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Technology Entrepreneurship

Welcome to the March 2012 issue of the *Technology Innovation Management Review*. The editorial theme of this issue is Technology Entrepreneurship. We invite 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 early-stage 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 third sector, and others – to bridge the gap between theory and practice. In particular, we focus on the topics of managing innovation, technology entrepreneurship, economic development, and open source business.

Upcoming Issues

- *April*: Technology Entrepreneurship III
Guest Editor: Tony Bailetti
- *May*: Technology Entrepreneurship IV
Guest Editor: Tony Bailetti
- *June*: Global Business Creation
Guest Editors: Marko Seppä and Stoyan Tanev
- *July*: Social Innovation
Guest Editor: Stephen Huddart

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

Contribute

Contribute to the TIM Review in the following ways:

- Read and comment on past articles and blog posts.
- Review the upcoming themes and tell us what topics you would like to see covered.
- Write an article for a future issue; see the author guidelines and editorial process for details.
- Recommend colleagues as authors or guest editors.
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Editorial: Technology Entrepreneurship

Chris McPhee, Editor-in-Chief

Tony Bailetti, Guest Editor

From the Editor-in-Chief

It is my pleasure to welcome back **Tony Bailetti**, Director of Carleton University's Technology Innovation Management program, as the guest editor for four issues on the theme of Technology Entrepreneurship: February, March, April, and May.

In June, we will examine the theme of Global Business Creation with **Marko Seppä**, founder of Global Faculty Partners for Problems Worth Solving LP, and **Stoyan Tanev**, Associate Professor at the University of Southern Denmark.

In July, we will be joined by **Stephen Huddart**, President and CEO of the J.W. McConnell Family Foundation, as guest editor for the theme of Social Innovation.

As always, we welcome your feedback, suggestions for future themes, and contributions of articles. We hope you enjoy this issue of the TIM Review and will share your comments on articles online. Please also feel free to contact us (timreview.ca/contact) directly with feedback or article submissions.

Chris McPhee
Editor-in-Chief

From the Guest Editor

Welcome to the March issue of the TIM Review. This is the second of four issues that examine various aspects of technology entrepreneurship, contribute to theory, and provide insights into the various issues facing technology entrepreneurs and top management teams of technology companies.

The field of technology entrepreneurship offers many opportunities for scholarly inquiry and innovative industrial initiatives. The March issue includes five articles and a report on a TIM lecture. The five articles provide: i) insights from recent research on born-global firms; ii) examples of how case studies are used to carry out entrepreneurship research; iii) a model that relates open source software to the creation of customer value; iv) a description of the lean startup model; and v) a guide to the actions and behavioral traits required to lead and manage change. The report summarizes the first lecture of the 2012 TIM Lecture Series titled "The Business of Mobile Apps" presented by Brian Hurley, President and CEO of Purple Forge, on February 9, 2012.

Stoyan Tanev, an Associate Professor at the University of Southern Denmark, Odense, Denmark and an Adjunct Professor at Carleton University, discusses the characteristics of technology firms that are born global and the importance that ecosystems have for their growth. A born-global firm is defined as "a venture launched to exploit a global niche from the first day of its operation".

Tom Duxbury, Entrepreneur in Residence at Wesley Clover Technologies and doctoral student at Carleton University's Sprott School of Business, explores how the case study method has been applied to entrepreneurship research and provides recommendations for improved publication rates.

Aparna Shanker, a customer application engineer with Alcatel-Lucent and a student in Carleton's Technology Innovation Management program, examines the dimensions of customer value creation and provides guidelines to help businesses that generate revenue from open source assets to create value for their customers.

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Chris McPhee and Tony Bailetti

Dobriła Rancic Moogk, the Vice-Chair with the University of Ottawa Women in Engineering and Computer Science committee and a Vice-Chair on the Volunteer Ottawa Board of Directors, argues that a technology company operating in conditions of extreme uncertainty should introduce a minimum viable product to the market as soon as possible in order to test its value and the entrepreneur's growth projections.

Llynn Plante, Regional Director with the Industrial Research Assistance Program of the National Research Council Canada (NRC-IRAP) and doctoral student at Carleton University's Sprott School of Business, identifies the top nine actions (and their associated behavioural traits) that technology entrepreneurs who lead and manage change should carry out.

Brian Hurley, CEO of Purple Forge, delivered a lecture titled "The Business of Mobile Apps" at Carleton University on February 9, 2012. This summary includes the lessons learned by individuals who attended the lecture and the results of a discussion on next steps.

We hope that you, your colleagues, and your organizations benefit from reading this issue of the TIM Review.

Tony Bailetti
Guest Editor

About the Authors

Chris McPhee is Editor-in-Chief of the *Technology Innovation Management Review* and is in the Technology Innovation Management program at Carleton University in Ottawa. Chris received his BScH and MSc degrees in Biology from Queen's University in Kingston, following which he worked in a variety of management, design, and content development roles on science education software projects in Canada and Scotland.

Tony Bailetti is an Associate Professor in the Sprott School of Business and the Department of Systems and Computer Engineering at Carleton University, Ottawa, Canada. Professor Bailetti is the Director of Carleton University's Technology Innovation Management program. His research, teaching, and community contributions support technology entrepreneurship, regional economic development, and international co-innovation.

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Global from the Start: The Characteristics of Born-Global Firms in the Technology Sector

Stoyan Tanev

“Born-global companies merit much more attention than they are receiving, as their growth strategies could provide lessons for many other organizations.”

Alina Kudina, George S. Yip, and Harry G. Barkema
“Born Global”, *Business Strategy Review*, 2008

This article provides insights from recent research on firms that are “born global”. A born-global firm is a venture launched to exploit a global niche from the first day of its operations. The insights in this article are relevant to technology entrepreneurs and top management teams of new technology firms. After discussing various definitions for the term “born global” and identifying the main characteristics of born-global firms, this article lists a few salient characteristics of firms that are born global in the technology sector. The article concludes by identifying opportunities for future research.

Introduction

The “born global” label originated with Michael Rennie (1993; tinyurl.com/7d6aa22), who studied firms established with the capability to compete internationally and coordinate resources across countries (Jones et al., 2011; tinyurl.com/7mbjjzz). Research on born-global firms focuses on how to launch and grow a small firm to satisfy the needs of customers in a global niche (Cavusgil and Knight, 2009; tinyurl.com/74th3bb; Knight and Cavusgil, 1996; tinyurl.com/7hxs7l2; Madsen and Servais, 1997; tinyurl.com/82pgrhj). The internationalization of businesses has become a pervasive phenomenon, which underscores the importance of the born-global concept and the need for researchers and practitioners to understand the factors that influence the success of born-global firms.

In the international business literature, firms that internationalize early in their life cycle are also referred to as “global startups” (Oviatt and McDougall, 1995; tinyurl.com/6w6v8cj), “instant internationals” (Fillis, 2001; tinyurl.com/7e8dq3), and “international new ventures” (Oviatt and McDougall, 1994; tinyurl.com/79eye8t). Although many

firms target global niches and develop a global presence within one or two years of their founding (Autio et al., 2000; tinyurl.com/7plvc5d; McDougall and Oviatt, 2000; tinyurl.com/745yv3v; Rennie, 1993; tinyurl.com/7d6aa22), this does not mean they fit the definition of “born global”.

For the purpose of this paper, a true born-global firm is a new venture that acts to satisfy a global niche from day one. While various definitions of born-global firms have been proposed (Jones et al., 2011; tinyurl.com/7mbjjzz), this definition of born-global firms fits best with the entrepreneurship literature and is consistent with the definition advanced by Moen, Sørheim, and Erikson (2008; tinyurl.com/82r2j4k). This definition focuses on the creation of new ventures that are international by design and not by emergence. Thus, the unit of analysis is a startup that is born global, excluding firms that have simply grown to be global after being a domestic firm for a period of time.

The remainder of this article is organized into four sections. The next section describes the distinctive characteristics of born-global firms. Then, the conditions that enable a technology firm to go global are identified, the

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importance of business ecosystems to the growth of born-global firms is highlighted, and a set of research questions is advanced. The last section provides the conclusions.

Distinctive Characteristics of Born-Global Firms

Born-global firms possess the following distinctive characteristics:

1. High activity in international markets from or near the founding

Born-global firms begin exporting their products or services within a couple of years after their founding and may export a quarter or more of their total production. Most of them advance through subsequent stages of internationalization, collaboration with foreign partners, or undertaking of direct foreign investment. Findings from Denmark and Australia show that, although born-global firms are presumed to have the intent to internationalize from inception; internationalization is not necessarily an objective in the founding process (Rasmussen et al., 2001; tinyurl.com/7u8pj4l). The decision to engage the firm into a systematic internationalization process is usually determined by the nature of the new firm; the type of technology that is being developed or the firm's specialization within the specific industry sector, value chain, or market (Jones et al., 2011; tinyurl.com/7mbjjzz). Other studies from Norway and France show slightly different results, indicating that, although the specific market situation is important, the extent to which a firm is a born global rather than a "born local" or a "late global" depends on the firm's own early decisions (Moen, 2002; tinyurl.com/7yegguu). Similar findings were reported in Sweden and Finland, where the founder's vision at the time of the incorporation was found to be a key factor for a firm's early internationalization patterns (Gabrielsson and Pelkonen, 2008; tinyurl.com/6ot26js).

2. Limited financial and tangible resources

Born-global firms tend to be relatively small and have far fewer financial, human, and tangible resources as compared to large multinational enterprises that have been considered as dominant in global trade and investment.

3. Present across most industries

Many born-global firms are technology firms. However, recent evidence suggests that the born global phenomenon is widely spread beyond the technology sector (Moen, 2002; tinyurl.com/7yegguu; Rennie, 1993;

tinyurl.com/7d6aa22). For example, in Denmark, Madsen, and Servais (1997; tinyurl.com/82pgrhj) have found born-global firms in industries such as metal fabrication, furniture, processed food, and consumer products.

4. Managers have a strong international outlook and international entrepreneurial orientation

The managers of born-global firms do not see foreign markets as a mere addition to their domestic markets. They possess a strong entrepreneurial mindset. They proactively and aggressively compete in international markets, they take risks, and innovate. Findings from the United States, the United Kingdom, Australia, Canada, Ireland, and New Zealand highlight the importance of the combined role of the creativity, knowledge, and resourcefulness of the top management team and not just of the personal qualities of a single entrepreneur. The skills of top management teams have been found important for a more dynamic form of internationalization, particularly in the knowledge-based sectors (Johnson, 2004; tinyurl.com/7ylm49z; Andersson and Evangelista, 2006; tinyurl.com/6wm49re; Loane et al., 2007; tinyurl.com/7hdohoc).

5. Emphasis on differentiation strategy

Born-global firms tend to adopt differentiation strategies by developing differentiated designs and highly distinctive products that target niche markets, which may be too small for the tastes of larger firms. The focus is on stimulating customer loyalty by uniquely meeting particular needs. "People and firms increasingly demand specialized and customized products, and niche markets have become an important source of opportunities for small firms" (Cavusgil and Knight, 2009; tinyurl.com/74th3bb).

6. Emphasis on superior product quality

Born-global firms are often at the leading technological edge of their industry or product category. They are founded to exploit business opportunities based on the development of new products or services that are better designed and higher quality than competitors' offerings. Typically, these firms do not operate in "commodity" markets (Cavusgil and Knight, 2009; tinyurl.com/74th3bb).

7. Leveraging advanced information and communications technology (ICT)

Many born-global firms leverage ICT to segment customers into narrow global-market niches and skillfully serve highly specialized buyer needs. ICT allows them to process information efficiently and communicate with partners and customers worldwide at practically zero cost (Cavusgil and Knight, 2009; tinyurl.com/74th3bb).

