

# Hidden Innovators: The Case of the Sustaining Engineers

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# The Hidden Innovators: The Case of The Sustaining Engineer

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The main aim of this paper is to understand what motivates engineers to innovate in multinational corporations. It is based on a single case study within a product development unit of a multinational automotive company in the UK. The research is exploratory in nature and seeks to provide insights into what motivates certain employees to act entrepreneurially in a large rules-based organization. An inductive research approach was employed to develop insights into the way in which a group of ‘patent holding’ engineers construct their world or work. The mixed methods approach included a survey of 100 patent holding engineers, followed by twelve interviews and one focus group discussion with six participants.

Results of this case study illustrate an underdeveloped area in the field where the individual intrapreneur is consistently overlooked. The dominant approach is to study intrapreneurship through the *corporate entrepreneurship* lens. This top-down approach lends itself to prescribing personal traits and organizational factors as prerequisites for intrapreneurship. However, a weakness in this approach is that the causes of intrapreneurial behaviour often remain concealed, which raises the question of how the effects can be fully understood. The study provides a clearer understanding of the causes and effects of intrapreneurial behaviour. The research highlighted specific themes that relate to either the individual or the organization and which serve as a set of prerequisite conditions that encourage intrapreneurial behaviour and innovation. Individual themes related to motivation, control and risk management, whilst organizational themes related to management patronage, time and resource availability. The report concludes that intrapreneurship is not only dependent on individual characteristics and organizational factors, but also promoting and inhibiting factors, which combine to influence the outcome of innovative projects.

Analyses of employee initiatives in promoting innovation within companies are scarce, such that research at different levels is required to improve understanding of the intrapreneurial process in established organizations (Srivastava & Agrawal, 2010). This paucity supports the continued calls for further studies at the individual employee level (Sambrook & Roberts, 2005; de Jong & Wennekers, 2008; Parker, 2011). Furthermore, most research has been US-centric, leading to calls for additional research to help shape theory (Zahra et al, 2013).

**Keywords:** Corporate Entrepreneurship; Intrapreneurship; Innovation; Employee Motivation; Business Sustainability; Knowledge Economy.

## Introduction

Innovation becomes a key strategic consideration since companies can operate in complex, uncertain and global environments; it is regarded as a technique to improve company performance and sustain competitive advantage (OECD, 2005). Innovation can therefore be an attractive proposition for small enterprises through to multinational corporations, and is not restricted to specific areas of the firm. If a product, process, organisational or marketing method is new or significantly improved for the firm, then this is considered an innovation (OECD, *ibid.*). Innovations can also vary in their degree of novelty and diffuse to other consumers, regions and firms (OECD, *ibid.*). The linkages that a firm has as part of its innovation process aid understanding of how knowledge and information can flow throughout the process, and how this relates to creating and dispersing innovation. Hence whilst it is important to know that firms innovate, it is also obligatory to acquire knowledge of their innovation processes, in order to understand *how* firms innovate.

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Entrepreneurs are traditionally associated with innovation through creating or discovering market opportunities for exploitation. A plausible assumption is that if an entrepreneur can deliver innovation external to the firm, then an individual (an intrapreneur) can deliver innovation within the firm. The human resource management literature considers human capital as the firm's greatest asset. Human capital can be interpreted to an individual baseline through those employees who combine resources to deliver improvements which can increase revenue, reduce costs and create competitive advantage. Employees that develop products or deliver services form an integral part of a dense network with ties of varying degrees of strength that link to customers, suppliers, competitors and other stakeholders. The concept of intrapreneurship can therefore be decoded into a shared means for generating, developing and implementing ideas and which harnesses innovation as an end to that means.

Since patent data is considered an indicator of the innovation capability of a firm (OECD, 2005), then for the purpose of this study, the intrapreneurs identified are engineers that have been granted patent awards. According to Menzel et al (2007), engineers have analytical skills and technical expertise, which are an important source for innovative ideas and intrapreneurial opportunities. It is worth noting that the engineers participating in this study are employed in non-research roles; they work in a rules-based organization and despite not being expected to innovate, they willingly continue to do so. The context of the rules-based statement relates to the hierarchical structure of the organization. Company goals are communicated as scorecards, with relevant sections cascaded as individual objectives, which are then aligned with the employee's job description and responsibilities.

The case study company is a large, mature multinational automotive player with approximately 200,000 employees and 67 plants worldwide. Although the company is profitable at a global level, some regions face strong headwinds as they maneuver through a climate of excess capacity, intense cost pressure and fervent competition. To this end, the European operation recognizes the need to evolve through a focus on problem solving and innovation by adopting a more flexible approach. The study is based within a Product Development Centre in the UK, and looks through the lens of intrapreneurship to focus on engineers in order to understand the factors which motivate them to innovate.

This paper comprises five sections. The following section presents the supporting theoretical background for our analysis, and literature review relating to intrapreneurship. This is followed by an explanation of the research approach used in this study. Section four analyses the findings and reports on them through the conceptual framework. Section five provides a discussion to the paper and proffers implications of this research study. The paper is then drawn to a close in section six and provides future direction for this research.

## **Theoretical Background**

### ***Corporate Entrepreneurship and Intrapreneurship***

A comprehensive literature review highlights a continued debate around entrepreneurial behaviour within organizations. An apparent lack of consensus has generated multiple perspectives and differences in opinion as to where the nucleus of intrapreneurship resides within the organization, along with its subsequent purpose and benefits. Many of the theories offered tend to lack empirical verification, are conceptual, or an amalgamation of the extant literature. A continuous theme is the propensity to focus on the macro level of the organization and its operating environment. A consequence of this top-down approach is that the micro level of the individual is habitually overlooked. A qualitative, bottom-up approach

with the intrapreneur at its core is therefore expected to develop a clearer understanding of the significant factors that motivate employees to behave intrapreneurially.

### **The Search for a Unifying Definition**

The fact that there remains no universal definition for *entrepreneurship*, despite Cunningham & Lischeron's (1991) venerable attempt, could be considered an attenuating factor extending to the phenomenon of intrapreneurship. Definitions of entrepreneurship tend to focus on the characteristics of the individual and whether those characteristics lead the individual to create or discover opportunities and consequently exploit those opportunities. Traditional theories then look outwards from the entrepreneur and often consider contextual factors as fixed and peripheral to the individual, and subsequently concentrate on the decisions and actions of the individual as part of the entrepreneurial process. One of the drawbacks of such an approach is that it does not consider the individual from an inward looking standpoint, which creates an opportunity which will be explored in this study.

Notwithstanding Peterson and Berger's (1971) seminal article around utilizing intrapreneurship within organizations as a coping strategy for turbulent market environments, calls for a more robust definition and understanding of the phenomenon have persisted (Shane & Venkataraman, 2000; Christensen, 2004; Ma & Tan, 2006). The terminology has evolved to include strategic corporate entrepreneurship (Burgelman, 1983), intrapreneurship (Pinchot, 1985), corporate entrepreneurship (Wortman, 1987) and strategic entrepreneurship (Kuratko & Audretsch, 2009). A substantive review highlights the two most widespread definitions as corporate entrepreneurship and intrapreneurship. **Table 1** summarizes the key contributions to the debate and gives an indication of their proclivity of use.

