Bringing Discipline into Transdisciplinary Communications
-The ISO 56000 Family of Innovation Standards-

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ABSTRACT

Trans-disciplinary communication generates new knowledge that may lead to inventions that may be processed into innovations by ambidextrous organizations operating in a global innovation ecosystem. These ecosystems comprise global partnerships united by supply chains financed by multinational institutions whose professional talent originates in universities. For these ecosystems to succeed, their individual components must operate as open systems shareable by each and developed according to a mutually agreed set of rules or standards. In this paper, we will present the developing ISO 56000 family of standards as serving to bring discipline into the global innovation ecosystem.

Keywords: Trans-disciplinary communication, innovation, innovation standards, ISO, innovation ecosystem, Delphi process

1. INTRODUCTION

Trans-Disciplinary Communications (TDC) is a process that creates new knowledge (Swart, 2023). Effective TDC produces new knowledge via diverse teams collaborating to integrate perspectives, theories, methods, or tools that solve complex problems (Yuki, 2009; Makinen, 2018). To be effective, these teams require an agile organizational structure with unencumbered interorganizational information exchanges and a high level of decisional autonomy (Crossan, Lane, &White, 1999). This requires leaders who possess a multidisciplinary breadth of experience that facilitates open, deep, and continuous interpersonal communication between team members (Salazar & Lant, 2018).

TDC drives the knowledge economy in which we mostly work with our minds. New knowledge drives innovation and produces ideas as commodities. According to a McKinsey study, 96% of North American companies have innovation as a strategic priority in their business plans. Innovation starts with an invention, which is only the initial discovery, while innovation is a process that starts with an invention and includes all the steps of commercialization, adoption, utilization, and measurement of success. Unless an invention can be implemented to yield value for a customer or user, it remains an invention. It is the innovation process that leads to a competitive advantage, additional market share and financial gains.

TDC focuses on creating new knowledge. It must be an integral part of any organization seeking to innovate. However, to be successful, such organizations must be able to simultaneously:

- Exploit the benefits of past successful innovations, which are best facilitated in a stable organizational environment.
- Explore new knowledge and create new ideas that are better facilitated with an entrepreneurial organization.

This requires continual organizational change that will allow the firm to operate in an environment of rapid product innovation while maintaining the stability of a production company (Swart, MacLeod & Fernandez, 2023).

While the two organizational models appear to be incompatible, "ambidextrous" organizational structures have allowed some firms to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments. Because these firms' senior leadership developed an innovation culture and created flexible, adaptive and antifragile systems, they were able to create competitive advantages by operating in multiple modes simultaneously - managing for short-term efficiency by emphasizing stability and control and managing for long-term innovation by taking risks. Existing capabilities reflect the firm's ability to compete in the current environment. The challenge for senior leaders is to nurture and refine these and be prepared to reconfigure these assets as contexts shift (O'Reilly and Tushman, 2007).

The emergence of an ambidextrous organizational structure is seldom evolutionary and, more often, revolutionary. When there is no clear consensus within the senior leadership team about the organization's requirement to shift to ambidextrous, then the senior leader needs to be prepared to eliminate those who oppose the ambidextrous form. When USA Today encountered this problem, CEO Tom Curly replaced five of seven senior managers. At Ciba Vision, 60% of the senior team was replaced, and at IBM, new CEO Lou Gerstner replaced almost his entire senior team, citing the potential importance of "public hangings" to ensure focus (O'Reilly. and Tushman, 2007).

Once an organization has committed to innovation, it enters an "Innovation Ecosystem" (Grandstand & Holgersson, 2019). Such ecosystems are often global and consist of all the stakeholders of the organization, including financial, supply chains, sales and marketing, human resources, universities, research labs and customers. Given that surviving and thriving in such ecosystems depends on the partners and relationships that are chosen, the existence of standards can help to ensure the safety, quality, and reliability of products and services, facilitate trade, and protect individual and environmental health. For businesses, standards improve systems and processes, reduce waste, cut costs, ensure product and service consistency, improve customer satisfaction, increase revenues, and support trade through compatibility with other markets. For governments, they support the development of policy and legislation and to protect user and business interests. For consumers, they ensure reliability, consistency, the safety of products as well as ensuring interoperability. And, for us all, they ensure safety, reliability, protect our health and that of the government (https://www.bsj.org.jm/node/32). In other words, standards can introduce discipline into the global innovation ecosystem. Simply put, they constitute the "rules of the game" by which business is conducted.

