The Blue Marble: Land Surface, Ocean Color, Sea Ice, and Clouds - Credit: NASA/Visible Earth

Global Business Creation

Welcome to the June 2012 issue of the *Technology Innovation Management Review*. The editorial theme of this issue is Global Business Creation. We invite your comments on the articles in this issue as well as suggestions for future article topics and issue themes.

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Overview

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

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

Upcoming Issues

- *July:* Social Innovation
  Guest Editor: Stephen Huddart
- *August*: Entrepreneurship in the 21st Century
- *September:* Living Labs
  Guest Editors: Seppo Leminen and Mika Westerlund

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

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Contribute to the TIM Review in the following ways:

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- Write an article for a future issue; see the author guidelines and editorial process for details.
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- Sponsor or advertise in the TIM Review.
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Please contact the Editor if you have any questions or comments: timreview.ca/contact

Editorial: June 2012

Chris McPhee

Welcome to the June issue of the TIM Review. This month's theme is Global Business Creation and the guest editors are Marko Seppä, founder of Global Enabler (globalenabler.com), and Stoyan Tanev, Associate Professor at the University of Southern Denmark (sdu.dk/en/). Our guest editors have assembled a suitably global line-up of authors; this issue includes representation from Canada, Denmark, Finland, India, and the United States. Moreover, each of the authors brings a global perspective to their articles. We hope you will find their insights valuable and relevant to the globalization challenges you face.

This issue also includes a report on a recent **TIM Lecture**, which also closely matches the issue theme of Global Business Creation. On May 31st, a diverse audience engaged with faculty, graduate students, and professionals working to establish a worldwide leadership position in technology entrepreneurship and commercialization for Carleton University and the region. In the first part of the lecture, speakers associated with the TIM program (carleton.ca/tim) described seven proof points that can substantiate a leadership position for the university and the region as well as the many opportunities for community members to help attain these proof points. The second part of the lecture was a showcase of graduates students' work in entrepreneurship and commercialization. I encourage you to evaluate the seven proof points, provide feedback on them, and consider how you might contribute to the proposed worldwide leadership position in technology entrepreneurship and commercialization.

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

In August, the theme is Technology Entrepreneurship, and then in September, **Seppo Leminen**, Principal Lecturer at the Laurea University of Applied Sciences, Finland, and **Mika Westerlund**, Assistant Professor at Carleton University's Sprott School of Business, are guest editors for an issue on Living Labs. If you would like to contribute an article to the August or September issues, please contact us (timreview.ca/contact) immediately to discuss possible article topics related to these themes.

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

Chris McPhee
Editor-in-Chief

About the Author

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

Guest Editorial: Global Business Creation

Marko Seppä and Stoyan Tanev

Technology does not turn into innovation automatically and innovations cannot be sustained by administration and management alone. Breaking away from the incrementalism of evolution requires creativity and revolution, which again requires putting up with rebels: creators and revolutionaries. Sustaining revolution, in a business context, requires dynamic co-existence of administrators and creators, business administration and business creation.

Despite the growing number of existing enablers, both online and free of charge, in the Google and Facebook era, business creation is a tough sport – and global business creation is an extreme sport, one could argue. Global business creation requires a multitude of border-crossing competences and points of contacts – a constant orchestration of co-creative cross-cultural networks. However, global business creation is not just a world-win game, but a fight over prosperity and survival for nations at large, a real world competition, if not a "world war", already.

Established and emerging global businesses, and the tax income they generate, are the lifeline of the post-modern welfare society. Governments around the world emphasize ever more systematically the need for new high-growth ventures and the export income and jobs they could bring about. Europe, for example, suffers from an escalating public indebtedness of kin to cancer – to which global business creation might be the best, if not the only, cure available.

Given how serious a game, by any measure, global business creation has become, it is noteworthy that this topic has not surfaced in the scholarly discourse in any particular way. Consequently, there is no domain of knowing, even in sight, dedicated to producing "clinical doctors of global business creation". Given how badly we seem to need global business creators, it is paradoxical that there are no university professors positioned to produce champions of this crucially important art: doctors who would actually cure the patient, instead of examining her to death.

In late 2011, the organizers of the 11th Emergent Business Research Forum (EBRF) conference in Finland (ebrf.fi), invited scholars to "Global Business Creation Games". Metaphorically speaking, the organisers called

business scholars "to arms" to co-create global businesses together with entrepreneurs, executives, and policy makers, across all borders.

From the get-go, EBRF has pushed the academic frontier of knowing around business in the knowledge society. What started as e-Business Research Forum as part of the five-year eTampere (etampere.fi) knowledge society program, a local pilot of eEurope (2001-2005), transformed to Emergent Business Research Forum in the post eTampere years. EBRF has always entertained unorthodox research topics and conference formats, and rather pushed scholars away from comfort zones, than courted them with business as usual.

It is all the more insightful that the TIM Review dedicated this special issue to articles based on presentations at the EBRF 2011 conference. The special issue at hand serves as an important showcase of 11 years of work to push the scholarly envelope around business in knowledge society. The catering is as dispersed and scope as wide as can be expected from a multidisciplinary business research conference on a broadly defined topic. As such, this very portfolio of articles underscores the challenge of grasping what all global business creation calls for.

In the first article, **Marko Seppä** imagines The University as a global business creation factory, a new generation private-public-partnership. By introducing the concept of a Kalevala Global Business Creation School, the article pays a tribute to the national epic of Finland, which underscores knowledge over sword as the greatest enabler and eternal wellbeing, instead of world domination, as end goal. The six articles that follow contribute to the Global Kalevala vision, even if totally independently and by fully serving their own right.

In the second article, **Hanna Kurikko and Pekka Tuominen** underscore the changing nature of value creation and brand building in the era of online communities, one of the basic building blocks of global business creation. Their research into the Brickbuilders LEGO-fan community is a testimonial to the importance of facilitating belongingness and empowerment, reaching for and touching people's souls, when creating global business.

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Marko Seppä and Stoyan Tanev

In the third article, **Marikka Heikkilä and Leni Kuivaniemi** illustrate how global business creation is an ecosystem-level challenge, rather than a single-business creation challenge. Through an action research study on a health-sector ecosystem, the authors identify six sub-ecosystems, each having a different set of drivers as well as readiness or pace for development.

In the fourth article, **Punit Saurabh, Bhaskar Bhowmick, Amrita, and Dhrubes Biswas** also call for ecosystem-level global business creation models in the health sector, but in this case it is in an emerging-market context. Building on EBRF 2010 Global Academic Cup Award winning research work, their article underscores how entrepreneurial solutions could help solve some of the world's biggest problems. This requires the bridging of societal and market situations so vastly different that they seem to represent different historical eras altogether.

In the fifth article, **Benoit Montreuil, Jean-François Rougès, Yan Cimon, and Diane Poulin** provide a tangible vision of a physical future environment of global business creation, in the digital era. Their article on a physical internet and business model innovation manifests, in writing, the inspiration, insight, and impact of their EBRF 2011 Global Academic Cup award winning presentation. The future is ours to make; the choices are there. We can concentrate on administration of what exists or creation of what can be imagined.

In the sixth article, **Mila Hakanen and Aki Soudunsaari** remind of the importance of committed individuals to the success of global business creation. Given how multiple border-crossing competences are required, it may well be that the gap between theory and practice, within this domain, is simply too wide. Through their examination of trust within high-performing teams, their research highlights the importance of this factor when co-creating networks for global businesses.

In the seventh article, **Roman Wong and Shirley Ye Sheng** dig into the dynamism between consumer buying decisions and engagement in word-of-mouth communication. Social networks offer great foundations for global business creation, but online engagement does not convert to cash flow automatically. Their system-dynamics approach to this topic pushes the envelope in online commerce.

None of the seven articles introduced above could cover the "neglected domain" of global business creation on its own. Moreover, some of them only marginally address global business creation. However, put together, the seven articles open an interesting window to the phenomenon at hand and, as such, hopefully attract additional attention to the theme as a practice and a domain of knowing.

About the Authors

Marko Seppä is "serial co-creator" and knowledge investor specialized in growth venture creation. He was apprenticed as venture capitalist by Panostaja Group, in Finland in the late 1980s. Since 1991, he has led the co-creation of three enabler organizations: FVC, a pioneering venture capital firm for the emerging markets of Russia and the Baltic countries; eBRC, an ambitious e-business research center for a local pilot of eEurope; and GVL Finland, a global venture lab experiment for University Alliance Finland. He holds an MSc in Management from the University of Tampere and a PhD in Corporate Strategy from the University of Jyväskylä. He is currently engaged in the co-creation of Global Enabler: A community, platform and factory of enablers of global business creation for problems worth solving.

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

From Business Administration to Business Creation: The Case of the Kalevala Global Business Creation School

Marko Seppä

> " *The greater the loyalty of a group toward the group, the greater* "
> *is the motivation among the members to achieve the goals of*
> *the group, and the greater the probability that the group will*
> *achieve its goals.*
>
> Rensis Likert (1903–1981)
> Organizational Psychologist

Are there any businesses left to administer? The question is of course rhetorical and aimed at underscoring how several societies are more severely in need of creators of new businesses than managers of established ones. And yet, nearly all universities only produce masters of business administration, at best. Apart from theoretical research about business creation, and the education of masters of such research, universities are generally not equipped to produce knowledge for business creation or to produce masters of business creation.

This conceptual article calls for a new, complementary approach to research and education, around the theme of global business creation. Due to the limitations and restrictions related to the traditions and practices of the science of business administration, where the means justify the ends, a new exploratory field coined as the "Art of Business Creation," where the end justifies the means, is being explored for some inspiration.

For a concrete solution, the concept of a globally distributed, enterprise-centric, entrepreneurial-faculty-driven, open-innovation-based, and social-media-empowered university entity is depicted in this article. It is a new-generation private-public-partnership and "Living Lab 2.0" referred to as Kalevala Global Business Creation School. The conceptualization draws from observations and action research during the Global Venture Lab Finland experiment at the University of Jyväskylä from 2007 to 2011.

Introduction

The University is the ultimate knowledge factory. Nations compete, among other things, on the quantity of academic and scholarly knowledge created. Research and development expenditure, as a percentage of GDP, is an established macro-level measure of innovation and so is the number of patents. The university system accounts for a lot of the quantity.

But what is the economic value of the knowledge and the "knowledgists" produced? There are measures, education, and support readily available for those who invent and publish – either patents or journal papers – but less such support for those who commercialize and turn innovative ideas, technologies, or processes into world brands. Should not The University produce knowledge and "knowledgists" that bridge theory and the real world within the business-creation domain as well?

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Even the greatest invention and research result is economically worthless, unless taken up. One critical competence of nations is their relative ability to turn inventions into new products and services, new lines of business, and entirely new enterprises, even entire industries. No nation can create sustainable new businesses without creative, bold, motivated, and determined individuals. And yet, no such university programs exist that would produce doctors of business creation who can actually "cure patients".

This conceptual article depicts a concrete solution: the concept for a globally distributed, enterprise-centric, entrepreneurial-faculty-driven, open-innovation-based, and social-media-empowered university entity – a new-generation private public partnership and "Living Lab 2.0" – referred to as Kalevala Global Business Creation School. The conceptualization derives from observations and action research around the Global Venture Lab (GVL; gvl3.com) Finland experiment at the University of Jyväskylä (jyu.fi/en/), from 2007 to 2011. In 2010, the term "Art of Business Creation" was coined by GVL Finland as a new domain needed to complement the science of business administration.

GVL Finland set out to enable the solving of big ecological and societal problems via university-based growth venture creation. This was sought after by integrating research, education, and innovation – and working on a vision of universities as one global business-creation platform. In the process, the role and nature of university faculty had to be re-evaluated, and the concept, criteria, and forms of knowledge reconsidered. Important encouragement and inspiration was received from interaction with various representatives of the Finnish Funding Agency of Innovation and Technology (TEKES; tekes.fi/en/) and the European Institute of Innovation and Technology (EIT; eit.europa.eu) and with the co-founders of the University of California, Berkeley (berkeley.edu) coordinated Global Venture Lab Network, between 2007 and 2011.

Philosophical Foundation

As per GVL Finland terminology, global business creation is herein defined as "the determined (joint) action of various stakeholders to swiftly and maximally realize recognized global business opportunities by fully utilizing the vehicle value of incorporation." Overall, this article subscribes to the sentiments of The Kauffman Thoughtbook (2011, tinyurl.com/72rfxtu): "to

think differently and turn creative insights into practical, sustainable solutions".

In this article, entities, especially business firms, are viewed as the vehicles of their owners. According to our point of departure, the responsibility of the owners for the success of a venture is undividable. Luckily, we say, ownership can be divided – even if this should not be approached lightly. In this article, ownership is thought of as "venture parenthood" with a clear distinction made between active and passive shareholding. Whereas founding owners are thought of as biological parents and other active owners as step-parents, passive shareholders are thought of as anonymous "donors" of sorts, at best. Venture capitalists are step-parents dedicated to rapidly preparing venture babies, those both willing and able, for the cold world of faceless donors. Whereas natural persons are, by definition, limited to two biological parents, ventures – importantly – have no such limitations.

Even if owners carry an undivided responsibility for venture success, they typically have to limit their absolute decision power, over time, by allowing for contractual arrangements with various stakeholders, such as customers, employees, financiers, and subcontractors. Owners often also appoint representatives in their stead, for example, as members of the board and CEO. Nonetheless, companies and organizations, and their actions and doings, are viewed herein as the footprints of their owners aimed at fulfilling their interest, mission, or purpose. The mission can be clear or unclear, open ended or short term, direct financial, indirect strategic, or social but it is – at any rate – always set by the owners as "venture parents".

This article draws from the paradigm building around venture-to-capital (V2C) or knowledge investing and more recent work on the "who-do" framework (eBRC, 2006; tinyurl.com/7plzhmw). Originally, this work is rooted in the corporate strategy literature and the interest in linkages between ownership and strategy (Seppä, 2000; tinyurl.com/87acfec). Therein, understanding the global dynamism between who (exactly) owns an entity and what it can do – in order to maximize success – is the focus.

Based on the literature referred to above, Figure 1 illustrates the four main owner categories of growth ventures, referred to as the "principal venture parents". The principal venture parents are divided into those

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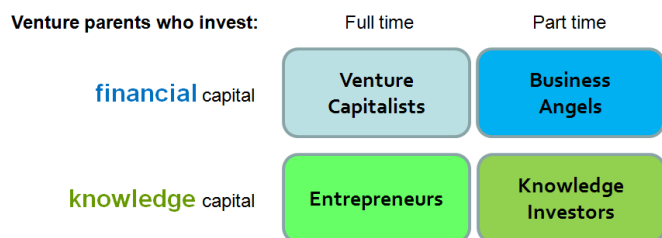
Figure 1. The main categories of venture parents

gaining their parenthood by primarily investing financial capital and those primarily investing knowledge capital. The former group of venture parents builds the bridge towards passive shareholders who do not interfere with "parenthood". An interesting archetype for a venture parent is a venture capital firm that is fully managed by salaried employees.

The roles of entrepreneurs and venture capitalists as well as business angels have received due attention in the literature, which is also reflected in economic policies. The full potential of actors referred to as knowledge investors is yet to be discovered. Kalevala Business Creation School would focus on maximally utilizing this potential.

Methodologically, this article leans on action-research methods where scholars are themselves participants and actors in the phenomenon under investigation. At an extreme, such scholarship requires a double competence, practical as well as academic. Consequently, the best action scholars and educators challenge the popular claim: "Those who can't do business, teach it". To be sure, the desire to tackle this punchy claim is written deep in the "DNA" of Kalevala Global Business Creation School.

From Business Administration to Business Creation

One hundred years ago, scientific management gave the answer to the question of how to organize for economies of scale and the heyday of industrialization. The functions of management and classic disciplines of business administration became well anchored and defined over the course of the 20th century. The classic functions are still being underscored by business schools that are producing masters of business administration all over the world.

What would Frederick Taylor – the "father of scientific management" (tinyurl.com/yuqhv9) – prescribe for the metal workshops with decreasing order books or the paper industry facing a world of ecological pressures? He might see the vast opportunities vested in empowering each individual – from employees to all other stakeholders – within a company's reach. He might ponder how to increase everyone's "knowledge investment" and passion for the company mission – how to engage everyone in (business) creation, rather than subject them to (business) administration.

To equip graduates with what it takes to create businesses in the Google era, The University is expected to renew itself, and the business school, accordingly. There is a call for ever more ambitious – and ever more creative, holistic, and global – university programs. The call is for approaches that (factually) integrate education, research, and innovation (i.e., the knowledge triangle) around business creation into dynamic, multidisciplinary, open-innovation-based, real-life experiments, referred to as "Living Labs" in Europe.

The whole world talks about innovation. Innovation is "the word". But what is innovation; what is it made of, essentially? Innovation is great ideas with proven economic value. Put bluntly, innovation is a commercialized invention. Many who talk about innovations effectively talk only about inventions or technological inventions, to be more precise. Very few talk about the commercialization end of innovation.

It appears to be somehow noble to deal with invention and somehow lowly to deal with commercialization. The former creates something new, we easily think, and the latter steals it away by charging the maximum a customer can pay – not the minimum needed for production. The former captures the essence of capitalism, the latter of socialism. Both require management and can benefit from professional business administration.

In the words of a frustrated rocket scientist colleague: "Hey, come on, business creation is not rocket science". Indeed, in our words, it is more complicated than that. Rocket science is connecting "compatible dots" under the rationality and logic of natural science. Business creation increasingly involves connecting "incompatible dots": systems far more complicated than in rocket science, namely human beings, time,

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money, machines, a good day and a bad day – "minds and matter" – and all this across vast cultural and physical barriers.

There is call for ever more deeply interdisciplinary foundations from academia, by the society at large, for ever more intimate – bolder, deeper, and ever more creative – interaction with practitioners of both established and emerging companies. Such new programs are under way in several universities around the world.

Kalevala Global Business Creation School

The objective, herein, is to conceptually depict a new breed of university entity: a globally distributed "business creation school". This is not something better or more important than the classic business administration school, but something supplementary. The entity is named "Kalevala" as a tribute to the Finnish national epic (tinyurl.com/yedcg8), which builds on the power of knowledge and knowledgists over swords and muscles and the quest for a machine of eternal wellbeing, instead of a source for world dominance, as the end goal. The term "global" stands for the challenge to create a globally shared business-creation platform.

The conceptualization of the "Kalevala Global Business Creation School" draws from the GVL Finland experiment from 2007 to 2011 (gvl3.com) and the eBRC program from 2001 to 2005 (ebrc.fi). While eBRC was a research intermediary leaning on a triple-helix model and the integration of business, university, and government, with emphasis on research, GVL Finland was a business-creation exercise integrating the three corners of the knowledge triangle, namely research, education, and innovation, with emphasis on education. Going forward, it is only logical that the emphasis will be on innovation (or business creation).

Kalevala subscribes to open-innovation thinking, but with the creation of businesses and the launching of new ventures at core, it is fuelled by the concept of knowledge investing (or V2C investing), which is of kin to sweat-equity investing. The fact that business creation requires co-creation by an ever-larger and dynamically evolving body of owners, rather than a single principal or a small team, does not make ownership unimportant. It makes it all the more important and all the more complicated to handle. The complicated linkage between the source and ownership of an invention versus the value of commercialisation (business creation) effort, and the split of eventual proceeds is to be respected and attended at all times.

There are four key inputs and four key outputs in the Kalevala process, as illustrated in Table 1. In the subsections that follow, each input and each output is briefly introduced.

Input 1: Faculty – from a bottleneck to enabler
The faculty members of the Kalevala Global Business Creation School are practicing business creators themselves and represent scholarly backgrounds (i.e., academic disciplines) across the board. They study and teach business creation by creating businesses, as co-entrepreneurs to practicing entrepreneurs and each

Table 1. Inputs and outputs in the Kalevala process

Inputs	Outputs
1. Global partnership between faculty (profs, doctoral students and lecturers)	1. New products, businesses, and enterprises (as research outcomes)
2. Dedicated students in each committed university location	2. Willing and able co-creators of global businesses and enterprises
3. Curious inventors and entrepreneurs (as live case material)	3. Great global enterprises that solve "big problems"
4. Practitioners and corporate partners (as knowledge and resource investors)	4. Return on investment for every involved person

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other, continuously and across all borders. Importantly, this new breed of faculty bridges all existing domains (and silos) of knowledge with the real world, thereby turning faculty, at large, from a bottleneck to enabler.

