



**ICAWW**  
Waste to Wealth



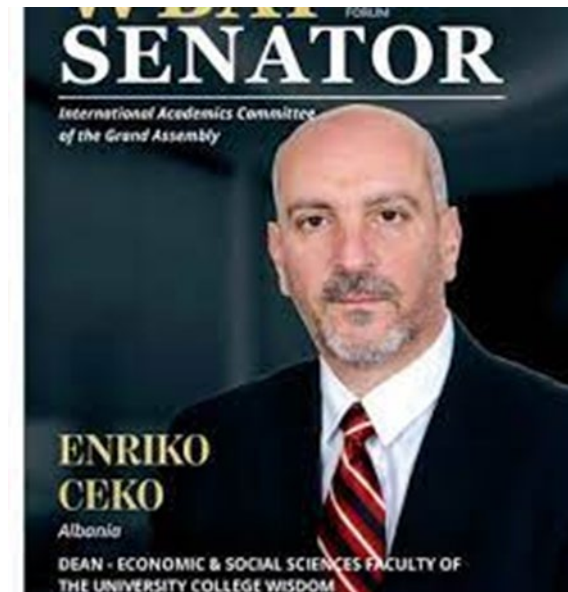
**CIT**  
CANADIAN INSTITUTE  
OF TECHNOLOGY

# On the relation between sustainable development and ISO 9001:2015 standard

Dr. Enriko Ceko

7th – 8th July, 2022.

Bedford Hotel, 135-137, 1000 Brussels, Belgium.



# Abstract

- Healthy ecosystems and environments are necessary for the survival of humans and other organisms. Moving towards sustainability is also a social challenge that entails international and national law, urban planning and transport, supply chain management local and individual lifestyles, and ethical consumerism.
- International Standards Organization is working on matching ISD Goals with ISO standards, declaring that: “Transforming our world is the aim of the United Nations 2030 Agenda for Sustainable Development and its corresponding 17 Sustainable Development Goals (SDGs). This ambitious action plan to enhance peace and prosperity, eradicate poverty and protect the planet is recognized globally as essential for the future sustainability of our world. It calls on the contribution from all elements of society, including local and national governments, businesses, industry, and individuals.
- The main goal of conducting this research was to clarify the relations between sustainable development and quality management. This was done by handling a regression analysis between the Sustainable development goals index and ISO 9001 index to verify Hypothesis H1 (There is not any relation between ISDG Index and ISO 9001 index) against Hypothesis H0 (There is a strong relation between SDG Index and ISO 9001 index).
- Results of the research are that (1) scientific management of factors of production creates opportunities for long-term sustainable development, guaranteeing future generations’ normal life and society’s wealth, promoting economic growth, and quality life improvement, without damaging the environment, applying quality management principles and ISO standards, as efficient and effective tools, and this is needed immediately.
- On the other hand, scientific management of factors of production requires ISO standards application, so, a connection and relations between sustainable development and ISOI standards, ISO 9001:2015 should exist.
- The general outcome of the research is looking forward to achieving and maintaining sustainable development scenarios, for all interested parties, individuals, public and private institutions, decision-makers, and civil society, 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 SDG and ISO standards, which currently doesn’t exist.

