Technology Innovation Management Review

October 2011

Fiori di Como by Dale Chihuly

Introducing the TIM Review

Welcome to the first issue of the *Technology Innovation Management Review*. We invite your comments on the articles in this issue as well as suggestions for future article topics and issue themes.

Editorial 3
Chris McPhee

Letters to the Editor 5
Roseann O'Reilly Runte, Rafik Goubran, and Jerry Tomberlin

Fostering Student Entrepreneurship and University Spinoff Companies 7
Tony Bailetti

Economics of Software Product Development Collectives 13
Michael Weiss

Managing the Challenges of Becoming an Open Innovation Company: Experiences from Living Labs 19
Mika Westerlund and Seppo Leminen

Acquisition Integration Models: How Large Companies Successfully Integrate Startups 26
Peter Carbone

A Sales Execution Strategy Guide for Technology Startups 32
Ian Gilbert and Stephen Davies

Author Guidelines 37

Carleton UNIVERSITY

www.timreview.ca

Publisher
The *Technology Innovation Management Review* is a monthly publication of the Talent First Network.

ISSN
1927-0321

www.timreview.ca

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.

Recent Issues

- Miscellany (August)
- Women Entrepreneurs (July)
- Technology Entrepreneurship (June)
- Technology Entrepreneurship (May)
- Collectives (April)

Upcoming Issues

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

Contribute

You can 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.
- Consider writing an article for a future issue; see the author guidelines and editorial process for details.
- Recommend colleagues as authors or guest editors.
- Give feedback on the website or any other aspect of this publication.
- Sponsor or advertise in the TIM Review.
- Tell a friend or colleague about the TIM Review.

Please contact the Editor if you have any questions or comments: timreview.ca/contact

Editorial: Introducing the TIM Review

Chris McPhee, Editor-in-Chief

It is my great pleasure to introduce the *Technology Innovation Management Review*.

The TIM Review is the new name for the Open Source Business Resource (OSBR), which we have been publishing on a monthly basis since 2007 from the Technology Innovation Management program at Carleton University in Ottawa, Canada (http://carleton.ca/tim). In the final issue of the OSBR, I described how the journal began with an emphasis on the business of open source, but has evolved over the years to focus on the theories, strategies, and tools that help early-stage technology companies succeed (McPhee, 2011; http://timreview.ca/article/465). While open source business will very much remain a topic of interest, it will be joined by a focus on innovation management, technology entrepreneurship, and economic development.

The new publication formalizes a change in scope, but also carries on the tradition of providing insightful content aimed at top teams that launch and grow technology companies. The TIM Review will bring together diverse viewpoints from academics, entrepreneurs, companies of all sizes, the public sector, the third sector, and others to share insights and practical ideas that readers can apply to their own organizations.

Along with the new name and scope, we have developed a new website (http://timreview.ca), which includes the archive of OSBR articles, now accessible by issue or by topic. The evolution of the website is ongoing, but we believe it already provides increased opportunities for discovery and discussion.

We would like to thank the faculty and students of the TIM program and other staff at Carleton University for their help in the transition to the TIM Review. In particular, I would like to acknowledge the efforts of Nathaniel Hudson for leading the website development work.

We are also grateful for the valuable feedback from readers and authors, our Advisory Board, and our new Review Board, who have collectively shaped the new publication and will continue to help evolve it. Please keep telling us what is working, what is not, and how we can make the TIM Review better.

In this first issue of the TIM Review, we feature a collection of five articles from authors within our ecosystem:

Tony Bailetti, Director of the Technology Innovation Management program, describes the importance of student entrepreneurship and proposes a model by which universities can increase the number of student spinoff companies. He recommends that senior university administrators use a results-based management approach, guided by a set of principles anchored around the proposed model of student entrepreneurship.

Michael Weiss, Associate Professor in the Department of Systems and Computer Engineering at Carleton University, retraces the evolution of software product development to illustrate a shift from a single-company, product-line development approach to software ecosystems and collectives. With particular emphasis on a case study of the Eclipse open source software ecosystem, he describes his recent research to develop a model that will help potential members decide whether or not to join a collective. The model links factors that affect the economics of software development collectives (level of contribution, number of members, and diversity of use) to economic outcomes (time, quality, and cost).

Mika Westerlund from the University of California Berkeley and Aalto University and **Seppo Leminen** from Laurea University and Aalto University, explore the challenges companies face when moving from a traditional, closed development approach to one where they co-create with customers. They identify and describe four distinct steps of open innovation based on their recent research with living labs. Finally, they discuss the differences between conventional, project-based development and the open innovation model, with an emphasis on the managerial challenges that come with a shift to greater openness and customer-led co-creation.

Peter Carbone reflects upon his experiences with acquisition integration as an executive at Nortel and extracts principles that can help both large companies and startups negotiate an appropriate integration approach following acquisition. With insights and lessons learned from six Nortel acquisitions, he describes four models of integration and the factors that can contribute to their success.

Editorial: Introducing the TIM Review

Chris McPhee

Ian Gilbert and **Stephen Davies** from Third Core Venture Expansion Partners outline a sales execution strategy guide for technology startups. They argue that much of the assistance offered to startups is focused on solution development and product-level commercialization, with less attention given to the execution of sales. In their article, they describe the reasons why sales execution strategies are commonly overlooked and offer practical tips for startups to put such a strategy in place – and execute it – in order to maximize revenue.

In November, we offer another collection of articles on topics that reflect the new scope of the publication. Following this, we will return to the tradition of publishing issues around specific editorial themes. We encourage you to suggest themes you would like to see covered in future issues.

We hope you enjoy the first issue of the TIM Review and will share your comments on articles online. Please also feel free to contact us directly with feedback or article submissions: http://timreview.ca/contact

About the Author

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.

Citation: McPhee, C. 2011. Editorial: Introducing the TIM Review. *Technology Innovation Management Review.* October 2011:3-4.

Letters to the Editor

Dear Editor-in-Chief,

Please accept my enthusiastic applause on the transformation of the *Open Source Business Resource* into the *Technology Innovation Management Review*! This publication is perfectly timed to respond to the issues experienced by the growing number of early-stage technology companies in Canada and around the world in the current economic and regulatory context.

I am delighted that this important publication will be located at Carleton University where we enjoy the leadership of some of the finest professors in the world like Dr. Tony Bailetti, to name but one of many. It is appropriate that the publication reside at Carleton where the university's commitment to engaging with industry and creating a context for collaborative work to find solutions to real-world problems is nothing short of remarkable.

The Technology Innovation Management program has generated theses and projects that feature innovative solutions to real-world problems. The Lead to Win program has matched the energy of nascent entrepreneurs with the need of the region, the expertise of our faculty and the experience of alumni who work as mentors to current students. The result is an impressive number of new enterprises which are both effective and profitable.

The doctoral program in the Sprott School of Business has generated dissertations and research projects which explore the relationship between leadership styles and the generation of creative ideas, the environment and corporate structures favoring change and the talents of the local workforce, the possibility of international cooperation as a solution to local problems.

The outreach of Carleton's Co-op Programs, community volunteer projects, and the involvement of alumni as investors, coaches, mentors and advisors are key factors in the success of the university's involvement in regional economic development.

I wish you every success with this important endeavor and look forward to reading it myself.

Sincerely yours,

Roseann O'Reilly Runte
President, Carleton University

Letters to the Editor

Dear Editor-in-Chief,

Congratulations on the launch of the *Technology Innovation Management Review*!

Based on the experience and reputation of the *Open Source Business Resource*, this new publication will have an even greater impact by broadening its scope from the theory and practice of open source businesses to that of early-stage technology enterprises in general. The review of emerging trends and technologies by and for a diverse audience of academics and practitioners will foster innovative solutions to the real-world problems faced by tech companies in their early growth stages.

The TIM Review builds on the success of Carleton's Technology Innovation Management program – a unique, interdisciplinary master's program that bridges the gap between engineering and business to support the growth of new technology companies and business ecosystems. The program launched in the mid-90s, and has resulted in many successes, among which include the creation of numerous start-up companies.

The TIM Review, along with the Technology Innovation Management and Lead to Win programs, as well as the new entrepreneurship programs designed by the Sprott School of Business for all students at Carleton, will play an important role in the economic development of our region and beyond.

We anticipate exciting things from this new initiative and look forward to being a part of a growing readership.

Sincerely,

Rafik Goubran
Dean, Faculty of Engineering
Carleton University

Jerry Tomberlin
Dean, Sprott School of Business
Carleton University

Fostering Student Entrepreneurship and University Spinoff Companies

Tony Bailetti

> *"Entrepreneurs do more than anybody thinks possible with less than anybody thinks possible, regardless of the field in which they work."*
>
> John Doerr
> Funder of Netscape, Google, and Amazon

A student spinoff company strives to transform knowledge acquired by students into an income-generating business. This article outlines how a university can increase the number of spinoff companies created by its student entrepreneurs.

Student spinoff companies are of interest to all forward-thinking universities, particularly those that support research and teaching programs in the field of entrepreneurship. The spinoff companies provide tangible evidence that students acquire viable entrepreneurial skills while studying at the university. In addition, student spinoff companies contribute to regional economic development, commercialize knowledge that otherwise would go undeveloped, help universities attain and expand their core missions, and increase the return on the investments in university R&D.

University policies developed specifically for student spinoff companies significantly affect the growth potential of such ventures. This article provides a model and a set of principles that universities can use to support and increase the number of student entrepreneurs at their institutions. The model and principles are grounded in research findings and practical experience. In addition, the article suggests that universities adopt a results-based management approach to plan and deploy initiatives to support student entrepreneurs. The approach is widely used by government agencies interested in increasing the outcomes from their investments.

Introduction

Today's academic institutions are adding economic development to their more traditional mandates of teaching and research (Hoskisson et al., 2011: http://tinyurl.com/3tkdepv; Rothaermel, et al., 2007: http://tinyurl.com/4xaacr8). Accordingly, the need to foster student entrepreneurship has become increasingly important for senior university administrators worldwide.

There is a risk however, that policies fostering entrepreneurship at a university may miss out on key scholarly insights and concrete practical experience. The literature on student entrepreneurship has grown in varied directions, making it difficult for universities to formulate effective policies. Lessons learned from practical experiences with student entrepreneurs are not widely available. The research findings and intuitive understanding around student entrepreneurs can be difficult to understand for senior university administrators interested in adopting effective university-wide policy principles promoting student entrepreneurship for commercial and social enterprises.

This article focuses on those students who establish new companies to commercialize opportunities using knowledge they acquired through their studies at university. This article is not concerned about university students working in projects commissioned by large companies, nor is it about students who commercialize

Fostering Student Entrepreneurship and University Spinoff Companies

Tony Bailetti

knowledge by means other than launching new companies (e.g., licensing technology to an established firm), who commercialize opportunities with knowledge acquired from non-university sources, or who are participants in business plan or idea competitions.

Student spinoff companies can be founded by students attending programs in any faculty at a university. These companies operate independently from the university; they have their own legal, technical, and commercial structures.

A student spinoff company transforms knowledge that students acquire at a university into revenues from: i) new products, services, technology, tools, and solutions; ii) new quality of goods; iii) new methods of production; iv) opening new markets; v) securing new sources of supply of raw materials; and vi) new organizational forms.

This article proceeds as follows. First, the importance of student spinoff companies is examined. Second, the distinct and salient aspects of student entrepreneurs are identified. Third, a model to increase the level of student entrepreneurship at a university is introduced. Fourth, a set of principles anchored around the model are identified. Fifth, a recommendation is provided to encourage senior university administrators to use a results-based management approach to manage their initiatives to increase the level of student entrepreneurship. Conclusions then follow.

Why Are Student Spinoff Companies Important?

Student spinoff companies are important for at least five reasons:

1. Student spinoff companies offer concrete proof that the university from which they emanate is relevant, up-to-date, and competitive. These proof points attract talented students, faculty, partners, and donors; generate private and public sector investment; and strengthen links to important regional and international networks.

2. They contribute to the economic development of the region where the university is located. They generate jobs (including jobs for students and knowledge-intensive jobs), diversify the local economy, satisfy customer needs, and attract talent and investment.

