Developing a Conceptual Schematic to Evaluate Organizational Innovative Capacity

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This paper explores the potential of using an intellectual capital lens to address the evaluation of an organization’s innovation capacity. It approaches this task by focusing on two specific questions: How do intellectual capital assets combine to produce an innovation capability? And, how can the combination of intellectual capital assets for innovative capacity be evaluated by a HR department? The first question is addressed through explorations of the literature to piece together the relationship between the characteristics of the behavioral asset distinctions made by an intellectual capital lens, innovation capability and innovation capacity. This results in a conceptual frame that clusters asset groups into resource and transformative asset types and makes distinctions between the early and late stages of innovation capacity development. The second question is addressed through a concluding analytical argument drawn from the preceding literature review. Further research is suggested for the development of the conceptual evaluative schematic.

1. Introduction

Innovation is often claimed to be a cornerstone of competitiveness (Denton, 1999; Jägle, 1999; Johannessen et al., 1999; Neely and Hii, 1998) and in some cases also profitability (Bose et al., 2002; Roberts, 1999). The role of innovation in a firm’s strategy is further said to contribute to competitive advantage (Johannessen et al., 2001), organizational performance (Yamin et al. 1999) and market share (Robinson, 1990). Many more studies consider the role of technology and research and development as contributors to innovation (Aghion and Tirole, 1994; d’Aspremont et al., 2000; Gans and Stern, 2003, Hull and Azumi, 1991; du Pre Gauntt, 2004) while others specifically target new product development (Jensen and Harmsen, 2001; Katila and Ahuja, 2002; Matusik, 2002; Romano, 1990; Shepherd and Ahmed, 2000). However studies, such as these, rely on past performance of an innovation effort to make an assessment or judgment about the organizations capacity to produce innovation.

The difficulties facing managers with respect to measurement and accountability of intangibles has been explored in the context of Human Resource (HR) Management by Bontis and Fitz-enz (2002:245), who claim that “it is perceived that they [HR managers] do not have the
necessary expertise to carry out appropriate measurement and that many of the measures used lack precision and are too difficult". Tidd (2001) specifically suggests that measuring innovation inputs and outputs is a difficult task and suggests that more so is establishing the relationship between measures and firm performance. He further claims that there is no single best measure of innovation.

Teece (2000) has aligned superior firm performance with innovation through "flows from the creation, ownership, protection and use of difficult-to-imitate knowledge assets." This suggests the need to identify and manage these specific antecedent knowledge assets and this function is served well by an intellectual capital model or lens (Edvinsson and Malone, 1997). While many would not deny that strategic management of a firm's intangible assets is key to firm performance (Hurwitz et al. 2002), it appears that an organization's intellectual capital (IC) is still not often articulated and considered in a systematic and meaningful way that enables organizations to realize their goals (Daniels and Noordhuis, 2005). Perhaps one reason for this may be that the field is still young and as yet there is no accepted method of intellectual capital accounting (Stewart, 2001).

This paper explores the potential of using an intellectual capital lens to address the evaluation of an organization's innovation capacity. It contends that HR departments require such an evaluative tool in order to mediate between the strategic intent of an organization and its resource asset base and in effect manage the organization's innovative capacity. This need arises in the absence of evidenced innovation capability. It approaches this task by building a conceptual framework by focusing on two specific questions:

- How do intellectual capital assets combine to produce an innovation capability?
- How can the combination of intellectual capital assets for innovative capacity be evaluated by a HR department?

2. The Intellectual Capital Lens

To address the first question germane to this paper we start by elaborating intellectual assets and how they may be combined to produce an innovation capability for an organization. Intellectual Capital (IC), when used as a lens or perspective on an organization, can act as either a measurement tool for establishing intangible value or a strategic management tool for building and deploying knowledge (von Krogh et al. 2001; Pike et al. 2002). In application, an IC approach divides the 'properties' of the organization into asset groups and, one method in particular emphasizes clusters of similar marginal utility behavior. Adopting the work of Roos, Roos, Dragonetti and Edvinsson (1997), and the further developments of Pike and Roos, (2001) and Roos, Pike and Fernström (2005) these groups may be described as human, relational, organizational, physical and, monetary resources with the first three of these comprising the organization's intellectual capital while the remaining two are forms of capital commonly encountered in accounting traditions.

