CHAPTER 2

THEORETICAL FRAMEWORK AND RESEARCH HYPOTHESES

This chapter presents a brief summary of literature review relevant to the current study. It draws on the existing literature on the SIDs to highlight the gaps in research literature from which the research objectives and questions presented in Chapter 1 were drawn. Several studies on SID had been undertaken both in India and aboard, the various key areas drawn from prior studies are presented here. In addition, this chapter was formulated the research hypotheses and proposed a research model to be tested in this study.

2.1 CAPITAL BUDGETING DECISION (CBD)

The term “Investment” refers to the commitment of resources made in the financial and physical assets, with the expectation of benefits that may occur in future course of time (Bierman and Smidt, 2007). Investments can be made for short term and long term duration/horizon. Short-term investments refer to an outlay of funds that is expected to produce benefits within a year. On the other hand, long term investments refer to the outlay of funds that is expected to produce benefits over a period of time i.e. more than a year (Gitman, 2005; Gilbert, 2003). Both are equally important in achieving the goal of a firm. However the scope of this study is concerned with long term investments. Identifying and choosing the long term investment alternatives with satisfactory cash flows and rate of return is a challenging task faced by the decision makers. To overcome these challenges, a company needs to have
a set of sound procedures to evaluate, compare and select the best one. This process is called capital budgeting. Hence, it is defined “as the process of evaluating and selecting long-term investment projects that achieve the goal of maximizing owners' wealth” (Gitman, 2005). Similarly Niels Hermes et al (2005) defines Capital budgeting “as refers to the process of determining which investment projects result in maximisation of shareholder value”.

Capital budgeting decisions may be tactical or strategic. Generally tactical investment decisions involve a relatively small amount of funds (Bierman and Smidt, 2007) and implementation of current strategy as efficiently or as profitably as possible (Chandra, 2007). In contrast, Strategic Investment Decisions (SIDs) involve large sum of money and has a significant impact on the direction of the firm (Chandra, 2006). Therefore, SID is one among the most critical as well as important of all management decisions (Smith 1994; Klammer et al 1991; Toit and Pienaar, 2005) and the same has been emphasised by various authors by way of defining SIDs as follows:

SIDs are referred that those have a long-term and wide range impact on the firm’s performance and they could be critical to the firm’s success or failure (Brown and Solomon 1993).

SIDs have implications for many aspects of operations and often exert a crucial impact on survival, profitability and growth of a company (Northcott 1995)

Strategic Investment Decisions are referred to as those decisions that entail the organisations comprehensive long-range financial perspective, grounded upon its mission and strategic objectives (Kooros and Mcmanis 1998).
SID making involves the process of identifying, evaluating, and selecting among projects that are likely to have a big impact on a company’s competitive advantage (Adler 2000).

SIDs are usually outsized, risky, and hard-to-reverse, with significant long term consequences on firm’s performance (Papadakis and Barwise 2002).

SIDs are substantial investments that involve high levels of risk, produce hard-to-quantify (or intangibles) outcomes, and have a significant long term impact on corporate performance (Alkaraan and Northcott 2006).

Taking into consideration of all the above discussed definitions, this study defines SID as: “those decisions that determine the overall direction of an organisation in terms of viability, profitability and its sustainability over the life span of SIDs. Moreover, those decisions have the distinguishing features of novelty, complexity, irreversibility and the commitment of huge amount of resources”.

The following section discusses the process of such important decisions with the help of the extant literature.

2.2 STRATEGIC INVESTMENT DECISION-MAKING PROCESS

In capital budgeting literature, capital budgeting decision making process can be bifurcated into two categories namely normative approach and process approach. Normative approach represents traditional capital budgeting theory. The main emphasis is generally given on the financial evaluation and selection of proposed investments in long-term assets. In contrast to the normative approach, the process approach has a broader perspective and tries to explain and describe the whole process by which projects become
identified, developed, justified and finally approved (Helen Axesson et al 2003).

In the following sections an introduction to the process oriented view is discussed and presented along with a summary of previous research findings. Though numerous models of the investment process have been developed, there have been variations among such models. However they tend to share some similar characteristics. Majority of them describe the investments process as an orderly process consisting of a number of distinct stages or components. Even though such models are simplifications of the overlapping and interactive activities, they serve as a rough description of reality. A comprehensive description of these activities will be presented in this section. King offered a view which placed investment appraisal within the strategic decision (SD) making process. The process described by King (1975) was based on his analysis of a case involving the addition of extra capacity in the chemicals division of a diversified group. His process model therefore has an empirical basis. He depicted the process as a sequence of six stages:

1. Triggering (recognition of opportunities)
2. Screening (should the opportunity be pursued?)
3. Definition (what form should the project take? and is it strategically acceptable?)
4. Evaluation (search for information and financial analysis)
5. Transmission (build up commitment)
6. Decision (final check on the worth of the project and formalisation of commitment)
This was the first attempt to recognise investment appraisal in the organisational context of the enterprise. Cooper et al (1990) portrayed the capital budgeting process into four stages viz., Project definition and cash flow estimation, Project analysis and project selection, Project implementation, and Project review. The results of their study indicate that the largest number of respondents believe that project definition and cash flow estimation is the most important stage of the capital budgeting process. The first stage is considered as the most important one because of the difficulty and importance of defining the project and estimating cash flows. These results confirm with the findings of the studies carried out by Fremgen (1971) and the Gitman and Forrester (1977) which opined that majority of the firms perceived project definition and cash flow estimation as the most important and difficult stage. Don Dayananda et al (2002) incorporates eleven elements in the strategic decision making process, which is also shown in diagrammatic form, with feedback loops. Most textbooks mention the establishment of strategic and financial long term investment goals as the first stage in the investment process, which should serve as a guide for managerial decisions.

Capital budgeting decisions must be related to the firm’s overall strategic planning because either excessive investments or inadequate investments will have serious consequences for the future of the firm. Capital budgeting inherently requires a commitment into the future (Copeland and Weston 1992). Hence DMs consider strategic planning as the second stage of capital budgeting process. The loop process was the same as described by Pike and Neale (1996). Nevertheless, this represents one of the first attempts to recognise qualitative factors, judgements, and gut feelings in the organisational context of the enterprise, Pike and Neale (1996) depicted a simple capital budgeting system as a five stage process:
1. Determination of the budget
2. Search and development
3. Evaluation
4. Authorization
5. Monitoring and control

Maccarrone (1996) described how most studies in capital budgeting were based on financial theory. As a result of managers’ complexity, and low receptivity of the organizational context, the development of very sophisticated analytical techniques has gained much popularity among managers. Moreover, the process by which an investment proposal is analysed, evaluated and approved, is often viewed as independent from those relating to other investments, as well as from the other procedures and systems of the firm. He developed a conceptual framework for organizing the whole capital budgeting process, starting from the identification of investment proposals to the formal approval of a set of projects.