**Keywords:** Sustainable development, quality management, ISO standards, ISO 9001:2015, etc.

# Introduction

- It is supposed that there is a strong relationship between sustainable development and quality management principles, especially with ISO standards, from which, ISO 9001:2015 is the most required standard worldwide.
- This was the main question investigated in this research, using quantitative methods, combined with a regression analysis on relations between Sustainable Development Goals Index and ISO 9001 index.
- Separated existing data and materials about sustainable development, quality management, and ISO 9001:2015, existed before, together with previously published works and scholarly articles books, as well as online libraries, too.
- It is believed that scientific management, including quality management, creates opportunities for long-term sustainable development, guaranteeing future generations' normal life and society's wealth, promoting economic growth, and quality life improvement, without damaging the environment, in a time when factors of production are more and more vulnerable against risks of misuse, damage, pollution, corruption, etc., so, applying in practice quality management principles and ISO standards, is needed immediately.
- To achieve and maintain sustainable development scenarios, and to achieve United Nations Sustainable Development Goals 2030 Agenda, for all interested parties, individuals, and public and private institutions, especially for decision-makers and civil society, an improvement of the situation is needed, since there is lack of methods, systems, techniques of use, and management of production's factors and lack of quality management principles and standardizations, too, application of ISO 9001:2015 standard included.
- There are strong and sustained relations between quality management / ISO standards and doing business climate. There are strong and sustained relations between doing business climate and life quality. Improving quality management systems / respecting ISO standards parallel with doing business regulations / doing business climate, can improve the life quality of citizens.
- Worldwide countries recently are facing problems that affect the development and performance of businesses, development and economic growth, sustainable development, and life quality.
- Improving quality institutions, quality infrastructure, and doing business climate worldwide, using ISO standards, ISO 9001:2015 included, will have a positive impact on increasing economic growth and improving the quality of life of citizens in a wider perspective, as a part of long-term sustainable development.

# Sustainability and healthy ecosystems

- The name sustainability is derived from the Latin *sustinere* (tenere, to hold; sub, under). Sustain can mean "maintain", "support", or "endure". Sustainability is the process of maintaining change in a balanced environment, in which the exploitation of resources, the direction of investments, the orientation of technological development, and institutional change are all in harmony and enhance both current and future potential to meet human needs and aspirations. For many in the field, sustainability is defined through the following interconnected domains or pillars: environment, economic and social. Sub-domains of sustainable development have been considered also: cultural, technological, and political. Managing and maintaining them, standards are needed.
- Healthy ecosystems and environments are necessary for the survival of humans and other organisms. Moving towards sustainability is also a social challenge that entails international and national law, urban planning and transport, supply chain management local and individual lifestyles, and ethical consumerism. Ways of living more sustainably can take many forms from reorganizing living conditions (e.g., ecovillages, eco-municipalities, and sustainable cities), reappraising economic sectors (permaculture, green building, sustainable agriculture), or work practices (sustainable architecture), using science to develop new technologies (green technologies, renewable energy, and sustainable fission and fusion power), or designing systems flexibly and reversibly, and adjusting individual lifestyles that conserve natural resources, applying standards. The term "sustainability" should be viewed as humanity's target goal of human-ecosystem equilibrium (homeostasis), while 'sustainable development' refers to the holistic approach and temporal processes that lead us to the end point of sustainability.". Despite the increased popularity of the use of the term "sustainability", the possibility that human societies will achieve environmental sustainability has been, and continues to be, questioned—in light of environmental degradation, climate change, overconsumption, population growth and societies' pursuit of unlimited economic growth in a closed system.

# Carrying capacities

- Since the 1980s sustainability has been used more in the sense of human sustainability on planet Earth and this has resulted in the most widely quoted definition of sustainability as a part of the concept of sustainable development, that of the Brundtland Commission of the United Nations on March 20, 1987: "sustainable development is a development that meets the needs of the present without compromising the ability of future generations to meet their own needs". Sustainability can also be defined as a socio-ecological process characterized by the pursuit of a common ideal.
- The 2005 World Summit on Social Development identified sustainable development goals, such as economic development, social development, and environmental protection. Sustainable development consists of balancing local and global efforts to meet basic human needs without destroying or degrading the natural environment and for this, standards are needed.
- The general trend is for higher standards of living to become less sustainable, with a population growth that has a marked influence on levels of consumption and the efficiency of resource use. The sustainability goal is to raise the global standard of living without increasing the use of resources beyond globally sustainable levels; to not exceed "one planet" consumption, for this cost reduction, applying standards is needed. The information generated by reports at the national, regional, and city scales confirms the global trend toward societies that are becoming less sustainable over time.
- It has been argued that the carrying capacity of Earth — that is, Earth's capacity to sustain human populations and consumption levels — is bound to decrease sometime in the future as Earth's finite stock of mineral resources is presently being extracted and put to use, and other studies have propounded the same argument. At the enterprise scale, carrying capacity now also plays a critical role in making it possible to measure and report the sustainability performance of individual organizations. For this, standards can help.

