Towards Economic Innovation in New Normal Era: Triangle Perspective of Technology, Knowledge, and Artificial Intelligent

Khin Sandar Kyaw[1(✉)], Wittawat Didyasarin Sattayaraksa[2], Tharnpas Sattayaraksa[1], Praman Tepsongkroh[3], and Chanwut Thongkamkaew[1]

[1] Department of International Business Management, Didyasarin International College, Hatyai University, Hat Yai, Thailand
khinsandarkyaw@hu.ac.th
[2] Hatyai University, Hat Yai, Thailand
[3] Didyasarin International College, Hatyai University, Hat Yai, Thailand

Abstract. In the era of Covid pandemic, the big revolution of economic has emerged where the role of creation is viewed as the significant factor to survive and stand for all various types of business. As a consequence of emerging challenge in innovation-based economics, perspective of technology knowledge, and artificial intelligent is needed to investigate as three critical angles to rise up the global economic in new normal era to develop our society with the new innovation business culture.

Keywords: Innovative Business · Entrepreneurship Education · Digital Revolution · Knowledge Collaboration · Product Innovation

1 Introduction

Since entrepreneurship business has become a critical role for economic development, innovation is needed to consider as the critical factor to reinvigorate a business, create new value and boost growth and productivity. In fact, innovation can be defined as new processes, services, or products with the positive change in business where including improving existing methods or starting from scratch. Moreover, the global economic had declined because of the impact of pandemic and which gave the lesson to accelerate innovation in business by providing the cases of firms developing breakthrough products in record time. In other words, innovation is imperative for economic survival and success in the turbulent market circumstance of the digital era, mainly more so in the pandemic crisis. Moreover, several business research reports the key benefits of innovation for successful business development such as gain profits, ahead of the competition, and advantage of new technologies.

This paper illustrates the literature review regard with the economic innovation in different fields from the perspective of technology, knowledge, and artificial intelligent. Moreover, smart business innovation concept is presented as the trend for new normal era.

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2 Covid-19 Pandamic and Business Challenge

On March 11, 2022, the World Health Organization proclaimed the coronavirus (COVID-19) outbreak a pandemic; the course and effects of the pandemic crisis are still developing globally. Pandemic crisis impacts all the sectors of business including trading, travelling, education, medical and health care, agriculture, food production industry, and so on. However, problems and challenges are supposed to regard as the big opportunity. In [1], entrepreneurship business has become foster as the transformation of innovation era to combat pandemic crisis since entrepreneurial vision will be crucial for unforeseen challenges. In [2], international entrepreneurship has become the critical role in the post pandemic world since innovation is the remedy to recover from crisis. Moreover, [3] stated to counteract the pandemic, entrepreneurs provide the necessary products and services and restore and reconstruct shattered social networks. Entrepreneurship is the act of adapting current processes and discovering new ones, finding or developing new commodities or services, or new ways to use current ones, as well as advancing novel ideas and perspectives on the world. Commercial and social entrepreneurs are the two primary categories of business owners.

3 Concept of Economics Innovation in New Normal

To shield companies from the effects of the present shutdown and to lessen the repercussions of upcoming crises, entrepreneurial ecosystem participants with a policy analysis declared and apparently adopted the design of innovation. Regard with the concept of innovation in economic, there are several definitions [4] such as the creation of new or improved products, the introduction of new production techniques, the growth of new supply and sales markets, and the reorganization or restructuring of the business.

Several economics innovations have been emerged during and post-pandemic in various business industries such as farming, industry, food, education, service, startup business, etc. Innovation is derived mainly from the source of intelligent-based transformation and value- based recalibration. On the other hand, other factors impact the development of economic innovation such as digital technology, smart technology, artificial intelligent, and so forth. The following subsection will present the role of digital transformation, artificial intelligent and smart technology-based economic innovation.

