A REGRESSIVE ANALYSIS OF RELATIONS BETWEEN INNOVATION AND BUSINESS SOPHISTICATION UNDER A QUALITY MANAGEMENT HOLISTIC APPROACH

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ABSTRACT

My goal in conducting this study is to present strong connections between innovation and business sophistication, worldwide, since innovation and business sophistication issues, related to quality and quality management too, have been subject to increasing interest all around the world.

The methodology of the research was collecting data and information about the innovation index and business sophistication worldwide and describing the newly introduced ISO 56000 family of standards, handling descriptive statistics for innovation index and business sophistication as well as a correlation and regressive analysis (inferential statistics) for relations between innovation index and business sophistication, which resulted on the main conclusion of this study that relations between innovation and business sophistication, statistically verified, are strong, so ISO 56000 standards family application is needed in the time of business sophistication, achieving competitive advantage.

The main recommendation is that application of ISO standards generally and the application of the ISO 56000 family of standards helps companies to strengthen their commitment to their clients, improving innovation and business sophistication activities, processes and procedures, and economies worldwide to achieve a competitive advantage.

Keywords: Innovation, business sophistication, ISO standards, quality, quality management, competitive advantage.

1. INTRODUCTION

Discussing innovation and business sophistication we immediately think about new products and/or services, as well as new combinations that result in improved ones, new methods of processing, manufacturing, assembling, entering new markets, a new way of resources usage, innovated business models, etc., and this related to effectiveness and efficiency of processes, procedures, methodologies, methods, tools, technologies involved on the process of production of goods and services.

Innovation and business sophistication do not always require inventions, but easy implementation in practice problem-solving techniques and decision-making, implementation of individual and group activity-based ideas, etc.

Currently, there is an increasing interest in innovation and business sophistication, especially related to a quality culture and ISO standards. Quality culture serves as a guide for continuous improvement, belonging to all members of an organization(s), and forming a connection between internal clients and suppliers. The core value of quality culture is embodied in ISO standards, for which there is an increasing interest worldwide, aiming to achieve a competitive advantage. Between them, ISO 9000, ISO 14000, ISO 20000, ISO 22301, ISO 27000, ISO 45000, and ISI 50000 family of standards and especially the ISO 56000 family of standards, which is directly related to Innovation management, introduced in 2019, which clashes with the period of pandemics of Covid – 19 too, are the most required standards. Innovation, business sophistication, quality,

quality culture, quality culture management, and ISO standards, are becoming an important part of business models achieving competitive advantage, under the new reality and new normality.

1. LITERATURE REVIEW

Currently, literature for innovation, business sophistication, quality, ISO standards, the culture of quality, etc, has been improved all around the world, besides the country and level of economic development. This is because concepts of innovation, business sophistication, quality, quality management, and ISO standards, applied correctly, help private and public organizations to be more competitive in an open market when and where the offer is much higher than the demand, one of the main characteristics of last 50 years of the world economy.

1.1. INNOVATION

As per an OECD report (Nadim Ahmad and Richard G. Seymour 2006), since around 35 years ago, entrepreneurship has been defined as an act of innovation that involves endowing existing resources with new wealth-producing capacity (Drucker, 1985), with its core, which lies with the creation and exploitation of entrepreneurial opportunities regardless of the context (Shane 2003) and as a creative activity that takes place when neither the goal nor often the initial conditions are known at the start, but constructed during the process (Sarasvathy. 2001).

Innovation is defined by the Oslo Manual (OECD 2005) of the Organization for Economic Cooperation and Development (OECD) as "the implementation of a new or significantly improved product (good or service) or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations".

In economics, further to Schumpeter's lesson, it is now part of mainstream thinking to consider innovation as the primary engine of economic dynamic: a process of "…industrial mutation that increasingly revolutionizes the economic structure from within, incessantly destroying the old one, incessantly creating a new one (Schumpeter. 1942)".

This notion is particularly relevant in today's globalized world and knowledge-based economies, which rely ever more on intangible resources.

Not surprisingly, innovation is widely recognized as one of the essential drivers of successful business and a key contributor to the productivity and economic and social development of nations.

Innovation is the practical implementation of ideas that result in the introduction of new goods or services or improvement in offering goods or services (Schumpeter. 1993). ISO TC 279 on innovation management proposes in the standards, ISO 56000:2020 (ISO 2020) to define innovation as "a new or changed entity creating or redistributing value".