# Consumption

- A major driver of human impact on Earth systems is the destruction of biophysical resources, and especially, the Earth's ecosystems.
- The environmental impact of a community or of humankind as a whole depends both on population and impact per person, which in turn depends in complex ways on what resources are being used, whether or not those resources are renewable, and the scale of the human activity relative to the carrying capacity of the ecosystems involved.
- Careful resource management can be applied at many scales, from economic sectors like agriculture, manufacturing and industry, to work organizations, the consumption patterns of households and individuals and to the resource demands of individual goods and services.

# Circularity

- In recent years, concepts based on (re-)cycling resources are increasingly gaining importance. The most prominent among these concepts might be the Circular Economy, with its comprehensive support by the Chinese and the European Union.
- There is also a broad range of similar concepts or schools of thought, including cradle-to-cradle laws of ecology, looped and performance economy, regenerative design, industrial ecology, bio-mimicry, and the blue economy.
- These concepts seem intuitively to be more sustainable than the current linear economic system.
- The reduction of resource inputs into waste and emission leakage out of the system reduces resource depletion and environmental pollution. However, these simple assumptions are not sufficient to deal with the involved systemic complexity and disregard potential trade-offs.
- For example, the social dimension of sustainability seems to be only marginally addressed in many publications on the Circular Economy, and there are cases that require different or additional strategies, like purchasing new, more energy-efficient equipment.
- A review of a team of researchers from Cambridge and TU Delft identified eight different relationship types between sustainability and the circular economy, namely a (1) conditional relation, a (2) strong conditional relation, a (3) necessary but not sufficient conditional relation, a (4) beneficial relationship a (structured and unstructured) (5) subset relation, a (6) degree relation, a (7) cost-benefit/trade-off relation, and an (8) selective relation.

# Measurement

- Sustainability measurement is the quantitative basis for the informed management of sustainability.
- The metrics used for the measurement of sustainability (involving the sustainability of environmental, social and economic domains, both individually and in various combinations) are evolving: they include indicators, benchmarks, audits, sustainability standards and certification systems like Fair trade and Organic, indexes and accounting, as well as assessment, appraisal and other reporting systems.
- Some of the best known and most widely used sustainability measures include corporate sustainability reporting,
- Triple Bottom Line accounting, World Sustainability Society, Circles of Sustainability, and estimates of the quality of sustainability governance for individual countries using the Environmental Sustainability Index and Environmental Performance Index.
- The SDG Index was published in The Sustainable Development Report, based on the publication Sachs et al. (2022): From Crisis to Sustainable Development: the SDGs as Roadmap to 2030 and Beyond. Sustainable Development Report 2022. Cambridge: Cambridge University Press, as an assessment of each country's overall performance on the 17 SDGs, ranked by their overall score, which measures the total progress towards achieving all 17 SDGs.



# Human impact and development

- Human impacts on the Earth are demonstrated in a general way through detrimental changes in the global biogeochemical cycles of chemicals that are critical to life, most notably those of water, oxygen, carbon, nitrogen, and phosphorus, as well as the human activity is having a significant and escalating impact on the biodiversity of world ecosystems, reducing both their resilience and bio-capacity.
- Development is a process that creates growth, progress, positive change, or the addition of physical, economic, environmental, social, and demographic components, purposing life quality improvement, and the creation or expansion of local regional income and employment opportunities, without damaging the resources of the environment.
- Amartya Sen developed the “capability approach,” which defined development as a tool enabling people to reach the highest level of their ability, through granting freedom of action, i.e., freedom of economic, social, and family actions, etc., an approach that became a basis for the measurement of development by the Human Development Index, developed by the UN Development Program in 1990.
- Martha Nussbaum developed the abilities approach in the field of gender and emphasized the empowerment of women as a development tool. Jeffrey Sachs and Paul Collier focused on mechanisms that prevent or oppress development in various countries, and cause them to linger in abject poverty for dozens of years.
- These are the various poverty traps, including civil wars, natural resources, and poverty itself. The identification of these traps enables relating to political – economic – social conditions in a country in an attempt to advance development.