3.1 Digital Transformation for Economic Innovation

The emergence and deployment of digital technologies in emerging markets significantly force the innovation potential in businesses. Moreover, the revolution of digital technology has been positively impacted in business sector in terms of industrial production, business model innovation, etc. In [5], digital economic innovation caused in positive changes in the industrial structure and assisted productivity improvement and cost reduction in the production sector. Therefore, technology innovation can be regarded as a key driver for economic growth. In fact, digital transformation has been speeded up by the main technologies of the Fourth Industrial Revolution (4IR) such as artificial intelligence (AI) and autonomous driving. In [6] the research illustrated that international markets

and digital technologies are positively related with innovation. Moreover, the digital technologies and international markets will be more involved in mutual relationships. When a company's entrepreneurial orientation increases.

3.2 Smart Business System

Since the economic has been dramatically declined since 2019 due to the impact of pandemic, the clients' demand has been moved to comprehensive business systems which offer clients innovative and cost-effective solutions in their business. Fundamentally, smart business system aims to facilitate end-to-end solution with the achievement of maximized productivity while ultimately driving down cost. In addition, savvy companies utilize cutting-edge technologies to implement their business strategies, achieve operational excellence across all internal core operations and the external supply chain, and integrate information technology development into their operational teams. A defined solution, anticipated compensation, a financial plan, predictable cash flow, and open marketing are the main characteristics of smart business.

4 Role of Technology in Open Innovation

Open innovation is a business management model which involves collaboration and co-creation with external organizations such as tech centers, universities, and other knowledge sources. The external contributions enhance the quality of the ideas and therefore the technological development is faster, and the risk is lower. Business organizations design open innovation practices in several way including alliance between organizations, innovation ecosystems, crowdsourcing competitions, and research chairs in universities. In other words, open innovation practices the distributed innovation process based on purposively managed knowledge flows across organizational boundaries.

The innovation process has become more open to capture and transfer greater resources for the various implementation phases between the internal and external firms as a result of much evidence demonstrating that digital and technology has become a critical source of innovation in many firms to manage the innovation processes through flexible access and sharing the implicit knowledge. Big data, Cloud computing, Internet of Things (IoT), knowledge management systems, product life cycle management systems, rapid prototyping systems, augmented and virtual reality, artificial intelligence, and cyber-physical systems are mentioned as the popular technologies for business innovation in [7].

4.1 Innovation in Agricultural Industry

Since agriculture is the pivotal role of economy in developing countries, the innovation process is viewed as a critical part of economic program to enhance the economy by reducing poverty and food insecurity. In [8], the impacts of adopting agricultural innovation using technology on production, social and economic outcomes are rises significantly over time. In fact, the contribution of technology in agriculture innovations can promote the farm enterprises by aligning with both progressive productivity gains

and incredible quality. Digitalization is extensive in present-day and the most significant trends for global agriculture with the purpose of transformative potential and associated pressures, in the foci of a huge number of principle research organizations. Several applications of innovation in agricultural sectors involve conservation of soil nutrients, and other natural resources for soil fertility improvement, enhancing pest management, aiding farm mechanization, and so forth. Some researcher conducted meta-analysis of the efforts by the national and international organizations to enhance society welfare in developing economics through adoption of agricultural innovations and technologies over the years and they reported as it seems to focus more on the dissemination of new high-yielding varieties of crops and improved animal breeds. Moreover, the controller and automation technologies has become the innovation assist for the development of reduction greenhouse gas emissions, promoting water use efficiency and soil conversation project in agricultural sector [9]. On the other hand, computer-aided intelligent system has been demanded in all aspects of farming sector to assist as the artificial intelligent-based smart farming with the expectation of risk-reduction for productivity and raw products' quality control.

As digitalization transforms agriculture, there has been developed the conceptual framework for the agricultural innovation system (AIS) [10] with relation to the effects of technical advancement on policy. It has been demonstrated in [11] that using cutting-edge technologies to direct business operations during a community lockdown offers both competitive benefits and the ability for existing business models to survive. Additionally, a number of technologies, such as virtual reality, the Internet of Things (IoT), and new communication channels offer social business development, customer relationship management systems, remote operations, and cost-cutting measures. Big data analytics also supports company decisions in the current demanding business environment.

