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THEORETICAL ARTICLE

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Innovation: from small “i” to large “I”

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Abstract

Innovation is the lifeline for every organization. The primary purpose of innovation is to apply new ideas or technologies to create new or added value for the organization. This narrow goal is for small “i”. In the dynamic digital age, however, the goal of innovation should be much more aspirational and noble: “doing well by doing good” for the society at large and humanity. This lofty goal of innovation is for large “I”. In this paper, we review the evolution process of innovation and propose how innovation can disrupt the barriers to creating a smart future, the aspirational goal of innovation for the greater good.

Background

Innovation, the activity of deploying new ideas and/or approaches to create new or greater value, is part of human history. Humans have always struggled to find better ways to create value and improve the quality of life through innovation, from the hunting and gathering age to agrarian society, industrial age, information age, and now the knowledge age. In today’s industry 4.0 era [1], the purpose of innovation is still basically the same: how to make the value chain more effective to maximize the organizational performance. However, the innovation process has become extremely complex as there are numerous strategic choices available due to rapid technological advances, globalization of economic activities, the increased concern for environmental sustainability, changing demographics of the various countries and the expanding influence of emerging economies, and changing roles of external stakeholders, especially customers [2]. Value co-creation for shared goals with the various stakeholders (including suppliers, partner organizations, customers, governments, and shareholders) has become a new strategic approach to make innovation effective [3]. In the advent of open innovation, sharing economy, collective intelligence, co-innovation [4], and convergence revolution [5], the innovation process has become increasingly sophisticated, especially in large business enterprises.

To ensure an effective innovation process, the organization should have clear understanding and knowledge about global market dynamics and the forces that shape the digital age. Today, every business is a global firm, regardless of its size, industry type, or location. Consequently, competition, supply chain, customers, and even regulations are all global. With the accelerating technological advances and fierce global competition, the product life cycle is getting ever shorter. New smartphones are being introduced almost every 6 months by different producers. The same is true for electronic goods, drugs, and even golf balls. That means business firms must continuously

reinvent their innovation S-curves to be competitive. In the past, firms focused on securing competitive advantage based on the ability to produce quality products that consumer would want and need. However, now many firms pursue service-dominant logic where superior services around the product create a complete product ecosystem [6, 7]. In the process, the competition has transformed from the product focused to the complete product ecosystem which provides a robust combination of customer values. The values that customers desire from the product or service have also changed from the traditional utilitarian price-quality-speed-customization features to experience, co-creation opportunities, and hedonic dimensions [8].

Innovation that is focused on creating value for the organization's bottom line is labeled small "i" in this paper. The purpose of small "i" is to create innovation in the five major areas of the value chain [5]: (1) introduce new products/services/ventures, (2) improve the efficiency of the value chain based on lean approaches, (3) produce new customer values, (4) attract new customers or new markets, and (5) create new business models.

It is the conviction of this author that if our expectation of innovation is simply for improving the financial bottom line of the organization, then we are asking too little of good ideas. It is only when innovation is for the greater good, the true potential of innovation is realized.

Innovation for the greater good would be for the well-being of humanity and the better world. This is large "I". Already numerous non-profit organizations and social enterprises around the world dedicate themselves to creating value through innovation for the greater good [9]. In this paper, we will discuss the differences in innovation strategies for small "i" and large "I".

The rest of the paper is structured as follows. In the "[Innovation for organizational value creation](#)" section, we will contrast small "i" and large "I". The "[Innovation for the greater good](#)" section presents ideas for creating a smart future through innovation which is for the greater good than just for an organization's performance outcomes. The "[Conclusions](#)" section concludes the paper by presenting some future research ideas for expanding the purpose of innovation for a brighter future for humanity.

Innovation for organizational value creation

Every successful human effort involves innovation: from a successful hunt in ancient times, creating better weaponry for winning battles, better crop production in agriculture, efficient factory operations, effective administration of government agencies, and control of communicable diseases. In today's digital age, organizations operate and compete in the complex and turbulent global market place. The world is supposed to be flatter [10], but the global economy has become ever more complex. Thus, innovation has become the primary strategy of every organization.

