

# ON THE RELATION BETWEEN ENTREPRENEURSHIP AND QUALITY MANAGEMENT

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## ABSTRACT

Abstract Healthy business ecosystems are necessary for competitive advantage, the major force of the trade economy, and free markets. Business sustainability requires entrepreneurship skills, knowledge, and competencies, as well as standardization of processes, procedures, etc., which relate to quality management patterns. Entrepreneurship can be measured, and so can quality management. Most international, regional, and local business organizations, individual businesses, as well as several researchers, assert that there is a connection between entrepreneurship and quality management, especially with ISO standards.

Therefore, it is necessary to research the relations between entrepreneurship and quality management to provide a clear insight into the issue. This study is based on an analysis of regression between the Index of Entrepreneurship and the Index of ISO Standards, to verify Hypothesis H1 (There is not any relation between E Index and ISO Standards Index) against Hypothesis H0 (There is a strong relation between E Index and ISO Standards Index). The results of the research show that entrepreneurship requires scientific management of factors of production, employing skills, knowledge, and competencies, as well as using principles of quality management, achieving an economic (competitive) advantage, so, a connection and relations between entrepreneurship and management of quality (standards of quality management, ISO), is indispensable. It can be stated from the conducted research that there is no relation between entrepreneurship and ISO standards yet, even though it is highly needed and that should exist to promote sustainable entrepreneurship with no support at all.

**Keywords:** *Entrepreneurship, business sustainability, competitive advantage, quality management, ISO standards, ISO standards Index.*

## INTRODUCTION

In this critical analysis, relations between entrepreneurship and International Standards of quality management are investigated, as they are important factors in healthy business ecosystems since The business environment in the 21st century has become very dynamic and keeps on changing over time. The market has been characterized by a high level of uncertainty that managers need to respond quickly if their companies are to survive in the market (Deshati & Gorica, 2023).

The essence of capitalism as an economic system is the capital accumulation. The accumulation of capital means to gather as much capital as possible by different means which derive from the use of the ownership. These sources of additional capital, otherwise called financial return, might be:

- Profit - It comes from the differences in prices
- Rent – It comes from the transfer of the right to use the property, from the owner to the user.
- Interest – It comes from the transfer of the right to use the money.
- Royalty – It comes from the transfer of the right to use the asset for generating profits.
- Capital gain – It is a result of the changes in the value of the asset in the market.

All of these elements are of great importance and need special attention for a deep analysis (Tafa & Tafa, 2021), and entrepreneurship as a business activity is the foundation of capitalism.

There is supposed to be a strong relationship between entrepreneurship and quality management principles, especially with ISO standards, considering that disruption and uncertainty continue in multiple business sectors; but, as most entrepreneurs know well, with disruption comes opportunity and it is clear that entrepreneurs have been grasping pandemic-related opportunities and building resilience while living with the pandemic has certainly raised awareness of the business opportunities it brings in its wake (GEM, 2022).

This was the core issue to be investigated in this research, using quantitative methods, combined with an analysis of regression on relations for the Index of Entrepreneurship and Index of ISO standards.

Also, there were have taken into account other sources to have thorough research such as classified existing data and materials about entrepreneurship, quality management, and ISO standards, the updated ones together with the previously published works and scholarly articles books, as well as online libraries.

There are strong and sustained relations between quality management / ISO standards and the climate of do-

ing business (Ceko, 2016a). There are strong and sustained relations between the climate of doing business and life quality, which is already verified scientifically (Ceko, 2016b). Improving the quality management system/compliance with ISO standards along with business regulations/business environment can improve people's quality of life. Countries around the world are recently facing issues affecting business development and performance, business performance, economic development and growth, sustainable development, and quality of life. The establishment of quality institutions, quality infrastructure, and worldwide business, using ISO standards, will have a positive impact on business practices and business behavior, as it leads to economic growth and improved quality of life for people in a broader perspective, within the framework of long-term sustainable development.

### **MATERIAL AND METHODS ENTREPRENEURSHIP**

Entrepreneurship is the creation or extraction of economic value (Diochon & Anderson, 2011, Gaddefors & Anderson, 2017, Alvarez & Busenitz & Lowell, 2001). With this definition, entrepreneurship is seen as a change, often involving risks beyond what is commonly encountered in entrepreneurship, that may include values other than mere economics.