Emphasis is given to the problem of integrating and co-coordinating capital investment activities and creating important linkages with the strategic planning process. The model is structured according to the principles of contingency theory. The process configuration depends on a set of exogenous variables which influence the choice of analytical tools and organizational patterns. The model serves as a reference framework for analysing the capital budgeting process of eight multinational companies headquartered in Italy. This analysis leads to some interesting findings about the attitude of managers towards some aspects of capital budgeting. The central question is whether there is a relationship between the characteristics of SID making process and the performance of the company. Papadakis (1998) identified that the performance of an organisation is strongly related to more
rational decision making process, more financial reporting activities, and so on. Also the process is strongly related to the long term performance than short term performance. In contrast to the process approach, normative approach give emphasis on the techniques which can be subdivided into three categories namely evaluation methods, risk analysis techniques and management science techniques. In the following section, the commonly used methods are presented along with the summary of various previous research findings.

2.3 EVALUATION METHODS

Several techniques are available to assess the potential capital budgeting projects in the corporate world. There are five most commonly cited capital budgeting techniques that are used by the DMs while evaluating an investment project. The Net Present Value (NPV) and Internal Rate of Return (IRR), and profitability index methods incorporate the concept of discounting cash flows (DCF) that are considered to be discounted cash flow (DCF) methods.

The Payback Period (PB) and Accounting Rate of Return (ARR) methods are so-called non-DCF methods (Freeman and Hobbes 1991). From a pure theoretical point of view, the NPV method is considered to be the most accurate technique to evaluate projects. Yet, it is also the most sophisticated of the five, followed by the IRR and PI methods (Niels Hermes 2000). Both non-DCF methods are considered to be less accurate, of which the PB method is the least sophisticated (Haka et al 1985). Further, some other techniques are also used by the business community namely Return on Investment (ROI), Residual Income (RI), adjusted NPV, discounted payback period and so on. In order to achieve the competitive advantage, there is a need to make sound SIDs. For this, one may use several techniques for making such a decision. This may be classified into two categories. The above mentioned techniques (DCF, Non DCF, and others) are considered as old/traditional techniques and
have been criticised on a number of grounds (Adler 2000). Some of the criticisms are too-narrow perspective (i.e. viewed as sole perspective of investment department), exclusion of non-financial benefits, over-emphasis on the short term, faulty assumptions about the status quo, inconsistent treatment of inflation, and promotion of non-value adding behaviour (Ibid).

These shortcomings associated with traditional investment appraisal techniques demanded some other techniques by DMs. The new evaluation methods came to existence are strategic cost management, the multi-attribute decision model, value analysis, the analytical hierarchy method, the R&D method, and the uncertainty method. Similarly, Kooros and Mcmanis (1998) developed a multi-attribute optimization model for SIDs. He advances a methodology for optimizing inter-temporal investment decisions through a consensus-oriented process. This process entails identifying the strategic investment factors, their relative importance, and their assumed values relevant to the timing of each investment program. He also provides a methodology for determining the system's priority formulation as the model’s objective function. This information generates an optimization matrix designated by investment programs and time. This matrix is then optimized through a hierarchical goal-programming model that maximizes overall strategic investment decisions. The model was applied in a major capital investment program in the state of New York.

**Trends in the usage of Evaluation techniques in CB:** Quite a number of researches have been done to look into the investment appraisal techniques being practiced and its level of popularity among the corporate community. With the researcher's limited knowledge, the study could not find any studies related to new age evaluation models and multi-attribute optimisation model which have emerged recently in the literature. Hence this study focused on the popularity of the traditional appraisal techniques among

Major finding of these studies is that larger firms tend to make more extensive use of DCF techniques than smaller firms. These surveys, which have focused on methods of evaluating project’s profitability and risk, have shown that the sophistication of the analytical techniques used by the Executives has increased over time. DCF techniques, such as NPV and IRR, have become the dominant method of evaluating and ranking proposed capital investments. But vast majority of these surveys usually asked the respondents to rank different techniques (or categories of techniques) as primary and secondary and reported the results with percentages, not with statistical comparison. Very few studies had performed statistical comparison i.e. analysis (for example, Klammer et al 1991, Shimin Chen 1995, Manoj Anand 2002). Further, it is widely criticized that all these studies documented on the ‘what’ and not enough on the ‘why’ of capital budgeting practices (Mukherjee
1987). In particular, the extant literature reflects two shortcomings. First, very few studies have examined the circumstances in which the use of DCF methods may or may not be beneficial. Second, all these studies focused on the quantitative financial measures.

Shimin Chen (2008) made an attempt to address these two shortcomings. Also he examined the association between the product standardisation, firm strategy and the use of DCF and non-financial measures. In today’s dynamic business environment, Non-financial measures have an impact on the long term performance of a company. Therefore, it is important to identify all the non-financial measures and evaluate them in a meaningful way. Most of the DMs may leave the financial appraisal calculations while using traditional methods as it is very difficult to measure some of the non-financial measures which cannot be easily valued in financial terms. There is no scientific method or real attempt for measuring or quantifying non-financial measures in financial terms. It is better to estimate and include these in the evaluation process instead of leaving all the non-financial measures (Abdel-Kader and Dugdale 1998, Zakari and Osemy 1999). Over the years, many studies have documented a trend towards increasing usage of such sophisticated CB techniques. Taking it as a base, the academic community has tried to convince corporate managers that there are sophisticated techniques that can improve the capital budgeting decision-making outcomes (Farragher et al 2001). However, there is no clear evidence whether better performing companies are more likely to employ sophisticated capital budgeting processes than the lower performing companies. Until recently, very limited attempts have been made to determine whether there is any relationship between the usage of these sophisticated techniques and corporate performance (Klammer 1972, Kim and Farragher 1982, Pike 1984, 1988, 1989, Haka et al 1985, Patricia et al 1997, Papakadis 1998, Macmillan 2000, Farragher et al 2001, Helen Axelsson et al 2003). The research findings are somewhat mixed and
inconclusive. When the DCF methods employ the use of a risk adjusted discount rate to account for exploration of risk, it suffers from the following deficiencies (Walls 1995):

- Inappropriate separation between risk discounting and time value discounting.
- Inconsistencies with respect to risk and valuation for projects having different duration.
- Use of arbitrary methodologies for determining the risk-adjusted discount rate.
- No guidance on limiting the project's downside exposure.