4.2 Innovations in Food Industry

Food industry has been transformed from conventional to innovation-based production process in industry 4.0 smart factory [12]. Although innovation is derived from several approaches and techniques in food industry, technology has been played mainly for innovative food industry to enhance the production rate with other benefits. Therefore, innovation process is highly demanded for the whole production chain including suppliers, producers, and customers. In other words, companies are considered both technology and management as the key roles during the digital transformation of food industry. Industry 4.0 involves "nine pillars" of advanced technology to optimize the manufacturing process environment by automation process. Although Internet of Things, Big data, Horizontal and vertical integration of systems, simulations, Clouds, augmented reality, autonomous robots, 3D printing, and cyber security are played the roles as nine pillars in Industry 4.0, Internet of Things and Cloud Computing are more common concepts and digital technologies.

In [13], Multiple essential food sector services, including aircraft, food services, supply chains, and export and import markets, were shut down by the COVID-19 pandemic. The pandemic has a direct impact on four food-related issues: food safety, bioactive food substances, food security, and sustainability. The innovations with the most potential in

the new era are those that rethink how we consume food and use ICTs, blockchain in the food supply chain, and other Industry 4.0 applications.

According to the research survey for the innovation incentives of the enterprises in [14], there was high demand of product innovation in SME business during pandemic and service innovation was followed as second high demand. However, organization innovation was not popular for the survey was conducted among 46 SMEs and process innovation had one third demand rate. Overall survey results showed that enterprises intended to accelerate the innovation in food industry business.

4.3 Innovation in Sustainable Energy Management

In the pandemic era, there are increased demands for the efficient use of resources, particularly energy. According to [15], the fresh wave of the Covid-19 pandemic prompted Ukrainian universities to cut all costs. This presented not only a chance for Ukrainian universities to save energy but also a significant task to maximize internal and external resources. As a result, the university's energy resources were conserved by adopting unconventional renewable energy sources. with the aid of innovative technologies and materials.

Moreover, [16] stated that advanced technological solutions assisted to mitigate unexpected events in energy consumption. The research analysis result demonstrated that the innovation of sustainable energy resources was conducted using information and communication technology (ICT) solutions in energy management to maintain and superintend the energy balance towards modern and smart high-renewables grids.

Since the Corona virus has decimated the world economy and is slowing it down, a low-carbon energy system is required for the future of the fossil fuel energy system. Governments and legislators are attempting to solve the problem by using hydrogen and fuel cell technology as alternative energy sources in the future. Innovative long-term policy framework for sustainable development of hydrogen energy system in United Nations for post-pandemic age has been developed by [17]. Deep carbonization across all energy demand sectors is required for the global energy system to undergo a revolutionary transition from the fossil fuel energy system of today to a low carbon energy system. development.

[18] has presented innovative new clean energy generation system using circular economy strategies towards a sustainable urban system in China during COVID-19 pandemic. The innovative proposal featured the cascading use of industrial waste heat to create a symbiotic relationship between manufacturers and the reuse of batteries as energy storage devices. Compared to the business-as-usual scenario, the results of the innovation indicated that a circular economy scenario reduced final energy consumption by 7.1 Mtoe (34%), 14.5 Mt CO2 emissions (40%) and 592 t PM2.5 emissions (43%). Moreover, the circular economy solutions outperform the new policy scenario by at least 7 percent.

4.4 Innovation in Tourism Industry

Innovation can be regarded as the critical strategic features to assure the development and sustainable wealth for every business industry especially where markets are saturated

and clients choose products and services from all around the world, for instance, tourism industry. Most of the innovation in tourism area has been performed with the assistance of Technology, for instance, Internet technology for Google navigation to conceive the location on the earth's surface as a possible candidate for a visit. In [19], Forrester American research company has shown that travel is the biggest online business globally with the help of Internet Technology.