**Table 1.** A Summary of the Key Contributions to the Intrapreneurship Debate

Definitions	Authors
Strategic Corporate Entrepreneurship	Burgelman, 1983.
Intrapreneurship	Pinchot, 1985; Duncan et al, 1988; Antoncic & Hisrich, 2001, 2003; Christensen 2004, 2005; Drejer et al, 2004; Antoncic, 2007; Menzel et al, 2007; de Jong & Wennekers, 2008; Alpkam et al, 2010; Bosma et al, 2010; Antoncic & Antoncic, 2011; Rigtering & Weitzel, 2013.
Corporate Entrepreneurship	Vesper, 1984; Wortman, 1987; Guth & Ginsberg, 1990; Kuratko et al, 1990; Hornsby et al, 1993; Stopford & Baden-Fuller, 1994; Zahra & Covin, 1995; Zahra, 1996; Covin & Miles, 1999; Sharma & Chrisma, 1999; Thornberry, 2001; Hornsby et al, 2002; Dess et al, 2003; Hayton, 2005; McFadzean et al, 2005; Shaw et al, 2005; Sambrook & Roberts, 2005; Ireland et al, 2006a, 2006b; Marvel et al, 2007; Hornsby et al, 2009; Kelley, 2011; Morris et al, 2009; de Jong et al, 2011; Goodale et al, 2011; Harms, 2013; Kuratko et al, 2014.
Strategic Entrepreneurship	Ireland et al, 2003; Ireland & Webb, 2007, 2009; Kuratko & Audretsch, 2009.

**Source:** Authors

An appropriate grounding point is offered by Gifford Pinchot (1985), who pronounces intracorporate entrepreneurs as employees taking hands-on responsibilities in creating any type of innovation within the organization, hence coining the idiom of "intrapreneur." Pinchot's (ibid.) notion of intrapreneurship has influenced other scholars; Drejer et al (2004)

argue that entrepreneurship applies to start-ups and intrapreneurship to going concerns. Pinchot's (1985) concept of the intrapreneur appears synonymous to the work of the economist Joseph Schumpeter who argued that entrepreneurs carry out "new combinations" such as the introduction of goods, services and production methods (Schumpeter, 1934). Schumpeter (ibid.) also suggested that entrepreneurs can be employees of a company provided they also create new combinations. However, Schumpeter's (1934) new combinations are associated with the more radical outputs of entrepreneurial behaviour and advocate creative destruction through the destroying of established goods, services or production methods and the creation of new ones. Pinchot's (1985) definition is considered more appropriate for the purpose of this study as the hands-on aspect of taking responsibility for creating innovation is more aligned with the job role of the engineer.

Since this study focuses on intrapreneurship in the context of innovation, then a solid relationship between the two is required. Although Drucker (1985) argued that innovation is a specific function of entrepreneurship which can apply to an existing organization, Ireland et al (2006) provide a robust link by arguing that innovation is a related and necessary part of successful intrapreneurship. The essence of this study is fittingly captured by Christensen (2004), who argues that entrepreneurs innovate for themselves, whilst intrapreneurs innovate on behalf of their organization.

### ***The Need to Understand Entrepreneurship in Organizations***

The array of definitions regarding entrepreneurship within organizations has stimulated the discussion regarding the different dimensions of the phenomenon and their corresponding effects within the firm. Such dimensions include diversification (Burgelman, 1983), internal venturing (Guth & Ginsberg, 1990), organizational renewal (Stopford & Baden-Fuller, 1994) and domain redefinition (Covin & Miles, 1999); a summary is shown in **Table 2** below.

**Table 2.** A Summary of the Key Dimensions and their Concepts

<b>Dimension</b>	<b>Synopsis</b>	<b>Authors</b>
<b>Diversification</b>	<i>Firms diversify through autonomous behaviour of operational level employees; middle managers support this behaviour and top managers control the rate of organizational change.</i>	Burgelman, 1983.
<b>Internal venturing and strategic renewal</b>	<i>Creating new businesses within existing organizations and organizational transformation through renewal of the founding ideas.</i>	Guth & Ginsberg, 1990.  Stopford & Baden-Fuller, 1994.
<b>New business venturing, organizational renewal and frame-breaking change</b>	<i>Different types of intrapreneurship exist in the same firm and consist of bundles of attributes which change over time.</i>	Covin & Miles, 1999.
<b>Sustained regeneration, organizational rejuvenation, strategic renewal and domain redefinition</b>	<i>Innovation underlies all forms of intrapreneurship but needs to co-exist with rejuvenation and redefinition.</i>	

Source: Authors

It has been argued elsewhere that multinational corporations are generally not as nimble as their SME counterparts when it comes to radical innovation (Burns, 2013), so the question arises as to whether such high level dimensions of intrapreneurship can be found in large organizations. Likewise, studies which propose such dimensions frequently stall when it comes to identifying the associated inputs of intrapreneurship or the triggers and drivers of change, such as the role of individuals and their behaviours and capabilities.

Guth and Ginsberg's (1990) dimension of business creation and transformation seeks to argue that an organisation can venture into new business, or renew the ideas on which it is built, simply through the practice of intrapreneurship. Despite linking internal innovation with intrapreneurship, additional factors such as the role of the intrapreneur are overlooked. Similarly, Stopford & Baden-Fuller (1994) focus on senior managers and the dimension of organisational renewal. However, the triggers (events) and the drivers (people) of change remain unidentified. Such approaches endorse Vecchio's (2003) argument that, at the macro level where the firm is considered, there is a tendency to consider individual actions as inconsequential.

Burgelman (1983) focuses on diversification as a dimension, arguing that this is contingent on the autonomous strategic behaviour of operational level participants. Although Burgelman (ibid.) suggests autonomous behaviour could be related to individual capabilities, the operational level participants are not clearly defined. In contrast, Hornsby et al (2009) dispute Burgelman's findings by arguing that autonomous strategic behaviour cannot be considered a bottom-up process, and is actually associated with manager levels, thereby excluding other players in the workforce.

### ***A Look at Personality Traits, Behaviour and Context***

In an effort to develop a more detailed understanding of the intrapreneur, the subject now spans multiple disciplines as the debate to agree the most appropriate subject field in which to accommodate the phenomenon continues. **Table 3** summarizes such disciplines.

**Table 3.** A summary of the Key Constructs of Intrapreneurship

Constructs	Authors
Human Resource Management Theory	Markman & Baron, 2003; Hayton, 2005; Hayton & Kelley (2006); Newbert et al, 2008; Hayton, Hornsby & Bloodgood (2013).
Leadership Theory	Vecchio, 2003.
Behavioural Theory	Gartner, 1989; Smilor, 1997; Zampetakis et al, 2009; Williamson et al, 2013.
Motivation Theory	McClelland, 1955, 1985; Miner, 1990.

**Source:** Authors

Shane and Venkataraman (2000) argue that entrepreneurship is a unique conceptual domain that should remain a separate field of research. However, Zahra & Dess (2001) see no advantage in separating entrepreneurship from other social sciences, emphasizing that many research fields have benefitted from overlapping with other disciplines. Vecchio (2003) draws a parallel to the leadership domain where the importance of both trait theory and contextual factors is considered simultaneously. Whilst noting the lack of study on entrepreneurial types in the traditional work setting, Vecchio (ibid.) amalgamates the trait

theory literature and summarizes the “Big Five” entrepreneurial personality traits as risk-taking propensity, need for achievement, need for autonomy, self-efficacy and locus of control. However, Gartner (1989) argues that behavioural factors are ancillary to personality factors, and while de Jong & Wennekers (2008) link intrapreneurship with innovation through behaviours, such behaviours are only conceptualized. In addition, Miner (1990) draws on motivation theory and identifies role motivation typologies to analyze the fit between the organization and the individual. Miner (ibid.) expands on McClelland’s (1955, 1985) single factor of achievement as a motivator and offers empirical evidence that people with high task motivation are attracted to entrepreneurial roles.

It is questionable as to whether these observations on entrepreneurship will extend to intrapreneurship. The paradigm of individuals within groups universally sharing personality types or behavioural characteristics implies a homogenous set. This model creates the opportunity for this study to explore personality, behavioural and contextual factors and to seek any interactions between them.