In addition, the superiority of the sophisticated (IRR and NPV) techniques is demonstrated under the conditions of certainty. Whereas uncertainty about future cash flows arises due to change in the management’s expectations over time, arrival of new information, exist in practice which has resulted in the development of various risk analysis techniques (Klammer et al 1991, Dastgir 2005). The next section covers the risk analysis methods in detail.

2.4 RISK ANALYSIS IN SIDs

Although all the Companies are using more sophisticated evaluation techniques, they are neglecting to consider risk (Blazouske et al 1988). It is important to consider risk while evaluating the investment proposals, because risk is an inherent element of virtually every SIDs. In this section, uncertainty, risk, risk analysis, risk variables, measures of risk are defined with the help of relevant literature. In addition, trends in the use of risk analysis techniques in CB are discussed. “Risk” and “uncertainty” are two basic terms used in any
decision-making framework. These terms are used interchangeably. However there is a small difference between these two. Risk can be defined as an imperfect knowledge where the probabilities of the possible outcomes are known, and uncertainty exists when the probabilities of the possible outcomes are not known (Hardaker et al 1997). There is a possibility that the actual happenings differ from the expected happenings. This possibility of variation is known as uncertainty Thus, Risk is defined as “a situation where the possibility of occurrence and non-occurrence of an event can be quantified and measured” (Rustagi 2003). Risk analysis is not a substitute for normal investment appraisal methodology, but rather a tool that enhances its results.

2.4.1 Levels of RA

As discussed above, risk is inherent in all the decisions. While looking at the risk of a decision, it is necessary to have a broader perspective. It is because of the following reasons:

- The impact of one project may have influence on other projects
- The DM has to consider the non-financial influences of a project, which may have impact of the project
- Acceptance or rejection of a project influences the shareholders wealth or not?
- The DM has to account for the dependencies as well as relationship of other projects with the project in hand.

It is essential to account the above listed aspects while making SIDs. Considering the number of aspects while making SIDs varies from one organization to other organization which is due to the firm’s belongs to different business and financial risk. This study has identified five objective
measures namely standard deviation of the return on capital employed as a composite measure of market, technological, environmental and other volatility sources; coefficient of variations of the firm’s sales, firm’s beta value as a general economic climate in which a firm operates; firm size and leverage which influence on the level of RA. All these five measures were used by Ho and Pike (1998) and Shao and Shao (1996) and their study found that these variables have influence on the level of risk analysis.

**Sales volatility (SV):** Business risk refers to the volatility in the earnings of a firm over time. Sales volatility is one among the important measures of business risk. Sales of a company is affected by various factors namely, industry wide trends, general economic climate of a country, and seasonal variations in which a company operates. In order to measure the volatility of sales, this study has used the coefficient of variation (CV) of sales. Higher CV indicates that the sales of a firm are more fluctuating or conversely less consistent, less stable or less uniform. On the other hand, lower CV indicates that the sales of a firm is less fluctuating, more consistent, more stable or more homogenous. Depending on the EU, DM tends to use risk analysis accordingly. Therefore, it is expected that:

**H 1 :** Higher the sales volatility, higher is the level of RA in SIDs

**Performance Volatility (PV):** This is another important measure of business risk. This measure is the composite measure of market, technological changes, and other volatility sources. The level of CV of Return on Capital Employed (ROCE) shows the environment in which the firm operates. The level of performance depends on the tools employed in making SIDs since there exists the relationship between sophisticated techniques and performance. Therefore if the CV of ROCE is higher, then the firm tend to use risk analysis more extensively. It is expected that:
$H_2$ : Higher the performance volatility, higher is the level of RA in SIDs

**Beta Value:** Beta is a measure of volatility, or systematic risk, of a security in comparison to the market as a whole. Systematic risk is attributable to general economic wide factors like inflation, changes in interest rate, and changes in purchasing power, credit policy, and fiscal policy, growth rate of GDP, recessions, wars and so forth. A company cannot eliminate or avoid these risks, because they affect all the companies’ securities. All the securities available to an investor do not have the same level of systematic risk. The factors contributing to systematic risk do not affect all the securities in the same way. It depends on the sensitivity of the security to the market fluctuations. This can be measured by Beta ($\beta$). It can be viewed as an index of the degree of the responsiveness of the security’s returns with the market fluctuations. It is important to understand the level of systematic risk before making SIDs. Therefore, it is expected that:

$H_3$ : Higher the beta value, higher is the level of RA in SIDs

**Firm Size:** There is a potential relationship between firm size and firm performance, because large firm possess favourable competitive positions over the small firm due to availability of capital and hence their ability to invest in profitable large-scale projects. While discovering the existence of potential relationship between the performance and firm size, many authors used firm size as an important variable in their studies (for example, Farragher et al 2001, Pike 1984, Papadakis and Barwise 2002, Shao and Shao 1996) and discovered a significant positive relationship between them. Considering this argument i.e. size of the firm influences its performance, a potential relationship between size and capital budgeting sophistication cannot be ignored. It is due to the following reasons:
a. Typically large firms are more likely to have full time staff members for making SIDs, and

b. Large firms have the ability to make considerable investments such as expansion, diversification and so forth which requires the use of more sophisticated techniques.