Other grouping approaches have been used to distinguish an organization's intellectual capital assets and reference is often particularly made to the pioneering work of a Scandinavian financial services company, Skandia (refer Edvinsson and Malone, 1997:16-23 for a brief history). This system however has been criticized for lack of clarity in its distinction in asset classes which leads to overlaps (Lelieart et al. 2003; Stewart, 1997), and missing components of value creation (McElroy, 2002). It is not our intent in this work to explore the different means and methods of intellectual capital management and readers are referred to MPherson and Pike (2001) and Pike and Roos (2001; 2004a; 2004b) for more detailed elaboration of measurement routines and the need for distinction in asset behavior. We do intend however to use IC to elaborate the intangible elements of the organization and the distinctions made by the marginal utility behavior method does ensure capture and appropriation of asset types.

The marginal utility behavior IC lens has also been adopted by past authors such as Peppard and Rylander (2001) to illustrate the development and implementation of an organization's growth strategy. This approach is consistent with our need, where it is not intended to collect information to perform an 'econometric' type analysis of shareholder value – those interested in this problem can see for example Burgaman and Roos, 2004 – but rather, the division of assets is considered a useful way of communicating the different forms of organizational intangibles to elicit a more complete disclosure of the stocks of intangible innovation assets.

Ethiraj, Kale, Krishnan and Singh (2005) make the claim that researchers in resource-based theory and strategy agree that resources and capabilities are both forms of assets that have rent-generating potential. Therefore it would appear quite legitimate to utilize the econometric terminology of IC in a resource based innovation strategy analysis. It can further be derived from this claim that there are two forms of assets; a resource asset and a capability asset. Capabilities are defined as "an intermediate transformation ability between resources (i.e. inputs) and objectives," (Dutta et al. 2005, italics added). Further, Amit and Schoemaker (1993) have shown that capabilities are evidenced by specific outcomes or desired ends. We contend then that capability is not merely represented by the transformative ability but rather it includes the resource assets to which the transformative ability is applied. Figure 1 expresses this relationship between resources, transformative abilities and objectives of innovation capability diagrammatically.

Leifer, McDermott, O'Connor, Peters, Rice, and Veryzer (2000) demonstrated how organizations acquire different radical innovation capability between early and mature stages of development. A similar discussion on organizational capabilities, resources, processes and change is to be found in the work of Christensen and Raynor (2003). From the perspective of innovation, neither authors carefully distinguished differences in the types of resource and transformative assets.
Capabilities and resources have also been examined from other perspectives of human resource management, for instance addressing competitiveness (Ulrich and Lake, 1990; Ulrich 1993), organizational change (Kerr and Ulrich, 1995), knowledge management, (Spanos and Prastacos, 2004). However, none of these examinations make clear distinctions between the types of resources at the fundamental level that is proposed by IC. Our interest is in the development of the distinct resource inputs and intermediate transformative assets that deliver specific evidence of innovation capability. In effect assets require an innovation capacity before they can produce evidence of an innovation capability and an IC framework assists in sorting the assets into similar behavioral types.

The distinction between capacity and capability is important as it forms the basic reasoning for distinguishing the types of assets. For our purposes organizational innovation capability is determined by combining the resource assets with transformative assets (or processes and interactions) in the normal course of business activity. How well that capability manifests through the organization we consider would be determined by two elements; first the presence and caliber of the resource and transformative assets and second the process effectiveness and efficiency with which they combine to evidence capability. In order to assess the second element the desired end or objective must be known and measurable. Damanpour (1991) suggested that organizational innovativeness was more accurately represented over time when multiple innovations could be considered and therefore the known outcomes could then be measured and assessed for effectiveness and efficiency through analyzing the expense of resources. This is an evaluation of the capability and our interest is in the former element of presence and caliber of resource and transformative assets.