According to the International Organization of Standards, "an innovation is a new or improved product or process that differs significantly from previous products or processes and is made available to users. This definition is in line with those found in ISO standards so that they can be useful tools for comparing and assessing innovation within and amongst organizations" (ISO. 2019).

Some common element in the different definitions is a focus on newness, improvement, and spread. It is also often viewed as taking place through the provision of more-effective products, processes, services, technologies, artworks business models that innovators make available to markets, governments, and society. Innovation is related to, but not the same as, invention: (Bhasin, Kim. 2 April 2012) innovation is more apt to involve the practical implementation of an invention (i.e. new/improved ability) to make a meaningful impact in a market or society (Morgan 2015), and not all innovations require a new invention (Schumpeter 1939).

The innovation system in any country consists of institutions, rules, and procedures that affect how the system acquires, creates, disseminates, and uses knowledge. Innovation in a developing country concerns not only the domestic development of frontier-based knowledge but also the application and use of new and existing knowledge in the local context. Innovation requires a favorable climate for entrepreneurs, which is free from bureaucracy, regulations, and

other obstacles (WB Institute, 2005).

Designing and developing cutting-edge products and processes to maintain a competitive edge requires an environment that is conducive to innovative activity, supported by both the public and the private sectors. In particular, it means sufficient investment in research and development (R&D), especially by the private sector; the presence of high-quality scientific research institutions; extensive collaboration in research between universities and industry; and the protection of intellectual property (Porter & Schwab, 2008).

SOURCES OF INNOVATION

Innovation may occur as a result of a focused effort by a range of different agents, by chance, or as a result of a major system failure. According to Peter F. Drucker, the general sources of innovations are different changes in industry structure, in market structure, in local and global demographics, in human perception, mood, and meaning, in the amount of already available scientific knowledge, etc (Drucker. 2002).

The robotics engineer Joseph F. Engelberger asserts that innovations require only three things:

- a recognized need
- competent people with relevant technology
- financial support (Engelberger 1982).

As per current tougher and tougher competition, globalization of products, services, production mode, business models and markets, as well as the implementation of new technologies, it looks that the success of businesses is dependent on effectiveness, efficiency, and intensity of innovation, which is considered as a decisive condition of competitive advantage in entrepreneurship, as a process created through interactions between various actors, which represents an important element of a company's future success.

It is clear that the growth of output is not attributable to labor or capital but is deemed to be linked to innovation and technological change (Neil Robert Anderson, Kristina Potočnik, Jing Zhou, 2015).

Other authors stress the relationship between innovation, integrative creativity, entrepreneurship, leadership, and management too (Shung Jae Shin, Xiaomeng Zhang, and Kathryn M. Bartol (2015), Kris Byron and Shalini Khazanchi (2015), Lucy L. Gilson, Hyoun Sook Lim, Robert C. Litchfield, and Paul W. Gilson (2015), Jill Perry-Smith and Pier Vittorio Mannucci, (2015).

As per above, considering competitive advantage as one of the main driving forces for entrepreneurship, innovation, and creativity as key factors should be considered, requiring physical and nonphysical support for an optimal result.

Every crisis brings opportunities and room for creative disruption. One side effect of the current crisis has been to stimulate interest in innovative health solutions, naturally, but also for areas such as remote work, distance education, e-commerce, and mobility solutions. With growing attention to innovation as the way to build a sustainable and inclusive future, unleashing these positive forces may well support societal goals, including reducing or reversing long-term climate change. (GII 2021).

The unprecedented global crisis that resulted from the outbreak of COVID-19 has propelled us into reinvigorating the important dimension of innovation to mitigate the pandemic's profound adverse effects on the economy and restore growth, calling for nations to embrace innovation as never before. While the crisis has naturally stimulated interest in innovative healthcare solutions, it has also catalyzed other areas, such as remote working, distance learning, e-commerce, and mobility solutions (GII. 2021).

The COVID-19 pandemic has triggered severe health and economic crises that will have lasting impacts. Vaccine research and scientific investigation to prevent the spread of coronavirus have increased awareness of the pivotal role of science, technology, and innovation (STI) in economic and social development (GII. 2021).