2. DEVELOPING ISO STANDARDS

While attempts have been made to develop standards on a regional basis (Mir & Casadesus, 2011), the globalization of all areas of endeavor has progressed to the extent that standards must be global to be effective. The International Organization for Standardization (ISO) is an international nongovernmental organization made up of national standards bodies (NSB's) representing over 160 countries that develops and publishes a wide range of proprietary, industrial, and commercial standards. It plays an important role in facilitating world trade by providing common standards among different countries. The two most popular existing ISO standards are ISO 9001 and ISO 14001. ISO 9001 is about quality management systems, while ISO 14001 is about environmental management systems. Both standards are applicable to most businesses and organizations, making them popular. The development of these two standards, as well as all other ISO standards, is defined in (https://www.iso.org/developing-standards.html) and follows a Delphi process (Kodyakov et al., 2023) in which international technical committees of experts from different sectors and stakeholders participate.

Figure 1 depicts the ISO Delphi process for the ISO standards development. The process is initiated after a NSB submits a proposal for a new standard, denoted as a new work item proposal (NWIP). The proposal must include a proposed project leader and the need, scope,
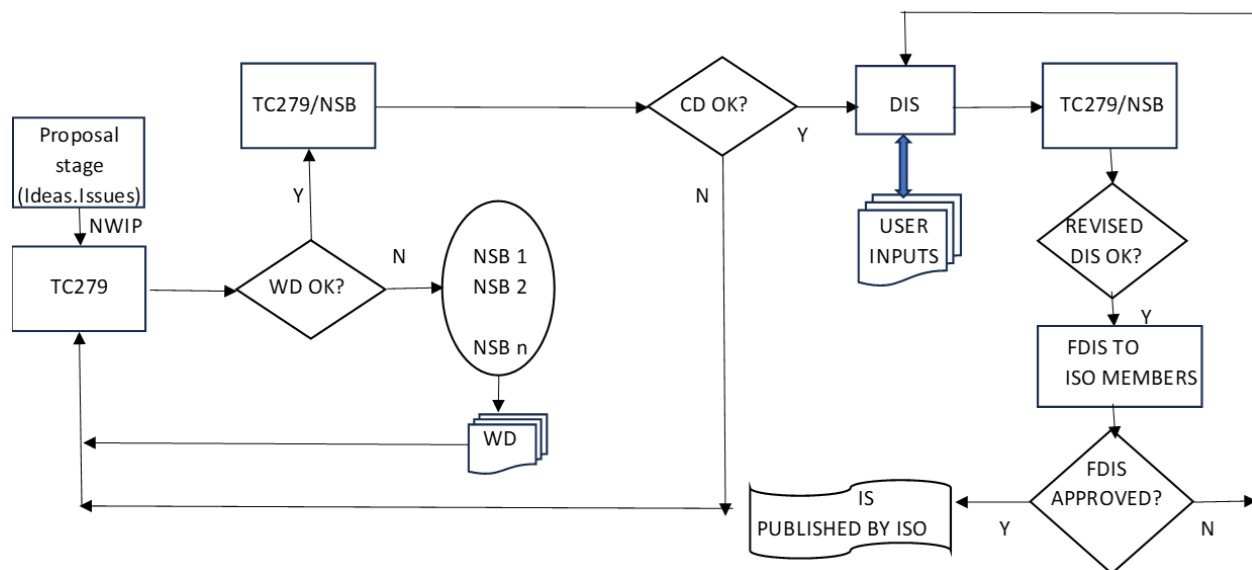

Figure 1: The ISO standards development Delphi process

and the objective of the new standard. Initially, the NWIP is submitted to the technical committee in charge of the area in question. In the case of the ISO 56000 family of standards this NWIP is submitted to TC279 the Technical Committee for Innovation Management Systems. The NWIP is put out to ballot to gain approval from the NSBs that are members of TC279. Once approved, the NWIP is assigned to either a new or existing Workgroup within TC279 and the TC asks for experts from the NSBs (NSB 1, NSB2, ,...,, NSB n) to participate in the development of the working draft (WD) of the standard according to the guidance of the approved NWIP. The WD is circulated among the TC279 members for comments and suggestions. The WD is modified based on these comments to become a committee draft (CD). The CD is then sent out to all the members of TC279, including the NSB's, for a vote. If approved the CD moves to the next stage. If it is not approved, then it needs to be modified with the second set of comments by the expert in the workgroup.