An entrepreneur is a person who starts and/or invests in one or more businesses, takes on the majority of the risks, and benefits heavily in return. The process of starting a business is called entrepreneurship. The entrepreneur is frequently viewed as a creator of novel concepts, products, services, businesses, or methods. An entity that can transform inventions or technologies into goods and services is referred to as an entrepreneur in the study of economics. In this sense, entrepreneurship refers to both established companies and new companies' activities. Different schools of thought are accepted in entrepreneurship as an academic discipline. It has been studied within disciplines such as management, economics, sociology, and economic history (Lindgren & Packendorff, 2009, Neergaard & Ulhøj, 2007).

Entrepreneurship is the act of becoming an entrepreneur or owner or manager of a business that seeks profit through risk and initiative. An entrepreneur acts as a manager and oversees the start-up and growth of a business.

Entrepreneurship is the process by which individuals or groups identify business opportunities and acquire and deploy the resources necessary to exploit them.

They can participate in business opportunities regardless of the size of the company.

Four criteria are required to be able to become an entrepreneur.

1. First, there must be an opportunity or situation to redistribute resources for profit.
2. Second, entrepreneurship requires human differences, such as the ability to better reach certain

people or recognize information about opportunities.

3. Third, it is necessary to take risks.
4. Fourth, the entrepreneurial process requires organizational personnel and resources (Shane, 2003).

Entrepreneurs use their time, energy, and resources to create value for others. In return, they pay money for it, so that the beneficiaries are both consumers and entrepreneurs who create value.

Entrepreneurs may employ the following techniques:

1. Innovation of new goods, services, or procedures.
2. Pay attention to customer input and make adjustments.
3. Improvement of processes continuously (CPI).
4. Investigation of novel business models.
5. Identifying and solving issues.
6. The application of technology.
7. Application of business intelligence.
8. Employing economic tactics.
9. Designing upcoming goods and services.
10. Improved talent management.
11. Innovative and interactive networking strategies for entrepreneurs (Qureshi, 2015, Adel & Mahrous & Hammad, 2020).

These strategies are part of the quality management subject too (Ceko & Meçalla, 2017).

Several entrepreneurship challenges have been identified for the pandemic and post-pandemic periods (GEM Report), including the fact that in some countries, one in two adults agreed that their household income had decreased; comparing 2021 to 2019 (pre-pandemic); and the fact that Total.

Early-stage Entrepreneurial Activity (TEA; GEM's most well-known indicator, representing the percentage of adults who are starting or running a new business) has typically decreased and this has also been the case.

This may be a sign of a large number of informal "survival" businesses, which are often started during economic hardship when there aren't any other options or social safety nets, and when people turn to entrepreneurship as their only option left. The COVID-19 pandemic crisis presented fresh opportunities for business owners all over the world, as has always been the case during times of crisis.

However, despite favorable opinions of how simple it is to launch a company, self-confidence in one's skills and abilities, and other factors, many business owners were held back by their fear of failure (GEM, 2022).

### **BUSINESS SUSTAINABLE MANAGEMENT**

Entrepreneurship and quality management are subjects of a discipline called Business sustainable management, which is concerned about:

- The current global situation, necessary changes, and methods for rewiring the economy to close the

## ON THE RELATION BETWEEN ENTREPRENEURSHIP AND QUALITY MANAGEMENT

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sustainability gap.

- The benefits of sustainability for businesses and the necessity of strong leadership for change.
- The role that business and civil society play in forming a zero-carbon economy, as well as the use of policy instruments and international agreements.
- The value chain: Putting business strategies and practices for sourcing, producing, and consuming things sustainably into practice.
- How cutting-edge technology, planning, and design can support sustainable business.
- How to persuade internal and external stakeholders to support sustainability strategies and goals.
- How businesses can work together with corporate, government, and non-profit actors to bring about large-scale change in the sustainability space (BSMC, 2022).

### ENTREPRENEURSHIP INDEX

The CEOWORLD magazine's Entrepreneurship Index assesses a total of 100 economies that account for 95 percent of global GDP.

To construct an overall "best countries for entrepreneurship" index, the overall rating takes into account a wide range of characteristics, including innovation, competitiveness, infrastructure, labor skills, access to money, and business openness.

Starting a business requires courage, perseverance, and a marketable idea anyplace, but certain economies make it just a little bit simpler for entrepreneurs to get started.