# Sustainable development goals

- Sustainable development is the organizing principle for meeting human development goals while at the same time sustaining the ability of natural systems to provide the natural resources and ecosystem services upon which the economy and society depend.
- The desired result is a state of society where living conditions and resource use continue to meet human needs without undermining the integrity and stability of the natural system, applying standards too.
- Sustainable development can be classified as development that meets the needs of the present without compromising the ability of future generations, a concept derived mostly from the 1987 Brundtland Report, shifted currently to focus more on economic development, social development, and environmental protection for future generations.
- In September 2015, the United Nations General Assembly formally adopted the "universal, integrated, and transformative" 2030 Agenda for Sustainable Development, a set of 17 Sustainable Development Goals (SDGs), to be implemented and achieved in every country from the year 2016 to 2030.

# 17 Sustainable Development Goals

- No Poverty – End poverty in all its forms everywhere
- Zero hunger - End hunger, achieve food security and improved nutrition, and promote sustainable agriculture
- Good Health & Health being – Ensure healthy lives and promote well-being for all at all ages
- Quality Education – Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
- Gender equality – Achieve gender equality and empower all women and girls
- Clean Water & Sanity – Ensure availability and sustainable management of water and sanitation for all
- Affordable & Clean Energy – Ensure access to affordable, reliable, sustainable, and modern energy for all
- Decent work & Economic growth – Promote sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all
- Industry innovation & Infrastructure – Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation
- Reduced Inequality – Reduce inequality within and among countries
- Sustainable cities and communities – Habitation – Make cities and human settlements inclusive, safe, resilient and sustainable
- Responsible Consumption & Production – Ensure sustainable consumption and production patterns
- Climate Action – Take urgent action to combat climate change and its impacts, ensuring that both mitigation and adaptation strategies are in place
- Life below water – Marine-ecosystems – Conserve and sustainably use the oceans, seas, and marine resources for sustainable development
- Life & Land – Ecosystems – Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
- Peace & Justice – Strong Institutions – Promote peaceful and inclusive societies for sustainable development, provide access to justice for all, and build effective, accountable, and inclusive institutions at all levels
- Partnership to achieve the goals – Sustainability – Strengthen the means of implementation and revitalize the global partnership for sustainable development.

# ISO and sustainable development

- On the other side, International Standards Organization is working on matching ISD Goals with ISO standards, declaring that: “Transforming our world is the aim of the United Nations 2030 Agenda for Sustainable Development and its corresponding 17 Sustainable Development Goals (SDGs).
- This ambitious action plan to enhance peace and prosperity, eradicate poverty and protect the planet is recognized globally as essential for the future sustainability of our world. It calls on the contribution from all elements of society, including local and national governments, businesses, industry, and individuals.
- To be successful, the process requires consensus, collaboration, and innovation. ISO has published more than 22 000 International Standards and related documents that represent globally recognized guidelines and frameworks based on international collaboration.
- Built around consensus, they provide a solid base on which innovation can thrive and are essential tools to help governments, industry, and consumers contribute to the achievement of every one of the SDGs.

# Benefits of ISO use

Using ISO International Standards can benefit:

- Government
- Industry
- Consumers
- Economic
- Social
- Environmental.

# ISO report on standards and certifications

- ISO has published its report on ISO standards certification issued, and lists countries as per the “The ISO Survey of management system standard certifications”, an annual survey of the number of valid certificates to ISO management system standards worldwide.

- As per the survey results, compared with the 2019 edition, there is an 18% increase in the total number of valid certificates issued for the 12 management system standards covered in the survey. For the ISO 9001, the rate of increase has been greater at +4%.

