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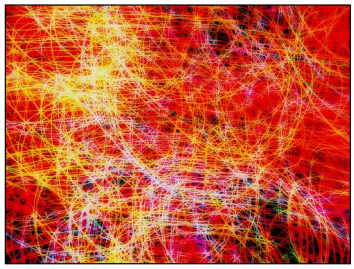
February 2014





## *Seeking Solutions*

Welcome to the February 2014 issue of the *Technology Innovation Management Review*. This month's editorial theme is Seeking Solutions. We welcome your comments on the articles in this issue as well as suggestions for future article topics and issue themes.



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## Overview

The *Technology Innovation Management Review* (TIM Review) provides insights about the issues and emerging trends relevant to launching and growing technology businesses. The TIM Review focuses on the theories, strategies, and tools that help small and large technology companies succeed.

Our readers are looking for practical ideas they can apply within their own organizations. The TIM Review brings together diverse viewpoints – from academics, entrepreneurs, companies of all sizes, the public sector, the community sector, and others – to bridge the gap between theory and practice. In particular, we focus on the topics of technology and global entrepreneurship in small and large companies.

We welcome input from readers into upcoming themes. Please visit timreview.ca to suggest themes and nominate authors and guest editors.

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# Editorial: Seeking Solutions

Chris McPhee, Editor-in-Chief

Welcome to the February 2014 issue of the *Technology Innovation Management Review*. This month's editorial theme is **Seeking Solutions**, which takes its name from an approach to local open innovation that was a focus of our March 2013 issue (timreview.ca/issue/2013/march).

The first three articles in this issue were selected from papers presented at the first International Seeking Solutions Summit (I3S; i3s-conference.com), which was held in Quebec City, Canada, in November 2013, as a collaboration between En Mode Solutions (enmode solutions.com), Quebec International (quebecinternational.ca), and the TIM Review.

The International Seeking Solutions Summit was paired with the 3rd Quebec Seeks Solutions event (tinyurl.com/ktso4ap), in which companies presented their challenging industrial problems to a local community of multidisciplinary specialists. On the first day, an international line-up of summit participants came together to "think globally" about local open innovation; on the second day, companies and problem solvers came together to "act locally" in developing creative solutions to the complex problems faced by local companies. It was my pleasure to participate in these two unique events, and I hope that the articles in this issue will encourage you also to think globally and act locally to foster innovation.

In the first article, **Stoyan Tanev** and **Marianne Harbo Frederiksen** from the University of Southern Denmark emphasize the importance of customer creativity in the adoption of new technology products. They argue that companies can increase the success of their innovation activities by viewing innovation as "the adoption of a new practice by a community", which will shift their focus to the ultimate recipient of the innovation outcome: the customer. The authors outline a generative approach to managing innovation, including practices to sharpen a company's focus on the adoption of its technology products by its customers.

Next, **Jesper Bank** and **Adnan Raza** share their experiences with collaborative idea management at Waabii Limited. Collaborative idea management is a means for companies to harness the creative input of their employees on an ongoing basis to drive continuous innovation. Bank and Raza identify the factors that inhibit innovation in growing companies, and then describe the key elements of collaborative idea management as a means of overcoming these inhibitors. They describe the key components of the tools and processes to support and implement collaborative idea management, and provide a case study to demonstrate its benefits.

**Tom Coughlan** from the School of Business at Mercy College in Dobbs Ferry, New York, examines the different types of proximity – not just the physical distance between individuals – to illustrate the importance of virtual proximity in enhancing a company's innovation capability. Virtual proximity refers to the level of emotional closeness between individuals, as developed through the use of information and communications technologies. Couglan highlights the importance of virtual proximity by identifying the key elements of effective communication and use of media, and the related links between regional clusters and innovation. The article concludes with practical recommendations for managers developing a virtual proximity strategy.

In the final article, **Walter Miron** and **David Hudson** from Carleton University in Ottawa, Canada, identify the barriers that managers of development projects of large technology firms face in allowing employees to act entrepreneurially. By reviewing the literature on entrepreneurial orientation and employee entrepreneurship, they examine the obstacles to employee entrepreneurship within development projects using the component framework from entrepreneurial orientation. Finally, they provide a tool that managers of development projects can use to help their project members overcome the obstacles to employees acting entrepreneurially in large technology firms.

In March, we will welcome back David Hudson in the role of guest editor for an issue on the editorial theme of Emerging Technologies.

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*Chris McPhee*

Finally, please note that the International Seeking Solutions Summit was also supported by the International Society for Professional Innovation Management (ISPIM; ispim.org) as a precursor for the first **ISPIM Americas** conference (americas.ispim.org), which will be held in Montreal, Canada, on October 5–8, 2014. Carleton University's TIM program and the TIM Review will be organizing a conference track on technology entrepreneurship and innovation, and I encourage you to read the call for papers (tinyurl.com/kqrp5od) and consider attending this unique conference.

We hope you enjoy this issue of the TIM Review and will share your comments online. Please contact us (timreview.ca/contact) with article topics and submissions, suggestions for future themes, and any other feedback.

**Chris McPhee**
**Editor-in-Chief**

## About the Editor

**Chris McPhee** is Editor-in-Chief of the *Technology Innovation Management Review*. Chris holds an MASc degree in Technology Innovation Management from Carleton University in Ottawa and BScH and MSc degrees in Biology from Queen's University in Kingston. He has over 15 years of management, design, and content-development experience in Canada and Scotland, primarily in the science, health, and education sectors. As an advisor and editor, he helps entrepreneurs, executives, and researchers develop and express their ideas.

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# Generative Innovation Practices, Customer Creativity, and the Adoption of New Technology Products

Stoyan Tanev and Marianne Harbo Frederiksen

> *"It is absurd to claim that our customers are missing! So say surprised skeptics seeing our claim of missing customers. What if our problem with value is rooted in a misconception of our customers, the people we are creating value for?"*
>
> Peter J. Denning & Robert P. Dunham
> "The Missing Customer" (2003; tinyurl.com/kl7y2wp)

We offer a critical reflection on one of the key reasons for the startlingly low success rate of innovation initiatives worldwide – the fact that the interactive environment surrounding the customer is a critical part of the adoption process; it can and should be designed in a way that enables customer creativity, and thus adoption. In this article, we embrace a definition of innovation as "the adoption of a new practice by a community" where the innovator is the one who does not only sense and move into new opportunities but also mobilizes all the necessary resources needed by customers to adopt a new practice. The emphasis on adoption merges together innovation and entrepreneurship by shifting the focus from the inventor and the designer, through the entrepreneur, to the ultimate recipient of the innovative outcomes. Looking at customers as co-creators is critically important for technological product adoption; missing the chance to enable their creativity is equivalent to missing the opportunity of seeing them for who they really are. The result is a distorted vision that is ultimately rooted in the misconception of the dynamics of customer value. We particularly emphasize two points: i) the increasing degree of complexity of everyday technological products requires a higher degree of creativity by customers to adopt; and ii) customer creativity is not only a function of user-technology interaction, it is a function of the various actors in the interactive environment surrounding the customer such as other customers, other technologies, local distributors, customer/technical support providers, and competitors.

## Introduction

According to a 2005 *Business Week* article, the success rate of innovation initiatives in terms of meeting their financial objectives is less than 4%, with the innovation success rates within specific industries ranging from a mere 1% in the toy industry to only 7.5% in the pharmaceutical industry (Nussbaum, 2005; tinyurl.com/krb6oyv). In a more recent study, Strategyn (2010; tinyurl.com/olgqvtp) used 12 different sources to evaluate the success rate of traditional innovation methods. The study reports success rates between 1% and 86%, with an average success rate of 17%. After removing the low and high outliers from the analysis, the average rate goes down to 8.5% – exactly half of the initially reported 17%. A most recent study by Accenture (2013; tinyurl.com/n7hdyb4) found that 93% of executives regard their company's long-term success to be dependent on its ability to innovate; but, at the same time, less than one out of five (18%) believe that their strategic investments in innovation are paying off. According to the study, such a poor track record discourages companies from taking

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the risk of initiating more radical innovation projects. There is no doubt that the specific success rates reported by the different studies depend on the methodology, the purpose of the study, and the particular context of their key messages. However, they seem to consistently indicate that, at the beginning of the 21st century, human involvement in dedicated innovation activities has not been as successful as we have been expecting it to be. Many companies are simply struggling with it – a fact that has been borne out in numerous other studies as well as in the marketplace, where new product introductions quite often fail to meet expectations even as others soar beyond expectations. What is the reason for such discouraging performance? Should we just lower our expectations by admitting that innovation is a risky game and silently agree to waste more than 80% of our investments? Or, should we try to locate the roots of the cause and work towards improving the success rate? What can innovators and entrepreneurs do to improve it?

In this article, we argue that one of the reasons for such failure could be associated with narrow or fluffy definitions of innovation that are impossible to translate into actionable insights. The problem with inadequate definitions is that: i) they misinterpret the job of the innovator and the entrepreneur; and ii) they misplace the focus of company efforts into activities that do not enable potential customers to become actual customers thus making the companies "miss the customer." We start by considering innovation as "the adoption of a new practice by a community", which emphasizes the critical roles of both innovators/entrepreneurs and customers as the two active poles of the dynamic adoption process. The entrepreneurial aspects are addressed by describing a generative approach to managing innovation, including several personal practices focusing on adoption. The customer aspects are addressed by conceptualizing customer creativity as an important factor in the adoption process. The article concludes by emphasizing the relevance of the topic with respect to the ever-increasing complexity of everyday technological products and summarizing the key insights of the analysis.

## Innovation as the Adoption of a New Practice by a Community

The particular working definition of innovation appears to be of critical importance for companies. Baregheh, Rowley, and Sambrook (2009; tinyurl.com/ko9r7h4) emphasize the fundamental difficulties in defining innovation by referring to its multidisciplinary nature. They have analyzed 60 definitions from eight fields including: business and management; economics; organization studies; innovation and entrepreneurship; technology, science and engineering; knowledge management; and marketing. Building on these diverse definitions, they propose a general and integrative definition that could be applied to the majority of contexts: "Innovation is the multi-stage process whereby organizations transform ideas into new/improved products, services, or processes, in order to advance, compete, and differentiate themselves successfully in their marketplace."