If you're looking for the fittest place to start a business, you might not have to look too far.

Researchers collated, examined, and compared countries in six important categories: innovation, competitiveness, labor skills, infrastructure, access to finance, and business openness.

Researchers examined 18 indicators that fit within one of the six categories to assess those aspects.

On a scale of 1-100, an index was built to score the individual indicators. Each indication received equal weighting within each of the six categories, with some indicators consisting of 2-3 sub-indicators that were likewise equally weighted.

The rankings are the product of a thorough analytical process that used many data sources and did not rely on investment promotion agency (IPA) or government industry trade data submissions.

The margin of sampling error for the entire sample of 120,000 people is 1.2 percentage points. In addition to sampling error, it is important to remember that, as with all survey research, there are other sources of error such as coverage, nonresponse, and measurement error that could affect the results (WMEC, 2022).

### INTERNATIONAL STANDARDS ORGANIZATION AND BUSINESS SUSTAINABILITY

The International Organization for Standardization (ISO) defines sustainability as the ability to sustain or improve performance across time. Looking at it from a different angle, sustainability is concerned with the financial, social, and environmental well-being of businesses.

Sustainability broadly consists of three components:

- Economic/financial sustainability in business;
- Environmental sustainability in business;
- Social responsibility in business.

Two types of ISO Standards are helpful for the successful implementation of Sustainability practices:

- Standards that can be verified
- Standards for guidance.

### BENEFIT OF USING ISO INTERNATIONAL STANDARDS

According to ISO (ISO, 2021) governments, industry, consumers, the economy, society, environment, can benefit from using ISO standards as per below:

#### Government

Regulators can rely on ISO standards as a solid base on which to create public policy that helps further Sustainable Development Goals (SDGs) such as human rights, water, and energy efficiency, public health, and more. Recognized the world over, International Standards also help governments achieve their national and international commitments (ISO, 2021).

#### Industry

Industry plays a key role in achieving all the SDGs and ISO standards help it do that by providing guidelines and frameworks on everything, from employee health and well-being to energy consumption, to resilient and eco-friendly infrastructures (ISO, 2021).

#### Consumers

While helping to achieve the SDGs is high on the agenda of business leaders and policymakers, many of the advantages are realized at the local community level. Reduced poverty, improved health, cleaner and more abundant water, and safe and secure infrastructures are just some of the benefits to be gained from implementing ISO standards (ISO, 2021).

#### Economic

ISO International Standards promote economic sustainability by facilitating international trade, improving a country's national quality infrastructure, and promoting sustainable business practices (A quality infrastructure is a system that contributes to governmental policy objectives such as industrial development, global trade competitiveness, efficient use of natural and human resources, food safety, health, the environment, and climate change). They cover everything from efficient farming methods to anti-bribery management systems (ISO, 2021).

**Social**

ISO International Standards support social sustainability by assisting countries and communities in improving their populations' health and well-being. They cover all aspects of social welfare, from healthcare systems and related products to social inclusion and accessibility (ISO, 2021).

**Environmental**

ISO International Standards assist enterprises and countries control their environmental effect, which promotes environmental sustainability. They cover such aspects as implementing an environmental management system, measuring and reducing greenhouse gas emissions and energy consumption, and encouraging responsible consumption (ISO, 2021).

**QUALITY MANAGEMENT, DOING BUSINESS, AND GLOBAL TRENDS ON ISO CERTIFICATES**

The act of supervising all activities and duties required to maintain a target degree of perfection is known as quality management. This includes developing and implementing quality assurance and planning, as well as quality control and improvement. Quality management guarantees the consistency of an organization, product, or service. It has four main components: quality planning, quality assurance, quality control, and quality improvement (Keneth, 2005).

Quality management is concerned not only with the quality of products and services but also with the methods employed to accomplish them. To achieve more consistent quality, quality management employs quality assurance and control of processes as well as products. Several means to achieve quality management are between doing business regulations and rules, ISO certificates included, which are focused more on the quality of procedures private and public subjects follow, which at the end of the day brings a higher quality of products and services (Ceko, 2013).

Because societies require regulation—and businesses, as a part of society, are no exception—ISO certificates are now part of business and trade regulations because they are the minimum requirements for the characteristics of processes, products, and services used by private and public entities/subjects to be acceptable to their clients and markets.