Input 2: Students – from passive learners to "dream labour"

One cannot learn without motivation. This holds true for business creation, in particular. Even in no-tuition university environments, students can be turned from passive to energetic, heavily engaged action learners by offering them real-life challenges and special ownership-related responsibilities and incentives. The curiosity, creativity, and energy reserves of students can turn them into "dream labour" and Kalevala Global Business Creation School into a "dream factory".

Input 3: Entrepreneurs – from single mothers to networked parents

The Kalevala Global Business Creation School offers entrepreneurs a globally distributed Doctor of Business Creation (DBC) program whereby they can explore ways and forms of shared venture parenthood in an experimental environment at, nevertheless, market terms. Also entrepreneurs that are not interested in pursuing their own DBC can offer their ventures as live case material and participate in the shared venture-parenthood programs. This helps entrepreneurs transform from single mothers to networked parents.

Input 4: Executives – from mentors to co-entrepreneurs

The Kalevala Global Business Creation School pools individual executives for a new role and capacity: that of knowledge investors. The school offers the busiest of professionals precision in terms of use of time and effort and most lucrative risk-return prospects. The executives are also offered opportunities to engage the organizations they represent in global business creation as resource investors. Overall, this expands the scope of alumni and other professional participation, in university-based business creation, from mentors to co-entrepreneurs.

Output 1: Products and businesses as research outcomes

On the ground level, the Kalevala Global Business Creation School produces new products, businesses, and enterprises as basic research outcomes. Even if the aim is always for world-class businesses, there is no guarantee that any hugely successful enterprises will emerge. Instead, tolerance for failure must be guaranteed. A significant level of trial and error is needed to enable the second, far more important output.

Output 2: Willing and able global business creators

The Kalevala Global Business Creation School produces "battle-tested", willing, and able co-creators of global businesses. This is a level where a world-class standard can be achieved from the get-go, regardless of the level of actual business success with the bottom-level output, described above. The possibility to experience and learn from failure is, in fact, more important than business success, on the bottom level. The participating universities can supply their home regions and enterprise environments with globally connected, ready-to-go business creators.

Output 3: Great global enterprises

All action in the Kalevala Global Business Creation School is targeted at producing great global enterprises, ones that solve Big Problems. While it is not imperative that such solutions emerge, it is all the more likely that this will happen. The pressure is off, but every passion is on. All the resources of this globally distributed community, platform, and factory of business creators and the knowledge they need, is always targeted to the most promising target ventures, across all borders.

Output 4: Return on investment for every involved person

For each global growth venture success story produced by Kalevala Global Business Creation School, return on investment will be distributed to every involved person. The guiding principle is globally shared parenthood of all ventures and, even if some (locally leading) individuals will always own, contribute, and receive far more than the others, everyone will have a small slice of everything.

Discussion and Conclusions

Rapidly growing companies and the jobs they create are the lifelines of contemporary societies around the world. While basic manufacturing and other labour-intensive domains still work for Asia, societies in America and Europe must move further upstream. While market orientation saves a lot for America, Europe faces an ever tougher challenge. We must move upstream in both the intensity of business knowledge and in mindset quality.

All said, one should wonder why there is no university domain focused on producing growth venture creators and the type of knowledge they need to create great enterprises. Universities do have research on growth ventures, and professors of such research, and they do educate more such researchers, but few universities

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produce "clinical doctors", individuals willing and able to co-create global growth ventures. Universities do have the best practice of bringing in entrepreneurs-in-residence, but this is only a quick fix and saves universities time from having to actually accept new, uncomfortable traditions.

In our time, universities could offer a globally distributed doctoral program in growth venture creation, one that produces "doctors that cure patients" in market conditions and on a shared enterprise platform. Such new breed of students would produce unique theses (of art, rather than science), while co-creating live case ventures across all borders and barriers, as co-entrepreneurs together with business creation professors, in a process open to wider such education and subject to such knowledge creation where the end justifies the means, complementing the tradition where "the means justify the ends".

To be sure, there are no internal pressures or any natural evolution that would cause universities to change the status quo. The demand for the universities to produce growth venture creators and "doctors of business creation" by professors who themselves "cure patients", in extreme action learning and action research environments, is increasingly voiced by the industry and policymakers, all over the world. But the willingness and ability of the universities to change, from within, is hypothetical only. Masters of business administration may theoretically understand that we need masters of business creation, but they have a hard time depicting how, and by whom, such masters could be produced in practice and – more importantly – how, and by whom, not.

History will be made by the decision makers and universities who dare to lead us in this new space. With reference to how global the playing field of growth venture creation has become, and how imperative it would be to build this "new domain of knowledge" on a globally shared enterprise platform, this takes more than a standard appointment of new professors. To learn and teach global growth venture creation, they have to do it.

About the Author

Marko Seppä is "serial co-creator" and knowledge investor specialized in growth venture creation. He was apprenticed as venture capitalist by Panostaja Group, in Finland in the late 1980s. Since 1991, he has led the co-creation of three enabler organizations: FVC, a pioneering venture capital firm for the emerging markets of Russia and the Baltic countries; eBRC, an ambitious e-business research center for a local pilot of eEurope; and GVL Finland, a global venture lab experiment for University Alliance Finland. He holds an MSc in Management from the University of Tampere and a PhD in Corporate Strategy from the University of Jyväskylä. He is currently engaged in the co-creation of Global Enabler: A community, platform and factory of enablers of global business creation for problems worth solving.

Collective Value Creation and Empowerment in an Online Brand Community: A Netnographic Study on LEGO Builders

Hanna Kurikko and Pekka Tuominen

> " *Online communities are not virtual. The people that we* "
> *meet online are not virtual. They are real communities*
> *populated with real people, which is why so many end*
> *up meeting in the flesh.*

<div align="right">

Robert Kozinets
Professor of Marketing
Author of *Netnography* (tinyurl.com/7eoklae)

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Online communities are becoming "places" of belonging, information, and emotional support that people cannot do without. These social groups have a real existence for their participants, and thus have consequential effects on many aspects of behaviour. This article examines collective value creation and empowerment in an online brand community. It presents the main features of an online brand community, the process of value co-creation, and motivators for participating in online brand communities. These key factors jointly characterize collective value creation and empowerment. This netnographic study focuses on an online brand community called BrickBuilders, which is a meeting place for LEGO builders in Finland. BrickBuilders' members feel a sense of belonging, they share similar motivations, and they create value together.

Introduction

A brand community can be formed by any group of people who share a common interest in a specific brand and who create a parallel social universe rife with its own myths, values, rituals, vocabulary, and hierarchy (Muniz and O'Guinn, 2001: tinyurl.com/d73sov4; Cova and Pace, 2006: tinyurl.com/ccp6jy3). Brand communities become more than a place. They become a common understanding of a shared identity, which can be found in both face-to-face interactions and in cyberspace (Muniz and O'Guinn, 2001).

Analysts no longer question whether the concept of community should have a place in the domain of marketing (Cova and Pace, 2006). However, the concepts of *brand community* and *online brand community* are relatively new and have yet to find their place in the academic world.

Traditionally, companies produced products relatively independently. Today, consumers and other stakeholders can create value more collectively. The purpose of this article is to describe and analyze collective value creation and empowerment in an online brand community.

Main Features of Online Brand Communities

Muniz and O'Guinn (2001; tinyurl.com/d73sov4) used three constructs to identify the distinguishing features of brand communities. First, a sense of belonging is a connection that members feel toward one another and the collective sense of difference from others outside of the community.

The second feature is the presence of shared rituals and traditions that surround the brand. Rituals and traditions perpetuate the community's shared history, cul-

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ture, and consciousness. Traditions include certain behavioural norms and values.

The third feature is a sense of moral responsibility, which is a felt sense of duty or obligation to the community. The sense of moral responsibility is what produces collective action.

Heinonen and Halonen (2007; tinyurl.com/cl8qwwb) have identified motivators for online brand community activities. Members want to belong to something, build and strengthen their identities, get feedback from others, and create something new.

The Process of Collective Value Creation

Schau and colleagues (2009; tinyurl.com/bsh984y) have identified the process of value co-creation in online brand communities. The process consists of four thematic practices, which are social networking, impression management, community engagement, and brand use.

Social networking is a practice that focuses on creating, enhancing, and sustaining ties among brand community members. These include welcoming, empathizing, and governing. These practices operate primarily in the intangible domain of the emotions and reinforce the social or moral bonds within the community.

Impression management includes evangelizing and justifying. Online brand community members act as altruistic emissaries and ambassadors of good will. Members devote time and effort to the brand, share the news of the brand, and inspire others to participate in the community.

Community-engagement practices are those that reinforce members' escalating engagement with the brand community. These include staking, milestoning, badging, and documenting. Staking, milestoning, and badging mean that community members bring out brand experiences and proclaim openly that they are fans of a particular brand. Documenting occurs when brand community members construct a narrative of their brand experiences.

Brand-use practices are specifically related to improved or enhanced use of the focal brand. These include grooming, customizing, and commoditizing. Grooming means that members share, for example, homemade tools and advice. Customizing means modifying existing ideas and discovering new ideas, which result in customized products. Commoditizing means that members rant or chastise some products, but at the same time, they have new ideas on how those products could be developed.

Synthesis of the Theoretical Framework

The main features of online brand communities, value co-creation, and motivators for participating in online brand communities (Heinonen and Halonen, 2007: tinyurl.com/cl8qwwb; Kozinets, 2010: tinyurl.com/7eoklae; Muniz and O'Guinn, 2001: tinyurl.com/d73sov4; Schau et al., 2009: tinyurl.com/bsh984y) are the key factors that jointly – realized in various combinations – characterize collective value creation and empowerment in an online brand community. The collective value creation and empowerment in the online brand community may occur when its members have a sense of belonging, they create value together, and they have similar motives.

The collective value creation and empowerment of the online brand community allows mutual interaction between the online brand community and the company as well as other stakeholders. Companies have an opportunity to communicate with consumers and influence their opinions (Kozinets, 2010; tinyurl.com/7eoklae) and vice-versa. We have moved away from one-way transactions to a relationship-based interaction model that emphasizes consumers' and other stakeholders' roles in networks and communities. Figure 1 illustrates the process of collective value creation and empowerment in an online brand community. This provides a theoretical framework for this study.
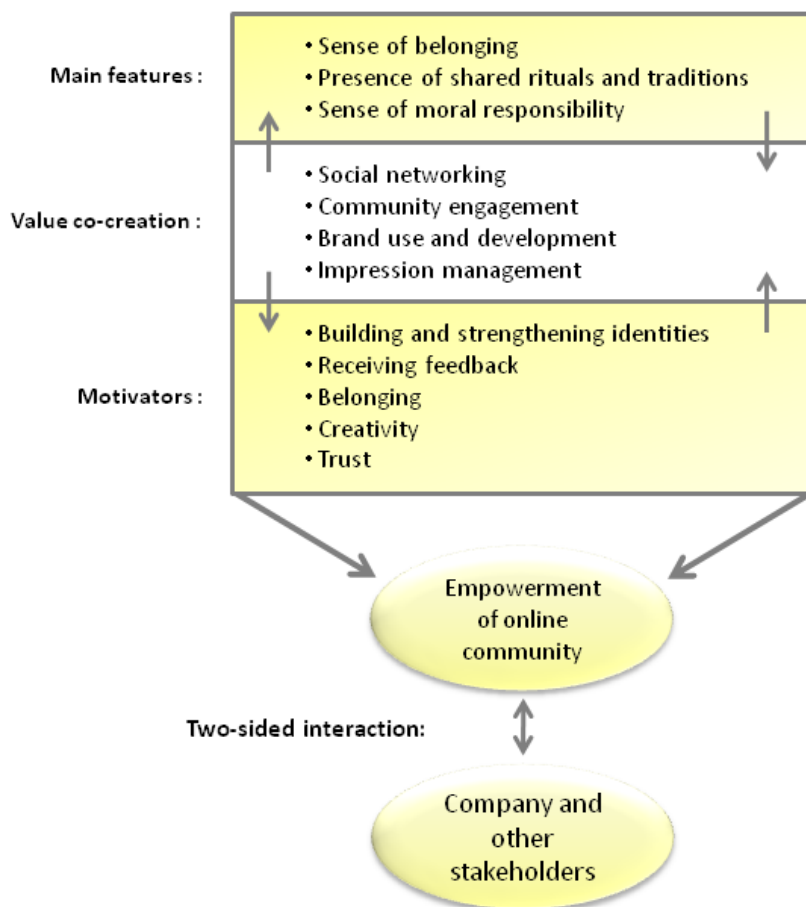
Conducting the Netnographic Study

Netnography is "a new qualitative research methodology that adapts ethnographic research techniques to study cultures and communities that are emerging through computer-mediated communications" (Kozinets, 2002; tinyurl.com/7sb92xl). The netnography method is about observing participants in online contexts (Kozinets, 2010: tinyurl.com/7eoklae; Rokka, 2010: tinyurl.com/6v7b4sn). Some of the most important standards of quality in netnography are immersive depth, prolonged engagement, researcher identification, and persistent conversations. (Kozinets, 2006: tinyurl.com/7j92tjp; Muniz and Schau, 2007: tinyurl.com/84kudob).

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Main features:
- Sense of belonging
- Presence of shared rituals and traditions
- Sense of moral responsibility

Value co-creation:
- Social networking
- Community engagement
- Brand use and development
- Impression management

Motivators:
- Building and strengthening identities
- Receiving feedback
- Belonging
- Creativity
- Trust

Empowerment of online community

Two-sided interaction:

Company and other stakeholders

Figure 1. The process of collective value creation and empowerment of an online brand community

In this study, the object is an active online brand community called BrickBuilders (Palikkatakomo; palikkatakomo.org). It is a meeting place for LEGO builders in Finland. The community is fully fan-based and is not sponsored by the LEGO company. As of April 2011, BrickBuilders had 350 members. The community's website had over 12,000 postings, almost 900 threads, and 10 different subject categories in the forum.

BrickBuilders was observed from November 2010 to the end of April 2011. In this study, 1,035 different postings that contained 197 distinct poster names were analyzed. The researcher also received 32 personal mails and participated regularly in BrickBuilders' activities: posting comments, asking questions, and receiving feedback from members, thus gaining sense of membership. During the research, there was an opportunity to visit the LEGO company with members of the community and the researcher attended the ModelExpo 2011 event,

where BrickBuilders had a stand. Those events made it possible to speak with BrickBuilders' members personally, and 11 interviews were conducted.

For data analysis and iterative interpretation of findings, the researcher used manual analytic coding and hermeneutic interpretation (Bernard, 2004: tinyurl.com/7ltq5wm; Kozinets, 2006: tinyurl.com/7j92tjp; Kozinets, 2010: tinyurl.com/7eoklae; Moisander and Valtonen, 2006; tinyurl.com/cgrc4gn).

The researcher's subjective interpretation is a major challenge to netnography and the data analysis. The form of data is mostly textual. Moreover, the amount of data that can be found online is immense. In order to interpret the data correctly, the researcher must possess knowledge of that particular online culture (Kozinets, 2006; tinyurl.com/7j92tjp).

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In this study, the feelings and tone of the texts are being analyzed in the same way as words. The researcher tried to read beyond the postings to find the true meaning of the texts. Within a textual reality, the anonymity that is sometimes advantageous for obtaining disclosure prevents the researcher from having confidence that she understands the discloser (Kozinets, 2006). In this study the researcher met BrickBuilders' members and went places where community members had meetings. These face-to-face meetings helped increase the reliability of the interpretations.

Main Features of BrickBuilders

This study into BrickBuilders showed how the three features of brand communities and value co-creation (i.e., a sense of belonging, shared rituals and traditions, and a sense of moral responsibility) occur in practice and what motivates people to participate in an online brand community.

In BrickBuilders the sense of belonging, the most important element of brand communities (Muniz and O'Guinn, 2001; tinyurl.com/d73sov4), is based on shared enthusiasm for LEGO. BrickBuilders feel an important connection to LEGO, but at the same time they feel a strong connection toward like-minded people.

BrickBuilders offers a place for LEGO discussions, spreading LEGO related news, and sharing new ideas and opinions with like-minded people enabling collective value creation. This sense of belonging, or "we-ness", motivates members to join BrickBuilders (Heinonen and Halonen, 2007; tinyurl.com/cl8qwwb).

In BrickBuilders, support from the community is not limited to LEGO as a hobby. The members have learned organizational skills, cooperation, trust, and courage as well. This community has also influenced its members' identities, and contributions to identity have been identified as motivators for membership in online brand communities (Heinonen and Halonen, 2007: tinyurl.com/cl8qwwb; Bagozzi and Dholakia, 2006: tinyurl.com/7qftu4v).

BrickBuilders has shared rituals and traditions that perpetuate the community's shared history, culture, and consciousness and include certain behavioral norms and values (Muniz and O'Guinn, 2001; tinyurl.com/d73sov4). BrickBuilders' members are interested in LEGO's history and old narratives associated with the brand. Older members greet and assist new members in their brand learning and community so-

cialization (Muniz and O'Guinn, 2001; Schau et al., 2009: tinyurl.com/bsh984y); they encourage new members to read the rules and instructions for the online forum, help others constantly, and take an active part in a variety of actions in the community.

A sense of moral responsibility (Muniz & O'Guinn, 2001) is felt in BrickBuilders. The members have two missions: i) integrating and retaining members and ii) assisting other members in the proper use of LEGO products. Active members have a need to raise Brick-Builders' profile. The forum contains user-generated promotional material and new members are being actively recruited at events such as ModelExpo. The members help and advise others every day in the forum.

Collective Value Creation in BrickBuilders

The process of value co-creation consists of four thematic practices, namely social networking, impression management, community engagement, and brand use (Schau et al., 2009; tinyurl.com/bsh984y). Each of these practices can be identified in BrickBuilders.

Social networking is a practice that focuses on creating, enhancing, and sustaining ties among brand community members. BrickBuilders has been praised by new members for its positive welcoming and good overall team spirit, including governing the community by rules. BrickBuilders offers emotional and practical support to people sharing similar interests. It includes support for product-related issues such as customizing and creating new LEGO structures. The members are interested in receiving feedback (Heinonen and Halonen, 2007; tinyurl.com/cl8qwwb) from like-minded fans that truly understand the art of LEGO building. Members also support each other in non-brand-related life issues such as illness or bullying.

Impression management means that community members act as ambassadors of goodwill (Schau et al., 2009; tinyurl.com/bsh984y). However, in light of this study, the definition for "impression management" does not fully describe BrickBuilders' practices. Impression management in BrickBuilders can viewed as having internal and external components. This view should be a topic for further studies.

Internal impression management occurs inside the community. Members share news about LEGO in the forum, inspiring others to use the brand. One of Brick-Builders' active members is a LEGO Ambassador (tinyurl.com/86e5qns), who maintains communication

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between LEGO hobbyists and the LEGO company. Impression management may also involve negative comparisons with other competing brands and "pirate" bricks.

External impression management has two concrete factors. First, all writing in the forum creates impressions of BrickBuilders to all readers, both registered (private) and unregistered (public). Hence, correct language and good behaviour are essential. The second important factor is common events. Events are used, for example, to recruit new members and attract media attention.

Community-engagement practices reinforce members' commitment to the brand community. The members of BrickBuilders bring out brand experiences and confess openly that they are fans of a particular brand. For example, view the "Best in Show" video (tinyurl.com/7vfq65k) from a BrickBuilders exhibition. Members actively participate in community discussions, in events, and through self-motivated promotion efforts. The community is capable of organizing and building a large stand full of structures made of LEGO bricks. Activities are organized mainly via the BrickBuilders forum, the Skype communication system (skype.com), and the Doodle scheduling platform (doodle.com). Members travel great distances to take part in these events. After every event, feedback is collected about what went well and what kind of things they need to improve for future events; this is a form of collaborative learning.

Further collaborative learning can be related to LEGO products (i.e., building, creating) or to everyday skills such as cooperation, teamwork, and identity construction. Members share advice and ask for help from other members.