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8. Using external, independent intermediaries for distribution in foreign markets

Most born-global firms expand internationally through exports by engaging in direct international sales or leveraging the resources of independent intermediaries located abroad. Many of them rely on external facilitators to organize international shipments. Exporting and leveraging independent intermediaries enables flexible international operations including the ability to enter or withdraw from foreign markets relatively quickly and easily. More experienced born-global firms appear to adopt additional strategies, such as joint ventures and foreign direct investment (Cavusgil and Knight, 2009; tinyurl.com/74th3bb).

The Specifics of Technology Firms

The majority of born-global firms are technology companies. A research study based on a comprehensive analysis of 12 technology firms in England formulated a number of conditions for newly created technology firms considering early, rapid globalization (Kudina et al., 2008; tinyurl.com/83c2qdz). Although these conditions were developed in a very specific context, it is worth summarizing them here:

1. The market in the home country is not large enough to support the scale at which the firm needs to operate.
2. Most of the firm's potential customers are foreign, multinational firms.
3. Many of the firm's potential customers have overseas operations where they will use the firm's products or services.
4. The firm operates in a knowledge-intensive or high-technology sector.
5. Having the most technically advanced offering in the world is key to the firm's competitive advantage.
6. The firm's product or service category faces few trade barriers.
7. The firm's product or service has high value relative to its transportation and other logistics costs.
8. Customer needs and tastes are fairly standard across the firm's potential country-markets.

9. The firm's product or service has significant first-mover advantages or network effects.

10. The firm's major competitors have already internationalized or will internationalize soon.

11. The firm has key managers who are experienced in international business.

The Importance of Ecosystems

Researchers have identified a number of organizational capabilities that enable internationalization and increase the international performance of born-global firms. Kudina, Yip, and Barkema (2008; tinyurl.com/83c2qdz) attribute the success of technology firms that are born global to their effective use of three types of ecosystems:

1. The first type of ecosystem is anchored around universities and firms operating in the same industry as the focal firm. Being part of such ecosystems results in a flow of technological knowledge, experienced people, and contacts with local venture capitalists that benefit the focal firm. The knowledge and expertise developed within such ecosystems provide a global competitive advantage.
2. The second type of ecosystem establishes and strengthens relationships between the local operations of firms and their foreign sales subsidiaries. Such networks are important sources of knowledge from experts that are spread out internationally. The ecosystem facilitates direct contacts between engineers and clients to satisfy the specific needs of clients and provides a mechanism for winning additional business.
3. The third type of ecosystem is anchored around foreign sales subsidiaries and local clients that are important for high-quality service. Such ecosystems involve customers and provide highly relevant information about client needs in relation to product development. These contacts help firms to obtain technological knowledge from the client or through the client's business partners that they would otherwise have to develop themselves.

The success of a firm is conditional on its ability to create an ecosystem of firms beyond its clients. The ecosystem comprises firms in the industry in which it has clients, as well as firms in many other related industries. Such an arrangement helps the firm to secure clients in a more systematic way as part of its ecosystem.

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Research Questions

The research on born-global firms is growing. There are many relevant research questions that should be addressed in future studies. This section builds on the research questions that have been discussed in the literature (Cavusgil and Knight, 2009; tinyurl.com/74th3bb). Suggested research questions include:

1. What barriers inhibit technology firms from being born global?
2. What factors contribute to the early success of born-global firms even in light of their limited access to resources?
3. What are the main advantages associated with internationalization at an early stage of the life cycle of a technology company? What is the nature of these advantages and how could they be developed?
4. How can design principles help launch and grow born-global technology firms?
5. How do resource-poor technology companies reconcile the costly needs for product customization in unique foreign markets with the need to achieve economies through product standardization? How can customer co-creation capabilities and business models help new firms deal with the high costs of customization?
6. Does early internationalization also occur among firms that specialize in technology-driven services? If so, how do they differ from manufacturers? How can product-enabled services help firms to differentiate themselves and compete in foreign markets?
7. What is the role of ecosystems in launching and growing technology firms that are born global? How do ecosystems advance internationalization goals of technology companies? What types of network contacts are most beneficial?
8. What proportion of born-global technology firms become large, successful firms? How many merge with other firms or become acquired by larger ones? Do born-global firms go out of business at the same rate as firms that were not born global? How do born-global companies grow?
9. Is ownership of born-global firms significantly different from ownership of firms that were not born global?

Conclusion

The main objective of this article was to discuss the characteristics of born-global firms. The literature on born-global firms has developed separately from the technology entrepreneurship literature. The various definitions of born-global firms do not enable linking research on born-global firms and the theory of the firm or entrepreneurship theory. This fact provides valuable opportunities for future research.

If technology firms that are born global are more successful than technology firms that are not born global, we should focus on defining design principles that incorporate key attributes of born-global firms and use these design principles to launch and grow technology companies. This article is a call to first empirically validate that born-global firms are more successful than firms that were not born global and then identify the design principles that can be used to design technology startups.

About the Author

Stoyan Tanev is an Associate Professor in the Institute of Technology and Innovation and member of the Integrative Innovation Management (I2M) Research Unit at the University of Southern Denmark, Odense, Denmark. He is also 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 an MSc and PhD in Physics (jointly by the University of Sofia, Bulgaria, and the University Pierre and Marie Curie, Paris, France), an MEng in Technology Management (Carleton University, Canada), and a MA (University of Sherbrooke, Canada). His main research interests are in the fields of technology innovation management and value co-creation in technology-driven businesses. Dr. Tanev is also on the Review Board of the *Technology Innovation Management Review*.

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Towards More Case Study Research in Entrepreneurship

Tom Duxbury

“*Discipline is the bridge between goals and accomplishment.*”

Jim Rohn

Entrepreneurship as an emerging discipline has made good strides, but according to some, has fallen short of bringing its theory and literature up to the standards of others in the management sciences. Rich with the descriptive detail needed for insightful theory building in entrepreneurship, scholars have called for more case study research, particularly those incorporating non-retrospective and longitudinal observations. At the same time however, it has become rare to find such research published in A-level journals dedicated to entrepreneurship. A survey presented here of major entrepreneurship journals over the past six years revealed a publication rate of only 3% using the case study method. This presents a major impediment for developing fresh research in this field based upon the study of real cases. The author explores how the case study method has been applied to entrepreneurship research and provides recommendations for improved publication rates.

Introduction

Interest in entrepreneurship has been growing steadily in business schools, doctorate programs, and journal publications, raising the question of how research to advance the field is conducted. Theories on entrepreneurial processes and outcomes are drawn from a cross section of management science disciplines, including strategy, marketing, finance, operations, and organizational behaviour. If one considers entrepreneurship as encompassing vibrant processes of discovery, initiation, survival and growth, it is hard to imagine a research paradigm based predominantly on the hypothetico-deductive method. Case study research (CSR) provides an alternative method and opportunity to help build new theory across disciplines. It also offers an accepted framework for building theory from real-world, immediate observations rather than relying on retrospectives, surveys, or lab tests. Single-case studies, and longitudinal ones in particular, provide educators and practitioners with rich and valuable details from which to draw their own conclusions.

Entrepreneurship scholars such as Bygrave (2007; tinyurl.com/7vwkr49) have pointed to the decline in descriptive research and relevance to practitioners over the past decade, attributing the cause to an increasing

difficulty in getting such studies published. Why is this? This article begins with a review of the CSR method as described by prevalent scholars, including a glossary of frequently encountered terms (Box 1). Using a survey of major journal publications over the past six years, the author explores how the method has been applied to entrepreneurship, and whether concerns over methodological rigour are justified. The author concludes with advice for researchers considering adopting the method.

What is Case Study Research?

CSR is a method whose defining features are: i) empirical study of contemporary situations in a natural setting; ii) a focus on asking “how” and “why” questions; and iii) the treatment of each case as an experiment in which the behaviors cannot be manipulated (Myers, 2009: tinyurl.com/7ts9bxq; Yin, 2009: tinyurl.com/7ywkcpy). Data collection can be accomplished using quantitative or qualitative methods, and it is a common misconception that case studies are based solely on the result of ethnographies or of participant observation (Dooley, 2002: tinyurl.com/7s5atpq; Yin, 2009). Case studies do not necessarily require fieldwork. In fact, they follow a linear, yet iterative process employing a variety of data collection methods to compare within and across cases for research validity.

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CSR has been successfully used for descriptive, exploratory (discovery), and explanatory (test, explain, or compare) theoretical purposes, and it is not limited in time to early stages of enterprises. Yin (2009; tinyurl.com/7ywkcpy) proposes a two-part definition of CSR, beginning with the scope, which helps distinguish between other types of research methods:

1. *A case study is an empirical inquiry that:*

- *investigates a contemporary phenomenon in depth and within its real-life context, especially when*
- *the boundaries between phenomenon and context are not clearly evident*

Implicit in these two points is the lack of control on the part of the researcher: the setting and variables are fixed for observation. In the second part, Yin additionally differentiates the method based on technical detail:

2. *The case study inquiry:*

- *cope with the technically distinctive situation in which there will be many more variables of interest than data points, and as one result*
- *relies on multiple sources of evidence, with data needing to converge in a triangulating fashion, and as another result*
- *benefits from the prior development of theoretical propositions to guide data collection and analysis*

Although there are variations in the definition, the methodology surrounding CSR design is reasonably consistent, with variations dependent upon the research paradigm. Research design is not dissimilar to other methodologies; with five components depending upon the epistemological stance (Yin, 2009):

1. *a study's research questions*

2. *its propositions (if positivist) or purpose*

3. *its unit(s) of analysis*

4. *the logic linking the data to the propositions (if positivist)*

5. *the criteria for interpreting the findings (if positivist)*

In designing a case study, the researcher must initially establish that a case study is the best method to answer the research question at hand. The proposed case must be of sufficient interest to justify its production, because "a boring case is really just a waste of everyone's time" (Myers, 2009; tinyurl.com/7ts9bx). Availability of

Box 1. Glossary

Epistemological: The philosophical nature of knowledge; its presuppositions, extent, methods, and validity.

Hypothetico-deductive method: Method of scientific progress whereby a general hypothesis is tested by deducing predictions that may be experimentally tested; when falsified, a new hypothesis is required.

Longitudinal: A type of study that involves repeated observations of the same variables over long periods of time.

Participant observation: A research strategy which aims to gain a close and intimate familiarity with a target study group through direct participation in their natural environment.

Positivist: A philosophical approach to knowledge based upon the deductive scientific method, i.e., development of testable, verifiable hypotheses with the goal of prediction, explanation, and theory development.

secondary data and access to key informants of the case are essential and may limit both the number and selection of cases studied. Consideration of the initial constructs requires careful alignment of the propositions (2), units of analysis (3), and linking of the data (4), and is an essential activity of theory building (Eisenhardt, 1991; tinyurl.com/6wsppa4). The findings are often presented in an objectively narrative form, linking interview data with secondary data.

The selection of cases is chosen primarily to illuminate the research questions, and is generally based on theoretical replication, rather than sampling logic (Eisenhardt, 1991; tinyurl.com/6wsppa4; Yin, 2009; tinyurl.com/7ywkcpy). Multiple case studies are analogous to the replication of scientific experiments in order to determine whether a theory holds true under consistent circumstances (Yin, 2009). Depending upon the emergent theory being developed however, it may be advantageous to select cases based on contrasts or polar opposites, giving rise to "theoretical sampling". Eisenhardt (1989; tinyurl.com/7dfuc3z) suggests that between four and eight cases is optimal, although many examples of groundbreaking studies based on single cases exist.