In addition, the present prevalence of smart technology has facilitated the transition of novel tourism services. Smart tourism is an individual tourist assistance system within the context of information services and comprehensive technology. In [20] Most vacation locations are dependent on smart technology experiences such as informativeness, accessibility, interaction, personalisation, and security, therefore the emergence of smart tourism technology creates new potential for tourist growth. The study indicated that smart tourism technology has a considerable beneficial effect on traveler satisfaction. Specifically, accessibility is the most essential aspect influencing the smart tourism technology experience, and satisfaction with the travel experience has a beneficial influence on both visitors' enjoyment and their propensity to return. In fact, smart tourism has become popular trend in global tourism sector. In [21], smart tourism represents a new direction implying a significant influence on tourist destinations, enterprises, and also tourists themselves in Chinese tourism market. In [22], smart tourism lift up the reliance of tourism destinations with the assistance of ICT that transforms the massive amounts of data to into value propositions.

4.5 Innovation in Medical Industry

Although the ongoing Covid-19 pandemic has adversely affected the health and wealth of nations globally, it has also resulted in subtle positive growth of innovative health technologies [23]. Innovation in health technology consists of the spectrum of health system interventions including prevention or health promotion strategies, diagnostic and therapeutic strategies, and complex strategies such as organization of healthcare delivery.

In [24] numerous innovation projects with huge and disruptive technological changes in the healthcare sector have been emerged in the era of COVID-19 pandemic. To overcome the crisis and save the society, a number of open innovations that went beyond organizational boundaries and involved collaboration were created, including quick design and manufacturing of personal protective equipment (PPE) and medical devices as well as testing, treatment, and vaccine technologies.

In [25] the research explored the technology-based innovation of contactless healthcare services in medical and healthcare industry in pre-, during-, and post-pandemic era. Intangible interactions based on cutting-edge technology have replaced personal client contacts as the predominant mode of service delivery since the advent of digital transformation. For instance, modern technologies like artificial intelligence (AI), the Internet of Things (IoT), virtual reality (VR) and/or augmented reality (AR), big data, and cloud-based platforms are typically used to supply contactless services. Additionally, contactless healthcare services will be expanded into the creation of smart healthcare protocols based on the use of smart and artificial intelligence in the future for the treatment, prognosis, and prevention of many sorts of infectious illnesses.

4.6 Innovation in Education Industry

One of the prominent innovations in education industry during pandemic is the concept of virtual learning framework using the digital transformation including technology, knowledge, and AI techniques. According to the research analysis result in [26], In times of crisis, the use of digital technologies has changed education globally toward innovative, creative, and solution-focused education. Simulations and digital models on the cutting-edge educational platform may help pupils clearly comprehend a variety of disciplines. Since learning can now be accessed virtually through online technology, opportunities for students to enroll in classes around the world have increased. As a result, students and instructors can now create online groups or virtual communities where information can be shared and discussions can take place conveniently around-the-clock. The use of digital applications and technology allows for quicker and more succinct performance review assessment.

In order to accommodate the unexpected changes imposed by the current Covid-19 pandemic, education industry has been transformed from traditional classroom to virtual classroom with the assistance of several technologies by saving time, and maximizing learning, teaching, and administrating by effectively working from home without communication lacuna. Several technologies including digital, wireless, sensor, and smart technologies contributes to innovation of education industry. The concept of smart university entails the incorporation of digital, innovative, and internet-based technologies to enhances the education, research, and work experience of stakeholders and promote the betterment of the society at-large [27].

[28] claimed that while the COVID-19 pandemic is still causing havoc around the world, technology has been mostly used to encourage educational innovation. In order to provide learning materials and classes via videoconferencing and online learning platforms employing school-based intranets and messaging platforms, teachers and schools have been resourceful in adopting a number of technology-based tactics as alternatives to the traditional classroom.