In this article, we embrace a definition suggested by Denning and Dunham (2010; innovators-way.com) who stress that successful innovation cannot be completed until the community of the intended users has actually adopted a new practice. For them, innovation is "the adoption of a new practice by a community". With such a definition, the focus of innovation shifts from invention to adoption practices and emphasizes the fact that there are millions of inventions that have never found their way to the marketplace. Interestingly, Accenture's (2013; tinyurl.com/n7hdyb4) study mentioned earlier found that one of the key reasons for the low efficiency of companies' innovation activities is the so-called "invention trap" – the "overreliance on the invention process itself to produce success and relative lack of systematic, enterprise-wide processes capable of commercializing inventions into products or services at scale, bringing them to market in a sufficiently timely fashion and reaping the expected returns."

The key benefit of the definition provided by Denning and Dunham is that it decouples the practices of invention from the practice of innovation which focuses on enabling adoption. This decoupling has two main effects. First, it merges together innovation and entrepreneurship, because they both could now be considered as managing and implementing change as part of the adoption of new practices. Second, it opens the opportunity to account for the value co-creation role of customers during the adoption process – a point that needs to be strongly emphasized. The two effects should be considered in a self-consistent manner because they are dialectally interrelated.

## A Generative Approach to Managing Innovation as Adoption

Denning and Dunham (2010; innovators-way.com) have developed a generative approach to managing innovation, which consists of eight practices within three

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categories: i) *the work of invention*, including the practices of sensing and envisioning; ii) *the work of adoption*, including the practices of offering, adopting, and sustaining; and iii) *the three practices providing the environment for all the other practices*, including executing, leading, and embodying. One of the key messages of this classification is that the major work of innovation is not related to invention but rather to the personal practices of innovators and entrepreneurs aiming at getting others to adopt a new practice enabled by a new product, process, or service. *Offering* is the first such practice including the presentation of a proposed new practice and its benefits to the community and its leaders so that they commit to considering it. *Adopting* is getting the community members to commit to adopting the practice for the first time, while reserving the option of dropping it if not satisfied after a trial period. *Sustaining* consists of getting the community members to commit to the practice for an extended period, integrating it into their other practices, standards, incentives, and processes, and making it productive for its useful life.

Denning and Dunham (2010; innovators-way.com) identify the following key activities associated with the offering practice:

- drawing listeners into a discussion about the ways of producing the new outcome
- modifying the proposal to fit listeners' concerns
- establishing trust in your expertise to fulfill the offer

They identify the following key activities associated with the adopting practice:

- achieving initial commitment to the new practice
- continuously demonstrating the value of the new practice
- showing how to manage risks and deal with resistance
- aligning action plans for coherence with existing practices, concerns, and interests
- addressing different community member adoption rates
- recruiting allies
- developing marketing strategies for the different groups in the community
- continuously look for ways to overcome resistance

And finally, they identify the following key activities associated with the sustaining practice:

- achieving commitment to stick with new practice
- developing supporting mechanisms, tools, and infrastructure
- integrating the new practice with the surrounding environment, standards, and incentive systems
- continuously assessing for negative consequences
- carefully abandoning bad or obsolete innovations

Denning and Dunham point out that the key activities associated with the three adoption practices should be considered at the personal level as conversational or rather discursive expressions of human behaviour. According to such a discursive perspective, the personality of the innovator or the entrepreneur should be considered in terms of the specific personal practices and their outcomes – "the streams of human actions and interactions, which can be understood in terms of their meanings for the actors and interactors and the norms and the traditions that are generally accepted by the people involved and which shape their actions" (Harré and Moghaddam, 2012; tinyurl.com/mq42vad).

It is true that conversation is very useful, but it is not the only model for analyzing such streams of action. However, it allows for treating all that people do collectively and individually, as well as privately and publicly, as if it were a kind of conversation or discourse – in other words, as consisting of meaningful exchanges constrained by a specific normative framework (Harré and Moghaddam, 2012; tinyurl.com/mq42vad). The entrepreneurial discursive skills and dispositions are a subset of human personal knowledge that most people possess to a certain extent but might not have been able to express, grow, or master. This realization has great implications for the study of entrepreneurship and innovation because it points out that the role of the learning process is to help all interested in entrepreneurship to discover the depths of their entrepreneurial self and nurture it in a consistent way.

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## Customer Creativity as a Key Factor in Technology Adoption

Denning and Dunham's approach has a great value in articulating the job of both innovators and entrepreneurs in terms of the specific practices that could be learned and perfected. Their approach, however, does not seem to sufficiently emphasize another important aspect – the fact that customers' activities are an equally important component of the adoption equation. We believe that the second major reason for the failure of the majority of innovation initiatives in the technology domain is the lack of proper understanding of the creativity needed by the ultimate users who are struggling to adopt the newly developed products. Our emphasis on customer creativity in the adoption of new products does not intend to undermine the efforts of designers, innovators, or entrepreneurs; it is just an attempt to locate another major source of the problem and suggest a way out of it. The solution includes the repositioning of the creativity concept within the context of customers' adoption efforts.

The widely acknowledged definition of creativity refers to the novelty, usefulness, and appropriateness of a new product (Duxbury, 2012; timreview.ca/article/594). However, this definition misses the important element of appropriation, which can be seen as a result of the creative efforts of the ultimate recipients of the new product. The increasing complexity of new technological products enlarges the difference between the total value built in as part of the design, development, and manufacturing process and the customer's perspective of that value. The difference allows us to emphasize two points. First, potential customers make purchase and adoption decisions on the basis of the relative benefit Δ1, which is the difference between the total value (reflecting the entrepreneurial perspective) and the value of whatever their currently existing solution is (Figure 1). Second, the estimation of the relative benefit Δ1 is based on the assumption that customers know in advance what the total value of a product is. It assumes that the total value is an objectively existing property that could be easily appreciated by potential customers. This last assumption is not true, especially in the case of more complex technology-based products. What customers really know is the perceived value of the product and, unfortunately, this perceived value could be lower than the value of their existing solution, leading to a negative relative benefit Δ2. In such situations, customers have two options: either neglect the new product or make the effort to further appreciate the total value of the new product.

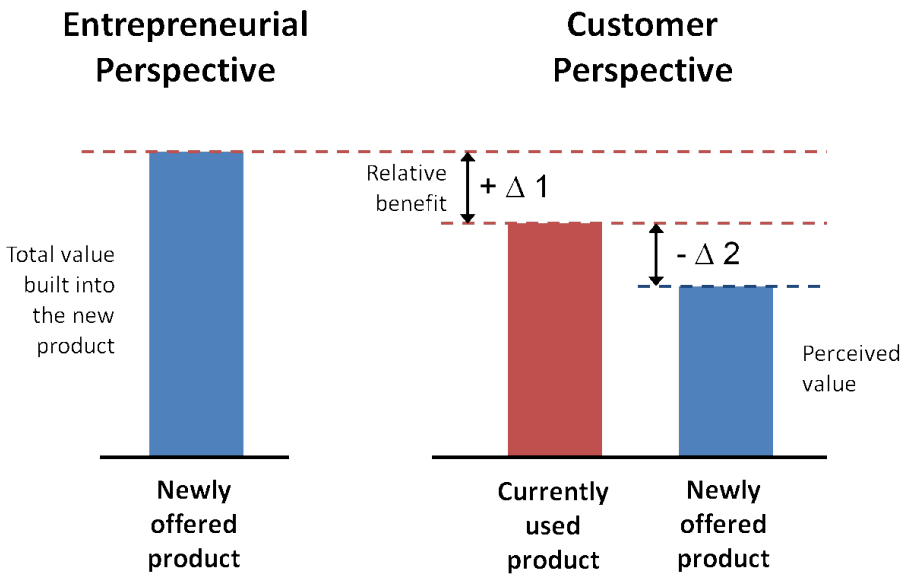


**Figure 1.** Visualization of the difference between the total value of a new product and its perceived customer value. Modified from Adner (2012; thewidelensbook.com).

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The reason for us to focus in greater detail on the difference between the total and the perceived value of a new product is to emphasize that: i) an adoption decision does not happen before there is a positive difference between the perceived value of a newly offered product and the value of the existing solution used by the potential adopters of the new product, and ii) this process takes time and effort on the side of the potential customers. In this sense, the perception that will make a specific potential customer buy and adopt is to a great extent the result of this customer's own activities and creative efforts – in other words, it should be conceptualized as customer creativity.

Product attributes are manifested within the context of specific circumstances. For example, two different customers may associate an original technological product with completely different perceptions depending on the degree of their actual involvement and creative efforts in actively appreciating its use value. One could actually speak of this association as a process of "product co-creation" given that the evolution of the perception of a particular product makes sense only within the specific context of a particular customer. In other words, every customer co-creates the product for him or herself using accessible resources. In this sense, customer creativity is always co-creativity; it is dialogical and relational. The dialogue and the relations go far beyond the activities emerging within the context of the dyad formed by the user and the technology to include all possible insights from a variety of actors in the interactive environment surrounding the customer, such as other customers, other technologies, local distributors, customer/technical support providers, and competitors. This realization suggests that activity-based approaches such as actor-network theory (Latour, 2005; tinyurl.com/m99un78) and activity theory (Kaptelinin and Nardi, 2006; tinyurl.com/m4qp8s3) could be highly appropriate in studying the dynamics and the outcomes of product adoption.

## The Increasing Complexity of Everyday Technological Products

The discussion of customer creativity suggested here is justified by the realization that there is an increased degree of complexity in most of the technological products used in everyday human lives. The higher degree of complexity generates both societal and personal pressures that are in the process of changing many aspects of the human condition. Scale is one of the critical concepts that could help in understanding how societal pressures are resulting in a significantly increased degree of technological complexity. It refers to the unprecedented increase of human population, the increasing intensity of the globalization processes, and the increasing relevance of technology in everyday human life. The increasing scale of society is forcing a shift from trust and trustworthiness based on personal relationships to impersonal trust, predictability, and compliance in both people and systems, which leads to different societal pressures from a number of different directions (Schneider, 2012; tinyurl.com/mcj8xwf):

1. Having more people in society changes the effectiveness of different reputational pressures driven by the necessity for the majority of people to follow dominant group norms due to fear from bad reputation.

2. There is a visible tendency for an increased degree of complexity of everyday technological products, given that having more people in society means more interactions among people. More interactions among people cause both the emergence of new societal dilemmas and interdependencies among them. The interdependency of newly emerging dilemmas requires new and more complex social management systems that need to rely on technology even more. Uncertainty is a key component of new technology development and more technology means that the new systems may have more flaws as well as a higher risk of failing in surprising and unexpected ways, which additionally complicates the entire socio-technological environment.

