The Role of Modern Technologies on Entrepreneurship Dynamics Across Efficiency and Innovation-Driven Countries

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Abstract The present research paper is focused on global trends of modern technologies (such as blockchain, mechatronics, IT, artificial intelligence, and augmented or virtual reality) that affect entrepreneurial activities in the short and long run. Research on technology's effects on business development is gaining momentum.

To examine the role of modern technologies on entrepreneurship dynamics in high-income countries, the authors conducted semi-structured qualitative interviews with 16 entrepreneurs from 4 countries (4 entrepreneurs per country, of which 8 came from countries that entered the EU in 2004 [Lithuania and Malta] and 8 from innovation-driven Canada and South Korea. We backed the conceptual matrix of modern technologies' effects on business with the GEM data for South Korea and Canada and paired GEM countries to Lithuania and Malta (Poland and Latvia for Lithuania and Cyprus for Malta).

The purpose of the research is to examine the role of modern technologies on entrepreneurship dynamics in high-income countries (in the efficiency and innovation-driven categories). *The research question* is how to leverage the economic and social value-added of entrepreneurship activities via modern technologies, create synergy among stakeholders, and reach business sustainability. *Our methodology* combines primary and secondary data analysis: The literature review and secondary GEM 2018/2019 data were supported by primary, qualitative, and semi-structured interview results with technology-driven entrepreneurship experts from four high-income countries (Lithuania, Malta, Canada, and South Korea), which backed the conceptual model created after the scientific literature review and GEM 2018/2019 data analysis.

Keywords Entrepreneurship · Modern technologies · Social value · Business sustainability · Efficiency-driven countries · Innovation-driven countries

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1 Introduction

The literature on the efficiency of modern technologies in business is currently gaining momentum, along with new market drivers, such as collaboration via digital hubs (while linking related and supporting industries), social innovation, corporate social responsibility, shared value economy, stronger environmental focus, the emergence of businesses (which are centered on organic and natural production), healthcare/well-being, and demographic challenges as well as the interdisciplinary, multifaceted concepts of entrepreneurial activities. Consumers' sophistication and the above-mentioned trends encourage entrepreneurs to focus on the quality of products via collaboration and knowledge-sharing among stakeholders. For instance, according to Hal Wolf (2019), HIMSS president and CEO, it is critical to bring innovators together to an open source platform that enables knowledge and resource-sharing and new concept development. Aziz et al. (2017) underscore the role of legal harmonization of innovative organic/natural products because legal framework conditions are developed and harmonized at a slower pace than technological and research functions.

Considering demographic changes, in order to create brand awareness and market share, entrepreneurs should focus on gathering community and engaging millennials via modern technologies. The spread of modern technologies' culture reflects millennials' characteristics. For instance, observation of over 70 millennials led Kurian et al. (2017) to a description of the millennial consumer, covering a set of traits such as technology-intuition, focus on a holistic approach, orientation to the newest technological solutions, insufficient consistency and sustainability in terms of career, the increasing role of culture and the willingness to optimize work-life balance, engagement in innovation processes, and adaptability to volatile market conditions, as well as social innovation. Moreover, 84% of millennials indicated as important the opportunity to allocate resources to environmental, social, and governance challenges (Morgan Stanley Survey 2018) as well as security and digitalization.

The analysis of the role of modern technologies on entrepreneurship calls for social value-added aspects, such as job creation, social inclusion, higher quality of living (Santana 2017), and technology-based entrepreneurship, which could help contribute to sustainable regional policies and social innovations. Social entrepreneurship is also seen as important by the International Finance Corporation (2019); the encouragement of young social entrepreneurs would be impossible without technologies uniting investors, legal policy experts, and social innovation enhancers. The availability of resources can be increased by projects employing specialists of different ages, which helps different generations achieve synergy among themselves.

Education is another key entrepreneurship condition for generating economic and social value-added. The European Commission expert Duell (2018) addresses the role of education on business development, which can manifest in forms such as training, counseling, mentoring, coaching, financial support, and many others.

Therefore, knowledge and competence enhancement are critical for potential young entrepreneurs. Synergy among different generations can only be reached via digital hubs where each generation enables cost-cutting, higher quality, and greater social value. Therefore, closing generation gaps can lead to business sustainability, effectiveness, and efficiency. Moreover, younger generations can help to select and use modern technologies, while more experienced experts can help younger entrepreneurs to apply business intelligence tools, to make effective solutions, and to execute and achieve higher productivity/profitability.

The review of research regarding technology's effects on entrepreneurial success (Saura et al. 2017; Etzioni and Etzioni 2016; Diakopoulos 2016, etc.) illustrates that some key entrepreneurship concepts were first defined in the past 3–5 years. Thus, many technologies, trends, and approaches to technological efficiency must still be investigated further (including artificial intelligence, digital hubs, robots, and augmented reality), while key strategic collaboration projects can prompt innovation, cut costs, and create greater value for future generations. Based on the Accenture Technology Vision (2019), distributed ledger technologies, artificial intelligence, extended reality, and quantum computing are those technologies which should be implemented in cutting-edge enterprises in order to attain sustainable growth.

Human resources link consumers with advanced technologies and help manage big data sets. Aunjum et al. (2017) highlight the importance of human resource and talent development, inspiring employees, creating community spirit (Husain 2013), improving communication (Shanga et al. 2017) and team-building capabilities (Luthra and Dahiya 2015), along with developing team creativity, innovation, and talent (McEwan et al. 2017). The trend of digitalization will affect 67% of HR experts in a few years' run because of the growing demand of business intelligence instruments and analytical tools.

2 Conceptual Framework Development

Liaisons between modern technologies and entrepreneurship activities are tackled in scientific literature from different angles and in rather diverse contexts. Some authors, such as Bahena-Álvarez et al. (2019), emphasize the role of social entrepreneurship in the context of innovation (while tackling more the social value-added aspect of technologies); Berger (2016) analyzes the digital transformation in a specific industry (healthcare); Bom et al. (2019) address the topic of business sustainability (while focusing on cosmetics). Maduro et al. (2018) and Richter (2016) scrutinize the role of social impact investment, which may be an important prerequisite for entrepreneurship sustainability (if managers' and investors' interests are met), while Wendt (2017) goes one step further and monitors impacts on social stock exchanges. Thus, technologies can play an important intermediation and/or knowledge-sharing role among various stakeholders as well as bring more visibility and reduce information asymmetry.