The relationship between firm size and capital budgeting decisions have been empirically tested in a few studies (for example, Ho and Pike 1991, 1992 and 1998, Pike 1984, Helan Axelsson 2003, Klammer et al 1991). Firm size has a relationship with the extent of usage of risk analysis (Klammer et al 1991), because larger firms tend to use more RA than the smaller ones as the larger firms are more likely to have the available resources (Ho and Pike 1998). From the above discussions, firm size is an important determinant of the RA in SIDs. Therefore, it is expected that:

H4 : Larger the firm size, higher is the level of RA in SIDs

H5 : There would be a significant association between the firm size and the aspects to be considered in RA in SIDs

Leverage: As discussed above, any SIDs need substantial amount of capital which results in a change in the capital structure of the firm. The leverage indicates the level of financial risk of a firm. The leverage has a potential influence on the managerial compensation (Agarwal and Mandelker 1987). This, in turn, affects the extent of usage of sophisticated techniques such as RA while making SIDs. Leverage has been studied frequently in the capital budgeting literature (for example, Helen Axelsson et al 2003, Ho and Pike 1998, Shimin Chen 1995, Agarwal and Mandelker 1987, Shao and Shao 1996). These studies found that companies with higher level of leverage tend to use more of sophisticated techniques than the firms with lower level of leverages. Therefore, this has the following hypothesis:
2.4.2 Risk Adjusted Methods

It is a widely accepted fact that DMs expect returns from their investments to compensate the risk they bear for such investments. Financial theorists suggest that DMs should understand the risk involved in SIDs in a broader perspective in order to employ the techniques to adjust the same. There are some techniques namely shortening the payback period, certainty equivalent approach, raising discount rate, adjusting the cash flows and so forth (Ho and Pike 1991, Shao and Shao 1996) which depends on the risk level of projects and preference of the DMs. Ho and Pike (1991) found that almost all the companies employ some formal methods to adjust for risk. Further, among the formal methods, raising discount rates was used very frequently and closely followed by shortening payback period. These findings were quite in contrast to the earlier studies of Shao and Shao (1996). On the whole, raising discount rate and shortening the payback period were used more than other techniques (Ho and Pike 1991). In UK, the raising discount rate was the most favoured technique, while risk adjustment of cash flow was adopted more in US managers (Gitman and Mercurio 1982). This difference in usage of methods to adjust for risk leads to the following hypothesis:

H7: There is a significant difference among the methods used to adjust for risk in SIDs

2.4.3 Trends in the use of Risk Analysis Techniques in CB

In recent years, SIDs under uncertainty i.e. risk analysis have become increasingly important because of unprecedented but fundamental changes in the Indian economic system, deregulation of all major industries,
intensive competition from the global players, and rapid advances of technology and so forth (Blasouske et al 1988). Considerable attention has been devoted to investigate the use of risk analysis techniques in CB. However, very limited studies have been covered in detail. For example, the extent of the usage of these techniques depends on various factors namely industry size, profitability, strategy, environmental factors/focus, reward systems and so on. The following literature summary highlights the need for the current study. There are number of techniques available for analysing investment risk, which may be classified into subjective and formal techniques. Formal techniques include sensitivity analysis (SA), simulation models (SM), probability tree (PT), adjustment of required payback period (ARPP), Adjustment of discount rate (ADR) and so on.

The trends in the use of formal risk analysis techniques in CB are well documented in many countries. In addition, most manufacturing companies use more than one technique for analysing risk in their SIDs. Among the RA techniques, SA technique is the most popular technique, followed by scenario analysis technique. The increasing usage of these techniques is due to the availability of computer software packages which can help in applying these techniques in practice. This was found by Pike (1988 and 1996), Klammer et al (1991), Arnold and Hatzopoulos (2000), Farragher et al 1999, Farragher and Leung 1987, Kester and Chong 1998, Kester et al 1999, Jog and Srivastava 1995, Pandey 1989, Manoj Anand 2002, Ashish Kumar and Bhavin Shah 2006, Zaki Osemy 2001, for example. According to the results of the survey conducted by Pike, 88 per cent of large companies in UK used SA while it is 85 per cent as per the survey conducted by Arnold and Hatzopoulos, Klammer and Wilner surveys showed that 57 per cent of companies operating USA used SA. Jog and Srivastava survey reported that 60 per cent of the companies operating in Canada used SA; Kester et al , Kester and Chong opined that almost all the companies operating in Asia Pacific regions and Singapore used SA techniques.
In India, Pandey (1989) opined that the sensitivity and conservative forecasts are two equally important and widely used methods of handling investment risk, also Manoj Anand (2002) stated similar findings in his survey (90.10 per cent of the respondents used sensitivity analysis, 61.60 per cent of the respondents employed scenario analysis and 31 per cent of the respondents used risk adjusted discount rate while assessing the project risk). Similarly Ashish Kumar and Bhavin shah (2006) found similar findings in the Indian chemical industry. In addition, these surveys revealed that companies do not normally rely on any single technique, but prefer to use a combination of these techniques. According to Manoj Anand’s surveys there has been an increase in the use of risk analysis techniques (see also, Pike 1988,1996). Though the DM often rely more on formal risk analysis, when uncertainty increases, they tend to rely on judgement and past experience at greater extent. It is due to the facts that the formal analysis needs more information to quantify the possible outcomes (Courtney et al 1997 and Alessandri 2003), the managers are unfamiliar with risk analysis and lack of staff, time, and experience for carrying formal analysis (Lazaridis 2004). Further, Cooper et al (1990) stated that companies do not use risk analysis in their formal analysis, but, they evaluate risk subjectively. Similarly Tood et al (2004) identified a qualitative approach to evaluate capital investment projects as useful methods, because DMs make decisions, which involve high levels of uncertainty.

The above discussion suggests a substitution effect (a negative relationship) between the two methods of risk analysis. When DMs have all relevant information, then it leads to less reliance on subjective methods of risk analysis. In contrast, subjective methods are likely to become increasingly important in situations where uncertainty is high; as a result, DMs are unable to get all relevant information. These discussions are presented in the following statement of hypotheses:
H 8 : Formal risk analysis methods are used more extensively than the subjective methods in SIDs

H 9 : There would be an inverse relationship between the formal and subjective risk analysis methods.

The above stated review of literature suggests the importance of both subjective and formal risk handling practices. These studies have also reported about the risk handling practices and its related problems as part of broad based surveys. But very limited studies have examined the extent of the use of these techniques and its relationship with contingency and agency theory. For example, Ho and Pike (1998) examined the influence of a number of key firm characteristics on the extent of the use of risk analysis in CB. This study identifies a list of organisational and individuals i.e., DMs characteristics based on the theoretical framework of contingency and agency theory and prior studies in the CB literature which is discussed in the subsequent sections in detail.

