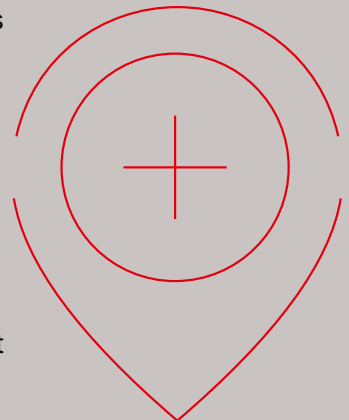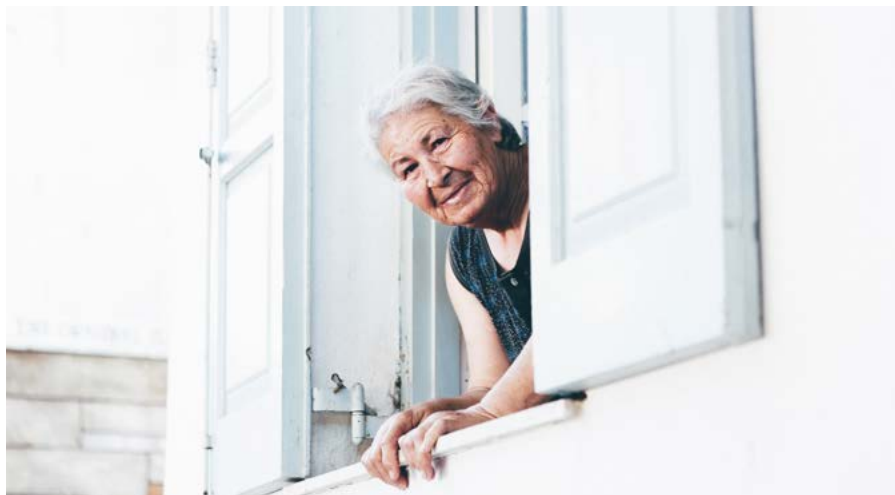Executive summary
ISO Trend Report 2022

Contents

The world around us is changing and the pace of change is faster than ever before. The future has begun and those who don't want to get left behind must ensure their ability to look ahead. That is why ISO has developed a Standardization Foresight Framework; to help us look more systematically at the long-term and to encourage discussion and exchange within the ISO system about future opportunities for International Standardization.

This trend report is the output of the first phase of the Standardization Foresight Framework: environmental scanning. It is designed to support the ISO community to navigate global trends as we work towards achieving the goals and priorities of the ISO Strategy 2030. In this report, we expand upon the drivers of change identified in the Strategy, breaking them down into smaller trends, analyzing their links to existing ISO work, and asking what their implications for standardization could be. Our ultimate aim is to better understand the context in which we operate, so that ISO can effectively meet emerging market needs and help to shape a more sustainable future.

Many of the future trends in this report will be familiar. Readers will recognize, for example, the climate emergency, accelerating and converging technologies, shifting geopolitical and economic power, changing demographics and evolving consumer preferences. Although the content may not come as a surprise, we hope that pulling together this information will provide readers with a new, macro perspective on the world around us and standardization's place in it. This broad perspective should help to inform strategy and decision-making and to drive discussions about the future amongst ISO members and technical committees.

This trend report does not claim to be all-encompassing – the trends presented here are high-level and have been selected because of their relevance to standardization or to the international landscape within which ISO operates. They are long-term driving forces that are already having a visible impact at the global level.

Taking inspiration from the STEEPS analysis, which is a tool used in strategy to evaluate the external factors impacting an organization (also known as PEST or PESTLE analysis), we have chosen to classify our selected trends using the STEEPS categories of:

SOCIETY, **TECHNOLOGY**, **ENVIRONMENT**, **ECONOMY**, **POLITICS** and **SCIENCE**.

Within the high-level STEEPS categories, trends have been grouped into 15 sub-categories, which are summarized below.

To browse the individual trends and for a more interactive experience with links to ISO technical committees, standards and other resources, we invite you to consult the web version of the report: www.iso.org/foresight.html.

Age groups

Ageing population | Young generation influences

These trends are about demographic changes at both ends of the spectrum. Overall, the world's population is growing older, but there are nevertheless some regions where growing young populations will have significant impacts. While ageing populations will have implications for the sustainability of public financing models and healthcare, growing young populations will have implications for political behaviours and education systems. Both trends will profoundly affect workforce and employment models.

Consumption

The experience economy | Sustainable production | Customized products

Consumer attitudes and preferences are constantly changing as a result of megatrends such as increasing connectivity, environmental degradation, demographic changes, shifting inequalities and more.

These trends are affecting how companies think about value creation today – it is no longer just about the final product, but about the inputs that went into it along the whole value chain, how that product is produced, and how unique it is (tailored to a specific customer's needs). Indeed, it may no longer be about a product at all, as consumers move away from wanting 'things' to wanting experiences that bring them personal growth and more than material satisfaction.