3. They commercialize knowledge that may otherwise go undeveloped within the university. Transforming "in house" knowledge into sellable goods is expensive and uncertain. Most universities do not have the skills, willpower, discipline, financial resources, space, and networks required to transform university knowledge into a wide range of commercial goods. In many cases, student spinoff companies are required to transform university knowledge into market offers, attract capital, and validate customer value.

4. They help universities accomplish their core missions of research, teaching, and community development. Student spinoffs provide faculty with knowledge that is useful for educating students, and they increase awareness of the practical value of undertaking university research.

5. They increase the return on government investment in university R&D. Policy makers and taxpayers are increasingly concerned about the low returns from government investment in university R&D. Michelacci (2003; http://tinyurl.com/68pvg3e) has shown that, when the stock of knowledge is high and the amount of entrepreneurial skill is low, an increase in R&D reduces economic growth. When entrepreneurial skills at the university are low, returns on large R&D investments are also low. In addition to being knowledge-transfer mechanisms, student spinoff companies increase the level of entrepreneurial activity at a university, which then increases the university's return on its R&D.

What Are the Distinct and Salient Aspects of Student Entrepreneurs?

Student entrepreneurs use university knowledge to recognize opportunities and develop, launch, and operate new companies to exploit them. This definition is consistent with the definitions of entrepreneurship contributed by Shane (2003; http://tinyurl.com/6yy3yqy) and Hoskisson, Covin, Volberda, and Johnson (2011; http://tinyurl.com/3tkdepv).

There are at least five distinct and salient aspects to student entrepreneurs:

1. They use their university education to develop the three core capabilities that underlie venture creation. According to Rasmussen and colleagues (2011; http://tinyurl.com/6xdn4cd), these three core capabilit-

Fostering Student Entrepreneurship and University Spinoff Companies

Tony Bailetti

ies are: opportunity refinement, resource acquisition, and venture championing.

2. They rely on the university's reputation and networks to reach the credibility thresholds of their ventures. Rasmussen and colleagues (2011) define the credibility threshold of a venture as the establishment of an entrepreneurial team and acquisition of resources required by the venture.

3. They learn to be more self-reliant than peers carrying out venture initiatives in large corporations. Unlike corporate venturing, student entrepreneurs learn that they cannot count on the university to provide them with the resources they require to develop their ventures. As a result, they tend to think of resources as tools that provide them with requisite services rather than feeling the need to own those resources. Student entrepreneurs focus on the applications, not the attributes of the resources.

4. The quality of their educational experience is very much influenced by the quality of their entrepreneurial experience while studying at the university. Student entrepreneurs expect more than lectures on entrepreneurship; they expect to interact with faculty who can help them attain their entrepreneurial-related goals.

5. They use the university to develop weak, strong, and bridging network ties. Weak ties provide them with new knowledge and information. Strong ties provide resources, legitimacy, and sensitive information exchange. Bridging ties provide market and customer information as well as capability to expand current capabilities (Hoskisson et al., 2011; http://tinyurl.com/3tkdepv).

Factors that Affect the Number of Student Spinoff Companies

Various entrepreneurship theories exist. In this section, we build on the knowledge-based theory of entrepreneurship (Acs et al., 2005: http://tinyurl.com/3q46kzq; Acs et al., 2009: http://tinyurl.com/3dlctbe) and the subjectivist theory of entrepreneurship (Mahoney and Michael, 2005; http://tinyurl.com/42p9fhv) to develop a model for the purpose of organizing policy principles to foster the creation of student spinoff companies. Six constructs were identified as determining the number of student entrepreneurs in a university at a given time (dependent variable), as shown in Figure 1 and described below:

A and B: Students use university-based knowledge to develop opportunities within the university. The

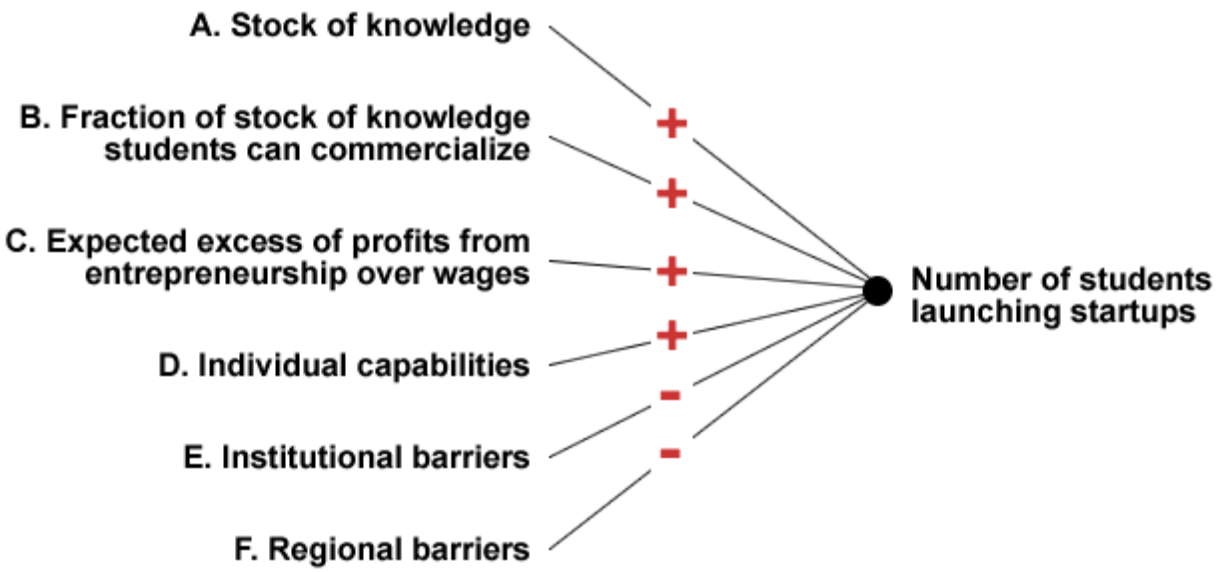

Figure 1. Factors that affect the level of student entrepreneurship at a university

Fostering Student Entrepreneurship and University Spinoff Companies

Tony Bailetti

amount of knowledge available to students is expressed as the product of two factors: the total stock of knowledge available at the university and the portion of knowledge that the university allows students to commercialize. If university policy assigns all rights over the university's stock of knowledge to students, then the number of student entrepreneurs launching companies is likely to increase.

C: When comparing the projected profits from entrepreneurship to the expected wages from employment inside or outside the university, the greater the disparity between profits over wages, the higher the level of students launching startups.

D: Students need to develop three core entrepreneurship capabilities: identify and refine an opportunity, acquire resources, and champion a venture. The stronger are the entrepreneurship capabilities of university students, the greater is the number of students launching startups.

E and F: The literature has identified barriers to entrepreneurship (Shane, 2003; http://tinyurl.com/6yy3yqy), which can be organized into two categories: university barriers and regional barriers. University barriers to entrepreneurship include lack of social acceptance of student entrepreneurs, tensions between academic and commercial outputs, lack of people with business experience and commercial skills, and inefficient technology transfer offices. Regional barriers to entrepreneurship include regulatory, legal, administrative, employment, financial, and partnership burdens. For example, in some regions, student entrepreneurs need one day to register a company; in other regions, they need 20 weeks. Some regions require skill qualification or the elaboration of a business plan certified by a business expert attesting to the company's viability. In some regions, students lack access to bank and trade credit.

Figure 1 illustrates that the number of student entrepreneurs at a university is positively affected by: i) the stock of knowledge at the university; ii) the fraction of stock of knowledge that students can commercialize, iii) the expected excess of profits from entrepreneurship minus wages from employment, and iv) the students' entrepreneurial capabilities. It also illustrates that the higher the university and regional barriers to entrepreneurship, the lower the number of student entrepreneurs.

Principles to Increase the Number of Student Spinoff Companies

Table 1 provides principles that can be used to develop university policies for increasing the number of spinoff companies created by university students. These principles are organized around the six factors illustrated in Figure 1.

The principles provided in this section link the descriptive nature of scientific research with the action-oriented nature of policy-making practices, as advocated by proponents of the science-based approach (Romme and Endenburg, 2006; http://tinyurl.com/6aowwcz). These principles use practical experience gained helping graduate students at Carleton University launch their businesses to expand on the principles reported by van Burg, Romme, Gilsing and Reymen (2008; http://tinyurl.com/3v3787c) and Gilsing, van Burg and Romme (2010; http://tinyurl.com/3w7s4q3).

A Results-Based Management Approach to Creating Student Spinoff Companies

Senior university administrators can use a results-based management approach to increase the level of student entrepreneurs. The results-based management approach looks beyond investment in activities and outputs, focusing on specific results of investments (Canadian International Development Agency, 2008; http://tinyurl.com/3jy985q). With this type of approach, the use of three tools to manage initiatives in fostering the creation of students' spinoff companies may prove quite helpful. These tools include: i) a logic model; ii) a performance measurement framework; and iii) an investment risk management template. Examples of the three tools used by the Canadian International Development Agency can be accessed here: http://tinyurl.com/3lnnde6

The logic model illustrates the logical relationships between inputs, activities, outputs, immediate outcomes, intermediate outcomes, and final outcome of a university initiative to increase its number of student entrepreneurs. The inputs, activities, and outputs address the "how" of the initiative, whereas the immediate, intermediate, and final outcomes provide the actual "changes" that take place as a result of investing in the initiative.

Fostering Student Entrepreneurship and University Spinoff Companies

Tony Bailetti

Table 1. Principles to foster student entrepreneurship at a university

Focus	Principles
A. Increase stock of knowledge	• Attract and retain productive faculty researchers with business experience who can increase the stock of knowledge that can be commercialized. • Provide mentors to students to help define and strengthen opportunities. • Distinguish between knowledge that reinforces existing practices versus knowledge that destroys them.
B. Increase portion of knowledge students can exploit	• Enable students to commercialize a large portion of the stock of university knowledge. • Separate spinoff process from research and teaching.
C. Increase projected excess of profits from entrepreneurship over wages	• Provide students with entrepreneurship assistantships using the same support level used to provide teaching and research assistantships. • Fund student entrepreneurs to pay other students to work on their ventures. • Fund students with viable opportunities. • Differentiate product development versus opportunity development. • Screen opportunities and provide students with constructive feedback on how to advance their opportunities. • Insist on market orientation for opportunities. • Provide access to potential customers, partners, and investors. • Provide tools to define and strengthen opportunities. • Help obtain external resources. • Do not take equity or keep intellectual property.
D. Increase individual capabilities	• Provide experiential training and mentors to develop capability to identify and refine opportunities, acquire resources, and champion ventures. • Link students to serial entrepreneurs.
E. Decrease institutional barriers	• Create university-wide awareness of benefits of student entrepreneurship to the region, university, and faculty. • Create exemplars that motivate entrepreneurial behaviour and celebrate successes. • Provide space for students to collaborate. • Set clear and supportive spinoff process tailored to opportunity type. • Stimulate creation and development of compelling opportunities. • Define nature and duration of spinoff company ties to university. • Greater focus on results of investments than on tracking investments in activities. • Eliminate inequalities based on gender, age, race, health, and religion.
F. Decrease regional barriers	• Encourage faculty to contribute to regional economic development organizations. • Involve students in economic development organizations, clusters, capital suppliers, incubators, service providers, etc. • Provide access to conferences where technology and market trends are discussed with potential customers.

Fostering Student Entrepreneurship and University Spinoff Companies

Tony Bailetti

A university can use the performance measurement framework to prepare and implement a plan that systematically collects relevant data over the lifetime of the student spinoff creation initiative and to demonstrate progress made in achieving expected results.

The investment risk register outlines the operational, financial, developmental, and reputational risks of a university initiative to increase numbers of student entrepreneurs and defines the corresponding risk response strategies.

Conclusions

Today's universities are adding economic development to their teaching and research mandates. Fostering student entrepreneurship for commercial and social purposes therefore has become increasingly important for senior university administrators worldwide.

We all face the challenge to do right for our student entrepreneurs and institutionalize the pertinent processes and values required to support the creation of their companies.

About the Author

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 international co-innovation, technical entrepreneurship, and regional economic development.

Citation: Bailetti, T. 2011. Fostering Student Entrepreneurship and University Spinoff Companies. *Technology Innovation Management Review.* October 2011: 7-12.