Brand use and development practices are specifically related to improved or enhanced use of the focal brand (Schau et al., 2009; tinyurl.com/bsh984y). Modifying the products and generating new ideas is one of the major activities in BrickBuilders. For example, one member developed a computer-based service called Basebrick (basebrick.com). This service helps LEGO fans to keep an inventory of the number and types of bricks that they own. The developer received help and advice from BrickBuilders' members during the development process. The ambassador project is another example of this type of activity. Advice and interactions between members also can be related to issues such as washing LEGO bricks or insuring a LEGO collection.

BrickBuilders' members develop and share novel ideas with other members and with the brand owner, relating to how the products could be developed (Schau et al., 2009). BrickBuilders' active members act as a liaison between LEGO hobbyists and the LEGO company. This kind of feedback is very valuable to the LEGO company.

BrickBuilders' Collective Value Creation and Empowerment

BrickBuilders' members feel a sense of belonging, they create value together, and they share similar motivations. The online brand community helps members to share their hobby and interests with congenial and like-minded people. Feedback and new ideas for improvement have been reported to the LEGO company via BrickBuilders. Thus, BrickBuilders can be considered to be a collectively creative and empowered online brand community.

The community's collective value creation and empowerment does not automatically lead to bidirectional communication with the company or other stakeholders. However, BrickBuilders' activity allows such cooperation in which both BrickBuilders and the LEGO company are willing to develop the relationship further. The company's investments in BrickBuilders are still limited. The community members would be motivated to have even more active collaboration with the LEGO company, which could pay more attention to this potential channel of marketing and cooperation.

Conclusions

Based on our research, we found evidence of intensive activity and positivity within an online community called BrickBuilders. The community members share their LEGO enthusiasm and mutual support. This sharing encourages the members to spread their skills and ideas actively throughout the community. A hobby of nearly professional LEGO building, which non-members may see as even slightly strange, further strengthens the bonds between members. The sense of belonging, strong motivation, and value co-creation are keys for empowerment.

An important note is that BrickBuilders is a fully fan-based community that is not affiliated with the LEGO company. Instead, BrickBuilders is born out of the fans' joint interest in the LEGO world. Being an open online community, the everyday conversations, events, and innovations organized and developed in BrickBuilders

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can be easily monitored by the LEGO company. The ideas being cultivated within the community could prove very significant to LEGO's research, development, and marketing. The potential benefits to the LEGO company are strengthened by the intense passion the members show in the LEGO world.

In general, companies and their stakeholders should use the experiences and ideas born within online communities. Companies already have access to large amount of data arising daily from these communities. This data should be used more actively and courageously. Companies should explore the communities and other online sources to learn how their actions, services, and products are being received. Co-operation between companies and active communities could prove to be surprisingly beneficial.

The target of the modern marketer is to enhance collective value creation between different stakeholders. A one-sided monologue is not sufficient. Brand communities allow mutual dialogue, further strengthening the community-company relationship and offering community members new opportunities. Online communities provide real and significant opportunities for marketing.

About the Authors

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Ecosystem Under Construction:
An Action Research Study on Entrepreneurship in a Business Ecosystem

Marikka Heikkilä and Leni Kuivaniemi

 " *All great things are based on a series of small things, and all* "
the small things need hard work.

Kimmo Rauhala
Growth venturer and entrepreneur
Owner of Suomen Liikunta-apteekki
(Finnish Sport Pharmacy)

In recent years, we have seen increasing interest in new service concepts that take advantage of the capabilities of business ecosystems instead of single companies. In this article, we describe how a business ecosystem begins to develop around a service business idea proposed by an entrepreneur. We aim to recognize the different domains of players that are or should be involved in the ecosystem while it is under construction. The article concludes with an ecosystem model consisting of six sub-ecosystems having different change drivers and clockspeeds.

Introduction

Today, we see a lot of new services and innovative business ideas that mix the traditional boundaries of business sectors and of companies. Innovations can be found in the form of new products or services, cost-reducing process improvements, or innovative business models and methods. Many practitioners point out that it is rather easy to come up with new ideas, but the real challenge is in putting them into practice. This task is especially demanding when innovations occur outside the exclusive control and the supporting mechanisms of traditional business firms (Muegge, 2011; timreview.ca/article/495). Instead, an ecosystem consisting of multiple expertises, capabilities, and resources should be created around the innovation.

In our previous studies (Heikkilä, 2010; tinyurl.com/346kgel), we observed that the expansion of a business ecosystem follows a process of collaborative business modelling consisting of two parallel processes: i) the systematic analysis, improvement, and adjustment of a business model and its components and ii) the organizational change-management process. That is, at the same time as the business model is being developed, a substantial amount of effort has to be put into change management, to select the collaborators and escort the partners to harmonize the network strategy, to synchronize its operations, as well as to evaluate the feasibility of the operational business model. In this article, we concentrate on the very first tasks of change management, setting the scene, and selecting the players. We explore how an ecosystem evolves through a case study of physical activity prescriptions. The aim is to recognize the different domains of players that are or should be involved in the ecosystem under construction.

The remainder of the paper is organized as follows. In the next section, we review the existing literature on business ecosystems. Thereafter we present the case study and draw some conclusions from the case. We end the article with a summary, contributions and limitations of this study, and concluding remarks and suggestions for future work.

An Action Research Study on Entrepreneurship in a Business Ecosystem

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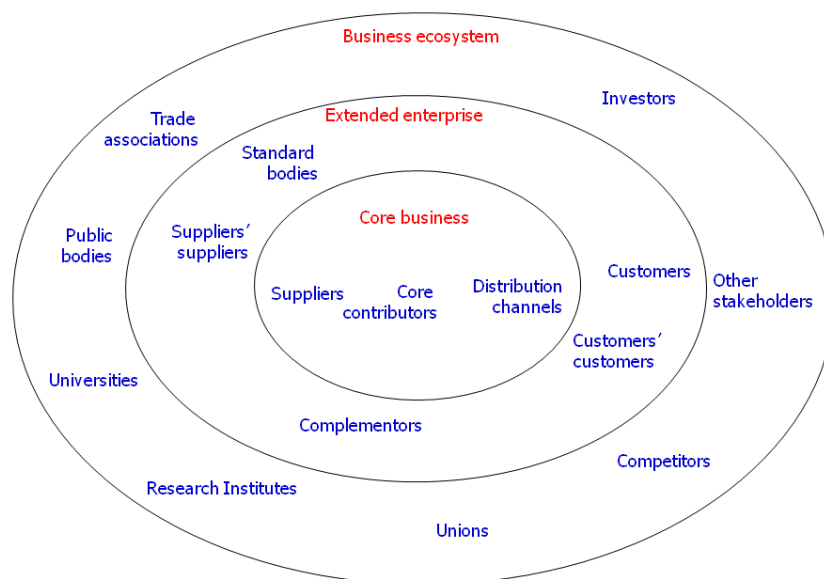
Relevant Research on Business Ecosystems

Recently it has become quite common to conceptualize business networks by comparing them to biological ecosystems (Iansiti and Levien, 2004a; tinyurl.com/bvn8zkv). Similar to a biological ecosystem, a business ecosystem is formed by large, loosely coupled networks of entities. These entities such as firms, organizations, entrepreneurs, etc. interact with each other and the health and performance of each actor is dependent on the health and performance of the whole. That is, the actors are simultaneously influenced by their own capabilities and their interaction ties with the other players in the ecosystem (Håkansson and Ford, 2002; tinyurl.com/bwq298m). The trend of many firms looking for new opportunities beyond their existing industry explicates (Solaimani et al., 2010; tinyurl.com/czoh69o) that contemporary ecosystems are not restricted to any single industry but cross a variety of industries (Moore, 1993; tinyurl.com/cygzy6o).

Perhaps the major difference between the concepts of business ecosystems and business networks is in the variety of actors. Typically, business networks are considered as groups of firms co-operating in designing, producing, and delivering products to customers. Business ecosystems, in turn, include partners and subcontractors but also complementors, competitors, customers, and potential collaborator companies, as well as public bodies, local incubators, investors, and

even research institutes and universities (Moore, 1998; tinyurl.com/7cghul7). Each ecosystem typically encompasses several domains that it shares with other ecosystems. It is expected to have a heterogeneous structure, with actors adopting dramatically different roles that influence different aspects of the stability and productivity of the whole. This especially is the case when complex knowledge is needed and the sources of expertise are widely dispersed (Powell et al., 1996; tinyurl.com/6t4btal).

Innovative ideas may come from large corporations or organizations, but often they are suggested and pushed forward by entrepreneurs, or in spin-off companies. Many of the seeds of new businesses die young, but perhaps are revitalised at some later date when more fertile ground is available – this includes an ecosystem that supports the growth. As Iansiti and Levien (2004b; tinyurl.com/7t4xgvn) point out, it is merely an academic exercise to try to draw the boundaries of an ecosystem. Instead, it is more helpful to recognize the types of organizations or players that should be involved in order to provide a suitable environment for new business to prosper.

Moore (1993; tinyurl.com/cygzy6o) describes a business ecosystem as consisting of layers (Figure 1), which correspond to differing levels of commitment to the business. The core business layer consists of the parties forming the heart of the business. In traditional busi-

*Adapted from Moore (1993; tinyurl.com/cygzy6o)

Figure 1. The layers of a business ecosystem*

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ness, this layer would be run by a single company or the supply chain would be coordinated by the focal company. Alternatively, it can also be formed by a network of several companies each taking care of part of the core business. The next layer, the extended enterprise, widens the view of the business supply chain to include the customers, complementors and second-layer suppliers, as well as standard-setting bodies in the particular field of business. The outermost layer adds trade associations, unions, universities and other research bodies, investors, and stakeholders to the business ecosystem. Even though they are perhaps not directly involved in the business operations, these parties may have a significant effect on the success of the business.

Pragmatic, Abductive Action Research

"Fighting Low Activity by Business Creation" (LA; fighting la.com/research) is a research project focusing on preventing health problems that typical of Western industrialized countries (e.g., obesity, Type 2 diabetes) by developing significant global export service products based on Finnish expertise in the domains of health, exercise, and well-being. These service innovations are turned into new service and e-business models that are exploited by a network of new ventures and corporations, and they are spread with help of the supporting ecosystem. This ecosystem is expected to have a significant impact on public health.

Our research method is action research (tinyurl.com/2rarbb), where researchers actively participate in the business decisions by producing knowledge for the ecosystem players. Whereas other research methods seek to study organizational phenomena but not to change them, the action researcher is simultaneously studying the phenomenon and creating organizational change (Heikkilä, 2010: tinyurl.com/7f2g6ze; Aspegren et al., 2011: tinyurl.com/cn2sxwp).

Action research is an established research method in social sciences, and it builds on a pragmatist philosophy (Baskerville and Myers, 2004 tinyurl.com/8xqaeos). In pragmatism, the investigator and the research object are assumed to be interactively linked so that the findings are literally created as the investigation proceeds (Guba and Lincoln, 1994; tinyurl.com/bl4kgyh).

As action researchers, we are actively taking part in building the supporting ecosystem that we call an Ecosystem under Construction (EuC), which is the object of the study described in this article. We aim to make purposeful use of propositions, models, or theories,

and to question whether they are useful in practice "in the sense of helping people to better cope with the world or to create better organizations" (Wicks and Freeman, 1998; tinyurl.com/bt23uno).

Our theoretical reasoning is moving back and forth between empirical discovery and theory in abductive manner (Paavola, 2006; tinyurl.com/cg26esw). Even though it has been heavily criticized, abduction is seen as a method to test new ideas or to make sense of new situations (Richardson and Kramer, 2006; tinyurl.com/cblzcmq), which is the case in the creation of an ecosystem. The original theoretical framework is successively modified, partly as a result of unanticipated empirical findings, but also because of theoretical insights gained during the process (Dubois and Gadde, 2002; tinyurl.com/d9bu5vb). By helping to create the EuC, which combines partners and researchers with previous knowledge and understanding from several complementing areas, such as business, law, information systems, sports, and medicine, the ecosystem can help to provide new theoretical explanations and practical methods to find potential cures for the western world's problem of meagre physical activity.

Case Study: Physical Activity Prescriptions

The case example examined in this article is "physical activity prescription", a service innovation in preventive healthcare. The idea of boosting the physical activity of patients with prescriptions had been suggested by several researchers in the late 90s. The first pilots were carried out by public instances (marked as Phase 0 in Figure 2). The adoption of the sports prescriptions however, died down after the public financing ceased.

Phase 1 presents the new start, where the development is driven by an entrepreneur who has invested a lot of time in creating and promoting a business model requiring close collaboration of several companies. Figure 2 illustrates how previously the ecosystem consisted of mainly the most outer layer: universities and research institutes working with several unions and associations. In Phase 1, the ecosystem-building started from the core, with partners from a university and a funding institute. Phase 1 is led by an entrepreneur who has years of experience in the field and has knowledge of the research projects on physical activity prescriptions. Even though physical activity prescriptions have been trialled before, this business proposal is the first one that also gives financial incentives for the companies to provide the service.

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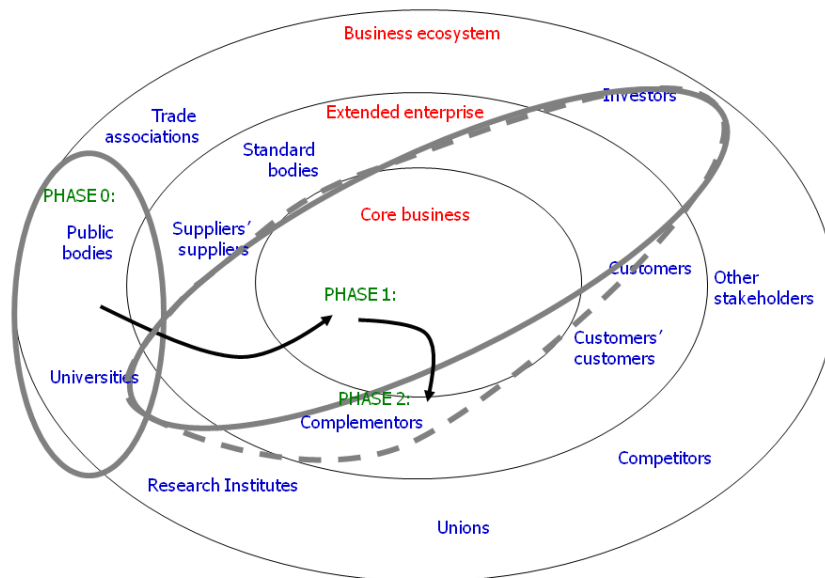
Figure 2. Evolution of the case ecosystem

Key players

The entrepreneur built the core of the around a network of companies. He saw that three parties are needed to guarantee the viability of the business:

1. Private medical clinics

2. Pharmacies

3. The entrepreneur's own company

Well-known private medical clinics provide credibility and critical mass. Initially, there were several prospects for the core partners, and those that had the most interest in the business idea were met in person. After negotiations, the leading private medical centre in Finland, Terveystalo (terveystalo.com/en/), was selected as a core contributor. Its core assets are doctors and a large customer base: the company has over 2,000 practitioners providing occupational healthcare in more than 150 locations. It also has the customer contacts of companies that purchase occupational health services for their employees. This relationship provides a good fit with the planned business model in which occupational healthcare patients are considered to be the most important segment of the new service. The role of the medical clinic in this business is to prescribe physical activity to its patients, especially within occupational healthcare.

Easy access and continuance of customer relationships can be guaranteed via pharmacies located near the customers. In Finland, there is at least one pharmacy in each community; in most communities there are multiple pharmacies. Most of the pharmacies are privately owned. The activities of pharmacies are controlled with licences provided by The Finnish Medicines Agency, a central administrative agency operating under the Ministry of Social Affairs and Health. Currently the majority of pharmacies' turnover comes from prescription drugs, but most pharmacies are seeking business opportunities to provide additional services. Pharmacies seem to have a good chance of success with their new strategy because a recent survey shows that customers are highly satisfied with pharmacy services (Apteekkariliitto, 2010; tinyurl.com/bo5omlf). After negotiations, a chain of 64 privately owned pharmacies, Avainapteekit Ltd. (avainapteekit.fi) joined the team. Their task in related to physical activity prescription is counselling and ongoing measurement of the improvements in the physical health of the patients.

The entrepreneur's own company (Finnish Sport Pharmacy) coordinates the operations. Whereas in previous experiments the researchers and public instances were leading the formation of the ecosystem, in this case the leader is the entrepreneur. His company is focusing on exactly those issues pointed out in previous trials as the most critical to success. The entrepreneur plays the

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main role in the creation of a fluent process that fits with the daily practice of practitioners and customers. He will provide an electronic prescription system that makes this process possible. He will also provide training to the doctors and pharmacists, which is needed for this new service. Also a large pharmaceutical company in the Finnish prescription and OTC (over the counter) market, ratiopharm Oy (ratiopharm.fi), is committed to helping train practitioners.

Business model

The "value add" in the new business model does not come from automation of the processes but from an entirely new process consisting of tasks carried out in multiple organizations. The process starts at a medical clinic, where the doctor prescribes medicines and physical exercise to the patient suffering from "wealth diseases". As the patient goes regularly the pharmacy for the medicine, the pharmacist measures their physical health and provides advice on how to improve it further. These measures are also available to the doctor when the patient is coming to the next check-up.

The business model requires information systems that facilitate and support this process (Mooney et al., 1996; tinyurl.com/cau7sbc). Currently, there are no information systems or measurement equipment in place that would transfer necessary information between the partners. That is why Phase 2 of the ecosystem-construction process, which is now underway, involves business

negotiations with information systems providers and health monitoring equipment suppliers. Information technology is actually the major cost issue to solve before a proof of concept can demonstrate whether the business model is fiscally sound. For proof of concept, a minimalist prototype or pilot is needed to demonstrate how the business idea will play out in the real world and why all the core companies are needed to provide the services.

Ecosystem sub-sectors

In this case study, based on previous literature and on workshops where the business model was discussed, we added the actual names of the potential players to Figures 1 and 2. Currently, the challenge in boosting the growth of the ecosystem is how to recognize who are the next actors or areas that should be contacted and involved in collaboration. To overcome this challenge, it is useful to divide the ecosystem map into differing subsectors as we have done in Figure 3. The sectors are recognized from business modelling literature. Business model articles typically list external forces that affect the success of the business. These forces include competition/co-opetition, policies and the legal environment, social or technological change, research insights, and changes in customer demand (Nalebuff and Brandenburger, 1996: tinyurl.com/7jjllcb; eFactors, 2002: tinyurl.com/cyv3jxo; Hoffner et al., 2004: tinyurl.com/7a72l3s; Osterwalder, 2004: tinyurl.com/cx9smc7).
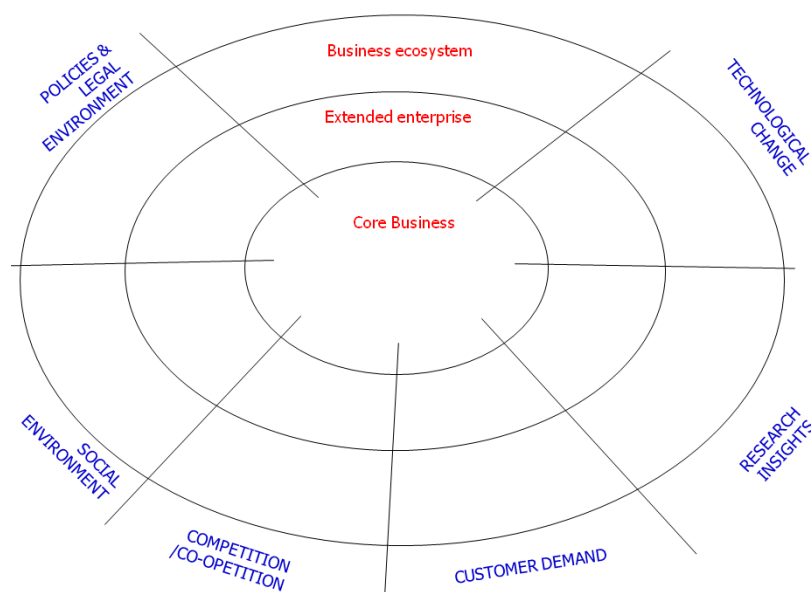

Figure 3. Sub-ecosystems within the business ecosystem

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Each of the ecosystem sub-sectors shown in Figure 3 is described in greater detail below, in the form of implementation advice for business leaders attempting to construct similar business ecosystems:

1. Technological change: Perhaps the majority of new business models build on technology or information technology. Decreasing information and communication costs make totally new processes and ways of working possible. In addition to proving new business possibilities, it also challenges the existence of current ones. Therefore, identify the potential technologies for your business and contact the suppliers.