3. There is a growing variety of new technological systems. As more and different technology permeates human lives and society in general, there will be new areas of concern that will need to be addressed, new societal dilemmas, and newly emerging technological challenges. In this context, the concept of scale in society becomes even more important because more aspects of our society are going to be controlled not by people but by technologically automated systems. Unfortunately, the ongoing automation of social systems is paralleled by a process of depersonalization of the interaction between people, which additionally increases social pressures due to the inability to efficiently clarify problems associated with communication ambiguities.

4. Globalization has brought the opportunity for people to move much greater distances across national borders, across nations, and across continents. Greater

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distances create the potential for more people, with weaker social ties, to be involved in mutual accidental interactions, which may weaken their moral and reputational pressures and diminish the strength of their home-based institutional pressures. This situation creates a necessity for more control and more monitoring, not only of people, but also of unprecedented amounts of goods and services, which additionally enhances the need for more complex technological solutions based on wireless, sensing, information and communication technologies.

## Conclusion

In this article, we embraced a definition of innovation as "the adoption of a new practice by a community" where the innovator is the one who mobilizes all the necessary resources to enable customers to adopt the new practice. One of the benefits of such a definition is that it merges together innovation and entrepreneurship and shifts the focus from the inventor and the designer to the entrepreneur and the ultimate adopters of the innovative outcomes. The entrepreneurial aspects of technology adoption were discussed by summarizing the generative practices adoption framework suggested by Denning and Dunham (2010; innovators-way.com). We have, however, also emphasized the relevance of customers' creative efforts and activities as a key factor in the adoption process and suggested conceptualizing these efforts as part of customer creativity. The point of this emphasis is to underline the fact that customer creativity is another key prerequisite for the success of innovation initiatives. Failing to integrate the mastership of the personal innovation practices to the design and development of a commercialization environment that enables the co-creativity of customers will always result in missing the customers as the ultimate destination of the firm's offerings.

## About the Authors

**Stoyan Tanev** is an Associate Professor in the Department of Technology and Innovation and member of the Centre for Integrative Innovation Management at the University of Southern Denmark, Odense, Denmark, as well as Adjunct Professor in the Department of Systems and Computer Engineering at Carleton University in Ottawa, Canada, where he was previously a faculty member in the Technology Innovation Management Program. He has a MSc and a PhD in Physics jointly from the University Pierre and Marie Curie, Paris, France and the University of Sofia, Bulgaria, a PhD in Theology from the University of Sofia, Bulgaria, an MEng in Technology Management from Carleton University, Canada, and an MA from the University of Sherbrooke, Canada. He has multidisciplinary research interests with a focus on the fields of technology innovation management, born global technology startup business model development and value co-creation. Dr. Tanev is Senior IEEE member and member of the Review Board of the *Technology Innovation Management Review*.

**Marianne Harbo Frederiksen** is an Associate Professor in the Department of Technology and Innovation and a member of the Centre for Integrative Innovation Management at the University of Southern Denmark. Currently, she is also a PhD student focusing on creative processes and outcomes in connection with new product development and adoption and therefore the linkages between creativity and innovation. She has an MSc in Architecture from the Aarhus School of Architecture, Denmark, with a specialization within industrial design and product development. She has been co-owner of a design company and has worked in and together with several industries as a designer and R&D Manager as well as an adviser in public-private research projects focusing on user experience, experience designing, and other aspects of product development.

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# Collaborative Idea Management: A Driver of Continuous Innovation

Jesper Bank and Adnan Raza

> *"Collaboration is important not just because it's a better way to learn. The spirit of collaboration is penetrating every institution and all of our lives. So learning to collaborate is part of equipping yourself for effectiveness, problem solving, innovation, and life-long learning in an ever-changing networked economy."*
>
> Don Tapscott
> Business executive, author, and speaker

Despite the critical importance of innovation to most companies' ongoing success, many organizations fail to develop sustainable innovation management processes. The article explores the application of collaborative idea management to drive continuous innovation in large organizations based on our experience at Waabii, an innovation software and consulting service provider. First, we identify the key roadblocks faced by organizations in managing their innovation processes. Next, we describe the innovation model created at Waabii to help implement a sustainable innovation process, and we present a case study of an innovation management software solution, Exago Idea Market, which was implemented to create a collaborative and sustainable innovation environment in a large global telecommunications company. Finally, we offer recommendations for implementing this model of collaborative idea management. This article is particularly relevant to managers in larger organizations and practitioners of organizational change seeking to identify inhibitors of growth and business innovation and how to combat the roadblocks and create a sustainable innovation environment.

## Introduction

Innovation is often touted as "the lifeblood of business", and yet many companies struggle to keep the continuous flow of innovation that is required to sustain long-term health. But why? What are the key factors that prevent companies from being the innovation engines they strive to be? In this article, we examine the major inhibitors of innovation, and then propose collaborative idea management as an approach that companies can use to drive continuous innovation by harnessing the creativity of their employees.

Our perspective is based on our experiences at Waabii (waabii.com), an innovation software and consulting service provider in the Greater Toronto Area of Ontario, Canada. We help companies overcome barriers to innovation by tapping into the knowledge of their employees using an approach called "collaborative idea management". In this article, we explore the concept of collaborative idea management with the aim of providing managers with insights to overcome roadblocks to innovation and harness the innovation capabilities of their employees on an ongoing basis. First, we identify the major inhibitors of innovation in large organizations. Second, we introduce collaborative idea management as a means of creating a sustainable environment for innovation. Third, we discuss the three essential components that must be considered when implementing a collaborative idea management process: strategy, leadership, and culture. Fourth, we highlight the benefits of the approach through a case study of a large global telecommunications company. Finally, we close with recommendations and conclusions.

# Collaborative Idea Management: A Driver of Continuous Innovation

*Jesper Bank and Adnan Raza*

## Inhibitors of Innovation

Based on consulting interviews we conducted with executives from a wide mix of global corporations active in the telecommunications, banking, life science, utilities, and resource-extraction domains we have identified three major inhibitors of innovation: i) growing size, ii) operation silos, and iii) lack of employee motivation.

*1. Growing size*
Increasing size of an organization has created a disconnect between the organization's strategy and its core-level executors: its employees. Increasingly, companies are busy creating high-level strategies to steer the company to increase profitability but face challenges in involving key resources to execute the plan. In many cases, the major reason identified is not the dearth of skill to execute the high-level strategy but a lack of communication initiatives to drive and manage the core message to the primary contributors to help them work towards the primary goal. This challenge becomes even more evident when the company wants to drive "targeted" innovation (i.e., innovation aimed at a common or particular goal). It becomes virtually impossible to control the direction of innovation from high up in the leadership chain. Today, most companies plough resources into established R&D or innovation centres directed to churn out innovation; the major drawback in this innovation model is that we are leveraging a very small section of the company's intellectual capital. Moreover, one of the key resources is rarely involved in the innovation cycle: the front-end employees, who serve as the connection points between the organization and its customers. We have observed that these problems become particularly acute when companies are growing in size.

*2. Operational silos*
As growing companies create various new lines of business and numerous sub-divisions, they tend to become increasingly compartmentalized. Each section of the group becomes disconnected from its peers and respective divisions. Because each division is so busy competing and is focused on completing their given task, "tunnel vision" may begin to inhibit innovation. These effects may be further worsened by geographic expansion, because regional divisions become preoccupied by their own local challenges. In such an environment, innovating towards a common goal becomes challenging.

To overcome the negative impact of operational silos, many companies establish distributed innovation centres. However, a major drawback of this approach is typically a lack of sync between solutions developed in each of these distributed silos. More importantly, a lack of proper methodology to select the most applicable of best ideas undermines these efforts. Indeed, Vermeulen (2013; tinyurl.com/lvcsczz), reports that the act of selecting ideas is a key challenge faced by most large organizations today. He highlights that, in terms of innovation, most business executives place a high value on variation, but do not put enough thought or management effort into deliberately selecting which ideas are worth pursuing. The act of selecting ideas has become a subjective process, wherein political interests and personal preferences determine which projects are funded and which are terminated. Companies need to devise a systematic idea-selection process that is free from any personal bias and incorporates a smart and efficient selection framework.

*3. Lack of employee motivation*
The other underlying key reason for a dearth in corporate innovation is the lack of sufficient motivation for the employees to participate in innovation processes. We have observed that, even if employees are keen to participate in innovation processes or projects hosted by their company, the level of engagement is hard to maintain for a long period of time.

One of the main contributors to such behaviour is an ill-defined "innovation to implementation" process, or "idea journey". A typical idea journey has four stages: i) creating ideas, ii) sorting the submitted ideas, iii) selecting the top ideas, and iv) implementing the selected ideas. Companies must follow through on each of these stages. After the idea creation stage, it is equally important to communicate to the participants on the progress of subsequent stages, through the sorting and selecting stages to the final implementation of the shortlisted ideas. Most of the innovation projects organized by organizations fail in the last stage of the idea journey: implementing the shortlisted idea in a structured timeline process. To motivate employees for ongoing participation in innovation activities, companies need to develop processes and mechanisms that allow for the establishment of teams capable of executing the shortlisted ideas and monitoring the step-by-step progress from start to execution. This full-cycle approach is crucial for gaining and maintaining employee participation.

# Collaborative Idea Management: A Driver of Continuous Innovation

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## Collaborative Idea Management

To overcome these three inhibitors of innovation – growing size, operational silos, and lack of motivators for employees – we encourage our clients to adopt collaborative idea management within their organizations. In essence, collaborative idea management involves soliciting ideas from within an organization, empowering employees to work collaboratively to define better solutions for a given problem, and managing and communicating the progression of the ideas through the full cycle of the idea journey up to implementation. Thus, collaborative idea management is a systematic approach to gathering and channeling ideas that enables an organization to:

- foster innovation by tapping into the diverse knowledge and collective creativity of its employees
- ensure that the "right ideas" actually end up meeting the organization's relevant innovation needs
- measure and drive front-end innovation activities
- engage employees across the organization in business innovation and improvement
- provide participants with feedback and recognition
- communicate corporate strategy in a consistent and relevant manner to the entire organization
- create transformational change to an innovation-driven culture

Collaborative idea management should be supported by appropriate processes and tools for managing the submission, sorting, and selection of ideas, as well as their implementation. This approach not only overcomes the inhibitors of innovation described earlier but also improves the efficiency of the innovation process.

As an example, the innovation management solution we typically use at Waabii is the Idea Market by Exago (exagomarkets.com), which is illustrated in the case study described in Box 1.