Organizations that thrive on time of crisis have leaped ahead in the technological world moved away from traditional competencies (innov8rs. 2021), and there is a unique time now for companies to create, innovate and standardize excellent, meaningful products that customers

truly need and innovation is an instrument of development that plays an increasingly important role in global trade. Particularly over the past two decades, the arena of global trade has been changing, with economies of scale gradually being replaced by an innovation economy focused on high-value-added products and services (GII. 2021).

Innovation has long been argued to be the engine of growth. It is important to note that it can also provide growth, almost regardless of the condition of the larger economy. economies are more likely to experience growth due to the development of products, such as new computer software or new pharmaceutical drugs than to reductions in prices of existing products, such as telephones or motorcars. Indeed, early observations suggested that economic development does not occur in any regular manner, but seemed to occur in bursts or waves of activity, thereby indicating the important influence of external factors on economic development. It was Marx who first suggested that innovations could be associated with waves of economic growth, and later others (Schumpeter, Kondratieff, Abernathy and Utterback, Domar, Harrod), have argued the longwave theory of innovation, stressing one of the most important influences on innovation seemed to be industrial research and development (Trott. 2015).

The success or failure of an innovation or a new product1 in the marketplace is determined by how well it is accepted by customers, how fast it diffuses among the adopter population, and how large a market it creates over a period of time. New product entry strategy and competitor responses to the entry also play important roles in the success or failure of the innovation. Thus, customer adoption, diffusion, market growth, product life cycle, new product entry strategy, and competitor responses all help to shape the market evolution process for an innovation (Shane. 2009).

1.2. INNOVATION AS AN ISO FAMILY OF STANDARDS. ISO 56000

Innovation is the fuel that drives a successful business. And organizations that give their managers and employees the tools to respond to and make the most of opportunities, both internal and external, are well placed to grow profits and improve the health and well-being of their employees and, thereby, the wider society. With effective innovation management systems in place, organizations – both large and small – can not only be in a better position to achieve their business growth goals but also be more agile and better prepared in their response to unexpected challenges and disruptions (Ann Brady. 2021).

An innovation management system helps organizations capture the best ideas and continually improve to keep up with the competition. The latest standard in the ISO innovation management series has been published in 2019 (Clare Naden. 2020).

Alice de Casanove, Chair of the ISO technical committee responsible for the standard, says all organizations, whatever their nature or size, need to continually evolve to survive, and the ISO 56000 series will help them to do that in a structured and effective way. "Innovation is about creating something new that adds value; this can be a product, a service, a business model, or an organization. And the value that is added is not necessarily financial, it can also be social or environmental, for example," she says. "The ISO 56000 family will help organizations significantly improve their ability to survive in our changing and uncertain world. They allow organizations to permanently reinvent themselves." (Clare Naden. 2020).

The ISO series on innovation management includes the following published documents:

- ISO 56000:2019 - Innovation management — Innovation management system — Guidance
- ISO 56002, Innovation management – Innovation management system – Guidance
- ISO 56003, Innovation management – Tools and methods for innovation partnership – Guidance
- ISO/TR 56004, Innovation management assessment – Guidance
- ISO 56005, Innovation management – Tools and methods for intellectual property management – Guidance
- ISO 56006, Innovation management – Strategic intelligence management – Guidance
- ISO 56007, Innovation management – Idea management
- ISO 56008, Innovation management – Tools

and methods for innovation operation measurements – Guidance (ISO. 2019)

It is clear that even for International Standards Organization, relations between Innovation and Creativity are strong, since the ISO 56000 family of standards of innovation expresses the connection clearly, saying that, the application of ISO standards generally and the application of the ISO 56000 family of standards helps companies to strengthen their commitment to their clients, improving innovation and creativity activities, processes and procedures, and economies worldwide to achieve a competitive advantage.

1.3. BUSINESS SOPHISTICATION AND ITS RELATIONS WITH INNOVATION

The economic management agenda in many economies around the world is the transition from an efficiency-driven economy to an innovation-driven one. To this end, their economic policy-making should benefit from valid orientation and indicators for this transition. Utilizing a comparative approach and benchmarking from successful economic experiences around the world can help policymakers and business leaders manage the economy and achieve a higher level of prosperity. In this regard, improving national competitiveness is a key factor (Vares et al., 2011).