Modern private and public enterprises cannot exist without this standard. And if markets are allowed to operate without standards, they will deliver poor results and, ultimately, inferior living quality for citizens. Entrepreneurs must establish certain procedures and standards when starting a new business or entering a new phase of enterprise development, allowing the business to live beyond minimum frontiers, e, export, and import, participate in public procurement procedures, and finally attract as many clients as possible in order to maximize profits and achieve other business objectives.

All of these difficulties revolve around standards, which facilitate commercial transactions and allow businesses to run efficiently. With 1 609 294 certificates issued worldwide in 2014, there is a slight up on the previous year, which demonstrates a moderate growth for almost all the ISO management systems standards around the world (ISO, 2021), confirming trends observed over the last two years. This market stabilization is offset, however, by three strong performers demonstrating more consistent growth.

Although less spectacular than in previous years, ISO 50001 for energy management shows a 40% increase, driven once again by Germany, which accounts for 50% of the 6 778 certificates reported. Similarly, food management standard ISO 22000 continues to deliver reliable performance with a 14 % growth rate, while ISO 16949 for the automotive sector shows accelerated progression with a commendable 8 %, signaling that economic recovery in the auto industry is holding up (ISO, 2014).

Table 1. ISO Survey Executive Summary. 2020 (ISO, 2020a)

ISO standards	Total valid certificates	Total number of sites
ISO 9001 – QMS	916,842	1,299,837
ISO 14001 – EP	348,473	568,798
ISO 45001 – HSW	190,481	251,191
ISO/IEC 27001 – ISM	44,499	84,181
ISO 22000 – QSGF	33,741	39,894
ISO 13485 – H	25,656	34,954
ISO 50001 – EE	19,731	45,092
ISO 20000-1 – IT	7,846	9,927
ISO 22301 – BC	2,205	4,662
ISO 37001 – ABMS	2,065	5,946
ISO 39001 – RTS	972	2,341
ISO 28000 - SRMS	520	968

When compared with the 2019 edition, the results are consistent when looking at the overall figures for most of the countries. Overall, the total number of valid certificates for the 12 management system standards examined in the survey has increased by 18% since 2019. Part of this considerable rise might be attributed to the significant growth in ISO 45001 certification; this standard was issued in 2018 and hence had a restricted number of certificates in the previous edition of the survey.

The pace of rise for ISO 9001 and ISO 14001 has been higher than in prior years, with +4% for ISO 9001 and +12% for ISO 14001, owing primarily to a significant increase in China. Similarly to earlier editions of the survey, the results reveal certain changes at the country level, which can be explained by factors relating to the participants, such as the non-participation of certain certifying bodies for those specific nations.

In the 2020 survey, this is the case, particularly for ISO 9001 and ISO 14001 for Belgium, Korea, Mexico, Ireland, and the Philippines and for ISO 28000, for China (ISO, 2020).

The most important thing related to this paper is the declaration of the International Standards Organization that the ISO Survey is not a database, but just a list of ISO certificates issued and a list of countries based on alphabetic order, neither based on the number of certificates issued per country (ISO, 2020b).

How ISO standards help companies and bring benefits to their clients

As it is stated in the GEM Report Policymakers could allay much of this fear by drawing greater attention to entrepreneurial success stories both large and small and implementing risk-mitigating initiatives that reduce real and perceived impediments for startups (GEM, 2022), besides other factors, ISO standards help on this issue.

### ISO STANDARDS HAVE HELPED VARIOUS COMPANIES AND OUR CLIENTS HAVE BENEFITED BECAUSE OF:

1. **Reduced risk:** The underlying reason for ISO compliance is that entrepreneurial businesses face greater risk than established organizations and hence have a stronger justification for risk mitigation. If a young company does not have consistent policies, methods, and procedures, it risks wasting valuable resources. And this can imply more than just missing the numbers; it can even mean going out of business.
2. **Builds in consistency:** It is not enough for newcomers to have a "general knowledge" of the minutiae necessary in producing high-quality products or services. Typically, the founders and a few workers have the necessary knowledge, but it is not routinely shared throughout the firm. ISO standards, on the other hand, document rules, methods, and procedures so that everyone is aware of and able to work within common guidelines.