2. Research insights: In addition to the business aspects, the ecosystem should attract research. The salience of the symbiotic relationship of business and research may be seen in Silicon Valley (Sydänmaalakka, 2011; tinyurl.com/d8c64bo). Take the time to read major research articles on the topic of your business and contact those researchers; they can help to locate suitable collaborators within the universities or other research institutes.

3. Changes in customer demand: Consumption patterns and "fashion" are examples of changes in customer demand. High adoption rates of social media is a good example of social change that might provide new possibilities. Customer co-creation is increasingly adopted to gain knowledge on the changing demand.

4. Competition/co-opetition: One of the main pressures comes from competitors. In order to survive, your product or service must be cheaper, better, or quicker than that of your competitors. However, sometimes collaboration with your competitors might be needed to execute your business model. Competitors, for instance, might have some specific knowledge or capabilities that you do not have or wish to invest in. Be brave and try to turn your competitors into co-opetitors.

5. Social change: Changes in work practices, processes, culture, and social mood in general might have an effect on the business. Changes in attitudes on environmental issues, technology adoption, or outsourcing to low-cost countries can affect the business. Collaboration with various kinds of associations and societies helps to keep track of social change.

6. Policies and legal environment: Legal issues are something that you must always take into consideration. For example, be aware of the differences in work regulations between countries. New privacy laws can make the use of some business models illegal. Many times, it pays to find out the legal restrictions at the beginning so you take them into account when building the ecosystem.

We suggest that when considering the expansion of the ecosystem, one should carefully consider all the six sub-ecosystems recognised in Figure 3 and plan in what order the sectors should be covered. Our research so far has already revealed that there are significant differences in the clockspeed of the sub-ecosystems and this should be taken into account in planning. The clockspeed characterizes the general velocity of change in the sector and the pace of the firms' internal operations (Mendelson and Pillai, 1999; tinyurl.com/d9ov3cz). It can be measured by the rate at which new products, processes, and organizational structures are introduced. We have tentatively placed the sectors in their clockspeed order: the fastest is the technology sector and the slowest is policies and legal environment. This has practical implications; the sectors where one is most likely to find actors that are willing to cooperate in new, innovative initiatives are the technology and research sectors. In contrast, because no quick changes are expected to accrue in legal and social environments, a business initiative can build on the current laws and social customs. However, one should always be aware of the status of preparations of new laws and policies, and act accordingly.

Conclusion

This article presents early results from an ongoing action research study on a business ecosystem. The business case examined is physical activity prescription, an innovation in the field of preventive healthcare. An entrepreneur is pushing the business initiative forward. His goal is to create a functioning business network consisting of companies that jointly provide health prescription services - profitably. Together with other actors that provide and co-create supplementary services, products, and research in cooperation with public institutions, these organizations form the ecosystem.

We suggest that the expansion of an ecosystem can be analysed and even perhaps planned by considering six differing sub-ecosystems: technology, research, customer demands, competitors, social environment, and legal and policy environment.

In the future, we will work to widen the case network together with the growth entrepreneurs, corporations, as well as by teaming with researchers from different

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fields. Thus, in the future, the business and research network will serve as a platform onto which the ecosystem is built one piece at a time. The use of this approach can be seen in its grander form in Silicon Valley, but whereas there it has developed over a longer period of time and without guidance, our aim is to proactively find the best-fitting components for the ecosystem to flourish.

The ecosystem is built on trust and benefit for all the participants. In the business world, the gains have to be measurable and arrive quite quickly. On one hand, this pressure creates challenges for action research, but on the other hand, it rewards the research team because we receive immediate feedback on our input. Our research hypotheses either work in a real market situation or they do not. If they do, our research will have wider meaning and impact for society both in terms of health and growth venturing.

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Developmental Impact Analysis of an ICT-Enabled Scalable Healthcare Model in BRICS Economies

Punit Saurabh, Bhaskar Bhowmick, Amrita, and Dhrubes Biswas

> " *Age considers; youth ventures.* "

Gurudev Ravindranath Tagore (1861–1941)
Noble Laureate, Poet, and Indian Freedom Fighter

This article highlights the need for initiating a healthcare business model in a grassroots, emerging-nation context. This article's backdrop is a history of chronic anomalies afflicting the healthcare sector in India and similarly placed BRICS nations. In these countries, a significant percentage of populations remain deprived of basic healthcare facilities and emergency services. Community (primary care) services are being offered by public and private stakeholders as a panacea to the problem. Yet, there is an urgent need for specialized (tertiary care) services at all levels.

As a response to this challenge, an all-inclusive health-exchange system (HES) model, which utilizes information communication technology (ICT) to provide solutions in rural India, has been developed. The uniqueness of the model lies in its innovative hub-and-spoke architecture and its emphasis on affordability, accessibility, and availability to the masses. This article describes a developmental impact analysis (DIA) that was used to assess the impact of this model. The article contributes to the knowledge base of readers by making them aware of the healthcare challenges emerging nations are facing and ways to mitigate those challenges using entrepreneurial solutions.

Introduction

Brazil, Russia, India, China, and South Africa (BRICS; tinyurl.com/3s7uxnn) form a conglomerate of the world's fastest-developing large economies. With the rising economic growth of the BRICS nations, the need for healthcare amenities has also grown by leaps and bounds. The challenge is to address the current healthcare issues of people living at the "bottom of the pyramid" in India and other emerging countries (tinyurl.com/3pdssv).

Health is a primary area of concern in BRICS nations, where services are not at par with developed nations. Governments in these nations have resorted to launching several customized health-centered programs and enhancing the basic healthcare infrastructure to bridge the gaps. Unfortunately, the issues relating to healthcare are too large to be addressed by governments alone. Health-service delivery in emerging nations, especially in a diverse country such as India, is under significant pressure. There is a lack of healthcare infrastructure, notably hospitals, primary healthcare facilities, and trained medical manpower (doctors, nurses, etc); there is also a lack of "affordable, available, and accessible" medical services and medicines. Rapid, uncontrolled urbanization and an overdependence on conventional business processes have made the existing healthcare-delivery model in India non-scalable in non-metro and rural areas (Sharad et al, 2011; tinyurl.com/82gemb5).

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In India, most of the existing healthcare infrastructure consists of government-supported facilities, Accredited Social Health Activists (ASHA) and individual Registered Medical Practitioners (RMPs), mostly located in smaller towns and rural areas. Primary healthcare support is delivered through a constellation of over 146,000 public healthcare centers and around 4200 community healthcare centers. The Ministry of Health and Family Welfare (mohfw.nic.in) also supports many mid-level hospitals with variable capacity between 50 to 500 beds, as well as district headquarters. Most of the private-sector health infrastructure is located in larger towns and cities. This has forced the smaller city, towns and villages to rely more on government facilities and hospitals with low to medium levels of support services available.

A potential solution to this healthcare challenge is a delivery system based on a unique health-exchange system (HES) model that is scalable and affordable to its users to a considerable extent (Biswas et al. 2010; tiny url.com/6ou6o4g). The term "health-exchange system" is similar to an Indian employment-exchange system (tiny url.com/6vn43du), which provides a platform for the registration of unemployed youths, useful information, routing government training, and supported programs and employment opportunities. In the case of the HES, the model not only provides a platform for the exchange of useful health information, but it also delivers the requisite diagnostic, medical, emergency services required by patients at a nominal charges. Similar such health-exchange organizations exist elsewhere, such as in the United Kingdom (healthexchange.org.uk).

The idea behind the HES was to create business opportunities, infrastructure facilities, and employment opportunities in healthcare, all while providing the targeted population with the required healthcare support. The HES is in tune with Government of India's vision of fostering a grassroots, bottom-up approach to innovation and development and to arrive at healthcare solutions for local problems that are sustainable and scalable (Pande, 2012; tinyurl.com/ce942pc). The next part of the article provides background on the HES, followed by a description of the developmental impact analysis on the model.

The Health-Exchange System

The HES is a low-cost, scalable healthcare delivery model designed to serve the semi-town and rural areas of West Bengal, India. The HES model was inaugurated in 2009 and is currently operational at eight locations. It involves an innovative healthcare architecture consisting of health kiosks and is strategically located in semi-urban and rural areas (Sharad et al., 2011; tinyurl.com/82gemb5). The model is spread across tertiary towns and cities far from the reach of mainstream medical facilities but close to the targeted users, who are generally secluded from healthcare infrastructure. The kiosk model is considered inexpensive; it provides several emergency facilities at low cost. Medicines, vital medical measurement devices (e.g., blood pressure and blood sugar meters, electrocardiography and ambulance services are available for the benefit of patients at the kiosk.

The HES is based on an innovative business-process concept which was conceptualized by professors and students of the Indian Institute of Technology Kharagpur (iitkgp.ac.in) under the platform of the Society of Social Entrepreneurs (SSE; sseglobal.com). SSE is a not-for-profit body that brings scalable healthcare services and insurance to people living at "bottom of the pyramid". It established the entrepreneurship-driven HES with intention to provide "global solutions to local problems".

The HES uses a hub-and-spoke architecture, which increases the accessibility of healthcare for the masses without compromising on quality (Amrita et al., 2009; RVIM Journal of Management Research, vol 1:41-56). It consists of a super-specialty hub hospital surrounded by a constellation of 'health technology business nodes". These health technology business nodes are commonly referred as "health kiosks" (see Figures 1 and 2). The technology business nodes or kiosks become focal points for creating a business infrastructure

Figure 1. Outside a typical HES kiosk West Bengal, India

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Figure 2. Inside a typical HES kiosk in West Bengal, India

of medical, ambulance, diagnostic, and referral facilities. They also provide emergency healthcare services, maternity services, pre-natal and post-natal services, epidemic response services, etc. At times, these kiosks are also used for immunization, public health awareness, and other related services.

The HES also has alliances with pharmaceutical companies, insurance providers, medical service providers (e.g., hospitals and nursing homes), and educational institutions such as the Indian Institute of Technology Kharagpur for mentoring. These partners help provide accessible and readily available quality healthcare at affordable costs.

The HES model contains three subsystems:

1. Hardware: client tools, servers, mobile access points, etc.

2. Software: database management systems, enterprise resource planning architecture, simulated workflow software and operating systems, optimized health information systems, cloud computing, etc.

3. Manpower: entrepreneurs, researchers, doctors, and academics

The HES model embodies the concept of "equity ownership of entrepreneurs" to deliver public health ser-

vices to tertiary towns and cities, and it utilizes private enterprise network platforms supported by the SSE. The HES is designed to establish a unique and vigorous health delivery network at low cost; the kiosks offer innovative and essential health-centric services.

Developmental Impact Analysis

To scale up the HES model, early feedback for evaluation and path correction was needed in case a flaw in the model was detected. Therefore, a developmental impact analysis was conducted, which can predict the impact of a project before its implementation in the local community. A development impact analysis can also assess the post-development impact of a project on a community. According to Mary Edwards (2000; tinyurl.com/789anot):

> *"The DIA process makes use of existing information, where possible to determine potential impacts of a proposed development employing techniques to gather additional, new information, where necessary while providing a framework to integrate these data, models, spatial and statistical analyses and experiences in other locales to predict development impacts."*

For emerging nations, which have less resources and financial freedom to improve healthcare infrastructure, the development impact analysis assumes greater significance because it helps save precious resources. Thus, the analysis was particularly important for the HES model as it would enable stakeholders to assess the impact of future growth and assist with planning.

To conduct the development impact analysis, the research team visited eight health kiosks set up under the HES model in West Bengal, India. Researchers directly interacted with all the stakeholders of the HES, including the patients, doctors, kiosk owners, managers, and pharmaceutical and equipment suppliers. Particular attention was paid to studying the day-to-day working of the system and the means by which customers were attracted, services were provided, and feedback was received by the kiosk users. Reports generated by government agencies and internal reports relating to kiosks functioning and management were also analyzed.

The development impact analysis considered four key aspects, the results for which are described in the subsections that follow:

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1. Technical impact

2. Potential market

3. Fiscal impact

4. Socio-economic impact

Technical impact
Innovative healthcare products for the HES form an integral part of the business design architecture of the kiosks. A technical analysis of the instruments, devices, and components contributes to the overall aim of developing business architecture and intelligence for the HES.

Cloud-computing technology is used extensively to share resources securely within the network and to provide healthcare providers with flexible access to resources. The kiosks are also equipped with wireless communication devices and an IT infrastructure for basic healthcare facilities, emergency medicines, and testing services. The system installed at the kiosk monitors and delivers a patient's physiological readings to the hospitals and provides an alert mechanism triggered by the patient's vital signs. This information is linked to a medical practitioner's mobile device for analysis. Thus, a doctor can remotely access all the information needed to monitor a patient.

The kiosks also include multifunctional medical instruments that are integrated with Android-based devices (see Figures 3 and 4). Thus, medical data can be collected and relayed by the devices to a centralized database via the GSM mobile communications network (Sharad et al., 2011; tinyurl.com/82gemb5). Enterprise resource planning software (tinyurl.com/8yr9k) combines data from these devices with data provided by healthcare providers. The types of data these instruments can collect include electrocardiographs, blood pressure, pulse rate, plethysmographs, pulse-oximeters, and phono-cardio-grams – all integrated with a single mobile device (Tiyashi et al., 2009; tinyurl.com/7ostm4s). The device is portable, meaning it can be carried from the kiosk to a patient's house if needed. Although these devices are expensive, the implementation becomes cost effective through volume purchasing.

Potential market
Looking at the robustness of the model, we believe that it provides tremendous scope and value for money for several stakeholders. The HES model is not only applicable for developing nations in the BRICS region but for nations in Sub-Saharan Africa, Latin America, and the Asia-Pacific region as well. According to the Global Entrepreneurship Monitor (2010; tinyurl.com/77jakrk), there is a considerable percentage of Africans who intend to start their own enterprises and healthcare is one of the priority markets for them.

The socio-economic impact of the model and the resultant effect on participating stakeholders is also important. The model has an elaborate list of partners, including: the kiosk owner or the entrepreneur, registered medical practitioners (RMPs), doctors, hospitals, pharmaceuticals, and manufacturers of mobile
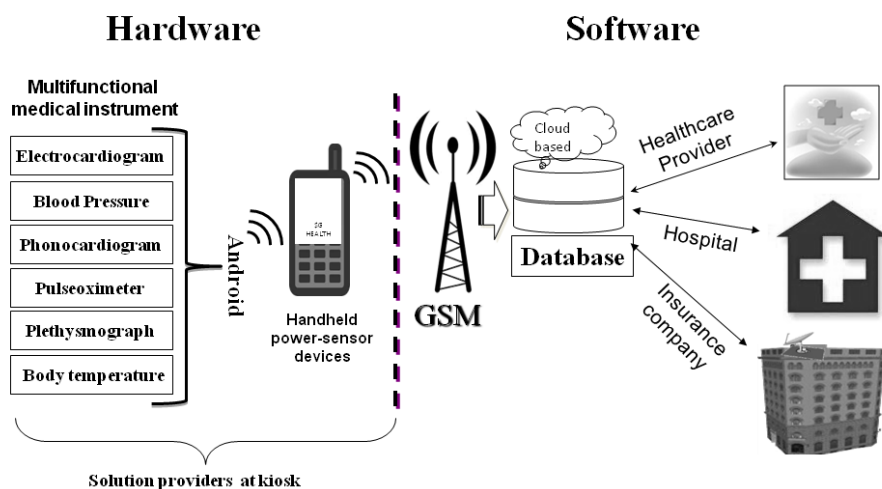
Figure 3. The hardware and software interface devices and architecture in the HES model

Figure 4. Examples of medical instruments available in an HES kiosk

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health devices. Innovators, academics, business providers, researchers, and health professionals can also benefit in their own way from the implementation of the HES model. The HES acts as a platform for associated stakeholders to sell their products and utilize the business opportunities available at the kiosk for their growth. The potential for growth is also high for those companies involved in medical and educational content development, making the HES model a market-friendly business proposition.

Fiscal impact
According to Edwards (2000; tinyurl.com/789anot):

> *"Fiscal analysis involves assessing the public service costs and revenues associated with the development. According to the researcher, such an analysis projects the net cost of the development on the fiscal balance sheet of the community. Since finance plays an important role in determining whether or not to proceed with a proposed development, fiscal impact analysis is a critical component of any development impact assessment".*

A properly conceptualized financial model helps generate larger profits, which allow improvement in health infrastructure. This directly impacts the social aspects of the model, thereby strengthening its foundation. Social profits increase inclusivity, which ultimately decreases the incremental operating expenses that are necessary for affordable price points. Further innovations help create a synthesis between branding, insurance price models, and scale-up strategies with a host of partners from healthcare industries as well as from hardware and software organizations. The fiscal impact analysis of the model helps us to understand the fiscal management side of the model implementation and its impact on the market and stakeholders. It is difficult to predict the ultimate financial model for a project before it has been implemented. A properly conceptualized and planned model helps reduce the risk to a considerable extent.

Socio-economic impact
A socio-economic impact analysis, according to Edwards (2000; tinyurl.com/789anot), measures the potential socio-economic impacts of a development and the changes occurring due to several factors. These factors include demographics, market analyses, public services, and employment and income levels, along with the aesthetic quality of the community. Thus, in order to provide and deliver appropriate medical care, effective planning and management of health services is essential.

The team involved in scaling up the HES is powered by members of the local population who are trained to become entrepreneurs with support from several agencies. The training was provided by the Indian Institute of Technology Kharagpur through the government-supported Technology Entrepreneurship Development Program (TEDP; tinyurl.com/7aozuc9), with handholding from the SSE. The emphasis is on a globally collaborated solution (i.e., following the doctrines of knowledge capital, co-creation and, co-entrepreneurship) by liaising with its partners in Finland (JYU) and the United States.(UCB) Apart from a cost-effective and scalable architecture for tertiary and secondary healthcare delivery, HES is pioneering the creation of the "highways to health" that are essential for all-inclusive economic development of emerging economies, which public funding has so far failed to create. The novelty of TEDP entrepreneurs and optimized global solutions through local involvement enables the HES to more efficiently deliver health services. The HES model has further invoked time-tested methods of microfinance and secondary business solutions to increase affordability for the participants. It has also led to a significant increase in network penetration.

The HES model has benefited its target customers and promoters to a considerable extent. The model provides a low-cost, private alternative that is delivered by local entrepreneurs. The model is co-created by global partners, with significant opportunities for several key players in the proposed "highways to health", spawning hundreds of micro-enterprises that will create rapid economic growth. The ensuing economic growth will ensure that major healthcare gaps in the local community are filled. So far, eight financially successful micro-enterprises have been created and several others are due to become operational shortly. Once the HES model is fully implemented in another five years from now, it will be able to create and sustain more than 5000 local jobs (direct and indirect).

Implications for BRICS Countries and Beyond

There is considerable scope to replicate the HES model in other BRICS nations and other countries. For example, the model has prospects in Africa and Latin America, which are vast and include many remote areas that are secluded from health care infrastructure. Russia has inaccessible places that hold a considerable population of elderly people that need substantial healthcare support. Similar such conditions exist in several parts of Scandinavia, central Asia, Europe, and America (notably Arizona, Colorado, and New Mexico).

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In such areas, there is a need to provide quick and effective healthcare services. These places can effectively be served through the scalable HES model. The model, while creating direct benefits in the local region, indirectly helps the community by creating business opportunities across all stakeholders.

Conclusion

The uniqueness of the HES model lies in its emphasis on affordability, accessibility, and availability, which has been realized through ICT-driven healthcare technology. Although healthcare is a priority sector for the Indian government, the major factor that motivates the mission to improve healthcare is the affordability of ICT. India has made remarkable progress in this regard and now holds the top rank in terms of the affordability of ICT in the "Global Information Technology Report" (INSEAD-WEF, 2012; tinyurl.com/88fpfjx). This progress has implications for the entire health sector because government and industry usage and emphasis on the affordability of ICT will benefit the health sector (Saurabh, 2012; tinyurl.com/7x4t9o5).