The collaboration aspect is also related to social value creation: Sørensen and Torfing (2013) examine social value creation via collaboration, leadership, and public governance, while Wahid et al. (2019) cover social entrepreneurship aspiration aspects among educational organizations (Malaysian university students), which affect both technological competences and attitudes. Wascher et al. (2018) cover an important function of R&D transfer, while specifically focusing on social innovation labs as a starting point for social innovation. Hahn et al. (2016) emphasize more expansive R&D and marketing in parallel to investment efficacy and efficiency as well as more interactive knowledge-/resource-sharing communication among stakeholders. Ferguson et al. (2016) emphasize the role of high-tech and low-tech combination, which becomes more feasible thanks to digital networks and strategic collaboration.

Many scholars are focusing on analysis of technology's impacts via characteristics of various generations. For instance, Accenture's research, presented by Thompson and Blomquist (2017), identified the main characteristics of millennial investors, while Doorley (2019) examined the value-added of investment in youth, which is in line with Mashini and Cousin's (2017) insights on the role of young leaders and cooperative entrepreneurs. Some scientists, such as Santana (2017), investigate the dynamics of entrepreneurship in a region (for instance, the Mediterranean region), which reveals the importance of cultural and social norms within technology-entrepreneurship symbiosis. Some authors, such as Steigertahl and Mauer (2018), address a set of diverse aspects of this symbiosis via analysis of start-up dynamics.

In light of the postdigital revolution (Accenture 2019), companies face the issue of preparing their employees for more intensive usage of modern technologies or the changing role of human resources (KPMG 2019), along with embracing the phenomenon of digital marketing (Saura et al. 2017) and/or attention to holistic framework models of entrepreneurship conditions (GEM 2019). Moreover, special attention should be paid to education (Mykhailyshyn and Kondur 2018) given its strong liaison with cultural and social norms and the educational power of realigning attitudes and of perceptions of youth because education's effects are more pertinent when creative leaders connect various stakeholders (Uusi-Kakkuri 2017) via modern technologies. Innovation potential could be unleashed via collaboration between educational organizations (universities and schools) and businesses. According to Lyons (2015), before investment in new technologies or upgrading the existing ones, it is important to develop a creativity system and innovation culture first as well as contribute to the acknowledgment of technology's effects at each hierarchy level.

While emphasizing culture first, then focusing on technology and strategy, it may be easier to reach equilibrium among stakeholders' expectations (between individual and organizational goals). The creative leaders' role in encouraging the use of modern technologies, realigning attitude, and linking stakeholders can be described as transformational. For example, Uusi-Kakkuri (2017) focuses on transformational leadership as the intermediary enhancing the creativity and innovation culture.

Yonazi et al. (2012) add modern technologies' value-added in gathering community and realigning cultural and social norms; engaging society is also highlighted by Gálvez-Rodríguez et al. (2017). To use the untapped potential of modern technologies, it is crucial to understand the context of a country (particularly the social capital dimensions or cultural social norms), or more specifically fear of failure, social trust, and ethical and moral norms (Singh et al. 2017). Paynton et al. (2016) note that technologies facilitate more interactive and transactional communication; thus, it requires more improvisation and tolerance of mistakes and failures. Digital media technologies and various collaboration initiatives are emphasized by Jain and Yadav (2017) with a focus on social value-added or solving social challenges of various communities (Zaimova et al. 2012). Companies are encouraged to monitor their progress in creating economic and social value (Ferguson et al. 2016).

While supporting the conceptual framework of the scientific literature review, we have structured the research data accordingly (see Fig. 1). In terms of modern technologies' enhancement and development, the research relied on certain indicators. Improvement-driven opportunity/necessity motif, fear of failure, and perceived opportunities/perceived capabilities are related to national characteristics, which work as technological enhancement conditions, while intrapreneurship, innovation (how many entrepreneurs consider their business innovative and niche), a shared value economy, and GIGS are used as indicators of the perception, attitude toward technological improvement, and innovation development performance.

The pillars of the conceptual model were built relying on ten previous studies conducted by Lauzikas, Miliute, and other colleagues (for instance, Lauzikas and Mokseckiene 2013a, b; Lauzikas et al. 2015, 2017) as well as another ten scientific

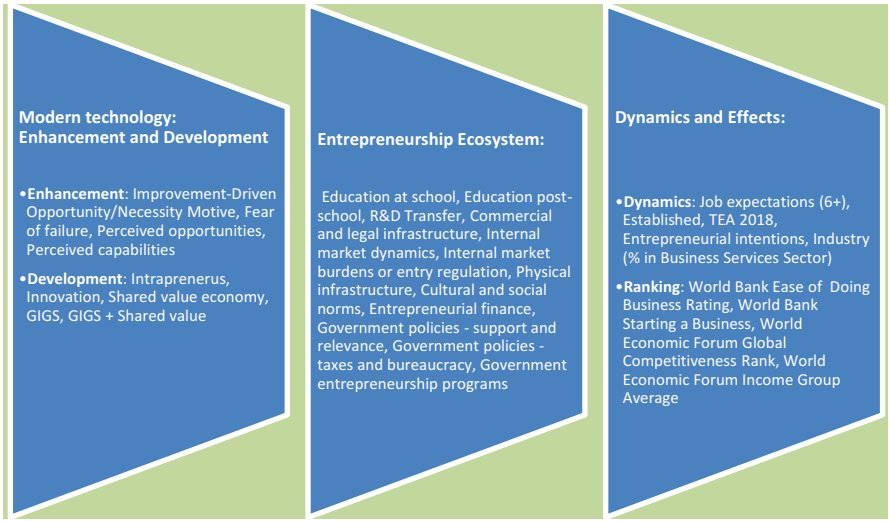

Fig. 1 The conceptual framework of technological impacts on entrepreneurship. (Source: Authors' own figure, based on GEM report 2018/2019)

literature sources related to key drivers and supporting infrastructure for entrepreneurship. While focusing on practical technological entrepreneurship practices, Badzinska (2019) linked academic and intellectual entrepreneurship with the entrepreneurship of commercial organizations implementing new technologies and innovative business solutions. Palma-Chorres and Montiel-Campos (2016) proved the existing relationship between creativity and innovation among 103 new technology-based firms. Sołtysik et al. (2019) linked technology with entrepreneurship via innovation for sustainable entrepreneurship and relied on empirical evidence from the bioeconomy sector in Poland. According to Sołtysik et al. (2019), innovation commercialization's success depended on many external and internal factors that may lead to more sustainable production and consumption models. Thomas et al. (2019) pointed out that a well-established ecosystem with a corresponding strategy and policy is necessary to develop entrepreneurship in a digital economy in a sustainable way.