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Research journal editors have expressed a strong desire for more longitudinal case studies in particular, while acknowledging their ongoing challenges. According to Chandler and Lyon (2001; tinyurl.com/7pfgkwf) only 7% of the 416 empirical entrepreneurship articles published in nine major journals between 1989 and 1999 were longitudinal studies, and as Bygrave (2007; tinyurl.com/7vwkr49) states, "there is still room for more". Longitudinal cases are not only difficult to sustain with the subjects (who may go out of business), but run counter to the pressures of publication and tenure many researchers face. Risk of enterprise failure is a consistent hazard in entrepreneurship research and is one likely explanation for the low production of this type of CSR noted by Chandler and Lyon (2001).

Criteria of Quality in Case Study Research

There are no commonly agreed upon quality standards in CSR, therefore one might ask: who is to be the judge of good quality? If the target audience is the academic community, then it is the inner circle of journal editors and reviewers, and theoretical, factual, or methodological insights are the underlying basis of assessment. If the gap between researchers and practitioners is to be bridged in order to advance the field, then the needs of the practitioner audience for more practical frameworks and suggestions needs to be considered.

Positivist case study scholars (e.g., Yin, 2009: tinyurl.com/7ywkcpy; Eisenhardt, 1989: tinyurl.com/7dfuc3z and 1991: tinyurl.com/6wsppa4) have long endorsed the grafting of natural science measures onto CSR in terms of propositions, construct validity, internal validity, external validity, and reliability. Construct validity refers to identifying correct operational measures for the concepts under study, and is especially challenging in CSR since "subjective" measures may be used to collect data (Yin, 2009). External validity deals with the problem of generalizability and is often a criticism of single-case studies. Reliability refers to the repeatability of a study and is most easily overcome by well-documented data collection. Other common techniques, such as the use of multiple researchers with high inter-rater reliability (IRR) measurements, serve to increase study confidence (Crook et al., 2010; tinyurl.com/7fhuj37).

However, alternative quality criteria should apply to less positivist research (Leitch et al., 2010; tinyurl.com/6qrvz8e). Lincoln and Guba (1985; tinyurl.com/76xmfks) proposed, for example, that internal validity be recast as *credibility*: the degree to which a respondent's views fit with an inquirer's reconstruction; that external

validity be viewed as *transferability*: the generation of sufficient case information so that case-to-case generalizations are possible; and reliability be considered as *dependability*: the degree to which the research process is logical, traceable, and documented. In qualitative research, these concepts, while more subjective, are alternative means of establishing the trustworthiness of the findings.

For case studies, Yin (2009; tinyurl.com/7ywkcpy) insists on strong triangulation of data sources (e.g., interview, observations, documents, archival records), to establish the reliability and validity of the research. Convincing the reader that adequate triangulation to support a finding has been achieved however, is an important yet subjective task left up to the researcher.

Use of the Case Study Research Method

Given that CSR is well suited for applied management fields such as entrepreneurship, it is surprising how little it is used as a method in entrepreneurship publications. Wigren (2007; tinyurl.com/7vwkr49), for example, reviewed the literature published in two top entrepreneurship journals to determine the types of research methods used. In *Entrepreneurship Theory and Practice* (ETP), there were 11 matches in 11 issues using case studies published between 2002 and 2005. In the *Journal of Business Venturing* (JBV), there were 25 matches in 20 volumes published between 1985 and 2005. Chandler and Lyon (2001; tinyurl.com/7pfgkwf) reviewed 415 empirical articles in nine entrepreneurship journals between 1989 and 1999, and they found only 18% employed qualitative techniques of any kind. Those that could be categorized as CSR amounted to 49 studies, or 11% of the total. Longitudinal studies comprised only 7% of the total, almost none of which were in real time (i.e., non-retrospective), a "severe shortcoming" (Bygrave, 2007; tinyurl.com/vwkr49).

Crook and colleagues (2010; tinyurl.com/7fhuj37) revisited Chandler and Lyon's (2001; tinyurl.com/7pfgkwf) benchmark assessment of the state of construct validity in entrepreneurship research during the 10 years since its publication and discovered only minor changes in qualitative research publication overall.

Method Used in this Survey

There are currently two major journals among the *Financial Times* "top 45" (2010; tinyurl.com/88t68ep) that are dedicated to entrepreneurship: ETP and JBV. A review of articles from these two journals for the time period

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January 2005 to March 2011 was conducted to assess how successfully CSR has been applied to recent entrepreneurship research.

Sample selection

In the first stage of sample selection, the Scholar's Portal search engine (<http://scholarsportal.info>) was used to search titles, keywords, abstracts, and text bodies for the terms "case study", "case studies", or "case analysis". In the second stage, each of the previously identified articles was manually scanned to determine whether the article methodology meets the definition of CSR. A breakdown of the number of articles identified by journal is shown in Table 1. Table 2 provides a breakdown of the final number of articles selected by year of publication.

Review of articles and coding

Following selection of the cases, each case was re-examined in depth to determine:

1. how many cases were used in the study
2. the logic of case selection
3. the sources of data triangulation

4. whether the case was longitudinal or not
5. whether theoretical propositions were established
6. the type of interview technique used (e.g., open ended, structured)
7. whether a computer-aided text analysis (CATA) tool was identified (e.g., nVivo: tinyurl.com/5w7ws5)
8. to what extent the author(s) addressed methodological validity concerns

Two further aspects relating more specifically to entrepreneurship were investigated:

1. level of analysis
2. classification within major entrepreneurship themes

Chandler and Lyon's (2001; tinyurl.com/7pfgkwf) survey of entrepreneurship identified appropriate indications of validity (e.g., internal, external, construct) and reliability (e.g., inter-rater reliability, triangulation) that may be applied to CSR.

Table 1. Number of articles identified in the first and second stages of this study, by journal

Journal	Articles Published	CSR Articles (1 st Stage)	CSR Articles (2 nd Stage)	CSR Publication Rate
ETP	349	16	13	4%
JBV	294	6	5	2%
Total	643	22	18	3%

Table 2. Number of articles selected, by journal and year of publication

Journal	2005	2006	2007	2008	2009	2010	2011	Total
ETP	1	3	1	0	3	4	1	13
JBV	2	2	0	0	1	1	0	5

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Survey Results

Case attributes

Table 3 provides a synopsis of the case attributes, coded as previously described. The number of cases used in the studies examined ranged from one to 29, indicating that single-case studies do not appear to be a barrier to publication. The basis for case selection was split evenly between random selection, replication, variance and serendipity; two of the studies did not provide enough information to determine how cases were chosen. Most cases were conducted at a single point in time, and only 17% were conducted longitudinally, in line with Chandler and Lyon (2001; tinyurl.com/7pfgkwf).

The advancement of propositions in a study indicates a positivist application of the method. Half of the studies provided no theoretical propositions, which might be expected in a non-positivist epistemology. All case studies conducted interviews of some kind, and the majority were identified as semi-structured in the methods section. Somewhat surprisingly, 18% did not identify the type of interview, and only 17% used a CATA tool to assist in narrative analysis.

Triangulation of secondary data sources is essential to the CSR method, and 82% of the studies provided information regarding how this was accomplished. If one accepts Yin's (2009; tinyurl.com/7ywkcpy) positivist defini-

Table 3. Case attributes

Attribute	Measurement	Comments
Number of cases studied	Varied from 1 to 29, with a mean of 8.	4 studies (22%) were single-cases
Case selection logic	Split between random, replication, variance, and serendipity	2 studies did not provide enough information to determine the basis for case selection
Time span	Most of the studies (78%) collected data at a single point in time	4 cases (22%) were longitudinal
Theoretical propositions	9 studies (50%) included propositions based on theory	50% of studies made no propositions based on theory
Interview technique used	10 of the studies reported semi-structured; 2 were unstructured; 1 was structured	5 studies (18%) did not specify how interviews were conducted
Use of tools	3 of the studies reported use of computer-aided text analysis (CATA) tools	The majority of cases (83%) appear to have processed qualitative data manually
Triangulation	Most identified secondary sources, such as archival data or news reports; however, details were sparse.	4 studies (18%) provided no information regarding secondary data
Reliability and validity	10 of the studies reported some form of validity confirmation (e.g., inter-rater reliability; construct validity, external validity, declaration of biases)	8 studies (44%) did not address reliability or validity concerns

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tion of case studies outlined earlier, the four studies that did not identify secondary data sources, nor discuss triangulation in the analysis phase, might not even qualify as CSR. Looking back to 2001 however, Chandler and Lyon (2001; tinyurl.com/7pfgkwf) reported that only 5% of entrepreneurship studies combined primary and secondary data, indicating a significant improvement over the past decade.

Finally, most studies (56%) provided some evidence of validity, including: rechecking of interview data with informants, using independent coders, and reporting inter-rater reliability.

Level of analysis

Ten studies (55%) were single-level cases, in contrast to the 89% found by Chandler and Lyon (2001; tinyurl.com/7pfgkwf) in entrepreneurship research overall. Table 4 details the breakdown by level found in entrepreneurship CSR; the counts sum to more than the cases studied due to multiple-level studies.

It appears that the "firm" level receives 50% more attention than the "individual" level of analysis in this study and that this ratio has remained constant over the past decade, regardless of methodology.

Major topic areas of articles

The 18 articles were further coded into categories following entrepreneurship streams of research. Following Shane and Venkataraman's (2000; tinyurl.com/6sj7sk6) typology, the results are shown in Table 5.

Table 4. Entrepreneurship CSR levels of analysis

Level of Analysis	Count	% of Total
Individual	9	50%
Team	–	–
Project/Innovation	1	5%
Firm	15	83%
Industry	3	11%
Country	1	5%

It is apparent that, with nine studies (50%) focused on the "decision to exploit opportunities" stream, the field has been preoccupied with the individual entrepreneur in the recent past.

Discussion

This survey has uncovered significant findings. The CSR publication rate in entrepreneurship of 3% for JBV and ETP reported here is significantly lower than the 11% figure reported 10 years earlier by Chandler and Lyon (2001; tinyurl.com/7pfgkwf). It would appear that the usage of CSR in the entrepreneurship field is declining; neither of these two leading entrepreneurship journals published a single article using CSR in 2008, for example. Is there a lack of quality CSR in entrepreneurship to publish, or do journal editors and reviewers systematically choose other types of research to publish?

It would appear that many of the methodological criticisms of the entrepreneurship field highlighted by certain authors remain valid today. When we observe for example, that 18% of entrepreneurship CSR did not discuss their interview data collection method, or that a further 18% never triangulated their data, or that 44% never addressed methodological quality in any identifiable form, it may be true that we are "not there yet" (Crook et al., 2010; tinyurl.com/7fhuj37).

Regarding the second question, it is likely that CSR falls into the same challenges as other qualitative research methods: building new theory is difficult and requires more novelty, and there is a tension between breaking from existing theory while being attached to extant theory (Pratt, 2008; tinyurl.com/6tthf3f). Validation measures are unconventional and demand more of a trust relationship with the reader; consequently many researchers, reviewers, and editors prefer more positivist quantitative methods (Leitch et al., 2010; tinyurl.com/6qrvz8e). This may also be a reflection of the fact that: i) most major journals are based in North America and follow long traditions of positivist, quantitative research; ii) such research is well understood and requires less methodological reasoning; and iii) the entrepreneurship field comprises a relatively small number of researchers and journals compared to other management sciences. This lack of "critical mass" in the field generally, may limit the types of research we see undertaken and published.

