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TOWARD A CONTINGENCY THEORY OF INNOVATION STRATEGIES

by

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TOWARD A CONTINGENCY THEORY OF INNOVATION STRATEGIES

Organizations must respond effectively to the rapid technological, product and market changes taking place in today's society in order to remain competitive. Few, if any, companies can continue to successfully defend a market domain without continuous upgrading both in terms of product quality and manufacturing processes. Many times, however, companies find it difficult to achieve the necessary capacity for innovation. Success with current operations can stifle creative abilities because activities become routinized and mechanized, breeding a comfortable and familiar attitude. Such an attitude makes flexibility and response to change difficult. To quote Peter Drucker, "... innovation [requires] hard, focused, purposeful work making very great demands on diligence, on persistence, and on commitment. If these are lacking, no amount of talent, ingenuity, or knowledge will avail."

There are four basic methods by which innovative ideas can accrue to an organization: (1) research and development, (2) internal ventures (or intrapreneurship), (3) joint ventures, and (4) acquisition. This paper provides guidelines to aid businesses in selecting among these methods to achieve product innovation. The discussion centers around various dimensions of the traditional "make or buy" decision. Our focus is not on how to innovate or how to generate creative ideas. Rather, our concern is with the strategic selection of an approach for innovation.

Innovation invariably entails risk. However, different methods of innovation involve different types of risk. Our purpose is not to promote one innovation mode over another, but to better define both the nature of the risks inherent in each method and the

way in which different types of risk are more or less compatible with different organization situations.

METHODS FOR INNOVATION

Four generic strategies for corporate product innovation exist: research and development, acquisitions, internal ventures and joint ventures. These different methods offer distinct and important advantages and disadvatages to the organization. For example, some methopds allow members of the firm to be very involved in the product innovation process while others permit only limited involvement. Some methods require a radical and pervasive organization change, others are more gradually implemented or more insular. Although most innovation require large cash outlays through time, some require large initial cash outlays, others require continuously increasing but incremental investment. Each of these conditions could provide a barrier to innovation for some firms and offer attractive opportunities to others. Each of the four generic innovation methods is described below.

RESEARCH AND DEVELOPMENT

A research and development unit consists of specialists who focus on innovation and the creation of knowledge as their primary objective. These specialists, usually concentrated in one area of the organization, generate not only new products and ideas but also develop new methods of manufacturing or packaging existing products.

A research and development operation can focus on a wide range of future products and processes. This may or may not be an advantage for the business unit. For example, if the research and

development team conducts pure scientific research, the resultant products may have no clear relationship to the firm's existing market or manufacturing capabilities. If a strategic change to accommopdate such differences is not envisioned, these products or processes are unlikely to make a contribution to the firm's success. Such problems can be overcome in part, by increasing the level of communication and integration between research and development operations and other parts of the organization. This solution, however, is not without costs. The trade-off may be an increase in the relatedness of new products and processes, but a decrease in the rate of innovation.

Communication also places an additional task burden on the research and develpment unit. Establishing some degree of credibility among manufacturing and other line units is essential to the long term viability of any research and development laboratory (Westwood, 1984). Credibility and comunication are both requisite for effective technology transfer, and the transfer of technical knowledge allows the organization to use innovative ideas. These processes do not, however, require structural compatibilty among research and development and other organization units. The degree of organization involvement in innovation can be quite limited when using a research and development approach to innovation.

The corporation must carefully determine the appropriate mission for its research and development unit. Some organizations do not take full advantage of a reseach and development unit's capabilities due to a lack of agreement between top management and research and development specialists regarding the laboratory's mission and strategic contribution (Schmitt, 1985). The potential creative capabilities of a research and development unit may be intentionally restricted to focus only on product advances that lay

within the organizations current realm. While this may enhance the existing domain position, such an approach dramatically restricts the firm's access to new markets or new technology.

In addition, research and development operations require constant funding regardless of whether or not current innovations are successful. This implies that initial cash outlay is minimal for a particular project start-up because the lab itself is funded on a on-going basis. Since research and development units generally work on a variety of short- and long-term projects at any one time, there is a high probability that some of the activities will result in an economic payoff for the firm. There is, however, the corresponding high probability that some investments will have no positive results. As a consequence, while the risks of unmarketable or insufficient innovation associated with any one project may be high, the risk for the total innovation effort is low to moderate if many diverse projects are undertaken simultaneously.