According to [29], the growth of information technology enables the widespread adoption of online learning as an element of educational innovation in the wake of the COVID-19 pandemic. The flexibility, information accessibility, global reach, equity, innovation, and efficiency of online education are just a few of the benefits that make it attractive to students, and this is why educational institutions all over the world are now offering degree-granting distance education and hybrid education programs. In the aftermath of COVID-19, online education is still quite essential. Online education will coexist alongside traditional education to offer more educational possibilities, and by adding artificial intelligence and mobile learning, it will improve educational innovation and promote educational justice.

Digital technologies have been played as a gateway to overcome the challenge of extending classroom learning to the home in the COVID-19 outbreak [30] According to an analysis of studies on the use of digital technology in education, educational institutions are largely dependent on the development of the Internet and digital networks. As a result, nations with high internet infrastructure and devices can react more effectively to operate via distance learning during a pandemic outbreak. Furthermore, several

experts came to the conclusion that even after the pandemic outbreak, distance learning via virtual online classroom may be feasible with the current infrastructure.

5 Role of Knowledge in Innovation

Knowledge currently serves as a commodity in a knowledge-driven economy, where it is used to control innovation. The poll at the European level indicates that the innovation process and strategy are impacted by a knowledge-driven economy. The traditional theory of innovation based on research (technology-push theory) and interactions between businesses and other actors has been superseded by the social network theory of innovation based on knowledge. Smart business system has been utilized in several applications such a smart farming in agricultural sector, smart food processing in industrial sector, smart travelling in tourism sector, smart service in business organization sector, smart healthcare in medical sector, smart delivery in transportation sectors, and so forth.

6 Role of Artificial Intelligent in Business Innovation

Since artificial intelligence technology has been emerging last 60 years, the role of AI has played tremendous impact on business innovation model in the role of customer segments and relationships, key resources, key partnerships, key activities, channels, revenue streams, value positions and cost structure.

In [31] business innovation is the innovation of business model by changing the basic logic of enterprise value creation to uplift customer value and enterprise competitiveness. The expression of value position is to promote the business innovation by conducting risk suppression and price reduction. There are several applications that utilize AI for business innovation, for instance, AI-based innovation for commercial banks in the management of financial risk exposure and examining and regulating the overall Information Technology framework in banking system; AI-based innovation for telecommunication industry to replace with auto service system; AI-based innovation for publishing industry to provide the best qualities.

7 Business Innovation Challenge

Organizations are expected to innovate in response to a variety of reasons, including consumer expectations, lifestyles, new technologies, markets, and structural changes since business innovation is a means of ensuring the survival and development of life and society [32]. Business innovation involves the development of new products, processes, services, and organizational solutions. However, a universal definition of innovation is defined with six attributes such as stage including creation, generation, implementation, development, and adaptation; social including organization, enterprise, customers, social system, employees, and software developers; means including technology, idea, invention, creativity, and market; nature including new, improved, and changed; type including product, service, process, and technique; and objective including success, and rivalry.

On the other hand, there was a big implication of the COVID-19 pandemic for economies, societies, and enterprises and therefore business organizations need to prepare for the flock by building, reinforcing, and developing antifragility to sustain their business since many collective behaviors and consumer choices were changed. However, business organization need to turn from problem into opportunities and be more resilient to change with innovation strategy since innovation is the therapy of adaption to the circumstance of customer demand change suddenly. Three basic categories of innovation exist: managerial innovation, non-technical innovation (such as organizational and marketing innovation), and technology innovation (such as process and product innovation). However, technical advancements in industry 4.0 technology helped the need for essential medical supplies, medications, and top-tier IT solutions to meet business challenges even during pandemic times develop quickly.

A fifth industrial revolution may also result from the COVID-19 pandemic, according to the industrial research community. Furthermore, since substantial technical advancements were prompted by natural disasters and infectious disease outbreaks, smart manufacturing technology will be increasingly in demand. To fulfill their commercial and industrial objectives, each organization's management system and enterprise culture must be integrated with the principal creative. Innovation in management is now essential for enabling rapid and adaptable reactions to market signals and obstacles, as well as for the implementation of strategies.

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