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Table 5. Entrepreneurship CSR streams of research

	Existence of entrepreneurial opportunities	Discovery of entrepreneurial opportunity/ Information corridors/ Cognitive properties	Decision to exploit entrepreneurial opportunities/ Individual differences	Other
Vaghely & Julien, 2010; JBV	✓	✓		
Kelley et al., 2009; JBV		✓		
Lichtenstein, et al., 2006; JBV		✓	✓	
Henderson et al., 2006; JBV				Resource Exchange
Claryssea et al., 2005; JBV			✓	
Marlow & McAdam, 2011; ETP			✓	
Kistruck & Beamish 2010; ETP				Form & Structure
Iacobucci & Rosa, 2010; ETP			✓	
Grimes, 2010; ETP				Sensemaking
Corner & Ho, 2010; ETP	✓			
Lechner & Leyronas, 2009; ETP				Growth Strategy
Tergeson & Elam, 2009; ETP			✓	
Khavul et al., 2009; ETP			✓	
Sin & Amanda, 2009; ETP			✓	
Tracey & Jarvis, 2007; ETP			✓	
Karra et al., 2006; ETP			✓	
Neergaard & Ulhøi, 2006; ETP		✓		
Makela & Maula, 2006; ETP		✓		
Hite, 2005; ETP	✓	✓		

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Recommendations

Yin (2009; tinyurl.com/7ywkcpy) lists a number of objections to the method to overcome: sloppy past procedures resulting in lack of rigour; confusion with cases for teaching (in which facts may be altered); and the notion that case studies provide insufficient basis for scientific generalization. The latter is a specific problem with misinterpretation of the method; cases must be viewed as generalizable to *theoretical* propositions, rather than populations. Case studies are intended for *analytic* generalizations, rather than *statistical* generalizations (Yin, 2009). Authors are particularly cautioned against attempts to generalize a few cases into a "single truth".

Many of these perceptual associations with the method are not reconcilable without continuing to produce ever higher-quality examples with better-qualified researchers (Short et al., 2010: tinyurl.com/6raro9b; Crook et al., 2010: tinyurl.com/7fhuj37; Yin, 2009: tinyurl.com/7ywkcpy). The ongoing question of methodological quality must be laid to rest; based on this study, five actionable recommendations for improvement are:

1. Always include secondary data sources and triangulation in the analysis.
2. Describe coding methodology surrounding interviews.
3. Advance propositions where possible.
4. Describe how CATA tools were used to improve consistency.
5. Always provide the reader with clues about reliability, validity, and trustworthiness.

In the end, CSR (along with all qualitative research methods) must excel at answering the basic reader questions of: "Is it an interesting story?", "Did it help me see organizational life differently?", and "Do I believe it?" (Pratt, 2008; tinyurl.com/6thf3f). These are essential elements that will help CSR move forward as a research paradigm.

Advice for Researchers

Researchers considering using CSR in the field of entrepreneurship may expect to face many challenges, primarily:

1. Meeting methodological skepticism

2. Gaining access to entrepreneurial companies (some of whom fail, by definition)
3. Engaging in the type of longitudinal, multi-level studies being called for
4. Publishing work in the few A-level journals supporting entrepreneurship
5. Publishing work that is meaningful to the practice of entrepreneurship
6. Gaining tenure-track positions in a non-traditional management science discipline

These are daunting propositions. It is recommended that the research design schema of Eisenhardt (1991; tinyurl.com/6wsppa4) and Yin (2009; tinyurl.com/7ywkcpy) be followed: build from theory, propose constructs that are operationally testable, and design the study from that foundation. This approach is well understood by editors, and a largely descriptive study is not likely to be worth the effort if publication is the end goal. Careful design of constructs and attention to data and theoretical triangulation is essential to meet expectations of rigour.

Many have pointed out that not everyone can perform qualitative research or execute case studies well. It is a craft work that would best be learned from a skilled craftsman, rather than by texts alone. Simple publication of a case study article does not qualify it as an exemplar. New researchers are well advised to seek the mentorship of those experienced in conducting well-regarded case studies.

Conclusions

This study has confirmed the low publication rate (3%) of articles employing CSR in the two major entrepreneurship journals. It is unclear whether few are produced due to production challenges and low publication rates or whether many are produced and suffer high journal rejection rates. It is likely that the combination of these two factors has led to a circular publication impasse. This survey has found that, although general principles of CSR are followed by entrepreneurship researchers, there remains work to address the validity concerns voiced by editors. If publication is a goal, following well established paths laid out by Eisenhardt (1989; tinyurl.com/7dfuc3z) and Yin (2009; tinyurl.com/7ywkcpy) with substantial triangulation of data is essential.

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To conclude on a positive note, there are encouraging signs from the field. Wiklund and colleagues (2010; tinyurl.com/77hkbqq), in proclaiming entrepreneurship's "golden era", also note that the field has yet to decline into a "preoccupation with increasingly marginal questions and methodological subtleties" that characterizes more mature disciplines. Case study methods in entrepreneurship give the field more of what we need: multi-level richness in detail, intriguing cross disciplinary theory, and actionable advice for entrepreneurs.

About the Author

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Recommended Reading

The SAGE Handbook of Qualitative Research

By Norman K. Denzin and Yvonna S. Lincoln
(1994; tinyurl.com/76zo4my)

"Theory Building From Cases: Opportunities and Challenges"

By Kathleen M. Eisenhardt and Melissa E. Graebner
(2007; tinyurl.com/7lkaawe)

Handbook of Qualitative Research Methods in Entrepreneurship

By Helle Neergaard and John P. Ulhøi
(2007; tinyurl.com/7vwkr49)

"The Future of Entrepreneurship Research"

By Johan Wiklund, Per Davidsson, David B. Audretsch, and Charlie Karlsson
(2010; tinyurl.com/77hkbqq)

Case Study Research

By Robert K. Yin
(2009; tinyurl.com/7ywkcpy)

A Customer Value Creation Framework for Businesses That Generate Revenue with Open Source Software

Aparna Shanker

“If you're proactive, you don't have to wait for circumstances or other people to create perspective expanding experiences. You can consciously create your own.”

Stephen Covey
Author, speaker, consultant, and professor

Technology entrepreneurs must create value for customers in order to generate revenue. This article examines the dimensions of customer value creation and provides a framework to help entrepreneurs, managers, and leaders of open source projects create value, with an emphasis on businesses that generate revenue from open source assets. The proposed framework focuses on a firm's pre-emptive value offering (also known as a customer value proposition). This is a firm's offering of the value it seeks to create for a customer, in order to meet his or her requirements.

Introduction

A business model establishes how value is created for customers and a firm's strategy to appropriate returns derived from that value. Typically, a business model identifies: i) the firm's value propositions for customers, partners, and other stakeholders; ii) the processes and resources required to deliver these value propositions; iii) and a profit formula.

In the February issue of the *TIM Review*, the author described customer value and how it is *delivered* to customers (Shanker, 2012; timreview.ca/article/525). In this article, the focus is on *creating* customer value, particularly in the context of businesses that generate revenue using open sources assets.

From a marketing theory perspective, customer value refers to customers' perceptions of what they receive, in return for what they sacrifice (Zeithaml, 1988; tinyurl.com/7s2blkp). There are two aspects to customer value: desired value and perceived value (Woodruff, 1997; tinyurl.com/7lu6wxz). Desired value refers to what a customer desires in a product or service. Perceived

value is the benefit a customer believes he or she received from a product after it was purchased. Customer value propositions are formulated by assessing the current market offerings, identifying what customers want, and then developing solutions that meet the market need for a product or service (Anderson et al., 2006; tinyurl.com/7ymgebb). Figure 1 illustrates the customer value creation strategy; it is the author's representation of the extant literature.

When a firm uses a proprietary software business model, value is created by producing specific software that fulfils a customer's need to get a job done or solve a problem. Value may be appropriated using patents and licenses may be required to use the software.

When a firm uses open source software to satisfy customer's needs, value is captured in different ways because the supplier cannot charge for the software. This article reviews current customer value creation strategies and then proposes a value-creation framework for suppliers that rely on open source software to generate revenue.

A Customer Value Creation Framework for Open Source Software

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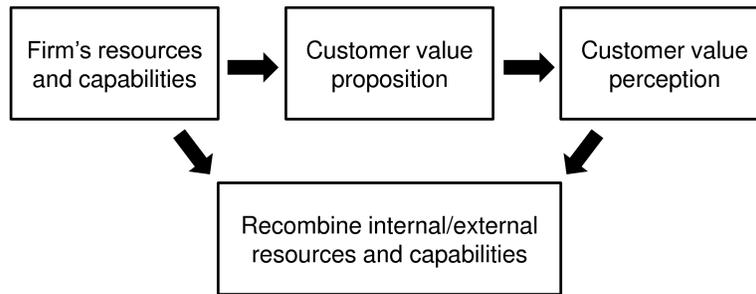


Figure 1. A firm's value creation strategy

Value Creation Frameworks

To develop a value-creation strategy, a firm must first identify what points of value their potential customers seek. Next, the firm develops a pre-emptive strategy to provide those benefits (O'Cass and Ngo, 2011; tinyurl.com/7zqcqpx).

Value-creation strategies focus on the various dimensions along which customers perceive value. Ulaga (2003; tinyurl.com/7plujz) identified eight dimensions of value creation in a business-to-business context: product quality, service support, delivery performance, supplier know-how, time-to-market, personal interaction, price, and process costs. While Ulaga focused on relationship value (i.e., manufacturer-supplier relationships), his eight dimensions also apply to an open source context because most consumers or end-customers of commercial open source software are businesses.

Smith and Colgate (2007; tinyurl.com/727r4le) proposed a customer-value creation framework that identifies four main types of value that can be created by organizations:

- 1. Functional/instrumental value:** the attributes of the product itself; the extent to which a product is useful and fulfills a customer's desired goals
- 2. Experiential/hedonic value:** the extent to which a product creates appropriate experiences, feelings, and emotions for the customer
- 3. Symbolic/expressive value:** the extent to which customers attach or associate psychological meaning to a product
- 4. Cost/sacrifice value:** the cost or sacrifice that would be associated with the use of the product

Smith and Colgate proposed their framework as a tool for marketing strategists to develop creative product concepts and recognize new product opportunities. The sources of value identified have to be appropriate and applicable to the context in which they are used. Smith and Colgate's value-creation framework must be adapted to the context of open source software because open source is most attractive to businesses and expert users, such as universities and hobbyist programmers (West, 2007; tinyurl.com/6pwjozm). Some components of the framework might not apply in this context. For example, experiential value is more of an individual assessment than a firm-level assessment. Similarly, symbolic value components such as self-identity, personal meaning, and self-expression, would only apply in cases where the end-customer was an individual user.

O'Cass and Ngo (2011; tinyurl.com/7zqcqpx) assert that a firm's pre-emptive value-creation strategy is comprised of:

- 1. Performance value:** this component is associated with the product attributes and the attributes' performance. This relationship was also noted Woodruff (1997; tinyurl.com/7lu6wxz).
- 2. Pricing value:** this component can refer to the fair price or the value price. The fair price refers to customers believing they are paying a fair price for a product or service; the value price refers to a price that justifies the benefits of purchasing a product.
- 3. Relationship value:** this component refers to the firm's efforts to create and deliver a hassle-free purchase and consumption experience.
- 4. Co-creation value:** this component is added when customers find it beneficial to influence various parts of the business system to co-create or co-produce their own unique purchase and consumption experience.

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Value Creation in Open Source

Value-creation frameworks and strategies rely on combining the resources and capabilities of a firm. These resources and capabilities are considered to be valuable, rare, inimitable, and non-substitutable because they provide a sustainable competitive advantage for a firm (Landroguéz et al., 2011; tinyurl.com/7mpdtxz).

Firms that produce open source software and related services do not always rely solely on open source software. They usually combine proprietary and open source offerings and employ hybrid business models to deliver greater value to customers (West, 2003; tinyurl.com/6s68jno; Bonaccorsi et al., 2006; tinyurl.com/7vnupff). A network of developers (who may be internal and external to the firm), collaborates to produce open source software. Firms that use open source software as one of their resources to create value for customers can use the attributes of open source software to create a competitive advantage. For example, West (2007; tinyurl.com/6pwjozm) recognizes that firms can create value for customers by providing software at lower prices through the use of open source software as one of their resource components.