**Box 1.** Case study: Portugal Telecom

Portugal Telecom (telecom.pt) was founded in 1994 and is headquartered in Lisbon, Portugal. As of January 2014, the company is the largest telecom provider in Portugal with a market cap of $4 Billion, $6.6 Billion in revenues, and more than 11,000 employees.

*Challenge*
- To define a transversal innovation strategy shared by the company's 11,000+ employees

*Solution*
- A structured innovation program open to entire organization
- Exago Idea Market used as the fundamental collaborative idea management tool to support this program, providing a solution to capture and collate ideas, enrich suggestions through comments, and help identify the best ideas
- The tool integrates an evaluation engine that mimics the functioning of a stock market, with virtual credits being invested by the participants to help select the best ideas

*Benefits*
- More than 7,000 employees joined the platform
- More than 5,000 ideas have bee validated so far.
- $38 Million in annual savings from employee's ideas on business process improvements
- 44% improvement in employee engagement over four years (from 58% in 2008 up to 84% in 2012)
- 67% of all employees engaged in business innovation
- Decentralized and transparent evaluation process brings efficiency and flexibility to the innovation process
- The Exago Idea Market helped increase employee satisfaction by providing them a platform to voice their creativity

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The Idea Market enables an organization to "broadcast" a business problem or broad question relating to corporate strategy to its employees and "call" for innovative thinking and cross-company cooperation to find solutions to the problem. Employees from all business units can then offer insights in three ways:

1. Present their own ideas about how to address the business challenges that management put forward

2. Offer comments to discuss and build upon ideas presented by others

3. Indicate their support (or lack thereof) for a particular idea by choosing how to "invest" their virtual currency in the market

The Idea Market functions as a traditional stock market in that investor (i.e., employee) confidence drives results – the ideas that receive the most investment are the ideas that rise to the top. Top ideas are then assessed by the management team in order to decide which ideas move forward for implementation. This process helps the organization reach its broad employee base with ease, connects different operational departments, and engages everyone to work towards a common goal.

Most importantly, this type of approach to collaborative idea management increases employee engagement and promotes innovation. At Waabii, we provide our clients with the innovation platform, we support strategic management, and we actively assist in the implementation of supporting processes. The goal is to establish a collaborative idea management process that continuously drives innovation by empowering employees to better define problems and to propose and refine solutions.

## Key Components of a Collaborative Idea Management Process

Underpinning our approach to collaborative idea management at Waabii is what we call the "innovation triangle". The innovation triangle highlights three components that are essential to establishing a successful and sustainable collaborative idea management process: strategy, culture, and leadership.

*1. Strategy*
Strategy in its broadest definition outlines the direction the company takes to comply with the vision of the organization. Communicating the strategy and the role of individual employees in "the big picture" is very important; it allows the organization to harness the active participation of its employees. As underlined earlier, fast-growing companies face a challenging problem of communicating their strategy to their internal audience. But beyond simply communicating the direction the company is headed, the organization must also identify and communicate the roles each employee will play in executing this strategy. The concept of collaborative idea management helps the company direct strategic challenges aligned to the core strategy of the company or even to a specific business unit, and it helps engage the employees in innovating around the centrally defined problem. The key idea behind the success of this component is the empowerment of employees by providing them a platform to create innovative solutions and collectively evaluate and select the best solutions for the company-defined challenges.

*2. Leadership*
The other key aspect of implementing a successful innovation program is applying executive support for the process, which in turn will make respective lines of business/departments engage in the company-designed innovation program. A strong and engaged leadership structure helps the employee stay motivated and helps increase the active participation rate for the designed innovation program. Without support from leadership, an otherwise perfectly designed innovation process or program is bound to fail. In addition, it is imperative that the innovation program is pushed and supported by the top manager of the company/department leading this process. It not only gives a face to the innovation program but also increases the perceived importance of such program.

*3. Culture*
Lastly, the culture of the organization must be aligned with the innovation process. In the challenges identified above, we highlighted that companies are becoming compartmentalized and operate as silos, with each unit concentrating on its respective objectives. This compartmentalization limits the employees' ability to understand and effectively participate in initiatives that transcend their departments. The concept of collaborative idea management not only helps connect the employees, but helps the organization bring varied skilled individuals to converse about the potential solution to "sticky problems". Our experiences with large organizations indicate that employees emphasize problem solving and creating innovative solutions. The collaborative idea management process aligns the need of the organization to the want of the employees, thereby enhancing the workforce experience.

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To further catalyze employee participation and embed innovation within the culture of the organization, an organization needs to motivate its workforce by rewarding participation through tangible or intangible awards. Tangible awards may include real goods or benefits, such as monetary awards, physical prizes, and so forth. Our interactions with organizations with a higher proportion of knowledge-based workforce has shown that, compared to tangible rewards, intangible awards are deemed more valuable even though they are not monetary. Examples of intangible awards include an opportunity to have breakfast with the CEO of the company or a coaching session with the senior manager of the employee's choice.

## Key Takeaways

The concept of collaborative idea management helps an organization progress in its innovation process by aligning the three spokes of the innovation triangle: strategy, leadership, and culture. As illustrated earlier, collaborative idea management is based on the concept of designing a solution collectively, hence the primary step of the process is to design a problem broad enough but aligned to the central strategy of the organization. This problem can be a high-level problem or can be a problem designed to address a functional component of the larger puzzle.

The second component of collaborative idea management is to invite employees and potentially other stakeholders (e.g., suppliers, customers, academia, graduate students) to engage in a conversation to drive collaborative innovation. For example, the Exago Idea Market innovation solution can be used as an interface to engage various stakeholders around potential challenges faced by the company. The platform will thereafter help the company identify top ideas or solutions selected by the population at large. These top ideas can be further evaluated by the leadership team to prioritize development of the selected solution in isolation or combination, thereby driving groundbreaking innovation for the organization.

Finally, to increase employee participation exponentially and to instill innovation in the very core values of the workforce, the company needs to motivate the employees by rewarding them through a mix of tangible and intangible awards.

## Conclusion

Collaborative idea management empowers an organization to efficiently leverage its prized intellectual capital: its employees. An organization has to be mindful of the three components in the innovation triangle – strategy, leadership, and culture – while implementing a collaborative idea management solution. Each of the three parameters helps in establishing a sustained innovation environment. Lastly, to instill an engaged participants, the organization has to reward participation. The reward mix has to be strategically composed of both tangible and intangible awards to attract participation from all areas of the workforce.

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# Enhancing Innovation through Virtual Proximity

Tom Coughlan

> *"No distance of a place or lapse of time can lessen the friendship of those who are thoroughly persuaded of each other's worth."*
>
> Robert Southey (1774–1843)
> Poet, scholar, and historian

Historically, innovation strategists have focused on leveraging local resources and the development of local clusters, which have relied heavily on personal contact. It was assumed that serendipity would occur through casual contact and that this contact would result in rapid sharing of ideas. Many studies have supported this concept; however, the pace of innovation has changed and the most successful organizations promote not only physical proximity but also virtual proximity to resources. Virtual proximity refers to the level of emotional closeness between individuals, as developed through the use of information and communications technologies. This article argues that organizations can and should look to develop local virtual relationships supported by physical proximity: the mix of both virtual proximity and physical proximity can increase an organization's innovation capability.

## Introduction

Ever since Samuel Morse tapped out "What hath God wrought?" on his telegraph to send the first electronic message (Howe, 2007; tinyurl.com/m8n724a), and with the release of every information communications technology since, there have been pundits who have proclaimed the "death of distance"(e.g., Bowersox and Calantone, 1998: tinyurl.com/m5rkxx2; Cairncross, 1997: tinyurl.com/m7sqhsc; Evans and Harrigan, 2005: tinyurl.com/ld2xjnu). But, to paraphrase another nineteenth century luminary, Mark Twain (tinyurl.com/57mptu), the reports of its death have been greatly exaggerated. Distance is still alive and well and creating havoc for those of us who practice or study innovation.

Even though we can tap out a text, send an email, make a phone call, or share in a video conference, part of the message is lost if we are not sharing the same physical location with the people on our innovation team. Just moving the location of a key person or resource a few metres can dramatically drop the level of interaction and therefore amount of innovation an organization will produce (Allen, 2007; tinyurl.com/lshbss7). But, the sharing of information is not just about physical distance – it is about a shared connection. To truly understand these connections, and in turn how innovation happens, it is important to understand the concepts of proximity, effective communication, information architecture, and some of the properties of the media used for intra-organizational communications.

Managers, entrepreneurs, researchers, and innovators of all types need to find new ways of leveraging both their existing resources and discovering new potential innovation resources. Innovation is often a function of recombining ideas and resources that often already exist or building on the ideas of others – who may exist both inside and outside your organization (Kelley, 2005; tinyurl.com/l44ooal). Many studies have supported the notion that casual, serendipitous contact facilitates idea sharing (Bindroo et al., 2012: tinyurl.com/mmh5t58; Hauser et al., 2007: tinyurl.com/qdk4dhf; Huggins and Izushi, 2011: tinyurl.com/plnnt9a; Knoben and Oerlemans, 2006: tinyurl.com/kn3svq9; Porter, 1990: tinyurl.com/khf32f4); but, unfortunately, given the pace of modern lifestyles, our ability to travel, and the required commitments of many of our potential collaborators, it is often difficult if not impossible to be in the same place at the same time. However, some level of proximity is necessary in order for ideas to collide and serendipity to occur. Therefore, we need to develop a new virtual type of

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proximity that allows our collaborators to be aware of the new ideas or potential resources – and this awareness could lead to the development of a feeling of presence and possibly engagement, which increases the likelihood of innovation.

This article focuses on virtual proximity as a means of enhancing innovation. To understand the problems that make virtual proximity an important part of an innovation strategy, it is critical to understand some of the key principles surrounding it; therefore, this article will be structured as follows. First, the different types of proximity and their roles are identified. Next, the key elements of effective communications and media use are examined, and the key factors surrounding regional clusters and their effect on innovation are outlined. Then, some of the misconceptions surrounding virtual proximity are dispelled. Finally, a foundation for a solid virtual proximity strategy is provided, along with some simple and actionable recommendations for managers.