2.5 ORGANISATIONAL CHARACTERISTICS (OC)

The study identifies five variables as part of the OC with help of the theoretical framework outlined by contingency and agency theory and prior research findings. Out of these, two variables (Business strategy and environmental uncertainty) represent the perspective of contingency theory. The next two variables namely rewards and control structure and financial variables represent the perspective of agency theory (Both the variables are complementary to each other). In order to build a model this study grouped all the five variables into one head i.e. (OC) which is given below:

- Business strategy (BS)
- Information System (IS)
- Reward and control structure (RCS)
- Environmental Uncertainty (EU)
- Performance of a Company (PC)

This section provides the theoretical bases for these variables, which in turn, formulate the hypotheses. In order to test the relationship between the OC and the extent of the usage of risk analysis, this study proposes the following hypothesis:

**H 10**: There is a positive relationship between OC and the extent of the usage of RA in SIDs

### 2.5.1 Business Strategy (BS)

The fundamental objective of any business is to create wealth i.e. benefits for their stakeholders. Every organisation has a vision/mission, which defines the scope and extent of those benefits. However vision/mission alone does not create benefits, the same should be implemented on time. The projects i.e. SIDs are one among the most important alternative means to deliver the capability of the company which will help them to achieve the required benefits. Defining the vision/mission and business benefits is the realm of strategy (David Hillion 2006). Each company follows a strategy in its efforts to achieve the goal. Strategies spell the fundamental steps to be followed by a company and give directions in its process of effective and efficient resource allocation. Each company can have a single or multiple strategies and it may be adopted at three different levels viz., corporate level, business level, and functional level. This study focuses on the strategies followed by automotive companies at the business unit level or in short the business strategy level.
Most researches on business strategy have sought to validate and test one of the two schools of thought viz. typologies developed by Porter’s (1980) differentiation and low cost strategies and Miles –Snow’s (1978) typology of Prospectors, analysers, and defenders. Though all the companies are not alike, they face three fundamental problems viz. Entrepreneurial (managing its market share), engineering or operational (finding and implement the solution to the entrepreneurial problems), and administrative problems (formulating the structure to manage the implementation of the solutions to the first two problems). Companies choose different ways to address these problems i.e. strategy. There is a possibility that many companies develop similar solutions. As a result, Miles and snow (1978) suggested that organisations could be grouped into any one of the four types mentioned above.

Prospectors refer to firms that are externally oriented i.e. they are very keen in exploiting new product and market opportunities. They are the pioneers in new product develop with a focus on innovation and creators of change in an industry since they monitor the external environment constantly and developing alternative responses according to emerging trends (Thomas and Ramaswamy 1996). They have a flexible administrative structure (Smith et al 1989) and have complex coordination and communication mechanisms which rely on decentralized decision-making which in turn makes them ever ready to seize the opportunities (Hambrick 1983). In contrast, defenders refer to firms that are internally oriented. Generally, they use narrow –product domain which has a focus on improving operational efficiency. They have a stable administrative structure (Smith et al 1989) and rely on centralized decision making. They use vertical integration to control costs as its technology is inflexible. Comparatively they devote valuable time in controlling costs than other type of firms (Hambrick 1983).
Analyzers refer to the firms that are hybrid in nature i.e. those firms exhibit some features of the prospector and some of the defender firms (Thomas and Ramaswamy 1994). They have multiple products, but they adopt both stable and flexible technology with matrix or product-oriented organisation structures. They penetrate more deeply into the market they serve and adopt new products only after thorough analysis and proven potential (Conant et al 1990). Depending on the strategy adopted, a company may give emphasis to one or more of the following aspects such as technological position, innovation, organisational design, and so on. These aspects largely determine the firm’s efficiency in operations and its (performance) accomplishment of objectives (Slater and Narver 1993).


Contrary to the above findings, Smith et al (1989) found that the four strategies resulted in significant differences among firms’ performance on all measures. Parnell and Wright (1993) showed that for a single industry,
prospectors outperformed other strategists in terms of sales growth, but analyzers performed better in terms of return on assets. Therefore, it is clear from the above discussion that previous empirical researches have not arrived at a consensus with regards to the definite relationship between business strategies and performance or which strategies are best. However, a few studies examined that the influence of some variables such as technology, firm size and environment on the strength of the above said relationship i.e. strategy-performance relationship.

Lina anatan (2006) found that hard technology moderates the relationship between manufacturing strategy and operational performance, as a quase moderator variable. Conversely, soft technology has an impact on the manufacturing strategy-performance relationship as an independent predictor variable, but it doesn’t moderate the relationship between manufacturing strategy and operational performance. Prescott (1986) demonstrated that environments, as measured by characteristics of market structures, moderate the strength but not the form of relationship between strategy variables and performance. Hofer (1975) and Simth et al (1989) found that firm size explain differences in the relationship between strategy and performance. Further, Since 1990s, the accelerated speed of globalisation of economic activities and global competition has made it impossible for automotive industry to make decisions without incorporating risk analysis in their SIDs. The extent of risk analysis in SIDs varies from one organisation to the other due to several reasons, predominant among them being its types of strategy.

Prospectors are primarily concerned about various subjects, such as how can they gain the competitive advantage, how to identify and avail the opportunities in markets, which products or services to be introduced to serve the lucrative markets, so on and so forth. Answers to all these questions demand careful analysis i.e. Risk analysis. In contrast, defenders are concerned about various subjects, like improving operational efficiency, controlling costs.
The extent of RA carried out by defenders is low while comparing with that of the Prospectors firms. Analyzers are hybrid in the nature of the above. This difference leads to the following hypothesis:

**H11**: Prospectors use risk analysis more extensively than defenders.

**H12**: The extent of usage of RA in SIDs varies with the types of business strategy adopted by the company.

### 2.5.2 Information System (IS)

As noted earlier, the estimation of cash flows is the important, but also the most difficult step in the SID making process as it is the base in deciding whether the project should be undertaken or not. Therefore, DMs need substantial amount of internal information to make sound SIDs (Asaari and Razak 2007, Ho and Pike 1996). Information is required not only to estimate the cash flows accurately and objectively, but also to employ sophisticated techniques such as risk analysis. The required information for RA depends on the decision phase (Larcker 1981) and demographic characteristics of DMs such as education, experience, age, gender and so forth (Bhimani et al 2007). The estimation of cost and benefits may be made on the basis of input data being provided by experts in production, marketing, accounting and other departments (Chandra, 2007). Therefore, it is important to design a system which provides all the relevant information to the DMs; it is called as information system (IS).