According to the International Organization of Standards "Innovation is not just about shiny new inventions or discoveries. Innovation is a crucial business need as it relates to a company's ability to identify and pursue new areas of opportunity while understanding and responding to changing conditions in its environment. It also helps organizations to create value while managing uncertainty by leveraging the knowledge and creativity of the people who work there. It is a fundamental factor in business sustainability and economic viability, as well as a key contributor to the development of society as a whole. Innovation is essential because the world never stays still. Innovative organizations also contribute to many of the United Nations' Sustainable Development Goals, including Goal 9, which aims to "build resilient infrastructure, promote inclusive and sustainable industrialization and foster the innovation ".

ISO has developed a large portfolio of International Standards and guidance documents that enable an organization to align all its systems and processes to undertake innovation activities and initiatives. They address all factors that contribute to an organization being innovative, right down to the implementation of an effective innovation management system (ISO. 2019).

In research that intended to investigate the relationship between "Innovation" and "Business sophistication", authors using the Global Competitiveness report data in 2011-2012, activated secondary analysis research, with 142 countries' data, evidenced that there is a meaningful relationship between "Innovation" pillar and "Business sophistication" pillar; and "Innovation" pillar has a positive effect on "Business sophistication" pillar (Razavi, Abdollahi, Ghasemi, Shafie. 2011).

In research that intends to investigate relations between innovation and business sophistication and their indication on entrepreneurship, authors have explored the relationship between entrepreneurship, the entrepreneurial ecosystem, and global competitiveness, identifying the role of innovation and business sophistication in achieving global competitiveness by fostering the entrepreneurship ecosystem, a strategic theme that has drawn the attention of various stakeholders such as business players, regulators, and related coworking organizations to promote a healthy environment for entrepreneurship. This research has offered a valuable understanding of the relationship between global competitiveness and factors of the entrepreneurship ecosystem on the one hand, and innovation and business sophistication on the other.

As per this research, "entrepreneurship has been considered as a key driver in fostering the economic development of the countries". This study uses the 2013-14 country-level data from the World Bank - WB, World Economic Forum (WEF), and the Global Entrepreneurship Monitor Consortium - GEM. The key finding of the study shows that innovation and business sophistication play prominent roles and are linked with entrepreneurship in promoting global competitiveness, recommending that "countries

should think of innovation and business sophistication in designing the entrepreneurship program to achieve higher competitiveness" (Gandhi, Maria, Catharina Badra. 2020)

In a paper published about economic and business perspectives including the developing countries, one main conclusion that comes up by a group of experts was "that changes by globalization will affect the SMEs and entrepreneurs in a different type of economies both on a national and regional perspective. The world is globalized so is the world for entrepreneurs and innovations. All types of companies will be affected by the changes that one nowadays could observe, not only SMEs or innovative entrepreneurship but of course also the behavior of multinationals and large firms, and the relations between large and small firms. More or less every type of firm could in the future be an actor in a global market. One reason is the new technology which means that even very small local firms will have such a possibility; a factor which is analyzed in this report. On the other hand, this means increased competition from many more firms than one is used to realizing (SGC. 2009), which requires business sophistication too.

In a paper about relations between innovation, business sophistication and economic growth, authors stated improvement in business sophistication triggers innovation capacity and support macroeconomic stability. Innovation capacity would also need to be expanded in the long-run, which positively leads to advanced business sophistication that has a cyclical effect. If policymakers intend to accelerate business sophistication, then their attention should be directed towards maximizing the economic indicators in the long-run (Kirikkaleli & Ozun. 2019).

Business sophistication is conducive to higher efficiency in the production of goods and services. This leads, in turn, to increased productivity, thus enhancing a nation's competitiveness. Business sophistication concerns the quality of a country's overall business networks as well as the quality of individual firms' operations and strategies. This is particularly important for countries at an advanced stage of development when the more basic sources of productivity improvements have been exhausted to a large extent. The quality of a country's business networks and supporting industries, as measured by the quantity and quality of local suppliers and the extent of their interaction, is important for a variety of reasons. When companies and suppliers from a particular sector are interconnected in geographically proximate groups ("clusters"), efficiency is heightened, greater opportunities for innovation are created, and barriers to entry for new firms are reduced. Individual firms' operations and strategies (branding, marketing, the presence of a value chain, and the production of unique and sophisticated products) all lead to sophisticated and modern business processes (Porter & Schwab, 2008, p.8).