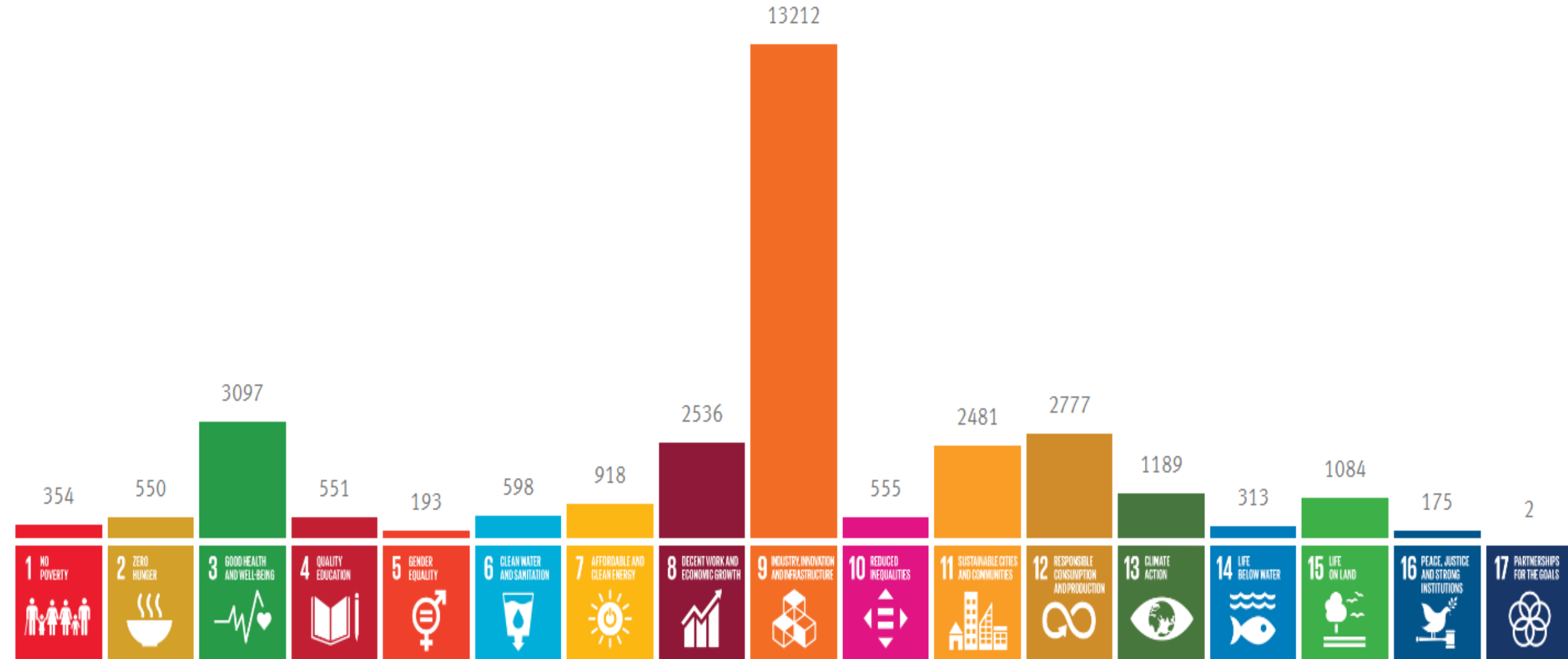
ISO standards	Total valid certificates	Total number of sites
<b>ISO 9001 – QMS</b>	<b>916,842</b>	<b>1,299,837</b>
<b>ISO 14001 – EP</b>	<b>348,473</b>	<b>568,798</b>
<b>ISO 45001 – HSW</b>	<b>190,481</b>	<b>251,191</b>
<b>ISO/IEC 27001 – ISM</b>	<b>44,499</b>	<b>84,181</b>
<b>ISO 22000 – QSGF</b>	<b>33,741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

B.P.E.