## Proximity

Proximity to resources, and the clustering of resources by specific industries within a geographic region, has long been considered an important factor in the promotion of both the volume and the quality of innovation (Doloreux, 2004: tinyurl.com/k7botqn; Porter, 2001: tinyurl.com/kp2l8o8). The belief is that close geographic proximity to key resources would reduce friction and speed access to those resources and therefore increase innovation. Some researchers have gone as far as to suggest that tacit knowledge is an essential ingredient of innovation, and that tacit knowledge can only be transferred in close physical proximity. The true value of clustering emerges when proximity of both key resources and tacit knowledge fosters the spillover of knowledge within and across industries (Greunz, 2003: tinyurl.com/pefatjs; Knoben and Oerlemans, 2006: tinyurl.com/kn3svq9).

This perspective, however, begs the questions: what is proximity? The definition of proximity dramatically changed when Wilfred Beckerman (1956; tinyurl.com/lyjhhyx) introduced the term *psychic distance*. Beckerman's contention was that distance is not an absolute. The distance between two individuals is a function of the disparity of their cultures, not the physical distance between them. The concept of psychic distance has been expanded by a number of researchers, leading to the development of additional concepts such as:

- *cultural proximity:* how similar the cultures of network participants are on a national level (Hofstede, 2009: tinyurl.com/5p6sme; Knoben and Oerlemans, 2006: tinyurl.com/kn3svq9; Sousa and Bradley, 2006: tinyurl.com/n2na6by)
- *cognitive distance:* the level of diversity in the skills, knowledge, and cognitive frame (Wuyts et al., 2005; tinyurl.com/khvb7ca)
- *organizational proximity:* the distance felt by members of the same large or multi-site organization (Knoben and Oerlemans, 2006: tinyurl.com/kn3svq9)
- *technology proximity:* the level of overlap between the firms' technology or patent portfolio
- *vision proximity:* the similarity in vision (Cantų, 2010; tinyurl.com/prlxkb4)
- *virtual proximity:* the level of emotional closeness developed through the use of information and communications technologies (Coughlan, 2010; tinyurl.com/olqrel7)

These descriptions of proximity are not mutually exclusive, it is often unclear where they begin and end, and there are gradient scales to each and every one. For example, even geographic proximity, one of the most straightforward of the proximity metrics, can be measured in either physical distance or travel time. Some researchers have gone as far as to develop meta indexes that attempt to combine several of these elements into a single measure of proximity (Amin and Cohendet, 2005: tinyurl.com/k6ebtry; Coughlan, 2010: tinyurl.com/olqrel7). So, defining how close you are to a resource can be more difficult than what might be originally assumed.

## Communications

The principles of proximity, culture, and cognition have a dramatic effect on the encoding, transmission, decoding, and processing of an idea from one individual to another. However, when understanding the strategy of communication, it is just as important to understand the "what and why" (i.e., the architecture) of the communications. Allen (2007; tinyurl.com/lshbss7) suggested that relationships within the organization affect the success of the communications, and that there are three types of communications, each of which is affected by its own proximity or relationship dynamics:

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1. Type I: simple communications required to coordinate group or team projects.

2. Type II: the sharing of codified knowledge.

3. Type III: the transfer of tacit knowledge, which is the most important type of knowledge for innovation and the one most affected by distance.

Allen's study also found that, unsurprisingly, people who work in close physical proximity to each other will typically communicate more often than those who do not. However, what was surprising is that, when this relationship is plotted on a curve, little to no drop in the level of communications can be seen beyond 50 metres. Allen posited that visual clues to a person's existence are important in prompting communications.

## Media

In order for innovation teams to properly communicate key ideas, their choice of communication media is often extremely important. Each medium has inherent properties and limitations; as we increase the distance between team members – and reduce the time they are physically co-present – the importance of this choice increases. Media richness theory (Lengel and Daft, 1988; tinyurl.com/ogd2k2v) posits that performance of communications improves with the richness of the communications media. For example, phone conversations are richer than text messages, and videoconferences are richer than phone calls. In addition, as the equivocality of the task increases, so should the richness of the media used (Lengel and Daft, 1988; tinyurl.com/ogd2k2v). After decades of study what has been discovered is that real communications often transcends the media (Dennis and Kinney, 1998; tinyurl.com/kw6qf8y): our successful use of media is often dependent on our familiarity with that media and our familiarity with the recipient of the message. Another key finding is that the less natural we feel in using a media, the more cognitive resources we will need to expend (Dennis et al., 2008; tinyurl.com/mk9w6c7). However, with time and effort, our familiarity with a specific medium improves and the cognitive effort declines (Dennis et al., 2008; tinyurl.com/mk9w6c7).

## Anatomy of Clusters

According to Porter (1998; tinyurl.com/38rnvv6), clusters are "geographic concentrations of interconnected companies and institutions in a particular field." Porter's work has often been cited as seminal in terms of outlining the concepts of clusters and why cluster provide a competitive advantage in efficiency and innovation. Porter points out that clusters often provides a company with access to employees, suppliers, specialized information, and key services that are difficult and more expensive to obtain outside the cluster. The clusters that have historically worked best have clear industry foci and many inter-organizational relationships, allowing that the advantages become specialized to a specific industry or the needs of a particular type of customer (Porter, 1998; tinyurl.com/38rnvv6). But, can we supplement the advantages that geographic proximity delivers through access to non-local resources? Would some other form of proximity, such as virtual proximity or cultural proximity, provide an even greater competitive advantage? For example, in comparing California's Silicon Valley to the Route 128 Corridor in Massachusetts, there is a cultural difference in how innovation has historically been handled. Although both regions are focused on the technology Industry, Silicon Valley has been much more open to inter-organizational relationships and sharing; resulting in a far more dramatic regional growth (Saxenian, 1994; tinyurl.com/m3xzkjq). Knoben (2008; tinyurl.com/l44ooal) demonstrated that it is not just about the density of firms or the size of the population; the success of innovation is dependent on the membership of the internal team as well as the connections and relationships developed outside the firm. The makeup of the regional economy has a strong influence on local success: "...simply bringing firms together, for example by building science parks, is unlikely to effectively stimulate the innovativeness of firms and might even hamper it" (Knoben, 2008; tinyurl.com/l44ooal). The cluster of firms must have a culture and a resource profile that not only allows but also encourages each firm to interact (Ben Letaifa and Rabeau, 2013; tinyurl.com/pjx9yj3). Virtual proximity might help fill a gap in a team's talent profile with a person or firm that has a better cultural fit than a local resource.

Studies by the author in the New York metropolitan area, have shown that firms that have a portfolio of inter-organizational relationships, which include both local and non-local linkages, are typically more innovative (Coughlan, 2010; tinyurl.com/olqrel7). In addition, top performers have inter-organizational relationship portfolios that are very broad in terms of the types of firms and industries included (Coughlan, 2010: tinyurl.com/olqrel7; Knoben, 2008: tinyurl.com/l44ooal). However, it is possible for a portfolio to be too broad. It is important that cognitive distance "be restricted for the sake of coordination" (Wuyts et al., 2005; tinyurl.com/khvb7ca). Diversity in thought is critical in innovation, but in this case you can have too much of a good thing. If a plot

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were developed to show innovation initiative over a scale of novelty and understandability an inverse U-shaped curve would develop. Too little diversity limits the available intellectual capital and too much diversity makes it difficult for team members to cognitively process the available information. So, organizations should be looking for a balance.

## Virtual Proximity

Given this environment, virtual proximity can be a useful model if properly applied. However, there are a number of misconceptions or misunderstandings of how or when it should be leveraged – or even what it is.

Virtual proximity is about leveraging information and communications technologies to build and maintain relationships – the emphasis being on the relationship and not the technology. Simply having or using technology does not necessarily equate to an improvement in virtual proximity. Here, it might be important to think about the factors that nullified media richness theory, such as the familiarity with specific media tools and how cognitive ease improve with use (Dennis and Kinney, 1998; tinyurl.com/kw6qf8y). It is in the use of the technology and the integration into our work processes that we experience the advantages of virtual proximity. Once the use of a tool becomes familiar and easy to use, we can free up cognitive resources to work on innovation.

However, if the use of virtual proximity tools feels unnatural, too much of the cognitive effort will be devoted to the use of the tool and not into the content needed to develop the relationship or reorganizing of ideas and resources to develop new innovations. Although we can learn to use the tools and platforms, thereby reducing allocation of cognitive effort to the technology, we may struggle to keep up with the growth and change in these technologies and platforms. We want the latest technology, but we also want familiarity and efficacy.

It is tempting to assume that virtual proximity is primarily used to engage resources or individuals that exist outside the local region, and that it is not required for local relationships. However, this assumption is false. Allen (2007; tinyurl.com/lshbss7) points out that the probability of using a resource drops for every metre of separation up to 50 metres. Thus, the notion of "non local" starts at 50 metres. He also suggests that often we need visual clues to remind us that the resource is there. Increasing the number of visual clues or contacts should help in reminding the network of the existence of a resource, and increase the probability of it being integrated into the innovation process.

Virtual proximity is multidimensional. Measuring virtual proximity requires the development of a matrix, which includes a variety of different electronic media, the level of use, the proficiency, and the impact of the use. In some way, it is similar to the concept of the Klout score (klout.com), which measures the influence of a given user across social media. However, there is no claim that a virtual proximity measure is an absolute measure. It is intended to be a model for thinking, just as one would use the product lifecycle in marketing or Tuckman's stages of group development in management (tinyurl.com/2bpowb4). As with these models, there are generalities that do apply. For example, a high degree of virtual proximity does generally result in higher level of innovation and higher levels of disruptive or intersectional innovation (Coughlan, 2010; tinyurl.com/olqrel7).

Virtual proximity is similar to the notion of mental processing of social presence on the Internet, which has been described by Ning Shen and Khalifa (2008; tinyurl.com/lgl4by2) as:

> *"...the moment-by-moment awareness of the co-presence of another sentient being accompanied by a sense of engagement with the other... as a global, moment-by-moment sense of the other, social presence is an outcome of cognitive stimulations (i.e., inferences) of the other's cognitive, emotional, and behavioral dispositions".*

Whereas social presence emphasizes the real-time awareness of a resource's presence, virtual proximity emphasizes the ongoing awareness of a resource's existence. The key difference is that virtual proximity does not require engagement until the point it is integrated into the innovation process. In a sense, virtual proximity is more an awareness of the resource and the ability to readily engage the resource.

Virtual proximity is also different from the other forms of proximity outlined earlier in this article. However, it can act as a catalyst to improve other types of proximity such as psychic distance, cultural proximity, cognitive distance, and organizational proximity - all of which are broader concepts and span both the virtual and terrestrial worlds.

