

Can Standardization Lead to Innovation?

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Abstract

Standardization and innovation are relatively complex in nature. The relationship between these two terminologies has witnessed a mayhem in recent past. Some of the scholars believe that focusing on standardization can lead to lack of innovation whereby some of them believe that standardization and innovation should complement each other to get fruitful outcome. This paper examines the various aspects pertaining to standardization. From the intensive literature review, we have found that standardization forms the basis and facilitator for innovation. Hence organizations need to understand that standards are to be followed for achieving innovation. Future studies can be done to know about the level of awareness what organizations have on standardization and innovation.

Keywords: standardization, standards, innovation, catalyst

David & Rothwell (1996)¹ and Wright et al. (2012)² saw standardization as “the antithesis of innovation” as they represent organizational control and regulations with their persistent, rule-bound and measurable processes. On the other hand, Blind (2009)³ observed that Standardization and innovation are often perceived as conflicting processes because innovation is associated with excellence and exclusivity/ while standardization is associated with predictability and a level playing field.

This conflicting perceptions of Innovation and Standardization made it a difficult choice for the companies, as they were not sure to choose Standardization or Innovation. Innovation and standardization have a complex, unique and paradoxical relationship. Interdependent on each other, they are like two sides of a coin, different yet complimenting each other. Standardization can actually be a catalyst to innovation.

According to Schumpeter (1939)⁴, invention and innovation are essential for the progress of society and asserted that innovation generated all economic cycles or waves. They improve competitiveness, accessibility, and business performance by managing risk. The primary focus of Innovation is on exploitation of newer capabilities while optimization of existing capabilities is for standardization.

Innovation begins with identifying the need or improvement on the different characteristics of a product or service. We can make comparisons or improvements only after keeping other things fixed. We need a standard procedure for the same. That can happen only when we have standardization. So as Shivakumar (2022)⁵ asserts that we need to understand that standardization is many times a prerequisite for innovation and not always a deterrent as it is made out to be.

Developing standards is a rigorous and flexible process. For Wang (2011)⁶ Standardization seems to be the embodiment of the proposition of diversity and regularity in human history. Standards are one of the characteristics of an industrial society. They are more important for innovation success than patents. Standards make the difference between product success and failure in the market to the industries and countries by

delivering competitive advantages.

Innovative companies use standards framework to bring their products faster to the market. Standards need to make people feel the same experience and share the same expectations about a product or service. This helps to:

- ✿ Facilitate trade
- ✿ Enhance consumer protection and confidence
- ✿ Help in achieving economies, efficiencies and interoperability

To understand the complex and dynamic relationship between innovation and standardization, we will try to define and categorize both innovation and standardization and explore how they affect each other.

Innovation might be loosely termed as something new and how it affects can make all the difference in the world. It is introduction or implementation of a new or improved product, process or method, that are new to the organization or market or the world. In a highly unpredictable and unexpected environment, innovation is the key to competitive advantage and major driving force for economic growth of nation/ states. According to OSLO manual (2005)⁷ the main types of innovations are

- ★ Product innovation: It can be the creation of a new or one that is improved in its characteristics or intended uses of a product or service. The improvements need to be significant in terms of the different characteristics.
- ★ Process innovation: Involves application of a new method of production or delivery or one that is significantly improved. The significant changes need to be in the techniques, equipment and/or software.
- ★ Management innovation or organizational innovation new forms and methods of organization of business companies that changes the firm's business practices
- ★ Marketing innovation: Use of a marketing method that is novel or significantly different in the design, promotion, pricing, placement, or packaging of the product.

Standards require regular review and revision to ensure updating of the product enhancements and technology advancements. Standardization, like innovation, never rests and is a continuous process. Standardization ensures application of innovation to the whole economy as it brings most companies not too far behind the early adopters of new ideas. Standardization can help business by:

- ❖ Providing better access to markets
- ❖ Delivering measurable benefits when used within the company itself
- ❖ Minimising business costs and risks
- ❖ Stream lining internal processes
- ❖ Improving communication

Standards can be vital for commercial success by helping to increase demand for innovation activity. Ensuring interoperability is also important in order to avoid fragmentation of the Market. Standards are voluntary but decides the success or failures of new technologies. One of the important dimensions of standardization is the development cooperation among private interests that can lead to healthy competition and collaboration.