In addition to a different value creation strategy for producers of open source software, the impact on customer value perceptions also changes with open source. Customers can engage the open source community, influence the direction of the product offering, and increase their interoperability with other vendors by using the same common open source code base. Customer value perceptions in open source software therefore, will differ from proprietary software because customers derive value along additional dimensions that do not apply in proprietary software development models.

The literature on customer value creation in open source software is still very new and few authors have addressed the creation of value in the open source software development model, with the exception of West (2007; tinyurl.com/6pwjozm) and Morgan and Finnegan (2008; tinyurl.com/7jx8gt3).

Some of the key attributes of customer value creation that need to be considered when developing a framework are:

1. Customers perceive value from product attributes, from the consequences of using a product, and from whether they achieve their desired goals (Woodruff, 1997; tinyurl.com/7lu6wxz).

2. For a convincing customer value proposition, a firm needs to identify how value is perceived by customers and then offer those identified points of value in terms of a pre-emptive value offering (O’Cass and Ngo, 2011; tinyurl.com/7zqcqpx).

3. A value creation framework should identify the various types of value (Smith and Colgate, 2007; tinyurl.com/727r4le; O’Cass and Ngo, 2011).

A Proposed Customer-Value Creation Framework

Figure 2 illustrates the author’s proposed customer-value creation framework. A firm’s value offering is organized into the categories of value creation that apply to a context where one of the firm’s resources is open source software. Using the value offering, firms must create a customer value proposition that fulfills customer needs. Figure 2 identifies the characteristics of a customer value proposition that can be used to fulfill customer needs.

Firm’s value offering

- 1. Functional value:** The product attributes that help create value, as identified by Morgan and Finnegan (2008; tinyurl.com/7jx8gt3), are: cost, quality, reliability, security, and performance. These attributes of open source software are features of the product itself; they do not focus on other dimensions of value creation such as attribute consequences and goals. Woodruff’s (1997; tinyurl.com/7lu6wxz) customer value hierarchy identifies that customers perceive value not only from the attributes of a product itself but also from the consequences of using a product and the goals achieved by it.

- 2. Cost/sacrifice value:** Customer value perception is often defined as a customer’s evaluation of what they get in return for what they give (Zeithaml, 1988; tinyurl.com/7s2blkp). The cost/sacrifice value identifies the customer’s perception of whether the value created is worth the cost paid. The cost paid can be in monetary terms, time, effort spend defining requirements, or any other way in which the customer invests in a firm’s offering. The commoditization of open source software allows suppliers to provide undifferentiated software at a lower price point, thereby increasing the customer perception of value added (West, 2007; tinyurl.com/6pwjozm).

- 3. Relationship value:** this refers to the overall customer experience during interactions with the supplier. Value can be added to a relationship along dimensions such as product quality, service support, delivery per-

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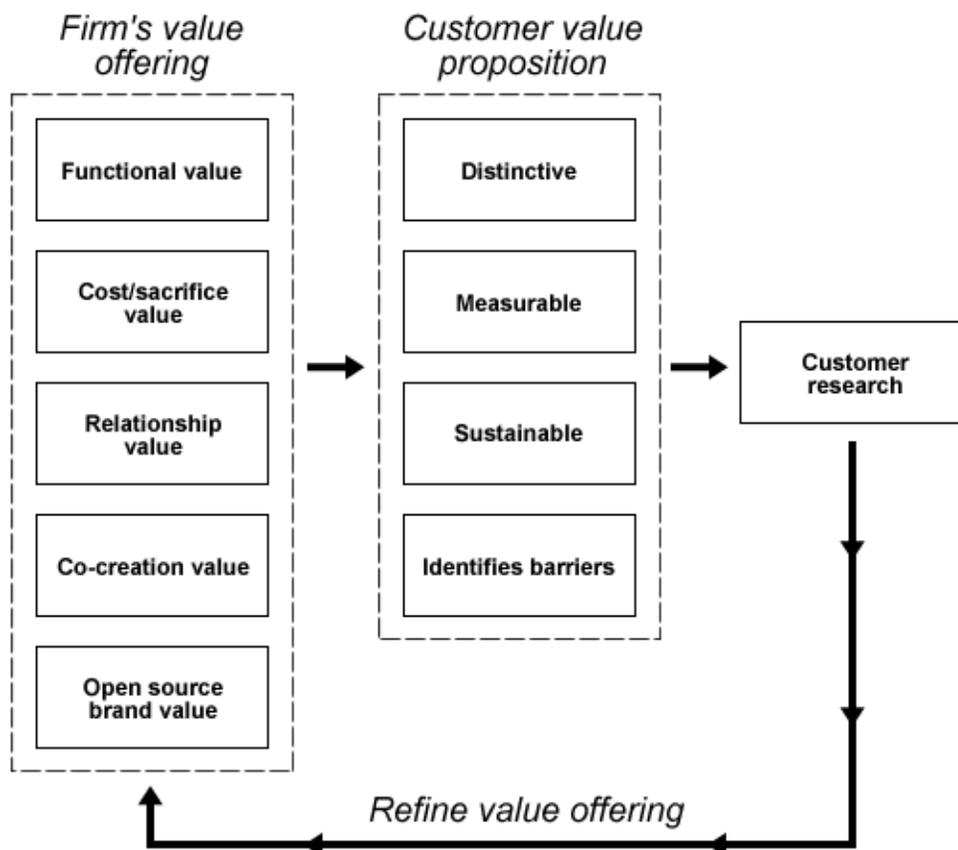


Figure 2. Creating a customer value proposition

formance, supplier know-how, time-to-market, personal interaction, price, and process costs (Ulaga, 2003; tinyurl.com/7plujz). Open source software can be combined with complementary assets such as support, customization, integration, or upgrades (West, 2007; tinyurl.com/6pwjozm) to create value for customers. Such value-added offerings encourage customers to develop and maintain a relationship with suppliers to obtain a hassle-free purchase and consumption experience (O’Cass and Ngo, 2011; tinyurl.com/7zqcqpx). Firms that use open source software could also create value for their customers by re-using code and by reducing time to market and production costs; these firms can then use this saved time and money towards enhancing business processes or employee development (Morgan and Finnegan, 2008; tinyurl.com/7jx8gt3).

4. Co-creation value: this is the value perceived in either modifying available source code or defining re-

quirements that allow a product to be customized to meet a customer’s needs. It is the value customers perceive in having a say in a supplier’s manufacturing process (O’Cass and Ngo, 2011; tinyurl.com/7zqcqpx). The nature of open source software allows users to co-create value by actively participating in the development process.

5. Open source brand value: this refers to the value that customers perceive in the open source brand itself. For example, value could be perceived by gaining legitimacy in the open source software community or by creating partnerships with other companies. Customer value creation strategies could change based on the extent to which open source resources are used in an offering (Bonaccorsi et. al., 2006; tinyurl.com/7vnupff). For example, the value in a pure open source offering could be in the supplier’s ability to customize without incurring high marginal costs.

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Customer value proposition

A customer value proposition can be developed based on the points of value that a firm can create (and that matter to customers). In this respect, a customer value proposition must provide distinctive, measurable, and sustainable value (Anderson et al., 2006; tinyurl.com/7ymgebb). A distinctive value proposition is superior to the competitor's offering, a measurable value proposition allows customers to quantify value in monetary terms, and a sustainable value proposition ensures that customers can continue to provide value to customers. A customer value proposition can be constructed by identifying the barriers that limit customers from getting a job done. The four most common barriers identified by Johnson, Christiansen, and Kagermann (2008; tinyurl.com/79gnwyq) are insufficient wealth, access, skill, and time.

Customer research

To determine what customers want, what job they need to get done, and what barriers they face, a firm needs to conduct customer value research. Based on customer data, firms should then refine their value creation strategy to provide value along the dimensions of value that customers identify as important to them.

Conclusion

The value creation framework proposed here focuses on the creation of value from an open source business model perspective. The framework can be used in at least three ways. First, it can be used as a guideline for customer value research by manufacturers to assess what points of value matter to customers. Second, it can be used by managers and leaders of open source software projects to determine the points of value that their products and offerings should focus on. Third, managers and leaders can use the customer value di-

mensions outlined in the framework to compete along dimensions other than cost.

The level of formal appropriability or control that a firm has over its open source resources impacts the extent to which a firm can capture value from open source software. Therefore, value creation strategies would also be influenced by the degree to which a firm is involved in an open source software project. Future value creation frameworks could take that factor into account because it impacts the resources and capabilities that a firm has at its disposal.

The proposed value creation framework can be refined by conducting customer research to: i) validate the points of value creation identified; ii) determine new dimensions of value creation; and iii) assess the relative importance of each dimension of value from a customer's perspective.

About the Author

Aparna Shanker is a customer applications engineer with Alcatel-Lucent in Ottawa, where her job focus is on IP networks and the 4G LTE Evolved Packet Core. She is also currently a graduate student in the Technology Innovation Management program at Carleton University. Her research interests include open source businesses and customer value management. She holds an undergraduate degree in Computer Engineering from Queen's University, Kingston.

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Minimum Viable Product and the Importance of Experimentation in Technology Startups

Dobriła Rancic Moogk

“Startups don't starve; they drown.”

Shawn Carolan

Managing Director, Menlo Ventures

Entrepreneurs are often faced with limited resources in their quest to commercialize new technology. This article presents the model of a lean startup, which can be applied to an organization regardless of its size or environment. It also emphasizes the conditions of extreme uncertainty under which the commercialization of new technology is carried out. The lean startup philosophy advocates efficient use of resources by introducing a minimum viable product to the market as soon as possible in order to test its value and the entrepreneur's growth projections. This testing is done by running experiments that examine the metrics relevant to three distinct types of the growth. These experiments bring about accelerated learning to help reduce the uncertainty that accompanies commercialization projects, thereby bringing the resulting new technology to market faster.

Introduction

Commercializing a brand new product or service is a complex task with an uncertain outcome. Whether it is undertaken in a big corporation, a startup, or a not-for-profit organization, it requires vision, determination, and resources. Entrepreneurs of all stripes, in a garage, a multinational, or in a social enterprise, have brilliant ideas and doggedness to succeed. Resources, however, can be scarce.

Money needed to bring a new idea to market is difficult to secure. In an established business, metrics of success that apply to the mainstream products or services typically do little to justify an investment in a new idea serving different customers in different markets. For startups, with the ever-diminishing availability of venture capital over the last decade, bootstrapping is the order of the day. Those few that have been lucky to secure venture capital investment must account for frugal-yet-effective spending to their boards of directors. For these reasons, all visionaries who want to succeed need to ensure that the scarce resources not only last longer but also bring a demonstration of market viability as early as possible.

A response to these challenges is presented by Eric Ries, in his book *The Lean Startup* (tinyurl.com/7dxdzz), which has its origins in his blog (startuplessonslearned.com), and his concrete entrepreneurial experiences in startups such as IMVU (imvu.com), which he co-founded and where he served as a CTO. Much of Ries's original thinking draws inspiration from Clayton Christensen's theories presented in *The Innovator's Dilemma* (tinyurl.com/7onvohk) and *The Innovator's Solution* (tinyurl.com/7n7x5rd); Geoffrey Moore's *Crossing the Chasm* (tinyurl.com/6qfeowt); and the lean production systems derived by Taiichi Ohno and Shigeo Shingo and popularized by Toyota (tinyurl.com/3a8tx3). This article will focus on the lean startup and the novel idea of “minimum viable product”; the article will show how these concepts can make technology entrepreneurs and their startup endeavours more successful.