The success of entrepreneurship activity may depend on digital technology diffusion, which can be enhanced by policy makers, R&D transfer mechanisms, or organizations that can provide advice and information regarding various development challenges. During the United Nations Conference on Trade and Development, the Enterprise and Development Commission (2018) emphasized the role of technology and innovation for the sustainability of entrepreneurship. Firms' ability to combine science, technology, and innovation can help to improve productivity if an adequate ecosystem of support conditions and organizations is established, technology-driven communication among stakeholders is smooth, and governmental programs and policies support technology usage among entrepreneurs. Such implications are in line with the findings of Karlsson et al. (2019) regarding the success of entrepreneurial ventures, considering a set of factors, such as location, networking, knowledge spillovers, and institutions that could be efficiently connected via modern technologies. To continue, Mazzarol (2014) relates entrepreneurial success to fostering the growth of the entrepreneurship ecosystem, which should be among the key priorities of local governments.

First, entrepreneurship education, knowledge sharing, and a lifelong learning system should be sufficient for technological skill enhancement across various organizations supporting entrepreneurship (in particular education, Lauzikas and Miliute 2017). Meanwhile, Militaru et al. (2015) connect the dimensions of technology and entrepreneurship sustainability via scientific and technical knowledge, which is necessarily a career choice and communication with other stakeholders in big technology-driven networks. Second, technology should be effectively and efficiently used by various organizations, related to GEM 2018/2019 entrepreneurship framework conditions (programs, policies, finance, etc.), which are involved in entrepreneurship enhancement. In-line with Gabor's insights (2019), we also rely on entrepreneurial framework conditions (described by Global Entrepreneurship Monitor 2018) as vital for the entrepreneurship ecosystem because they affect entrepreneurial opportunities, capabilities, choices, and the entrepreneurship dynamics of an economy.

The usage of modern technology is becoming more organic and natural for stakeholders; thus, to engage citizens and entrepreneurs and to gather community, organizations that directly or indirectly support entrepreneurship must use modern technologies (including social media, digital hubs, blockchain, and apps) in order to achieve the strategic collaboration synergy effect and greater economic and social value-added (Lauzikas and Miliute 2019a). Nambisan (2019) adds that digital technologies can form a hub that facilitates connections between diverse ideas and leads to faster and more innovative solutions for various challenges as well as potential synergy among stakeholders.

The conceptual model of this chapter is also related to a recent study regarding the transformational function and style of communication: Technology-driven communication is becoming more intuitive, transactional, and transformational; governmental programs and policies makers should understand that entrepreneurial ventures' success is measured by its growth, innovation, and sustainability (Lauzikas et al. 2012, 2013, 2014; Lauzikas and Miliute 2019b).

To test the conceptual model, the secondary data from various studies was collected and analyzed, which led to the collection of primary data with the aid of semi-structured interview questions (derived from the scientific literature review), which backed the conceptual model of this chapter.

3 Methodology

To examine the role of modern technologies on entrepreneurship dynamics in efficiency and innovation-driven countries, we conducted semi-structured qualitative interviews with 16 entrepreneurs from 4 countries (4 entrepreneurs per county, of which 8 came from efficiency-driven Lithuania and Malta and 8 from innovation-driven Canada and South Korea). The authors backed the conceptual matrix of modern technologies' effects on business with the GEM 2018/2019 data for South Korea and Canada and paired GEM countries for Lithuania and Malta, such as Poland or Latvia (Peers of Lithuania) and Cyprus (which incorporates similar development trends as Malta).

Moreover, we intend to rely on the positive experience of similar countries/peers (Cyprus for Malta and Latvia and Poland for Lithuania) which entered the EU in 2004 and experienced similar development trends due to common regulations and structural fund mechanisms. Canada and the Republic of Korea were chosen as examples of economic leaders in terms of innovation and the successful usage of modern technologies. Therefore, our chapter is relevant and adds value to both policy makers and entrepreneurs who offer or apply modern technologies for greater economic and social value-added.

Qualitative experts' insights were of significant value to our investigation, while primary qualitative semi-structured interview results were useful for both entrepreneurs and experts of governmental programs and policies. Research results also contributed to the development of technological organizations that can link their

stakeholders via new technologies and strengthen their performance via innovative strategies.

All 16 experts represented higher-income countries, based on the GEM 2018/2019 Global Report; they had a similar perception and knowledge regarding modern technologies (thanks to their entrepreneurship and technology usage experience in the compared countries) and provided important arguments regarding technological impacts, including economic and social value-added. The comparative analysis of the selected countries via comparison of GEM 2018/2019 data, World Bank 2019, Global Competitiveness Rank for 2018 (World Economic Forum 2019 by Schwab), and semi-structured expert interviews led to pertinent recommendations for both the countries that entered the EU in 2014 (Lithuania, Malta, Latvia, and Poland) and global innovation leaders of different continents (for instance, Canada and the Republic of Korea).

4 Assessment

4.1 Technology Effects Among Countries

The development axis of this chapter is centered on three factor groups: technology as an exogenous factor, dynamics and effects as endogenous factors, and all the GEM entrepreneurship framework factors can be related to the infrastructure of organizations contributing to entrepreneurship dynamics. While describing the impacts, we intend to track the world's rankings or indicators for entrepreneurship dynamics. The input dimension (which is rather diverse among the analyzed countries) shows the technological advancement level. For instance, shared value economy and GIGS are particularly prominent in South Korea with 6.2% and 14.3% of adults involved respectively, while innovation (niche and innovative products) is higher ranked in Malta's peer Cyprus (7/48) and Canada (5th out of 58), South Korea is ranked 17th, and Lithuania's peer Poland stands at the 45th position. As may be expected, the innovation-driven entrepreneurs from Poland and Cyprus were more capable in identifying opportunities, which translate to the fourth and fifth opportunity/necessity positions respectively. In order to catch up, Polish adults, similar to other representatives from CEEC, must be faster and braver in identifying and commercializing innovative ideas; thus, the negative effect of fear of failure should be mitigated by self-esteem and motivation programs. In terms of intrapreneurship, Canada, with experts' valuations averaging 8.6 (GEM, 2018/2019), has the opportunity to unleash intrapreneurs' potential and help them shift to diverse career choices (including independent entrepreneurs).

In order to better understand and explain the potential technology impacts on entrepreneurship dynamics in efficiency- and innovation-driven countries, we intend to check the GEM 2018/2019 data on the role of intermediary factors from entrepreneurship framework conditions, which in our conceptual model is related to

the role of various organizations. Later in this chapter, we will examine how modern technologies help these organizations contribute to the entrepreneurship dynamics of a country. The context of the strongest dimension within the entrepreneurship framework conditions' model should be further examined because of its role on business development and the efficiency of technology usage in corresponding organizations. Meanwhile, the weakest areas can be improved via modern technologies. For instance, the Baltic State Latvia (which is culturally and economically rather like Lithuania), along with Canada, should investigate the usage of modern technologies at schools. Cyprus has a stronger advantage in terms of education at the postschool level. The positive experience of the leading countries in terms of promoting an entrepreneurial culture among educational organizations (including the technological aspect of education) should be taken into consideration at the school and postschool level in South Korea (13th and 37th, respectively) and Poland (36th and 43rd, respectively).