Business Process Management and ISO are typically addressed as two different endeavors, but they can be brought in alignment to improve the quality of businesses. A wide range of systems, including BPM and ISO, have been introduced in the past decades and have been explored and tried by organizations all over the world to attain best business practices. A company that is process-oriented and ISO-certified benefits when there is an alignment of BPM with the ISO standards (Breyfogle. 2015)

Business sophistication (GII. 2021) includes:

- Knowledge workers
- Innovation linkages
- Knowledge absorption
- Knowledge workers include:
  - Knowledge-intensive employment
  - Firms offering formal training
  - GERD performed by business
  - GERD financed by business
  - Females employed w/advanced degrees
- Innovation linkages include
  - University-industry R&D collaboration
  - State of cluster development and depth
  - GERD financed abroad
  - Joint venture/strategic alliance deals
  - Patent families

- Knowledge absorption includes:
  - Intellectual property payments
  - High-tech imports
  - ICT services imports
  - FDI net inflows
  - Research talent (GII. 2021)

1.4. MEGATRENDS OF 2020 – 2030

Five main megatrends for the next 10 years shall be (1) Population growth, as the heart of the shift in economic power. (2) The impact of global warming is all around us, significantly impacting yield and coastal regions. (3) We're in the midst of a fourth industrial revolution, which will become known as the digital revolution, with the rapid advancement of technology, AI, and machine learning. (4) Changes in global demographics (world population, density, ethnicity, education level, and other aspects of the human population) will bring about significant social change, and t and, therefore, challenges and opportunities for government and business. These megatrends underpin structural shifts, technological development, shifting economic power, etc., having a profound effect on local and global markets and societies. (Peter Fisk. 2019).

In response to these big changes/megatrends the World is going towards (1) information revolution, (2) flexible & learning organizations and innovation systems, (3) explosion of skills, knowledge, and competencies, (4) improving systems of creation, production, and distribution, (5) usage and expand of innovation systems, creativity, and quality management culture, etc.

1.5. QUALITY AND CULTURE OF QUALITY

The core definition of quality, as a group of values that helps on how improvement is done on the daily practice of works and outputs related, a group of applications taken for granted that forms the philosophy of organizations or working groups, has been identified by several authors, which in paraphrasing that has defined quality culture as "social attack that supports people in the organization to stay together" (Robbins, 1999).

Products and services features and improvement of them thrive. This is a culture expressed in several issues: (1) improvement individually, (2) tolerance and respect, (3) entrepreneurship (4) having proven capacity.

"Culture of quality is a group of common, respected and integrally formed approaches of features of products and services, identified on the culture of organizations and systems of management" (Vlãsceanu, Grünberg & Pârlea, 2007).

"The importance of quality culture, quality management culture on doing business, achieving competitive advantage, relating them with corporate social responsibility, sustainable business, business ethics, diversity issues, international, cross-cultural management, national/international organizational culture, culture and sectors of the economy in a country, as well as currently as an important part of history of economic thought (related to business management culture)" (Gordon and Owen, 2008), Harvey and Stensaker, 2008), (Schein, 2010, 2013).

ISO standards, their importance, their use of them in practice, etc. have been described in several publications (Harrington & Mathers, 1997).

Main ISO standards required then most currently are:

- ISO 9000 Family – Quality management system
- ISO 10244:2010- Document management — Business process baselining and analysis
- ISO 14000 – Environment protection
- ISO 20000 – Information technology
- ISO 22301:2019- Security and resilience — Business continuity management systems — Requirements
- ISO 27000 – information security management
- ISO 45000 – Health and safety at work
- ISO 50000 – Energy efficiency

- ISO 56002:2019 - Innovation management — Innovation management system — Guidance Etc.

According to ISO, there are three main types of benefits from using standards (ISO, 2014):

Key benefit 1: ***Streamlining internal operations***

One main finding is that standards can be used to streamline the internal processes of a company, for example by reducing the time needed to perform specific activities in the various business functions, decreasing waste, reducing procurement costs, and increasing productivity. The case studies consistently report that the contribution of standards to the gross profit of companies ranges between 0.15 % and 5 % of the annual sales revenues.

Key benefit 2: ***Innovating and scaling up operations***

Some case studies provide examples where standards served as the basis for innovating business processes, allowing companies to expand their suppliers' network or to introduce and manage new product lines effectively. In other instances, standards helped mitigate the risk to companies of introducing new products onto national markets.