A review of existing literature shows that a development impact analysis has not been performed on a live, healthcare-based project, which adds a unique perspective to this article. While making an honest assessment of the model, the development impact analysis identified several issues that have a positive or negative impact on the stakeholders in terms of one or more related areas. This analysis thus helps us identify common issues that arise when implementing a project and solving its problems using a case-by-case approach. The article has also highlighted gaps in the literature, which help us understand how we can advance the theory and practice of the HES model in the context of BRICS and other nations.

On the academic side, the HES model has wider ramifications for prospective social entrepreneurs. Initially, the HES model was conceptualized as a joint research initiative of professors and researchers at the Indian Institute of Technology Kharagpur with limited academic output expected. Later, it became a multi-university collaborative effort under the Global Venture Lab platform (gvl3.com) with the University of Jyväskylä in Finland (jyu.fi/en/) and the University of California, Berkeley in the United States (berkeley.edu) as partners. The very fact that academic research initiatives can be tuned in with innovation to create a social enterprise model at a global scale is a success in itself.

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Punit Saurabh is a senior researcher from the Vinod Gupta School of Management at the Indian Institute of Technology Kharagpur. His research specialization includes entrepreneurship and innovation technology management. He is also a research partner at Global Venture Lab (GVL). He has played an instrumental role in the successful establishment and functioning of the DSIR-run TePP Outreach Center at IIT-Kharagpur, providing innovation funding support to individual innovators. At the Center, he has overseen the development and commercialization of more than 30 path-breaking innovations and the functioning of several other innovation and entrepreneurship support programs. As a mentor to startup companies, he provides expert advice and active support to several university-based startups.

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The Physical Internet and Business Model Innovation

Benoit Montreuil, Jean-François Rougès, Yan Cimon, and Diane Poulin

❝ *Amateurs discuss tactics; professionals discuss logistics.* ❞
Napoléon Bonaparte (1769–1821)

Building on the analogy of data packets within the Digital Internet, the Physical Internet is a concept that dramatically transforms how physical objects are designed, manufactured, and distributed. This approach is open, efficient, and sustainable beyond traditional proprietary logistical solutions, which are often plagued by inefficiencies. The Physical Internet redefines supply chain configurations, business models, and value- creation patterns. Firms are bound to be less dependent on operational scale and scope trade-offs because they will be in a position to offer novel hybrid products and services that would otherwise destroy value. Finally, logistical chains become flexible and reconfigurable in real time, thus becoming better in tune with firm strategic choices. This article focuses on the potential impact of the Physical Internet on business model innovation, both from the perspectives of Physical-Internet enabled and enabling business models.

Introduction

The way physical objects are moved, handled, stored, realized, supplied, and used throughout the world is not sustainable economically, environmentally, or socially. Trucks and containers are often half empty at departure and often return empty. Vehicles leaving loaded get emptier and emptier as their route unfolds from delivery point to delivery point. This inefficiency has a huge impact on the environment and on the profitability of both manufacturer and carrier. Products are mostly stored in networks of warehouses and distribution centres and are not available: i) quickly, ii) with low transportation costs, and iii) where needed. Products commonly travel thousands of kilometres, which can be avoided by making or assembling them much nearer to their point of use (Montreuil, 2011a; tinyurl.com/83guvh5).

Furthermore, critical variables such as costs, delays, and quality have a major influence on the design of value chains, thus acting as major constraints on business models. These constraints have a bearing on supply and how that supply is created. For example,

e-commerce websites and mass customization efforts are hindered in part by delivery costs as well as by the sometimes-prohibitive coordination efforts required to match production and the appropriate distribution channels.

In order to address all these issues, there is no choice but to change the fundamentals of logistics and supply chain management. The Physical Internet ( ) is a paradigm-breaking vision – inspired by the Digital Internet – that enables organizations to move and deploy physical products seamlessly though logistical networks like data packets move through heterogeneous equipment respecting the TCP/IP protocol of the Digital Internet in a way that is transparent to the user (Montreuil, 2011a; tinyurl.com/83guvh5).

The first section of this article describes key concepts of the Physical Internet. The second section proposes a framework of business model innovation enabled by the Physical Internet. The third section explores how the Physical Internet enables business models that are transient, yet robust.

The Physical Internet and Business Model Innovation

Benoit Montreuil, Jean-François Rougès, Yan Cimon, and Diane Poulin

The Physical Internet

The Physical Internet constitutes a path-breaking solution to the inefficiencies of traditional proprietary models (Montreuil, 2011a; tinyurl.com/83guvh5). It represents an open, global, interconnected, and sustainable logistics system. This system is based on standard containers that are easily transported through various transport means (e.g., planes, trucks, and also private cars). The containers move though distributed, multimodal transportation networks in which transit sites aggregate containers from diverse origins to optimize the loading on the next segments. Open warehouses and open logistics facilities are part of the network, enabling a global Logistics Web. As such, in order to clearly differentiate it from classical logistical activities, it is said to be -enabled as the Physical Internet goes beyond the development of agile networks known in the literature (Montreuil et al., 2000: tinyurl.com/6s7rwaw; Lee, 2004: tinyurl.com/8x4oqd3).

The Physical Internet spans four layers (Montreuil, 2011a: tinyurl.com/83guvh5; 2011b: physicalinternetinitiative.org), as shown in Figure 1. At the first layer lies a Realization Web for open distributed conception and manufacturing of objects. At the second layer is embedded a Distribution Web that serves to openly deploy encapsulated objects across territories and markets. The third layer involves seamlessly moving encapsulated objects though an open multimodal Mobility Web. Through these layered webs, the Physical-Internet-enabled Logistics Web can infinitely (re)combine, thus creating yet-unheard-of possibilities for business model innovation. To put the Physical Internet into a current, real–life context, consider the UPS logistics network – including trucks, planes, hubs and factories – as a closed, proprietary form of the Physical Internet.

A Key Driver of Business Model Innovation

Business models can be thought of as the way a company creates value in a competitive landscape (Magretta, 2002: tinyurl.com/78knpfc; Muegge, 2012; timreview.ca/article/545) and may be dynamic as value-creation patterns shift within and between firms (Mason and Leek, 2008; tinyurl.com/79gf2ys).

The Physical Internet is a key driver of business model innovation. In rapidly evolving industries, such as optical networking at the end of the 1990s, firms acquired in-
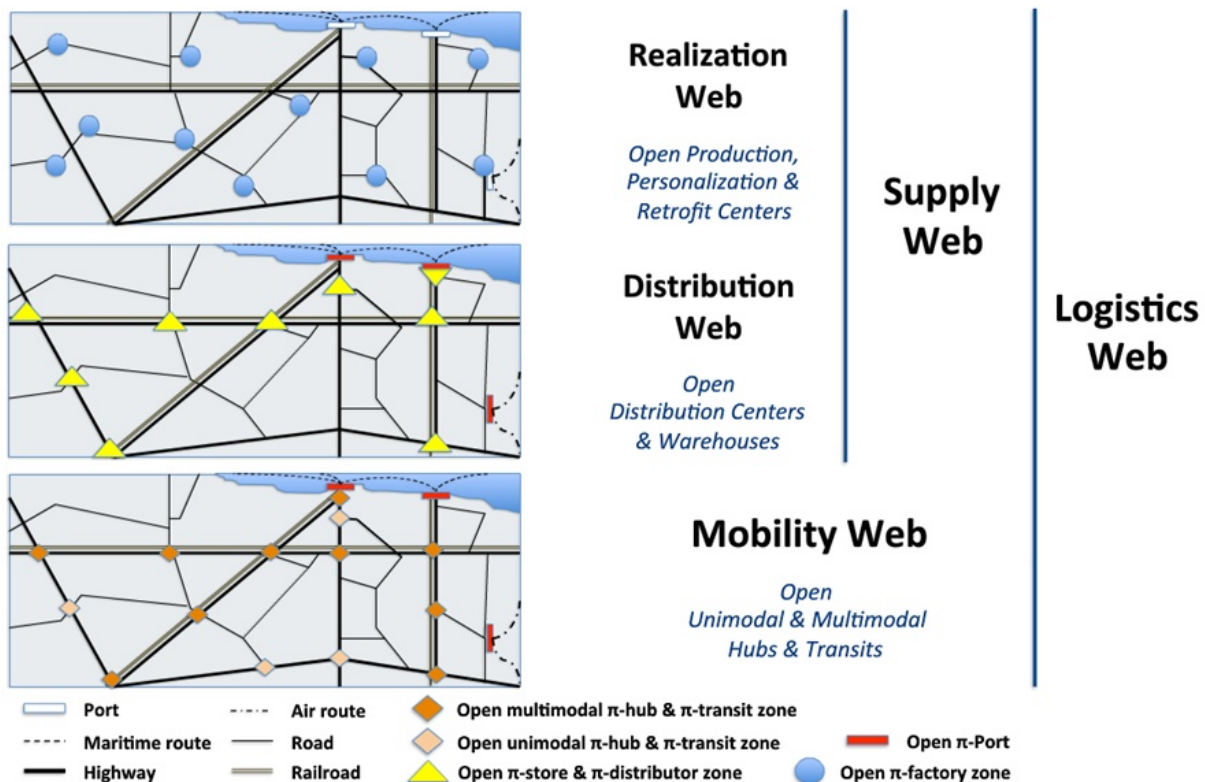

Figure 1. The four layers of the Physical Internet*

*Adapted from Montreuil (2011a: tinyurl.com/83guvh5; 2011b: physicalinternetinitiative.org)

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novative capabilities from the market (e.g., Carpenter et al., 2003; tinyurl.com/85galnr). Value can also be created from innovations that result from efficient knowledge transfer. For Chesbrough (2007; tinyurl.com/7sne52v), open innovation is an element to be taken into account in business models. The Physical Internet provides the framework to go beyond this view by enabling business model innovation and not just business models around specific types of innovation.

Past work by Linder and Cantrell (2000; tinyurl.com/848uj54) identifies four types of business models innovation strategies: realization, renewal, extension, and journey. These authors go on to specify that a realization strategy is focused on maximizing returns and suggests a level of operational excellence. A renewal strategy is based on the constant evolution of products and services while remaining true to an original model. An extension strategy adds new value-creating activities within the firms' value chain. Finally, a journey strategy focuses on major overhauls and transformation of the

firms' business model. Linder and Cantrell further suggest that, as a firm moves along that continuum, the changes become more transformational.

In the context of the Physical Internet, there are two important categories of firms: the -Enablers and the -Enabled. As depicted in Figure 2, while the former provides baseline infrastructural tools such as containers, vehicles, services, and software, the latter exploits the potential value creation induced by the Physical Internet to create value for the full range of stakeholders involved. This may be explained by the fact that value is co-created by firms that are now in a position to leverage their asymmetries, notwithstanding their respective levels of heterogeneity (Papadopoulos et al., 2008; tinyurl.com/7bzwnh2).

Figure 2 shows the relationships between -Enabler firms and -Enabled firms. The introduction of the Physical Internet will force firms to innovate. -Enabler firms provide the necessary physical and material infra-
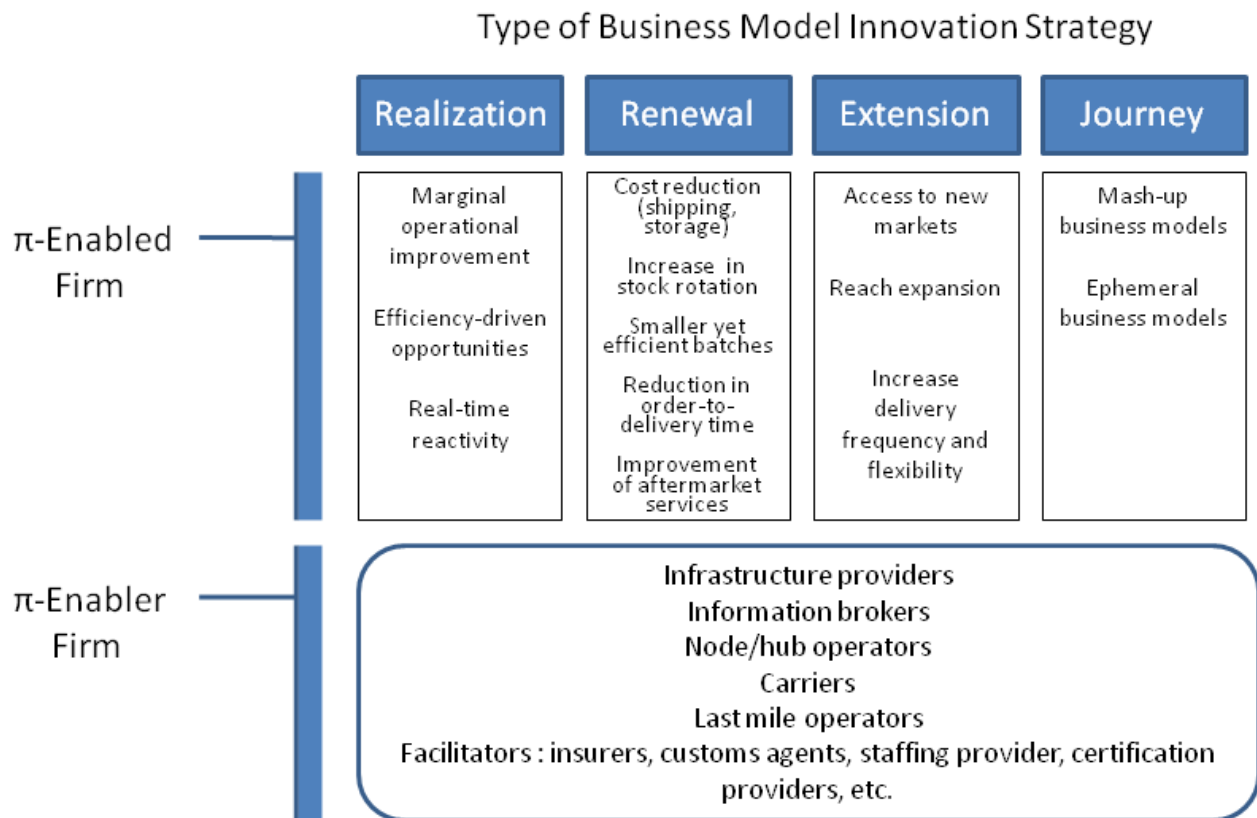
Figure 2. Implications of different types of business model innovation strategies for -Enablers and -Enabled firms*

*Adapted and expanded from Montreuil (2011a; tinyurl.com/83guvh5) and Linder and Cantrell (2000; tinyurl.com/848uj54)

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structure, including a full range of services. The stand-ardization that this suggests for the Physical Internet to be efficient (e.g., containers, vehicles, equipment) will transform current providers.

For example, one can imagine that car manufacturers will use standardized containers both for inbound supply purposes and outbound distribution purposes, thus altering (Renewal) their business model, which is highly dependent on trucking, in North America at least. This may lead them to adopt or devise radically different logistical solutions (Extension) or even to create new bundles of products-markets-services that go beyond car manufacturing (Journey).

By the same token, infrastructure providers will be strongly impacted. The Mobility and Distribution Webs discussed earlier mean that transit centres, hubs, distribution centres, and warehouses will be flexible nodes of an elaborate and flexible network that will transform the way cargo, storage, and routing will be done. Last-mile operations are then to be better customized for rural and urban deliveries that will prove less dependent on traffic patterns and population density. This may be done using a mix of public/private means, whether proprietary or not.

In turn, customs agents, insurers, logisticians, and information systems developers will be impacted as new services will become profitable despite a change in inter-mediation relationships that will provide for real-time optimization. As an early example Tri-Vizor (trivizor.com) introduces itself as "the world's first supply chain orchestrator". It "proactively designs and operates horizontal partnerships and collaborative communities among shippers by bundling and synchronizing freight flows across multiple supply networks".

Toward Increasingly Transient-Yet-Robust Business Models

Business models in the realization category have one option for change: a relentless drive toward efficiency and operational excellence. Business models focused on renewal will allow firms to go beyond the constraints imposed by their value chains. Manufacturers will have the opportunity to reduce the costs of supply, storage, and shipping, to minimize order-to-delivery time, and to develop reactivity. Retailers will improve the efficiency of their logistics flows, notably increasing stock-rotation frequency and in-store product availability, which are key success factors when small, customized batches are at the core of the retailer's competitive advantage.

Those engaged in extension-driven business models will cover an ever-increasing span of products and markets in an ever-increasing economically viable manner. Manufacturers will have the opportunity to reach new markets by increasing frequency, reducing constraints related to lot size, and reducing the cost of delivery. The mass customization of products will become easier thanks to the reduction of shipping costs and with the development of a distributed network of open factories, which will enable the creation of a more flexible and adaptive value chain. For their part, retailers will have the opportunity to open stores in new markets at the periphery of existing logistics networks, in areas that are not profitable in the current context. The development of smaller, "right-sized" shops will be profitable.

On another note, journey business models will be deployed in many ways. Figure 3 depicts two such ways: mash-up models and ephemeral models. First, mash-ups are a bundle of many consumer trends, with the impetus to mix existing elements, such as combining many branded elements in order to create a unique product that corresponds to an individualized experience. This type of business model is currently very complex to implement as uniqueness is harder to come by and often very costly. The Logistics Web enables small batches to be made at a lower cost and closer to customers, which is ideal for fragile or highly specific orders.

Ephemeral business models are characterized by mobility and customer experiences akin to those of pop-up stores. This model specifically addresses the need for a customer experience that is leading edge and strong. When a business adopts this model, it provides a highly tailored consumer experience. It renders small market niches very attractive because it does not require the wide proprietary infrastructure of classical department stores.

Nowadays, many business models coexist. The Physical Internet multiplies the opportunities for tailored models that simultaneously enrich customer's experiences and drive high-value creation for businesses to thrive from. By allowing efficient, seamless, open, decentralized and distributed mobility, distribution, production, and supply in tune with point-of-sale mobility and flexibility, the Physical Internet provides numerous opportunities for enhancing existing business models and designing novel business models. It can transform unprofitable or unreachable markets and ideas into attractive business opportunities.

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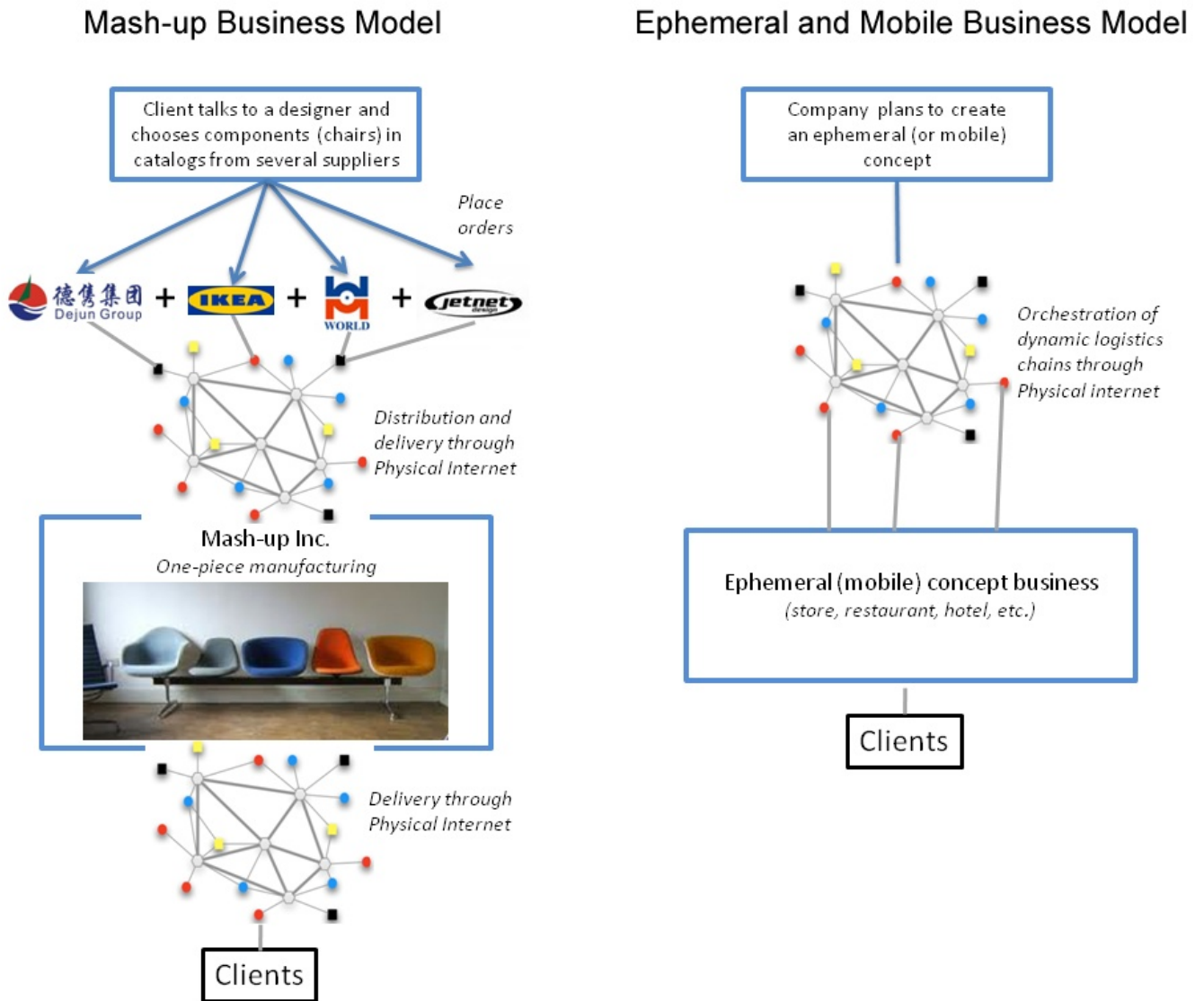*Benoit Montreuil, Jean-François Rougès, Yan Cimon, and Diane Poulin*

Figure 3. Mash-up and ephemeral business models

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Conclusion

Introducing a new infrastructure such as the Physical Internet generates an intense wave of innovative change in business models. Firms are now in a position to leverage their asymmetries in order to push further value creation (Cimon, 2004; tinyurl.com/73u97f7). Electricity and the Digital Internet were game changers just as the Physical Internet will be.