### *The Multiple Angles of Focus*

Different focal points have been used to pinpoint the origins of intrapreneurship within the organization, and concentrate on either a) organizational-level studies (Kuratko et al, 2014), b) management-level studies (Hornsby et al, 2009), or c) individual-level studies (Rigtering & Weitzel, 2013). These are shown in **Table 4** below, where it can be seen that organizational and management level studies form the dominant discourse.

**Table 4.** A Summary of the Key Areas of Focus of Intrapreneurship Studies

Focus	Authors
A) Organization-level studies	Miller, 1983; Covin & Slevin, 1989; Kuratko et al, 1990; Zahra, 1993, 1996; Stopford & Baden-Fuller, 1994; Zahra & Covin, 1995. Lumpkin & Dess, 1996; Morris & Sexton, 1996; Covin & Miles, 1999; Antoncic & Hisrich, 2001, 2003; Brown et al, 2001; Dess et al, 2003; Hult et al, 2003; Antoncic, 2007; Newbert et al, 2008; Kuratko 2009; Morris et al, 2009; Kelley, 2011; Kuratko et al, 2014.
B) Management-level studies	Kuratko et al, 1990; Hornsby et al, 1993; Pearce et al, 1997; Hornsby et al, 1999; Hornsby et al, 2002; Kuratko et al, 2005; Hornsby et al, 2009; Srivastava & Agrawal 2009.
C) Individual-level studies	Douglas & Shepherd, 1999; Marvel et al, 2007; de Jong & Wennekers, 2008; Douglas & Fitzsimmons, 2008; Monsen et al, 2009; Zampetakis et al, 2009; Alpkam et al, 2010; de Jong et al, 2011; Rigtering & Weitzel, 2013; Williamson et al, 2013.

**Source:** Authors

Hornsby et al (1999) offer the Corporate Entrepreneurship Assessment Instrument (CEAI) to prescribe firm-level factors that promote intrapreneurship. These “Big Five” factors are the appropriate use of rewards, top management support, resource availability, supportive organizational structure and risk taking and tolerance for failure (Hornsby et al, 2002). The CEAI scale has been refreshed in various guises (Ireland et al, 2006b; Hornsby et al, 2013) with recent applications including use as a predictive model for innovation (Rutherford & Holt, 2007) and as a diagnostic tool for assessing the internal environment for

intrapreneurship (Kuratko et al, 2014). However, empirical testing of the factors using individuals has generated disparate conclusions. Alpkan et al (2010) found that only management support and risk taking have positive effects on innovative performance. Similarly, Christensen (2005) found that the five factors were not of equal importance nor sufficient to encourage intrapreneurship. In addition, Marvel et al (2007) showed that the five factors were not sufficient motivators; intrinsic motivation and work design were also considered important. The authors called for future research to consider these two factors as an enabler for intrapreneurship in the context of innovation, thereby opening an avenue which will be explored in this study.

The suggestion that just five common organizational factors can inspire intrapreneurship is debatable. Additional factors would be expected to vary in number and effect between firms, thereby highlighting a limitation in applying the factors universally. This constraint could stem from the fact that the five factors are conceptual and based on the most consistent themes in the literature. Furthermore, the original intent of the IAI research (Kuratko et al, 1990) was to focus on the factors from an employee perspective, but that focus was repositioned to understand the factors from a management perspective, which could also be attributed to any shortcoming. The continued focus on the macro level of the organization has directly contributed to the notion of common factors as mandates for intrapreneurial behaviour. This concept appears restrictive and gives rise to the opportunity for this study to evaluate these factors at the employee level within the firm. This approach is expected to provide a clearer understanding as to what extent these factors encourage intrapreneurial behaviour and whether additional factors need to be considered.

### ***Frameworks for intrapreneurship and innovation***

In **Table 5** we present a summary of frequently cited frameworks which illustrates the continued focus on the firm. This section discusses how frameworks for intrapreneurship tend to overlook individual employees as integral constituents of the intrapreneurial process. Such frameworks are typically contingent on organizational factors but also have limitations when individuals are considered.

**Table 5.** A Summary of the Frequently Cited Frameworks Applied to Intrapreneurship

<b>Frameworks</b>	<b>Structure</b>	<b>Authors</b>
Intrapreneurial Assessment Instrument (IAI)	<i>28 Likert-style questions finding that management support, organizational structure and resource availability support intrapreneurship</i>	Kuratko et al, 1990.
Corporate Entrepreneurship Assessment Instrument (CEAI)	<i>84 Likert-style questions adding rewards and tolerance for risk taking to the IAI results</i>	Hornsby et al, 1999, 2002.
Interactive Model of Corporate Entrepreneurship	<i>Considers a precipitating event as a mediating factor to the “Big Five” organizational and “Big Five” individual characteristics</i>	Hornsby et al, 1993.
Corporate Entrepreneurship Climate Instrument	<i>78 Likert-style questions to measure entrepreneurial intensity of the firm</i>	Ireland et al, 2006b.
Organizational Preparedness for Corporate Entrepreneurship	<i>18 Likert-style questions to assess organizational architecture for implementing an intrapreneurship strategy</i>	Hornsby et al, 2013.

**Source:** Authors

Although frameworks for intrapreneurship tend to overlook individual employees, Hornsby et al (1993) consider the interactions between organizational factors and individual characteristics. The organizational factors are drawn from the work of Kuratko et al (1990) and their five-factor scale of rewards, management support, time availability, organizational boundaries and work discretion. The individual characteristics are amalgamated from the trait theory literature and summarized as risk-taking propensity, need for achievement, need for autonomy, self-efficacy and locus of control (Kuratko et al, *ibid.*). Whilst Hornsby et al (1993) recognize that some form of precipitating event is required to stimulate intrapreneurial behaviour, the absence of empirical testing means that this event and the associated causalities are not identified.

McFadzean et al (2005) acknowledge that the framework adds value, since it highlights the interactive nature of intrapreneurship, but argue a weakness in the fact that it does not evaluate the entire process. Furthermore, whilst Hornsby et al (1993) recognize that the interaction between organizational factors and individual characteristics requires some form of precipitating event to stimulate intrapreneurial behaviour, the absence of empirical testing means that this event and the associated causalities are not identified. However, the framework continues to be utilized by organizations as an audit tool for intrapreneurship and innovation capability (Ireland *et al.*, 2006a).

### ***Summary***

There is a degree of sustained turbulence around intrapreneurship and repeated calls for lucidity. Definitions are wide-ranging and the associated dimensions remain high-level, with prolonged debate regarding the holistic effects of intrapreneurship on the organization. The continued attention on the firm results in frameworks which are contingent on organizational factors as antecedents for intrapreneurship. However, whilst the causes of intrapreneurship remain under investigation, it should be questioned as to whether the effects are fully identified and understood. These shortcomings provide an opportunity for this study to focus on the individual in the organization, and develop theoretical insights into the factors that encourage employees to behave intrapreneurially. In order to address some of the limitations in the extant literature and build knowledge, this paper will critically evaluate the “Big Five” personality traits (Vecchio, 2003) and the “Big Five” organizational factors (Hornsby et al, 2002) at the employee level within a multinational corporation. A focus on individuals creates the opportunity to explore the conditions which influence intrapreneurial behaviour and innovation projects.

### **Research Approach**

#### ***Design***

It has been argued that internal product development is a traditional route to intrapreneurship (Zahra, 1996) which does not occur without the presence of opportunities and individuals (Shane and Venkataraman, 2000; Morris et al, 2009). However, a growing body of recent research argues that intrapreneurship relies on people and is based on innovation, such that it can be considered as a process seeking to use innovation as the means to pursue entrepreneurial opportunities (Ireland et al, 2006a,b; Worthington et al, 2009; Kelley, 2011). Hence a case study approach was pursued in the role of practitioner-researcher in order to collect a set of observations (insights) and to then generate a set of propositions about those experiences. The intrapreneurs in this study were identified as engineers that have been granted patents on behalf of the company, since by definition patents cover inventive steps

that are new in relation to products or processes that are capable of industrial application (Lowe & Marriot, 2007).