It has also been argued by others that capabilities evolve and/or are built over time (Eithiraj et al. 2005; Ridder et al. 2005). This suggests that in order for assets to be either effective or efficient they must first acquire a capacity to deliver the required objectives (Ridder et al. 2005). Cohen and Levinthal (1990) earlier recognized absorptive capacity as one dimension of an organization’s innovative capabilities based upon the recognition of value in external information, assimilation and application toward a commercial end. This was later developed further by authors such as Zahra and Gerard (2002); however neither identified the resource assets that contributed to this capacity and both focused on the process level representing the capability. Other authors such as Romijn and Albaladejo (2000) and Palmberg (2002), went part way to distinguishing inputs to innovative capability through internal and external sources however still fell short of making specific distinctions between resource and transformative assets and recognizing the different behavioral characteristics of each. Therefore we turn to the literature to explore the characteristics of each of the asset groups that may represent an innovative capacity before moving to propose an evaluation for innovation capacity.

3. Innovation Capacity: Resource and Transformative Assets

Our second question inquires into how the combination of intellectual capital assets for an innovation capability can be evaluated by a HR department. To address this question we adopt the intellectual capital marginal utility behavior asset groups as a starting point and seek to explore some of the specific characteristics of the asset groupings with respect to innovation. As we speak of innovation we intend here to make clear that we also consider actions, and specifically entrepreneurial actions – sometimes referred to as intrapreneurial actions – in established organizations (Pinchot and Pellman, 1999). If innovation were only considered from the perspective of new ideas (creativity) it would fail to be of interest to most management teams, as it is the creation of value through the enacting of new ideas that makes innovation, as a strategy, attractive (Hindle, 2002; Yamin and O’Connor, 2004).

Two asset groupings – human and relational assets – can
be defined specifically as resource assets as they retain a distinguishing feature with respect to ownership. Unlike the remaining three asset groups – organizational, physical and monetary assets – human and relational assets can not be owned or controlled (to a large extent) by the organization; ownership and control is shared. Therefore, these two forms of assets form a supply or resource to the organization that potentially ‘fuels’ the latent capacity of the other three transformative assets. The organizational, physical and monetary assets can be owned and controlled to a large extent by the organization and importantly these three asset groups when combined form the composite ‘transformative asset’, essentially the engine that transforms resources (fuel) to meet specific objectives. The characteristics of the resource and transformative asset groups are now considered.

3.1 The Human Resource Asset

Roos et al. (1997) consider human assets to have three components; competence, attitude and intellectual agility. They further divide competence into skills and knowledge. Skills and knowledge might be considered to reflect innovation competences held by an organization. Some authors have attempted to make a distinction between innovations that are technical (new technologies, products and services), and administrative (new procedures, policies and organizational forms) (Van De Ven, 1986). This however has been disputed by other authors with the claim that it is an unnecessary fragmentation of innovation (Johannessen et al. 2001; Nohria and Gulati, 1996; Van De Ven, 1986). However Damanpour (1996) found that technical and product innovations are ‘industry-specific’ meaning that the focus of innovation is narrower and learning is more explicit and tangible while administrative and process innovations are ‘organization-specific’ that suggests a dependency on the structure, culture and systems of the organization. Competence then may differ between types of organizations and will include a range of some generic; such as creativity, opportunity recognition, planning and project management; and, some specific skills such as those within technical disciplines aligned to an industry. However from the perspective of competence there are consistent strong links to learning organizations (Sundbo, 1999; Roffie, 1999; Schwabsky et al. 2004) that suggests innovative firms are ‘learning’ oriented.

The second element of human capital proposed by Roos et al. (1997) is attitudes. Attitude has been described as a predisposition toward behavior (Athayde, 2003). Attitudes such as conservativism, conformity and risk-avoidance can provide major internal barriers to innovation (Neely and Hii, 1998). Prevailing attitudes may have one of two major implications for building an innovation capacity. First, if the attitudes inherent in the organization are deep-set and reflecting anti-innovativeness due to the intrinsic characteristics of individuals, then a human capital development strategy may be employed that focuses on either internal development or lateral hiring (Kor and Leblebic, 2005) both designed to increase positive attitudes toward innovation. Second, if the individuals are open minded with positive attitudes for innovation then perhaps it is the organizational infrastructure and management practices (embodied in the transformative asset) that need to take a priority for review. Evidences then of attitudes are found in behaviors and behavior is in turn also affected by the third element of the human assets described by Roos et al. (1997).