Along with entrepreneurship-related educational practices, the selected high-income countries should pay attention to cultural and social norms in Canada (ranked 13th), where entrepreneurship dynamics are enhanced by cultural and social norms. Thus, one of the objectives of our independent qualitative semi-structured expert interviews was focused on technological efficiency in organizations dealing with cultural and social norms. South Korea and Poland should check and apply positive experiences of commercial and legal infrastructure improvement from higher-ranked Cyprus (14th) and leading Canada (6.07; 3rd out of 54) or Latvia (6.03, GEM average – 4.90). The government of Poland should focus more on orienting policies (taxes and bureaucracy) toward entrepreneurship, as according to this condition, this county occupies only the 44th position; while Cyprus should offer more entrepreneurship programs (40/54) as that might diminish other framework conditions. Apart from centering entrepreneurship enhancement around physical infrastructure, Baltic countries such as Poland (7.22, 9/54) and Latvia (7.02; GEM average – 6.32) should strengthen one of the most important dimensions of the entrepreneurship framework conditions – R&D transfer. Based on GEM data, Poland is ranked 32nd, while Latvia's value of 3.98 only slightly exceeds the GEM average (3.95).

It is interesting to note that, based on the GEM NECI index, the analyzed EU countries that entered the European Union in 2004 (Poland, Latvia, and Cyprus) are positioned at rather similar ranks (24th, 22nd, and 27th), which may be related to EU regulations and cohesion mechanisms; however, the examples of the Republic of Korea and Canada, in particular how to stimulate knowledge transfer from educational organizations to business via intermediary entities, may be of significant interest (as these countries are ranked 14th and 12th respectively). A similar situation is based on the Global Competitiveness Rank for 2018, provided in the Global Competitiveness Report by Schwab during the World Economic Forum 2019 (South Korea – 15/140, Canada – 12/140; Lithuania – 39th, Poland – 37/140; and Cyprus – 44/140) or World Bank Starting a Business (South Korea – 95.83/100, rank: 11/190; Canada – 98.23/100, rank: 3/190; Lithuania – 93.18, rank: 31/48; Poland – 76.95/100, rank: 33/190; and Cyprus – 91.24/100, rank: 52/190).

The 2004 EU entrants experience rather similar trends due to the similar development stage and entrepreneurship framework conditions; however, collaboration, education, and technological advancement may lead to the success of Estonia, which is among the most innovative and cutting-edge countries in the world, while Lithuania is capable of achieving a relatively high ranking (14th), based on the World Bank Ease of Doing Business Rating (International Bank for Reconstruction and Development/ the World Bank 2019). A high GEM ranking in terms of entrepreneurship intentions should be focused on by every nation in order to understand motives and characteristics of potential entrepreneurs as well as help them in business development processes. Among the selected countries, South Korea is ranked 13th, based on entrepreneurial intentions, which leads this country to occupy the second position (according to internal market dynamics) and calls for investigation about how the Republic of Korea encourages sustainability and a positive dynamic in entrepreneurial activities.

While using the potential of the strongest link of framework conditions and strengthening the weakest categories of factors through relying on the positive experiences of the leading countries, we make an assumption that the only way to enhance entrepreneurial conditions is via efficient use of technologies and education (Table 1).

4.2 Investment in Modern Technologies

Among the most frequently mentioned technologies, the dominant is IT (including blockchain, mobile applications, digital hubs, and embedded solutions). The experts also include augmented reality, virtual reality, artificial intelligence (as a part of IT), nanotechnologies, biotechnologies, mechatronics (which is also related to artificial intelligence), and lasers in modern technology. They all admit that within 3 years, the human resource development functions should transform from uniquely taking care of recruiting, remuneration, creativity enhancement, motivation, and career development to an intermediating between technologies and clients/customers.

Four experts from the Republic of Korea, three experts from Canada, and two experts from Lithuania and Malta emphasize the role of a shared value economy and strategic collaboration, which is critical for entrepreneurs to grow sustainably as well as to achieve synergy among stakeholders. Notwithstanding clear differences in development between efficiency and innovation-driven economies, all the experts identified the same development drivers in the four examined countries, such as CSR, social entrepreneurship or social value-added, environmental protection, shared value economy, collaboration, and high-tech solutions. South Korean and Lithuanian experts focused more on a shared value economy, lasers, biotechnologies, and IT (software applications), while Maltese and Canadian experts emphasized technologies, such as blockchain, i-gaming, and collaboration technologies. This cleavage was mainly found in inherited specialization of each country.

Table 1 Effects of modern technologies on entrepreneurship dynamics (comparison of GEM and other indices)

Modern technology	Republic of Korea	Canada	Poland	Cyprus
Perceived opportunities	45.7 (23rd out of 49)	63.0 (9th out of 49)	68.5 (6th out of 49)	45.9 (22/ 49)
Perceived capabilities	49.7 (24th out of 49)	55.9 (12th out of 49)	46.6 (29T/49)	45.9 (33/ 49)
Intrapreneurs	3.6 (23/49)	8.6 (1T/49)	1.9 (34T/49)	5.4 (14/49)
Fear failure	32.8 (28th out of 49)	42.3 (12th out of 49)	31.1 (33rd out of 49)	48.5 (6st out of 49)
Opportunity/Necessity	3.2 (14T/ 48)	3.3 (13th out of 48)	6.6 (4th out of 48)	5.7 (5th out of 48))
Innovation	29.9 (17th out of 48)	41.3 (5th out of 48)	12.2 (45th out of 48)	38.6 (7/ 48)
Shared value economy	c.a. 6.2%	n.a.	c.a. 0.2%	c.a. 1.8%
GIGS	c.a. 14.3%	n.a.	c.a. 0.6%	c.a. 1.4%
GIGS + Shared value	c.a. 1%	n.a.	c.a. 0.1%	c.a. 0.5%