# IMPACT AT A GLANCE

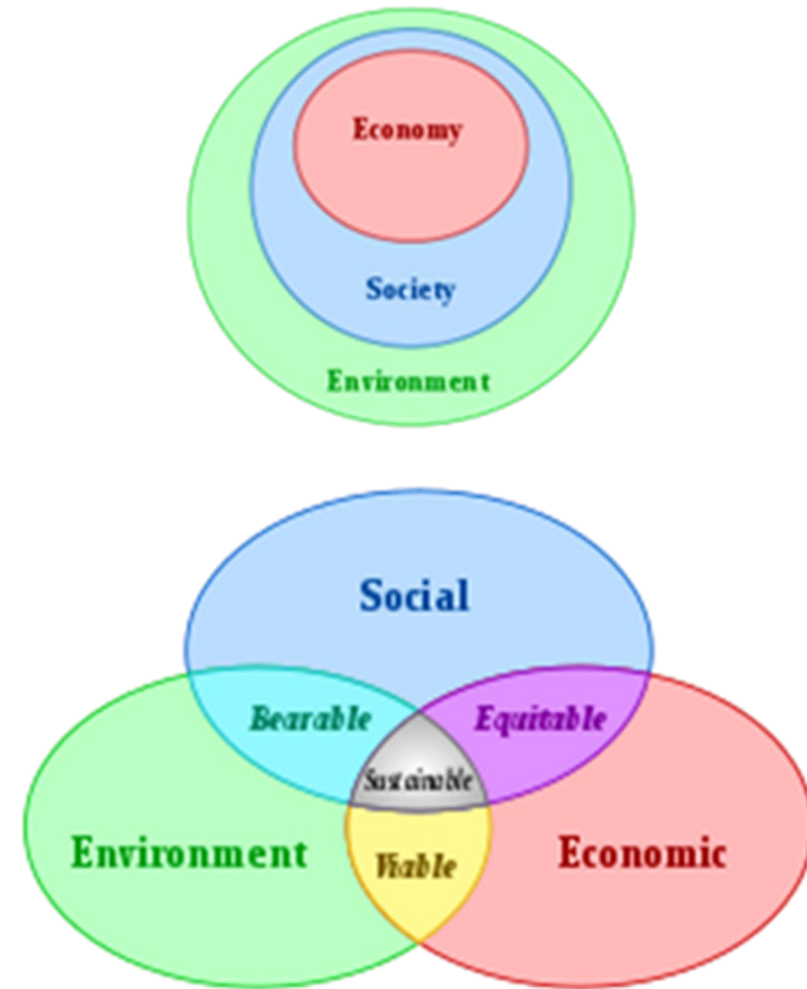
ISO contributes to all of the SDGs. Here you can see the number of ISO standards that are directly applicable to each Goal.





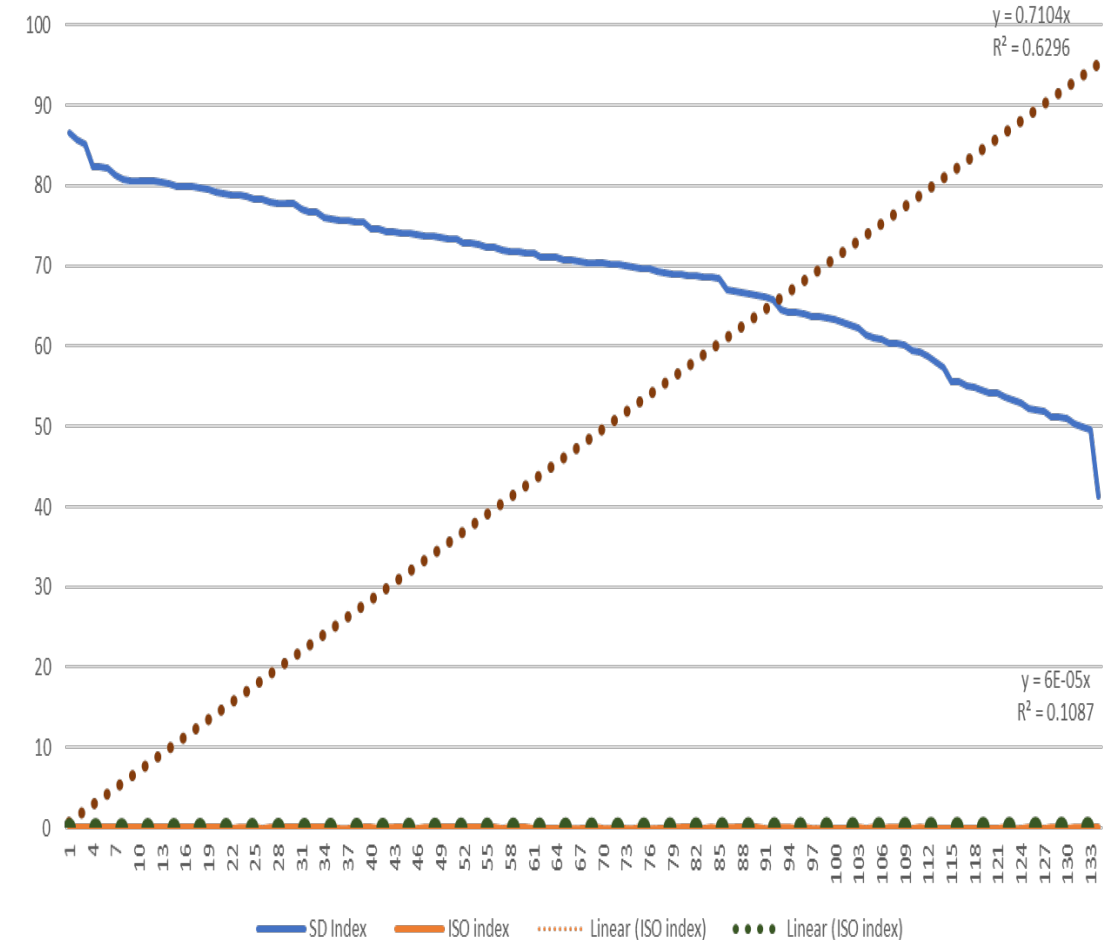
# ISO standards support the three pillars of sustainable development