Economics of Software Product Development Collectives

Michael Weiss

> *"Define very precisely what your competitive differentiators are for your customers or you're going out of business. Focus all possible energies there, and acquire everything else from open source software, or help build it in open source software. Or in other words: pick your niche; co-evolve the platform in collaboration with other actors in the ecosystem."*
>
> Mike Milinkovich
> Executive Director, Eclipse

Where software product development occurs is shifting from single companies to groups or collectives of companies. In this article, we retrace the evolution of how software product development is organized and then offer insights into the economic motivation for collectives, which will be relevant to companies considering joining a software product development collective. Building on the literature on software product line economics, we identify three factors affecting the economics of collectives (level of contribution, number of members, and diversity of use), and develop a model that links those factors to three economic outcomes (time, quality, and cost). This model can be used by potential members when deciding whether or not to join a collective.

Introduction

The traditional view of software development is that it occurs within a single company. While parts of the development may be sourced from outside the company, the final product has been specified, and is owned in full, by the company. When a company develops multiple products in the same domain, it benefits from organizing its software development activity as a product line (http://sei.cmu.edu/productlines).

A product-line provides a platform (also known as a core asset base) shared by a set of related products that are developed by an organization. The shared platform identifies points of commonality and variation. Products are created on top of the platform by reusing its core assets, while reducing the effort that goes towards developing assets that are unique to the product.

The motivation for a product line is reducing the cost of developing new products while increasing their quality and reducing the time to market. By taking a product line approach, a company can manage product diversity and reuse more systematically. In other words, products built using a product line approach will share a common base, which allows a company to manage customer-specific variations more systematically.

This traditional view is being challenged by two recent developments: a transition from software product lines to software ecosystems (Bosch, 2009; http://tinyurl.com/3gfr5lg) and a transition from software ecosystems to collectives. A transition from product lines to software ecosystems takes place when a product-line company makes its platform available to developers outside the company. These include internal developers (as in a product line), strategic partners with long-term relationships, undirected external developers, and independent solution providers.

The transition from software ecosystems to collectives recently has created many new collectives, even though they often go by different names, including "ecosystems". Examples are the open source Eclipse project (http://eclipse.org) and the closed source Artop ecosystem (http://www.artop.org). A collective is set up when

Economics of Software Product Development Collectives

Michael Weiss

a group of organizations wants to achieve a goal they cannot achieve on their own. A collective can address common needs of its members, allowing them to focus on the differentiating features of their products.

It is often observed that somewhere between 50% and 90% of development effort is spent on creating software that does not differentiate a company from its competitors (van der Linden, 2009: http://tinyurl.com/6ef7p22; Milinkovich, 2008: http://tinyurl.com/6aguklw). Only the remainder differentiates a company from its competitors. This observation has motivated companies to acquire the non-differentiating parts of their software stack elsewhere, for example, as COTS (http://wikipedia.org/wiki/Commercial_off-the-shelf) or open source software. When such software is not available, or when a higher degree of control over the software is desired to enable more effective customization, organizations have joined efforts to create their own common software stack in a collaborative effort, making the result available to each other, or even to anyone else who wishes to use it.

This article seeks to identify the factors that affect the economics of collectives and to create a model linking those factors to economic outcomes. It develops propositions from case studies of collectives about how the composition of a collective affects the achievement of the business goals of their members. The propositions link three characteristics of collectives (level of contribution, number of members, and diversity of use) to three variables used to model the economics of product lines (time, quality, and cost).

Collectives

A collective can achieve things that its individual members cannot achieve on their own, as described in the April 2011 issue (http://timreview.ca/issue/2011/april) of this publication. For example, as a collective, a group of startups can deliver a complete solution to a customer, whereas individually they are only able to deliver pieces of the solution, which the customer has to integrate. Joining forces makes the group of startups much more competitive against large system integrators. Collectives can also collaborate to address common needs, allowing their members to focus on the differentiating features of their products. The more members a collective has, the more its members are able to share the load of meeting common needs. However, such collaboration is also fraught with problems, for example, the coordination overhead that results from dependencies between subtasks.

A key characteristic of collectives is that they are voluntary organizations. Membership in a collective is a function of how well the collective helps its members meet their business goals.

As contributors to the collective, members gain access to the total value generated by the collective. Previous research has shown that, as long as the total value received is higher than the cost of contribution, members benefit from joining (Baldwin and Clark, 2006; http://tinyurl.com/3qygf9y). Conversely, existing members of a collective are not interested in members who do not add value to the collective. Thus, collectives often impose conditions on membership such as asking members to commit resources.

Figure 1 summarizes the transitions from a single company to a collective model of developing software products. The transitions occur along two dimensions. The first transition is from an internal to an external activity, as the platform is made available to external developers. The second transition is from a hierarchical to a network type of governance. The locus of creation and evolution of the platform shifts from a single platform owner to a network that collectively creates and owns the platform.

Case Study: Eclipse

In the research underlying this article, we studied several cases both from firsthand observation and the literature. From these cases, we identified factors that affect the economics of collectives and created a model that links those factors to economic outcomes. The model is described as a set of propositions or statements that suggest causal links between the factors and the economic outcomes. A summary of each case was prepared that described its purpose, governance structure, and software architecture. Factors and economic outcomes were identified in an iterative manner.

In this section, we describe one of our case studies in detail: the Eclipse project. Eclipse is an open source community focused on building an open software development platform (Smith and Milinkovich, 2007; http://timreview.ca/article/94). The Eclipse project was founded in 2001 as a spin-out of technology that IBM had acquired from Object Technology International. Initially, the Eclipse community was primarily driven by IBM and other software vendors. In 2004, with the creation of an independent, non-profit governance body – the Eclipse Foundation – IBM relinquished its control over the project and allowed other players, in-

Economics of Software Product Development Collectives

Michael Weiss

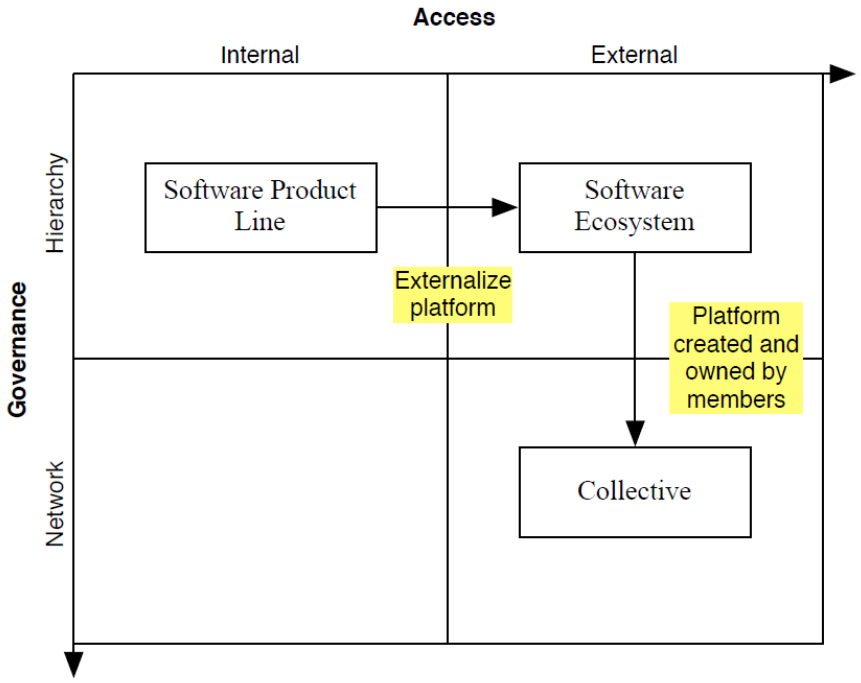

Figure 1. Evolution of software product development models

cluding IBM's competitors, to become equal members of the community.

The Eclipse Foundation is responsible for the technical infrastructure, coordinating the development process, handling the intellectual property rights, and promoting Eclipse and its wider ecosystem. The role of the Eclipse Foundation is administrative; it does not set the direction of the project or develop code. The direction of the project is set by strategic members of the collective. To become a strategic member, a company has to pay a membership fee and commit resources to the development of the platform. The Eclipse project is organized as a set of top-level projects with subprojects.

Eclipse has a well-defined process for member engagement, and project guidance is provided by three councils. The requirements council collects, reviews, and prioritizes incoming requirements. The planning council manages the release train. The architecture council defines and evolves the architecture of the Eclipse platform. Individual projects are overseen by project management committees. The councils are composed of strategic members and representatives of the project management committees.

Eclipse is designed to be highly extensible. At its core is a minimal runtime that provides tools for extension management. All functionality of Eclipse (even "core" functionality such as basic user interface elements) is implemented in the form of plug-ins. Plug-ins are the basic distribution unit of functionality in Eclipse. A plug-in can declare extension points, which are points where the behavior of the plug-in can be extended by others. It also implements extensions to the extension points of existing plug-ins. Those extension points are not predefined by the Eclipse platform, but can be defined by each plug-in author.

Findings

From the analysis of the cases examined in this research, three factors were identified as characteristics of collectives: level of contribution, number of members, and diversity of use. Level of contribution refers to the amount of work contributed to the core asset base by a member of the collective. Contributions are not limited to code, but can include requirements, designs, test cases, and feedback. The number of members is the size of the collective. Diversity of use measures the range and variety of contexts of use for the platform.

Economics of Software Product Development Collectives

Michael Weiss

Figure 2 shows a model that links these factors to economic outcomes that we developed as a result of examining the case studies. Traditional cost-benefit models of product lines only model the impact on cost, not other benefits such as time to market or quality. The three economic outcomes considered in this model are time, quality, and cost. Time is either time to market or the coordination overhead. Quality refers to the quality of the core asset base or the quality of the product. Cost is either the cost for the organization of the collective, the cost to create the core asset base, the cost to reuse assets, or the cost to create a unique asset not based on the platform.

The level of contribution is not evenly distributed among members of a collective. Instead, as studies of open source projects show, a small number of members account for a majority of the contributions (Crowston et al., 2011; http://tinyurl.com/3nrntty). Some members may be in a better position to create a specific core asset, because the skills required are not generally available, or they may have a more urgent need than other members for a specific asset to be available in the asset base. Most Eclipse subprojects receive their primary input from a single company. This company has greater influence over which core assets a contained in the platform than companies that contribute less.

Proposition 1: *Time to market decreases with the level of contribution as a result of better alignment between contributed assets and the contributor's needs.*

In the literature on small groups, trust has been noted as a determinant of effective team collaboration (Crowston et al., 2011; http://tinyurl.com/3nrntty). Successful leaders make a strong contribution and hold a central position in the community. Projects run by leaders who have demonstrated their technical skills and who have a record of past successes are generally more likely to succeed. Trust can be increased by developing key functionality early in a project to demonstrate that the project is doable and has merit. With the initial release of the Eclipse source code in 2001, IBM triggered contributions from other companies.