In summary, the research and development approach to innovation uses existing organization skills, permits innovation efforts to consider other functional capabilities and constraints, entails a fairly low risk of long-term over-committment to an unsuitable product, but involves a fairly high risk of developing a product or process which either fits the firms interests but is not market-competitive due to technological failure, omission, or obsolescence or is abandoned prematurely due to a perceived lack of fit with the organization's current strategy.

INTERNAL VENTURES

The internal venture, or intrapreneurship, approach to innovation is characterized by a group of current employees

devoting their attention to the development, manufacturing, marketing and distribution of a specific potential product option. This approach differs from research and development in two respects. First employees are dedicated to a particular product or project outcome. Second, employees are responsible for all functional activities and for all phases of product design, production and delivery. Often internal venturing takes on a moonlighting aura in that time devoted to the innovative ideas are "stolen" from the regular duties involved employees must perform at the early stages of development. At later stages, internal venture activities are often separated from the rest of the company. This provides greater independence, freedom from short-term pressures, different rewards, improved visibility, and access to key decision-makers (Roberts & Froman, 1972). Besides easing the implementation of new products, this mode increases the level of organization involvement in innovation. Employees are drawn from most functional areas. The level of resource commitment is higher, on a per project basis, than it is with a research and development approach. The costs associated with internal venturing are somewhat controllable by the organization because cash flows can be planned and the project can be disbanded at many points along the way (Roberts & Froman, 1972).

Resource investment is not limited to financial resources alone. Increased visibility often leads to increased emotional investment. Despite the initial separation of the internal venture unit from the rest of the organization, concerns related to the existing organization climate remain. If successful, the intent is usually to reintegrate the product within the existing portfolio. If the structure and administrative processes developed for the internal venture are not compatible with the host organization's design, the potential exists for major organizational change, or serious organization conflict.

In summary, the invernal venturing approach to innovation uses existing organization skills, but may refocus these skills in new directions. Internal verturing incorporates innovation with all functional activites. This mode entails a moderate risk of over-committment to an unsuccessful product, and involves a moderate risk of developing a product is not market-competitive due to technological failure, omission, or obsolescence. The risk of over-commitment to a product which either doesn't fit the organization or is non-competitive is somewhat greater than with research and development, due to the extended resource commitment and planning horizon associated with establishing a separate organization entitiy. The risk of omitting critical product, market or technology characteristics is lower than with research and development because of the broader functional base and the undivided focus of employees associated with the internal venture.

JOINT VENTURES

The joint venture approach to innovation involves two or more firms pooling their resources to design, produce and/or market a new product. Joint ventures involve external parties, consequently the required initial cash outlay varies. It is not uncommon, however, for this type of union to require a substantial cash contribution from one firm to gain the expertise or scarce non-fiscal resources of another firm. The primary reasons for joint venturing include attaining a better market position, warding off competitors through scale of operations, and increased responsiveness to market needs. Joint ventures allow each partner to make a unique contribution to the innovation effort, and neither partner is required to have all the needed skills or resources. Each partner can concentrate resources in those areas where they possess the greatest relative competence while diversifying into

attractive yet unfamiliar business areas (Harrigan, 1985). Joint ventures provide easier and quicker competitive access to new products and markets than either research and development or internal venturing.

Joint ventures allow firms to contribute diverse competencies to the innovation effort. This reduces the risks associated with inadequate product or market development expertise, with making wrong choices, and with omitting critical features of product design, production or distribution. The risks of inadequate financial returns remain.

Perhaps the greatest risks are in the area of organization involvement and future organization stability. Often joint ventures involve a totally new orientation for the firm. If successful, such ventures often lead to a change in strategic direction. Since the venture is undertaken with an external company, managers have less control over the innovation efforts than with internal modes of innovation. High organizational commitment and involvement is needed to maintain a high level of influence. As Harrigan (1985) points out, the primary barriers to forming joint ventures are strategic in nature. Firms must try a new basis for competition if the joint venture is to be successful. Further, companies must accept many uncertainties regarding their ability to manage and operate joint venture activities.

In summary, joint ventures allow a company to develop new capabilities which capitalizing on their existing competitive advantages. The risk of product failure and of poor product fit are lower than with the types of innovation methods previously discussed. The risks of adverse organizational consequences are much greater both because of a complex external linkage and because of the increased likelihood of control problems. Joint ventures

are also likely precursers of major organization change. With this type of innovation, there is an increased probability of either major structural or strategic reorganization if the venture is successful. If the joint venture is unsuccessful, the exit costs are higher than with either research and development or internal venturing.