Cross-sectional primary research was undertaken in the form of a Likert-style questionnaire, one-to-one interviews and a focus group discussion; the purpose of a sequential, mixed methods approach was to permit triangulation of the quantitative and qualitative data to establish confidence in the findings (Bryman & Bell, 2007). Participants were selected from a list of employees having either filed invention disclosures or been granted patents in the UK during the last 5 years. In total 517 applications had been filed by 535 employees. The list was filtered to exclude employees that worked in a pure research role, were not based in the UK, or had left the company. This gave a population of interest of 154 employees.

### ***Data Collection***

Participants were contacted via email, requested to complete an online questionnaire and indicate their willingness to attend a face-to-face interview and/or focus group session. In total, 100 questionnaires were completed giving a 65% response rate, and 19 people volunteered to participate further; all 19 were agreeable to being interviewed and 8 were willing to participate in a focus group.

The purpose of the questionnaire was to identify the relevant themes that could be explored in the interviews and focus group discussion. The questionnaire explored the themes of the literature review using a 5-point Likert-style rating scale to collect opinion data (Saunders et al, 2009) relating to entrepreneurial traits and organizational factors that support intrapreneurship in the context of innovation. The questionnaire was pilot tested in three phases to assess face validity (Saunders et al, 2009) using engineers who were not part of the research process. Questionnaire themes are shown in **Figure 1**.

**Fig 1: Questionnaire Themes**

<b>Questions with 5-point scale (Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree)</b>
<b><u>Personality Traits</u></b>
1. I have a high need for achievement
2. I am willing to taking risks
3. I believe that I can control the events which affect me
4. I have a high need for independence
5. I have a strong ability to complete tasks and achieve goals
<b><u>Organizational Elements</u></b>
6. Reward and recognition is important to encourage innovation
7. Support from top management is required for innovation
8. The availability of time and resources promotes innovation
9. An organizational structure promoting innovation is important
10. Management tolerance of risk taking is an enabler for innovation

A series of semi-structured, face-to-face interviews were employed to explore the themes arising from the questionnaire responses. A blend of open and probing questions enabled participants to describe their experiences; specific and closed questions were used as necessary for confirmation purposes (Saunders et al, 2009). A total of twelve in-depth interviews were considered sufficient to understand the common themes in a homogenous group. This approach is consistent with the work of Guest et al (2006) who found that for non-probabilistic purposive sampling, data saturation occurs within the first twelve

interviews, such that no new themes are observed in the data. Twelve participants were randomly selected for interview in order to represent varied organizational tenures and number of patent awards. The interviews were conducted over a two-week period and digitally recorded and transcribed verbatim; interview duration ranged from 31 minutes to 61 minutes, with the average duration being 44 minutes. Invitations were sent to respondents to attend a focus group discussion and 6 were able to attend. The discussion lasted 45 minutes and was digitally recorded and transcribed verbatim.

### ***Data Analysis***

The research strategy was essentially an exploratory case study to examine intrapreneurship in a real-life context (Yin, 1981) and not expected to develop substantive theory, but moreover to provide theoretical insight (Eisenhardt, 1989). For this reason it was considered appropriate to summarize and categorize the data for analysis (Saunders et al, 2009). Questionnaire responses were condensed into a chart form and interview and focus group discussions were abridged into summary notes. The coding techniques related to the grounded theory analysis method were considered comprehensive and therefore adopted in order to convert raw data into categories. To add integrity to the research process and coding procedure, Isabella's (1990) study of manager's interpretations of unfolding change was referenced as it is considered an outstanding exemplar of grounded theory methodology (Suddaby, *ibid.*).

Exploratory categories were derived from the questionnaire themes and interview summary notes were created to add new categories. After the first 6 interviews, all transcripts were reviewed as raw data and 314 verbatim sections, or concepts, were coded and assigned to categories using code notes (Isabella, 1990; Strauss & Corbin, 1990). The transcripts were reviewed for key words, phrases or sentences that could be related to the phenomenon of intrapreneurship. In order to verify the accuracy of the coding, an independent reviewer was invited to code the data from the first interview. The reviewer was provided with 25 randomly selected concepts and asked to code them and assign them to categories; this approach was consistent with that of Isabella (1990) and yielded 84% accuracy and therefore considered an equitable validation of the coding process. On completion of the remaining 6 interviews, these transcripts were also reviewed using the same coding process, resulting in a further 332 concepts being coded and assigned to categories. The categories were derived through the simultaneous process of open coding and axial coding (Strauss & Corbin, 1990) to denote relationships between categories and to form sub-categories. Sub-categories were linked to categories through the application of the paradigm model (Strauss & Corbin, *ibid.*) to determine relationships. Selective coding was used to select the core category as a central phenomenon and hence integrate other categories around it (Strauss and Corbin, 1990). In summary, 10 initial categories were developed from the questionnaire. A total of 717 concepts were coded – 646 from the interviews and 71 from the focus group - and consequently assigned to 19 categories using open coding. The number of categories was then iteratively reduced through axial coding to 9 final categories with sub-categories.

### **Findings**

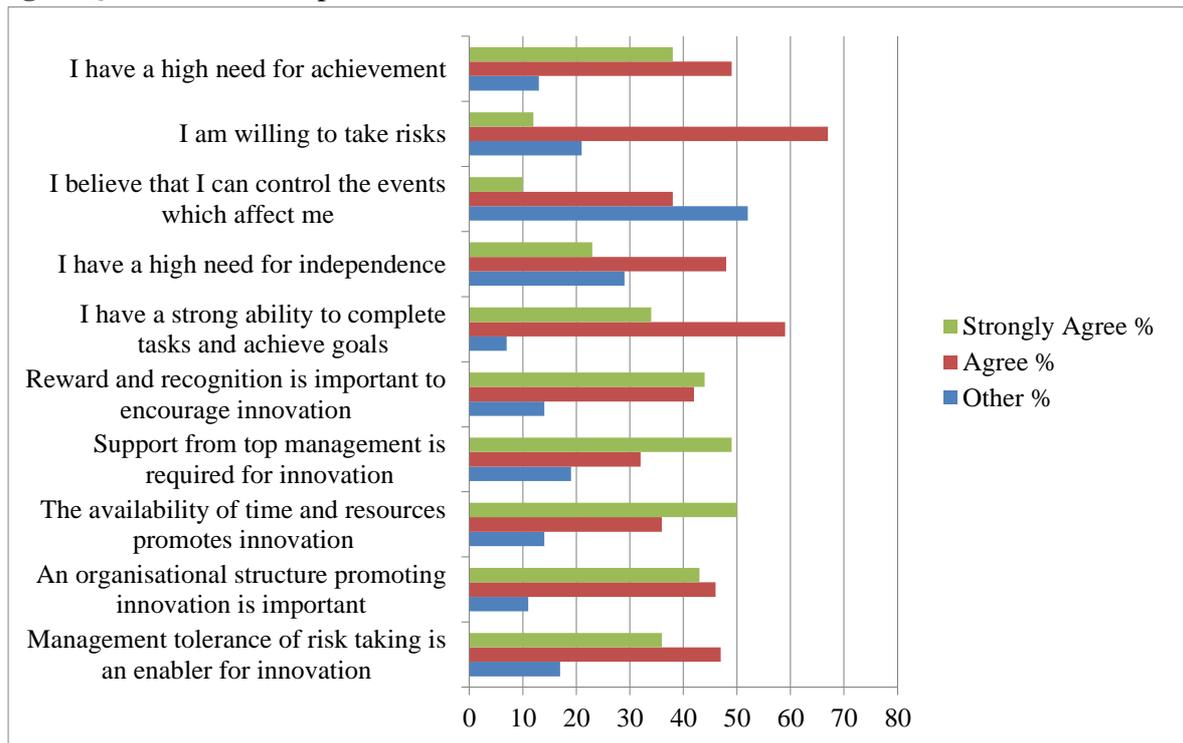
This section gives a brief overview of the key points emerging from the questionnaire responses, interviews and focus group session.