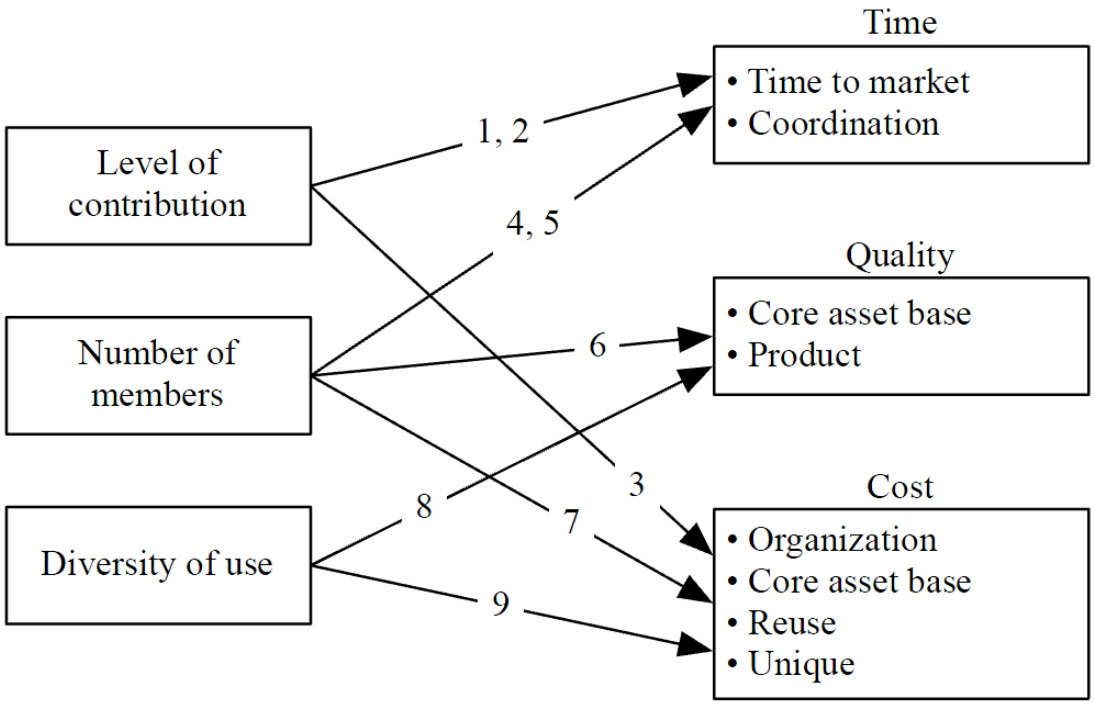

Figure 2. Linking factors to economic outputs. The arrows between factors and economic outcomes are the propositions that suggest causal relationships between them. The numbers on the arrow refer to the propositions. For example, the level of contribution influences time and cost.

Economics of Software Product Development Collectives

Michael Weiss

Proposition 2: *Coordination overhead decreases with the level of contribution as a result of the increase in trust it creates between the members.*

Through their level of contribution, a member can ensure the core assets fit with their business goals. Members who contribute the most to a specific asset can expect to benefit when reusing the asset. A study of open source development found that contributors obtain private benefits from the development of shared assets that are not available to "free riders" who only use the assets (von Hippel and von Krogh, 2003; http://tinyurl.com/6e39qa3). These include learning, sense of ownership and control, and feedback from others on the contributed code. Contributors are also in a better position to tailor their code to their individual needs, because the code that they contributed for general use may not be a good fit with someone else's needs. Many commercial products (such as IBM's WebSphere product) are built on top of the Eclipse platform. When IBM released the initial version of Eclipse, they had a significant lead over others in using the platform even though the code was open to anyone.

Proposition 3: *The cost to reuse assets in the core asset base and the cost to develop unique assets both decrease with the level of contribution.*

When members of a collective contribute to a core asset base, they develop a shared platform. The purpose of the shared platform is to provide non-differentiating functionality to members of the collective so that each member can focus on its differentiating features. A decision on whether to include a contribution in the shared platform is made on the basis of how well the contribution is aligned with the goals of the other members of the collective. If a contribution were only to benefit a single member, then it would not be included in the platform. For example, the Eclipse Modeling Framework provides modeling and code generation capabilities that are leveraged by tools such as Rational Rose. Tools based on the framework can interoperate because they share common representations.

Proposition 4: *The time to market decreases with the number of members. Members can focus on the development of value-added features.*

Each member added to a team introduces coordination overhead, which is time not spent productively towards achieving the task of the team. The capacity of team members to interact with one other in meaningful ways is also limited. Conversely, a smaller number of collaborators allows members to interact more frequently with each other. This creates stronger ties among the members and increases commitment and identification with the collective and its goals. The effort to coordinate activities can be controlled by restricting access, that is, strategically selecting members for specific interactions. In open source software projects, restricting access to core members reduces the amount of coordination required when members collaborate on a section of the project. The Eclipse project is organized into top-level projects, each of which has multiple subprojects. Only a subset of project members is active in any specific subproject.

Proposition 5: *Coordination overhead increases with the number of members working on the same section of the core asset base.*

A high level of quality in the core asset base attracts new members to the collective. Products built on top of a high quality base will also be of higher quality. In a collective of small companies, individual members do not have the resources to build a system to the level of quality provided by the platform. From proposition 2, it is also apparent that a collective needs to receive enough initial contributions in order to reach an acceptable level of quality that will attract more new members. A study of embedded systems companies using Linux showed that these companies were motivated to reveal their changes to Linux to receive technical support from other companies (Henkel, 2006; http://tinyurl.com/3dbfl7v).

Proposition 6: *The quality of the core asset base increases with the number of members who provide feedback on the assets in the core asset base.*

A collective approach to developing a core asset base is more efficient than for each member of the collective to develop a full software stack in isolation. Instead of creating their own versions of commodity features, members can focus on developing features that differentiate them from each other. The effort for maintaining the software stack as it evolves is also significantly reduced. Changes in underlying technologies can be spread among members. If members have existing investments in their own software stacks, switching to a platform developed by a collective may be expensive at first, but will pay off in the long term. Companies that build on the Eclipse Modeling Framework differentiate themselves through the value they offer to end users.

Economics of Software Product Development Collectives

Michael Weiss

Proposition 7: *The cost of contributing to the core asset base decreases with the number of members who provide resources.*

Each time the core asset base is put to use in a new context, new aspects of the base will be exercised. Each new context of use may uncover errors or omissions that had not been identified before. This increases the chance of correcting errors, thus increasing the quality of all products that depend on the asset base. For example, each Eclipse subproject exposes the shared core components to new uses.

Proposition 8: *The quality of the core asset base increases with diversity of use. Each new context of use will further harden the asset base.*

Diversity of use is driven by the diversity of needs of the members of the collective. At early stages of growth, the availability of multiple perspectives that come with diversity of use benefits a collective. Decisions about what functionality to include in the core asset base will be made from a broad understanding of product needs. At later stages, too much diversity may, in fact, hinder the evolution of the core asset base in a cohesive manner. When initially released, the Eclipse project provided core components for a Java-centric development environment. It subsequently grew in diversity to include components for tool integration, modeling, and web applications that could be applied across a range of domains. Today, Eclipse can perhaps be best characterized as a collection of vertical solutions for specific domains. About one half of the Eclipse project pool today is technology specific. The diversity of Eclipse projects has increased significantly, and as a group, the projects are far less cohesive now.

Proposition 9: *The cost of creating the core asset base first decreases, then increases with diversity of use. At low diversity of use, the collective benefits from a broader range of perspectives. When diversity of use is high, the collective will appear less cohesive.*

Conclusion

The focus of this article was on the shift in software product development from single companies to collectives. The analysis revealed motivations for companies to join a collective by examining the economics of collectives. The article also argued that development in collectives effectively amounts to the creation of a shared platform or product line. Different from traditional software products lines, which are managed by a single platform owner, these product lines are collectively owned. Another important difference is that the members of a collective are typically small and do not have extensive experience in product line engineering. In a future article we will explore the notion of a minimal viable product line, asking how a company can obtain some of the benefits of a product line approach without a full implementation of the approach.

Even though we used the open source collective Eclipse as our example in this article, we have also found the same patterns with closed source collectives (i.e., those that do not share the results of their work with nonmembers). Closed source collectives obtain the same types of benefits from collaboration as their open source cousins. Forming a collective is not a question of open or closed sourcing; it is a question of development models.

Acknowledgement
A version of this article was presented at the International Workshop on Quantitative Methods in Software Product Line Engineering (QMSPLE 2011; http://users.dsic.upv.es/workshops/qmsple2011/).

About the Author

Michael Weiss holds a faculty appointment in the Department of Systems and Computer Engineering at Carleton University, and he is a member of the Technology Innovation Management program. His research interests include open source ecosystems, mashups/Web 2.0, business process modeling, social network analysis, and product architecture and design. Michael has published on the evolution of open source communities, licensing of open services, and innovation in the mashup ecosystem.

Citation: Weiss, M. 2011. Economics of Software Product Development Collectives. *Technology Innovation Management Review.* October 2011: 13-18.

Managing the Challenges of Becoming an Open Innovation Company: Experiences from Living Labs

Mika Westerlund and Seppo Leminen

> *"The future cannot be predicted, but futures can be invented. It was man's ability to invent which has made human society what it is."*
>
> Dennis Gabor
> Physicist, Inventor, and Nobel Laureate (1900-1979)

High-technology firms have paved the way for user-driven innovations, but now even traditional industries are becoming increasingly open. This shift is a great challenge for companies with instituted practices, policies, and customer relationships. In this article, we identify four distinct steps in becoming an open innovation company based on our recent research into firms' experiences with living lab experiments in the information and communication technology (ICT) sector. We describe these phases and illustrate the divergent roles that users play in each one. We conclude with a discussion on the differences between the management challenges of conventional development projects versus the open innovation model. For all firms that wish to become open innovators, we recommend that their managers promote an open organizational mindset and apply groupware that supports increased openness, because traditional project management tools are insufficient for open innovation.

Introduction

Today's organizations need a constant flow of novel ideas while competing through emergent technologies. A growing number of companies pay close attention to users as a source of valuable feedback and relevant use experiences. Companies in all industries agree that integrating users in the innovation process – to learn from and with them – is crucial. Moreover, one of the most important recent trends is the progressive inclusion of users in firms' processes where value is co-created, as described in the November 2009, December 2009, and March 2011 issues of this publication (http://timreview.ca/issue-archive). Co-creation with users helps firms better address their customers' latent needs. It reduces market risk in the launch of new products and services, and it improves return on investment and time to market. Firms involve users in the co-production of brands, experiences, design, marketing strategies, and products or services.

The increasingly fashionable concept of "open innovation" drives user involvement. It provides an interesting alternative to conventional in-house development and includes various possibilities, such as open sourcing and crowdsourcing. Open source is a widespread means of innovation in the software industry, where open source communities act as innovation intermediaries and peer-to-peer production resources. Examples of well-known open source software projects include the mainstays of the LAMP stack (http://wikipedia.org/wiki/LAMP_(software_bundle)). As for crowdsourcing, Google has been crowdsourcing mapping data, content, and ideas (http://project10tothe100.com) for some time now, and InnoCentive (http://wikipedia.org/wiki/InnoCentive) crowdsources R&D for biomedical and pharmaceutical companies by providing connection and relationship management services between solution seekers and solvers.

One particularly interesting form of open innovation is the living labs approach (http://en.wikipedia.org/wiki/Living_lab), where technology is developed and tested in a physical or virtual real-life context, and users are important informants and co-creators in the tests (Kusiak, 2007; http://tinyurl.com/5vggb7h). The living labs approach is also attractive for traditional industries, because it extends the conventional innovation processes rather than reinvents them. Companies, on average, have little experience in open innovation, and

Managing the Challenges of Becoming an Open Innovation Company

Mika Westerlund and Seppo Leminen

transforming from an in-house innovator into an open innovation company is especially difficult for firms in traditional industries. Existing academic studies (e.g., Almirall and Casadesus-Masanell, 2010; http://tinyurl.com/6je6gph) can offer only limited insight; they predominantly consider firm's innovation development options as either closed or open without indicating what is needed for a firm to become an open innovator.

In this article, we examine the steps and managerial challenges firms face on their way to becoming open innovation companies. First, we look at customer involvement in development work and discuss why some firms choose living labs as their preferred way to initiate it. Second, we describe four different steps of co-creation with customers and users. We use data from our recent research to explain how the role of users and the depth of their integration within firm's innovation processes vary between the four steps. Third, we discuss the organizational challenges of managing co-creation, most of which relate to coping with change from a psychological perspective, because established corporate culture and practices often hinder this type of change. We argue that the managerial tools required in open innovation differ from those used in conventional, project-based innovation development.

Customer Involvement in Development Work

Many companies no longer attempt to grasp the details of customer needs and use experiences. They reassign the design aspect of product development to external sources of ideas, such as their customers, who can help with innovation work and create value (Edvarsson et al., 2010; http://tinyurl.com/3exkqua). Seeking to understand user needs is expensive and labour intensive, but customer insight speeds up the development processes of products and services and lowers the cost. Zaltmann (2003; http://tinyurl.com/4xmrtba) argues that firms increasingly recognize the need for integrating users as co-developers in R&D activities, because at least 80% of new products and services fail once they are launched into the market. With co-development, the result is more innovative and better fits with market needs.