The approved CD becomes a draft international standard (DIS) and is used to get input from all stakeholders of the standard being developed. The TC279/NSB's will use this input to make final technical changes and vote on their acceptance as the final draft stage (FDIS). If the DIS is rejected, it is sent back to the technical committee for further revision and another vote. Otherwise, the FDIS is submitted to all ISO members for a final vote. If accepted, the FDIS moves on to the Publication Stage. If the FDIS is rejected, the project is terminated or the FDIS is revised and voted on again. Once approved, the approved FDIS becomes an international standard (IS) and is published by ISO. The IS is then available for implementation and use by the relevant industry, consumers, regulators, and other stakeholders.

The development process for an ISO standard usually takes between two and three years, depending on the complexity and level of interest of the topic.

## 3. DEVELOPING INNOVATION MANAGEMENT STANDARDS

It is often mistakenly thought that an invention is an innovation. There are thousands of patents or inventions that are approved yearly in most industrialized countries. Although inventions are often mistaken for innovations, unless an invention can be implemented to yield value for a customer or user, then it remains an invention. An invention relates to the technology, process, or product but an innovation is when an invention is deployed, and value is created. So, invention is only the initial discovery while an innovation has successfully navigated all the steps of commercialization, adoption, utilization, and measurement of success. It is the innovation that leads to a competitive advantage, additional market share and financial gains.

The purpose of an Innovation Ecosystem is to facilitate the path from the strategic innovation intent to an opportunity/idea through to an innovation. To get to the innovation, many paths can be followed. Some paths might start from an invention which may need to be commercialized but many innovations start with opportunities or ideas that have been generated to further the strategic innovation intent of the organization.

Invention is a creative process which by its very nature cannot/should not be standardized. However, the steps that lead to innovation are predictable and form a process, as shown in Figure 2. To manage such a process, the organizational focus must be on value realization and:

- Produce knowledge via diverse teams collaborating to integrate perspectives, theories, methods, or tools that solve complex problems.
- Have an agile organizational structure with an unencumbered intraorganizational information exchange and a high level of decisional autonomy.
- Be led by a team that posses a multidisciplinary breath of experience that will facilitate open, deep, and continuous interpersonal communication between team members.
- Be able to transform tacit knowledge that leads to organizational learning.

THE INNOVATION PROCESS
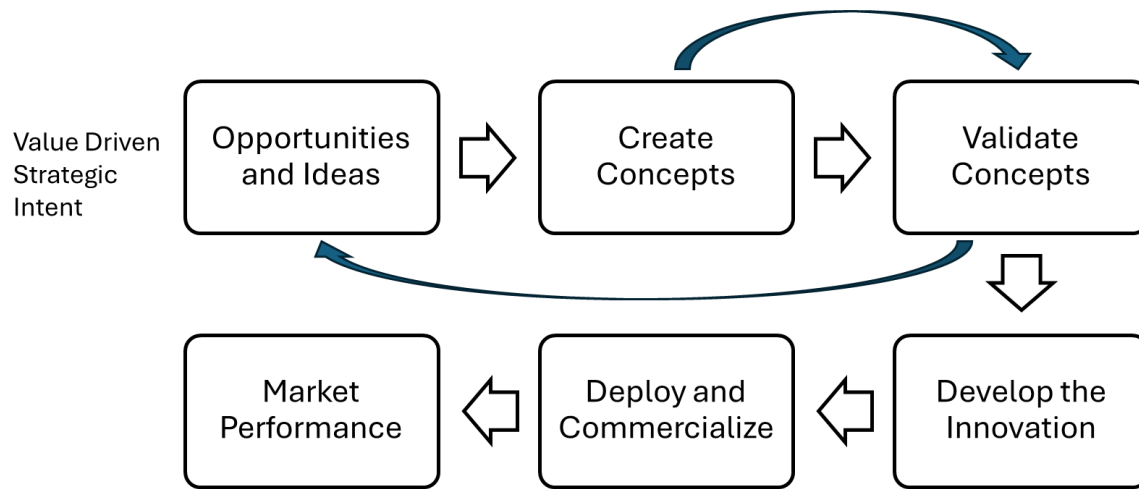
Figure 2: The innovation process.