- **Economic**
- ISO International Standards promote economic sustainability by facilitating international trade, improving a country's national quality infrastructure and supporting sustainable business practices. They cover everything from efficient farming methods to anti-bribery management systems.
- **Social**
- ISO International Standards promote social sustainability by helping countries and communities to improve the health and well-being of their citizens. They cover all aspects of social welfare, from healthcare systems and related products to social inclusion and accessibility.
- **Environmental**
- ISO International Standards promote environmental sustainability by helping businesses and countries manage their environmental impact. They cover such aspects as implementing an environmental management system, measuring and reducing greenhouse gas emissions and energy consumption, and encouraging responsible consumption.



# SDG Index and ISO 9001 index regression analysis

- Based on these data and information from secondary resources, I build a regression between SDG Index and ISO certificates issued per country. Data from ISO about ISO 9001 certificates issued don't help directly, because an index is needed, so I build the index by dividing the number of ISO 9001 certificates issued per country by the number of business entities in the country, finding the ISO 9001 index.
- After listing countries per this index, I performed a regression analysis between ISDG Index and ISO 9001 index, based on which, the relations between the ISDG index and ISO 9001 index are not high, verifying the H1 hypothesis which was "There is not any relation between ISDG Index and ISO 9001 index, against Ho that was: "There is a strong relation between ISDG Index and ISO 9001 index".



SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0.492513
R Square	0.242569
Adjusted R Square	0.23505
Standard Error	60.84842
Observations	134

ANOVA	df	SS	MS	F	Significance F
Regression	1	157704.1	157704.1	42.59361	1.32E-09
Residual	133	492436.5	3702.53		
Total	134	650140.6			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	0	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
ISO index	2510.54	384.6758	6.526378	1.3E-09	1749.666	3271.414	1749.666	3271.414

## Results of the research

- Results of the research are that scientific management of factors of production creates opportunities for long-term sustainable development, guaranteeing future generations' normal life and society's wealth, promoting economic growth, and quality life improvement, without damaging the environment, applying quality management principles and ISO standards, as efficient and effective tools, and this is needed, immediately.
- On the other hand, scientific management of factors of production requires ISO standards application, so, a connection and relations between the sustainable development goals index (SDGI) and ISO standards, ISO 9001:2015 should exist.
- The general outcome of the research is looking forward to achieving and maintaining sustainable development scenarios, for all interested parties, individuals, public and private institutions, decision-makers, and civil society, 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 SDG and ISO standards, which currently doesn't exist.