The most common means of integrating users into development work involves collecting feedback on a company's products and services. However, users are now so intimately involved in the development processes that they have become co-creators of value and the innovation is user-driven. To co-create value, the firm, its customers, and its partners must reconcile their objectives, define the role and effort required from each party, and agree on an equitable division of the returns (Chesbrough, 2003; http://tinyurl.com/455m3q6). Shifting the focus from ownership to openness requires a total reconsideration of the processes that underlie value creation and capture (Chesbrough and Appleyard, 2007; http://tinyurl.com/3ne6xts).

Customer involvement in innovation development also has challenges. Experiments show that ideas from users are often more original and valuable, but ideas from in-house developers are more realizable (Edvarsson et al., 2010; http://tinyurl.com/3exkqua). Therefore, managers need to consider the type and organization of R&D to be performed, including a choice about the exposure of the innovation work to knowledge from outside the firm. Open innovation calls for a specific organizational mindset, which requires the creation and learning of a new operational culture, including open organization, processes, and products and services. Openness is difficult for firms where conventional thinking is the norm, because it means the firm must consider the inputs of others and cannot exert exclusive rights over the resultant innovation.

The Living Lab as a Form of Open Innovation

A firm can become an open innovator in different ways. Living labs provide an option for firms in industries, where the cognitive distinction between closed and open innovation is particularly strong. Living labs are co-creation ecosystems for human-centric research and innovation. We share the view of Ballon and colleagues (2005; http://tinyurl.com/5wwollx), who define living labs as experimentation environments; they are physical regions or virtual realities where stakeholders form public-private-people partnerships (4Ps) of firms, public agencies, universities, institutes, and users all collaborating for creation, prototyping, validating, and testing of new technologies, services, products and systems in real-life contexts. Living labs are different from test beds for controlled testing of a technology in a laboratory environment and field trials for testing in a limited, but still real-life, environment.

Stewart (2007; http://tinyurl.com/6cx2pfb) makes a distinction between diverse types of living labs. They include: i) narrow but sizable communities of expert users; ii) whole bounded populations; iii) living labs for technical service development; and iv) living labs for

Managing the Challenges of Becoming an Open Innovation Company

Mika Westerlund and Seppo Leminen

non-technical research using a service platform. All these types have something in common: they employ an array of participants with different rationale for joining the innovation development. Participants must reconcile their objectives and define both the role and effort required from each party and an equitable division of the returns to co-create value. Many living labs also join regional or global networks of living labs, such as the geographically distributed European Network of Living Labs (http://www.openlivinglabs.eu).

A living lab provides a concrete setting, unlike the other forms of open and collaborative innovation (Schaffers et al., 2007; http://tinyurl.com/6x8y6ku). Its main activities are:

1. Co-creation: co-design by users and producers; utilizers and enablers are also involved.

2. Exploration: discovering emerging usages, behaviours, and market opportunities.

3. Experimentation: implementing live scenarios within communities of users.

4. Evaluation: assessment of concepts, products, and services according to socio-ergonomic, socio-cognitive, and socio-economic criteria.

Living labs are platforms that bring together all the relevant parties for innovation co-creation. They open up the possibility to generate a wide and extensive spectrum of product and service portfolios (De Ryuter et al., 2007; http://tinyurl.com/3ugxd54) and connect producers and users with utilizers and enablers. The utilizer is a non-producer firm that seeks efficiency gains, supplements to resource bottlenecks, and knowledge from the living lab. It may boost its innovation process through the living lab network or even outsource its innovation capacity and knowledge to boost the living lab network. Enablers are companies or organizations that provide supportive technology, virtual or physical space, and other necessary resources to the use of participants.

Data Collection and Analysis

Between 2007 and 2010, we conducted 27 semi-structured interviews with senior managers of ICT companies. The data includes companies of all sizes from startups to large multinationals. We chose the ICT industry because open innovation practices are most advanced in high-technology industries (Chiaroni et al., 2011; http://tinyurl.com/3h4pdav). Therefore, we expected to find many firms that integrate users in their R&D processes or provide such services to other firms. Most of the firms we studied followed closed, producer-led development practices, while some were more open and user driven. Because all our case companies employ or intend to use living labs to boost their business, we expected that our interviewees could provide useful information on the past or current challenges of opening up a firm's innovation development. To further understand living labs as a form of open innovation, and the challenges of operating with multiple parties who have different motives, we conducted an additional 40 interviews with the staff of living labs in Finland, Sweden, and Spain.

We analyzed the data in a way similar to Lazzarotti and Manzini (2009; http://tinyurl.com/3zk9zbo), who established a framework to describe four basic ways to collaborate. Although the two dimensions along which we analyzed our data – the degree of openness and the type of co-creation – are different from their study, we also ended up with four different steps of collaboration. The following sections describe these four steps.

Four Steps to Becoming an Open Innovator

According to our analysis, when a conventional in-house developer decides to become an open innovation company, they will likely encounter four steps of development: i) producer-driven; ii) user-centric closed; iii) user-centric open; and iv) user-driven, as illustrated in Figure 1. These steps represent increasing degrees of user involvement. Firms are not required to progress through these steps sequentially, although that is the usual pattern. Furthermore, a firm can start or stop at any step. Previous research shows that it may take a long time for a firm to become an open innovator and this change may bring about many challenges (Chiaroni et al., 2011; http://tinyurl.com/3h4pdav). Managers need to establish a new organizational culture and mindset to support opening up their innovation processes.

Step 1: Producer-driven. In the first step, development work is led by the producer and is closed. This step is characterized by technology push, since the innovation originates from the producer's ideas and patents. The firm's policy to maintain knowledge and intellectual property rights within the company guides the development work. The staff has little communication or interaction with users; it considers them merely as buyers

Managing the Challenges of Becoming an Open Innovation Company

Mika Westerlund and Seppo Leminen

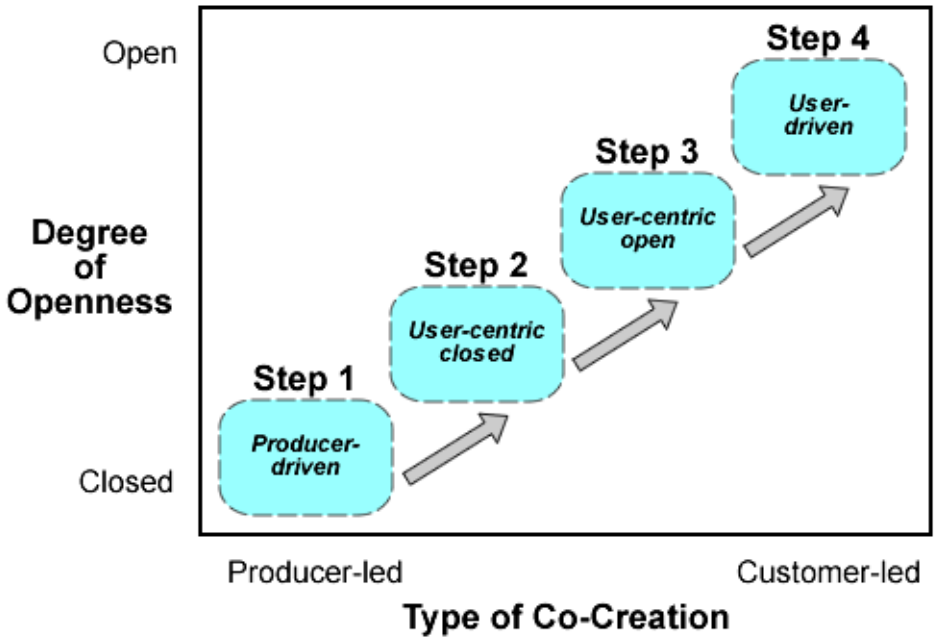

Figure 1. Four steps to becoming an open innovation company

whose role is to purchase and consume the firm's products and services. The contacts in customer firms are not the actual users of the product or service. Users' knowledge and use experiences, as well as potential development ideas, fail to flow into the producer organization due to minimal interaction with customers. Because of the restrictive producer-driven culture, the same may apply even if the company collects feedback by conducting market research, customer surveys, or interviews with the customers, because the firm may not apply this information to its development work. This lack of relevant information in development work is somewhat paradoxical, as even producer-driven innovators recognize the value and benefits of understanding users.

Companies operating in the producer-driven step often use intermediaries such as consultants to obtain customer feedback and development ideas. Because companies' co-creation with users is almost non-existent, intermediaries act as agents between the developer firm and the users. Agents collect users' needs and use experiences, then disseminate them to the producer's R&D department. Our data suggests that the reason for using agents is their ease of use from the producer's perspective. In addition, companies lack the skills, experience, or resources required to interact with their customers in a way that would benefit the parties involved.

Step 2: User-centric closed. In the second step, development work is still led by the producer and is closed, but the role of users is more visible than in the first step. The producer and its partners collect ideas from users through customer surveys and user studies, which often take place in the company's premises. These studies are quite comprehensive and systematically target specific users. Some users are involved in early stages of the development process, whereas others are included in later stages. Producers use pilot testing for new products and services; pilot users include customers as well as the firm's employees, family members, and employees of the firm's partners.

Some business units within the company have ample resources and experience of user involvement while others have none. R&D management does not have established general procedures for user involvement, and organizational culture fails to support openness in the innovation process. Therefore, the producer expends a lot of effort protecting its intellectual property rights and maintaining knowledge and information strictly inside the organization. User involvement is not the firm's primary objective and it does not have related organization-wide practices.

Step 3: User-centric open. In the third step, development work is somewhat led by customers, but they are disposable in the sense that a given individual is in-

Managing the Challenges of Becoming an Open Innovation Company

Mika Westerlund and Seppo Leminen

volved in the process only once. This step is a major move towards the open innovation model in terms of increased openness. Companies consider users, who are both the firm's current and potential clientele, as an important source of information. Relevant procedures required for user involvement are widespread within the producer organization and user involvement is among the firm's daily routines. Characteristically, the producer understands the value of its users' knowledge and its previous experiences of value co-creation with customers and users are mainly positive.

Nevertheless, the company only involves users in some phases of the innovation process. It selects them purposely for a certain phase on the basis of its needs; the same users do not participate throughout the product or service innovation lifecycle. The chosen users will be excluded from the subsequent phases after it is accomplished, because they quickly learn how to use the newly-developed service or process. Learning discourages them giving critical feedback and suggestions for further improvements. Therefore, finding more and more new pilot users becomes a challenge for the company.

Step 4: User-driven. In the fourth step, development work is led by customers and is open. In this step, a company enters into intense, long-term collaboration with its users and the majority of the firm's innovation activity is grounded on user involvement. Users' latent needs and motives for collaboration in innovation development rise up and become explicable through their efforts. The firm has well-established procedures for user involvement, and value co-creation with its current or potential customers takes place across the organization.

The company's innovation development practices evolve rapidly. Value co-creation is achieved through continuous trial and error, leading to new products and services, concepts, or operational improvements. The producer often tries new ways of operating and if the new methods do not yield improvements, it tries something else. User-driven development work is truly challenging, because the company entirely opens up its processes and procedures. Organized innovation development activities – which targeted specific users in the previous steps – are now open to any interested parties. Still, operation remains largely unorganized for an undisclosed time; it amends and adapts in time by the interests of the participants.

Managing Increased Openness

In this section, we describe the management challenges that firms face in opening up their development processes during their transition from conventional, project-based development to open innovation.

Conventional R&D is grounded in projects that bring about new products and services, beneficial change, or added value. Meredith and Mantel (1995; http://tinyurl.com/5v34qld) point out that a project targets a well-defined set of desired end results and a single project itself is non-recurrent. A project is a temporary endeavor, having a defined beginning and end, and it is undertaken to meet unique goals and objectives. The fundaments of project management are based on attaining preset end results and management reaches these goals by using diverse project management tools, methods, and models (Eskerod and Riis, 2009; http://tinyurl.com/5v9t9kx). Companies can decrease perceived uncertainty by running projects through sequential design phases or subprojects, as in the waterfall model (http://wikipedia.org/wiki/Waterfall_model).