Thus, the Physical Internet will instil a change of several orders of magnitude as this infrastructure and business models will continue to influence one another. We face a revolution as radical as the Internet Revolution. "Brick and Mortar Firms" will seize on the occasion to improve on a spectrum that spans from improving on current business model to radically altering them, and a vast room of opportunities is opening for "start-up" entrepreneurs that are able to invent new ways to create value through the Physical Internet.

Further research on the topic is much needed. For example, there should be research focusing on the strategic role of communications and information technology when considering the morphology of business models (Cimon et al., 2009; Proc. Int. Conf. Industrial Eng. and Sys. Man.) and its alignment with strategy (Rouges et al., 2010; tinyurl.com/84bh9k9). There is also critical need for research pushing the frontiers of current business paradigms that would be challenged by a Physical-Internet-enabled world. For example, the Physical Internet could help with the introduction of efficient and sustainable cloud manufacturing and cloud storage in the material world (e.g. Montreuil 2011a: tinyurl.com/83guvh5; Xu, 2012: tinyurl.com/7wtonj8).

About the Authors

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Building Trust in High-Performing Teams

Mila Hakanen and Aki Soudunsaari

> **"** *Ultimately the evolution of how self-organizing teams evolve* **"**
> *into high-performance teams depends on mutual respect and*
> *trust of the members of the team.*
>
> <div align="right">Steve Denning
Author and consultant</div>

Facilitation of growth is more about good, trustworthy contacts than capital. Trust is a driving force for business creation, and to create a global business you need to build a team that is capable of meeting the challenge. Trust is a key factor in team building and a needed enabler for cooperation. In general, trust building is a slow process, but it can be accelerated with open interaction and good communication skills. The fast-growing and ever-changing nature of global business sets demands for cooperation and team building, especially for startup companies. Trust building needs personal knowledge and regular face-to-face interaction, but it also requires empathy, respect, and genuine listening. Trust increases communication, and rich and open communication is essential for the building of high-performing teams. Other building materials are a shared vision, clear roles and responsibilities, willingness for cooperation, and supporting and encouraging leadership.

This study focuses on trust in high-performing teams. It asks whether it is possible to manage trust and which tools and operation models should be used to speed up the building of trust. In this article, preliminary results from the authors' research are presented to highlight the importance of sharing critical information and having a high level of communication through constant interaction.

Introduction

In a global business, conscious team building is one of the key factors to success. It is better to have a first-rate team with a second-rate plan, than to have a second-rate team with a first-rate plan. Winning teams can overcome obstacles and react faster to changing surroundings. When building high-performing teams, one of the most essential aspects is trust.

In this article, we summarize the insights from the relevant literature and present early findings from a study focusing on enhancing the team building and trust between different parties involved in a business ecosystem. The main question of interest is: "What is the relationship between trust and team performance?"

Defining Trust

Trust is difficult to define. Ring and van de Ven (1992; tinyurl.com/72bz27v) define trust as "confidence in another's goodwill". Trust is a commitment to cooperate before there is any certainty about how the trusted people will act (Coleman, 1990; tinyurl.com/7qkkg8d). Adler (2001; tinyurl.com/7npfxzm) distinguishes three sources of trust: i) a calculative form of trust via assessment of costs and benefits; ii) familiarity through continuing interaction; and iii) values and norms that cultivate trustworthy behaviour. Fukuyama (1996; tinyurl.com/7qd3fpl) describes trust as arising from expectations of honest and cooperative behaviour. Thus, trust is expressed in the behaviour towards others (Costa, 2003; tinyurl.com/7p9s5nd). Trust also can be seen as a flexibility that turns up in dif-

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ficult circumstances (Ilmonen et al., 1998; tinyurl.com/ 7pbkhff). Trust is also based on the probability calculus where the emphasis is on advantages and disadvantages of an interaction (Tyler and Degoey, 1996; tiny url.com/7odewvl). Past experiences and interactions affect trust, which usually takes a long time to develop.

In this research, trust is considered as faith in others' behaviour and goodwill that can grow or vanish due to interaction and experiences. A lack of trust may negatively impact communication, delegation, empowerment, productivity, and results (Erdem et al., 2003; tinyurl.com/7ry3f5k). Trust is fragile and can be lost quickly through negative experiences. Larson and LaFasto (1989; tinyurl.com/7s2jdfq) argued that four elements are needed in trust building: honesty, openness, consistency and respect. Without one of these dimensions, trust can fray or even break.

Communication Supports Trust

Trust supports communication and vice versa. People share information voluntarily, and as a consequence of trust, people are willing to share ideas and information (Ståhle and Grönroos, 2000; tinyurl.com/6uza8gm). Interaction can be measured by the quality and extent of interaction. Varamäki and colleagues (2004: tinyurl.com/ 7og3hjo; 2006: tinyurl.com/6lrmw4u) have defined the optimum level of interaction, which includes genuine dialog in an open and responsive atmosphere of reciprocal respect. Unwillingness to share ideas or comments, weak social skills, and distrust are common problems in the communication process. The rooting of ideas and allocation of feedback is easier in a trusted relationship (Mäkipeska and Niemelä, 2005; tinyurl.com/6tr629v). In a relationship that is built up by trust, cooperative behaviour and knowledge transfer are likely to happen (Jones and George, 1998: tinyurl.com/7gu888; Adler, 2001; tinyurl.com/7npfxzm). A lack of trust will show up as problems in communication, empowerment, and quality (Owen, 1996; tinyurl.com/7ry3f5k).

Openness builds trust, which further increases communication. The building materials of trust are also empathy, respect, interest in others, and genuine listening. Trust is based on the transaction of facts and feelings, but mere fact-based communication does not build the personal relationships (Ståhle and Laento, 2000; tinyurl .com/7qwywgs). Trust brings the risk that has been taken based on the feelings, others' behaviour and the conclusions about cooperation. Shared norms and morals also help to increase trust.

Ståhle and Laento (2000; tinyurl.com/7qwywgs) have defined four types of dynamics in an interaction process: rival, critical, consensus oriented, and collaboration oriented. The rival dynamic means an argumentation of one's own competences (i.e., not being responsive to the ideas of others). In the critical dynamic, arguments and interruptions are common. Consensus-oriented communication concentrates on avoiding subjects that could produce disagreements. Genuine listening and consideration of other's ideas are features of collaboration-oriented communication. The collaboration-orientated dynamic also includes readiness for shared learning and development.

Trust in High-Performing Teams

Trust is a complicated aspect of the relationships between persons, but trust on the team level is even more complex. Trust increases communication, commitment, and loyalty between team members. Trust can be considered as a foundation that enables people to work together, and it is an enabler for social interactions. It can also improve team performance and increase the probability of creating successful companies (Mäkipeska and Niemelä, 2005; tinyurl.com/6tr629v). Trust plays a crucial role when global business teams, startups, and networks are being created (Harisalo and Miettinen, 2010; tinyurl.com/6n49wu6). In modern organizations, trust has become increasingly important because the organizations cannot rely on formal policies and rigid rules (Erdem et al., 2003; tinyurl.com/7ry3f5k).

The team is a basic unit of performance for most organizations; it melds together the skills, experiences, and insights of several people (Katzenbach and Smith, 1993; tinyurl.com/7ubuxq6). High-performing teams are not usually a collection of the brightest individuals. Rather, they are functioning entities that have diverse roles for the team members who provide the skills and knowledge to succeed. Healthy rivalries between team members enable the team to perform at a high level, but only if the team is built on robust trust (Tienari and Piekkari, 2011; tinyurl.com/7ntr2pt).

Trust building is a relatively slow and long process compared to other business processes, but it can be accelerated with open interaction and good communication skills (Ståhle and Laento 2000; tinyurl.com/87y3bc4). Shared experiences create trust and trust, in turn, enables deeper levels of interaction and expression between team members (Mäkipeska and Niemelä, 2005; tinyurl.com/6tr629v). Trust building requires open-

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ness, informing, honesty and arguments (Ruuskanen, 2003; tinyurl.com/7r6bn8s); trust also enables free sharing of ideas, which is the basis of innovation processes. Usually, the feeling of trust is based on intuition and emotions (Ståhle and Laento, 2000; tinyurl.com/87y3bc4).

Cook (2009; tinyurl.com/7lhq3lf) studied teams in IT companies and defined the characteristics of a high-performing team. High-performing teams have a clearly defined and commonly shared purpose, mutual trust and respect, clarity around individual roles and responsibilities, high levels of communication, willingness to work towards the greater good of the team, and a leader who both supports and challenges the team members. There is also a climate of cooperation and an ability to voice differences and appreciate conflict. A high-performing team does not sweep inevitable differences under the carpet and it values openness.

Järvenpää, Knoll, and Leidner (1998; tinyurl.com/7pet42t) have researched team building in global, virtual teams. Their research revealed the importance of sharing personal information, such as background, work experience, and current organizational contexts. Trust, benevolence, ability, and integrity were perceived to increase because of team-building exercises. The exercises focused on enriching communication, creating a team identity and building team spirit. In high-trust teams people expressed their feelings, for example excitement, more freely. Team members also gave each other recognition and feedback. Disagreements were discussed more openly. Overall, high-trust teams had more open interaction and discussion (Järvenpää et al., 1998; tinyurl.com/7pet42t). Reagans and Zuckerman's (2001; tinyurl.com/76kof33) research about R&D teams reveals the positive relationship between communication frequency and productivity. Their research also shows that homogeneous teams yield a lower level of productivity.

Larson and LaFasto (1989; tinyurl.com/7s2jdfq) described the importance of a team leader's ability to: i) share the vision successfully, ii) execute needed changes, and iii) motivate team members to their best actions by supporting a healthy climate and high energy level. Team members should internalize the vision and desired targets to reach a high-performing state. Team members should also be open to hear others' opinions and take part in team discussion.

When building high-performing teams, one should make sure that everyone shares the common goal or goals and that there is commitment and understanding

of what needs to be done, on both personal and team levels (Tienari and Piekkari 2011; tinyurl.com/7ntr2pt). Team members should also have competence trust for each other, which is based on the trustee's knowledge and expertise (Sako, 1992; tinyurl.com/7sbqvhm).

Early Findings from a Study in Progress

In this section, we present early findings from an action-research study on building trust in high-performing teams. The subjects of our analysis are teams from partner companies and a research group that are working together on a large-scale international project, around which a business ecosystem has formed.

The project is called "Globally scalable business models in health, exercise and wellbeing markets" (fightingla.com). In this project, global business creation comes together with top research, forming an ecosystem in the health, exercise, and wellbeing industries. Our vision is to bring together the relevant knowledge and the most talented people from all over the world, whether their passion is in business or in research, to create an ecosystem that helps our mission to bring sustainable business solutions for problems affecting health, exercise, and wellbeing.

The data was collected primarily through interviews with top-level managers from the partner companies. In this research, we are interested in finding out how trust develops and grows in the business ecosystem. How can the building of trust be supported? Can trust be managed? What is the relationship between trust and team performance?

Our preliminary findings reveal the importance of trust in team building. Trust has been built profoundly in the level of the project team. Most of the team members had worked together before, so they knew each other already and trust has been built through shared experiences, active communication, and mutually respective behaviour. The project consists of co-creation on different levels and, for example, in business modelling it is important to share critical information and personal ideas.

Our findings also show that the business partners do not commit fully to business network development without trust, both at the personal and business-concept levels. Enhancing trust needs a community of enrichment and regular interaction between all partners. Also, value creation and shared learning could be increased if high-trust relations could be built. One of

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the key ingredients for better communication is genuine listening and respecting other team members' ideas. This study has also shown that fact-based communication alone does not build personal relations. Trust takes time to develop, but without conscious actions like one-on-one meetings with different partners and team-building exercises, the probability for success decreases.

Conclusion

Existing research emphasizes the importance of trust and team building. Trust is a crucial factor for team performance (Erdem et al., 2003; tinyurl.com/7ry3f5k); without trust, team members are not willing to voice their opinions, questions, and improvement ideas. Also team members do not display their feelings and they are not willing to help others (Sitkin and Roth, 1993: tinyurl.com/7rf2rn9; Jones and George, 1998: tinyurl.com/7ygu888). All these aspects are crucial in co-creation of business networks and in the building of high-performing teams.

The preliminary results of our study reinforce the insights from the literature and contribute further insights relating to trust in high-performing teams and within business ecosystems. In particularly, these results highlight the importance of sharing critical information and having a high level of communication through constant interaction. We are looking forward to find out what further insights our ongoing study may reveal.

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A Business Application of the System Dynamics Approach: Word-of-Mouth and Its Effect in an Online Environment

Roman Wong and Shirley Ye Sheng

> " *To profit from good advice requires more wisdom* "
> *than to give it.*
>
> John Churton Collins (1848–1908)
> Author and literary critic

In this article, we illustrate the use of system dynamics modeling approach to study a complex system: word-of-mouth. Word-of-mouth plays an important role in reducing risk and uncertainty in purchase and consumption. Most of the prior research on word-of-mouth focused on studying either the factors that trigger consumers' participation (sending or receiving) in word-of-mouth activities or the impact word-of-mouth information has on consumers' buying decisions. The relationship between the two decision processes, however, is recursive and dynamic. Most prior studies have not focused on a recursive relationship. Our objective is to present a system dynamics model for the study of the relationship between the buying decision and the decision to participate in word-of-mouth communication. We also discuss how system dynamics modeling can be used in other complex problems in business such as the creation of a global business.

Introduction

Word-of-mouth plays a crucial role in helping to reduce risk and uncertainty in purchase and consumption (Murray and Schlacter, 1990; tinyurl.com/7cylp66). It is an informal, customer-to-customer communication about the characteristics of a business or a product. The objective of the study described in this article is to construct a computational architecture and use it as a simulation tool for the study of the dynamic recursive relationship between consumers' decision to adopt a product and how the adoption experience may trigger their contribution of word-of-mouth messages to online review websites, which frequently exert impacts on other potential adopters.

Prior research on word-of-mouth has mainly focused on studying either the factors that trigger consumers' participation (sending or receiving) in word-of-mouth activities (e.g., Dellarocas et al., 2004: tinyurl.com/7rhysge; Godes and Mayzlrrin, 2004: tinyurl.com/7fu6nja) or the im-

pact word-of-mouth information has on consumers' buying decisions (e.g., Chatterjee, 2001: tinyurl.com/7avb5th; Chen and Xie, 2005: tinyurl.com/6rs5cu2; Chevalier and Mayzlin, 2006: tinyurl.com/7bqjysz). However, the buying decision and the decision to participate in word-of-mouth communication are not disjoined and not much has been done to study the interdependency existing in this relationship. Our study contributes to the existing literature by providing insights into the interactive dynamics of the two processes: the process of how word-of-mouth affects online shoppers' decision making for product adoption.

In this article, we briefly discuss the nature of the two decision processes involved in word-of-mouth and their inter-relationship. Next, we present our system-dynamics model for adoption and word-of-mouth. We then draw out the implications of this research for global business creation. Finally, we discuss some future directions to further our current research.

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Word-of-Mouth

Word-of-mouth can take one of many forms. An online review from another customer on a shopping website is a common example. Consumers also often acquire information about specific products from various online communities such as blogs and product review websites. Studies have shown that consumer reliance on word-of-mouth is increasing. For example, the ongoing study conducted by the Kokokusha group (2007; tinyurl.com/7ulr6f4) has shown that such reliance increased from 61% in 2005 to 76% in 2007).

Prior studies (e.g., Chen and Xie, 2005: tinyurl.com/6rs5cu2; Bone, 1995: tinyurl.com/7ttvzfd) show evidence that suggests consumers tend to rely on other people's experiences and opinions during the decision-making process when purchasing a high-involvement product or service. This is especially the case when: i) the transparency of the product is high; ii) the product is complicated; iii) the criteria for an objective evaluation of the product are difficult to assess; and iv) the perceived risk is high.

In some cases, e-shoppers who have made an adoption decision may wish to contribute an online review about the adoption experience regarding the product they adopted. Such contributing activities allow consumers to exert both informational and normative influences on the product evaluation and purchase intention of fellow consumers (Bone, 1995: tinyurl.com/7ttvzfd; Ward and Reingen, 1990: tinyurl.com/6nvsr2p). Past research has linked word-of-mouth activities to factors including satisfaction, loyalty, quality, commitment, trust, and perceived value.

Harrison-Walker (2001; tinyurl.com/7movns7) suggests that word-of-mouth valence (i.e., whether a review is positive or negative) is an important dimension that may exert a significant impact on buying decisions. Figure 1 indicates major contributing factors that lead to consumer participation in word-of-mouth activities. Figure 2 is a model showing word-of-mouth as a significant factor that influences a shopper's buying decision and moderates the impacts of other factors.

An online shopper's product-adoption decision making, however, has an interrelated connection with their decisions about making contributions to word-of-mouth. There is a recursive relationship between the two decision processes in that the buying decision of a consumer, which leads to the later evaluation of the purchased product, may then lead to the decision of
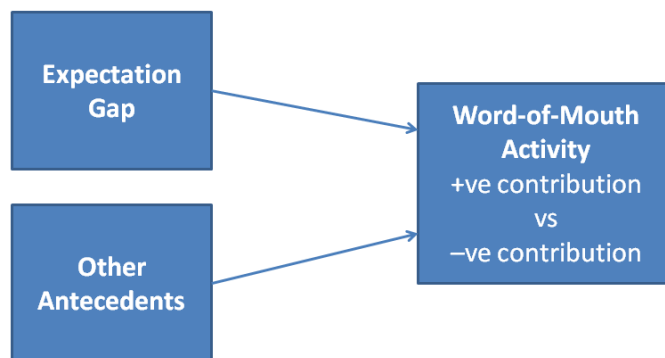

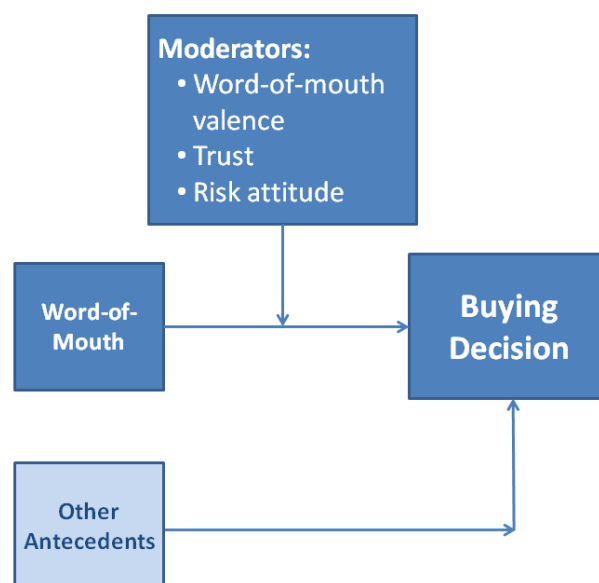**Figure 1.** Contributing factors of word-of-mouth activity

Figure 2. A model for word-of-mouth impact on a buying decision

whether or not to send out word-of-mouth in regard to the consumer's experience with the product. The consumer's word-of-mouth contributions in turn may likely influence the buying decisions of other consumers in the online community. Figure 3 indicates such recursive and dynamic influence between the buying decisions and the decisions to send a word-of-mouth message. So far, there has not been much research devoted to such recursive relationship and the dynamic nature of these two decision processes. In the current study, we concentrate on studying the recursive relationship between the buying decision and the decision to participate in word-of-mouth communication.