Movement of people

Urbanization | Increasing migration

Whether within or between countries, by choice or by force, people are on the move. As the global population grows, so do rates of urbanization and migration, with potentially significant social, political, and environmental implications. There are a multitude of factors pushing people to move, including economic development, conflict, political instability and, increasingly, the impacts of climate change. More people live outside their country of birth than ever before and many of them end up in cities. If managed well, urban centres will foster social and economic development and more sustainable living. But in places where the pace of growth outstrips the resources to support it, this trend could compound social inequalities and lead to greater conflict.

Prosperity

**Diversifying inequalities | Rise of the middle class |
Stagnating happiness levels**

The world is undoubtedly more prosperous today than it has ever been before. But the way that prosperity is shared across the globe is still far from equal and the trends that affect prosperity are far from simple.

Inequality (and not just in the economic sense) is growing, even as overall poverty decreases and the middle class grows. Yet, the expanding middle class is not necessarily happier. Economic growth, demographic change and technological advances are just some of the complex forces driving these trends in prosperity.

Tech risks

Ethics of technology | Data privacy | Cyber-vulnerability

As technology becomes integrated with more and more aspects of our lives, the profile of risks associated with technology is also expanding. New advances in many kinds of technologies pose potentially significant ethical challenges (e.g. artificial intelligence, biotechnology, or decarbonization technologies). This coincides with our increasing use of these technologies creating potential risks at a macro level (e.g. cybersecurity of a nation's critical infrastructures) and at a micro level (e.g. security of personal data and individuals' vulnerability to online manipulation). Effective mitigation of such risks will be necessary so we can fully benefit from new technologies.

The changing nature of work

Effects of automation | Reinventing the workplace

History has seen several industrial revolutions that have each dramatically changed the labour market, as means of production and levels of productivity have continually evolved with the introduction of new technologies. Today, new technologies are converging to make for even faster progress and more disruptive changes to the nature of work.

Automation will change the kinds of jobs needed in the future, while digital technologies and societal preferences will change how and where we work. Thus, not only is the definition of 'workforce' changing, but the scope and focus of what a human resource department does may be shifting from being 'workforce focused' to 'human capital focused'.
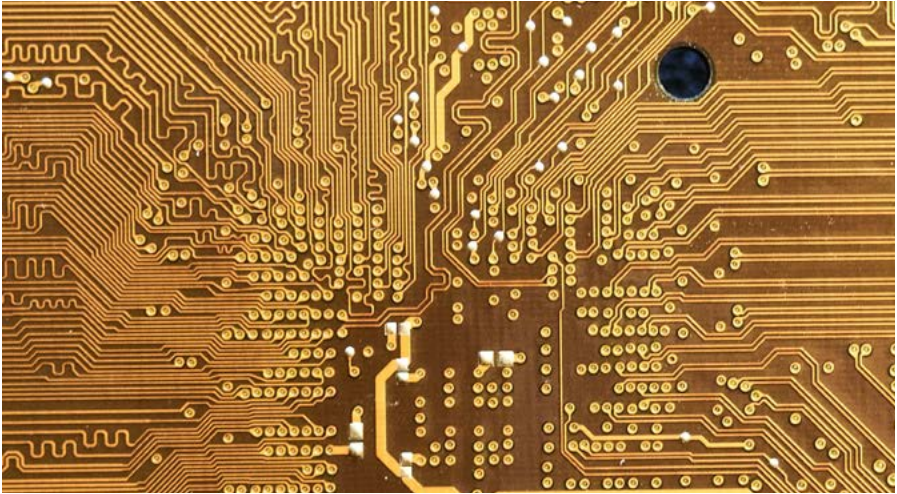
Computing

Artificial intelligence | Extended reality | Blockchain | Edge computing | Quantum technologies

The world is rapidly moving toward a post-digital era. Distributed ledger technology, artificial intelligence, extended reality, and quantum computing (DARQ technologies) will be the next set of emerging technologies to spark profound change, letting businesses reimagine entire industries. Collectively, the DARQ technologies will power the innovation and opportunity uniquely associated with the coming post-digital era. As the business landscape becomes increasingly dominated by digital natives and companies that have undergone successful digital transformations, DARQ is the key that will open unimagined new pathways into the future.
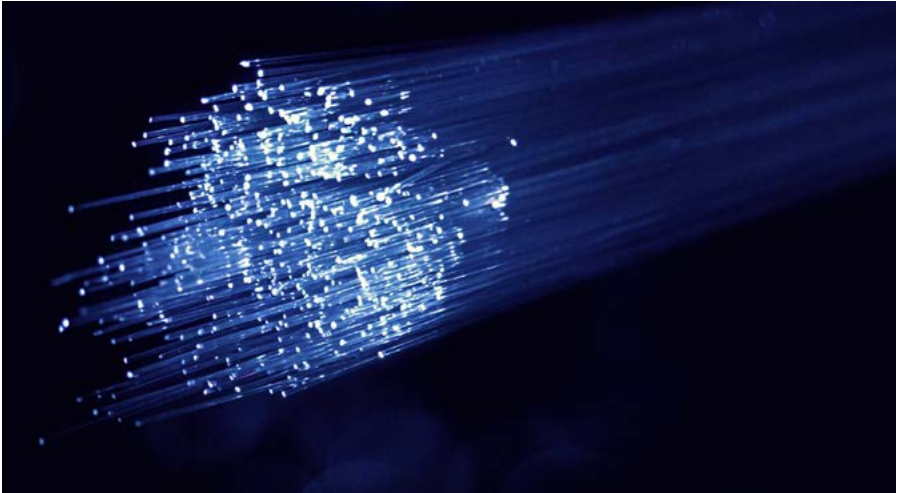
Connectivity