The third element of the human asset group deals with intellectual agility. Roos et al. (1997:39) define intellectual agility as “the ability to use the knowledge and skills, building on it, applying it in practical contexts and increasing it through learning”. This suggests a cognitive view that can be linked to entrepreneurial behavior, for instance Mitchell, Busenitz, Lant, McDougall, Morse, and Smith (2002), suggest entrepreneurial cognition to be about creating new products and services, assembling resources and not only starting but growing new businesses. For an organization seeking to be innovative, an individual’s cognitive perception about capacity to act and combine or transform ideas into specific outcomes, will significantly affect the innovation performance. Further, Shepherd and Krueger (2002) argue that entrepreneurial teams embody a social cognition that emphasizes the perceptions of desirability and feasibility at both the individual and the team levels.

Entrepreneurial cognition then is closely aligned with taking action as it deals with the individual’s mental model of the organization which affects what an individual will do. When innovative thinking is combined with action it might be referred to as a ‘transformative intelligence’, that is, an intelligence encompassing both the perception of new ways and, the capacities to bring them into being. This requires both a strategic sense and a communicative ability in order to overcome, bypass and surmount obstacles that others often consider as an impasse and barrier. In an extreme organizational setting evidence that action and responsibility is devolved right through all parts of an organization that empower employees to act in new ways would be expected.

In summary, the literature highlights strategic choices of either ‘industry’ specific or ‘organizational’ specific innovation strategy options and we find that the transformative asset is the facilitator to the resource base. Table 1 summarizes the human resource asset characteristics that ‘fuels’ the transformative asset.

3.2 The Relational Resource Asset

Relational assets address the social capital associated with individuals and organizations (McElroy, 2002). The social capital can be both internal and external and each has an impact on the innovative effect and capacity of an organization (Tidd, 2001; Van Den Ende and Wijnberg, 2001) that can improve the chances of innovation success. The social capital entails a web of relationships that is facilitated through norms, values and obligations. An organization can affect the social capital by increasing the autonomy of employees, however, this raises significant issues of leadership whereby organizational leaders need to
encourage the development of tacit capabilities in people as well as create and maintain trust and cooperation within the organization (Hitt and Ireland, 2002). Williams (2001) addressed the need to train managers in preparation for stimulating innovation while Kelloway and Barling (2000) found that leadership was a key predictor of knowledge sharing in an organization. In this category then evidence of strong and distributed internal and external relationships would be found, supported by an organizations leadership style that creates trust, knowledge sharing, and devotes attention to the development of tacit employee capabilities such as team and communication skills.

The characteristics of the relational assets then can be described as being both strong and distributed and this applies to both internal and external forms of relationships. Furthermore we again encounter reference to the transformative asset in which leadership, norms, values, obligations, trust and cooperation can all be facilitative of innovation. Knowledge sharing requires specific mention as this can both be an embedded human attitude and enhanced through the transformative asset. In addition we can add a further tacit characteristic to the human resource base which may be reflected in competence; team skills (refer Table 1).

### 3.3 The Transformative Asset

Organizational assets in IC measurement parlance broadly include a firm’s infrastructure, processes and culture (Roos et al., 1997); however in our case, we have argued that from an evaluative perspective both physical and monetary assets should be included within a singular transformative asset group. The logic in this convergence of assets holds that the use and application of all the organizationally ‘owned’ assets for innovation will be viewed from the perspective of the individual employees. It is the employees’ perception of accessibility and sufficiency of the packaged transformative assets that will determine an innovation capability, given that there is a sufficiency of innovation resource assets – both human and relationships – in the first instance.

In IC measurement each of the contributing asset types to the transformative ability – organizational, physical and monetary assets – are determined to behave differently in economic terms and therefore demand distinct treatment. From the perspective of employees however, this distinction is irrelevant in terms of the perception of innovation support. It would seem that in evaluating the innovation capacity it is required on one hand to gauge the perception of the adequacy, and sufficiency of transformative assets at the employees’ disposal and then consider separately the way in which the distinct behavioral assets groups – organizational, physical and monetary – combine to produce adequacy, accessibility and sufficiency to meet organizational goals.