#### ***Questionnaire***

Responses can be seen in **Figure 2**, which focuses on comparing the response “Strongly Agree” to “Agree” in terms of the 10 statements shown; “Other” is the combination of

responses “Neither Disagree nor Agree”, “Disagree” and “Strongly Disagree.” The purpose of the first 5 statements was to gather opinion data regarding the “Big 5” personality traits (Vecchio, 2003) that have been suggested in the literature as important influences for entrepreneurial behaviour. Adopting the standpoint that entrepreneurs would strongly agree with all 5 statements regarding individual characteristics and hence supporting trait theory, a comparison to intrapreneurs was therefore required in order to compare and contrast differences in response. A high level observation of the responses shows that the respondents did not rate any of the statements such that “Strongly Agree” exceeded “Agree”; particular areas of interest are with regard to willingness to take risk and control of events.

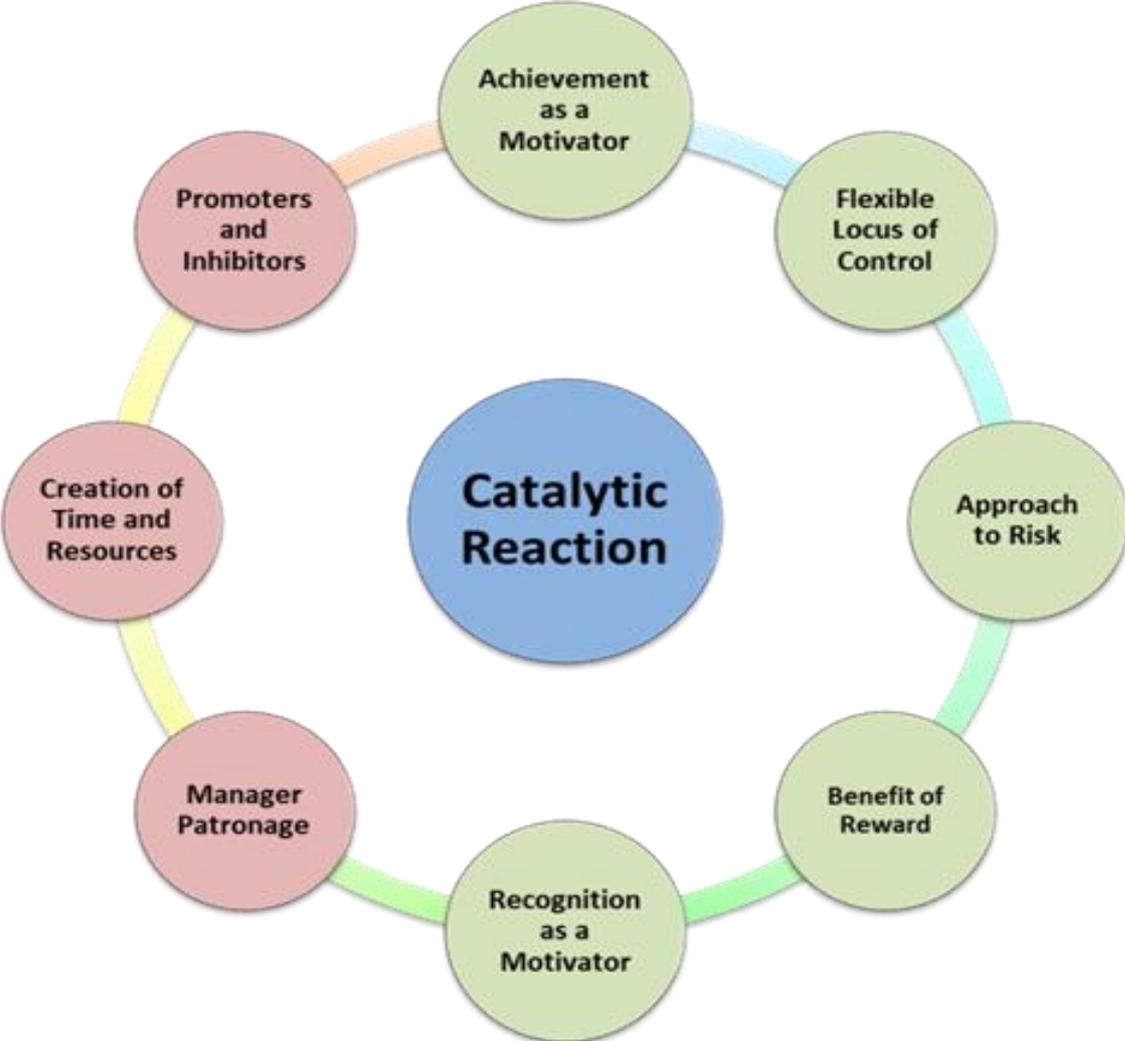
**Fig 2: Questionnaire Response**



The purpose of the second 5 statements was to gather opinion data regarding the “Big 5” organisational factors (Hornsby et al, 1999; 2002) that have been suggested as important influences for intrapreneurship. Similarly adopting the standpoint that these factors would default to strongly agree for all 5 statements, a comparison of the viewpoints of respondents was also required in order to compare and contrast differences in response. A high level observation of the responses shows that respondents rated only 3 of the statements such that “Strongly Agree” exceeded “Agree”; these were for the factors of reward and recognition, top management support and the availability of time and resources.

The interviews, focus group discussion, and corresponding coding process, enabled the data to be allocated to a single core category and eight main categories. A conceptualization of the main categories and their relationship to the core category is shown in **Figure 3** where the core category is represented as a nucleus which is orbited by the main categories. The main categories symbolize prerequisite conditions that exist in the intrapreneur’s environment which are activated when the intrapreneur discovers a problem within the job function and works to create a solution. Without that problem being identified as part of the engineer’s job function, there would be no stimulus to galvanize their abilities and therefore no reaction to the prerequisite conditions which orbit them.

**Fig 3:** The main categories orbit the nucleus as the core category



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The key takeaways from the questionnaire, interviews and focus group are summarised in **Table 6**.

**Table 6.** High level overview of main findings

**Headline Indicators**

Questionnaire

- For the Big 5 personality traits, none of the statements are rated such that “Strongly Agree” exceeds “Agree”
- Willingness to take risks and control of events are of particular interest
- For the Big 5 organisational factors, only 3 of the statements are rated such that “Strongly Agree” exceeds “Agree”
- Reward and recognition, top management support and availability of time and resources are of particular interest

Interviews

- Single core and eight main categories derived through coding
- Core category – “Catalytic Reaction”; sub-category – “Ideas”
- Main categories (Individual)
  - “Achievement as a Motivator”; sub-category – “Tasks/Goals”
  - “Approach to Risk”
  - “Flexible Locus of Control”
- Main categories (Organisational)
  - “Benefit of Financial Reward”
  - “Recognition as a Motivator”
  - “Management Patronage”
  - “Creation of Time and Resources”
  - “Promoters and Inhibitors”; sub-categories – “Patent Process”, “Metrics” and “Structure”

Focus Group

- Added clarification and depth around the categories of “Approach to Risk” and “Promoters and Inhibitors”
- “Approach to Risk”
  - Externally - tendency for risk aversion; Internally - company viewed as risk bearer (essentially managers); Recognition that intrapreneur has risk in terms of credibility
- “Promoters and Inhibitors”
  - Patent process - infringements seen as an opportunity; process should be part of projects and publicised; committee decisions unclear; international filing not understood
  - Structure - Intellectual Property (IP) deemed important for business; IP checkpoints recommended for projects; technology can come from projects and not just research

Opportunities

Software deemed major IP opportunity – apps, connectivity etc.