Small "i"

The main purpose of innovation is to create organizational value. In the innovation process, organizations must balance three boxes well simultaneously: forgetting (not dwelling on) past successes, optimizing current business, and inventing new business models for the future [11]. Regardless the type or industry, every organization has five primary areas where value can be created in [5]:

(1) Innovation for new products, services, or ventures

Organizations must constantly renew innovation S-curves to introduce new products/services. Even then, the firm's market leadership may erode as the innovation life cycle becomes increasingly short.

Competitors may offer similar products/services, or new market entrants could introduce disruptive innovations to undercut the market. Another way to create value is to develop new ventures based on innovation activities of the organization. Such ventures may be based solely on the firm's R&D efforts or collaborative efforts with external partners.

(2) Innovation for a greater efficiency of the end-to-end value chain architecture

The organizational value chain involves various activities from the suppliers to the final customer. Many innovative ideas for searching sources, purchasing methods, lean supply chain systems, marketing alliances, and the like are good examples for this type of innovation.

(3) Reinventing the customer value

Today's market can be best characterized as the customer-dominant or customer-centric phenomenon. Customers used to be passive participants in the market seeking utilitarian value from products/services. Today's customers are active co-creators of value with the firm and seeking experience, participation, and hedonic features (sense of safety, emotional satisfaction, flow, contribution, and the like). Thus, firms need to introduce innovation that can continuously reinvent customer value [12].

(4) Redefining the customer base

The conventional customer base was comprised of customers who buy products/services from brick and mortar stores. However, in the digital age, customers are scattered all over the world who explore, shop, and purchase through multiple channels. There are global customers, e-customers, do-it-yourself customers, and blue ocean customers [13].

(5) Reformulating business models

With the rapid advances in the information and communication technologies (ICTs) and globalization, many innovative business models have been introduced. E-commerce (mobile and social commerce), virtual organizations, virtual and augmented reality, Internet of Things (IoT), Internet of Brains (IoB), cryptocurrency, peer-to-peer (P2P)-based social network commerce (including virtual entrepreneurship), crowdsourcing (crowdfunding)-based business, and the like represent only a glimpse of numerous innovative new opportunities for new business models in the digital age.

Evolution of small "i"

Organizational innovation for value creation has evolved over the years. Innovation used to be based on the firm's R&D capability for new products/services or process efficiency. However, the fast pace of globalization and technological advances made it almost impossible for any single company, regardless of its size or global presence scale, to be world class in every phase of the value chain. Thus, organizations began to seek collaborative partnerships with others for innovation. The ICT-enabled collective intelligence provided the impetus for open innovation which allows outside-in and inside-out innovation opportunities. With the overload of new ideas from within and

without the organization, a new system needed to be developed for the innovation process. Such new innovation ecosystem is co-innovation which creates a platform to filter and screen ideas and project. In today's digital age, where experimentation can be speedy and inexpensive [12], we need to innovate the innovation process. This is the meta-innovation stage [14].

(1) Innovation 1.0: closed innovation

The conventional strategic wisdom for innovation was to invest in acquiring proprietary core capabilities of the organization for competitive advantage and protect them from competitors. Thus, organizations used to focus on developing their internal R&D to support value-creating activities along the value chain [5]. Some of the widely known closed innovation systems in the past were Bell Labs, Proctor & Gamble ("invented here"), and NASA (with its catch phrase "as only NASA can"). The pride of the firms with closed innovation systems was to be totally secretive about their innovation agenda.

(2) Innovation 2.0: collaborative innovation

With the rapid pace of technological advances and globalization, even leading global firms do not have world-class competencies in all areas of their value chains. Thus, to secure and sustain competitive advantage, every firm needs to collaborate with partners who possess better value-creating capabilities in certain phases of the value chain. Many forms of collaborative partnerships have evolved over time, such as joint ventures, licensing agreements, strategic alliances, and B2B brand marketing. Many well-known global firms have practiced collaborative innovation, including Nike, Apple, Mattel, and Intel (e.g., "Intel inside" brand marketing).