It has been argued that HR departments have a key responsibility for building ties between strategic intent and encouraging innovation and intrapreneurship (Twomey and Harris, 2000). This incorporates the Human Resource Management systems and these seem to have two roles in producing innovation: first, to encourage and build the innovative and/or intrapreneurial capacity of the organization therefore necessitating the management of the resource and transformative assets, and second; to capture and focus the existing or developed entrepreneurial talent, emerging what might be considered an alignment issue between the employees and the strategic intent. The transformative asset capability through the lens of IC is influenced by the availability and application of organizational systems, processes, procedures, intellectual property, branding, culture, space and monetary contribution. These components of the transformative asset have been shown through combination to influence and facilitate the people and their relationships with respect to developing and delivering upon innovative ideas and demonstrating organizational capability (Ridder et al. 2005). However, with respect to innovation the relationship between the components of the transformative asset, that create an innovative environment and those that produce a firms innovation performance, has also been found to be extremely complex with both managerial and environmental factors being strong influencers (Chandler et al. 2000). The managerial factors we would contend are incorporated into the Human Resource Management system itself part of the transformative asset. The environmental factors on the other hand are beyond our scope and a matter that is more relevant to innovation capability assessment than the internally

<table>
<thead>
<tr>
<th>Human Asset Characteristics</th>
<th>Competence</th>
<th>Attitude</th>
<th>Intellectual Agility</th>
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<tbody>
<tr>
<td>Creativity</td>
<td>Open minded</td>
<td>Strategic sense</td>
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<tr>
<td>Opportunity recognition</td>
<td>Learning oriented</td>
<td>Communicative ability</td>
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<tr>
<td>Planning</td>
<td>Positive disposition toward innovation</td>
<td>Perceptions of feasibility</td>
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<tr>
<td>Project management</td>
<td>Desirability to act</td>
<td>Capacity to act</td>
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<tr>
<td>Technical or product</td>
<td>Preparedness to share knowledge</td>
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<td>Team skills</td>
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Table 1. Summary of Human Asset Characteristics.
oriented HR Department assessment of innovation capacity.

3.4 A Summary Representation of Change in Asset Characteristics

To summarize the asset characteristics we present figure 2 that shows the change in innovation capacity through the lens of IC assets at different innovation capability levels. We further note that leadership of the organization will influence the extent to which these assets are developed or utilized and similarly environmental factors (that may be mediated through leadership) may also have some impact.

4. Conclusion

In our discussion of the relational assets above, we encountered the reference to leadership and we would contend that it is an organization’s leadership that mediates between the environment and management to influence innovation capacity. Interestingly, Chandler et al. (2000) refers to the ‘management’ construct at the supervisory level in the questionnaire and did not seem to account for any intervening layers between supervisors and the leadership level responsible for strategic management. This we would consider is partly due to the sampling strategy that included companies with numbers of employees ranging from 2 to 1150 and a median of 31. Below the median the odds of the supervisor and strategic manager being one and the same increases but above the median the situation is reversed. For our purposes our evaluative tool is destined for firms that are above the Chandler et al. median.

The transformative asset we propose will have characteristics viewed from two perspectives. The first perspective will be from the employee and the characteristics of adequacy, accessibility and sufficiency for innovation would appear to be key elements for an evaluation. The second perspective is from that of the organization’s leadership whereby adequacy, accessibility and sufficiency of the transformative asset need to be weighed against the strategic intent and purpose of the organization and the role innovation will play within that strategic intent. The role of the HR department therefore acts as a connector and an enabler between the employee perspective and the leadership perspective. The evaluative
tool for the HR department function assesses the alignment (or misalignment) between the employee perspective and the leadership perspective of the two critical elements of both the innovation and strategic intents and perceptions of adequacy, accessibility and sufficiency of the transformative asset to fulfill these intents.