**Discussion**

***Individual Characteristics and the Psychology of the Intrapreneur***

Entrepreneurial trait research has been widely used to portray entrepreneurial action through personality facets and psychological states in order to define the entrepreneur (Vecchio, 2003). If trait theory is accepted such that entrepreneurial behaviour can be explained as a consequence of personality, then it would be plausible to expect a greater level of congruence in the questionnaire responses in the sense that respondents would unanimously “strongly agree” with all personality related statements. Our study found that this is not the case hence personality traits alone do not provide a complete explanation for intrapreneurial behaviour. The findings are supported by Gartner (1989) who argues that personality traits should be considered ancillary to behavioural factors, and Vecchio (ibid.) who believes that contextual

factors cannot be excluded in any analysis of such behaviour. Attempting to explain such behaviour through trait theory alone has also been pronounced a fundamental attribution error (Delmar, 2000, in Carter & Jones-Evans, 2000). Our findings show how respondents provided mixed replies to the personality related statements, thereby suggesting that intrapreneurs do not form a homogeneous group and further questioning the validity of trait theory alone. As a consequence of the difficulty in defining the intrapreneur, it has been suggested that a more accurate approach would be to focus on the different types of intrapreneur by assuming heterogeneity (Delmar, 2000, in Carter & Jones-Evans, 2000). Hence if distal factors such as traits are deficient in explaining intrapreneurial behaviour, then proximal factors should be better suited to accounting for the complexity of such behaviour (Delmar, *ibid.*).

### ***The Role of Achievement as a Motivator***

Our respondents revealed that their need for achievement was essentially self-driven. This conviction came from within, was self-defined and a motivating factor. Achievement was linked to the job role and needed to be recognized by both managers and peers, but not necessarily rewarded. Respondents disclosed that the opportunity to take responsibility and fix an issue, or the opportunity to successfully utilize and apply skills, were motivating factors which generated a sense of achievement through personal fulfilment. Respondents also described how they were motivated to seek out the right job role in order to satisfy this need, as opposed to being allocated to a role.

Our study findings are consistent with the positions of McClelland (1965, 1985), Herzberg et al (1959) and Herzberg (1987). McClelland (*ibid.*) defined motivation as an aroused motive, which can be a need for achievement; he argued that this could influence employees to seek out entrepreneurial positions and suggested that firms provide further scope for intrapreneurial behaviour. Herzberg et al (*ibid.*) separated factors affecting job attitudes into motivator factors and hygiene factors; motivator factors are the primary cause of job satisfaction and hygiene factors are the avoiders of job dissatisfaction. The motivator factors intrinsic to the role are achievement, recognition, the job itself, responsibility, advancement and growth. The hygiene factors which are extrinsic to the role include company policy and administration, supervision, interpersonal relationships, salary, personal life, status and security. Whilst noting criticism of Herzberg's studies, it has been argued that this two-factor theory retains utility and endurance (Bassett-Jones and Lloyd, 2005), which is supported by our study. Herzberg (*ibid.*) also argued that motivation is a function of growth, which is acquired from intrinsic rewards through challenging and interesting work. However, our respondents did not provide any meaningful feedback in relation to advancement or growth, or any mention of hygiene factors.

Our respondents did explain that completing tasks and achieving goals were linked to intrinsic motivation, which aligns with Miner's (1990) argument that people with high task motivation are attracted to intrapreneurial roles. Our findings also suggest that respondents operate in a task oriented domain (Miner, *ibid.*), where intrinsic motive patterns include the need for individual achievement, pursuing innovation and goal setting. There is also empirical correlation with our findings. Marvel et al (2007) observed that intrinsic motivation and work design are necessary to motivate intrapreneurs. Similarly, Williamson et al (2013) studied various occupations and identified intrinsic motivation as a key personality trait of engineers which is necessary for intrapreneurship and technical innovation. The implications for organizations are to recognize intrinsic motivation as an enabler for intrapreneurship, and

hence structure job roles such that motivator factors are amplified whilst hygiene factors are attenuated for optimum job enrichment.

### ***The Potential Flexibility of Locus of Control***

The mixed responses to our questionnaire indicate that each respondent's locus of control could be interpreted as adopting a static position on a continuum. Our respondents explained that their external environment and degree of freedom within the role affected their ability to control events, and perceived these situations as inhibiting factors which introduce an element of uncertainty and chance in their role, with regard to the outcome of tasks. This suggests that their locus of control could be situation-specific and potentially dynamic, since it could adopt a different position on that continuum dependent on the circumstances. Such behaviour and expected outcomes has been explained in terms of internal and external control (Rotter, 1966). If an individual perceives an outcome as contingent on their behaviour and characteristics, and related to skill, then their locus of control is internal. If the outcome is perceived as not entirely dependent on behaviour and characteristics, and more related to chance, then their locus of control is external (Rotter, *ibid.*).

Our respondents indicated that a need for achievement is a motivating factor. If this need was regarded as a constant, and they were given more freedom in a particular task, then our findings suggests that any perceived outcome would become more associated with skill than chance as a result of the increased level of control. Rotter (1966) acknowledges that individual perception of tasks and procedures might influence locus of control, and argues that there is a relationship between locus of control and the need for achievement. This represents an opportunity for organizations through creating job roles or assignments which enable employees to become motivated by the fact that they perceive the outcome to be contingent on their skillset, rather than potentially demotivated if aspects of the outcome are perceived beyond their control.

On the other hand, Wijbenga & van Witteloostuijn (2007) argue that environmental dynamism has a moderating effect on entrepreneurial locus of control and competitive strategies. The dominant research maintains that entrepreneurs with an internal locus of control (internals) are associated with innovation strategies, whilst entrepreneurs with an external locus of control (externals) are associated with low-cost strategies. Since dynamic environments are perceived as chance dependent and stable environments as skill dependent, the authors argue that a strategy-environment mismatch occurs because internals perceive their actions and abilities to be restricted in dynamic environments and therefore adopt low-cost strategies. Conversely, externals perceive their actions and abilities to be unrestricted in stable environments and adopt innovation strategies. However, Wijbenga & van Witteloostuijn's (*ibid.*) argument considers locus of control as a constant factor, meaning that changes in the environment affect the strategic choice. Our findings offer an alternative perspective in the sense that if locus of control is not constant, but variable, then the state of the environment actually shifts the locus of control and influences the strategic choice.

### ***Approach to Risk***

Our respondents described a self-perception of being risk averse within two main themes; firstly, due to having a responsibility for others, and secondly, due to the potential effects of uncontrollable events in their external environment. From a company perspective, respondents linked risk aversion in the role to any potential negative consequences such as the perceived long corporate memory associated with failures, or the restriction of not being permitted to take risks without permission. Respondents demonstrated an inherent sense of responsibility in both their immediate social environment and their corporate environment to

obviate the need to take risk. The social environment stems from the fact that respondents feel responsible for more than just themselves, and within the corporate environment, respondents perceive themselves as obligating a level of responsibility toward the company as an entity.