Dynamics and Effects	Republic of Korea	Canada	LT	Poland	Cyprus
Entrepreneurial intentions	31.0 (13/48)	14.5 (33/48)		9.5 (38/48)	15.3 (28T/48)
TEA 2018	14.7 (14/48)	18.71 (10/48)		5.2 (45/ 48)	3.9 (48/ 48)
Established	c.a. 12.5%	c.a. 7.5%		c.a. 12.6%	c.a. 5.1
Job expectations (6+)	12.8 (34/ 48)	20.7 (21/48)		11.5 (37/ 48)	22.4 (19/48)
Industry (% in Services)	6.9 (35/ 48)	14.7 (24/48)		20.1 (17/48)	25.4 (11/ 48)
World Bank Ease of Doing Business Rating (2019)	84.14/100; Rank: 5/190	79.26/100; Rank: 22/190	Rank 14	76.95/100; Rank: 33/190	71.71/100; R.: 57/190
World Bank Starting a Business (sub-index)	95.83/100; Rank: 11/190	98.23/100; Rank: 3/190	93.18 (31/48)	76.95/100; Rank: 33/190	91.24/100; R.: 52/190
Global Competitiveness Rank (2018)	15/140	12/140	39th	37/140	44/140

Entrepreneurship Ecosystem	Korea	Canada	Poland	Latvia (average GEM)	Cyprus
Education at school	3.4 (17/54)	4.13 (8/54)	2.73 (36/54)	4,13 (3,14)	3.25 (20/54)
Education post-school	4.36 (37/54)	4.78 (29/54)	4.03 (43/54	4,76 (4,79)	5.30 (13/54
R&D Transfer	4.01 (29/54)	4.8 (9/54)	3.77 (32/54)	3,98 (3,95)	4.17 (24/54)
Commercial and legal infrastructure	4.26 (45/54)	6.07 (3/54)	4.98 (27/54)	6,03 (4,90)	5.34 (14/54)
Internal market dynamics	7.2 (2/54)	4.24 (48/54)	6.71 (4/54	4,30 (5,27)	4.82 (33/54)
Internal market burdens or entry regulation	3.77 (38/54)	4.51 (20/54)	4.29 (26/54)	4,55 (4,20)	4.53 (19/54
Physical infrastructure	6.69 (21/54)	6.71 (20/54)	7.22 (9/54)	7,02 (6,32)	6.45 (29/54)
Cultural and social norms	5.12 (21/54)	5.58 (13/54)	4.84 (28/54	4,74 (4,84)	4.33 (40/54)
Entrepreneurial finance	4.66 (25/54)	5.27 (7/54)	5.24 (9/54)	4,78 (4,29)	3.77 (39/54)
Government policies: support and relevance	6.14 (5/54)	4.94 (14/54)	4.88 (15/54)	4,18 (4,37)	4.66 (19/54)
Government policies: taxes and bureaucracy	4.45 (17/54)	4.31 (20/54)	3.15 (44/54)	3,64 (3,88)	5.14 (8/54)
Government entrepreneurship programs	5.15 (17/54)	4.85 (21/54)	4.37 (29/54)	4,46 (4,49)	3.70 (40/54)
NECI	5.49 (14th)	5.54 (12th)	5.21 (24th)	5,21 (22nd)	5,09 (27th)

Source: Authors' own table, based on GEM 2018–2019 data, World bank 2019, Global Competitiveness Rank 2018

Taking into consideration that innovation-driven economies have relatively more developed research and development transfer mechanisms, it is not surprising that experts from the Republic of Korea and Canada did not emphasize the significance of R&D and focused more on horizontal communication efficiency among educational, R&D transfer, and entrepreneurial organizations. The experts from Lithuania

and Malta mainly indicated the efficiency of R&D transfer organizations because the process of knowledge transfer and synergy creation among stakeholders is less established.

The experts' opinions regarding the main challenges entrepreneurs face while establishing and developing their entrepreneurial ventures differ from one country to another: Lithuanian experts emphasized the negative impact of fear of failure and insufficient social trust, which are a part of social capital; the Maltese experts underlined the limited supply of human capital from educational organizations and nepotism; while South Korean and Canadian experts paid more attention to competition, innovation climate, creativity, and alternative revenue sources.

Four experts representing South Korea, the leading country of the shared value and gig economy, argued that without modern technologies, it is impossible to improve quality, expand to emerging markets, or generate greater social value-added; Canadian experts emphasized the role of synergy among stakeholders via strategic collaboration and digital hubs. These aspects were discussed less by Maltese and Lithuanian experts (one expert from Malta and two experts from Lithuania), which show that these countries are on their way to establishing effective and efficient innovation processes. As could be expected, experts from smaller countries emphasized the role of expansion because of small niche markets, while development of bigger innovation-driven countries was centered on innovation performance and new alternative revenue sources.

The Korean and Canadian experts (three Koreans and three Canadians) drew more attention to innovation processes and leadership along with stronger marketing efforts of switching from niche to mainstream markets via digital hubs and collaboration. These experts also emphasized the importance of upgrading new technologies in parallel to process/product and service innovation: It is advantageous to upgrade technology at least once per 2 years, while innovation processes should be continuous with a well-established innovation and creativity-monitoring process tracking the commercialization process at least four times a year. The experts from Lithuania and Malta focused more on the establishment of innovation processes, climate, and creativity along with clear structure and philosophy/values. Most experts from leading innovation-driven economies (four respondents from South Korea and three respondents from Canada) easily described the process of how creative ideas are generated, selected, and implemented with an efficient creative ideas commercialization and monitoring system established where a special department is dedicated to innovation. The experts from Lithuania and Malta underscored the role of human resources supply, knowledge sharing, and the establishment of creativity systems: Seven out of eight experts from these EU counties focused on process innovations, which require a holistic understanding of strategic challenges and main market trends within the same industry.

While answering the question about what percentage of revenue a successful company should invest in key strategic departments to be edgy and innovative, the innovation-driven experts from innovation economies emphasize the role of marketing input (10–35% expenditure of revenue is oriented to marketing in the Republic of Korea and Canada, while R&D expenditure reads more than 20% of revenue

among experts from innovation-driven countries). The inputs for HR from revenue in innovation-driven Canada and South Korea account for 10–35%, which shows the willingness of Canadian and South Korean entrepreneurs to engage and empower their employees. As could be expected, the experts from Malta and Lithuania stated that entrepreneurs should invest from 5% to 20% in R&D (from revenue), rather converging results regarding expenditure in marketing (10–35% in Lithuania and Malta), and rather mixed results in terms of HR expenses (Malta from 10% to 35%; Lithuania from 5% to 35%), which shows that Lithuanian entrepreneurs should pay more attention to innovative HR techniques, creativity enhancement, and talent development (Table 2).