ACQUISITION

Acquisition generally involves obtaining a proven product, entering a new market with high growth potential, or obtaining a complementary or newly developed technology to be used in existing product lines through the purchase or stock merger of an existing organization. The acquired business often has a distribution system and marketing image in place. The acquired business certainly has an existing structure, administrative processes and culture which must be accommodated if the acquisition is to provide the intended benefits.

Acquisitions usually requires a large initial cash outlay. Even in an uncontested acquisition the purchasing company frequently offers a substantial premium over market value to secure the purchase (Parsons, 1984). Thus two types of risks are prevalent in obtaining innovation through acquisition. First, the financial consequences of an unsuccessful acquisition are large and immediate. Second, there is also a major risk in attempting to join companies which have unique cultures and practices. Since the incentive for aquisition is generally based on some capability, access, or technology the purchasing firms does not presently have; the probability of significant cultural differences between the two companies is great. Intensive planning and pre-acquisition preparation cannot erase all of these differences (Parsons, 1984).

Due to the large financial investment and the need for organizational realignment, the level of wide-spread organization involvement is high. The potential for major and long-standing organization change is great both from a structural and from a strategic perspective. If such a change was not desired, there would be little incentive for acquisition. This does not eliminate the inherent riskiness or difficulty of successfully negotiating and implementing such changes.

In summary, achieving innovation through acquisition generally provides greater certainty regarding product, market and technology choices than any of the other innovation methods. This certainty is purchased though greater initial financial risk and through greater long term organizational and strategic risk.

RISK AND INNOVATION

Since innovation involves uncertainty, innovation entails risks. Diverse types of risk should be considered when choosing an innovation method. One type of risk is related to over-commitment of resources and investing in an innovation which has no market payoff. These risks can be termed product commission errors. Problems can occur because the firm does not understand the market. The firm may, for example, design a product which is highly competitive in a particular market niche, but does not fit the larger market interests. If the niche is either not sufficiently large or is not willing to pay a sufficient premium to sustain the product, the innovation may be a poor strategic investment. Failure may result from mistakes in technology development of choice of product characteristics. Product commission errors can also occur if the firm makes good choices but is simply unable to implement those choices as effectively or efficiently as competitors.

A second type of product-related risk is product omission errors. This type of error occurs if a firm's product scope is too narrow. Such errors often occur if a firm is unfamiliar with the nature of competitive issues in a product/market area or does not understand the full range of industry forces which affect product success or failure. For example, a firm which attempts to compete on the basis of product differentiation when the market is interested in low price omits a critical characteristic from product scope The relationship of these two product-related risks to the generic innovation strategies is presented in Figure 1.

A third type of risk is financial risk. This type of risk relates directly to the magnitude, flexibility and time orientation of resource commitments. To the extent that initial cash outlays are great, financial and non-financial resource flexibility is low and the investment commitment is of long duration, financial risks are great. When cash outlay is gradual, when various resources can easily be converted to alternate uses and commitment is incremental, the resouce risks are lower.

Organizational risk is the fourth type of risk to be considered. This type of risk is also related to resources. With organizational risk the threat is to the sturucture, culture or processes of the organization. Organizational risk is different from the other three types of risk in one important way. Organization risk often increases with the success of the innovation while each of the other types of risk relate to causes of innovation failure. The relationship of the two resource-related risks to the generic innovation strategies is presented in Figure 2.

The types of risk an organization must be willing to accept vary with different approaches to innovation. Some innovation

strategies favor product-related risks, other accept greater resource-related risks. The types of risk which the firm can best accomodate depends both on their competitive approach and on the current state of organization maturity. These two contingencies are discussed below.

TWO ORGANIZATION CONTINGENCIES

Each of the generic innovation strategies discussed is more or less advantageous under different organization contingencies. Two contingencies seem particularly important to selecting an appropriate innovation style. These are: domain strategy (Miles et al, 1978) and life course characteristics (Quinn & Cameron, 1983). These two contingencies are particularly important because of their links with risk posture and with strategic strengths and weaknesses which are directly related to innovative capacity.