Part of the complexity in linking an innovative internal environment with performance seems to stem from the array of possible combinations to influence adequacy, accessibility and sufficiency in the distinct asset groups due to variations between types of organizations and industries, their strategies and shifts in strategy over time. Given this complexity, it is important to have the tools to manage the presence and caliber of the resource and the transformative assets. Underpinning this problem is having the knowledge of what distinct assets to combine and how, in order to produce an innovation capability through the combinations of resource and transformative assets. Developing an evaluative conceptual framework for innovation capacity is a first step towards having the tool(s) for achieving management of this complexity. Another aspect pertains to the overarching complexity confronted in the external environment, an aspect beyond the scope of this paper and a matter that is arguably better considered from the strategic perspective of organizational leadership than by the internally oriented HR Department.

We conclude from our review of the literature that the specific characteristics of the transformative asset within an organization can not be generalized due to the large range of variation in strategic positioning and posturing of organizations. Although it might be concluded that the perceptions of the transformative asset characteristics from both employee and leadership perspectives need to have reference to the three perspectives of:

- adequacy (the right combination of resources/assets are available for innovation),
- accessibility (those who need the resources/assets to innovate can obtain them), and
- sufficiency (enough resource/asset is available for innovation to occur).

Moreover the transformative asset and the resource assets for innovation must be aligned with a strategic intent informed by the external environment. Figure 3 maps a conceptual evaluative schematic that summarizes this analytical review.

5. Further Research

Distinguishing an innovation capability with its emphasis on outcomes, from an innovation capacity that addresses the internal potential to enable outcomes was found to be important. This may be further explored in organizational designs where intangible forward looking measures are emphasized, for instance organizations designed for responsiveness such as a commercial research and development firm that needs an ability to utilize an innovation capacity when directed to a variety of different challenges that are without pre-determinable outcomes. To date, capacity and capability seem to have had little focused distinction; however we argue that there is indeed a difference and elucidating innovation capacity may be a powerful concept for managing an organization’s innovation capability. Capability might be better considered as another form of asset and it is the capacity of the asset to deliver
results that determines the efficiency and effectiveness of its use when measured against outcomes. Capacity requires close attention to the underlying resources and the extent to which they are embedded (Hall, 2005) while capability addresses the process of combination. Further research to confirm the usefulness and benefit of this distinction is still required.

Some studies have suggested that the type of innovation sought by an organization is less important than the organizational determinants for innovation (Damanpour, 1991; Johannessen et al., 2001; Nohria and Gulati, 1996; Van De Ven, 1986). However Damanpour (1996) later added that innovation maybe ‘industry-specific’ or ‘organizational-specific’ and this presents the case for different strategic purposes for innovation. Further, it would seem that the mission and purpose of first the organization and second the innovation strategy are the fundamental precursors to the development of an innovation capacity (Bart 2004). In attempting an evaluative analysis of innovative capacity there perhaps should be consideration for the starting points, determining what it is that is required and what constraints are imposed by the leadership and environmental factors. Specific types of organizations, for example research organizations, hold innovation as a way of being or raison d’être (Simpson and Powell, 1999). However organizational designs of research and science institutions were found to be subject to archetypes and again it returns to the mission of the organization to establish how the organization is constructed to achieve the best output. A study that integrates the purpose for innovation with the capacity for innovation would assist to elaborate differences in sufficiency of assets.

Innovation as an organizational design or organizing principle also raises the issue of a systems approach as suggested by a study by Bradley and Parker (2001). Innovation systems are often considered from the perspective of cross-institutional frameworks at national and international levels (Hall, 2005; Spencer, 2003) as those that provide significant regional and community benefit. In the commercial environment, Getz and Robinson (2003) have investigated systems for managing ideas at the organizational level while Costanzo (2004) established that a company’s capability to innovate continuously was linked to its nimbleness, structured processes, extensive communication and a focused management team that bundled together to create a core capability. Overall the systems approach requires different thinking about organizational form (Harkema and Browaeys, 2002) and research that addresses these challenges by distinguishing the types; quantity and caliber of intangible assets would be valuable for increasing understanding of how different organizational systems affect innovation capacity.

To move from this conceptual evaluation design toward a normative model of innovation capacity evaluation, case studies could be considered of organizations that have developed or grown an innovative capacity over time. This would allow the study of how these asset distinctions were affected and by what. Delineating an innovation capacity from capability also would assist an organization to establish ready measures of efficiency and effectiveness of innovation capability strategies. Case studies would help identify the challenges imposed by leadership strategy and environment influencers.

### 6. References