3. **Measures ROI:** Furthermore, ISO standards serve as a checklist against which a small firm, whose financial talent and systems may be lacking, can measure crucial entrepreneurial objectives, such as return on investment (ROI).
4. **Builds credibility:** Finally, standards function as an imprimatur, convincing partners to engage with, and customers net to buy from, an untested entity (Glyn & Stove, 2003).

### METHODOLOGY AND METHODS (RESEARCH FRAMEWORK, THE PURPOSE OF THE CASE STUDY)

The association between the Entrepreneurship Index (E Index) and the ISO Standards Index from a worldwide perspective and global ecosystem served as the research framework.

Given the scarcity of numerical, statistical, and algebraic reasons on the relationships between the E Index and the ISO Standards Index, this study employs the building mode theory and seeks to answer the following research questions:

1. Ho: There is a strong connection/relation between E Index and the ISO Standards Index.
2. H1: There is not a strong connection/relation between E Index and the ISO Standards Index.

... considering that there is little research on the relationship between the E Index and the ISO standards Index, as listed in the literature review of this paper research, and considering that theoretical approaches on the relationship between entrepreneurship and ISO standards, and specifically between the E Index and the ISO standards Index, as well as numerical, statistical, and algebraic arguments on the relationship between them, do not exist.

Specifically, while acknowledging the importance of connections/relationships between entrepreneurship and ISO standards, prior empirical research impresses with declarations that this connection exists, but does not explain statistically if there is any connection/relation between them; thus, a theory supported by analysis and evidence was required. As a result of this critical analysis, an exploratory method was taken, employing a single in-depth case study technique, which is suited for developing an in-depth understanding of a phenomenon and allowing for closer examination of theoretical constructs.

### CASE SELECTION

The case was chosen based on three primary criteria: a theoretical approach, the applicability of the relationships, and the practical positive impacts on the relationships between the E Index and the ISO Standards Index. The case project was divided into three stages: (1) identifying needs for entrepreneurship, (2) identifying needs for quality management and ISO standards certification, and (3) determining the rank of countries for entrepreneurship and ISO standards index.

**DATA COLLECTION**

Data for E Index has been gathered from Entrepreneurship Report 2021, an annual ranking of countries by their achievement on the subject, compiled by the CEOWORLD magazine (WMREC, 2022).

Data for the number of businesses registered worldwide has been gathered from HitHorizon (HitHorizon, 2022).

Data for the ISO Standards Index has been gathered from the ISO Certificates Report 2022 (ISO, 2020).

To prepare the ISO standards Index I have divided the number of ISO certificates issued per country by the number of businesses registered in the country, resulting in the ISO standards Index per country, preparing the list of countries based on this Index.

**DATA ANALYSIS**

A correlation and regressive analysis (inferential statistics) between these Indexes for 91 countries worldwide were performed.

In the table below, 91 countries are listed for the E Index, and ISO Standards Index (prepared by the author of this article as per the explanation given in the paragraph above).

Based on these data and information from secondary resources, a regression between E Index and ISO certificates issued per country was built. Data from ISO about ISO standards certificates issued worldwide (taken from ISO report) didn't help directly, because an Index was needed, so the Index divided the number of ISO standards certificates issued per country by the number of business entities in the country, finding the ISO standards Index, as explained above.

**Results**

After listing countries per this Index, regression analysis between the E Index and ISO Standards Index was drafted, based on which, it can be stated that the relations between the E Index and ISO Standards Index are not high, verifying the H1 hypothesis which was: "There is no relation between E Index and ISO Standards Index, against Ho that was: "There is a strong relation between E Index and ISO Standards Index", which is a hypothesis that comes from the highly estimated situation from international organizations and believes of people who work on these subjects, which could never prove this hypothesis statistically.

In table 1, countries are listed as per the E Index, which served as the "Y" at the regression procedures, and ISO standard Index which served as the "X" at regression procedures, handled in an excel program.