(3) Innovation 3.0: open and free innovation

The advanced ICT has opened new opportunities for the sharing economy and global connectivity. While collaborative innovation is typically based on a one-to-one relationship, open innovation may involve multiple viable partners, either or both outside-in and inside-out [3]. The basic idea of open innovation is to create a world-class value chain with the best global class partners [5]. For example, Proctor & Gamble has a value chain which included both R&D and C&D (connect and develop). Today, many leading global firms, governments, and non-profit organizations have adopted the basic notion of open innovation: P&G, Eli Lilly, Google, Apple, Microsoft, Facebook, Samsung Electronics, SAP, NASA, along with the US government and many state governments.

There are a number of innovation intermediaries ("innomediaries") that help connect firms with problems with those that can provide solutions (e.g., NineSigma). In addition, the open source environment has given rise to collective intelligence and crowdsourcing ideas, often through social networks. These innovation ideas are not only free but they are also often superior to many internally generated ideas.

(4) Innovation 4.0: co-innovation

Open innovation is a beautiful concept, but its practical application is often challenging. There are numerous sources of ideas, some from credible sources (research labs, independent researchers, universities, suppliers, app developers, customer co-creation groups, and the like) and some are complete novices with no proven credentials. In addition, many outside-in ideas may be useful but may not be

compatible with the firm's internal innovation infrastructure or human resource capabilities. Thus, the firm needs to develop an information ecosystem which embodies a unique tacit filter system to evaluate the technical and economic feasibility for idea implementation [2]. The essential characteristic of co-innovation is its inimitable ecosystem which combines the development of implementable innovation through idea convergence, a filter system that scrutinizes internal and external ideas through the lens of the firm's strategies and capabilities, and participation of stakeholders in innovation co-creation [15].

(5) Innovation 5.0: meta-innovation

In the age of Industry 4.0 or digital transformation, there are massive opportunities to collect and process context-rich data about people, places, things, and organizations. Applications of AI (Deep Mind, Watson, Deep Face Pepper), smart sensors, machine learning, geotagged data mining, big data analytics, 3-D technologies, IoT, brain-computer interface, cloud computing, smart robots, autonomous vehicles, technology convergence, and the like have opened new innovation possibilities. In addition, social technologies and the co-creation paradigm [15] provide organizations to innovate or disrupt their own innovation processes. This is the new frontier of innovation or meta-innovation [14].

Innovation for the greater good

The primary purpose of innovation has been to help an organization achieve its value creation goals, the small "i". However, innovation should not be restricted to business enterprises, governments, and non-profit organization. Innovation should be for the greater good with broader and more profound purposes, such as for a smart future, better quality of life for people around the world, peace and just societies, and the like, the "large I".

Today's new normal, according to mass media, is "increasing uncertainty and slowing economic growth around the world." There are numerous challenges confronting every society, from ideological conflicts stemming from ethnic and cultural differences, economic and goal divides, deteriorating environment and infrastructures, job shortage, problems in education and healthcare, and the like. Thus, there has been a movement to elevate the innovation goal to a much noble level such as creating value for the greater good or creating a smart future. Large "I" can be initiated by civic communities, social entrepreneurs, business enterprises, governments, or international organizations [2]. We are quite familiar with many socially minded businesses that respond to diverse social needs as part of the firms' corporate social responsibility (CSR) activities [16]. These projects may involve green management, inner city problem solutions, job training for unemployed people, community development, etc. However, such CSR projects may not be strictly for the greater good but for the market sustainability goal of the firm as well.

Large "I"

Large "I" is about applying innovative ideas for a brighter future [17]. Everyone realizes the importance of innovation in the age of speed, urgency, and complexity. While advanced technologies are being applied to almost every facet of our lives, the world is

not any safer or more equitable. Rather, major social ills and problems are becoming much worse. We need innovation that will enhance agility, flexibility, co-creation of shared goals, and all these with a sense of urgency. Every government, business, NGO, or individual strives to be future smart, be better prepared for the expected future state. However, the future that most people try hard to predict is most likely not the aspirational future we dream about. So, large “I” is for dream makers who aspire to create a better future, not only for themselves but for humanity and the society at large [17].