Baxter and Hirst (1993) explored the choices process (viz. Bounded rationality, standard operating procedures, political, and artifactual) and the role of information (instrumental, strategic, and symbolic) in capital budgeting. Management Information System, Accounting Information System (AIS), and Decision Support System (DSS) are sub parts of information system.
system. AIS provides the information and models that are useful to forecast the future cash flows, to assess the risks associated with these cash flows, and to assess the non-quantifiable uncertainties associated with the estimation of cash flows (Accola 1994). The responsibility of the Management Accountant is to design an organisation’s internal informational system (IIS) or management accounting system (MAS) such that it supports the managerial decision making process (Larcker 1981).

Consider, for example the work of Larcker (1981), who investigated the information preference of senior executives in the SID making process on three dimensions namely focus, quantification, and time horizon. He concluded that the information preference among the executives are similar and vary with decision phase. Whereas Chenhall et al (2007) grouped these three dimensions into one head namely scope. In addition to this, they added some more dimensions namely timeliness, aggregation, and integration. They examined the effect of structure, environment, and interdependence on these information characteristics. In addition, Bhimani et al (2007) considered the financial executives’ preference in deployment of qualitative and numerical information with reference to SIDs across different countries. Another important part of IS is DSS that use decision rules, models, a comprehensive database and the DM’s own insights in an interactive computer based process to assist in making SIDs (Ho and Pike 1996). DSS helps the DMs to make decision quickly (Dastgir 2005).

Consider for example of Ho and Pike’s work (1996), which explored the barrier and problems encountered in the use of probabilistic risk analysis in SIDs. Accola et al (1995) identified the task factors, context factors, and decision maker factors which influence perceived risk in CBDs. The central issue studied by them is that whether some context and DM factors can be included in a CB decision support system’s knowledge systems and whether a DSS can adapt its choice models and interface to different decision
making situations. Similarly Dastgir (2005) concentrated on two important real options viz., to wait and to abandon using DSS. No matter whether using AIS, DSS, or MIS, the DMs need information to make sound SIDs. The IS should provide the required information to employ the sophisticated risk analysis tools in SIDs.

Typically, the organisation’s information system consists of ex-post, financial, and internal information. This is not enough to employ risk analysis techniques while making SIDs. In addition, DM needs the information that are ex-ante (projected cash flows and discount rates), external (e.g., reaction of competitors), and non-financial information (e.g. technological changes) (for example, Larcker 1981, Ho and Pike 1998). The organisation should employ suitable (unstructured and reliable) channels to collect such information. Ideally, more information should enable the DMs to estimate more precisely the probabilities on possible outcomes. Conversely, inadequate information may not produce precise estimation /prediction, which in turn, lead to a situation where the DM is unable to make a good decision. Therefore, if the Information System is more supportive to the DM (i.e. collecting and supplying the necessary information for risk analysis), DMs are interested to conduct risk analysis thoroughly. Hence it is hypothesised as:

**H 13**: The more supportive a firm’s information system, the more extensively the firm uses risk analysis in SIDs.

### 2.5.3 Rewards and Control Structure (RCS)

The fundamental goal of a financial manager is to maximize the owners’ wealth. Owners’ hire managers and delegate their authorities to them to do the business on their behalf. Therefore, goal of the manager should be the same as that of the shareholders and hence managers are viewed as agents. The relationship between the shareholders and managers is described as
principal – agent relationship. Agency theory (AT) assumes that the interest of the principal and agent are the same, but in practice, however, this may differ. For example, rather than attending to the owners’ objectives, they may wish to improve their wealth, job security, incentives, luxurious lifestyle, and so on. Keeping their personal objective in mind, they may be reluctant to accept some good proposals or unwilling to take risk, which in turn, affects the return to the shareholders. The difference or conflict between owners’ goal and agents’ goal creates the principal agent problems. AT recognizes the divergent interest of managers and shareholders, and attempts to align the interest of agents with that of the shareholders via compensation schemes (Schotter and Weigelt 1992).

The components of managerial compensation packages are: base pay, incentives and benefits (including perquisites). Incentive may be paid based on their performance in short term or long term period. Bonus is an example for short term incentive which is based on various organizational measures like profits, sales, cost savings, productivity and so forth. Among these, organizational profit is the most common base for arriving at managerial bonus. Measures such as Earning per Share (EPS), Return on Equity (ROE), Return on Capital Employed (ROCE), and Return on Assets (ROA) are used as a criterion for managerial compensation under the short term incentives. The bonus is normally paid in cash. In contrast, long-term incentives are usually deferred. The purpose of long-term incentive is to tie the executive to the long-term success of the organization. The most popular mode of the incentive plan is the grant of stock options.

and Mandelker 1987, Breatty and Zajac 1994, Tosi and Mejia 1994, Chen and Clark 1994, Chen 1995, Bloom and Milkovich 1998, Miller et al 2002, Sunil Dutta 2003). The agents’ behaviour and performance largely depends on the incentive schemes adopted by the company. For example, if the compensation schemes are not correctly structured, DMs are more myopic in their investment decisions (Schotter and Weigelt 1992). Therefore, it is important to design an appropriate reward system, which motivates them to look at the investment decision at broader context and select the best project in order to enhance the performance of a company.

While structuring the compensation schemes, firms not only must consider how to motivate their managers to work hard and make appropriate investment decisions, but firms must also ensure that they retain valuable managerial human capital (Sunil Dutta 2003). Also it is necessary to induce the agents to act in the principal’s interest by way of creating the balance between base pay and incentive pay (Baiman 1990). The use of capital budgeting techniques may be affected by the relationship between the principal and agent. DMs prefer to select the project which gives benefits to them, involve minimum effort and risk, and have short term horizon (Pike 1985), because owners and managers have different preferences concerning the timing of cash flows of investment projects.

Owners are primarily concerned with the net present value of the firm (say two projects with equal net present value, but different payback period). In contrast, DMs are risk averse, favouring safe investments with earlier and quicker returns. It may be due to employment contract (shorter period) or reward system (earning based compensation schemes which motivate to choose the projects which have shorter payback period and larger accounting earnings with the hope of increasing the manager’s near term revenues). Also it is very difficult to capture all the benefits derived from the projects which have long–term payback period. Therefore, they prefer to have
the project which has shorter payback period. It is evident that the agent does not consider the owners’ objective as a priority instead, agent emphasises short payback for the purpose of increasing their own earning-based compensation (Pike 1985, Chen and Clark 1994, Chen 1995).