Möller and colleagues (2008; http://tinyurl.com/3s95gax) show that innovation co-creation can be producer-driven, customer-driven, or in equilibrium. When employing the open innovation model, user input steers the direction of innovation creation processes heavily (Chesbrough, 2003; http://tinyurl.com/455m3q6). Open innovation is based on value co-creation with users and the end result of the development work is unforeseeable beforehand, unlike in conventional development projects. Traditional project management methods, where fundamental assumptions of the management are based on a clear measurable goal of a project (Maylor et al., 2008; http://tinyurl.com/3ep6os3), fail to apply in the open innovation model.

Hacievliyagil and Auger (2010; http://tinyurl.com/667h9o2) stress the impact of open innovation on the management of R&D. Our data on living labs shows that conventional project-based innovation development and the open innovation model differ in many respects. These differences are highly relevant for the firm's management in its attempt to become an open innovation company. Management needs to pay special attention to these differences in order to stress the right aspects during the transformation. The main differences include:

Managing the Challenges of Becoming an Open Innovation Company

Mika Westerlund and Seppo Leminen

1. Objective. Traditional innovation projects aim at firmly pre-defined goals. Managers can evaluate the success of the project by comparing the realized outcomes with the original project plan. Our data indicates that the open innovation model is different. Living labs target undefined objectives, albeit they introduce loose guidelines to initiate and promote collaboration. The objectives can change many times, as they depend on the interaction and collaboration among participants of the living lab. The results may comprise several different outcomes, which were not targeted in the beginning of the development work. The purpose of collaboration is producing products and services or solutions that have better market fit.

2. Control points. Conventional projects apply preset control points for amendments. Project management control points are usually located at the completion of defined tasks within the overall project plan. Because this plan describes the tasks, it heavily limits and guides the timing of changes in the goals and tasks or even the termination of project. Open innovation allows for changes to be made any time during the co-development work. For example, a living lab has few strictly set control points; it is self-organizing and the goals of innovation development change by the users' activity and involvement.

3. Project manager's role. The project manager's role differs clearly between conventional projects and open innovation. In the conventional model, the project manager manages and controls the resources and organizes schedules according to the project plan. Participants of a living lab cannot be managed as though they are personnel, because users join the innovation co-creation work on a voluntary basis. Their participation is often compelled by hedonic motives instead of economic ones. For example, many users do not expect any monetary rewards because they value the opportunity to participate and learn about the development process. Often, users consider that a token gift or formal recognition of their efforts is sufficient reward. Managers need to learn how to motivate users and other participants in living labs, which is challenging and resource intensive.

4. User's role. A conventional innovation development project deems users as objects of study. They join the project in diverse roles at any time during the product development lifecycle, whether the project is an early trend-identification phase or about to launch. Sometimes, end users test and verify products and services even after the launch. Open innovation is different; users are equal to other participants in living labs, as they are genuine co-creators of value. They participate in various intensive analyses concerning their everyday life, as well as in planning and doing the innovation development work.

5. Resources. Innovation resources in traditional projects include those of the firm and its partners, and companies spend these resources on many activities relating to a project plan. While projects emphasize the capability to utilize extant resources timely and efficiently, a living lab requires new resources and capabilities that are obtained or created by integrating the participants' knowledge. Because the goals change radically over time, co-creation in open innovation may necessitate resources that were not anticipated in the beginning. User involvement is resource intensive and a key managerial challenge is to facilitate user communities to generate sufficient support and resources.

6. Management tools. When managing conventional projects, companies can choose from a large assortment of extant methods and tools, such as the stage-gate model (http://wikipedia.org/wiki/Stage-gate_model) or project management software like Microsoft Project, which help managers control and monitor the progress of a project efficiently. Open innovation communities make collective decisions about future directions, and control and coordination is usually self-organized. Therefore, companies running or participating in running living labs need to use diverse facilitative methods, work group tools, and relevant groupware.

Conclusion

This article investigates co-creation of innovations with users. We examined the challenges firms face when they transform from conventional in-house developers to open innovation companies. A living lab is a real-life test and experimentation environment where users and producers co-create innovations. With data from small and large high-tech firms using the living lab approach, we found four distinctive steps in becoming an open innovator.

We argue that, although a firm can start or stop at any step, the path from closed to open modes of innovation evolves step by step for pragmatic reasons. It spreads out the degree of change in culture and practices, because the transformation is challenging and takes time and effort. Companies must first de-learn their current

Managing the Challenges of Becoming an Open Innovation Company

Mika Westerlund and Seppo Leminen

practices and possibly seek new customer domains that differ from their current market. For small companies, the change towards an open innovator is easier than for large firms, as they are often more agile and less restricted by current markets and practices due to their smallness and newness.

However, the main challenges for any company include establishing a new organizational culture and mindset as well as providing facilities that support increased openness. Traditional project management tools are insufficient for the purpose. Therefore, managers of companies in any industry that intend to become open innovators should apply groupware tools that facilitate and motivate all participants of innovation co-creation. Companies that already use agile development methods probably adapt to open modes of innovation quicker than those relying on plan-driven methods, because they have more adaptive and responsive organizational culture.

About the Authors

Mika Westerlund, D. Sc. (Econ.), holds positions as Postdoctoral Scholar in the Haas School of Business at the University of California Berkeley and Postdoctoral Researcher in the School of Economics at Aalto University. Mika earned his doctoral degree in Marketing from the Helsinki School of Economics. His doctoral research focused on software firms' business models and his current research interests include open innovation, business strategy, and management models in high-tech and service-intensive industries. Results from his research are reported in numerous scholarly journals.

Seppo Leminen, D. Sc. (Econ.), Lic. Tech., holds positions as Principal Lecturer at the Laurea University of Applied Sciences and Adjunct Professor in the School of Economics at Aalto University. Seppo holds a doctoral degree in Marketing from the Hanken School of Economics and a licentiate degree in Information Technology at the Helsinki University of Technology. His research and consultation interests include value co-creation and capture with users as well as relationships, services, and business models in marketing. He runs various living lab and business model projects in ICT and media industries.

Citation: Westerlund, M. and Leminen, S. 2011. Managing the Challenges of Becoming an Open Innovation Company: Experiences from Living Labs. *Technology Innovation Management Review*. October 2011: 19-25.

Acquisition Integration Models: How Large Companies Successfully Integrate Startups

Peter Carbone

> *"In all affairs it's a healthy thing now and then to hang a question mark on the things you have long taken for granted."*
>
> Bertrand Russell
> Author, Mathematician, and Philosopher (1872-1970)

Mergers and acquisitions (M&A) have been popular means for many companies to address the increasing pace and level of competition that they face. Large companies have pursued acquisitions to more quickly access technology, markets, and customers, and this approach has always been a viable exit strategy for startups. However, not all deals deliver the anticipated benefits, in large part due to poor integration of the acquired assets into the acquiring company. Integration can greatly impact the success of the acquisition and, indeed, the combined company's overall market success.

In this article, I explore the implementation of several integration models that have been put into place by a large company and extract principles that may assist negotiating parties with maximizing success. This perspective may also be of interest to smaller companies as they explore exit options while trying to ensure continued market success after acquisition. I assert that business success with acquisitions is dependent on an appropriate integration model, but that asset integration is not formulaic. Any integration effort must consider the specific market context and personnel involved.

Introduction

When large companies wish to bring new technology to market, increase their portfolio capability to address broader customer opportunities, or access new customers or market segments, their need to move quickly drives them to consider acquiring the assets of other companies. The target of acquisition, typically a startup, may have outstanding technology and a wish to exit stand-alone operation in favour of being acquired. Their motivation may be to leverage a larger company's capabilities, such as cash for growth, access to channels, and brand association. The combination of these complementary motivations may seem to provide a strong force in the market, however, a strong commercial outcome depends on successful integration to realize the consolidated potential of any deal. Many acquisitions that looked promising during the business case phase do not deliver to expectation, in part due to the implementation challenges.

Based on a several first-hand acquisition experiences, I have observed that the majority of the discussion preceding the close of a deal is often focused on the value of the technology being acquired, the fit to a customer's solution, sales projections, market valuation, and potential roles for the senior leaders in the acquiring company. The most successful transactions that I have been involved with also had a clear strategy for the assimilation of the new company into the acquired company, one that fueled growth of the strongest assets.

Transactions Selected for Examination

Over an eight year period, Nortel (http://wikipedia.org/wiki/Nortel) made more than 20 acquisitions of companies to improve its market/competitive position and accelerate technology availability. This article will examine six of these transactions (Table 1), selected based on the author's personal involvement. These selected transactions illustrate some of the characteristics

Acquisition Integration Models

Peter Carbone

Table 1. Summary of selected Nortel acquisitions

Company	Year	Cost	Description	Nortel's Motivation
Aptis Comm	1998	~$290M	Remote-access data networking startup	Replace a partner's weaker product to achieve technology and market leadership
Architel	2000	~$395M	Network management company	Fill gaps in overall network management portfolio
Bay Networks	1998	~$9.1B	Large data networking company	Accelerate a competitive entry to new market segment with leadership technology, market access, and customer base
Cambrian	1998	~$300M	Metro optical start-up	Fill portfolio technology gap quickly and secure new platform
Clarify	1999	$2.1B	Front office CRM solutions	Broaden enterprise portfolio offer
Shasta	1999	~$340M	Service g/w and policy management edge router	Enter new growth market for services gateways and applications/services

of the different integration models being used and will be examined based on their impact on performance.

Models of Integration

Different models of integration are characterized based on how the newly acquired assets are leveraged by the acquirer. Figure 1 illustrates four types of integration that can be differentiated along two dimensions: i) the form of integration used and ii) the target organization for integration. The form of integration considers whether resources are consolidated in the buyer's or seller's company; the other dimension considers whether the combined entity remains as a standalone unit or is absorbed into the acquiring company's units.

1. The "Cross-Leverage" model leaves the acquisition as a separate business unit, but merges the technology and people into the main company. Bay Networks was a large company and, after being acquired, was folded into the existing data business within Nortel at the executive level. It then underwent portfolio rationalization and integration across the new, larger data networking unit, being fully assimilated over time. This is the default model when the acquired company is very large or has overlapping portfolio elements that must be rationalized.

2. The "New Bet" model turns an acquisition into a new, standalone business unit within the company to pursue a new market segment. Shasta was a startup that had a unique value proposition at the time. They offered a services gateway based on routing technology that was not easily addressable by the market leader, Cisco, due to its architecture. Shasta was set up as a new, standalone "applications business unit" within the larger company and was chartered to lead in this new applications space by leveraging Nortel's brand, customer base, and manufacturing leverage. In theory, this model should assist in entering a new market segment; however the new entity must overcome many challenges, such as the acquiring company's lack of brand value in a new space, different business processes, and unwanted "help" from the acquiring company.

3. The "Top Up" model breaks up the acquired entity into portfolio elements and consolidates it into the acquiring company. Architel's portfolio elements were consolidated with the Nortel portfolio elements and the product managers and technology people moved to join Nortel organizations. Clarify was split between the Enterprise and Service Provider divisions within Nortel and was consolidated within these units. This model works well to accelerate a successful internal business

Acquisition Integration Models

Peter Carbone

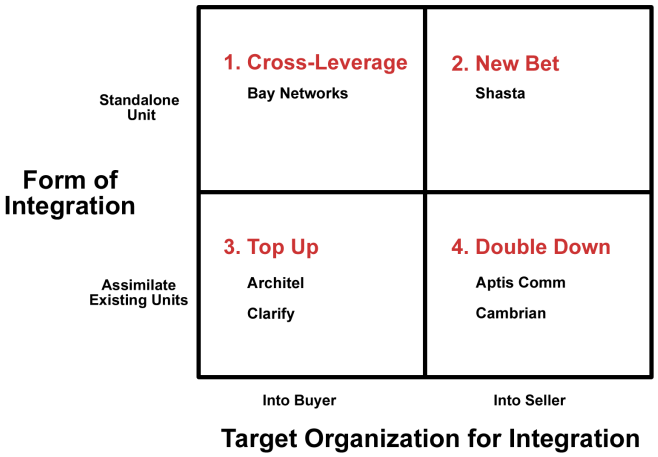

Figure 1. Four models of acquisition integration

unit by providing it with additional resources and filling gaps more quickly than can be done organically.