DOMAIN STRATEGY

Domain strategy refers to the firm's choice of a particular posture with respect to the product or market areas in which they compete. Miles et. al. (1978) identified three successful domain approaches. One, a defender strategy focuses on protecting or sealing off a defensible portion of the market. This defense often entails a single core technology which is highly cost efficient. The strategic focus is on standard competitive practices such as low price and high quality products. Defender organizations generally concentrate on efficiency and control. Such firms generally grow through market penetration and product development rather than through expansion into new product or market areas. Defender firms must protect their resource and organization base, often at the expense of increased product risks. Prospector firms

enact a considerably more dynamic environment. These firms devote their energy to finding and exploiting new product and market opportunities. Such firms develop means to avoid long-term commitments to single products or technologies. Prospector organizations are flexible and learn how to facilitate and coordinate numerous and diverse operations. While resources are effectively used, they may be underutilized. These firms often sacrifice production efficiency for rapid response time. Such firms choose innovation over high profitability. The third successful domain approach is that of an analyzer. Prospector firms are more prone to accepting resource risks than they are to accepting product risks. Analyzer firms try to increase profit opportunities but within controlled levels of uncertainty. In many respects these firms are a hybrid between defenders and prospectors. Analyzer firms must manage the most complex organizations, since they attempt to promote stability and efficiency within their "bread and butter" line and to foster flexibility and change in their expansion areas. These firms cannot permit extensive financial risks nor extensive organizational risks.

LIFE COURSE CHARACTERISTICS

Organizational life cycle or life course theories are an attempt to examine they dynamic nature of organizations through the lens of a biological metaphor. While there is much debate over the number of life stages and the triggers which move organizations from one state to another, there is agreement that mature, complex, formal organizations are substantially different in terms of their risk posture and their resource base from young, simple, and informal organizations (Kimberly, Miles. et.al. 1980; Mintzberg, 1984). We do not contend that organizations move through a smooth, unidirectional, unrelenting pattern. We do, however, believe that

the characteristics of an organizations structure, culture and administrative practices are an important consideration in selecting an innovation strategy. Further, we believe that many of the important feature of these characteristics are captured in the life course approach to categorizing organizations.

Quinn and Cameron (1983) present a useful summary model which incorporates many of the features of diverse life cycle theories. This model depicts four stages of organization development. The entrepreneurial stage is concerned with answering the questions what to do, how to do it, for whom, with what, and for what payoff. During this stage the primarly objectives concern generating ideas and gathering resources. The organization structure and communication patterns are informal. There is little planning or structured coordination. Much of the power in the organization rests with the "prime mover." Since financial resources are often scarce during this stage, wuch resource must be used efficiently and effectively. There is little in the way of established organization structure, so little threat to the structure exists. Establishing a product which is seen as valuable in the markeplace is perhaps the greatest challenge at this stage of organizational development.

In the collectivity stage the structure and the comunication patterns remain informal, however coordination is increased and the firm takes on a sense of focus and selectivity. Innovation continues to be strong. There is high commitment and a sense of mission guiding the organization. Often the firm is experiencing a period of rapid growth. Functional area power often shifts from marketing to production. The critical product charactersitics have been esablished and the organization structure is still being developed. Misuse of fiscal resources is perhaps the most damaging mistake at this stage.

An emphasis on rules and insistutionalized procedures characterize the formalization and collectivity stage. Much of this emphasis on procedures is in respose to the size and complexity of operations. During this phase of the organization's life course the emphasis is on stability, predictability, efficiency, and maintenance. Efforts are often devoted to separating routine tasks from nonroutine activities and toward managing the volume of tasks and information. Planning and evaluation systems gain importance along with individuals who understand and can control the "system." The formalization stage is often characterized by specialization and division of labor. During this stage financial resources are relatively abundant. Increased competition presents major challenges to the product. Market shifts often generate a need for new product characteristics, or make existing sources of differentiation unimportant. The firm needs to be able to extract information and technology from the environment without disrupting internal operations. Stability of the organization structure and processes is of paramount importance to maintining efficency and predictable resource flows.

The fourth stage in the summary model is elaboration. In the elaboration stage the focus is on adaptation and refinement of products, organization structures, administrative processes. Efforts are directed toward managing maturity effectively not just efficiently. Growth opportunities are sought. New strategic orientations are developed to aid decentralized and divisonalized firms revitalize their resource utilization and creative capacity. Efforts are made to develop a balance between delegation, coordination and collaboration. During the elaboration stage resources are available, but often less abundant than during the formalization stage. The organization structure is able to

tolerate modification. Stability is sacrificed to gain new insights. The product focus is ripe for redefinition, and the strategic orientation is amenable to change.