A Lean Startup

For the purposes of this article, Ries's definition of a startup will be used: “A startup is a human institution designed to create a new product or service under conditions of extreme uncertainty” (Ries, 2011; tinyurl.com/7dxdzz). This goes hand in hand with the intention to re-

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cognize that startups, apart from what is commonly considered to be a bootstrapped, or a venture capital backed small operation, can be found in for-profit organizations of all sizes, among the not-for-profits, and even within the government. This wide definition of startups should be kept in mind even though the examples in this article are predominantly drawn from new technology companies.

Typically, startups arise around a vision that a new product or service (henceforth, a product) will be embraced by a particular market because it solves the customers' urgent problem. Following the path of established companies, startups often devise a strategy to develop a full product based on this vision and deploy it in the target market. In many such cases, there is not as much traction as anticipated, which brings about the painful realization that either the product was not compelling, the market was poorly chosen, or both.

Developing a full product before testing a concept in the market is a risky proposition due to the extreme uncertainty associated with startup operations. But how can the market be tested if the product is not fully designed and implemented? This apparent paradox is based on the notion that startups operate on the same management principles as the established companies. Although established companies typically serve known customers in deterministic markets, startups have to address an environment of extreme uncertainty. Hence, startups need to operate in a way that will provide them with the opportunity to learn while validating their vision; ambiguity must be replaced by increasing certainty over as short a timeframe as possible.

The best learning for a startup comes as a result of experiments that test a version of a product against relevant metrics. The result of the experiment can reveal whether the original idea: i) is valid, in which case development can continue in the same direction or ii) is not valid, in which case the strategy has to change. The acceleration of this feedback loop is essential to take full advantage of the learning.

The key principles of the lean startup include: omnipresence of the entrepreneurs, uniqueness of the startups management style, and learning from product testing against relevant metrics. This article will drill down further into the aspect of accelerated learning from experiments designed to validate a product against pertinent metrics.

A Minimum Viable Product

A startup operates around a vision that its product will uniquely solve the pressing problems of customers in their target market. The founders often expect that their product will deliver an unprecedented return on their investment. This vision includes two important assumptions: the assumption around providing value (i.e., the value hypothesis) and the assumption around growth in the market (i.e., the growth hypothesis).

To illustrate these two assumptions, consider a now well-known example of the early success Facebook had with investors. In the summer of 2004, when Facebook was just six months old, had 150,000 registered users, and had very little revenue, the company was able to secure its first \$500,000 investment (Ries, 2011; tinyurl.com/7dxddzz). In April 2005, Facebook raised an additional \$12.2 million (Arrington, 2005; tinyurl.com/yduzltb). Apart from the business model that was based on producing revenue from different types of ads and sponsored groups, what was it that investors found so compelling about the company? Remarkable as it was that, in such a short time, Facebook amassed 3.85 million users, equally impressive was the statistic that 60% of the users logged on daily (Arrington, 2005). Moreover, Facebook did not spend money to acquire its customers. The organic growth in registered users coupled with their strong engagement validated the company's value hypothesis. The increase from 150,000 users at 6 months to 3.85 million users at 14 months validated Facebook's growth hypothesis.

For a startup, it is essential to validate its value and growth hypotheses as soon as possible. In order to do that, the company has to come up with a version of its product that is complete enough to demonstrate the value it brings to the users: a minimum viable product (MVP). It then needs to design experiments that will use the MVP to confirm (or refute) its value and growth hypotheses. On the one hand, an MVP may need less time to develop and should have just the "bare bones" set of features. On the other hand, an MVP should include development of capabilities to measure its traction in the market. Although many product features that were "on the drawing board" will be soon requested by the users, designers should avoid the temptation of including these features in the initial development – their time will be much better spent developing the experiments that measure the MVP's impact.

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In order to measure the effect of the MVP, baseline data must be captured. Further data will be collected as part of planned tests on the initial MVP and its subsequent revisions. The complexity and number of tests can be staggering. In an online consumer business, the number of different versions of a product running different tests can be in the thousands, and can change every week, even daily.

Regardless of the challenge of managing that complexity, the more pressing question is how to determine what needs to be measured in order to evaluate the impact of these tests. To address this issue, Ries suggests that three types of engines of growth should be considered: sticky, viral, and paid (Ries, 2011; tinyurl.com/7dxddzz).

The sticky engine of growth relies predominantly on the high retention rate of its customers. A mobile telephone service provider would be an example of this type of growth. Another example would be a fables semiconductor company that sells intellectual property (such as ARM and its microprocessors) to be designed into another product (such as a smartphone). The company relying on the sticky growth needs to diligently track the number of customers who disengage from the company's product. If that number is related to a period of time and is expressed as a fraction of all the customers, it is called the churn rate. The company's growth rate is defined by the growth rate of newly acquired customers minus the churn rate. In contexts that depend on a sticky engine of growth, this is a relevant metric that should be captured in MVP experiments.

The viral engine of growth was originally described as "network-enhanced word of mouth" by Draper Fisher Jurvetson (Jurvetson, 2000; tinyurl.com/6nneasa), a venture capital firm that was a seed investor in Hotmail.com. It is now a legendary story that the growth of Hotmail.com accelerated when the company decided to add a link at the bottom of every outgoing message sent by existing users, inviting the recipients to register for its free email service. Hotmail.com went from zero to 12 million users in 18 months with a \$50,000 advertising budget (Jurvetson, 2000). Other examples of this growth are online social networks and "house parties" used to sell a slew of different products.

The paid engine of growth simply relies on the difference in the lifetime revenue from each customer minus the cost of acquiring every additional customer. Clearly,

the higher the difference, the higher the rate of growth; however, the cost of acquiring an additional customer should include all related costs, including such things as Google AdWords, supporting a sales force, and efforts to bring customers into a physical store. The MVP experiments of companies that rely on the paid engine of growth should track metrics related to lifetime revenue values and customer acquisition costs.

It is important to emphasize that metrics designed to evaluate the impact of MVPs should measure the real business impact and not simply produce feel-good results through "vanity metrics". An example of the latter case would be a company that relies on the sticky engine of growth tracking only the number of newly acquired customers. While steady growth in this metric is encouraging, the company may not be making any real progress if the number of disengaged customers is growing at the same rate.

Conclusion

Startups are organizations that develop new products under conditions of extreme uncertainty. The startup label can be applied to small new companies, but it can also be applied to parts of established enterprises that are trying to break new ground in order to give a boost to a slowing growth. In every case, startups can benefit from the lean startup philosophy, especially from the ideas and learning generated as a result of testing minimum viable product versions against relevant metrics. By applying this philosophy, startups can develop products that are tailored to target markets.

The idea of a lean startup focuses on increasing development efficiencies and reaching the target market sooner, thus potentially capitalizing on the first-mover advantage. It emphasizes that startups should try to eliminate waste (e.g., wasted development resources) by releasing an MVP as soon as possible. Startups should use MVPs to engage target customers and test the value and growth hypotheses using metrics that are suited to the type of the engine driving a startup's growth (i.e., sticky, viral, or paid). Initially, development should focus on experiments that provide answers to fundamental questions related to the value and growth hypotheses. Subsequently, the focus should be maintained on the engine of growth itself. Although it is possible that more than one type of engine can be propelling the growth, the most successful startups are those that focus on only one of them at a time.

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The fundamental idea behind the lean startup philosophy is that the real product of an early-stage startup is an experiment, or a slew of experiments, that contribute to reducing the initial extreme uncertainty. Progress of a startup can be measured by the learning that is gained from these experiments. The more accelerated the learning, the closer the startup gets to releasing the right product in the right market and to attaining its visionary goals.

About the Author

Dobriła Rancic Moogk has over 19 years of executive and leadership experience in R&D, marketing, product management, and people management roles in high-tech companies ranging from startups to multinationals in North America and Europe. She is currently working on business strategy, product development, and corporate development with several high-tech startups. Her interests are in the area of increasing the efficiency of innovation commercialization. Also, Dobriła serves as a vice-chair with the University of Ottawa Women in Engineering and Computer Science committee and a vice-chair on the Volunteer Ottawa Board of Directors. Dobriła has a BSEE as well as Master of Engineering and MBA degrees from the University of Ottawa.

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A Guide for Entrepreneurs Who Lead and Manage Change

Llynne Plante

“ *When you are a young startup, the one thing you cannot be afraid of is change – because change happens all the time.* ”

Tariq Zaid
CEO of Select Start Studio

To grow a business, entrepreneurs must know how to lead and manage change. However, the change management literature offers little in the way of specific, practical advice that leaders can use to guide their actions. This article builds on a review of the change management literature, a small field study, and years of experience supporting technology companies. It identifies and describes the top nine leadership actions (and their associated behavioural traits) that technology entrepreneurs who lead and manage change should carry out.

Introduction

A fundamental reason that organizations undergo change is to survive and grow; hence managing change becomes a priority for all founders and entrepreneurs. Key to survival is adaptability, or the ability to effectively and efficiently change business models, business processes, and technologies in response to disruptive innovations and competitive threats in a rapidly evolving environment. Entrepreneurs must then be armed with the right knowledge to ensure successful execution of change tactics as they seek to adapt their growth strategies in response to competitive, economic and technological pressures.

Much has been written about change management and the role and behaviours of the Chief Executive Officer (e.g., Eisenbach et al., 1999: tinyurl.com/6vrpgmj; Higgs and Rowland, 2005: tinyurl.com/7g55tmu; Miller, 2002: tinyurl.com/7wlkn56; Ahn et al., 2004: tinyurl.com/7d9qfzq). Studies link leadership to the change management process (e.g., Kotter, 1995: tinyurl.com/84of2p4; Higgs and Rowland, 2005). Process-based change models, from Lewin's three-step model (Burnes, 2004; tinyurl.com/7qrqsez) to Kotter's eight-step process (Kotter, 1995), make the leader responsible for the successful management of change.

However, technology entrepreneurs may find the change management literature confusing with a plethora of lists of actions and processes that primarily focus on change in large organizations. Furthermore, a review of the change management literature revealed that up to 70% of change initiatives fail or underperform and that the role and behaviours of leaders of change are largely associated to the success and failure of change initiatives (Miller, 2002: tinyurl.com/7wlkn56; Higgs and Rowland, 2005: tinyurl.com/7g55tmu).

In this article, the top nine leadership actions that a technology entrepreneur must undertake when leading and managing a change initiative are summarized based on a broad review of change management literature. For each action, behavioural traits that enable effective leadership are identified because behaviour is intrinsically linked to the effectiveness and success of action. A field study was carried out to validate the identified actions and to map behavioural traits to actions. The results of the field study included five in-depth interviews (two entrepreneurs, two executives of a large organization, and one employee) and nine responses to a survey completed by employees of a large organization.

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Table 1 lists the nine leadership actions and their corresponding behavioural traits that an entrepreneur who wishes to increase the likelihood of success of leading change must carry out. The order does not represent a sequence of action or a process. The sections that follow provide greater detail about each of these actions and their associated behavioural traits, including related insights from the literature.

1. Communicate the Change

To build commitment and buy-in, an entrepreneur who leads change must communicate their big picture or vision clearly and consistently (Fedor et al., 2008; tinyurl.com/7649p9m; Kotter, 1995; tinyurl.com/84of2p4). The job of bringing the vision to life rests with the entrepreneur as they share their mission, goals, and objectives and build a sense of accomplishment throughout the organization (Hesselbein, 2000; tinyurl.com/7rkor63). The leader must also build a vision of the future that can be easily communicated to customers, employees, and

other stakeholders (Kotter, 1995). A critical component of communicating the vision is providing stakeholders with a roadmap for the implementation of the change strategy (Elrod and Tippett, 2002; tinyurl.com/7r5v2vb).