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## Conclusions

Virtual proximity is not a choice – just as your reputation is not a choice. It exists in relative terms to the environment in which you live and operate. Individually or as an organization, we have a level of virtual proximity with every team member, supplier, partner, or collaborator that we currently have or could potentially have. However, just as your reputation can be managed and improved with time, vigilance, and effort, so can your virtual proximity. Managers should realize that the majority of telecommunications traffic is local – whether it be phone calls, text messages, tweets, emails, Facebook posts, Linkedin requests, Vines, or what whatever means of virtual communications your organization or network participates in. Virtual proximity is a local phenomenon.

In addition, the engagement levels of resources drop significantly in a matter of a few metres and the old adage "out of sight, out of mind" is constantly eroding our ability to stay aware of the resources and maintain our relationships. Virtual technologies are powerful tools that allow us to maintain our relations whether they are within our own organizations, across the street, or on the other side of the world.

Therefore, managers looking to capitalize on their innovation opportunities should have a proximity strategy. At a minimum, this strategy should include the following:

1. *Visual clues*: if at all possible, visual clues should be incorporated for key resources. Examples include making sure that photographs in social media profiles are up to date and that regular posts remind key resources of your existence. Simple tools that show presence are also important. Instant messaging tools such as Google Hangouts or Microsoft Lync could remind potential collaborators of each other's existence.

2. *Combined proximities*: as stated earlier, the effect that diversity has on innovation can be plotted as an inverse U-shaped curve. So, we need to find resources that have some minimal level of proximity on multiple scales of proximity (i.e., cultural, cognitive, organizational, technological, or vision), and we should engage resource outside the firm to help bolster the diversity of thought.

3. *Common tools*: it is important to develop familiarity with tools that enable virtual proximity. Virtual proximity can be developed using tools as simple as SMS or as complex as telepresence conference rooms; however, it is important that the users feel comfortable with whatever tools are chosen. Some of these tools will require training and all will require practice to use them properly without excessive cognitive effort. So, there must be some agreement, whether overt or implied, as to which tools will be used and why.

4. *Regular integration of new tools*: new tools are constantly being introduced in this area; however, managers must be careful in how they are integrated. New tools may have a technical advantage but the advantage might be negated but the additional overhead that it takes to be competent with a new tool. The introduction of too many new tools, or tools that feel unnatural to the users, could actually be a detriment to the process. Conversely, not introducing new capabilities that would improve the communications process and improve the level of virtual proximity could have the same effect.

5. *Roll out of new tools with closely knit teams*: given that familiarity with both the tools and the participants is important in reducing the cognitive overhead, when possible, new tools should be first introduced to participants who are familiar with each other. This approach will reduce the cognitive overhead and allow faster integration of the tool into the innovation process with the least disruption.

6. *Experimentation*: virtual proximity is a broad principle with few hard edges. It is likely that many of the key variables that surround virtual proximity will change over time and so will the specifics of virtual proximity. However, it is likely that the innovators will need to find power tools to maintain a broad set of relationships and expand their reach working with new collaborators and resources. In this sense, virtual proximity will likely increase in importance over time, and it will be necessary to develop new skills and techniques and capabilities in this area as our existing tools and techniques complete their lifecycle.

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# Enabling Employee Entrepreneurship in Large Technology Firms

Walter Miron and David Hudson

> *"The more people you have to ask for permission, the more dangerous a project gets."*
>
> Alain de Botton
> Writer, documentary film maker, and entrepreneur

Managers of development projects in large technology firms face a dilemma. They operate under pressure to achieve predictable quality, cost, and schedule objectives but are also expected to encourage their employees to act entrepreneurially. Given the uncertain nature of the entrepreneurial process, these managers often cling to existing practices and values and consequently inhibit their employees' ability to act entrepreneurially.

In this article, we examine the product development and entrepreneurship literature streams to identify the barriers that managers of development projects of large technology firms face in allowing employees to act entrepreneurially. We organize these barriers using the five components of entrepreneurial orientation: risk taking, proactiveness, innovativeness, competitive aggressiveness, and autonomy. Then, building on the literature and our combined 40 years of experience managing development projects in large technology firms, we provide recommendations to managers on how to overcome these barriers.

A better understanding of how to enable employees to act entrepreneurially will increase the entrepreneurial orientation of development projects in large technology firms. The relationship between entrepreneurial orientation and development project performance is expected to be curvilinear. Therefore, an increase in entrepreneurial orientation is expected to improve the performance of development projects up to a point after which it is expected to decrease it.

This article will be particularly relevant to researchers interested in the relationship between entrepreneurial orientation and project performance as well as managers in technology firms who want to achieve their operational milestones while maximizing the entrepreneurial value creation of their employees.

## Introduction

Managers of large technology firms are routinely expected to improve the performance of their development projects. This expectation arises because of the need for firm competitiveness and because externalization of technology development through outsourcing and acquisition is an alternative to internal product projects (Granstrand and Sjölander, 1990; tinyurl.com/mhtrv77). Improvements can take the form of increased revenue from project outcomes, reduced project development costs, or reduced time to market.

Entrepreneurial orientation describes the extent to which a firm is able to capture new value in the marketplace beyond its existing products, services, and customers (Covin and Slevin, 1989: tinyurl.com/6drqgjk; Lumpkin and Dess, 1996: tinyurl.com/qxsxa57; Miller, 1983: tinyurl.com/cus88fa; Schillo, 2011: timreview.ca/article/497). Can increasing the entrepreneurial orientation of the project development organization within a firm provide the required improvement in development project performance? How can managers in large technology firms apply the concept of entrepreneurial orientation to improve their project development performance? And

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how can managers overcome the barriers preventing development project team members from acting entrepreneurially in large technology firms?

In this article, we review the literature on entrepreneurial orientation and employee entrepreneurship. We propose how the components of entrepreneurial orientation can be understood at the development project level and then examine the obstacles to employee entrepreneurship within development projects using the component framework from entrepreneurial orientation. Finally, we provide a tool that managers of development projects can use to help their project members overcome the obstacles to employees acting entrepreneurially in large technology firms. Our intent is to better support employees who think and act entrepreneurially for the purpose of increasing the entrepreneurial orientation of project development organizations in the expectation that this increase will lead to better development project performance.

## Entrepreneurial Orientation and Entrepreneurial Employees

The literature suggests that increasing the entrepreneurial orientation of a technology firm leads to increased firm performance (Rauch et al., 2009; tinyurl.com/3kjbwfr). That is, there is a relationship between a firm's ability to create and capture new value and the firm's overall profitability. The literature also indicates that the relationship between entrepreneurial orientation and firm performance may be curvilinear, and beyond some threshold, an increase in entrepreneurial orientation no longer improves firm performance and may have a negative impact (Schillo, 2011; timreview.ca/article/497). Consequently, there is a range where firms with low entrepreneurial orientation can benefit from some degree of improvement.

The components of entrepreneurial orientation include:

1. *Risk taking:* the willingness of the firm to commit of resources to projects with uncertain outcomes
2. *Proactiveness:* the degree to which the firm leads in its markets rather than follows
3. *Innovativeness:* the importance of technology and product leadership to the company
4. *Competitive aggressiveness:* the extent to which a company pursues competitors' markets
5. *Autonomy:* the extent to which the company allows and supports independent entrepreneurial action

Entrepreneurial orientation has been studied through various techniques at the firm level using these attributes, which were developed from the idea that the "configuration" of the firm affected its ability to be entrepreneurial (Miller, 2011; tinyurl.com/6jjzdkx). In larger firms, configuration could include explicit decisions made concerning strategies, organizational structures, and operational processes as well as implicit attributes such as attitudes of executives. Of course, companies do not innovate; it is the employees who make a company innovative (Blank, 2013; tinyurl.com/adzqhdq). Therefore, it is the entrepreneurial actions of employees including how they do their jobs and how they contribute to project activities that ultimately contribute to the firm's entrepreneurial orientation.

Entrepreneurship research addresses where firms come from (Foss et al., 2007; tinyurl.com/d77uotf) and often focuses on the role of founders but does allow that employees of established firms can be entrepreneurial (Shane, 2012: tinyurl.com/aznwf4n; Thornton, 1999: tinyurl.com/m732z8g). One definition of employee entrepreneurship refers to the actions of employees participating in formal corporate venturing (Ireland et al., 2009; tinyurl.com/ltkqfo5) or intrapreneurship programs (Aldrich, 2005; tinyurl.com/7waf4y7). This definition includes a wide range of possible entrepreneurship-related activities – such as training, business diversification, internal process and technology innovation, creation of new divisions, recreation of existing divisions, and reallocation of resources – but emphasizes that the initiatives are led by management (Thornton, 1999; tinyurl.com/m732z8g).

The literature also describes employee entrepreneurship outside of specific programs and management-directed activities. Foss, Foss, and Klein (2007; tinyurl.com/d77uotf) refer to entrepreneurship by employees within established firms as "proxy entrepreneurship". Similarly, Courpasson, Dany, and Marti (2011; tinyurl.com/dx9z9y4) describe "occupational entrepreneuring" where employees are entrepreneurial in the course of doing their jobs. Baker and Nelson (2005; tinyurl.com/c6svx2e) describe "entrepreneurial bricolage" as improvisational acts by employees. Finally, Rindova, Barry, and Ketchen Jr. (2009; tinyurl.com/l2htbbh) describe entrepreneurial activity within established firms where there is no direct financial benefit to the entrepreneur from "efforts to bring about new economic, social, institu-

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tional, and cultural environments… with broad change potential". These authors suggest that there are aspects of an employee's environment that may encourage such proxy, occupational, bricolage-like entrepreneurial efforts to bring change within firms.

Consequently, a second definition of employee entrepreneurship is the value-creating actions that employees may personally initiate related to their immediate job responsibility or environment using available assets including assets that the employee obtains herself or himself (Baker and Nelson, 2005: tinyurl.com/c6svx2e; Courpasson et al., 2011: tinyurl.com/dx9z9y4). This type of employee entrepreneurship emphasizes informal and broadly based entrepreneurship by employees within firms rather than founders of new firms or formally sanctioned programs (Baker and Nelson, 2005: tinyurl.com/c6svx2e; Foss et al., 2007: tinyurl.com/d77uotf). This type of employee entrepreneurship is motivated, at least in part, by emancipation or taking control of one's environment rather than personal profit, although it may bring profit to the firm. That is, employees can become entrepreneurial as a reaction to constraints in their environment and the need to remove those constraints. In this definition, employee entrepreneurship is not a program but is voluntarily, day-to-day value creation that employees motivated by the opportunity to increase their control over their own immediate work environment may choose to pursue, or not.