Our findings appear consistent with role schemas, that is, the cognitive structure relating to the organization of knowledge associated with expected behaviour in a role (Corbett and Hmieleski, 2007). Role schemas are context dependent and individuals will typically regulate their behaviour through either a promotion focus or a prevention focus. A promotion focus relates to accomplishment, growth and advancement, whereas a prevention focus relates to responsibility, safety and protection (Corbett and Hmieleski, *ibid.*). In the context of risk, our findings suggest that a prevention focus is applied through a work role schema, where company intellectual property is safeguarded through patents, and also a home role schema, where immediate family are shielded through not pursuing entrepreneurial ventures.

Our respondents accepted that risk taking is necessary, but the risk should be always controlled or mitigated as far as possible. The approach to risk taking is therefore pragmatic, with respondents preferring to progress with what is proven rather than delve into the unknown. Our respondents did not reveal any aspirations to take unauthorized risks or violate corporate policies, which aligns with a recent GEM report indicating that intrapreneurs tend to act within the boundaries of the organization as it provides considerable security in the event of failure (GEM, 2013). Our findings support the arguments that risk taking can be explained by individual perception of a given situation (Vecchio, 2003), and that perceived context emerges as a more realistic determinant of risk taking propensity than personality traits (Delmar, 2000, in Carter & Jones-Evans, 2000). This is encouraging from an organizational standpoint, since employees consider the context and demonstrate responsibility in relation to risk taking.

### ***The Trigger for Intrapreneurial Behaviour: Justification, Motivation and Ideas***

Our respondents delivered a core message in terms of what triggers intrapreneurial behaviour – the fact that the job role presents a problem which is consequently perceived as an opportunity to solve that problem. The core motives to behave intrapreneurially were typically related to a desire to deploy engineering skills, satisfy customer requirements and advance the company. A challenge is regarded as an opportunity, which justifies the motives for solving a problem; it is somewhat instinctive and necessary within the role to start applying skills to develop changes. Our study indicates that this type of conduct is synonymous with Burgelman's (1983) concept of autonomous strategic behaviour, since there is a degree of spontaneity from operational level participants who act on their inclinations and are reliant on their capabilities.

We next probed the subject of how our respondents identified problems - herein referred to as opportunities – within their roles. Our respondents described a process of discovery as opposed to creation (Alvarez and Barney, 2007), since opportunities were encountered in the job role, rather than generated. A common example of encountering an opportunity was through the requirement for products to meet legal requirements; respondents utilize their skills and knowledge and combine resources to address forthcoming legislative changes. Our concept of opportunity discovery within the role is supported by Shane's (2000) argument that entrepreneurs have the ability to discover opportunities without searching for them, that

technological changes generate opportunities and such opportunities are related to prior knowledge.

Upon discovering an opportunity, respondents described how they make a commitment to an end-point and combine available resources to develop that opportunity; a common example was having a patent award as a self-defined goal when developing an idea. Our study indicates that respondents are practitioners of creative causal reasoning as opposed to effectual reasoning (Sarasvathy, 2003). Creative causal reasoning is associated with strategic thinking, since new means are generated to achieve pre-determined goals, whereas effectual reasoning is associated with entrepreneurial thinking where, given a set of means, new ends can be created (Sarasvathy, *ibid.*). Our findings might offer some explanation as to why respondents choose to work for a company rather than for their own business.

The study shows that innovation is occurring through exploitation, since respondents discover opportunities within the role and deploy their skills to take advantage of them. This is consistent with Zahra & George's (2002) definition of absorptive capacity where the firm is able to exploit knowledge to create competitive advantage. However, our findings uncovered no evidence of opportunities being created; respondents explained that this was attributable to their high workload. This suggests that organizations need to have awareness that exploration might not occur among this group of employees. This is an important observation from a strategic perspective, since the strategic entrepreneurship literature argues that firms need to exploit their current sources of competitive advantages whilst simultaneously exploring opportunities for future sources of competitive advantage (Ireland & Webb 2007; 2009).

Our respondents explained that their creative ideas were linked to the business, were not confined to their day job and would often cross functional boundaries. They felt unequipped to cross these boundaries and reticent to push their ideas, either for fear of intrusion into a different area or due to a lack of knowledge of how to pursue their ideas. Kuratko (2009) argues that applying creativity and developing innovation can be a stimulus to building competitive advantage, hence there appears to be an opportunity for organizations to capture creative ideas and realize such benefits.

## **Organizational Factors and the Impact on the Intrapreneur**

### ***Is There a Benefit of Financial Reward?***

The outcomes from this area of the study were expected to align with the corporate entrepreneurship literature, which customarily portrays financial reward as a prevailing motivator for intrapreneurial behaviour. Such reward is typically through increased salary or promotion (Hornsby et al, 2002; Antoncic and Antoncic, 2005; Mahnke et al, 2007). However, our study findings contradict the extant literature, since financial reward was not found to be a motivator for intrapreneurial action.

Our findings challenge the dominant logic, through revealing that financial reward is ordinarily viewed as a nice-to-have, discretionary rather than mandatory and not a motivator for initiating intrapreneurial activity. Our respondents viewed financial rewards from patents as either a minor incentive or nominal compensation for their innovation. This was despite the fact that the fiscal value can range from hundreds to thousands of pounds, dependent on the success of the patent. Respondents explained that the incentive aspect related to the prospect of future monetary reward, and the compensation aspect related to a potential monetary return for the additional effort of own time working, writing and filing the patent. Respondents also emphasized the fact that financial reward is not guaranteed at the outset of a project, since it is not known at that stage how a patent application will subsequently

materialize. Additionally, some of our respondents had embarked on patent applications without realizing until much later in the process that monetary reward was attainable. Respondents explained that within their job role, they felt duty-bound to build and protect intellectual property rather than seek financial reward, since they were already being paid for doing their job. This is an important revelation for organizations, since the offer of financial benefit is unlikely to motivate employees to be more innovative.

### ***Is Recognition a Motivator?***

This area of the study was expected to highlight that recognition has some importance as a motivator factor, but is less significant than other factors. Although recognition receives far less attention than reward in the literature, it has been cited as a form of positive feedback (Scanlan, 1981; Hornsby et al, 1993) and acknowledged through the act of reward (Marvel et al, 2007). However, our findings illustrate that recognition is a critically important motivator factor. Management recognition was considered formal and perceived as acknowledgement of a job well done, whereas peer recognition was considered informal and perceived as acknowledgement of utilizing intellect in developing innovative solutions. In terms of recognition events, our respondents felt that these should be low-key and explained that a handshake, photograph or certificate behind closed doors was appropriate. Recognition was interpreted as a form of positive feedback that should carry sincerity and not be too frequent to avoid it becoming diluted or mundane. If names or photographs were published in company literature, then this was seen as a positive way of communicating that the invention had been created and thereby potentially inspiring others to be innovative. Both formal and informal recognition were perceived as an illustration of respect in acknowledging the contribution made, having a high emotional value to the recipient, and also providing the inspiration and motivation to develop new ideas. Our findings are further supported by two-factor theory in the sense that recognition can be considered a motivator factor whilst (financial) reward can be considered a hygiene factor (Herzberg et al, 1959). An important opportunity for organizations is to appreciate the capacity of recognition as a key enabler for intrapreneurial behaviour and therefore place emphasis on the benefits of effective recognition processes.

### ***The Art of Creating Time and Resources***

The overwhelming stance from our respondents was that creative time would be found either through the job as slack time, or through personal time as hobby time. There were mixed views on whether time should be formerly allocated to facilitate creativity. Some respondents explained that they could be creative in prescribed time as they already worked this way, whilst others could not, since ideas came to them spontaneously. With regard to allocating time for creativity to all employees, respondents felt this was unnecessary and believed that individuals should be capable of managing their own time. Formally allocated time for creativity was perceived as a risk, should employees not use the time effectively, or for the purpose for which it was granted. Resources were perceived as facilities, materials, people or suppliers. Our respondents felt that projects would get to a stage where organizational support became necessary for continuation. At this point, projects were considered too cumbersome to handle on an individual basis and the organization could remove barriers by providing resources, which were deemed essential in order to accelerate the pace of the projects.

