6: Hierarchical Regression : Mediating of method of scanning

Independent variables	DECISION QUALITY				
	<i>Unstandardized Beta</i>		<i>R square</i>	<i>R square change</i>	<i>Effect</i>
	Step 1	Step 2			
Decision task Method	.018	.017 .339***	.001 .090***	.089	No effect
Decision situation Method	.127	.151 .352***	.014 .109***	.095	No effect

***significant at the .001 level ** significant at the .05 level * significant at the 0.1 level

Table 7: Hierarchical Regression : Mediating of Source Of Scanning (Personal/Impersonal)

Independent /mediating variables	DECISION QUALITY				
	<i>Unstandardized Beta</i>		<i>R square</i>	<i>R square change</i>	<i>Effect</i>
	Step 1	Step 2			
Decision task Source (P/IP)	.018	.011 -.213**	.001 .039**	.038	No effect
Decision situation Source (P/IP)	.127	.126 .214***	.014 .053***	.039	No effect

***significant at the .001 level ** significant at the .05 level * significant at the 0.1 level

Table 8: Hierarchical Regression : Mediating of Sources Of Scanning (External/Internal)

Independent/mediating variables	DECISION QUALITY				
	<i>Unstandardized Beta</i>		<i>R square</i>	<i>R square change</i>	<i>Effect</i>
	Step 1	Step 2			
Decision task Source (E/I)	.018	.019 -.150	.001 .019	.018	No effect
Decision situation Source (E/I)	.127	.115 .138	.014 .029	.015	No effect

***significant at the .001 level ** significant at the .05 level * significant at the 0.1 level

Moderating Effect of Extent of Scanning, Method of Scanning and Sources of scanning and IPC to Decision Quality

To test the moderating effect of information processing capacity on the relationship of environmental scanning and decision quality, model 2 and 3 display the result of hierarchical regression analysis (refer to Table 9). The test for moderating influence to the environmental scanning and quality decision relationship, model 2 upon inclusion of information processing capacity variable is analyzed. The results indicates that the model is highly significant (F-change=9.40; p-value=0.003) and the R square improved by 6.4%. With the inclusion of interaction variables in model 3, R square improved only 0.05%, which indicates that the moderating variables have little influence on the relationship between the extent of scanning and the decision quality. Hence, the moderator acts more as a predictor variable with the dependent variable.

The regression coefficient measured by the standardized (β) coefficients indicates that moderating variables was not significant for the interaction variable of IPC with the extent of information scan, method and sources used to decision quality. This indicates that the relationship of extent, method and source with decision quality was not influenced by the inclusion of moderating variable. Thus, IPC was not a moderator but a predictor variable.

Table 9: Hierarchical Regression – Environmental Scanning and Investment Decision

Making Quality

	DECISION QUALITY		
	Model 1	Model 2	Model 3
Model Variable			
Extent of scanning	.264***	.178*	-.121
Method of scanning	.172	.072	.407
Source of scanning (P/IP)	-.128	-.065	.427
Source of scanning(E/I)	-.142	-.014	-.871
Moderating variable			
Information Processing Capacity (IPC)		3.068***	.130
Interaction Variable			
IPC_Extent			.423
IPC_ Method			-.520
IPC_Source(P/IP)			-.545
IPC_Source(E/I)			.990
<i>R square</i>	.178	.242	.246
<i>R square change</i>	.178	.064	.005
<i>F value</i>	6.108***	7.132***	3.923***
<i>F change</i>	6.108***	9.410***	.174

DISCUSSION AND CONCLUSION

The data of the present study found that there are significant and positive relationships between environmental scanning and investment decision quality. What this means is that the more scanning is done in making the decisions, the better is the decision made. However, the analysis suggests that this is only true for amount of scanning done and not for method and source of scanning when measured simultaneously (i.e multiple regression). However, when tested the mediating effect of each variables, all the variables are significant except for sources (external vs. internal) of scanning; Three possible reasons why this happened is that; firstly the IV itself has little variation (SD small) therefore statistically it is impossible for it to explain why the DV varies from unit to unit; may be due to unit are similar with the IV in the sample questions; Secondly, if the particular (insignificant IV) is significantly correlated with another IV (that is significant); in multiple regression, once one variable is significant; the significance of another IV is evaluated on the additional predictive power that the new IV brings to the relationship; This situation can be seen by correlation between X1 and X2; in other words the effect of X2 on Y is subsumed (captured) within X1; much like mediating. Third possible reason is that the relationship between the IV with Y is non-linear (suggesting) that the impact of the IV on Y may be moderated by some other variable i.e. effect of the IV on Y may be contingent on some other factors.

Results of the moderated regression analyses provide no support for hypothesis concerning the environmental scanning behavior, information processing capacity and investment decision quality. IPC was found to act as predictor variables and not moderating variables. This means that IPC does not enhance decision quality, but act as an influential factor for high quality

decision. The reasons for this scenario as explained by many researchers (e.g. Fahey and King, 1977) are due to two reasons. One is either the information is very complex to process or the information is common knowledge and therefore cannot be used to differentiate between low and high quality decisions. In both these situations, the need for IPC is minimal. The second reason is the information may not be relevant to the business decisions involved; therefore having the capacity to process the information (high IPC) will not make an impact on turning data into information. Thirdly, majority of the investment related to the capital acquisition, this explains that decision maker needs to focus on internal information and not too rely too much on external information, which may be irrelevant to non fundamentals or may be rumors. This is supported with the decision objectives, which demonstrated on internal operational strengths such as improving quality product, profitability, and cost efficiency. Fourthly, as the size of investment is more at the lower end, this may affect the sources and methods used in scanning. The reason is the investment, which is not significant in amount, may not affect the higher level managers scanning behaviour. Since the decisions are more on internal operations, the used of external information from scanning will not help them a lot as they supposedly rely on the internal information. The nonexistence impact on scanning behaviour among CEOs are due to their uncertainty about the cause and effect relationships which exist between environmental effect and firm performance(Olsen, Murthy & Teare, 1994).

In addition to all the plausible reasons being mentioned, the insignificant results could also be attributed to a number of influential factors as well. Among the factors that may influence the level of decision quality are the differential natures of the organizational culture, structure, leadership style, and business sector or operation of the organizations involved in the study.

Different organizational culture leads to different requirement of information and learning about

different things (Thompson & Wildavsky, 1986). Organizational culture affects managers' perceptions and managers may suppress their personal opinion as they have to accept favorably views of firms' leaders (Wang & Chan, 1995). Thus, whether the scanning is done or undone, the views from the superiors will be the final decision. As a result, the scanning effort undertaken serves only as complementary to the final decision. Most probably, these factors could directly or indirectly shape or mold the characteristics of decision; the extent, method, and source of environmental scanning; and also the information processing capacity of a decision maker. Since quality of decision is rather subjective in nature, then the way it is being measured may not be similar. Therefore, further studies should be carried out by taking into consideration the influential capacity of these factors and other potential factors on decision quality.

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