Such results call for identification of the most important factors to commercialize innovative ideas, where seven out of eight innovation-driven experts from Canada and South Korea emphasize the role of key strategic partners and digital hubs, while EU members of Lithuania and Malta correspond more to quality of expertise and market demand. The research results led to the agreement that a successful company should continually invest a competitive input in R&D, marketing, and HR in order to be edgy and innovative, and it is relevant to both innovation and efficiency-driven companies.

4.3 Contribution of Modern Technologies to the Entrepreneurship Dynamic

In order to back the conceptual model deriving from the scientific literature review and GEM 2018/2019 data analysis, we intend to evaluate the role of modern technologies on entrepreneurship enhancement in organizations which directly or

Table 2 Innovation efforts in terms of types of expenditures (in numbers of experts)

Country	Expenditure	Innovation-driven economies					Efficiency-driven economies				
		0-5%	5-10%	10-20%	20-35%	> 35%	0-5%	5-10%	10-20%	20-35%	> 35%
South Korea	R&D				3	1					
	Marketing			2	2						
	HR			1	2	1					
Canada	R&D				3	1					
	Marketing			2	2						
	HR			2	2						
Lithuania	R&D							2	2		
	Marketing								2	2	
	HR							1	2	1	
Malta	R&D							2	2		
	Marketing								2	2	
	HR								2	2	

Source: Authors' own table, based on semi-structured interview results

indirectly belong to the entrepreneurship ecosystem in the four analyzed countries (on a scale of 0–9 in each organizational category/factor group; where 9 is "particularly important" and 0 is "no impact").

The research results illustrated that modern technologies have a greater positive impact on R&D transfer organizations in innovation-driven Asia and North American countries (reaching an average value of 8.5 out of 9 in the Republic of Korea and reading 7 in Canada), compared to Lithuania and Malta with 5 and 4.5 respectively. Based on Korean and Canadian experts' insights, we found technologies also played a key strategic role on cultural and social norms in their economies (7.5 in South Korea and 7 in Canada, compared to 6.5 in Malta and Lithuania); this is mainly related to the positive contributions of digital hubs, while larger networks of stakeholders are engaged via video advertising, participative and social marketing, and digital education as well as the shared value economy (in particular in the Republic of Korea). The transformational communication function of modern technologies helps cultural and social organizations realign citizens' attitudes and perceptions regarding entrepreneurship as career and social value creation opportunities for future generations. Canada was slightly in the lead in terms of modern technologies' usage among organizations related to governmental programs and policies. The distribution of experts' valuations in terms of how technologies affect finance, commercial infrastructure, and physical infrastructure is not diverse from country to country (from 7 to 8.5), while in the areas of technological impacts on governmental programs and policies Canada is slightly in the lead compared to other economies. The research results gave the following insights for Lithuanian entrepreneurs: Technologies emerged as a key driver in the area of education (the average value of experts' answers was 7.5 for technological impacts on education), which indicates the untapped potential for Lithuanian entrepreneurs to use the available technologies oriented to information and knowledge-sharing as well as business intelligence opportunities, in particular, while strengthening collaboration between education/science, business, and citizens. Such a positive result regarding education-related technologies may be related to the orientation of the Lithuanian education system to entrepreneurship at the school level, with the average experts' evaluation of 2.37 compared to Europe's level of 2.12, and the average mark of 3.07 for postschool education compared to the average value of 2.82 in Europe (2014 GEM data). Although the GEM Lithuanian data for the period 2015–2018 is not available, the role of early-stage education on entrepreneurship in neighboring Latvia in 2017 was ranked 7th out of 54 participating countries (Fig. 2).

4.4 Modern Technologies and Intrapreneurship Dynamics

Another important dimension of entrepreneurship our qualitative expert research intended to examine is intrapreneurship. Most experts expressed the importance of mitigating risk via the combination of employment and entrepreneurial career choices. A significant fear of failure, accompanied by risk avoidance, was

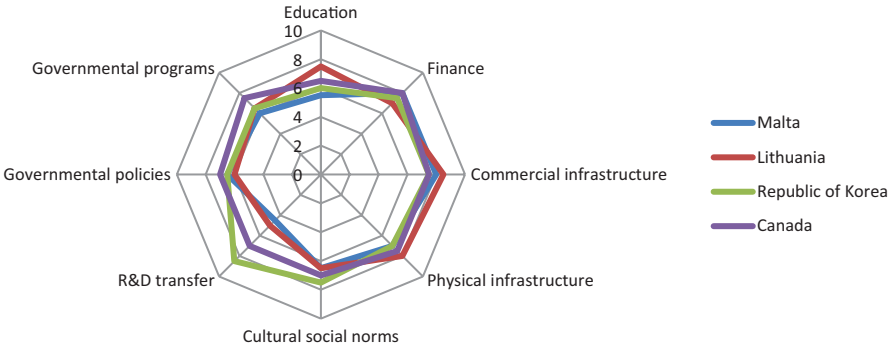

Fig. 2 The role of modern technologies on efficiency of entrepreneurship enhancement organizations. (Source: Authors' own figure, based on semi-structured interview results)

mentioned by four Lithuanian experts as the main reason why Lithuania has a significant number of intrapreneurs (based on 2014 GEM data, Lithuania had one of the highest percentages of adults involved in entrepreneurial employees activities among efficiency-driven economies – approximately 5% of the adult population). Most Lithuanian experts agree that it is important at least a few times a year to be involved in a vast spectrum of innovative projects. A similar situation was witnesses by the four South Korean experts, who were frequently involved in entrepreneurial projects, thanks to digital hub usage and shared value economy principles, where knowledge- and resource-sharing is a natural constitutive part of innovation processes – Korean experts emphasized both more enhanced competences of using those technologies and a positive attitude toward digital collaboration. Lithuanian experts admitted that many employees (particularly senior ones) are not willing to tolerate mistakes and communicate in a more linear communication style, which is partly related to limited social trust. Thus, intrapreneurship for many employees is related to the opportunity to combine security with creativity.

Six English-speaking Canadian and Maltese experts (three from Canada and three from Malta) identify intrapreneurship as a win-win situation where it is possible to reach an equilibrium between organizational and individual employees' expectations; however, the creativity enhancement system should be developed and innovation performance encouraged financially, psychologically, and socially. Only two experts from Canada and Malta refrained from emphasizing the role of technologies in creating reputation, social image, and motivation among employees.