4. THE ISO 56000 SERIES OF STANDARDS

As discussed above, the innovation process begins with having a strategic innovation intent. From this intent, opportunities are developed from which new inventions can be developed into commercially useful innovations, creating something new. Creativity has been notoriously difficult to standardize. Hence, ISO has focused on developing standards for managing the process that leads from invention to commercialization. As a first step toward that end, it developed a set of principles to guide the development of the ISO 56000 family of standards. These principles are:

1. **Realization of Value:** Value is the key principle of Innovation Management. If you are not creating value, then you are not innovating. There is often confusion between R&D and true Innovation. In R&D you may be making great discoveries but unless they are deployed to add value to either some internal process or to an existing or new customer market segment, then it is not an innovation. We need to understand these differences to understand how to manage innovation.

2. **Leaders Focusing on the Future:** Leaders are usually focused on achieving their next quarterly result goals. Many do not even think about the future moving forward into the following year. It is those leaders that can "see around the corner"

who can be ready for the future and contribute to the creation of that future environment which favors their organizational success.

3. **Aligning Innovation to Business Strategy:** Innovation efforts need to be aligned to the business strategy. There needs to be an innovation strategy defined that deliberately establishes an "intention" at the strategic, tactical, and operational levels. This ensures that the resources devoted to innovation are prioritized according to the needs of the organization.

4. **Creating an Innovation Culture:** The culture of innovation, including the values of the organization that support openness to change, risk-taking, and collaboration must exist for an integrated innovation management system to be sustainable. Creativity and effective and adaptive decision-making must be fostered as well. Leadership will need to drive this to all levels of the organization.

5. **Exploiting Insights:** The organization must constantly be on the lookout for new developments in their ecosystem to determine if there are new threats from their competitors or if there are new best practices that are being developed in their industry or outside their industry that can be useful to their ecosystem. These insights need to be exploited to take competitive advantage. Sometimes this is done

internally and sometimes the insights come from outside their organization from suppliers and other partners.

6. **Managing Risk and Uncertainty:** Risk and uncertainty both need to be managed in an integrated IMS. The organization needs to take calculated and managed risk to improve their ability to move the organization to new levels. To better understand these risks, the organization must look for ways to get better informed either from internal experimentation or through working with their ecosystem and to reduce the uncertainty inherent in each of the initiatives.

7. **Adaptability and Resilience:** The organization should be constantly surveying their ecosystems and their existing and potential markets. Once they see a change in context that may affect them, they need to have the internal processes ready to adapt quickly and make any appropriate changes.

Using these principles as the foundation, the ISO 56000 family of standards are in various stages of development. They are designed to provide a universal blueprint for the effective implementation, maintenance, and continuous improvement of an innovation management system. Its intent is to provide standards to guide the management the innovation process, and not the innovation itself. It stipulates guidelines for organizations of all sizes.