Spread of the Internet | 5G | Services moving online

Connectivity acts as one of the drivers towards a more pluralistic world, deepening connections across the globe. Mobile, or wireless, technologies have become basic communication tools of everyday life and, for many people, mobile is the primary (sometimes only) channel for accessing the Internet and the benefits it brings. The number of devices connected to the Internet is projected to reach 50 billion from 2025. Anticipated increases in traffic, growth in the number of devices and services, as well as demand for enhanced affordability and user experience will require innovative solutions.

Cyber-physical systems

Robotics | Autonomous vehicles | Internet of Things | Smart cities

Cyber-physical systems integrate computational components with physical processes, which interact through a network. Technological advances in the Internet of Things, robotics, and autonomous vehicles make cyber-physical systems possible and today there are successful examples of such systems everywhere... from driver-less trains to smart buildings and wearable fitness devices. While they offer opportunities to improve quality of life in many domains, it's likely that unintended consequences of integrating cyber-physical systems will emerge in future. It is therefore important to think ahead about the ethics surrounding these systems and how future regulation can limit risks related to safety, responsibility, liability, privacy and more.

Smart manufacturing

New generation plastics | Additive manufacturing

Smart manufacturing refers to how new disruptive technologies such as artificial intelligence, cloud computing, robotics, additive manufacturing (3D printing), gene editing and Internet of Things will be leveraged by industry to change the face of traditional manufacturing. It has been described as a 'fusion of the digital, biological and physical world' and represents a change that is so significant that it is sometimes referred to as the 'fourth industrial revolution'. Smart manufacturing could represent an important opportunity to boost sustainable manufacturing and, as its implementation expands, it will be essential to develop a better understanding of how it can contribute to sustainable development.

Energy

Energy sources | Energy storage and distribution

Global energy use is increasing dramatically at a time when reducing CO_2 emissions is an urgent international priority. The only path to success will be through technological innovations leading to energy savings, low/zero carbon energy sources, carbon capture, and greater energy efficiency.

The number of potential power sources is expected to increase over the next 30 years, as technological innovations in energy production and storage make renewables and new generation batteries cheaper and more efficient. Changes in electricity markets, such as growth in developing countries and regionalization of energy systems, will set the scene for future evolutions in the sector.

Environmental degradation

Natural resources scarcity | Threatened ecosystems

The natural world has been irreversibly changed by human actions and this has led to long term trends towards increasing scarcity of natural resources and environmental degradation. With a growing global population, demand for fresh water and arable land for agriculture are expected to increase. The development of new technologies (such as smart farming) will be essential to overcome some of these challenges. Substantial efforts in terms of both mitigation (reduction of carbon emissions) and adaptation (changing behaviors, consumption patterns, resource management and more) will be required to maintain a level of ecosystem services needed for human well-being.

ECONOMY

Trade

Changing trade patterns | New business models

Trade has been increasingly globalized in recent decades, but this trend is now slowing, and the coming years may see an increasing fragmentation and a shift toward regionalization and localization. Drivers of these changing trade patterns will include shifting consumption patterns (with, for example, goods produced in China increasingly being consumed in Southeast Asia), changes in the political environment, changing consumer preferences, and the growth of new business models that are made possible by new technologies (such as blockchain and additive manufacturing).

Power transition

Multipolarity | Decline of multilateralism | Regionalization

As the world moves towards multipolarity, some predict a decline of multilateralism as international coordination becomes more difficult. Others see multipolarity as a potential driver of increased inter-state cooperation, forcing countries to form alliances to counteract fragmentation. In either case, regional alliances are likely to become stronger and the regionalization that is already evident in trade is set to continue.

Biotechnology

Gene editing | Synthetic biology

Biotechnology uses living organisms and biological systems to create new products. Over the last 50 years, this field has developed rapidly because of advances in genetic engineering that allow scientists to make changes to organisms' DNA. New methods of genetic modification have led to rapid advances in gene editing and testing, which have also become much more targeted, quicker, and cheaper. According to the US National Intelligence Council, "biotechnologies are at an inflection point [...] turning science fiction into reality." Within the broad category of biotechnology, there are many emerging developments that will lead to significant improvements to human health, food security, sustainability and more. However, they may raise some ethical dilemmas along the way.

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