Large “I” for the greater good

Innovation for the greater good requires new models that emphasize collaboration, design thinking, and value co-creation for an inclusive and people-oriented world. This enlightened approach to innovation is basically for “doing well by doing good” [9]. Today’s digital connectivity and globalization provide new tools and opportunities where governments, business enterprises, social organizations, and ordinary citizens can co-create shared visions for the greater good. These entities are dream makers [9]. The shared goal of dream makers is to create a future where people are happy, organizations thrive, governments are just, and nature flourishes. There are many examples of dream makers, from individuals, social entrepreneurs, NGOs, business firms, and governments. We present only a handful of examples here.

(1) Social entrepreneurship (SE)

SE is a form of convergence innovation, converging the passion for social good and entrepreneurship for effective value creation [18]. Many SE projects we are familiar with are based on personal funds of committed individuals, crowdfunding, donations, fees, or grants from governments, NGOs, or businesses. SE can be both for profit or non-profit. Here, we provide only two examples:

- Grameen Bank, Bangladesh
Founded by Dr. Muhammad Yunus, it provided micro loans to people to improve their economic health.
- The Institute for One World Health, USA
Established by Dr. Victoria Hale, this first non-profit pharmaceutical company provides drugs to people in developing countries with infectious diseases.

(2) Dream maker projects

Dream makers are innovators who strive to be successful so that they do for the greater good. We provide only several examples of dream makers’ projects.

- Rid-All, USA
Established by three childhood friends, it reclaimed 3 acres of abandoned land in Cleveland, Ohio, and transformed it into a thriving urban farm and learning center. It provides healthy food to companies, institutions, and community. The three young black friends truly optimize the power of shared vision in transforming dreams into reality for the greater good.
- WakaWaka
Founded in the Netherlands, it provides solar-powered LED light to some 1.2 billion people around the world. There are more than 200,000 WakaWakas in 43 underdeveloped countries.

- EAT Initiative
Founded by Dr. Gunhild Stordalen, it strives to meet the global challenge of providing people with a healthy and nutritious diet within safe environments.

Large “I” for a smart future

A smart future is an aspirational state where people are overall happy by continuously improving their quality of life, while organizations thrive, governments pursue shared goals, and the environment flourishes. In other words, innovation should enable people to improve well-being. The Gallup Organization and Healthways have collaborated to develop the Global Well-Being Index [19]. The index includes five well-being criteria; this author added the sixth:

- 1) Purpose—enjoy pursuing set goals and daily activities
- 2) Social—have nurturing relationships, affection, trust, and friendship
- 3) Financial—manage comfortable life style and security for the future
- 4) Community—enjoy the community and security and have pride in the country
- 5) Physical—enjoy good health and have energy for daily activities
- 6) Personal growth—ability to learn, explore, grow intellectually

To create a smart future, we need innovation which can disrupt the barriers to the ideal state. Large “I” should be innovations that can remove many challenges and problems on the path to the greater good. Already there are a variety of new technologies and convergence practices that are available for large “I”. These technological advances, however, are not sufficient to tackle the complex and uncertain reality. We also need many social, psychological, managerial, and political research to support large “I”. Some of the innovations needed to disrupt the barriers to the aspirational smart future are suggested as follows:

- Matching human talent and jobs
While technological advances have greatly helped improve productivity, human resource remains the most important asset in organizations. Leadership, motivation, job satisfaction, enrichment, job design, communication, and team management are all important human resource management (HRM) practices. Strength-based HRM [20], positive psychology, and psychological capital (PsyCap) [21] advocate that people are most productive and engaged when their job and talents are matched well. Gallup suggests that matching human talents and jobs will greatly increase GDP (several trillion in the USA) while improving happiness of workers [22].
- Creating new jobs with long life cycles
The conventional belief was that technology creates more jobs than it destroys. However, recent studies have shown that around 47–50% of job activities can be replaced by technologies of today [23]. Furthermore, technologies are making many jobs’ life cycles increasingly short. Thus, we need innovations that create many knowledge-intensive or personal service jobs that have relatively long life cycles.
- Leveraging senior citizens
Population in almost every country is aging rapidly. This trend is the result of several factors including drastic decrease in birth rates, increasing longevity of

people with the improved healthcare, improved quality of life and the like. Japan already has about 25% of its population with people over 65 years of age. The working population simply cannot generate sufficient amounts of income and taxes to support the population. We need smart innovations that can leverage the knowledge and experience of senior citizens who can produce value for many organizations [5].