Our respondents explained that they regarded the creation of time and resources as mandatory, so that projects could be delivered without cutting corners. Our findings are reinforced by Hornsby et al (2009) who argue that available time and resources are enablers

for intrapreneurship. However, the extant literature highlights mixed opinion in the debate regarding the appropriation of time and resources when managing intrapreneurial projects. Christensen (2005) acknowledges the importance of time and resources, but argues that employee knowledge and skill are additional factors that firms should consider. According to Menzel et al (2007), a fixed ratio of working time should be devoted to intrapreneurial projects and capital should be made available to fund resources. Conversely, Alpkhan et al (2010) found no correlation to support their hypothesis that additional free time increases a firm's innovative performance. Our findings illustrate the difficulties faced by firms when allocating time and resources to intrapreneurial projects. Since the outcomes of such projects have elements of uncertainty and risk, then firms might need to increase their tolerance of failure and be prepared to write-off the time and resources spent on such projects, rather than seeking defined paybacks.

### ***The Need for Management Patronage***

Our respondents revealed that senior management support was perceived as crucial for disseminating the intrapreneurship message to functional teams. Respondents typically enlisted senior managers in cases where the helicopter view was needed, and where their organizational knowledge could be utilized to lobby support and influence stakeholders. Support from senior managers was often required during latter project phases, typically for approval to continue. Middle managers were regarded as being under pressure to deliver existing projects and therefore unlikely to possess the required bandwidth for new ideas. Such managers were understood to have a tendency for risk-aversion with little appetite for any fallout from failed attempts at unplanned innovation. Immediate management support was typically required during initial development phases and was considered necessary for guidance and encouragement in progressing to the next step. Management support was also considered as having the potential to embolden others to participate in intrapreneurial activity through transmitting a positive message to the workforce, and was also interpreted as a form of recognition through patronage. Our findings are supported by the literature which advocates the benefits of management support for intrapreneurship (Kuratko et al, 1990; Antoncic, 2007). This support can manifest itself through various practices including sponsorship (Christensen, 2005), motivation (Marvel, 2007), and problem solving and conflict resolution (Alpkhan et al, 2010). Our study confirms that management patronage from different levels of management, at various times and in certain formats, facilitates intrapreneurial behaviour. This type of organizational support has been shown to have a positive impact on employee entrepreneurial behaviour (Pearce et al, 1997; Zampetakis et al, 2009).

This study also indicates that middle management can become an unintentional bottle-neck in the innovation process due to conflicting objectives and priorities. A key opportunity for organizations is to calibrate managers to a common set-point and ensure that their roles enable them to adopt a positive stance regarding intrapreneurship. Menzel et al (2007) support this notion and believe that senior management have a role to develop a clear commitment to intrapreneurship initiatives; the authors suggest promoter, sponsor and protector roles for managers as advocates of intrapreneurs.

### ***Measuring and Promoting Innovation Activity***

Our respondents envisaged benefits in measuring innovation activity, acknowledging that this would be challenging to implement in practice, but not insurmountable. Formal cascading of innovation objectives was perceived as a way of demonstrating a commitment to innovation in the sense that it becomes a component of normal business. The motives for this stance

related to the fact that Intellectual Property (IP) and safeguarding creative developments were of immense importance to the business and reinforced long-term brand perceptions. Our findings align with Chesbrough's (2004) argument that there is a benefit to the firm in measuring innovation, especially in uncertain markets. Chesbrough (ibid.) suggests measuring internal and external licensing revenue, patent timelines and their implementation, and reassessing terminated projects as ways of enhancing the business model.

Our respondents sensed a conflict between delivery and innovation, with the core business of product development focused on delivering new technology, and with innovation led by pure research teams. If innovation were to be considered as a key attribute of new technology, then it was anticipated that this would complement delivery rather than disrupt it. They felt that supporting structures could be introduced to consolidate innovation and delivery, such as increased cross-functional team involvement at earlier stages in the development phase in order to optimize knowledge sharing (Menzel et al, 2007). This study also considered work environment and recruitment in the context of encouraging innovation, with respondents regarding the ambient environment and recruitment policy as significant opportunities to attract creative types and harvest an innovative mind-set. This study aligns with the claims that an appropriate physical environment will foster intrapreneurship (Menzel et al, 2007) and that correct person-to-organization fit results in greater job satisfaction and increased performance (Markman and Baron, 2003).

Our respondents regarded the patent process as significant for encouraging and supporting innovation. They felt that if the process could be publicized and quantified, then this would facilitate process engagement and increase the number of invention disclosures and patent applications. They were also interested to understand the financial benefits received from licensing revenues and trading values; international comparisons against competitors was of particular interest. Respondents believed that there would be a benefit in quantifying the value of patents as a tangible financial measure in terms of revenue and profit (Chesbrough, 2004). Our findings provide an important observation given that intrapreneurship has been positively associated with financial performance (Zahra and Covin, 1995).

## **Conclusions and Further Research**

The purpose of our study was to aid understanding of the factors that motivate engineers to behave intrapreneurially within a multinational corporation, through examining their proclivity for innovating. Our findings illustrate the advantage of exploring the weakness that was exposed in the literature review through engaging individuals in the workplace to understand their perspectives on intrapreneurship. These findings show that whilst individual characteristics and organizational factors are essential for intrapreneurial behaviour, these cannot be applied in a linear fashion. Grouping together employees that share personality traits and providing them with the same levels of organizational support is not a prerequisite for intrapreneurship to occur. The phenomenon is multidimensional, meaning that additional factors must be considered.

Although employees that demonstrate intrapreneurial behaviour form a collective group, there are differences between individuals within that group. Our findings show that personality traits vary in strength between individuals with regard to their need for achievement, willingness to take risks, locus of control, need for independence, and ability to complete tasks and achieve goals. This variation can be explained by the different cognitive and

behavioural factors that these individuals apply when confronted with specific tasks within their job role. Hence when looking inwards at the intrapreneur, a dynamic relationship exists between personality, behaviour and context. This specificity to the individual suggests that heterogeneity should be assumed when studying intrapreneurs.

A focus on the micro level of the organization also shows that the universal application of five prescriptive organizational factors does not guarantee intrapreneurial behaviour. It is not sufficient to offer reward and recognition, top management support, time and resources, a tolerance for risk taking and a structure to inspire intrapreneurship. Our findings show that intrapreneurship is not merely reliant on individual characteristics and organizational factors. Additional factors come into play that moderate the process by either promoting or inhibiting intrapreneurial behaviour. These moderating factors are likely to be specific to the organization and far outnumber the prescriptive factors. Our study suggests that intrapreneurship can be considered as a process which is not only dependent on individual characteristics and organizational factors, but also promoting and inhibiting factors, which each combine as a set of interrelated variables that differ in relative strength and thereby influence the outcome of the process.

Further research with regard to motivation especially in relation to advancement or growth and hygiene factors would be useful to allow a more detailed understanding to emerge. A second research opportunity would be to explore the reasons as to why participants described a process of strategic thinking rather than entrepreneurial thinking and whether this influences decisions such as whether to work for an employer or engage in self-employment. A limitation of this research is the lack of cross-sectional and comparative research design due to one case being studied which hinders comparisons and generalization with regard to innovation in the workplace. A final limitation is that demographics such as age, number of patents awarded, gender and organizational tenure were not considered and could be researched further to allow comparisons and generalizations to be made.

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