Key benefit 3: ***Creating or entering new markets***

Standards have been used as the basis for developing new products, penetrating new markets (both domestic and export), supporting the market uptake of products, and even creating markets. In exceptional cases, the impact of standards far exceeded the figure mentioned above, with companies achieving a gross profit contribution of up to 33 % of their annual revenue, which helped them position themselves as leaders in their field, at least over a certain period (ISO. 2014).

2. RESEARCH FRAMEWORK, THE PURPOSE OF THE CASE STUDY

The framework of the research has been the level of innovation and business sophistication and relations between them in a global entrepreneurship ecosystem.

Given the lack of numerical, statistical, and algebraic arguments on the relations between innovation and business sophistication, this study adopts a theory-building mode and aims to investigate the following research questions:

1 *RQ1:* There is any relation between innovation and business sophistication?

2 Based on this, two hypotheses have been built:

3 Ho: There is no connection between Innovation and business sophistication.

4 H1: There is a connection between Innovation and Business sophistication.

… considering that, there are few types of research on relations between innovation and business sophistication, listed in the literature review of this paper research, and considering that theoretical approaches to relations between innovation and business sophistication exist, but numerical, statistical, and algebraic arguments on relations between innovation and business sophistication don't exist.

3. METHODOLOGY

Specifically, while acknowledging the importance of innovation, business sophistication, and quality management in doing business and entrepreneurship ecosystem, prior empirical research does not explain how innovation and business sophistication influence and connect quality management, besides the fact that few serious theoretical studies are showing the strong connection between innovation and business sophistication, but not numerical, statistical and algebraic studies. Thus, a theory building is needed, supported by analysis and evidence. An exploratory approach should be adopted using a single in-depth case study approach, appropriate for building an in-depth understanding of a phenomenon and allowing closer investigation of theoretical constructs.

3.1 CASE SELECTION

The case was selected based on three main criteria: a theoretical approach, suitability of relations, and practical positive impacts on relations

between innovation and business sophistication, considering innovation as a property of the ISO 56000 family of standards.

The case project ran in stages: (1) identifying needs for innovation and business sophistication, (2) identifying needs for quality management, and (3) identifying the rank of the countries for innovation and business sophistication.

DATA COLLECTION

Data for innovation has been gathered from the Global Innovation Index Report 2021 (World Intellectual Property Organization, 14th Edition). The Global Innovation Index (GII) is an annual ranking of countries by their capacity for, and success in, innovation.

Data for business sophistication has been gathered from the Global Innovation Index Report 2021 (World Intellectual Property Organization, 14th Edition) too.

DATA ANALYSIS

1. Worldwide data about innovation was taken from the Global Innovation Index Report 2021 (World Intellectual Property Organization, 14th Edition)
2. Worldwide data about business sophistication was taken from the Global Innovation Index Report 2021 (World Intellectual Property Organization, 14th Edition).
3. Descriptive statistics for the Innovation index and Creativity output and a correlation and regressive analysis (inferential statistics) between Innovation Index and Business sophistication for 132 countries worldwide were performed.

RELATIONS BETWEEN INNOVATION AND BUSINESS SOPHISTICATION (132 COUNTRIES WORLDWIDE)

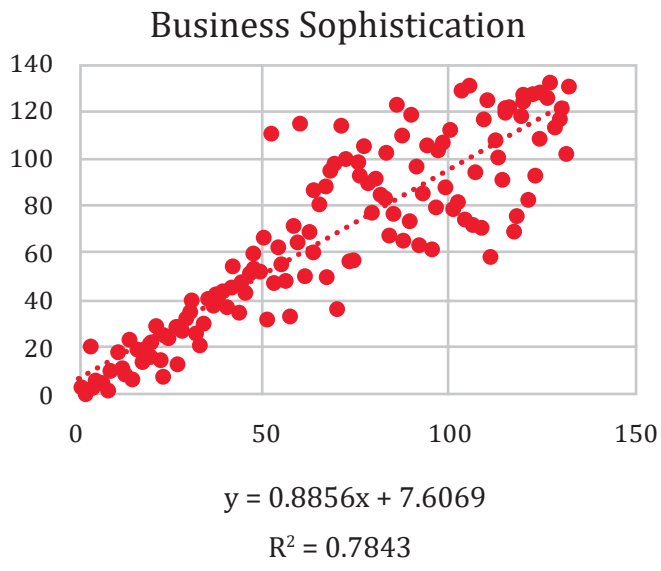
Table 1. Innovation index and Business sophistication ranking (GII, 2021)