It is interesting to note that experts' country profiles did not influence intrapreneurship and how technologies facilitate entrepreneurial projects: The organizational values, philosophy, ethical and moral norms, and cultural and social norms of a country play a more important role in technology usage within intrapreneurial processes. Moreover, experts from Canada and South Korea pointed out that entrepreneurial experience from previous employment is cumulative; thus, it leads to smoother business development processes as well as greater percentages of young entrepreneurial ventures becoming established businesses (passing the 3.5-year

mark). In the case of Lithuania, the cumulative intrapreneurship experience is more related to employees' security and confidence, which is particularly important in the context of huge uncertainty avoidance and significant fear of failure. In the context of a small island economy (a very specific niche market), three Maltese experts mentioned technologies (in particular, mobile applications) as the most efficient tool to reach clients from distant geographical regions as well as facilitate the information absorption process during big data management.

All experts agreed that whether an intrapreneur had shifted to a status of independent entrepreneurs or not, modern technologies contributed to more effective and efficient strategic collaboration among various stakeholders as well as helped create synergy among stakeholders. The latter was particularly deemed important by innovation-driven Korean and Canadian experts (seven out of eight experts).

4.5 Importance of Modern Technologies Within Strategic Goals

It should be taken into account that strategic collaboration is channeled via new digital and technological channels, which put pressure on entrepreneurs to pay more attention to a set of market trends, such as social impact, shared value economy, social entrepreneurship, environmental protection, healthcare, social innovation, corporate social responsibility, digitalization, and robots. The shared value economy via digital hubs was mentioned by South Korean and Canadian experts (four and three experts respectively): It accelerated sales of goods and services or led to profound knowledge while working for a shared-value business. Qualitative research results are in-line with GEM data for 2018/2019, where 6.2% of Korean adults sold their goods or services via digital share value platforms and an even bigger percentage (14.3%) worked for shared-value networks. As could be expected, these figures are much lower in the analyzed EU countries: for instance, 0.2% and 1.8% respectively in Poland and 0.6% and 1.4% respectively in Cyprus. The cases of Poland and Cyprus are used as peers for Lithuania and Malta, which did not participate in GEM data collection over recent years. All the experts from innovation-driven countries added the importance to upgrade the shared-value digital platform at least once every 2 years, as technology should be as advanced and powerful as it can be to enable smooth communication. The Lithuanian and Maltese experts were proud of international-level expertise among IT specialists; however, six out of eight experts in these efficiency-driven countries emphasized the insufficient supply of IT graduates for international investors in the case of Lithuania and the importance of attracting IT specialists from abroad for Maltese companies (in particular, the i-gaming industry).

While the consensus among the experts is that specificity of cultural and social norms affects the way entrepreneurs use modern technologies in their business, the next group of research results describes the key impacts of modern technologies on sustainability and success of entrepreneurship or how experts from different economies perceive these technological effects and business sustainability through

technological improvements. The Maltese experts, more than experts from other countries, emphasized the economic value-added of implementation of modern technologies within business development: The Maltese experts placed an average value on technological impacts in the context of execution of strategies in order to break even at 6.5 out of 9. They indicated that it then helps to switch from the niche to the mainstream market and survive for at least 3.5 years (the average values of 6 and 7.5, respectively). Although the Maltese economy positively contributed to the economic impacts of entrepreneurship sustainability thanks to a unique fiscal policy and attention to specific technological industries, technologies are not effectively and efficiently used in knowledge development and sharing, affordability of products, harmony with nature, healthy living and environmental protection, communication during times of change, creativity and innovation systems, and meeting stakeholders' expectations (Fig. 3).

All these social contributions of modern technologies to business development success are insufficiently achieved in Malta compared to Lithuania, Canada, and the Republic of Korea. The Maltese experts particularly emphasized the untapped potential of modern technologies in protecting the natural environment and enhancing the creativity and innovation system (6 and 5.5 respectively). The Canadian and South Korean experts, more than the Maltese and Lithuanian experts, drew attention to an engaged society (8 and 8.5 respectively), the creativity and innovation system (7 and 7.5 respectively), stakeholder's expectations (8.5 and 7 respectively), social value-added (8 and 7.5), and knowledge development and sharing (7.5 and 7) as well as to communication during times of change (7 and 7.5 respectively). The effects of modern technologies on healthy living and environmental protection as well as stakeholder's expectations achieved the highest average value in Canada. It is interesting to note that the Lithuanian experts, more than respondents from other countries, focused on affordable and accessible products for socially vulnerable groups.

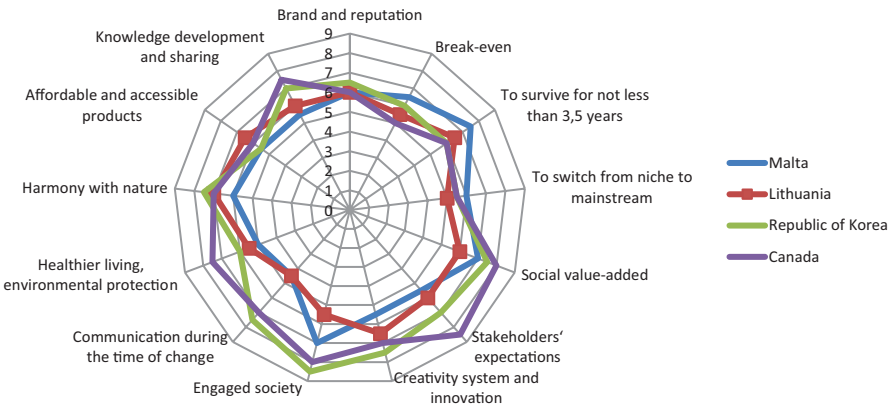

Fig. 3 Importance of modern technologies within strategic goals (9 refers to particularly important, 0 – no impact). (Source: Authors' own figure, based on semi-structured research results)

4.6 Inputs and Outputs of Modern Technologies

Experts' answers led to the conclusion that business sustainability can be measured based on both social and economic criteria. Sustainability is related to the equilibrium of social and economic value-added as a concrete tangible benefit for future generations. In terms of sustainability, innovation-driven experts stressed the shared value economy, synergy among stakeholders, and harmony with nature more, while the EU experts emphasized the value created for socially vulnerable groups more. All experts agreed that technologies help people communicate, share, and analyze data and simply find more intelligent solutions.

In order to summarize the research results, we backed the conceptual model, derived from the literature review and GEM data analysis, with pertinent qualitative research implications. The matrix of technology inputs and outputs focused on microcriteria. Experts came to believe that, despite the efficacy and efficiency of entrepreneurship enhancement, entrepreneurs should focus on effective distribution of available input/cash among key departments/areas which are critical for sustainable growth. Therefore, while using the available support and assets of the entrepreneurship ecosystem (including help from organizations from areas such as education, finance, commercial infrastructure, physical infrastructure, cultural social norms, R&D transfer, governmental policies, governmental programs, and other organizations), it is not likely to be sustainable and consistent in terms of strategic targets without a certain level of input in R&D and innovation, marketing, and/or human resources. These efforts might help entrepreneurs break even, create brand awareness/image, enter the niche market, compete in terms of profit margins, diversify their product portfolio, be the leading player in each segment or a business area, expand internationally, and create social value to employees, clients/customers, and other strategic partners. Experts agree that sustainability is possible only via a combination of positive and negative externalities, in parallel to the balance of the economic and social effects of technologies. Acknowledgment of the sustainability effects of technologies varies from country to country; however, experts from each economy agree that the easiest way to measure entrepreneurship sustainability is to track how many entrepreneurial ventures are able to surpass the 3.5-year development mark (Fig. 4).