CHOOSING AN INNOVATION STRATEGY

No innovation strategy completely eliminates risk. However, it is possible to select the kind of risk that the firm is best able to tolerate and to avoid those types of risk of greatest potential damage to the firm. One way to approach this selection process is to identify the types of risk most prevalent in each of the generic innovation strategies and to counterbalance the risk pattern with the product and resource related strengths inherent in the firms domain strategy and development stage.

As indicated previously, research and development involves a relatively low level of financial and organizational risk for each individual project. However, on a total innovation investment basis, the level of resource risk is moderate given the assumption of some product failures counteracted by some product successes. If research and development activities are guided by a corporate plan, the are likely to reflect organizational biases. Therefore, research and development involves a high level of product omission error coupled with a lower level of product comission error. Internal venture strategies involve a low-moderate level of financial and organizational risk. Further, intrapreneurship approaches entail a high-moderate level of product omission error and a low-moderate risk of product comission error. Joint ventures accept a high-moderate level of organization and financial risk. Joint ventures involve a moderately high level of product commission error, but a low-moderate level of product omission error. Acquisition strategies include high levels of financial,

organizational and product comission risk. However acquisitions entail low levels of product omission risk since the technology or other knowledge being acquired has already demonstrated effectiveness.

Defender domain strategies can tolerate product omission errors better than product comission errors because of the emphasis on defining and protecting a specific market segment. Defining a segment inappropriately is of more harm than narrowing the market domain through an insufficient offering. Because of the focus on efficiency, defender firms are reluctant to adopt major organization changes. Consequently, such firms try to avoid organization risk. Financial risk is of lesser concern, since these firms often have substantial financial resources. Defender firms are most amenible to either research and development approaches to innovation or to internal venturing.

Prospecting firms must be able to facilitate change. They, consequently, cannot rely solely on organization expertise to develop creative ideas. Prospector firms are more tolerant of choosing the wrong product than of making a poor competitive showing with the right product. Prospecting firms can tolerate high levels of either financial or organizational risk, but may only be able to accept moderately high levels of both types of resource risk simultaneously. Prospector firms are most comfortable with joint ventures or with acquisition because of the external focus of these innovation strategies.

Analyzer firms are attempting to maintain a delicate balance. Consequently, they can accept moderate levels of most types of risk, but are unable to accept high levels of any type of risk. They have neither the financial resources nor the organizational strength to tolerate high resource risks. Since they must make

shrewd product decisions, they can ill afford high levels of either product omission or comission errors. As a result, analyzers are best served by internal venture or joint venture approaches to innovation.

Entrepreneurial organizations generally have few financial resources and their organization structure is embrionic. Since they are attempting to establish a position in the market, product omission errors are more costly, in the long-term, than product comission errors, but neither are well tolerated. Therefore, entrepreneurial firms are best able to capitalize on research and development or on internal venture approaches to innovation.

Firms at the collectivity stage often have an established financial base, or a track record which enables borrowing. If the firm is experiencing successful growth, it may be able to accept reasonably high levels of financial and organizational risk. If the firm is facing intense competition and has yet to secure a solid market position, high levels of either organizational or financial risks are unacceptable. The product-related risks which are acceptable reflect a similar connection to the success pattern of the firm. If the firm is growing, product commission errors are more easily masked. If the firm is struggling to secure a market niche, product omission errors are more perilous. These firms are best suited to research and development if they are growing and to joint ventures if new skills or capabilities are needed.

Firms at the formalization and control stage are internally focused. Their greatest problems come from an inefficient use of resources or from lack of control. These firms have established product position. Problems associated with making an incorrect but costly strategic change are greater than problems resulting from a slowly eroding market base. Innovation strategies which rely on

internal strengths and which facilitate control of resource and product decisions are thus most appropriate for firms at the formalization stage. Internal ventures and research and development are thus the most compatible innovation strategies.

Elaboration stage organization are seeking renewal. It is unlikely that existing organizational resources will be sufficient to provide the needed creativity or reorientation. These firms are appropriately suited for externally driven innovation approaches. They are better able to tolerate the wrong choice than no new choice at all. Joint ventures and acquisitions are the most appropriate innovation approaches for firms at this stage.

A composite, contingency-based approach to selecting innovation strategies is summarized in Figure 3. Three sets of circumstances are particularly favorable. In each of these circumstances, innovation approaches which meet the needs of the organization life stage also meet the needs of the domain strategy. Defender organizations at the entrepreneurial stage of development or at the formalization and control stage, and prospector firms at the elaboration stage are in particularly fortunate situations since two innovation approaches fit all contingency considerations.