No	Country	Innovation Index	Business Sophistication Index
1	Switzerland	1	4
2	Sweden	2	1
3	USA	3	2
4	UK	4	21
5	Rep Korea	5	7
6	Netherlands	6	5
7	Finland	7	6
8	Singapore	8	3
9	Denmark	9	11
10	Germany	10	12
11	France	11	19
12	China	12	13
13	Japan	13	10
14	Hong Kong	14	24
15	Israel	15	8
16	Canada	16	20
17	Iceland	17	18
18	Austria	18	15
19	Ireland	19	17
20	Norway	20	23
21	Estonia	21	29
22	Belgium	22	16
23	Luxembourg	23	9
24	Czech Rep.	24	25
25	Australia	25	26

26	New Zealand	26	30
27	Malta	27	14
28	Cyprus	28	28
29	Italy	29	32
30	Spain	30	35
31	Portugal	31	41
32	Slovenia	32	27
33	UAE	33	22
34	Hungary	34	31
35	Bulgaria	35	42
36	Malaysia	36	39
37	Slovakia	37	43
38	Latvia	38	40
39	Lithuania	39	45
40	Poland	40	38
41	Turkey	41	46
42	Croatia	42	55
43	Thailand	43	36
44	Viet Nam	44	47
45	Russian Fed.	45	44
46	India	46	52
47	Greece	47	60
48	Romania	48	54
49	Ukraine	49	53
50	Montenegro	50	67
51	Philippines	51	33
52	Mauritius	52	111
53	Chile	53	48
54	Serbia	54	63
55	Mexico	55	56
56	Costa Rica	56	49
57	Brazil	57	34
58	Mongolia	58	71
59	N. Macedonia	59	65
60	Iran	60	115
61	South Africa	61	51

62	Belarus	62	69
63	Georgia	63	61
64	Moldova	64	87
65	Uruguay	65	81
66	Saudi Arabia	66	89
67	Colombia	67	50
68	Qatar	68	96
69	Armenia	69	98
70	Peru	70	37
71	Tunisia	71	114
72	Kuwait	72	100
73	Argentina	73	57
74	Jamaica	74	58
75	Bosnia & Hrzg	75	99
76	Oman	76	94
77	Morocco	77	105
78	Bahrain	78	90
79	Kazakhstan	79	78
80	Azerbaijan	80	92
81	Jordan	81	85
82	Brunei	82	84
83	Panama	83	103
84	Albania	84	68
85	Kenya	85	77
86	Uzbekistan	86	123
87	Indonesia	87	110
88	Paraguay	88	66
89	Cabo Verde	89	74
90	Tanzania	90	119
91	Ecuador	91	97
92	Lebanon	92	64
93	Dominic.Rep	93	86
94	Egypt	94	106
95	Sri Lanka	95	62
96	El Salvador	96	80
97	Trnd & Tbg	97	104

98	Kyrgyzstan	98	107
99	Pakistan	99	88
100	Namibia	100	112
101	Guatemala	101	79
102	Rwanda	102	82
103	Tajikistan	103	129
104	Bolivia	104	75
105	Senegal	105	131
106	Botswana	106	73
107	Malawi	107	95
108	Honduras	108	72
109	Cambodia	109	117
110	Madagascar	110	125
111	Nepal	111	59
112	Ghana	112	108
113	Zimbabwe	113	101
114	Côte d'Ivoire	114	91
115	Burkina Faso	115	120
116	Bangladesh	116	122
117	Lao	117	70
118	Nigeria	118	76
119	Uganda	119	118
120	Algeria	120	124
121	Zambia	121	83
122	Mozambique	122	127
123	Cameroon	123	93
124	Mali	124	109
125	Togo	125	128
126	Ethiopia	126	126
127	Myanmar	127	132
128	Benin	128	113
129	Niger	129	116
130	Guinea	130	121
131	Yemen	131	102
132	Angola	132	130



Graphic 1. Correlation between Innovation index and Business sophistication (drawn by authors, using GII 2021 data) where at X axes is the innovation index and at Y axes is business sophistication

SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0.885611
R Square	0.784307
Adjusted R Square	0.782648
Standard Error	17.83218
Observations	132

ANOVA		
	df	*SS*
Regression	1	150314.8
Residual	130	41338.25
Total	131	191653

Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept **b**	7.61	3.1	2.44	0.016	1.43	13.8	1.43
Innovation Index **a**	0.89	0.04	21.7	3.94E-45	0.81	0.97	0.80

$$Y = ax+b$$

$$y = 0.8856x + 7.6069$$

$$R^2 = 0.7843$$

$$r = 0.885611$$

With these results, we have verified that There is a connection between Innovation and Business sophistication (Hypothesis 1).

- Implications for theory and practice

About the theory, based on the final results of this research, a new window has been opened for further research on the field of relations between innovation and business sophistication, considering them as a tool for a stronger competitive advantage approach for individual businesses and as a country's economy too.

In terms of practice, the new shape of organizations as part of innovation processes has shown up currently, accompanied worldwide by new and improved products and services, as well as new business models, and besides other factors, the ISO 56000 family (innovation) helps organizations significantly improve their ability to survive in our changing and uncertain world, and allow them to permanently reinvent themselves.

- Limitations and further research

This research has been undertaken using plenty of data about the Innovation index and Business sophistication for the period of 2021.

Further research is needed to verify if these relations exist for other periods.

MS	*F*	*Significance F*
150314.8	472.7079	3.94E-45
317.9865		

CONCLUSIONS AND RECOMMENDATIONS

1. Towards fixedness of natural resources and restrictions on boundless economic growth approach, the direction of innovation and creativity is important in overcoming resource constraints.
2. There is a tendency for innovations to save on scarce resources. If technological progress will be fixed-factor saving, then fixed factors may not be a large barrier to growth. The same argument and logic can be applied to business sophistication and quality management, since both of them are not fixed resources, and are strongly connected with innovation.

3. Achieving competitive advantage requires a positive approach towards innovation, business sophistication, and quality management requiring improvement of innovation, business sophistication, quality management, and business climate in SMEs, seeing this as a general microeconomic perspective too, while, in a broader context, this study extends the general understanding of the innovation, business sophistication, and quality management relations to be used for a future managerial approach/mechanism in real-world situations, suggesting future research could focus on developing and validating the proposed framework and investigate the issue in more contexts and settings.
4. There is a strong connection between the Innovation index and Business sophistication, not only in theoretical aspects but verified through a regressive analysis.
5. Application of ISO standards generally and the application of ISO 56000 family of standards helps companies to strengthen their commitment to their clients, improving innovation and business sophistication activities, processes and procedures, and economies worldwide to achieve a competitive advantage.
6. The new shape of organizations as part of innovation processes has shown up currently, accompanied worldwide by new and improved products and services, as well as new business models, and besides other factors, the ISO 56000 family (innovation) helps organizations significantly improve their ability to survive in our changing and uncertain world, and allow them to permanently reinvent themselves.
7. The success of businesses is dependent on effectiveness, efficiency, and intensity of innovation, a decisive condition of competitive advantage.
8. Innovation is an instrument of development that plays an increasingly important role in global trade, and economies of scale are gradually being replaced by an innovation economy focused on high-value-added products and services.
9. Business sophistication is conducive to higher efficiency in the production of goods and services. This leads, in turn, to increased productivity, thus enhancing a nation's competitiveness. Business sophistication concerns the quality of a country's overall business networks as well as the quality of individual firms' operations and strategies. The quality of a country's business networks and supporting industries, as measured by the quantity and quality of local suppliers and the extent of their interaction, is important for a variety of reasons. When companies and suppliers from a particular sector are interconnected in geographically proximate groups ("clusters"), efficiency is heightened, greater opportunities for innovation are created, and barriers to entry for new firms are reduced. Individual firms' operations and strategies (branding, marketing, the presence of a value chain, and the production of unique and sophisticated products) all lead to sophisticated and modern business processes.
10. Improvement in business sophistication triggers innovation capacity and supports macroeconomic stability. Innovation capacity would also need to be expanded in the long run, which positively leads to advanced business sophistication that has a cyclical effect. If policymakers intend to accelerate business sophistication, then their attention should be directed toward maximizing the economic indicators in the long-run.

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