5 Conclusions and Recommendations

This chapter examines the role of modern technologies on entrepreneurship dynamics in high-income countries (in the efficiency and innovation-driven categories). This study presents new evidence from qualitative semi-structured interview results with technology-driven entrepreneurship experts from four high-income countries, and helps us understand how to leverage the economic and social value-added of entrepreneurship activities via modern technologies, create synergy effect among stakeholders, and reach business sustainability.

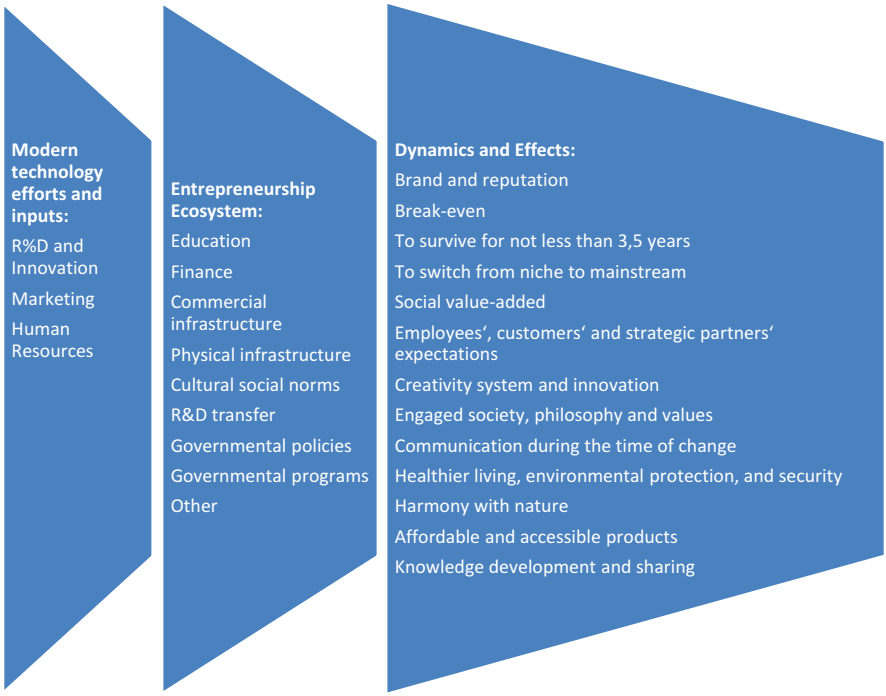

Fig. 4 Inputs and outputs of modern technologies for sustainable growth. (Source: Authors' own figure, based on semi-structured research results)

Modern technologies penetrate other industries at a volatile and rapid pace: The function of human resources will shift to an intermediary role between customers and next-generation technology solutions. Digital platforms (thanks to shared value economy principles) should enable entrepreneurs, managers, investors, employees, and customers through a reshaped perception/attitude and high ethical and moral standards. Such technological transformation is impossible without lifelong learning. Thus, the change should start from the level of management and creative leadership. The decision-making process should come from a bottom-up and/or horizontal management approach, where society, community, customers/clients, and employees can contribute to effective strategy formation and execution where technology, production, and value creation are part of synergetic collaboration and knowledge/resources sharing.

To leverage the potential of modern technologies in entrepreneurial projects, it is critical to know and speak investors' language, which helps to raise funds, commercialize innovations, and create a stronger corporate image, while modern technologies improve returns on investment in marketing/sales, R&D, and HR. Moreover, business intelligence techniques play an important role in business sustainability. The countries that lag behind in terms of educational impacts on entrepreneurship

success should consider the creation of entrepreneurship-related study programs or the introduction of technological aspects in existing education programs (such as big-data management, artificial intelligence, mechatronics, or IT).

Countries that, based on the GEM framework conditions model or other global indicators, are higher ranked in terms of the role of education on entrepreneurship should focus on creativity and innovation enhancement systems. Tracking technology's effects on the success of study programs via business intelligence departments, in particular how modern technologies (such as blockchain, artificial intelligence, robotics, and IT) affect education popularity, social image, and learning efficiency, may be more sustainable and effective rather than programs with a pure focus on wages. A part of remuneration for professors and creative leaders could be allocated for extra effort and success in terms of providing entrepreneurship-oriented, interactive, digital, and transformational lectures, which could help enhance the entrepreneurial spirit and realign attitudes of potential young entrepreneurs or current intrapreneurs.

Countries with strong education systems should also focus on knowledge transfer from educational organizations to business. An innovation system with significantly diverse entrepreneurship centers, knowledge and technology transfer organizations, business accelerators, and many other R&D transfer entities, can boost entrepreneurial intentions, help identify good opportunities in the market, encourage innovation commercialization processes, facilitate business growth, contribute to sustainability (larger percentage of established businesses), strengthen brand and reputation, and engage consumers and employees via digital networks.

While targeting socially vulnerable groups, social entrepreneurs should not diminish the role of B2B marketing, because many aspects of social value creation require efficient communication with investors (high-standard professional language skills, application of modern technologies, understanding investors' expectation and knowledge resource sharing concepts, crowdfunding, or collaboration within international projects) as well as a combination of innovation, R&D, marketing, and HR strategies. Given the increasing role of big data management and business intelligence, technologies emerge as a useful tool for gathering community, mitigating the unpleasant effects of uncertainty avoidance and fear of failure, improving social trust (particularly when the technology suits the organizational and community culture), and helping create greater social value-added. In the context of strategic collaboration, authors of the present chapter recommend continuously tracking the market trends, having a clear consensus regarding strategic expectations among stakeholders, clearly explaining organizational philosophy, clearly identifying the responsibilities of each partner, and enhancing social trust and lifelong learning.

Finally, concerning methodological limitations, future research should continue to provide information on the impact of the role of modern technologies on entrepreneurship dynamics. To this end, multidimensional indicators about the economic and social value-added of entrepreneurship activities via modern technologies could be created with information on countries to determine the synergy among stakeholders and business sustainability in specific countries.

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