Two behavioural traits of leaders that are closely associated with communicating change are consistency and instrumentality (defined as the ability to plan, structure, implement, and control). To align the organization, employees must receive consistent messages from the owner-entrepreneur (Mohrman, 1999; tinyurl.com/7nko56t). Communication consists of both words and actions (Kotter, 1995; tinyurl.com/84of2p4); inconsistency between the two will quickly lead to stakeholder cynicism and undermine the change (Miller, 2002; tinyurl.com/7wlkn56). In a large or strategic change, the entrepreneur requires significant instrumental skills for successful execution (Nadler and Tushman, 1989; tinyurl.com/7g7zdvm); as such, an entrepreneur's communications must be deliberate, planned, focused, engaging, and purposeful.

Table 1. Actions and behavioural traits to lead and manage change

Actions	Behavioural Traits
1 Communicate the change <ul style="list-style-type: none"> • Create clarity • Provide a roadmap 	Consistency and instrumentality <ul style="list-style-type: none"> • Instrumentality • Consistency
2 Create a vision <ul style="list-style-type: none"> • Create motivation and excitement • Create belief in the change • Own the change 	Confidence and courage <ul style="list-style-type: none"> • Ability to enable • Credibility • Commitment
3 Identify and mobilize change agents	Ability to enable
4 Engage at all levels	Integrity and trustworthiness
5 Mind the culture	Self-awareness and mindfulness
6 Mind the people	Integrity, consistency, and fairness
7 Plan and manage the change process <ul style="list-style-type: none"> • Measure • Create alignment 	Perseverance <ul style="list-style-type: none"> • Instrumentality • Instrumentality
8 Build organizational skills and capacity	Instrumentality
9 Adapt to the environment	Ability to synthesize

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2. Create a Vision

The ability of the entrepreneur to create a vision of the future has been identified as a central component of successful transformational change (Hesselbein, 2000: tinyurl.com/7rkor63; Ahn et al., 2004: tinyurl.com/7d9qfzq; Eisenbach et al., 1999: tinyurl.com/6vrpgmj; Kotter, 1995: tinyurl.com/84of2p4; Higgs and Rowland, 2005: tinyurl.com/7g55tmu). To be effective, this vision must provide a greater sense of purpose; encourage dissatisfaction with the status quo; and motivate, engage, and excite stakeholders. The entrepreneur must internalize that vision and truly believe in it. The vision provides clarity of direction for the organization and acts as a guidepost for decision making and for the alignment of the organization's business processes and systems, structure, and shorter term objectives (Kotter, 1995).

The five behavioural traits of leaders that are associated with vision creation are: confidence, courage, ability to enable, credibility, and commitment. Most of these behavioural traits have been linked to transformational leadership (Nadler and Tushman, 1989: tinyurl.com/7g7zdvj; Miller, 2002: tinyurl.com/7wlkn56).

Personal courage and confidence are often associated with leadership (Miller, 2002: tinyurl.com/7wlkn56) because managing and sustaining a transformational change initiative is hard work, is very demanding, and can be a high-risk undertaking both for the organization and the reputation of the entrepreneur (Ahn et al., 2004: tinyurl.com/7d9qfzq; Drucker, 2006: tinyurl.com/7vufkzp). Enabling others through frequent communication, training, empathy, listening, and mentoring is a way for an entrepreneur to resolve employees' uncertainty about the change process and enhance their capacity for dealing with the change effort (Eisenbach et al., 1999: tinyurl.com/6vrpgmj; Nadler and Tushman, 1989: tinyurl.com/7g7zdvj). Credibility through personal experience is a central factor linked to employees' positive belief in a change initiative (Miller, 2002). Finally, an entrepreneur leading change must be committed and engaged in the change process and cannot delegate that responsibility or accountability to others (Ahn et al., 2004; Miller, 2002).

3. Identify and Mobilize Change Agents

Entrepreneurs need to engage others to build a core team to drive a change forward (Kotter, 1995; tinyurl.com/84of2p4). They engage people by encouraging participation, rewarding success, and replacing those unwilling or unable to make the change (Miller, 2002; tinyurl.com/7wlkn56).

The key behavioural trait of leaders that are associated with identifying and mobilizing change agents is the ability to enable. The entrepreneur enables his change agents to mobilize the change by setting challenging goals, by providing personal support, by encouraging team-decision making, and by encouraging people to take risks (Eisenbach et al., 1999: tinyurl.com/6vrpgmj; Fedor et al., 2008: tinyurl.com/7649p9m; Mohrman, 1999: tinyurl.com/7nko56t).

4. Engage at All Levels

An entrepreneur will first outline the vision of the future and then engage groups of employees at different levels to help add detail to the vision and develop an implementation plan; this process builds commitment among team members (Higgs and Rowland, 2005; tinyurl.com/7g55tmu), as well as a sense of ownership. Buy-in achieved through engagement has been positively linked to the discretionary effort of individuals (Choi, 2011; tinyurl.com/7bn3xw6) and hence can be crucial to maintaining productivity during turbulent times. Furthermore, the probability of changes taking root increases when individuals can participate in the decision making on how the change will be implemented (Schneider et al., 1996; tinyurl.com/6nh4mzo).

The behavioural trait of leaders that is associated with engaging individuals at all levels is trustworthiness. Today's organizations are built on trust and therefore leaders must take responsibility for establishing trust-based relationships. Change introduces significant uncertainty, so trust is fundamental to successful engagement (Mohrman, 1999; tinyurl.com/7nko56t), can increase individual readiness for change (Choi, 2011; tinyurl.com/7bn3xw6), and can reduce resistance to change (Self and Shraeder, 2008; tinyurl.com/7vjp9nx).

5. Mind the Culture

Organizational culture refers to the norms, deeply held beliefs, and assumptions that develop through shared history and experiences (Schein, 1990; tinyurl.com/7vma5w7). Culture is difficult to change (Schneider et al., 1996; tinyurl.com/6nh4mzo) because it is difficult to understand and measure (Schein, 1990), making it a central challenge for entrepreneurs who lead transformational change.

However, changing the behaviour of people is the most important challenge in implementing change. To be successful, a change effort in a technical firm must influence emotions as well as thoughts (Deutschman, 2005; tinyurl.com/7d37z).

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To change organizational culture and behaviours, the entrepreneur can articulate new values and norms for the firm and use multiple levers, such as modeling the desired values or aligning reward structures and management processes (Fitzgerald, 1988; tinyurl.com/8xz4nef). Through policies, compensation, rewards, practices, and routines, the entrepreneur can create a climate to enable and reward the enactment of desired values and behaviours (Schein, 1990: tinyurl.com/7vma5w7; Schneider et al., 1996: tinyurl.com/6nh4mzo; Tushman and O'Reilly, 1996: tinyurl.com/7y8lhm6). The technology entrepreneur must also create an organizational mind-set and culture that are receptive to change; this results in an organization that sees change as an opportunity rather than a threat (Drucker, 2000; tinyurl.com/7rkor63).

The two behavioural traits of leaders that are associated with actions to mind the culture are self-awareness and mindfulness. Entrepreneurs must not only espouse the desired values and behaviours underpinning their change efforts, they must also enact them (Eisenbach et al., 1999: tinyurl.com/6vrpgmj). To be effective, entrepreneurs need to know who they are and what role they should play in different situations. Essentially, entrepreneurs need to adopt different personalities depending on the circumstance (Pettigrew, 1987; tinyurl.com/6uzvtbl).

6. Mind the People

Change is about people and, as a result, change may cause “people issues”. Change is an emotional experience for most individuals given that it often involves substantial changes in roles, responsibilities, relationships, which can significantly impact an individual’s capacity to learn new behaviours and skills during a transition process. Fundamentally, employees do not resist technical change; they resist changes in the human relationships that typically accompany technical changes (Lawrence, 1969; tinyurl.com/83v89wn).

The behavioural traits of leaders that are associated with actions to mind the people are consistency and integrity. Entrepreneurs must show consistency in the values they espouse and the values they enact (Eisenbach et al., 1999: tinyurl.com/6vrpgmj). Often, this is referred to as the need for leaders to “walk the talk”. Integrity and fairness are also closely linked to employee commitment at work, as well as the degree to which values are held and followed (Leader to Leader: The Integrity Connection, 2000; tinyurl.com/7rkor63). In change, the integ-

riety and fairness of leadership will take centre stage given that employees look to their leaders for guidance, direction, clarity, and understanding (Lawrence, 1969: tinyurl.com/83v89wn; Eisenbach et al., 1999), which makes those values critical to employee engagement, commitment, and retention.

7. Plan and Manage the Change Process

Entrepreneurs must remain closely in touch during the design and implementation steps of a change (Miller, 2002; tinyurl.com/7wlkn56). Leading change cannot be delegated and the entrepreneur who leads the change must own the process that brings about the change (Cummings, 1999; tinyurl.com/7nko56t). Entrepreneurs monitor change progress closely and take responsibility for internal and external commitment building (Miller, 2002). They align organizational structures, business processes, and systems to maximize results (Eisenbach et al., 1999: tinyurl.com/6vrpgmj; Pettigrew et al., 2001: tinyurl.com/6uzvtbl; Ahn et al., 2004: tinyurl.com/7d9qfzq).

The behavioural traits of leaders that are associated with planning and managing the change process are instrumentality and perseverance. Effective entrepreneurs provide more than charisma and vision; they focus on structure, implementation, execution, efficiency, and goal-setting (Rosing et al., 2011: tinyurl.com/72eyvmv; Nadler and Tushman, 1989; tinyurl.com/7g7zdvj). An entrepreneur must be persistent and relentless in maintaining commitment and sustaining the change effort long enough to realize the vision and the benefits sought (Miller, 2002; tinyurl.com/7wlkn56).

8. Build Organizational Skills and Capacity

Large-scale change cannot be managed by the entrepreneur alone. The effective leader focuses on building the leadership capacity, capability, and skills of senior staff, and ensures effective systems and managerial processes are in place (Nadler and Tushman, 1989: tinyurl.com/7g7zdvj; Self and Shraeder, 2008: tinyurl.com/7vjp9nx). Pushing leadership of strategic change throughout the organization increases engagement at all levels, thereby increasing the probability of success (Nadler and Tushman, 1989). Providing employees with opportunities to learn and develop new skills will also build a culture of inventiveness and improvisation that bolsters the organization’s resilience (Coutu, 2002; tinyurl.com/82bwxvu).

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9. Adapt to the Environment

In complex and turbulent environments, entrepreneurs cannot predict the future with accuracy and have little control over economic fluctuations, political events, industry restructuring, or competitive forces and technological discontinuities (Dunphy and Stace, 1988; tinyurl.com/7oj89ey). Entrepreneurs must be adept at recognizing patterns in chaos, identifying trends, knowing what inputs to disregard, and refining possibilities as additional data become available. Entrepreneurs must make sense of the external environment to formulate strategies (Maitlis and Sonenshein, 2010; tinyurl.com/7ctanxy) as well as to adapt strategies to respond to changes in their business environment.

The behavioural trait of leaders that is associated with adapting to the environment is the ability to synthesize. An effective leader of change synthesizes new strategies or course corrections by interpreting discrepant clues from the environment (Maitlis and Sonenshein, 2010; tinyurl.com/7ctanxy).

Conclusion

This article describes nine key leadership actions and corresponding behavioural traits that are associated with successful change leadership. Change can be complex and, as such, it will always be a challenge for entrepreneurs. Successful entrepreneurs adapt their leadership approach to the specific strategic situation they are facing rather than rely on a single style.

This article's contributions are that: i) it maps behavioural traits to specific actions that leaders must carry out in a change process and ii) it provides a framework that can be useful to an entrepreneur who needs to implement a change strategy.

Future research can explore key leadership actions and behaviours actually adopted by founders of growth-oriented technology companies.