Three situations suggest great difficultly in desiging an appropriate innovation strategy. Defender firms seeking elaboration, prospector firms attempting formalization and control, and analyzer firms focusing on collectivity would find innovation particularly difficult without a change in either strategic orientation or organization maturity. Each of these contingencies creates a mismatch between innovation strategies appropriate for their domain approach and innovation strategies which meet their organization development circumstances. Under these contingencies an organization might need to lower expectations regarding the contribution innovation can make to providing a competitive edge.

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Figure 1

PRODUCT-RELATED RISKS

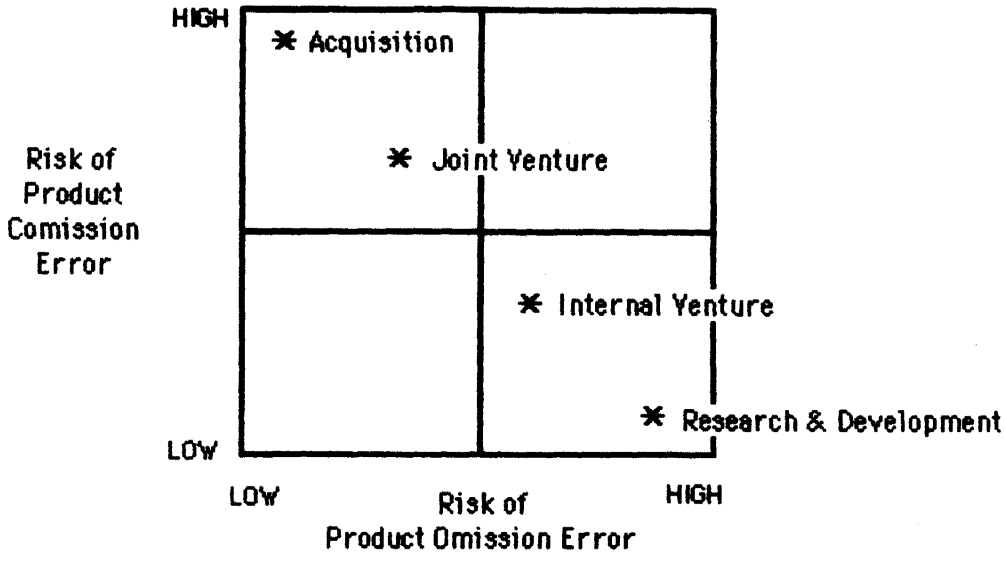

Figure 2

RESOURCE RELATED RISKS

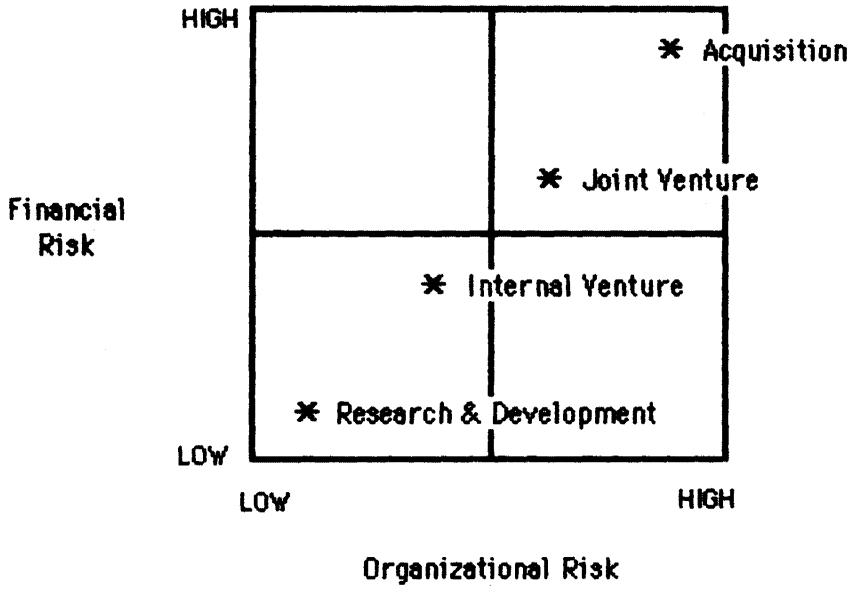

FIGURE 3

A CONTINGENCY APPROACH TO SELECTING INNOVATION STRATEGIES