Standardization is not, always beneficial for innovation. It may even hamper the access of innovations to the market. Standards that are technology-specific and over-prescriptive may block market access to new technologies. There are, unfortunately, examples where dominant players use established standards to prevent the access of competing technologies to the market.

The cognitive dimension in standards contributes to the diffusion of innovation. Many standards also embody knowledge, and their development and dissemination contribute to knowledge transfer.

Standardization brings predictability and a level playing field, while innovation, as one of the essential drivers of successful business strives for change and exclusivity. To innovate one need to be able to translate an invention into routine practice for which standards are required. Standards can enable the foundations for innovation as quickly as the situation demands.

Standards play a key role in increasing reliability by controlling quality and ensuring safety. They follow an evolutionary path like invention and technology. Invention interacts with standards and standards are capable of interaction with an invention.

Society uses the balance approach on the conflicting issues between the incentive value of private gain and the need for public good. Patents are issued to inventors to add unique value to their inventions protecting them from imitators. At the same time commercial advantage of potential natural monopoly on public utilities prevented. Standards thus define the uniformity. In the end, standards only play their role if they are implemented and

effectively used by the market players.

The contribution of standardization to innovation can happen only when the necessary standards are developed and made available as needed by innovators and other market players, and -potential users become aware of the relevant standards, and have the ability and the market incentives to use them.

Both the development of standards and their usage needs to be addressed to improve the contribution of standardization to innovation. Lack of standards, or their slow updating is likely to hamper innovation. A lively and strong standardization on the other hand accelerates access of innovation to both domestic and global market. Standardization needs to adapt to the needs of innovation, and to respond to the challenges that globalization, the emergence of new economic powers, and the evolution of technology present for the process of standardization itself.

David (1987)⁸, derived three categories or stratum of standards in taxonomy

- ★ *Reference Standards*: Standards that define common properties like standards for currencies, weight, length, international telephone number codes.
- ★ *Similarity Standards*: That gives the deviations allowed from the requirements like standards of product safety, plastic types for recycling, similarity standards of services or speed limitation
- ★ *Compatibility Standards*: They give descriptive features of two or more items to maintain interactions between/among them for compatibility. Compatibility standards promote interworking of dissimilar parts or systems and diffusion of technologies.

Baskin, Krechmer & Sherif (1998)⁹ added fourth strata called “Etiquette standards” that provide specify areas left for further study, the framework for negotiations. They are open-ended, and contain space for compatibility with inventions. According to Krechmer (1996)¹⁰, technology stratum is built on the previous stratum as new methods to design, control and add value are developed.

Blind (2016)¹¹ asserts that standardization helps in exploitation of economies of scale in the market during formative stages by creating demand for the innovations by creating critical mass by reducing fragmentation. It also promotes trust in innovative products and reduce information asymmetries by collecting the support of all relevant stakeholders and accelerate the diffusion of innovations. They also set the minimum requirements like regulations from the aspects of safety, health and environment.

Public standards can be a hindrance to private invention or provide an opening for inventors to control markets. Companies know that their successful inventions and innovation can result in increased profits.

The early standards can be traced to the creation of drawing (specification), matching the machine parts in the mid-19th century, for machine tools and measuring devices. Multiple companies were then able to manufacture many interchangeable parts by using these specifications.

Formal Public standards are usually created by Government intervention or accredited consensus within the industry. When it is desirable enough and well marketed, market also can create them like Microsoft windows though it is privately controlled.

Innovation really benefits only when standards are market-relevant, and effectively implemented. The actual use of standards is voluntary based on the perception and their capacity to use them by different market players of their interests. Standards may fail to become relevant if they are not visible enough or due to inappropriate timing of their development, or due to uncertainty by another competing standard.