4. The "Double Down" model consolidates both companies' assets into the acquired company. In the case of Aptis, all Nortel and Bay Networks remote access technology and associated sales teams were moved to Aptis and the President of Aptis took on the larger responsibility for the development and revenue targets of the combined portfolio. This model works best when the acquired company has the market momentum, brand, customer base, or channel, and when it also has an effective leadership team.

The motivation for using one model over another appears to consider the following:

1. The acquiring executive's preference for structuring and organizing the new assets, often based on the available internal talent

2. What is possible giving the size of the acquisition

3. The decision to focus on business results (e.g., market share, revenue) or technology results (e.g., platforms, portfolio elements)

Each of these four models had some strengths and weaknesses, as will be discussed in the following section.

Implementation Discussion

The most successful transactions, as measured by market or revenue growth, were the ones that maintained a strong business focus after the deal closed, rather than a strong technology focus. By reviewing these six examples, the key attributes that contributed to success or failure can be distilled.

Aptis grew to become the market share leader in its category, despite competition from large, dominant players, such as Cisco and Alcatel. Aptis had developed high-performance technology, but were struggling to penetrate the market. The following factors impacted their success:

1. Consolidation of smaller capacity remote access platforms with Aptis and provision of a clear and single focus for remote access in the company. This avoided the inevitable platform battles that would have emerged between different organizations if they had not been consolidated.

2. Consolidation of associated sales forces. This provided access to large customers (Regional Bell Operating Companies in this case) and avoided go-to-market conflict.

3. Setting of aggressive revenue targets (beyond what Aptis thought possible). This was a clear and shared goal for the entire team and made the Aptis unit a core contributor to the success of the overall Nortel division.

4. Transfer of an experienced R&D leader to Aptis, who was able to tap the Nortel technology portfolio quickly for required assets and manufacturing capability. This person worked well as an "employee" of the Aptis, successfully eliminating an "us versus them" mindset.

5. Appointment of the President of Aptis as the clear leader for the consolidated business.

6. Provision of required investment to develop and ship the competitive product.

With limited distractions and a clear focus, this became one of Nortel's most successful transactions in that it exceeded its acquisition business case.

Cambrian grew to provide a successful platform and portfolio for Nortel, and it held a market leadership pos-

Acquisition Integration Models

Peter Carbone

ition for several years. The company had developed and delivered a technology capability in advance of most competitors and were struggling with scaling to demand. Following its acquisition by Nortel, Cambrian was provided with:

1. A senior Nortel leader to co-lead the business unit. The Nortel leader provided access to R&D and manufacturing, as well as the service provider market. The Cambrian leadership remained focused on enterprise opportunities, and by working well together, they were able to reach a leadership position.

2. Clarity around Cambrian's positioned as the company's key bet in the metro-optical space, including ambitious targets that were key to the success of the overall business unit.

3. Investment to grow and evolve the portfolio and platform.

4. Access to Nortel's technology and manufacturing capability.

5. Access to Nortel's customer base and sales team.

Cambrian was also a successful transaction. As with the Aptis acquisition, the decision made was to add capability and fuel to the unit that was focused and was gaining success. By doing this, Nortel avoided having to train a new leadership team and address the natural concerns that acquired companies have about being "taken over". The key was to rapidly fuel a winning business and provide it with a compatible joint leadership team.

The "new bet" on Shasta was less successful. Although they had excellent technology and market position for their target service-edge market, the startup leadership team did not know how to leverage Nortel effectively and had little respect for the Nortel team, seeing the larger company as a drag on their nimbleness and momentum. Table 2 summarizes the factors that impacted the success of this acquisition.

The "top up" of the network management portfolio with Architel worked as expected. The Architel team saw the value in leveraging Nortel's technology and sales to further penetrate the market, and this contributed to the new unit's aligned objectives. These efforts benefited greatly from a compatible management team at the director level. The service provider portion of Clarify was less successful because the core technology team was retained in a different unit that had different priorities. This arrangement slowed the implementation changes required to fit the offers to the respective markets. Because the Clarify team was artificially split between Nortel units, they retained allegiance to two masters (their old core team and their new masters: Nortel), which negatively impacted performance.

The Cross-Leverage model used with Bay Networks was difficult to implement due to the relative large sizes of the two merging organizations and the overall complex-

Table 2. Factors that impacted the success of the Shasta acquisition by Nortel

Contributing Factors	Detracting Factors
• Clear positioning as Nortel's offer in the applications space • The autonomy to pursue the sector with their own sales force, which they were able to do very quickly • Some liaison resources were provided to bridge back and provide access to Nortel. • Investment to enhance the product offer • Appointment of the Shasta President as leader of the new applications unit	• Internal teams pursued Shasta as a source for an IP platform, which made the priorities less clear and distracted the team from their focus on services. • The original executive sponsor was reassigned, allowing the original business case to be dynamically changed to reflect platform investments that did not help secure sector leadership. • Not all technology in the services space was consolidated, causing internal teams to bid against each other in customer deals. • The Shasta team did not know how to leverage Nortel's other assets and capabilities.

Acquisition Integration Models

Peter Carbone

ity of the portfolio and market. Time was not an ally, as competitors were able to target various portfolio elements and reduce overall penetration. This put pressure on development budgets, ultimately resulting in program cancellations. There was drift in focus due to the multitude of potential opportunities, and the integration into the Nortel unit required the two teams to spend time educating each other on capabilities and strategies. The slow integration prevented this acquisition from performing to its potential.

Increasing the Potential for Success

The question is always how to maximize the probability of success with any M&A activity. Based on experience with these transactions, there are five key principles that, if followed, would increase the probability of any acquisition success. Many of these can be derived with common sense, however, based on the variable success in the transactions examined here, more attention should be paid to them.

1. Maintain a business focus over the business case period used to justify the transaction. In several cases, the original business case used to justify the acquisition was overlooked due to changes in leadership, market conditions, or perceived momentum. This can be avoided by having the transaction's sponsoring executive continue to be actively involved and accountable to deliver the original business plan (or justify its enhancement), at least until it can be determined that the market momentum promised is on track for delivery.

2. Accommodate the size of the acquisition in the integration plan, with a focus on ensuring the business plan is implemented quickly. Small acquisitions proceed more quickly into integration than larger ones, thereby enhancing the performance of the business plan. For large acquisitions, the company must hasten any "cross-leveraging" integration to reduce the vulnerability of the new entity to competition. From the examples above, this goal can be accomplished by rapidly assimilating the portfolio elements and associated people into the unit.

3. Ensure compatibility at the level of working-team management, not just the executive level. Executives of the acquired company are always a focus in a transaction, however, in some of the transactions examined here, some of the key management people were moved into organizations with little consideration for their fit. This results in friction, delays, and unproductive politics. This potential problem was addressed in other transactions by assessing the compatibility of the working-level team leaders and accommodating their requirements for success (e.g., clearly delineated responsibilities, joint performance objectives).

4. Bet on the team that has momentum in the market. It seems obvious, however, it is easy for a master-slave relationship develop. To avoid this potential problem, the business case should reflect the resulting organizational model and associated performance so that "fuel" can be quickly added" to the asset that has momentum.

5. Ensure absolute clarity around the new purpose, mission, and business objectives of the acquisition. As is often the case, a transaction changes the scope, market access, or potential for the new combined unit. Often, the acquired company wants to continue with the status quo because this approach helped them achieve a success exit. Alternatively, the buyer may want to fold the assets into its current model. As in the cases examined above, the most successful integrations establish clear leadership and business objectives, and they provide the new leader with the appropriate tools to do the job.

Although selecting a model is not formulaic, in addition to putting appropriate business discipline around the transaction, betting on the team with momentum has a high impact. This involves consolidating with the new player (as seen with Aptis) or strengthening internal momentum (as seen in the Architel network management case). The team that best knows how to use the assets will have higher potential for market leadership.

In hindsight, the Shasta acquisition might have resulted in better performance had principle 5 been applied along with the Double Down model, thereby consolidating the smaller capacity VPN portfolio with the acquired company.

Conclusion

The requirement for choosing an appropriate integration model is not a surprise, but too often it is pushed aside during the excitement of the chase. Although M&A is a key tool for driving competitiveness, additional focus must be placed on integrating the assets of the companies to realize the anticipated value. As with most processes, success is based on people and the

Acquisition Integration Models

Peter Carbone

speed of execution. Success is easier to achieve with small acquisitions, but there is no reliable, formulaic model.

The five principles identified here, by looking at a subset of Nortel's acquisitions, highlight the application of common business principles to the M&A space, including measuring results against a plan, making decisions quickly, clarifying purpose, supporting a winner, and ensuring strong team performance.

Understanding the characteristics of these different integration models and their success factors may allow a small company to promote its value and integration differently and avoid traps that can destroy the value of an acquisition. An acquisition is a material change, and it requires change in management structure, which is always difficult and bring with it potential benefit and risk. Principle 4 – betting on the team that has momentum in the market - is often the hardest for a company to do; however, allowing new players that have market momentum to drive the business is a foundation of any successful acquisition.

About the Author

Peter Carbone is a successful executive known for his thought leadership, business acumen, and technology leadership. He is often called on to address new business and technology challenges. Peter is a pathfinder with a track record of creating innovative solutions, strategically managing technology and innovation, successfully launching and running new businesses, and leading business development initiatives. Peter has held CTO, R&D, and senior business positions in several high-tech companies, and he has led or been directly involved with several technology company acquisitions. Peter has been engaged as technical advisor to startups, is part of the faculty of an entrepreneur development program that has created >100 new companies, and has been on the boards of US-based Alliance for Telecommunications Industry Solutions (ATIS) and Coral CEA. He is past Vice-Chair of the Executive Committee of the Information Technology Association of Canada (ITAC) and Chair of an ITAC committee, which is focused on the Global Competitiveness of Canada's Knowledge Economy.

Citation: Carbone, P. 2011. Acquisition Integration Models: How Large Companies Successfully Integrate Startups. *Technology Innovation Management Review.* October 2011: 26-31.

A Sales Execution Strategy Guide for Technology Startups

Ian Gilbert and Stephen Davies

> *"Business is like war in one respect. If its grand strategy is correct, any number of tactical errors can be made and yet the enterprise proves successful."*
>
> Robert E. Wood
> Business Executive and Brigadier General (1879-1969)

The majority of startups fail to consider sales execution as part of their overall strategy. This article demonstrates how a sales execution strategy can help a company take a product or service to market more efficiently and effectively by focusing on the customers that are key to generating revenue. Combined with techniques for recruiting effectively and measuring sales outcomes, a sales execution strategy helps technology startups exceed growth aspirations and potentially reduce or even eliminate the requirement for external investment.

In this article, we first describe the focus of assistance currently given to startups and the reasons why sales execution strategies are often overlooked. Next, we outline recommendations for developing, implementing, and supporting a sales execution strategy. Finally, we summarize the key points presented in the article.

Introduction

Entrepreneurs are exposed to a wide range of assistance and mentorship. Much of this help is focused on solution development and product-level commercialization. Both are important and are rightly fundamental to future investment decisions on the part of angels and venture capital companies. These two areas do not, however, offer a complete picture of sustainable entrepreneurial success.

Typically, startup organizations will "take a product to market" focusing on the technology with no attention paid to the actual execution of sales. Therefore, traditional product commercialization efforts often amount to little more than a "build it and they will come" approach to growth, which is about as effective as one would expect. Consequently, many companies are only modestly successful in their early growth efforts and seek structured external funding before fully exploring the opportunities afforded by their selling model.

Entrepreneurs are failing to achieve strong early growth despite the valuable and well-intentioned help that is available to them. Sales execution is under-emphasized by assistance programs and mentors, and yet value discovery, analysis, and creation, together with efficient customer engagement, are fundamental to entrepreneurial success. In this article, we suggest that startups are often not made aware of an additional critical element: a sales execution strategy.

Consider a typical entrepreneur: they know everything about the company's products and technology, but are unable tell sales strategy from sales execution strategy. The difference between the two is unclear for many. Strategy is what to do; execution is how to do it.

A sales execution strategy is a working document that contains a clearly defined set of goals, targets, and sales collateral that, if correctly implemented, will allow a startup to significantly scale sales. The sales execution strategy, implemented along the appropriate sales vehicle, will enable rapid and high-probably engagement with the target market while minimizing the cost of sales. In this article, we share our experiences as practitioners to examine the reasons why sales execution strategies receive so little attention, and we outline

A Sales Execution Strategy Guide for Technology Startups

Ian Gilbert and Stephen Davies

recommendations that leaders of technology startups can use to develop and support an effective sales execution strategy.