Figure 3 depicts what we refer to as the ISO 56000 Filing Cabinet and it shows the scope of the family of standards. The contents of the ISO 56000 filing cabinet include the following:
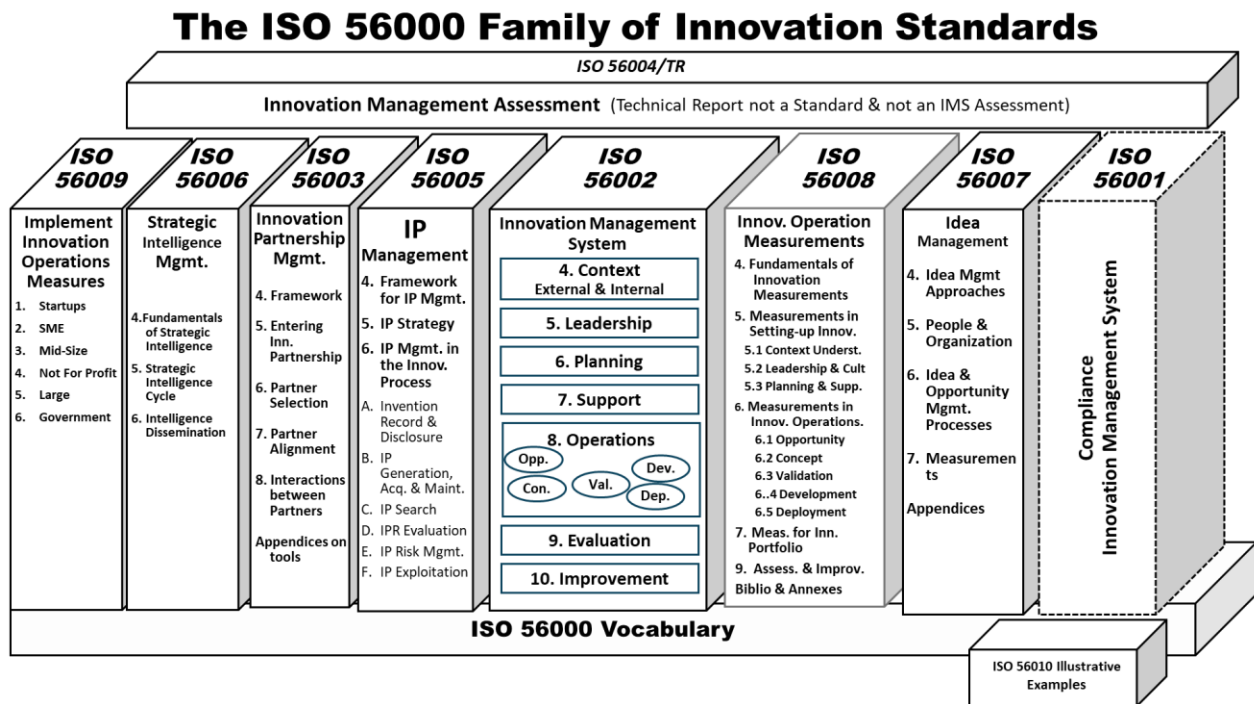

Figure 3: The ISO 56000 "Filing Cabinet.

ISO 56002 is a guidance standard. It guides organizations and provides an understanding of innovation management. Published in 2019.

ISO 56003 deals with innovation partnerships because partnerships and innovation ecosystems are critical to an innovation management system. Published in 2019

ISO 56004. This document is not a standard but rather a Technical Report. It lays out different ways to approach the assessment of Innovation Management. This technical report provides different approaches for assessment, the measures to use and how to provide feedback.

ISO 56005 is a guidance standard for Intellectual Property Management. This standard explains the considerations that should be taken into account for the proper development, implementation, and protection of intellectual property. It also explains its role in the Innovation Management process as well as the need to use it in the development of new innovations.

ISO 56006 provides guidance to your organization's efforts for a market and context analysis looking for insights to drive their innovation intent, strategy, tactics, objectives, and decision processes drive their innovation intent, strategy, tactics, objectives, and decision processes.

ISO 56007 is a guidance standard that will provide details about the first three parts of the Operation of an Innovation Management System. The focus is on the management of opportunities and ideas. This standard specifies the first 3 processes within innovation operations: 1) Determine Opportunities and Ideas, 2) Create Concepts, and 3) Validate Concepts.

ISO 56008 is a guidance standard focusing on Innovation Operations Measurement. This standard will be one of the most important standards in the family of ISO 56000 since it will guide the user to develop, implement and use good measurements for all levels of initiatives, and portfolios to keep track of and adjust actions to maximize the value to be gained from innovation initiatives. Published in 2023.

ISO 56000 and *ISO 56010* deal with definitions and terms. They create the foundation for understanding the nomenclature and many of the concepts that are needed to understand the remainder of the standards. ISO 56000 provides the definitions while ISO56010 provides fictitious case studies detailing use examples.

ISO 56009 is being developed as a Technical Report. This TR will develop fictitious cases for the implementation of ISO 56008 for different sectors of the economy. giving the user some more guidance on best practices and potential decisions to be made. It applies the concepts that were developed in ISO 56008 case studies to startups, SMES. mid-size companies, and nonprofits. This standard is under development.