Acts of emancipation by employees who are acting entrepreneurially include seeking autonomy, making declarations to share their activities, and authoring relationships with co-workers and others to increase support for their actions (Rindova et al., 2009; tinyurl.com/l2htbbh). Such entrepreneurial employees are motivated to create value for themselves in terms of greater control over their environment but can also add value to their firms' products, services, or operations through the same actions.

We propose that entrepreneurial orientation may be applied to development projects within firms, rather than at the firm level, because a firm's projects contribute to its success in the market. The employees, in turn, contribute to the entrepreneurial orientation of a project activity. Using the second definition of employee entrepreneurship, the components of entrepreneurial orientation at the project level must be understood somewhat differently to allow for voluntary entrepreneurial acts by individual employees:

1. *Risk taking:* employees take risk without reference to managers. Employees might hide their risk taking if the employee perceives that others might not see their actions as legitimate. Employees may not perceive that their actions are risky (Adner and Levinthal, 2008; tinyurl.com/777el7d).

2. *Proactiveness:* employees initiate the actions that create value for themselves or the firm and, again, may do so without reference to their firm or managers or competition (Courpasson et al., 2011; tinyurl.com/dx9z9y4).

3. *Innovativeness:* employees place importance on technology leadership in what they do in their own jobs and improve their firm's business operations or products and services through their personal entrepreneurial efforts at work (Bernoff and Scadler, 2010: tinyurl.com/244l9qz; Hudson, 2012: timreview.ca/article/633).

4. *Competitive aggressiveness:* employee entrepreneurship may address any constraint in their environment and not just competitors (Rindova et al., 2009; tinyurl.com/l2htbbh). Such effort would not necessarily involve aggressive posturing by employees but could involve efforts to communicate the potential for change and to actively marshal resources to support for innovation.

5. *Autonomy:* autonomy seeking by reducing uncertainty in their personal environment is one goal of employee entrepreneurship. Autonomy seeking may also be accompanied by making declarations and "authoring" relationships within the firm – that is, arguing for change and marshaling of others to support the change by the employee (Rindova et al., 2009; tinyurl.com/l2htbbh).

We therefore propose that the understanding of entrepreneurial orientation can be extended to development projects within firms by recasting the definition of its components to consider voluntary employee entrepreneurial actions and the potential for employees to act in this manner.

## Obstacles to Employees Acting Entrepreneurially

Given this understanding of entrepreneurial orientation at the development project level and considering voluntary employee entrepreneurship, we now discuss

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some of the obstacles that employees may face. The product development and corporate entrepreneurship literature streams were reviewed for the purpose of identifying the obstacles to employees acting entrepreneurially in large technology firms.

Table 1 provides the results of the literature review. The obstacles identified were organized into five categories, each representing a component of entrepreneurial orientation (Schillo, 2011; timreview.ca/article/497). The table identifies the literature used as reference material and how that material applies at the development project level, rather than the firm level, based on the authors' direct experience with development projects.

Obstacles to employees acting entrepreneurially can be identified in the literature for all the components of entrepreneurial orientation (Covin and Slevin, 1989: tinyurl.com/6drqgjk; Lumpkin and Dess, 1996: tinyurl.com/qxsxa57; Miller, 1983: tinyurl.com/cus88fa; Schillo, 2011: timreview.ca/article/497). Organizational structures and processes can constrain what managers can do within their projects or what employees have time to initiate by constraining capacity to undertake activities, allocating capacity in a top-down manner, and emphasizing incremental rather than disruptive innovation (Burgers et al., 2009: tinyurl.com/pbsaal3; Hornsby et al., 2009: tinyurl.com/lzhonhk; Goldenberg et al., 2001: tinyurl.com/k6ruh62). Reward systems may provide incentives for only incremental improvements or reactive firefighting by employees at the expense of proactive and self-started actions by project employees that might entail unsanctioned exploration and experimentation (Hornsby et al., 2009; tinyurl.com/lzhonhk). Project-level innovativeness can also be discouraged by a bias towards existing products, architectures, or technologies or even a formal requirement to refer innovation decisions to specific individuals or groups for approval (Burgers et al., 2009; tinyurl.com/pbsaal3). Innovativeness can also be impeded by a culture that emphasizes maintaining existing products or businesses and treats disruptive projects as fallbacks or insurance in the event that the existing businesses underperform (Burgelman, 1984; tinyurl.com/qb4pxmk). Competitive aggressiveness within projects can be impeded by either complacency, a sense that innovation is someone else's job, or the innovator's dilemma with the result that project members do not feel that they can address constraints, share disruptive innovations, or create relationships to support their innovations (Christensen, 1997: tinyurl.com/o5hap7k; Goldenberg et al., 2001: tinyurl.com/k6ruh62; Rindova et al., 2009: tinyurl.com/l2htbbh). Project management approaches that emphasize the elimination of risky activities through stage-gate models can also limit experimentation and preclude discovery of new value simply because it was not in the project plan (Goldenberg et al., 2001: tinyurl.com/k6ruh62; MacCormack et al., 2001: tinyurl.com/am6axfs). The obstacles to autonomy include management strategies that focus employees on top-down objectives and heavy-handed control to the exclusion of all other activities and discouraging initiative (Burgers et al., 2009: tinyurl.com/pbsaal3; Burgelman, 1984: tinyurl.com/qb4pxmk; Hornsby et al., 2009: tinyurl.com/lzhonhk; Narayanan et al., 2009: tinyurl.com/kvjxw5y).

This discussion of the obstacles identified in Table 1 leads us to consider how managers can help employees overcome the obstacles and act entrepreneurially.

## Overcoming Obstacles to Employees Acting Entrepreneurially

Table 2 suggests how managers of large technology companies can help employees who are part of their development organizations act entrepreneurially. In essence, we are proposing that managers recognize and then address the obstacles to entrepreneurial orientation faced by employees on development projects.

## Tool to Increase the Entrepreneurial Orientation of Development Projects

Managers may not be able to address all obstacles facing their employees, but they should focus on removing selected impediments to an improved entrepreneurial orientation for their projects. They may wish to address a small number of the most significant obstacles initially. This approach is consistent with the understanding from change management literature that reducing a few key counter-forces can be more effective than attempting to increase the pressure for the change or attempting to reduce all counter-forces at once (e.g., Coch et al., 2009; tinyurl.com/qhbx5tk).

We suggest that managers should determine which component of entrepreneurial orientation faces the largest obstacles and begin there.

*Risk taking*

Managers can make choices that create a risk-taking culture or microclimate within their projects by taking advantage of organization development techniques (e.g., Beer and Walton, 1987; tinyurl.com/pplm2mn). Entrepreneurially oriented structures within projects can be

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**Table 1.** Obstacles to employees acting entrepreneurially in development projects of large technology firms

| Component | Obstacles | Supporting Literature |
|---|---|---|
| **Risk Taking** | A corporate culture that discourages experimentation at the project level | Burgers et al. (2009; tinyurl.com/pbsaal3) discuss the impact that corporate structures limiting autonomy at the project level have on innovation and experimentation. Limiting autonomy between development teams leads to employees that are risk averse and who demonstrate low entrepreneurial orientation (Hornsby et al., 2009: tinyurl.com/lzhonhk; Goldenberg et al., 2001: tinyurl.com/k6ruh62). |
| | Staffing of new projects with employees who are busy doing other things, in order to minimize risk to near term deliverables | Shared objectives and rewards of the top management team inhibit the allocation of scarce human resources to projects, resulting in project leaders utilizing resources that are overtaxed and motivated exclusively by near-term goals, impacting innovation (Burgers et al., 2009; tinyurl.com/pbsaal3). |
| | Allocating available resources to enhance what exists or add more features to what exists | Encumbered by investments made in current products, firms are motivated to avoid disruption of their own markets and focus efforts on project activities that provide improvements to existing portfolios (Burgelman, 1984; tinyurl.com/qb4pxmk). |
| **Proactiveness** | Rewarding those who improve efficiency and delivery in current product lines and contributions to performance to corporate scorecards, not those who wish to launch and grow new product lines | Entrepreneurial behaviours are impeded by the development manager's inability to interpret the wider strategic context of the firm, preoccupation with improving efficiency and maintaining stability, and limited discretion in hiring staff and work assignment (Hornsby et al., 2009; tinyurl.com/lzhonhk). |
| | Encouraging employees to focus on existing projects rather than experimentation or starting initiatives on their own | Wider company processes limit the development manager's ability to proactively engage in entrepreneurial practices (Burgelman, 1984; tinyurl.com/qb4pxmk). |
| **Innovativeness** | Discouraging solutions "not invented here" | Poor processes and systems to incorporate knowledge created outside of the firm discourage the use of partners and external solutions by development managers constraining projects to depend on internal solutions and authorities (Nayayanan et al., 2008; tinyurl.com/kvjxw5y). |
| | Discouraging new ideas and experimentation to define new solutions | Burgers et al. (2009; tinyurl.com/pbsaal3) explain that social integration of top-level managers with shared objectives and rewards can result in a lack of intrinsic motivation to innovate. Rather than encouraging innovation, this leads to a project-level bias toward protecting investments in existing product lines and processes. |
| | Treating innovation as insurance rather than a primary goal | Burgelman (1984; tinyurl.com/qb4pxmk) states that processes used in the definition, project-impetus, and strategic context-setting phases of new projects can isolate the senior management team from the project leaders. One result can be a perception that new product or venture development is pursued as insurance against decline in existing portfolios rather than being pursed with the goal of replacing the existing business. |