Why Sales Execution Strategies Are Overlooked

The technology adoption lifecycle (http://wikipedia.org/wiki/Technology_adoption_lifecycle) is a staple of marketing and entrepreneurial education. It suggests that the early majority and late majority categories of customers are the key to successful growth (Figure 1). These categories represent influential customers with issues that reflect those of their industry at large. Focusing on the early and late majority also helps organizations in "crossing the chasm" (sometimes referred to as "the valley of death").

The majority of early entrepreneurial efforts, both from a product development perspective and in terms of marketing, focus on creating products and messages that attract innovators and early adopters. Typical incubation efforts do nothing but reinforce this approach. Investors also look for commercial "proof", as validated by communities of technology adopters and experts. Very few take the time to rigorously explore the extent to which real growth is feasible through the mainstream market.

There are many internal and external reasons why sales execution strategies are under-emphasized in startup companies. Below, we describe three key barriers that hold companies back from recognizing and acting upon this gap:

1. There is a lack of available sales talent and sales leadership talent. Very often, the available talent pool consists of people who are experiencing the entrepreneurial world for the first time. With limited funds available, it is very difficult for startup companies to satisfy the remuneration expectations of high-performing ex-corporate leaders and sales professionals. Consequently, many young businesses end up with sub-par sales talent who have been schooled in the corporate approach to customer engagement, but who do not understand the nuances of executing in an entrepreneurial world.

2. There is a distinct lack of clarity and consistency among investors. Investors, of course, are multi-dimensional, and many do look for sales and marketing readiness as they explore the potential for investment. However, they vary greatly in terms of what they are looking for to evaluate such readiness. During the due diligence process, entrepreneurs tend to think it is in their interests to exaggerate their sales funnel and oversell their partnerships. This practice does tend to in-

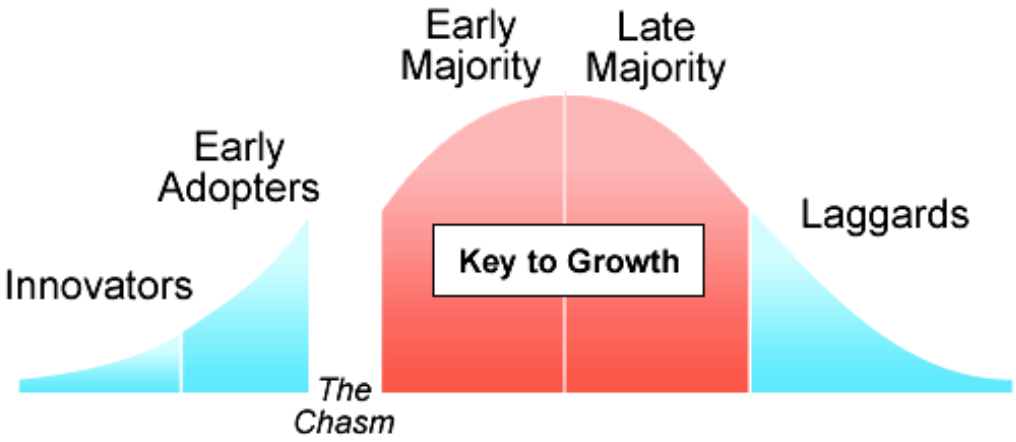

Figure 1. The Technology Adoption Lifecycle

A Sales Execution Strategy Guide for Technology Startups

Ian Gilbert and Stephen Davies

crease the likelihood of investment, but then everyone is confused when these companies later fail.

3. Startup operations are focused on feature development, not on scaling sales. To scale sales, a company must put product feature development to one side in favour of adopting an objective mindset to the metrics of growth. For most startups, operations are still focused on feature development and not on scaling sales. This demands a fundamental mind-shift so that the operations side of the business can better support the efforts of the sales team. Key components that are often missed are realistic product development strategies, lack of defined operations process, and poor subcontractor-developer relations.

Developing a Strategy

Selling is not telling. The most fundamental intent of a sales execution strategy is to create a systematic platform for discovery and analysis. A well-considered sales execution strategy should provide clear answers to questions such as:

- Who are the most influential customers in the target market?
- What are the poignant business issues that they face?
- What are the tactical problems that are created?
- How might the value proposition address these problems and what impact would it have?
- How motivated might they be to buy, given the value proposition?
- Who would they consider the competition to be?
- How would the customers perceive the difference between the startup and its competition?
- What would they be prepared to pay?
- How and for what would they pay?
- Who would they tell?

Developing a sales execution strategy also requires input from customers or prospects that have: i) significant problems they wish to solve; ii) genuine influence to purchase solutions; and iii) a willingness to tell their story. With input from customers, the answers to the questions above can help shape a compelling value proposition (the articulation of the value that your product or solution creates). Pilot projects also help in the development of a sales execution strategy, particularly when they are used to build reference stories. Returning to the customer over time captures the changing nature of their issues and the changing demands they have of the value proposition.

The sales execution strategy becomes a working document that contains the following information:

1. A clearly defined and tested product value proposition relating to the early and late majority customers in the market.

2. Tested price points for the product including quantity discounts.

3. Adaptive pricing options along the adoption lifecycle.

4. Clear competitor differentiation.

5. A set of sales collateral built on the above points and supported by testimonials from pilot projects.

6. A clear target profile of the early and late majority customers to aid in the tactical implementation of the product sales.

7. Timelines for product release based on a realistic product development strategy.

8. A clearly defined plan for ongoing customer service.

Implementing a Strategy

There are three major considerations that determine the most appropriate vehicle (e.g., in-field sales staff, call centre/reseller, or a web-centric approach) for tactically implementing a sales execution strategy:

1. The efficiency and appropriateness of the manner in which the prospect is accessed and engaged. The sales team should consider both the complexity of the decision-making process from the prospect's perspective and the seniority of the decision makers. The more complex the process and the more senior the decision makers, the more likely a traditional field sales model is appropriate, which may require partners who can help execute the strategy.

A Sales Execution Strategy Guide for Technology Startups

Ian Gilbert and Stephen Davies

2. The price of the product and its strategic impact on customers' businesses. The lower the price and strategic impact, the more likely that the use of telephone sales professionals or resellers is appropriate. Furthermore, the use of digital media such as emails and online shops can also be helpful.

3. The scale of the market and the depth of relationships required to provide further context. The larger the market and the lighter the touch, the more likely that web-based lead generation and nurturing tools are required to automate and scale the approach used.

Measuring Results

The outcomes of a sales execution strategy must be measurable. Specific and robust targets need to be set based on the outcome of a rich set of outputs.

The quality and quantity of activity (e.g., emails, calls, customer meetings) provides the foundation for all performance. This leads to a pipeline containing the following:

1. Leads
2. Unqualified prospects
3. Qualified opportunities
4. Forecastable deals

These pipeline elements are interrelated and all should be planned for. For example, a company may start with the pessimistic assumption that 640 quality calls yield 80 conversations, which result in 16 leads, four of which become prospects, two of which become qualified, and one of which leads to a deal. Once the company has made a number of calls, generated leads, and closed deals, these statistics can be adjusted to reflect the specific market.

As described by one of this article's authors, building a relevant and workable sales process, including a sales funnel, is "perhaps the most important aspect of a successful sales strategy" (Davies, 2010; http://timreview.ca/article/386) and it is critical to be realistic. The temptation and usual practice is to inflate the numbers (which end up becoming real to both the company and potential investors) in order to attract external funding, but the likelihood of failure as a consequence is very high. To keep things "real", disregard opportunities that are really no more than conversations.

To further ensure the sales funnel contains genuine "winnable" opportunities, companies should also apply a simple qualification model. The simplest form of sales qualification model asks four simple questions for which the realistic organization seeks proof:

1. Budget. Does the prospect have access to sufficient funds to make this purchase? Can this be validated?

2. Authority. Does the "buyer" have the authority to make a purchase decision? Can this be validated?

3. Need. Is there a compelling business need for the product or solution? What is the specific value to the customer? Can it be verified that the need for a solution is meaningful to the customer?

4. Timescale. Has the timescale been established during which the need must be addressed? What are the specific steps and timings of the buying process?

Supporting a Sales Execution Strategy

When recruiting a sales team to roll out the sales execution strategy, we offer the following advice:

1. Market and domain experience is important but can easily be overrated. A big rolodex is much less important than most people assume.

2. Recruit for demonstrable competency and capability. Both of these attributes are predictors of successful execution. Behavioural interviewing (exploring past situations and the candidate's actions and analysis at the time) can assist in predicting probable future behaviours.

3. Take the time to role play. Ask candidates to walk through a selling conversation for their current company or product. Do they ask lots of questions or do they start pitching straight away? Do they have the capability to take control and build rapport or is the interaction forced and "salesy"? For sales leaders, can they elevate beyond sales theory and actually sketch out a sales execution strategy for the business?

The ugly truth is that only a small percentage of salespeople are top sales talents. By following the points above you will maximize the probability of hiring an individual that meets your requirements. It is

A Sales Execution Strategy Guide for Technology Startups

Ian Gilbert and Stephen Davies

also important to provide ongoing support to engage and motivate the sales staff. This will lead to higher performance from all staff, not just the top sales talent.

Sales staff also require a supporting technical infrastructure. Cheap tools (e.g., web tracking, email automation, and customer relationship management in particular) are so easy to acquire and implement that there is no excuse for even an unfunded business to be well-equipped to turn marketing efforts into real leads. The tools, of course, only tell half the story. It is up to the startup to implement with a degree of energy, and to be consistent (not perfect) in the utilization of the tools and in the analysis of their impact.

Summary

To rapidly grow sales, startups need to:

1. Focus on required product features that are meaningful to the early and late majority, not on features that only excite early adopters and technology enthusiasts.

2. Structure the company operations to enable quick and rapid scaling to support the sales team.

3. Develop a sales execution strategy that matches a value proposition to the early majority.

4. Roll out the sales execution strategy using real metrics (e.g., ratio of qualified leads to closed sales, average cost of closed won vs closed lost sales) that are appropriate to the particular market.

5. Recruit effectively (as described above) to maximize the revenue potential and minimize the cost of sale.

6. Utilize effective technology to support the sales execution process.

7. Engage only in marketing activities that directly generate qualified leads.

By following the above guidelines, startup companies stand a better chance of achieving early revenue, which may reduce or even mitigate the requirement for external investment. Where investment is sought, this approach will also give both the investor and startup a real chance at maximizing investment for a safer and more profitable return.

About the Authors

Ian Gilbert is Managing Partner of Third Core Venture Expansion Partners, a company that offers sales assistance, and builds and runs sales teams for new and growing companies. He has been privileged to lead and contribute to sales operations at some of the world's dominant technology organizations, including HP, Cable & Wireless, CGI, Telus, Bell Canada, PTC, Tandberg, Nortel, and Avaya. Ian has used his corporate experiences to start and build successful companies in both Europe and Canada, and he has assisted many Canadian entrepreneurs in the creation, development, and eventual sale of their companies. He continues to work personally with entrepreneurs across Canada.

Stephen Davies is an associate with Third Core Venture Expansion Partners, where he helps to scale sales for the portfolio companies by optimizing their operations. Stephen also leads a dual role in both business development and operations management in founder, virtual executive, and consulting roles. Focusing on technology, regulated industries, and the military, Stephen has worked with organizations such as ICAO, DND, Porter Airlines, MITEL, Nortel, NQI, CNSC, CAE, SAIC, Lockheed Martin, as well as a number of technology startups. Stephen also lectures in entrepreneurship-related subjects at the Sprott School of Business at Carleton University.

Citation: Gilbert, I. and Davies, S. 2011. A Sales Execution Strategy Guide for Technology Startups. *Technology Innovation Management Review*. October 2011: 32-36.

Author Guidelines

These guidelines should assist in the process of translating your expertise into a focused article that adds to the knowledge resources available through the *Technology Innovation Management Review*. Prior to writing an article, we recommend that you contact the Editor to discuss your article topic, the author guidelines, upcoming editorial themes, and the submission process: timreview.ca/contact

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.