Word-of-Mouth and Its Effect in an Online Environment

Roman Wong and Shirley Ye Sheng
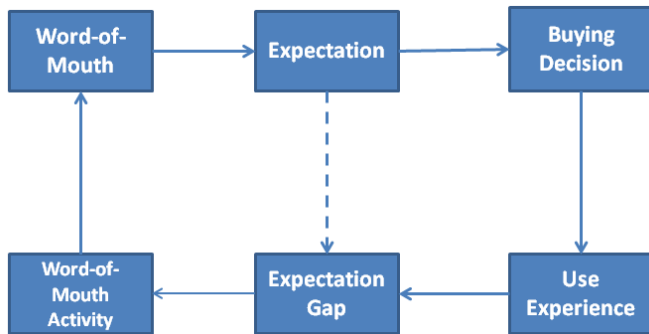
Figure 3. The recursive relationship between consumers' buying decisions and their word-of-mouth activity decisions

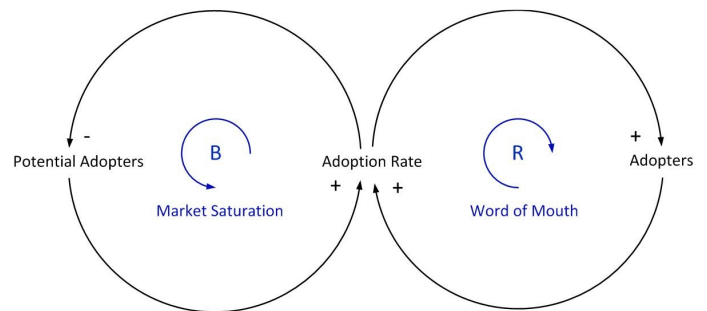**Figure 4.** A causal-loop diagram indicating the dynamic relationship between adoption and word-of-mouth

A System-Dynamics Model for Adoption and Word-of-Mouth

System dynamics is "an approach to understanding the behaviour of complex systems over time" (tinyurl.com/yrqbyx). In this section, we present a system-dynamics model that we constructed to explain the recursive relationship between online shoppers' buying decisions and their activities of sending word-of-mouth messages.

Causal loop between market saturation and word-of-mouth

In system dynamics modeling work, causal-loop diagrams (CLDs) are frequently used to represent the stocks and flows in a system. CLDs indicate how interrelated variables impact one another (Richardson and Pugh, 1981: tinyurl.com/ccco9zn; Kim, 1992: tinyurl.com/bwsxl4e).

The CLD in Figure 4 provides a representation of the two phenomena we included in our word-of-mouth and adoption model. The left-hand-side loop of the CLD represents how the change in the number of potential adopters impacts the adoption rate, which in return causing a change to the balance of the potential adopters. The causal loop is balancing by nature and labeled as 'Market Saturation'. The right-hand-side loop in Figure 4, on the other hand, represents how the change in the adoption rate brings along a change in the number of adopters, which in turn exerts an exponential impact, either positive or negative, depending on the direction of the original change in the adoption rate, on the adoption rate itself. Such a causal loop is reinforcing by nature and labeled as "Word of Mouth".

Implementation

Our word-of-mouth system-dynamics model was implemented using NetLogo (ccl.northwestern.edu/netlogo/), a freeware software package developed by Uri Wilensky of Northwestern University. NetLogo has been more frequently used for modeling agent-based problems, however the software comes with a programming tool called 'Systems Dynamic Modeler', which was designed for system dynamics modeling problems. We used System Dynamics Modeler for our aggregate system model, and we used NetLogo for our agent-level modeling in the second phase of our study.

Figure 5 depicts the key stocks (rectangular shapes), flows (broad arrow with faucet shape), and links (arrowed arc line) in the system-dynamics model for the word-of-mouth and adoption decision processes.

A stock is a collection of things, an aggregate, or a state variable. For example, a stock can represent a population of online shoppers, a collection of word-of-mouth messages, or the number of adopters. A flow brings things into, or out of, a stock. Flows look like pipes with a faucet because the faucet controls how much stuff passes through the pipe. Examples include decision to buy made by the online shoppers. A link makes a parameter value from one part of the diagram available to another. A link transmits a number from a variable or a stock into a stock or a flow.

There are four stocks identified for our model: Adopter (adopter), Potential Adopter (shopper), Positive Word-of-Mouth (PWOM), and Negative Word-of-Mouth (NWOM). Both Adopter and Potential Adopter have

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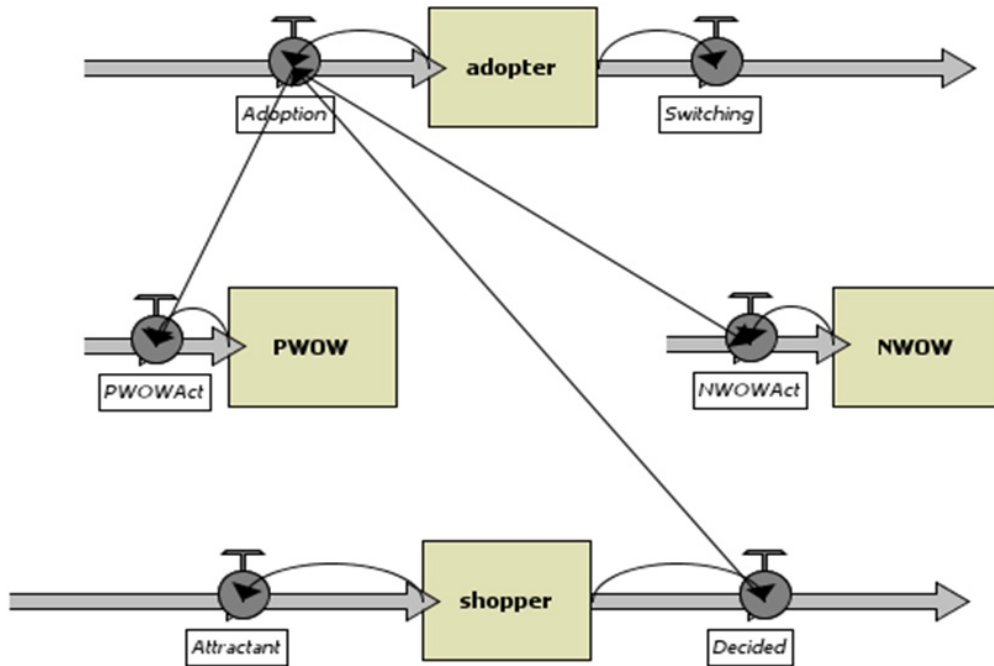
Figure 5. Major system components implemented in the system-dynamics model

flows into them and flows out of them. For the Positive WOM and Negative WOM stocks, there are only inward flows.

For Adopter, the inward flow is Adoption (i.e., when a Potential Adopter decides to buy). The flow pattern for this inward flow follows a gamma distribution as is commonly observed in new product adoption cases (see Figure 6). The mathematical representation for the in-flow of Adoption is:

$$Adoption = shopper^{k(pwom / (pwom + \alpha^* nwom)} \qquad (1)$$

where k is a scalar constant that defines the shape of the distribution, and where is a multiplier constant representing how sensitive the Potential Adopter is to the Negative WOM. There is an outward flow "Switching" that causes Adopter to decrease. Switching represents the depletion in number of Adopter due to switching to other products or end of product life cycle. Its outflow rate is a function of the number of Adopter and a switching rate.

For Potential Adopter, the in-flow is the amount of potential adopters newly attracted (Attractant) to consider adopting the product. The flow rate is represented as a function of Adoption and a scalar constant (attract-

Rate). The outward flow of Potential Adopter is the amount of potential adopters that decided to adopt the new product (i.e., Adoption). The mathematical representation for the stock of potential adopters (shopper) is as follows:

$$Shopper = a + Attractant - Adoption \qquad (2)$$

where a is the initial number of potential adopters to start with.
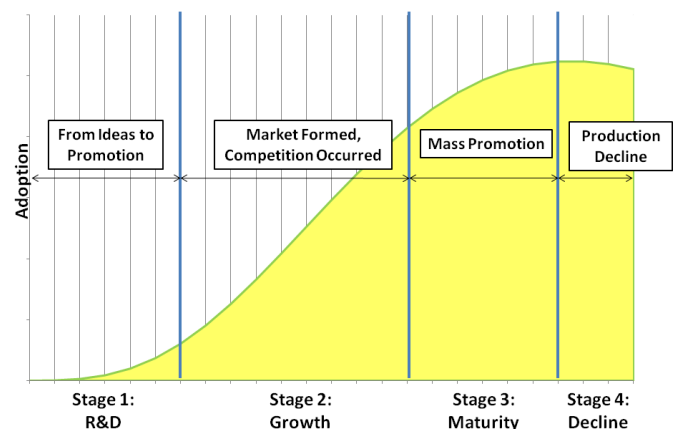
Figure 6. New product and technology adoption lifecycle

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For the Positive WOM (PWOM), the in-flow is the amount of number of new positive word-of-mouth messages contributed by adopters. The flow rate is represented as a function of Adoption and a scalar constant (pwomRate). The mathematical representation for PWOM is as follows:

$$PWOM = b + Adoption * pwomRate \qquad (3)$$

where *b* is the initial number of PWOM to start with.

For the Negative WOM, the in-flow is the amount of number of new negative word-of-mouth messages contributed by adopters. The flow rate is represented as a function of Adoption and a scalar constant (nwomRate). The mathematical representation for NWOM is as follows:

$$NWOM = c + Adoption * nwomRate \qquad (4)$$

where *c* is the initial number of NWOM to start with.

In addition to the System Dynamics Modeler, NetLogo also provides a set of tools for creating fundamental user interface for input and controls. For the current exercise, the slider control allows the model users to enter parameter values in variable rates. The textbox control can be used for input or output purposes. The button control provides the model users means to activate a procedure. Figure 7 shows a variety of controls for user interface of the model.

Result for sample configuration
The product adoption and word-of-mouth system-dynamics model in this study is a system of coupled, nonlinear, first-order differential equations. The simulation is implemented by dividing a time unit into discrete in-tervals of length (dt) and stepping the system through time one dt at a time such as the following generic format:

$$\frac{d}{dt} \mathbf{x}(t) = \mathbf{f}(\mathbf{x}, \mathbf{p}) \qquad (5)$$

where x is a vector of levels (stocks or state variables), p is a set of parameters, and f is a nonlinear vector-valued function. In our model, the differentiation process starts with the stock adopter, followed by potential adopter, and then the two kinds of word-of-mouth. Applying the differentiation to our current model, f is the function that determines the amount of adoption, while x is the number of shoppers (i.e. potential adopters) and the parameter p being the compound exponent index ($k(pwom / (pwom + * nwom)$) in equation (1).

In most new product adoption cases, the distribution of such new product adoption throughout its life-cycle usually follows a gamma pattern. As such, the mathematical characteristics of our model demonstrate a similar pattern of that of a gamma distribution pattern. Based on our initial observation of the online adoption behaviors for a certain model of digital camera on a leading shopping website, we derived a sample of parameter values to configure our adoption and word-of-mouth system dynamics model.

Theoretically, the scalar constant *k* and the multiplier constant are market specific. For our initial model, we proxied the number of shoppers (*x*) by the number of browsers visiting the online review board. We use 0.8 and 0.2 for k and respectively as the default values in lieu of values more specific for the digital camera. The default values have been tested on a number of products and found to be reasonably representative. The two variables, pwom and nwom, are dynamically
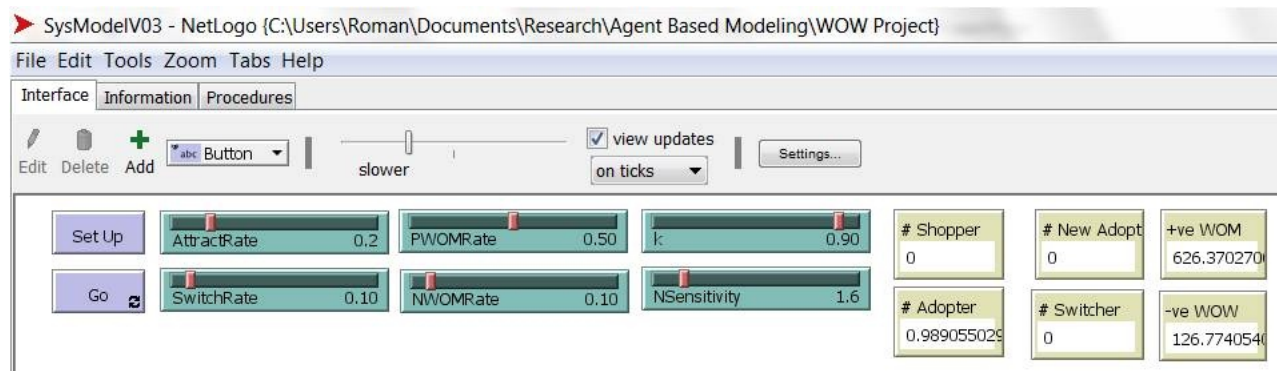

Figure 7. Sample controls used on the user interface of the system dynamics model for word-of-mouth

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determined by applying an appropriate probability value to new adopters (Adoption). For this study, the model was configured to use 0.4 and 0.05 on pwom and nwom, respectively. The two probability values were obtained from an earlier survey of subjects who had previous online buying experience. Figure 8 captures the change in the adoption and the number of potential adopters over time.

Implications for Global Business Creation

In this study, we aim to gain understanding about the dynamics in a word-of-mouth system by investigating the relationship between the buying decision and the decision to participate in word-of-mouth communication. The system dynamics approach can also be applied to many other business problems that are characterized by interdependence, mutual interaction, information feedback, and circular causality. One such good example is applying the approach to explore the various issues associated to the creation of global business.

In formulating business strategy for the global business, it is most important for the global entrepreneurs to possess the ability to assess the environmental factors in the global markets. These environmental factors are multi-faceted, including governmental, political, economic, social, cultural, and technological factors. The "Four Ps" of marketing (i.e., product, price, place, and promotion) for the global business are all going to be

different and will become uncertain. In particular, an entrepreneur planning to create a business at the global level will face the difficulties in the following aspects:

1. Ascertaining the differences in consumer needs and their usage patterns for products

2. Managing product-mix issues because consumers in global markets may not respond at the same to marketing-mix elements as in the home market

3. Evaluating the processes for the brand and product development in a competitive environment that is unfamiliar

4. Evaluating how the differences in the legal environment may impact on the overall marketing strategy

5. Assessing how the differences in administrative procedures may impact on the overall efficiency and costing of distribution

All of the above issues are difficult to address since each of them typically involves many factors that are interdependent, relation to large amounts of information and feedback, and feature circular causal effects among the factors and outcomes. The great explanatory power and insightfulness of a system-dynamics model will help global entrepreneurs visualize and understand how results are associated with their policy actions in interactions with the various factors.
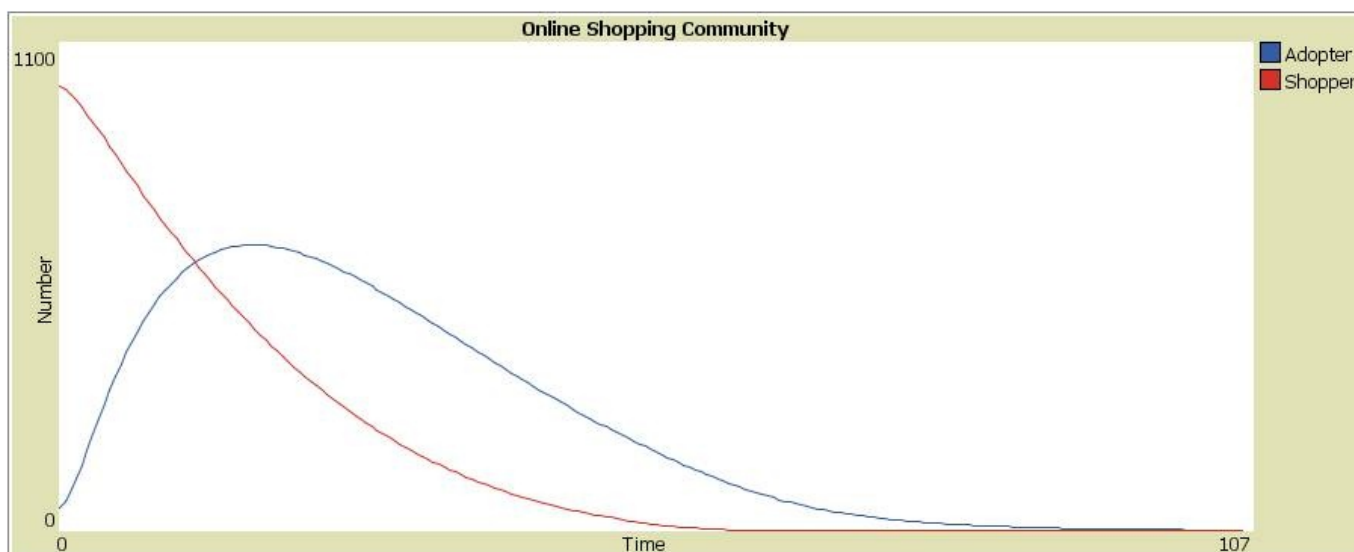
Figure 8. Number of adopters and potential adopters over time in a simulated online shopping community

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Conclusion

In this paper, we used a system-dynamics approach to model the recursive relationship between online shoppers' decisions to participate in word-of-mouth activities and how these activities in turn exert influence the buying decisions of other shoppers. We presented a system-level model that simulates the dynamics of such recursive relationships between the word-of-mouth decision processes. The contribution of the model we present is the tool we provide for the study of the complex dynamics in the product-adoption process and the word-of-mouth processes thereafter.

The future direction for this research is multifold. First, we shall continue our study by going into the empirical stage of systematically observing and collecting parameter data from more real-world shopping websites. Such empirical data will provide us with useful insights and help us validate our model, which can then be applied to other marketing-planning activities. The role of word-of-mouth through electronic channels in the adoption decision process is important; the understanding we will gain about word-of-mouth adoption will be valuable to marketers.

Second, we are constructing an agent-based model with adaptive agents that mimic various properties, including the behavioural ones, of online shoppers who buy and participate in online word-of-mouth activities. The objective is to observe the interaction of the agents in the community at a microscopic level and compare the emerging outcomes with the aggregate system model we constructed in this study. We believe such a comparative study to be valuable in terms of validating the models and reconciling unanswered questions arising in the simulation studies.

The system-dynamics modeling approach demonstrates a high explanatory power that helps users to explore and understand the nonlinear and dynamic nature of complex systems. In this paper, we demonstrate its use in our study of the recursive relationship of the online review activities and consumers' buying decision. It can also support the evaluation of many difficult business problems that involve the assessment of management policy in interaction with numerous environmental factors. Such complex problems include the creation of a global business.

About the Authors

Roman Wong is a professor in the areas of information systems and operations management at the Andreas School of Business of Barry University. He received his PhD in information systems from Southern Illinois University at Carbondale, and he received an MBA from the University of North Carolina at Charlotte. Before joining Barry University, he held a faculty position at the California State University at Northridge. His current research interests include the interrelations between the online review and product adoption processes and the development of innovativeness in emerging countries.