In contrast, Haka (1987) opined that there is a positive association between the effectiveness of DCF and the use of a long term reward system. Further agency theory expressed that the long term incentives schemes not only establish a mutual interest between the owners and managers, but also influences the managerial practices and investment decision making (Kren and Kerr 1993, Douglas Moses 1987, Schotter and Weigelt 1992). The above discussion shows that DMs are better motivated to do RA when they are appropriately rewarded. In addition, they give accurate estimates if they were properly rewarded for their time and effort through long term incentive schemes. Success of the reward schemes depends on the appraisal system (the evaluation about accuracy and performance of DMs should be based on the post-audit data, because it gives clear assessment). If the incentive schemes are not motivational and reliable, they do not produce fruitful results. Therefore, it is hypothesised as:

**H 14**: The Incentive rewards and control schemes linked to long term performance tend to use risk analysis more extensively than those linked to the short-term performance

**2.5.4 Environmental Uncertainty (EU)**

This is another important variable identified from the contingency theory. This contingency framework suggested that organisations must adapt to their organisational environment in order to survive and prosper. But the present environment in which decisions are made is more complex and consequential than ever before. However, accurate understanding of the
environment helps the DMs to make sound decisions. The decision making environment is defined as the collection of all relevant information, possible alternatives, values and preferences available at the time of decision making (Robert Harris 1998).

An ideal environment has all the relevant and possible information, which are accurate, and has possible and viable alternatives. However, it is impossible to have all the relevant information needed to make a decision with certainty. This indicates that most decisions involve an undeniable amount of uncertainty or risk. In the context of the contingency theory framework, many authors (Rentizeals et al 2007, Carpenter and Fredrickson 2001, Elbanna and Child 2007, Bourgeois et al 1988, Sauner-Leroy 2004, Cohen 2001, Alessandri 2003) considered environment as one of the important contingency factors. Porter (1980), Ho and Pike (1998) described environment as those forces (such as suppliers, customers, competitors, government regulatory agencies, public pressure, capital market and so forth) outside the organization, but over which the organization has little control, and that these forces can potentially affect the outcomes of a decision, in turn, organization’s performance.

Findings of the prior research studies show that the results are mixed. There is a positive relationship between EU and CB sophistication (Pike 1984). Conversely Kim et al (1981) found that there is a negative relationship between the EU and capital budgeting sophistication. From the above discussions, it is clear that there is a relationship between the EU and CB sophistication which indicates that DM has responsibilities to evaluate the environment and his organisation’s position before allocating resources and sometimes to move into and out of an environment. Evaluation of an environment can be done in two ways viz. Objective and perceptual. In order to measure the EU in automotive industry, the present study adopts perceptual measure which was used widely.
PEU refers to “an individual’s perceived inability to predict something accurately”. In other words, PEU occur when DM perceives an organisation’s environment to be unpredictable or inability to understand the future state of the environment (Milliken 1987). In a given situation, it is arguable that DMs may develop diverse perceptions and interpretations when they face the ‘same’ environmental events across the country. Numerous studies (for example, Pleshko 2006, Cohen 2001, Ho and Pike 1998, Pike 1986, Namiki 1989) have used perceptual method in order to measure the environmental uncertainty in various dimensions (such as technology, competition, buyers, suppliers and so forth). From the SIDs context, it is therefore argued that decision making by the DMs have partly resulted from their ‘perception of environment’ during the decision making process. PEU has been especially emphasised in prior studies on and capital budgeting decisions. Therefore it is expected that:

H15: Greater the environmental uncertainty, higher is the level of RA in SIDs

2.5.5 Performance of a Company (PC)

There are a number of studies which investigated the relationship between performance and risk (for example, Bromiley 1991). The past performance of a company is a major determinant of risk behaviour in decision making (Bromiley 1991) and has an influence over the design of the capital budgeting decision process (Pike, 1986). Knowing recent earning performance level helps DMs to understand the present position. This, in turn, helps in making SIDs related to expansion, diversification and so forth. For example, prospect theorists (Kahneman and Tversky 1979) have argued that, under conditions of adversity, failure to meet performance targets will lead to increased change and risk seeking (Bromiley 1991). This risk seeking attitude may reduce employing sophisticated techniques in their SIDs. As long as
performance is at satisfactory level, companies are more likely to continue whatever rules of thumb they had followed in the past while allocating resources (Warren Boeker 1997). In simple words, the techniques employed in the past will be followed in the future when the performance of a company is at satisfactory level. Therefore it is expected that:

**H 16 :** Higher the performance of a company, higher is the level of RA in SIDs

### 2.6 INDIVIDUAL CHARACTERISTICS (IC)

The role of DMs has increased tremendously and their tasks have become complicated, following disastrous changes in recent times in the entire global economic environment. In order to outperform stiff competition, the DM has to set the objectives in such a way that it helps the organisation to achieve its objective of excellence. DM has to therefore focus on value maximisation strategies. As discussed above, standard financial theory offers decision rules to DMs that are designed to maximize the value of the firm using CB procedures. Sound SIDs is one of the major determinants of overall corporate financial performance. The theories of economics and finance presume that DMs are rational which means that DMs consider all the available information and choices in the decision-making process and act to maximise their utility. In contrast, Hambrick and Mason (1984) arguing that complex decisions are largely the result of behavioural factors rather than rational and economic factors.