Table 1. List of countries based on the E Index (CEOWORLD) and the ISO Standards Index (drawn from the author of this paper)

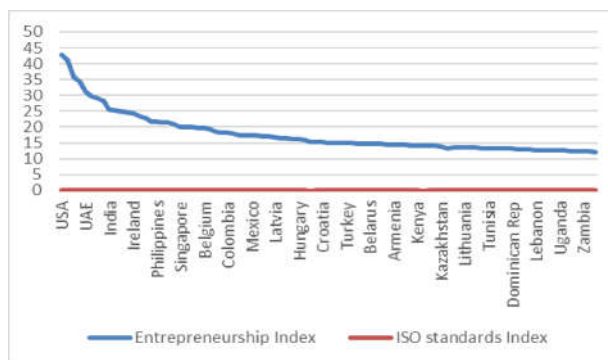
No	Country	E Index	ISO standards Index
1.	USA	42.88	0.00095
2.	Germany	41.05	0.021
3.	UK	35.8	0.00884

4.	Israel	34.25	0.018
5.	UAE	31.01	0.01185
6.	Poland	29.75	0.00656
7.	Spain	29.01	0.0146
8.	Sweden	28.16	0.00575
9.	India	25.47	0.00082
10.	France	25.34	0.0054
11.	Australia	25.05	0.00576
12.	Estonia	24.64	0.0071
13.	Ireland	24.37	0.0136
14.	Malaysia	23.6	0.011497
15.	S. Arabia	22.98	0.003433
16.	Canada	21.8	0.0052
17.	Philippines	21.62	0.00544
18.	Denmark	21.42	0.0071
19.	Switzerland	21.34	0.022
20.	Japan	20.71	0.011234
21.	Singapore	20.05	0.0153
22.	China	20.04	0.004338
23.	Austria	19.92	0.0173
24.	Portugal	19.73	0.0114
25.	Belgium	19.72	0.00467
26.	Italy	19.46	0.021
27.	New Zealand	18.55	0.00321
28.	Thailand	18.32	0.00505
29.	Colombia	18.25	0.00558
30.	Bulgaria	18.05	0.0129
31.	Chile	17.41	0.0293
32.	Czech Rep	17.37	0.0207
33.	Mexico	17.37	0.00209
34.	Norway	17.22	0.00695
35.	Cyprus	17.16	0.0053
36.	Argentina	16.96	0.00951
37.	Latvia	16.76	0.01173
38.	Serbia	16.55	0.0189
39.	Brazil	16.4	0.003433
40.	Romania	16.25	0.0144
41.	Hungary	16.19	0.009254
42.	Netherlands	16	0.0072
43.	Indonesia	15.42	0.000018
44.	Greece	15.23	0.034
45.	Croatia	15.2	0.0149
46.	S. Africa	15.12	0.00196
47.	Luxembourg	15.05	0.00231
48.	Rwanda	14.96	0.000389
49.	Turkey	14.95	0.00132
50.	Slovenia	14.86	0.0127
51.	Slovakia	14.8	0.0166
52.	Russia	14.79	0.001895

## ON THE RELATION BETWEEN ENTREPRENEURSHIP AND QUALITY MANAGEMENT

53.	Belarus	14.71	0.0494
54.	Iceland	14.65	0.0136
55.	Peru	14.65	0.00162
56.	Qatar	14.54	0.078
57.	Armenia	14.41	0.00124
58.	Malta	14.4	0.00596
59.	Morocco	14.32	0.01886
60.	Moldova	14.23	0.001201
61.	Kenya	14.2	0.000219
62.	Nigeria	14.11	0.000014
63.	Azerbaijan	14.07	0.144
64.	Finland	14	0.0082
65.	Kazakhstan	13.87	0.001995
66.	Albania	13.16	0.0043
67.	N.R.Macedonia	13.59	0.0191
68.	Georgia	13.57	0.011355
69.	Lithuania	13.55	0.0099
70.	Ukraine	13.53	0.001213
71.	Vietnam	13.44	0.0131
72.	Jordan	13.38	0.00282
73.	Tunisia	13.38	0.00212
74.	Ghana	13.35	0.00317
75.	Bahrain	13.34	0.0093
76.	Sri Lanka	13.18	0.001904
77.	Dominican Rep	13.16	0.00311
78.	Costa Rica	13.06	0.00428
79.	Bangladesh	12.99	0.00126
80.	Jamaica	12.91	0.00406
81.	Lebanon	12.8	0.00354
82.	Iran	12.66	0.0288
83.	Cameroon	12.65	0.00046
84.	Egypt	12.59	0.00094
85.	Uganda	12.59	0.000144
86.	Trind&Tob.	12.52	0.0048
87.	Algeria	12.28	0.000343
88.	Ethiopia	12.27	0.00113
89.	Zambia	12.27	0.00004
90.	Pakistan	12.24	0.022
91..	El Salvador	12.18	0.00147

In Graphic 1 a correlation analysis, in a graphical mode is given, where is shown there is no connection/relation between E Index and the ISO standards Index.