- **Green and sustainability management**
There have been numerous major natural disasters lately, caused by global warming. The world needs smart innovations to clean up the damaged environment and make proactive actions to prevent further deterioration. Many organizations, including governments and NGOs, have initiated green and sustainability-related innovations for environmental protection as well as for financial gains.
- **Design thinking**
The traditional decision making process assumes that the problem under study is well defined and some of the associated variables and parameters are already known. Design thinking, on the other hand, takes into consideration that the decision environment, objectives, variables, and relationships are fluid and dynamic [24]. The main purpose of design thinking is not just for the better bottom line of organizational performance but rather for a much noble concept of what is “good” for society and humanity. Design thinking that can alleviate social ills and problems would help create a smart future.
- **Innovations in education and healthcare**
For a smart future, transformative industries need to be reinvented continuously through innovation. Education and healthcare are two most important areas where continuous innovation S-curves need to be generated [2]. Already there are some fundamental changes occurring in education. For example, Computer Science for All (a US program initiated by President Obama in 2016), Pathways in Technology Early College High School (P-TECH) for “new collar” workers of the future (developed by IBM CEO Ginni Rometty), Minerva School (a hands-on approach to college education), massive open online courses (MOOCs), and Singularity University are good examples. The healthcare industry is also transforming itself to become more accessible, economical, and technically advanced by adopting advanced AI (Watson), robotics (Da Vinci surgical robot), smart sensors, and technology convergence.
- **Going from “the probable” to “what is imaginable”**
The global economy is dynamic with various forces interacting in an unpredictable fashion. The “butterfly effect” indicates that a seemingly insignificant small event in one part of the world may cause tsunami effects in other remote areas of the globe. Dynamic capabilities of the organization are essential to streamline strategic plans that are conducive to the fast changing environmental forces [25]. Thus, future smart is necessary to predict “the probable” of the future. But this approach is not sufficient for creating new products/services, ventures, new customer values, new markets, and new business models. Pursuing “what is imaginable” is especially imperative for creating a smart future for the greater good through innovation [8].

Conclusions

In this paper, we defined innovation as the actual application of new ideas or technologies to create new or additional value in fundamentally different ways. The conventional

purpose of innovation was to create value for the enhanced organizational performance. This is small “i”. We believe innovation should have a much nobler and inspiring goal, creating a smart future for the greater good. This is large “I”. Many people, organizations, governments, and countries aspire to create a smart future where people are happy, organizations thrive, and environment flourishes [9]. For example, the government of Singapore has a national priority project to build a smart nation, the same basic idea of large “I”.

Most countries that are trying to create a smart future through innovation emphasize hardware-focused programs such as development or enhancement of research infrastructure for science and technology, research commons, science-technology-engineering-mathematics (STEM) programs, structural plans and budget of the government, and the like. These are visible and obvious elements that are important components of productive innovation ecosystem. However, there are more important software type cultural factors that can nurture and grow innovation [2]. These are social justice, universalism under the law, culture that values creativity and entrepreneurship, leadership for co-creation of shared goals, transparency and accountability in the government, respect for integrity and collective discipline, culture that advocates change over status quo, and the like.

Today’s digital age is characterized by dynamic change, uncertainty, and complex co-existence of opportunities and challenges. We should aspire for the best outcome from innovation efforts, creation of a smart future for the greater good. This lofty goal may seem like an unreachable utopia. The road to a smart future for the greater good is arduous but reachable when we are determined to apply our collective wisdom with the support of ever advancing technologies. It is the time to pursue large “I”.

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