The processing of information in decision-making process in a particular environment differs from one individual to another which has influence on their decision outcomes. It is because of the DM’s characteristics such as demographics that are closely associated with many cognitive bases, values and perceptions. This line of thought has been consistently supported
by numerous authors. For example, Thomas and Ramaswamy (1994 and 1996) explored the relationship between DM characteristics such as demographics, strategic direction and performance of a company and suggest that matching managers to the requirements of a strategy is a significant component of superior performance. Papadakis and Barwise (2002) found in a straight line that the DM’s characteristics such as demographics and personality have an influence on the SID making. In addition, the Strategic Investment process and its associated methods of financial analysis depend ultimately upon what influences the behaviour of DM in allocating resources among competing investment alternatives in a given context (Pike 1988). This background leads to the following hypothesis:

**H17**: There would be a positive relationship between the IC and the extent of usage of RA in SIDs

### 2.6.1 Select Demographics

Over the last three decades, a major thrust of research on CEO and top Management characteristics in organisational level changes. Demographics such as education, experience, tenure, and functional background are observable characteristics which shape the values and beliefs of DM and the same can be seen as valid proxies for underlying cognitive abilities, values, and expertise which, in turn, substantially impact decision-making and behaviour (Herrmann and Datta 2005). As discussed above, The DM’s characteristics such as demographics and personality traits have an influence over the SID making. In addition, the tools used in such important decisions depend ultimately upon what influences the behaviour of a DM in allocating resources among competing investment alternatives in a given context (Pike 1988). Therefore, it is important to examine the influence of demographics on the RA practices. This study has considered two important variables namely tenure at the current organisation and individuals’ total experience. The
following paragraphs discuss the relationship between select demographics and the extent of usage of RA in SIDs and provide the specific hypotheses examined in this study.

**Tenure at the current Organisation:** Tenure refers to the number of years that the DM had served in the organisation (Thomas and Ramaswamy 1994). Organisational Tenure has been viewed as a key indicator of a manager’s ability to gather and process information (Miller 1991). Anecdotal evidence suggest that the DM who has spent long periods of time in the same organisation are likely to possess relatively restrictive perspective and a limited knowledge base in considering various alternatives while making decisions. Further, Miller (1991) reveals that the DM with longer tenures being associated with a decline in the amount of information gathered and processed (Miller 1991), because, DM with longer tenures, over time, develop a set of habits, establishing routine information sources, and rely on past experiences. They also develop a narrower frame of reference in alternative generation and its evaluation (Finkelstein and Hambric 1996).

SIDs need substantial information which has to be gathered and processed properly. It can be argued that DM with longer tenures is less likely to be enthusiastic in actively seeking information in making sound SIDs. In addition, more restricted knowledge and information base might make them to be less inclined towards making SIDs such as diversification. Moreover, increased risks associated with SIDs are likely to discourage the DM with longer tenure from pursuing such decisions (Herrmann and Datta 2005). This in turn affect employing sophisticated techniques such as RA in making SIDs.

**Total Experience:** Experience refers to the number of years that the DM had served after the formal education. This has been viewed as a key indicator of the DM’s background, since it typically complements and expands on the role played by DMs. The experience with different organisations and
industry has an important impact on the cognitive orientation of DMs. In addition, DM are able to integrate the learned experiences on their own, they are better equipped to deal with the uncertainties associated with SIDs. The experiences of DM contribute to the easier acquisition of information that is central to effective SIDs. They are able to process the information effectively and efficiently and thus, are able to reduce the level of uncertainty associated with SIDs. Further, experience has an influence on the risk perception. DM with less experience is less certain of their abilities to manage the situation. Conversely, a DM with higher level of experience exhibits high confidence in firms of his ability to correctly estimate the risks and returns. In summary, level of experience can be instrumental in developing a knowledge base and mindset that allows them to be more confident and effective in more volatile environment. Therefore, it is expected that:

**H 18 :** There would be a significant relationship between select demographics of an individual and the extent of use of RA in SIDs

### 2.6.2 Risk Propensity (RP)

Risk is an inherent element of all the decisions. Typically, the outcomes of the decisions are not predictable in nature rather it is more of probabilistic one. This implies that all the decisions are made under risky conditions. It is impossible to make decisions exclusively on rational evaluations, as it is also affected by DM’s predisposition towards risk i.e. risk propensity (Kahneman and Tversky 1979). RP refers to an individual’s i.e. DM’s willingness to take or avoid risk. Extant literature suggests that RP is a multifaceted personality trait.

In recent years, given the limited success of the trait approach, some researchers turned to more cognitive oriented approaches while studying DM’s behaviour. RP varies with the decision making context such as investment,
speculation, social and so forth. This study confines to investment decisions and SIDs in particular. Though RP is relatively a stable characteristic of DMs, it can be modified through their experience (Sitkin and Pablo 1992). Further, Age of the DM can be viewed as a proxy for one’s propensity for risk taking. This is acknowledged by Hambric and Manson (1984), who found that managerial youth with increased risk taking propensity. Conversely experienced (elder/aged) DMs are typically more risk averse, exhibiting a preference for greater financial and career security. Consequently experienced (elder/aged) DMs tend to avoid risky decisions. In similar manner, the firm size also influences the risk propensity level i.e. higher the firm size, higher the risk propensity.

Within the context of SIDs, researchers have studied the influence of RP on various perspectives. For example, Forlani and Mullins (2000) found the effect of differences in risk propensities on their new venture choices made by DMs. Similarly Carolis et al (2009) opined that there is a marginal support for the relationship between social capital and RP. Tabak and Barr (1996) stated that there is a positive significant relationship between functional interpretations and RP. RP is an important determinant of the DM’s risk behaviour (Williams and Narendran 1999, Sitkin and Weignart 1995). In Summary, DMs can be classified into three categories viz. Risk averse DMs, moderate DMs, and aggressive DMs. Risk averse DMs tend to overestimate the probability of loss which deters risk taking, whereas aggressive risk takers tend to underestimate the probability of loss which encourages risk taking. This indicates that there would be a positive association between risk propensity and risky decision making made by the DMs. Therefore, it is expected that:

H 19 : There would be a positive relationship between individual’s Risk Propensity and the extent of usage of RA in SIDs
2.7 PROPOSED RESEARCH MODEL

With the help of the literature review, the study conceptualised the research model to meet the research questions and the same has been presented in Figure 2.1. The proposed model encompasses OC, namely, business strategy, information system, rewards and control structure, environmental uncertainty, and performance of a company, and IC (select demographics and risk propensity) as independent variables. The extent of usage of Risk analysis would be the dependent variable. The arrows in the model explain the hypothesised relationship and indicate the impact of one latent construct on another. The proposed relationships of the models were examined using PLS-PM in Visual PLS software.

![Figure 2.1 Proposed research model](image-url)
In order to test the above research model, the researcher has conceptualised the following sub models and the same have been given in Figures 2.2 and 2.3.

**Figure 2.2 Proposed sub model 1**

**Figure 2.3 Proposed sub model 2**