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**Table 1 (continued).** Obstacles to employees acting entrepreneurially in development projects of large technology firms

| Component | Obstacles | Supporting Literature |
|---|---|---|
| **Competitive Aggressiveness** | Lack of an adequate vision of why the company will win in the marketplace | Using ill-defined ideation processes leads project leaders to develop features aimed solely at their high-end customers, leaving the low end of their market open to attack by competitors with inferior products (Christensen, 1997: tinyurl.com/o5hap7k; Goldenberg et al., 2001: tinyurl.com/k6ruh62). |
| | Reviewing project progress without incorporating feedback from customers or other project stakeholders | Stage-gate or waterfall development methodologies only engage customers late in the project cycle and lack early success determinants, leading to costly failures (Goldenberg et al., 2001: tinyurl.com/k6ruh62; MacCormack et al., 2001: tinyurl.com/am6axfs). These methodologies also encourage detailed upfront planning to minimize risk, which discourages experimentation and unsanctioned activities. |
| **Autonomy** | Discouraging the need for change or preventing marshaling relationships with others to drive change | Development managers are constrained to focus on near-term priorities through their linkages to the existing and mainstream businesses (Burgers et al., 2009: tinyurl.com/pbsaal3; Burgelman, 1984: tinyurl.com/qb4pxmk; Hornsby et al., 2009: tinyurl.com/lzhonhk; Narayanan et al., 2009: tinyurl.com/kvjxw5y). Employees are prevented from orchestrating relationships with others to accomplish their jobs and are required to follow certain channels. |
| | Investing little or no money to improve development processes | The linkage between development processes and innovation development is underestimated or overlooked. Project leaders are constrained by existing processes and methodologies, rather than embracing processes appropriate for innovation (Burgers et al., 2009: tinyurl.com/pbsaal3; Nayayanan et al., 2008: tinyurl.com/kvjxw5y). |

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**Table 2.** Suggestions on how development managers in large technology companies can help employees in development projects act entrepreneurially

| Component | Obstacles | Proposed Solutions |
|---|---|---|
| **Risk Taking** | A corporate culture that discourages experimentation at the project level | Select development managers based on their ability to interpret the strategic intent of their projects to put entrepreneurial activities into context. These managers and their project leaders can be permitted discretion in project definition, staffing selection, and rewards structures to encourage innovation (Burgelman, 1984: tinyurl.com/qb4pxmk; Narayanan et al., 2009: tinyurl.com/kvjxw5y; Burgers et al., 2009: tinyurl.com/pbsaal3; Hornsby et al., 2009; tinyurl.com/lzhonhk). |
| | Staffing of new projects with employees who are busy doing other things, in order to minimize risk to near term deliverables | Seek team members and partners with high generational experience, thereby enhancing the team's ability to incorporate new information in ways that benefit their project. Experience is measured by the number of project iterations that a team member has experienced (MacCormack et al., 2001: tinyurl.com/am6axfs; Narayanan et al., 2009: tinyurl.com/kvjxw5y). |
| | Allocating available resources to enhance what exists or add more features to what exists | Constrain resources to limit project scope, provide focus on delivery, and allow for experimentation and learning (Fisher, 2012; tinyurl.com/c8yb7rd). Team members can be encouraged to leverage external partners and external capabilities to support the staffing and resource goals of the project (Narayanan et al., 2009; tinyurl.com/kvjxw5y). |
| **Proactiveness** | Rewarding those who improve efficiency and delivery in current product lines and contributions to performance to corporate scorecards, not those who wish to launch and grow new product lines | Implement reward structures that link problem finding, problem solving, and knowledge development to the success of the project (Hornsby et al., 2009: tinyurl.com/lzhonhk; Burgelman, 1984; tinyurl.com/qb4pxmk). |
| | Encouraging employees to focus on existing projects rather than experimentation or employees starting initiatives on their own | Create an organizational structure within the project that allows entrepreneurial activity to be conducted autonomously from the mainstream business to insulate against influence of near-term goals (Burgelman, 1984: tinyurl.com/qb4pxmk; Narayanan et al., 2009: tinyurl.com/kvjxw5y; Burgers et al., 2009: tinyurl.com/pbsaal3; Hornsby et al., 2009: tinyurl.com/lzhonhk). |
| **Innovativeness** | Discouraging solutions "not built here" | Employ project controls that ensure alignment of activities to corporate strategic context and vision, and that capture and integrate new knowledge (Burgelman, 1984: tinyurl.com/qb4pxmk; Burgers et al., 2009: tinyurl.com/pbsaal3; Narayanan et al., 2009: tinyurl.com/kvjxw5y). |
| | Investing little or no money to improve development processes | Use a dynamic or agile development model rather than stage-gate or waterfall methods to promote collaboration, experimentation, and early customer engagement (MacCormack et al., 2001; tinyurl.com/am6axfs). |
| | Discouraging new ideas and experimentation to define new solutions | Promote collaboration, experimentation, and rapid deployment techniques (Fisher, 2012; tinyurl.com/c8yb7rd), and they should reward outcomes that reflect the innovative nature of the project (Hornsby et al., 2009; tinyurl.com/lzhonhk). |

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**Table 2 (continued).** Suggestions on how development managers in large technology companies can help employees in development projects act entrepreneurially

| Component | Obstacles | Proposed Solutions |
|---|---|---|
| **Competitive Aggressiveness** | Reviewing project progress without incorporating feedback from customers or other project stakeholders | Use early-idea, project, and market-level determinants, such as customer feedback on minimum viable products, to screen out potential poor ideas prior to product introduction (Goldenberg et al., 2001; tinyurl.com/k6ruh62). |
| **Autonomy** | Discouraging the need for change or prevent marshaling relationships with others to drive change | Conduct development autonomously from the mainstream business (Burgelman, 1984: tinyurl.com/qb4pxmk; Narayanan et al., 2009: tinyurl.com/kvjxw5y; Burgers et al., 2009: tinyurl.com/pbsaal3; Hornsby et al., 2009: tinyurl.com/lzhonhk). |
| | Discouraging employees from starting initiatives on their own | Support the employees' need to increase their control over uncertainty by authoring work relationships at the project level (Rindova et al., 2009; tinyurl.com/l2htbbh). |

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used to lead such change, for example, by allowing for necessary discretion in project definition, staffing selection, and rewards structures. Discretion and delegation here can encourage employee innovation in activities that addresses uncertain and emerging needs. Similar flexibility can be applied at the project level to task prioritization, tool selection, allocation of resources, and so on.

Project staffing considerations begin with the selection of the key project leaders and other critical team members. These people should be selected according to their ability to interpret the strategic context of the project given the desire to also encourage employee entrepreneurial activities. Managers within projects should therefore be allowed discretion with hiring and work assignment of employees (Hornsby et al., 2009; tinyurl.com/lzhonhk). Both MacCormack, Verganti, and Iansiti (2001; tinyurl.com/am6axfs) and Narayanan, Yang, and Zahra (2009; tinyurl.com/kvjxw5y) tell us that a project development manager should also seek team members and other partners who have high "generational experience", which enhances the team's ability to incorporate the type of new information that might arise from entrepreneurial effort.

*Proactiveness*
Managers can seek permission to link rewards for employees assigned to a development project to problem finding, problem solving, and knowledge development (Hornsby et al., 2009: tinyurl.com/lzhonhk; Burgelman, 1984: tinyurl.com/qb4pxmk). The allocation of differential rewards with the project team can therefore also be used to acknowledge and encourage employees who add value through entrepreneurial effort.

*Innovation*
Constraining the resources applied to new product development to the lowest level needed to produce a minimum viable product will focus resources on the task at hand and speed delivery (Fisher, 2012: tinyurl.com/c8yb7rd; Goldenberg et al., 2001: tinyurl.com/k6ruh62). There is also evidence in the literature that constraints can stimulate entrepreneurial effort by employees (Rindova et al., 2009; tinyurl.com/l2htbbh).

Managers can protect and incubate ideas within their projects until they are ready for outsiders. Applying effective ideation reviews leads to better outcomes. Goldenberg, Lehmann, and Mazursky (2001; tinyurl.com/k6ruh62) advise us that good ideation processes, which utilize early determinants for success at the idea, project, and market levels, must be employed to ensure success. Focusing reviews on solving problems for the customer, market readiness, and project scope are examples of early determinants that can be used. This same guidance can be applied at the project level to assess employee ideas and to assess their entrepreneurial potential within the project team rather than referring to external authorities or architects.

*Competitive aggressiveness*
Knowledge created and captured through project development must be integrated back into the firm, and therefore, managers can define a control mechanism to ensure knowledge capture (Burgelman, 1984: tinyurl.com/qb4pxmk; Burgers et al., 2009: tinyurl.com/pbsaal3; Narayanan et al., 2009: tinyurl.com/kvjxw5y). Managers must create or encourage forums for knowledge sharing among project employees and provide vehicles for knowledge capture.

*Autonomy*
Managers can provide time for individual employees to act entrepreneurially and ensure that rewards account for such initiative. Managers can also recognize that employees will select tools, orchestrate work with others, and take other steps to take control and reduce uncertainty with the result that they create greater value within the project (Rindova et al., 2009; tinyurl.com/l2htbbh).

## Conclusion

In seeking to encourage technology entrepreneurship in large incumbent technology firms, this article provides a framework that managers can use to support employees acting entrepreneurially. The highlights of the tool developed are:

1. The structure of the tool is based on entrepreneurial orientation literature that argues that firms can be more or less configured or predisposed to being entrepreneurial. We have adapted the entrepreneurial orientation literature to address how managers can encourage and capture entrepreneurial effort to improve the performance of their development projects.

2. We presented the obstacles and solutions to the obstacles to employees acting entrepreneurially by considering the activities of employees working on development projects. The entrepreneurship literature argues that employees of established firms can and do act entrepreneurially.

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3. There are many potential obstacles to employees acting entrepreneurially. We propose that development project managers address a subset of the obstacles to initiate change. Managers can identify the key obstacles to entrepreneurial activity by considering the five components of entrepreneurial orientation as presented in the framework in this article.

We have focused on the relationship between the five entrepreneurial orientation components and project development performance. In addition to examining the project level rather than the firm, we have considered employee entrepreneurship motivated by a desire to increase control and reduce uncertainty. Emancipation – or actions to increase their own control in an uncertain environment – adds a new perspective to entrepreneurial orientation and offers an opportunity for further research into drivers for entrepreneurship within firms. Employees may be motivated to improve their own work environment at the same time as they create value for their firms. The implication is that a development project manager can encourage such employee entrepreneurship to improve their project's performance.

## About the Authors

**Walter Miron** is a Director of Technology Strategy at TELUS Communications, where he is responsible for the evolution of their TCP/IP and optical networks. He has over 20 years of experience in enterprise and service provider networking conducting technology selection and service development projects. Walter is a member of the research program committee of the SAVI project, the Heavy Reading Global Ethernet Executive Council, the ATOPs SDN/nFV Working Group, and he represents TELUS at the Venus Cybersecurity Corporation and Invest Ottawa. He is frequently a speaker at industry conferences and working groups. Walter is currently a graduate student in the Technology Innovation Management (TIM) program at Carleton University in Ottawa, Canada.

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7. Provide a 2-3 paragraph conclusion that summarizes the article's main points and leaves the reader with the most important messages.
8. Include a 75-150 word biography.
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