Shirley Ye Sheng is an Assistant Professor of Marketing at Andreas School of Business of Barry University. She received her PhD in Business Administration with a Marketing concentration from Florida Atlantic University in the United States, and she received a Master of Science degree in Finance from Leicester University in the United Kingdom. Her research focuses on international marketing, consumer behavior, and marketing history.

TIM Lecture Series:

Leadership Position in Technology Entrepreneurship and Commercialization

> **"***We have worked very hard to figure out how to achieve a***"** *global leadership position in technology entrepreneurship and commercialization, and tonight, we present you with the seven proof points we have developed over the past several months. We ask that you validate these proof points and fully engage with us to attain them.*
>
> Tony Bailetti
> Director, Institute for Technology
> Entrepreneurship and Commercialization
> Carleton University, Ottawa, Ontario

Overview

The fourth Technology Innovation Management (TIM) lecture of 2012 will be remembered as one of the most important events on technology entrepreneurship and commercialization held in Canada's Capital Region this year.

On Thursday May 31st, a much larger audience than expected attended Carleton University to engage with faculty, graduate students, and professionals working to establish a worldwide leadership position in technology entrepreneurship and commercialization for Carleton University and the region. Members of the audience included technology entrepreneurs, investors, company executives, R&D personnel, economic development and government personnel, faculty, students, and alumni from Ottawa's post-secondary institutions, service providers, consultants, and visiting scholars. The event started at 6 p.m. and was scheduled to end at 9 p.m. However, event attendees engaged in vibrant conversations well past 10:30 p.m.

The May 31st TIM lecture was organized into two parts. The first part described seven proof points that can substantiate a leadership position for the university and

the region as well as the many opportunities for community members to help attain these proof points. The slides on the proof points selected to drive action toward attaining a worldwide leadership position are available here: tinyurl.com/82s2ob3

The second part of the lecture was a showcase of graduates students' work in entrepreneurship and commercialization. It was comprised of 10 presentations: one described a doctoral thesis proposal, one described a completed master's thesis, and eight highlighted master's-level projects that led to the launch of new technology ventures in Canada's Capital Region. From the very first speaker, the excitement and energy level in the overcrowded room were high and the presentations were delivered with matching enthusiasm.

The desired outcomes of the May 31st TIM lecture were to: i) validate the seven proof points and engage community talent who wish to help achieve them; ii) showcase graduate student talent and engage community resources with students' theses, projects, and ventures; and iii) volunteer to help key organizations in the community achieve their own proof points for leadership positions in technology entrepreneurship and commercialization.

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Opening Remarks

The Dean of the Sprott School of Business, Dr. Jerry Tomberlin, opened the lecture by welcoming the attendees and describing the joint status of Carleton University's Technology Innovation Management (TIM) program within both the School of Business and the Faculty of Engineering and Design, and its many strong connections to the community. He then introduced the President of Carleton University as a person who is committed to fostering entrepreneurship, innovation and creativity at Carleton and in the region.

Dr. Roseann O'Reilly Runte, President and Vice-Chancellor of Carleton University, expressed her pride about hearing students refer to Carleton University as the most entrepreneurial university in Canada. Dr. Runte set the tone for the event by relating a story of a painter in ancient Greece who was intent on painting horses that looked so real that people could imagine riding them right off the page. The painter studied anatomy and mechanics of movement, and he practiced many years without getting the painting right. One day, after many years of hard work, the painter threw a wet sponge at the painting out of frustration. The wet sponge left markings in the painting that made the horses he had drawn look like they were riding in a cloud of dust. That small addition to the painting made the artist into an accomplished and celebrated painter. The president's story emphasized that success requires hard work over many years, science, research, and inspiration. Luck is something that you make with other people.

Next, Dr. Tony Bailetti, Director of the Institute for Technology Entrepreneurship and Commercialization, thanked Carleton's senior administration and Mr. Wes Nicol for their commitment to make the university the most entrepreneurial in Canada. He also thanked the Industrial Research Assistance Program (IRAP; tinyurl .com/7z5jhvv), the Ontario Centres of Excellence (OCE; oce-ontario.org), the City of Ottawa (ottawa.ca), and Invest Ottawa (investottawa.ca) for their tireless efforts helping technology companies that operate in the region.

Leadership Relies on Implementing a Business Ecosystem Approach

In his presentation, Dr. Bailetti explained that an important distinguishing feature of the TIM program (carleton.ca/tim) is its implementation of a business ecosystem approach to delivering exceptional educational experiences to graduate students who are required to complete theses and projects.

Dr. Tony Bailetti then made it clear that to attain a leadership position in technology entrepreneurship and commercialization, the university and community members must collaborate by using the wide-lens perspective enabled by the business ecosystem approach (Baletti, 2008; timreview.ca/article/138; Milinkovich, 2008; timreview.ca/article/200; Hurley, 2009; timreview.ca/article/276; Bailetti, 2010a; timreview.ca/article/325; Bailetti, 2010b; timreview.ca/article/355). He emphasized the need for key organizations to move away from narrow-lens perspectives on entrepreneurship, innovation, and creativity.

A narrow-lens perspective on delivering academic programs leaves the provider focused on course staffing, student enrolment, and budgets. This makes narrow-lens suppliers prone to ignoring the implications for graduate students of globalization, co-innovation, and value-chain adoption challenges. Interaction between TIM students and members of the innovative wider ecosystem is a fundamental building block of the TIM program's content. The TIM program therefore uses a wide-lens perspective to deliver graduate-level education because the success of its students depends on the success of individuals and organizations innovating outside of the university. Today, this dependence is more pervasive than ever before. Failure to expand the focus to include the business ecosystem that successfully delivers and commercializes innovation will set up graduate-level programs for failure, regardless of how well they deliver on their narrow-lens objectives related to staffing, enrolment, and budgets.

Choosing to focus on the ecosystem approach to deliver graduate education, rather than the narrow-lens approach common elsewhere, has changed everything for TIM students and faculty – including how they define and measure success, how they see their work, how they prioritize opportunities and threats, how they contribute to the launch and growth of ventures, and how and why they contribute to the geographical and virtual communities in which they are embedded. Proper staffing levels, the correct size of enrolments, and adequate budgets are certainly important; however, these are just necessary but not sufficient conditions for the success of TIM students, the TIM program, the university, and the region.

Graduate students benefit from leveraging an existing healthy business ecosystem that includes assets

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anchored around the TIM program and assets closely associated with it. Students use, modify, and add to these assets. The assets anchored around the TIM program include: i) the TIM Review (timreview.ca), a monthly journal that provides technology entrepreneurs who operate in small and large firms practical solutions to real-world problems; ii) the Research Centre in Technology Innovation (tinyurl.com/7mjmzxm), a centre that carries out projects that strengthen or disrupt existing industrial competences; iii) the TIM Lecture Series, monthly lectures that promote knowledge transfer among technology company executives, entrepreneurs, research and development personnel, faculty, and students; iv) TIM Entrepreneurs, an accelerator for ventures owned by TIM students; and v) Lead to Win, Carleton Entrepreneurs, and Ottawa Young Entrepreneurs, programs designed to provide mentors, space, and funding to entrepreneurs who wish to launch and grow businesses that can generate six or more knowledge jobs in the region within three years.

Assets that are closely associated with the TIM program include: i) the Lead to Win Founders Club, an industry association that supports successful graduates of the Lead to Win program; ii) Lead to Win for Women, which supports women who launch and grow businesses; iii) BigBlueButton, an open source project that enables universities and colleges to deliver high-quality learning experiences to remote students; and iv) The Nicol Institute, an organization that provides internships to graduate and undergraduate students at Carleton University who are working to transform their ideas into commercial and non-profit ventures.

Dr. Bailetti ended his presentation by stating that his colleagues are committed to expanding the business ecosystem to include individuals and organizations around the world that are interested in bringing their entrepreneurship curricula, research, and services into the 21st century.

Part 1: Proof Points and Reasons to Engage

Dr. Steven Muegge, Dr. Michael Weiss, Tom Duxbury, David Hudson, and Chris McPhee presented the seven proof points to the audience, and identified the ways in which individuals and organizations can engage in helping attain each proof point. Together the seven proof points comprise a solid and achievable set of concrete objectives that engaged community members can contribute to and work towards.

The seven proposed proof points for a global leadership position in technology entrepreneurship and commercialization are as follows:

1. **TIM program:** 100+ students enrolled and 40+ TIM theses and projects completed

2. **TIM Review:** 10,000 readers/issue

3. **Training:** 80 company founders

4. **Sprott's doctoral program:** 4 students in entrepreneurship

5. **Lead projects:** 2

6. **Disruptive-knowledge projects:** 1

7. **Internships:** 50 interns

Unless stated otherwise, the proof points represent annual targets.

The wide-lens perspective enabled by the business ecosystem approach reveals new ways for TIM students, TIM graduates, and members of the community to: i) enhance knowledge and develop skills; ii) increase their social capital; iii) add value to customers, partners, investors, and employers; and iv) contribute to their physical and virtual communities.

Under the umbrella of the wide-lens approach, the reasons for a talented individual to contribute to the attainment of these seven proof points include: i) strengthen existing skills or develop new ones; ii) achieve with others what the individual cannot do alone; iii) increase the individual's brand and options; iv) find new interests and hobbies; v) enjoy new experiences; vi) provide public examples of the individual's commitment, dedication, and interests; and vii) be part of large and diverse technology entrepreneurship and commercialization community.

Part 2: Showcase

In the second part of the lecture, students from the TIM program and Sprott School of Business showcased their research and companies. Each student ended their presentation with a request to the audience, variously asking for feedback, participation, or help to secure customers, resources, or funding.

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David Hudson, PhD candidate (Sprott), described his current research on "Entrepreneurial effort in the theory of the firm". This research examines entrepreneurship in established companies, not just by the founders or executives, but by employees doing their jobs every day. It examines shifts in how consumer technology can provide conditions where employees add new value to the firm and how to design and manage work that depends on this technology.

Request: *Access to companies that are dealing with challenges related to their employees using consumer IT to attain work as well as personal goals and objectives.*
Contact: davidhudson@cmail.carleton.ca

Chris McPhee, MASc (TIM), described his recently completed thesis entitled: "Using a results-based organization design methodology to construct the *Technology Innovation Management Review*". The results-based organization design approach was developed through this research, and it was used to apply the literature on business ecosystems to the construction of a real-world organization that produces and disseminates knowledge. This new approach was described in the context of designing a technology startup in the May issue of the TIM Review (McPhee, 2012; timreview.ca/article/554).

Request: *Contribute to the TIM Review as a reader, author, or guest editor, and help spread the word about the journal.*
Contact: timreview.ca/contact

Arthur Low, founder of Crack Semiconductor and MASc (TIM) candidate, has 20 years of experience designing integrated circuits and holds several patents in encryption and network security. Today, his venture develops a turbo-charged security hardware processor that is sold to European customers. Crack Semiconductor (cracksemi.com) is developing a platform comprised of security software, Linux, and an embedded microprocessor, which will be licensed to partners worldwide. Each partner will use the platform to accelerate security software to its own customers. The combination of optimal hardware implementations of the important public key cryptographic operations, an operating system, and applications software that is finely

tuned to the hardware significantly reduces system integration costs and increases performance.

Request: *Provide introductions to potential partners worldwide that may be interested in licensing the platform.*
Contact: art@cracksemi.com

Michael Ayukawa, founder of Cornerportal and MASc (TIM) candidate. Cornerportal (cornerportal.com) sells a mobile-centric content management system (CMS) that integrates a social capability that makes "things" easier to sell by attaching a memorable story to now-personal objects. For service companies, the same CMS makes assets easier to manage. This helps Cornerportal's small and medium clients compete and grow.

Request: *Help identify new clients and applications.*
Contact: mike@cornerportal.com

David Ker, founder of Realwat and MASc (TIM) candidate. Realwat (realwat.com) has employees in Canada and Cambodia developing Lassoo The Web, an iPad application that makes it easier and faster to browse using an iPad, manage bookmarks, and share bookmarks to Evernote. Realwat is in the process of bringing Lassoo the Web to the next level by creating an interest-based social bookmarking platform viewed as "Pinterest version 2".

Request: *Help raise money, download Lassoo The Web and provide feedback, and refer potential clients who can benefit from the company's application development capabilities.*
Contact: David.Ker@Realwat.com

Ronald Amelunge, founder of ClearVoix and MASc (TIM) candidate. ClearVoix is getting ready to provide mobile voice-to-text conversion solutions in Canada. Currently, the company is improving the Spanish voice to text engine and modifying the system so it is capable of delivering solutions in English.

Request: *Help identify four talented students that Clearvoix will pay to program in PHP, Joomla, and MySQL as well as complete and maintain the website "Listings.ca".*
Contact: raantelo@connect.carleton.ca

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Robert Poole, founder of Freebird Connect and MEng (TIM) candidate, has more than 15 years of experience as an entrepreneur. Freebird Connect (freebird connect.com) uses a game-changing platform business model to deliver powerful, self-service data analytics, collaboration, and social networking capabilities to small and medium-size organizations globally. Freebird Connect is on a mission to enable companies, municipal governments, and not-for-profit organizations to eliminate decisions based on hunches, gut-feelings, and guesses. Freebird Connect also offers its solution to global OEM partners who need data analytics, reporting, and collaboration to add value to the solution they offer to their customers.

Request: *Refer organizations that struggle to access or understand data, need to enable collaboration, and wish to generate revenue from data.*
Contact: robert.poole@freebirdconnect.com

James Makienko, founder of HiveDirect Captioning and recent MEng (TIM) graduate, is a 2012 Nicol Intern (tinyurl.com/77grl2u) who has developed a minimum viable product in six months. HiveDirect sells services for captioning video that include hosting and support services as well as SaaS captioning. Due to media accessibility legislation, public institutions must caption their videos. HiveDirect decreases up to 50% of its customers captioning costs, and its service fits well with existing processes and infrastructure. HiveDirect's customers include public and private video content creators, particularly educational institutions in Canada and globally.

Request: *Help identify potential customers, channels to market, Python/Django/front-end developers, and international opportunities.*
Contact: jmakienk@gmail.com

Natasha D'Souza, founder of VirtualEyeSee and a recent MEng (TIM) graduate, is a 2012 Nicol Intern (tinyurl.com/77grl2u) with over 15 years of industry experience working in technology companies, non-profit organizations, startups, and running her own social media consulting company, VirtualEyeSee (virtualeye see.com). The development and commercialization of a system to deliver virtual therapy for children with special needs was a combination of a mother seeking an effective solution for her child and the knowledge gained from the TIM program (D'Souza, 2011; timreview.ca/ article/440). The system is for children with special needs (i.e., Autism Spectrum Disorder, ADHD, Asperger Syndrome) who have social challenges and for those who help these children, including schools, parents, and therapists. The system provides consistency between home, school, and the therapist, evidence of the right amount of repetitions to master a skill, and most importantly, it is affordable.

Request: *Help find developers, as well as parents and children willing to provide feedback on the system.*
Contact: natasha@virtualeyesee.com

Elias Majic, founder of Ottercall and recent MEng graduate, has four years of experience in speech recognition. Ottercall (ottercall.com) sells several mobile applications and has licensed technology to a military customer. Ottercall targets business users who are too busy to dedicate time to just learning a language at a computer. Customers focus on accent reduction and business language comprehension; they receive instantaneous feedback on pronunciation for a significantly lower price than other language-learning products. With Ottercall's software, users are able to become proficient in languages quicker, which results in greater earnings and increased global opportunities.

Request: *Help identify individuals who can help localize market offers in Brazil, Russia, India, and China and secure customers.*
Contact: eli@ottercall.com

Closing Remarks

Dean Tomberlin ended the evening by thanking the audience for attending and for their input into the proof points and graduate students' work. In closing, the Dean encouraged everyone to act upon the underlying theme of the evening: collaboration within a business ecosystem setting. In this spirit, readers of the TIM Review are invited to contribute their feedback on and support for the seven proof points and to fulfill the requests outlined in the student presentations.

The TIM Lecture Series is hosted by Carleton University's Technology Innovation Management (TIM) program (carleton.ca/tim).

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Do you want to grow your existing business?

Lead To Win is a free business-development program to help establish and grow businesses in Canada's Capital Region.

Benefits to company founders:
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- Confidence, encouragement, and motivation to succeed
- Stronger business opportunity quickly
- Foundation to sell to first customers, raise funds, and attract talent
- Access to large and diverse business network

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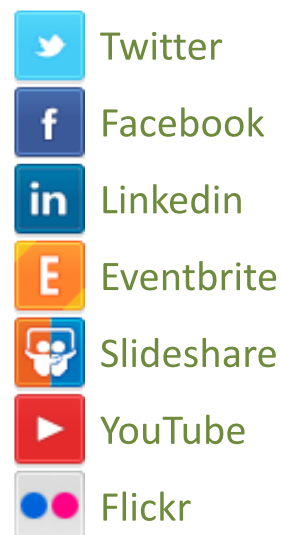
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These guidelines should assist in the process of translating your expertise into a focused article that adds to the knowledge resources available through the *Technology Innovation Management Review*. Prior to writing an article, we recommend that 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?
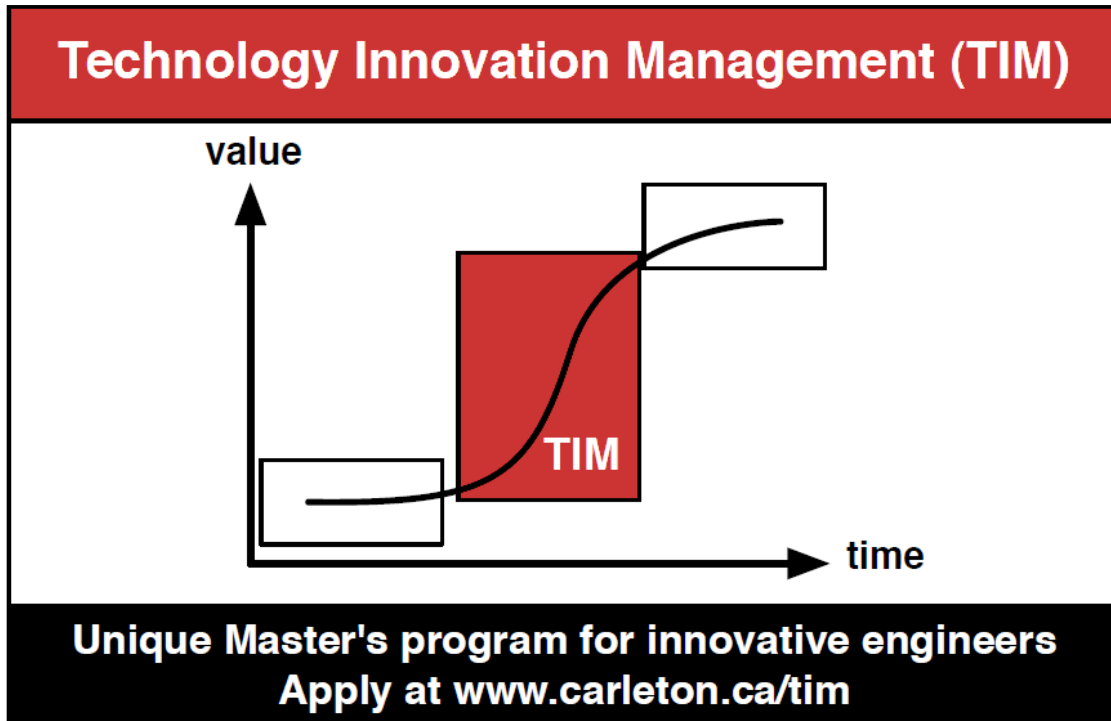
If your answer is "yes" to any of these questions, your topic is likely of interest to readers of the TIM Review.

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. Only the essential references should be included. The URL to an online reference is preferred; where no online reference exists, include the name of the person and the full title of the article or book containing the referenced text. If the reference is from a personal communication, ensure that you have permission to use the quote and include a comment to that effect.

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

8. Include a 75-150 word biography.

9. If there are any additional texts that would be of interest to readers, include their full title and location URL.

10. Include 5 keywords for the article's metadata to assist search engines in finding your article.

11. Include any figures at the appropriate locations in the article, but also send separate graphic files at maximum resolution available for each figure.

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