Standardization can realise its full potential only when it is able to adapt itself to the needs of innovation and respond to the challenges resulting from the evolution of technology, the emergence of new economic powers, and globalization.

According to Blind (2009)¹² while standards define our professional and private life, innovation takes care of the growth and welfare for our economies. Standards are very important elements to facilitative research, development and innovation. In recent times, user driven innovation strategies resulting in demand driven innovation policies have been promoted.

Standardization for the development of technical specifications is a voluntary process. When there is agreement in the industry and among other users, interest groups, and public authorities, it spreads to other types of specifications. Standards available to the public are either free or at nominal cost. Usually, implementation is free of charge.

Swann (2000)¹³ identified the following factors based on the existing literature related to innovation with standards and standardization.

- ★ Standardization enables to focus in the starting stages of technologies and markets by providing cohesion

and critical mass. Using the standards for measurements, creative companies demonstrate the features and the acceptable levels of risks for health, safety and the environment to the customer.

- ★ Standards codify by disseminating best practices and the current advances in science and technology.
- ★ By encouraging competition between and within technologies, open standards and standardization processes contribute to growth driven by innovation.

Standards help to restrict on specific technologies, by limiting the variety of options and increasing the credibility. They promote the development of critical masses which can attract additional investments for developing complementary technologies

Standardization has the following functions

- ❖ Reduction of information cost
- ❖ Reduction of transaction cost
- ❖ Interoperability between components
- ❖ Savings in adaptation cost
- ❖ Increased quality
- ❖ Reduced health safety privacy risks
- ❖ Building critical mass
- ❖ Creation of network externalities
- ❖ Inter-operability between products

Standards allow reflection of user needs as it helps early adopters in promoting the diffusion of new products. Standards make it possible for technological platforms with interoperable components that are independently supplied with common technical standards to emerge, making it easier to build a base of installed users. Mobile phone and the Internet are successful platforms based on open standards.

Innovations can result in high customer/ citizen satisfaction as the quality of public services and public infrastructures improves with lower maintenance and repair costs over the full life cycle of the technology. On the other hand, the initial purchase price will be higher due to the increased features or improved characteristics of the product. Further Innovative products and technologies also give higher risks for the user as well as for the environment. Finally, only a limited number of suppliers – sometimes only one have the capacity to make certain specific innovations.

Traditionally standards and innovation were viewed as contradictions. Standardization creates an infrastructure for subsequent innovation. David (1995)¹⁴ finds standards as the “flux between freedom and order”.

Innovation is crucial for organizations to move to new levels of development and efficiency across diverse fields and enables companies to overtake their peers. Innovation can thrive only with Standards, as they are the link that establish a common understanding between interested parties. Standards create the necessary environment for innovation to take off by providing a common language for new concepts and systems of metrics. It augments both forces that drive as well as the mechanisms for fostering innovation.

Innovation can be promoted through standards and participation in standardization processes. Standardization and Innovation are strongly interdependent. Standards are enablers for new ideas to take root and progress. They allow innovators to concentrate on finding ways to differentiate their products and services while facilitating the commercial exploitation of innovative ideas.

Standards and standardization may play a role during the research, the product development and the market introduction process. Standards have always been useful for companies and in particular for SMEs, by providing the necessary knowledge and technical solutions to facilitate innovation.

Standards provide consensus in measuring and testing, managing and reporting by agreeing upon naming, describing and specifying products and services. Due to this consensus approach Standard can provide

- ❖ A level playing field in the markets and market development for commercialisation
- ❖ Assures safety, reliability, interoperability and quality of products, processes and services by setting minimum requirements
- ❖ Technical basis for procurement being technology specific
- ❖ Variety and reduction in cost through optimization and best practice through technical support for appropriate regulation

In this complex technological world, it is not possible for us to operate without standards. Standards are

developed using robust and rigorous process to improve user's confidence in the information, procedures, requirements and recommendations based on detailed peer review at different stages. Standards helps individuals and organizations to apply the information contained for their own purposes.