ISO 56001 is currently in its final phases of development. Once published, it will become the standard used worldwide to certify companies that meet the minimum requirements of having designed, implemented, and managed an Innovation Management System within the scope of their organization. The expected publication date of this standard is September 2024.

5. FROM STANDARDS TO CERTIFICATION

The ISO 56000 family of standards is intended to provide a set of rules by which the members of an innovation ecosystem can develop their individual innovation networks knowing that the partners they chose to align with are "speaking the same innovation language." This will be assured through a process of certification that is to be specified in ISO 56001. Being mutually certified will give potential partners assurance that each meets the minimum requirements of having designed, implemented, and managed an innovation system within their organization and thus can synergize each other's innovation efforts. In short, the benefits of certification to all organizations, no matter their size, include:
1. It promotes best practices.
2. It helps to increase productivity.
3. It maintains customer satisfaction.
4. It improves revenues.
5. It opens the door to new markets.
6. It fosters team commitment.

6. PREPARING FOR ISO 56000 CERTIFICATION

To achieve certification for an organization, the capacity and capabilities of the professionals who will be participating in and managing innovation initiatives must be grown. By becoming certified as innovation management professionals, the organization they are working for can have confidence that they will be capable of either running an innovation team or leading that team or even the innovation portfolio. These innovation management professional competencies were developed 3 years ago by IMS PROFESSIONALS (https://imsprofessionals.com/) and consisted of five levels, each designated: a Karate belt color following the Six Sigma model (https://asq.org/quality-resources/six-sigma):

- Level 1- IMS Foundations (yellow belt): In this level the professional learns about the concepts, terms, common language, and how to become a good participant in an innovation team.

- Level 2- IMS Practitioner (Orange Belt): The professional must understand the overall IMS (Innovation Management System), but they also need to know how to lead an innovation team.

- Level 3- IMS Designer Implementer (Black Belt): The professional must know how to prepare a gap analysis and the steps needed to design and implement an IMS from beginning to end. They would normally guide several IMS Professionals as they deploy their innovation initiatives. They will also be responsible for managing the innovation portfolio and reporting progress to Senior Management. They need to understand what is necessary for the organization, how to design it, how to design the system, how to implement that system, how to do the change management, and how to make sure that all the systems interrelate with each other and are well coordinated.

- Level 4- IMS Lead Auditor (Master Black Belt): This is the highest professional level. The IMS Lead Auditor has to be proficient in all the previous levels and have experience in not only design and implementation but also how to audit the IMS. The audit of an IMS is not like a regular management system. It is not a simple checklist but rather levels of maturity at each performance area.

- Level 5- IMS Executive Champion (Silver Belt): This level is presented to high-level executives, VP's or CEO's. This level must understand what their role is in an Innovation Management System. How do they support, champion, and provide the necessary resources for the successful implementation of the innovation initiatives in their area of responsibility? They know the benefits of an IMS and how ISO certification can benefit them.

7. CONCLUSIONS

In this paper we have presented the ongoing effort of the International Standards Organization to develop the ISO 56000, a family of standards designed to provide a universal blueprint for the effective implementation, maintenance, and continuous improvement of an innovation management system. Such a standard is essential to allow the components of a global innovation ecosystem to function in a coordinated manner by bringing discipline to the development of local, national, and international entities committed to innovate their products and processes.

As shown in this paper, the development of an ISO innovation management standard is a laborious process that seeks consensus from stakeholders on how an innovation management process should be managed. Certification from a credible third party, ISO in this case, gives assurance that an organization has successfully implemented such standards. ISO 56001 has not been published yet. Companies wishing ISO 56000 certification must wait until it has been published to seek certification.

In the meantime, companies can move forward to prepare for certification by identifying and training key innovation management personnel through the IMS certifications. Although ISO is working on their own certification program, it will not be completed for another 2-3 years and it is likely to have many things in common with the IMS certifications.

The importance of finalizing the development of the ISO 56000 family of standards and the 56001 certification process for organizations cannot be minimized. With 96% of North American companies have innovation as a strategic priority in their business plans, it is not far fetched to expect ISO 56000 to achieve a level of popularity similar to that of ISO 9001 for quality management systems.

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