Graphic 1 depicts the missing relationships between the E Index and the ISO Standards Index (drawn by the author of this study).

In the three tables below, tables 2, 3, and 4, statistical results about missing connections/relations between E Index and ISO Standards Index are given, where  $R^2 = 0.248363$  shows a weak connection/relation between these two indexes.

Table 2

SUMMARY OUTPUT	
REGRESSION STATISTICS	
Multiple R	0.49836
R Square	0.248363
Adjusted R Space	0.237127
Standard Error	16.04706
Observations	90

Table 3

ANOVA					
	df	SS	MS	F	Significance F
Regression	1	7572.848	7572.848	29.4082	5.08E-07
Residual	89	22918.21	257.508		
Total	90	30491.06			

Table 4

	Coefficients	Standard Error	t Stat	P value	Lower 95%	Upper 95%	Lower 95%	Upper 95%
Intercept	0	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
0.00095	434.2485	80.07633	5.422933	4.98E-07	275.1386	593.3585	275.1386	593.3585

With these results, it has been verified in practice there is no connection/relation between E Index and ISO Standards Index.

**DISCUSSION**

In this study, by making use of a regressive analysis, it was verified statistically that there is no relation between E Index and ISO Standards Index, but this doesn't mean the relations are not needed, or they can't be achieved in the future. The question is when these relations will be achieved and verified, and what is needed next.

It is true and we all, World Bank, United Nations, and ISO including, do believe that entrepreneurship is important for economic growth and there is an improving ISO standard certification process all around the globe, but the question is how we can better match and adopt the entrepreneurship activity with ISO standards.

Scientific management of factors of production creates opportunities for improving entrepreneurship climate and business activity, applying quality management principles and ISO standards, as efficient and effective tools, and this is needed, immediately, but scientific management of factors of production requires ISO standards application in a wider approach and not only for private subjects which are looking to participate in public procurements as well as for exporting goods accompanied with ISO certificates, so, a real connection and relations between the E Index and ISO standards should exist.

**THEORY AND PRACTICE IMPLICATIONS**

Concerning the theory, based on the findings of this study, a new avenue for research has been opened in the field of relationships between entrepreneurship and quality management, particularly between the E Index and the ISO Standards Index, which are viewed as tools for improving life quality all over the world.

**LIMITATIONS AND FURTHER RESEARCH**

This study was conducted using a large amount of data on the E Index and offers for the first time information about the ISO Standards Index for the year 2020.

Further study is required to validate these relationships, which must be strengthened in the future in order to make the Entrepreneurship Index and the ISO Standards Index real tools for improving living quality all around the world.

**CONCLUSIONS AND RECOMMENDATIONS**

1. Scientific management of factors of production creates opportunities for entrepreneurship activities, applying quality management principles and ISO standards, as efficient and effective tools, and this is needed, immediately.
2. Scientific management of factors of production requires ISO standards application; so, a connection and relations between the Entrepreneurship Index (E Index) and ISO standards should exist, for healthier business ecosystems.
3. The general outcome of the research is looking forward to achieving and maintaining entrepreneur-

ship activities, applying quality management principles and ISO standards, as efficient and effective tools, as an immediate need, all parties should look forward to making sure building relations and connections between Entrepreneurship Index and ISO Standards Index, which currently doesn't exist.

4. There are no strong and sustained relations between sustainable development and quality management/ISO standards.
5. Improving quality management systems and adhering to ISO standards, in tandem with efforts to improve the business climate and increase entrepreneurial activities, will provide a clear sign of global life quality improvement.
6. There is no relation between entrepreneurship and ISO standards, even though it is assumed that it should exist to promote sustainable entrepreneurship with no support at all.

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The contribution of this paper, mostly on the field of relations between entrepreneurship and ISO standards, shows that international organizations, those mentioned in this paper, should carefully investigate the issue of building research relations between concepts, especially between important concepts and principles like those of Entrepreneurship and Quality management principles too.

This critical analysis article emphasizes the economic and social importance of Entrepreneurship and ISO standards, for current and future generations.

**CONFLICT OF INTERESTS**

The authors declare no conflict of interest.

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## ON THE RELATION BETWEEN ENTREPRENEURSHIP AND QUALITY MANAGEMENT

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