About the Author

Llynn Plante is Regional Director for Eastern and Northeastern Ontario with the Industrial Research Assistance Program of the National Research Council Canada (NRC-IRAP). Llynn has a strong experience in finance, international business, R&D, and technology entrepreneurship from both the private and public sectors. Prior to joining NRC-IRAP, Llynn worked at Public Works Government Services Canada (PWGSC), at Export Development Canada, and in business and engineering roles in small Canadian technology firms. Llynn holds an EMBA from Queen's University in Kingston, Canada.

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TIM Lecture Series: The Business of Mobile Apps

Brian Hurley

“I am happy to freely share my knowledge and experiences to help you in achieving your goals. My only expectation is that you will do the same for others in the future.”

Brian Hurley
President and CEO of Purple Forge

The first lecture of the 2012 TIM Lecture Series was presented by Brian Hurley, President and CEO of Purple Forge (<http://purpleforge.com/>), who generously shared his experiences and insights gained from running a successful mobile applications company. The presentation was targeted at individuals interested in starting their own mobile apps company, particularly those with a background in computer science, engineering, or business. The event was held on February 9, 2012 at Carleton University in Ottawa, Canada.

The TIM Lecture Series is hosted by the Technology Innovation Management program (TIM; <http://carleton.ca/tim>) at Carleton University. The lectures provide a forum to promote the transfer of knowledge from university research to technology company executives and entrepreneurs as well as research and development personnel. Readers are encouraged to share related insights or provide feedback on the presentation or the TIM Lecture Series, including recommendations of future speakers.

This report summarizes the presentation and its key messages, including the lessons learned and actions identified by audience members. The slides from his presentation are available here: <http://purplejunction.com/2012/02/09/2322/>

Part 1: Building a Mobile App Business

Mobile Apps can be characterized as the new “gold rush”. Brian Hurley began the presentation by sharing “gold rush stories” illustrating that: i) prospectors were lured in the mobile apps space by reports of individual developers reaping significant rewards from seemingly trivial applications, ii) prospectors underestimate the difficulty in coming up with a “good idea” that includes a path to making money, and iii) prospectors need to validate this path to money with prospective customers.

Before developing an idea, an entrepreneur needs to understand that, in the mobile apps space, money can be made in three ways:

1. By selling products (e.g., pay for downloads, advertising, digital goods, subscription),
2. By selling services (e.g., build apps on contract, sell hosted apps to customers)
3. By selling complementary products (e.g., license source code to developers, sell cloud services to developers, sell complementary hardware)

Close consideration should also be given to the key attributes of smartphones and why people use apps. These factors can help generate ideas and highlight opportunities. However, the strongest message in the first part of the presentation was that entrepreneurs should

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generate and validate ideas by talking to prospective customers. When combined with a detailed internal evaluation of the idea, external feedback is the surest way to narrow down a list of potential ideas to the ones most likely to be profitable.

In the remainder of this first part of the presentation, Hurley provided insights related to:

1. Defining the target market
2. Building a team with the necessary mix of skills
3. Pulling together the various components of an application
4. Choosing a platform
5. Outsourcing infrastructure
6. Managing the app production cycle

Part 2: Selling, Challenges, Operationalizing

The second half of the presentation focused on: i) selling mobile apps, ii) overcoming particular challenges, and iii) operationalizing a mobile apps business.

The various strategies for “getting your app noticed” were analyzed using several Purple Forge apps as examples following a detailed discussion of the advantages and disadvantages of each of the four most common sales channels for mobile apps:

1. Resellers
2. Partners
3. Direct
4. App Stores

The technology challenges faced by mobile apps businesses include: testing, multi-language support, multi-version support, multi-platform support, upgrade management, development environment and skills management, and fragmentation.

The business challenges faced by mobile apps businesses include: app store restrictions and policies, pri-

vacy, security, PCI compliance, open source risk management, rapidly changing trends and demographics, provenance/copyright, intellectual property risks, and intellectual property ownership issues.

Next, insights related to operationalizing a mobile apps business were shared. The presentation concluded with advice for funding the business in its early stages and leveraging networks, technologies, and programs to increase the odds of being a winner in the new gold rush.

Lessons Learned

In the discussions that followed the first and second parts of the presentation, audience members shared the lessons learned they learned from the presentation and injected their own knowledge and experience into the conversation. The presenter and several audience members highlighted the high growth potential for the mobile applications space.

The audience also identified the following key takeaways from the presentation:

1. It is very hard to develop (and validate with customers) an opportunity that will make money for the firm.
2. Validation with customers should be incremental and continuous. You cannot go from the 1st floor to the 10th floor in one step. Continuously validate the goodness of ideas, opportunities, and ventures with customers.
3. Business and development are tied up in a knot; they do not follow a linear sequence that says develop first and sell later. Entrepreneurs should not expect that releasing an application into an app store will be sufficient. An app store is not a business model. Similarly, the idea that “if you build it, they will come” is nonsense. In the mobile applications space in particular, development should proceed only if a strong business model is in place.
4. A business model includes three components: i) value propositions for customers, partners, investors, and employees; ii) resources and processes used to deliver on these value propositions; and iii) a formula to make profits.
5. Intellectual property is important, and so is information.

TIM Lecture Series: The Business of Mobile Apps

Brian Hurley

6. There is a need to inject a sense of reality into the mobile space. While the mobile apps boom can be thought of as being similar to the gold rush, it is worth remembering that many (most?) prospectors did not make substantial amounts of money during the gold rush.

7. Revenue is all you need, and you must secure customers to generate revenue.

8. The three most important challenges for a startup are: cash, cash, and cash.

A further list of “tips for becoming a successful entrepreneur in the mobile applications space” was developed from the audience reactions to the presentation:

1. Make cold calls and talk to potential customers.
2. Focus on money-making opportunities, not development opportunities.
3. Prioritize deal-making.
4. Set objectives and act to achieve them.
5. Know your market demographics.
6. Make sure you secure channels to market.
7. Encourage media to notice your firm and its products/services.
8. Realize that you cannot make money by developing applications by yourself; to launch and grow a business, you need to work with others.
9. Stick to your core competence and outsource the rest.
10. Put founder agreements in writing; good paper makes good friends.

Suggested Next Steps

To conclude the evening, the host – Dr. Tony Bailetti, Director of the TIM program – challenged the audience to identify actions that could be taken to improve opportunities for new and existing mobile businesses in Ottawa:

1. Launch Lead to Win Mobile, a suggested variation of the Lead to Win program (<http://leadtowin.ca>).
2. Set up a culture where firms collaborate to cross-promote their products and services.
3. Organize developers so they can collectively take on larger and more profitable contracts.
4. Establish a job board or speed dating events that enable developers looking for work and firms looking for developers to find each other.
5. Write a paper on business models used by mobile application companies.

About the Speaker

Brian Hurley is an entrepreneurial leader with over 25 years of experience in building strong teams, innovative products, and international businesses. Brian is currently CEO of Purple Forge which he founded in 2008. He founded Liquid Computing in 2003 and, as its CEO, raised over \$44M in venture financing, built a world-class team, delivered an award winning product to market, and won initial sales. Brian has built and led numerous successful business teams at Nortel, Bell-Northern Research, and Microtel Pacific Research. Brian is the best-selling author of "A Small Business Guide to Doing Big Business on the Internet". Brian graduated from Carleton University with a Bachelor of Engineering.

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Topic

Start by asking yourself:

- Does my research or experience provide any new insights or perspectives?
- Do I often find myself having to explain this topic when I meet people as they are unaware of its relevance?
- Do I believe that I could have saved myself time, money, and frustration if someone had explained to me the issues surrounding this topic?
- Am I constantly correcting misconceptions regarding this topic?
- Am I considered to be an expert in this field? For example, do I present my research or experience at conferences?

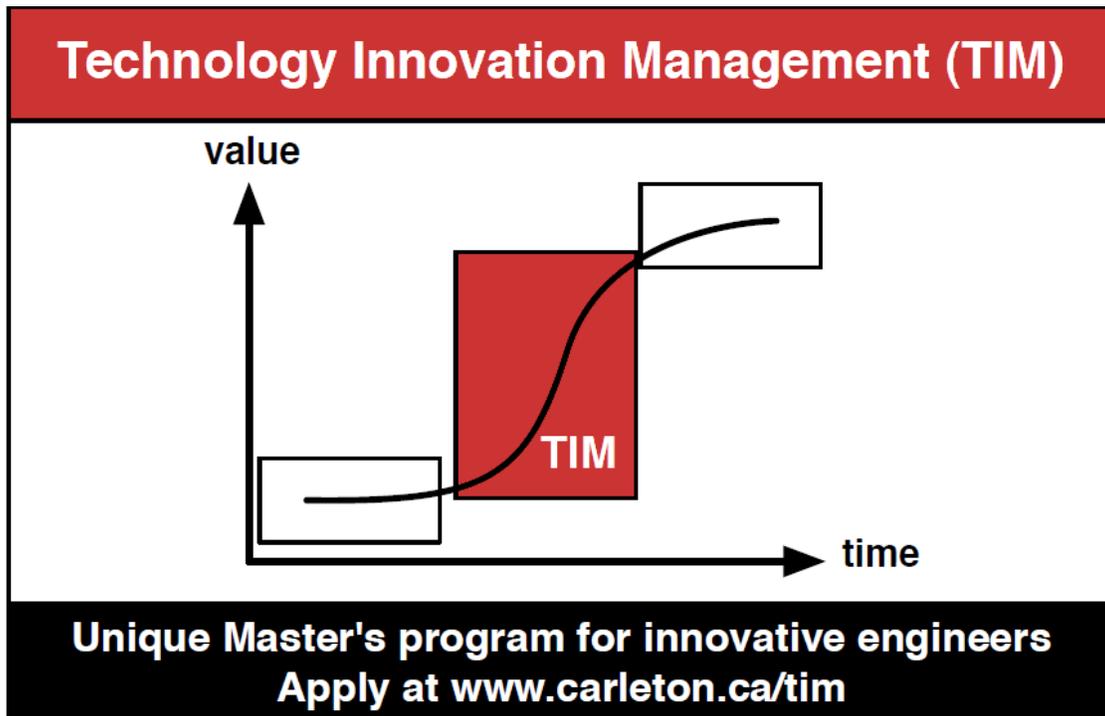
If your answer is "yes" to any of these questions, your topic is likely of interest to readers of the TIM Review.

When writing your article, keep the following points in mind:

- Emphasize the practical application of your insights or research.
- Thoroughly examine the topic; don't leave the reader wishing for more.
- Know your central theme and stick to it.
- Demonstrate your depth of understanding for the topic, and that you have considered its benefits, possible outcomes, and applicability.
- Write in a formal, analytical style. Third-person voice is recommended; first-person voice may also be acceptable depending on the perspective of your article.

Format

1. Use an article template: [.doc](#) [.odt](#)
2. Indicate if your submission has been previously published elsewhere. This is to ensure that we don't infringe upon another publisher's copyright policy.
3. Do not send articles shorter than 1500 words or longer than 3000 words.
4. Begin with a thought-provoking quotation that matches the spirit of the article. Research the source of your quotation in order to provide proper attribution.
5. Include a 2-3 paragraph abstract that provides the key messages you will be presenting in the article.
6. Any quotations or references within the article text need attribution. The URL to an online reference is preferred; where no online reference exists, include the name of the person and the full title of the article or book containing the referenced text. If the reference is from a personal communication, ensure that you have permission to use the quote and include a comment to that effect.
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.
9. If there are any additional texts that would be of interest to readers, include their full title and location URL.
10. Include 5 keywords for the article's metadata to assist search engines in finding your article.
11. Include any figures at the appropriate locations in the article, but also send separate graphic files at maximum resolution available for each figure.



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