

Chapter 81

Challenges Facing Technology Standardization in the Age of Digital Transformation

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ABSTRACT

It is widely recognized that we are in rapid transition to the so-called fourth industrial revolution, a world of digitalization and mass interconnectedness enabled by a plethora of emergent powerful technologies including artificial intelligence (AI), internet of things (IoT), and distributed ledgers (DLT). A key element of this “revolution” is the move to digital manufacturing. While undoubtedly exciting, this transition presents challenges to policymakers, industry, and societal stakeholders alike. One such challenge is defining an optimum level for any market intervention measure(s), such that a balance is struck between ensuring a pro-industrial and economic innovation-friendly approach and guaranteeing adequate levels of consumer-focused protection. Standardization can be leveraged as one element of interventionary policy designed to help strike the required balance, both in its well-proven bottom-up and industry-led voluntary application and as a tool to support implementation of regulations. With a focus on digital transformation, this chapter will analyze the readiness of the current standardization system to support this significant transition focusing on strengths and challenges to be addressed from the perspective of industry, policymakers, and standards-setting organizations.

INTRODUCTION

According to most observers we are now entering the fourth industrial revolution. This latest era will probably best characterised as being that which introduced the digitalization and interconnectedness of everything, enabled by a plethora of emergent powerful technologies including artificial intelligence (AI), internet of things (IoT), and distributed ledgers (DLT), all supported by enhanced and distributed networking platforms.

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While very exciting, the rapid pace of innovation in the underlying information and communication technology (ICT), together with previously unimagined application areas that impact all aspects of modern life, present many challenges to policy makers, industry, and societal stakeholders alike. One such challenge lies in establishing the optimum level of market intervention, for example with legislative & regulatory initiatives, the aim being - as should be the case with any intervention - to strike a balance between a pro-industrial & economic innovation-friendly approach and an adequate level of consumer-focused protectionary measures. Standardization, as one such interventionary policy instrument, both in a voluntary capacity and as a tool to support implementation of regulations, can be leveraged in this regard.

Standardization indeed has been used extensively in the past to play a key role in ensuring sustainable market development and technology adoption. However, as this paper will show, to meet the needs of this fourth industrial revolution, there are some challenges with the system of technology standardization that will need to be addressed - internally in private organisations, in the way policy makers leverage the standards system (including the interplay between private industry and public authorities), and, as important, in how incumbent standards development organisations (SDOs) will be forced to change as they strive to stay relevant, for example in how they interact with sector and technology specific industry consortia.

TECHNOLOGY AND STANDARDIZATION UP TO NOW

Mostly technological innovation takes the form of discrete and incremental developments in the area of a product or service – for example how computers have gone from mainframe to tablets over many decades. Accordingly, the focus of technology SDOs was in well-defined silos, for example at ITU (telecommunications)¹, IEC (eletrotechnical)², and ISO (technology specific technical committees (TCs) e.g. on health informatics)³, and standards were developed that focused on individual products or product categories (think telephones, washing machines) or on interfaces enabling interconnection of products, such as the IEEE 802.3⁴ series of ethernet standards.

This highly segmented standardization structure enabled suppliers develop products to comply with one or more relevant product-specific standards, with some differences depending on market geography. Once the appropriate product and interface-specific standards were implemented, the result was a well-functioning market with an interoperable set of products and services that leveraged them.

As well as benefitting the consumer, it also meant that manufacturing companies could specify standards-based procurement requirements for machines, products, and services they required for the production process.

Disruptive Technology Developments

However, with recent advances in technology – abundantly more computing power at a fraction of the cost together with the advent of the smartphone ecosystem and the rise of social media - we are now witnessing the ‘digitalization of (almost) everything’. While not so welcomed by some incumbents - digitalization has enabled the disintermediation and disruption of many tried and tested service models: travel agents (think SkyScanner™), hotel/guest accommodations (think AirBnB™) - it is certainly a development that garners huge mass consumer appeal.

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