Standards have value only when they are technically accurate and relevant to the stakeholders that use them. Standardization thus contributes to

- Cost savings due to economies of scale;
- Interoperability and compatibility
- Faster and broader diffusion of innovations leading to economic growth
- Enhanced productivity and innovativeness resulting in International competitiveness
- Increasing the competitiveness by Global market access for innovative solutions.

Standardization also facilitates:

- Early access to the market of new technologies;
- Increasing the market share and shortening the time to market;
- Quick access to information of other stakeholders;
- Networking with all the stakeholders;
- Compatibility with complementary technologies;
- Reduction of Innovation related financial risk;
- Easier acceptance of innovations by clients and public procurers;
- Transforming knowledge and technology into marketable products and services;
- Involving all stakeholders for feedback and improvement;
- Inclusion of all stakeholders in formulation of relevant research-related rules;

It is now accepted that standardization, is essential to give innovative technologies, early access to global markets to create jobs, generate return on investment, and make a broad impact on global society.

Standards builds confidence to Industry users as it creates new markets as well as enlarge market to promote innovation. Benefit the end user with lower prices while improving the quality of products while ensuring safety aspects by ensuring compatibility and interoperability of products and services. Standards create a level playing field for R&D and foster competition. It helps to penetrate the market of R&D results by more visibility and reduce production costs and avoids lock-in to proprietary solutions. Standards facilitates exports globally and also strengthen regulation as industries can meet legal requirements easily.

Long-term success of any society during the evolution of human beings affirms the fundamental role of Technology. According to Krechmer (1999)¹⁵ standards follow an evolutionary path like invention and are related with technology which is the fruit of Invention and Innovation. Further he feels that standards also follow the waves or cycles of change envisaged by Schumpeter and standards are related with each of the great Agrarian waves, Industrial waves and Information waves of change of society. Thus, standards are linked with the waves of progress, technology.

Zarzycka et al. (2019)¹⁶ found that management innovations can coexist with standardization and standardization reduces the complexity, creates a cyclic relationship with innovation enabling the coexistence of innovation and standardization. Blind (2008)¹⁷ identifies the following mechanisms by which standards support innovation for promoting public procurement.

- Lowering expenses for repair and maintenances due to reduction of production costs as well as life cycle cost
- Secure interoperability of the purchased innovation with the existing infrastructure
- Improving competition among competitors for public tenders.
- Decreases the risk of lock-in with a particular supplier.
- Provides a direct innovation effect
- Decrease the risks related to costs, health, safety and environment
- Produces a positive spill-over on innovation by promoting procurement processes in the private sector
- Standards decreases risks, transaction costs and issues of compatibility problems associated with any trade.

Organizations need to understand the compatibility between standardization and innovation especially when it is

undergoing a change. Imbalance and stressing too much on any of the two factors will have a negative impact on employee morale and productivity (Dimaggio, 2020)¹⁸. Emphasizing too much on standardization will make the people not think innovatively. Hence, standardization must be considered just as a foundation for innovation.

In order to give a greater scope for innovation, it is always better to standardize the interface than the things. Innovation can happen only when the standards are known. Co-creation of standards will lead to the development of open innovation and cross industry innovation.

Conclusion

Standards reduces the time between the initial concept and global market access as well as time to market: Standardization facilitate for fast introduction of innovative products and technologies at the earliest stage possible. The basic idea remains that standardization and innovation are two different and opposite things yet powerful individuals which are interrelated. Innovations of today may become standards of tomorrow, we may think they both cannot be used because we try to apply them in the same level of process, which is not the correct way.

When it comes to task level process / procedure, you may not be able to and would not want to standardize - let innovation come there. However, when you are defining and creating higher-level processes, standardization can fit in. If innovation brings new idea, standardization makes it compatible at the minimum cost.

Standardization and Innovation complements each other and benefit the customers. To be ahead of competition, business needs to be innovative and has to follow standards as well. So innovate first, set standards and standardize. When implemented properly and timely, it can make bring huge difference to the business.

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