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ISC Issue Brief

What is an Industrial Skills Council (ISC)?

ISC is an organization that supports the workforce development that meets industry demand through establishing training and qualifications standards in skills with high demand

The Concept of Digital Transformation and Tasks for Industry-specific Talent Training

◉ The 2022 2Q ISC Issue Brief presents concepts of digital transformation (DX) and industry-specific response measures from the standpoint of talent training.

- While the 2021 2Q ISC Issue Brief covered DX technologies, the present volume focuses on the tasks unique to each industry resulting from that transition.
- The 2022 2Q ISC Issue Brief connects industry-specific characteristics and talent training measures with the aim of specifying important policy tasks.

Digital Transformation: Concept and Trend

| In response to DX, which employs digital technology to completely innovate existing social structures and corporate operations, various policy initiatives are being implemented both domestically and abroad.

● **By integrating digital technology into society as a whole, DX innovates corporate operations and services as well as conventional social structures.**

- Digital technology, which fuels DX, is characterized by hyper-connectivity and hyper-intelligence in pursuit of on-demand services.
- Digital technologies can be classified into data, network, and artificial intelligence (AI) categories (D.N.A.).

● **The OECD, the European Commission, and G20 have implemented a number of activities to prepare for DX.**

- In 2017, the OECD introduced the three-phase, two-year "Going Digital" project to support DX.
- In March 2021, the European Commission announced its policy visions, goals, and plans for DX by 2030 via the 2020 Digital Compass.
- At the G20 Digital Economy Ministers' Meeting in August 2021, 12 actions for accelerating DX were accepted and declared.

※ Full text version of Issue Report published by 18 ISCs are available on the ISC website (http://www.isckorea.or.kr/industry_reference_list.do)

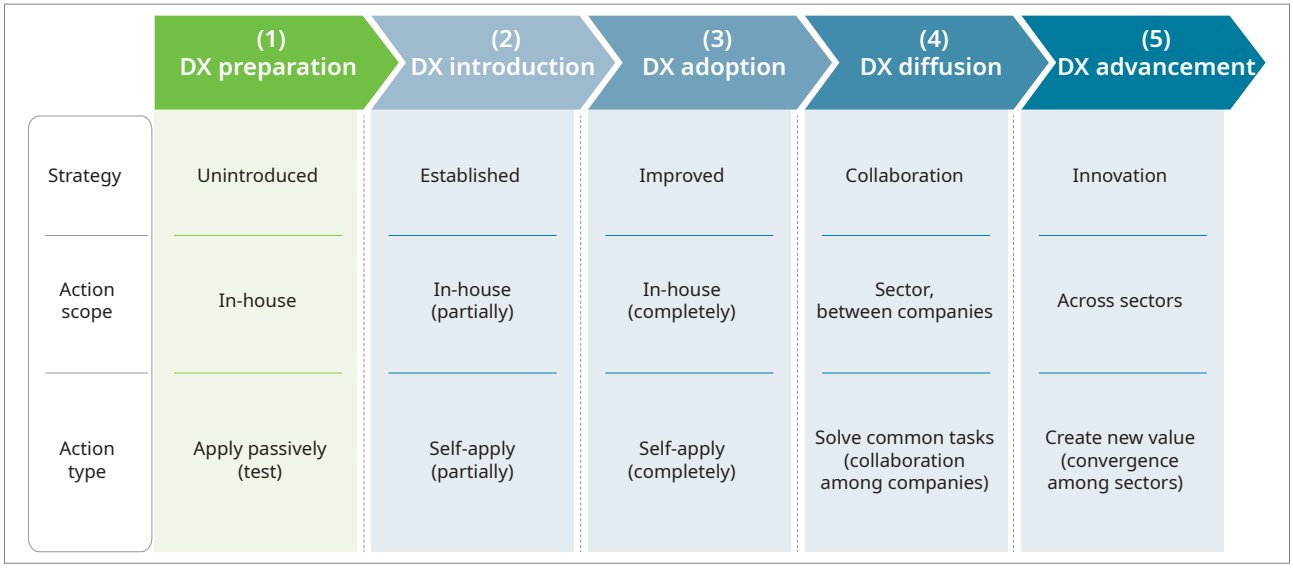
- **In addition to implementing the Digital New Deal, the Korean national agenda under the new administration includes several policy tasks related to DX.**
  - The 2020 Digital New Deal Action Plan, a national innovation initiative within Korea's national agenda, was announced in January 2021 and consists of 31 key task plans under four pillars: advancement of the D.N.A. ecosystem, digitalization of education infrastructure, growth of the contactless industry, and digitalization of social overhead capital (SOC).
  - The 120 policy tasks of the Yoon Suk Yeol administration include DX objectives, such as "#77. Creating a strong digital economy through public-private partnership" and "#78. Establishing global leadership in network and accelerating digital innovation."

Industrial DX: Concept and Practice

| The Act on the Promotion of Industrial Digital Transformation secured the legal justification for supporting DX. The action plan outlines the industry DX stage model and industry DX levels.

- **Digital transformation support has been systematically implemented in industries with a legal foundation since the Act on the Promotion of Industrial Digital Transformation was enacted on July 5, 2022.**
  - The Act establishes principles for the use and protection of industrial data. It seeks to expand the closing of contracts on industrial data usage, encourage business investment and collaboration, foster the development of DX talent, and create high-quality jobs.
  - Article 2 of the Act defines industrial DX as a series of actions that improve industrial process efficiency and generate new added values by utilizing industrial data and intelligent information technology.
- **The "Digital Big Push" suggests a conceptual model of the phases of DX and their respective levels of transformation.**
  - The approach sets target levels for each industry and classifies industrial DX into five stages: preparation, introduction, adoption, diffusion, and advancement.
  - The analytical framework of the conceptual model of DX phases has three categorizes: strategy level, action scope, and action type.

[Figure 1] Industrial DX phase – conceptual model

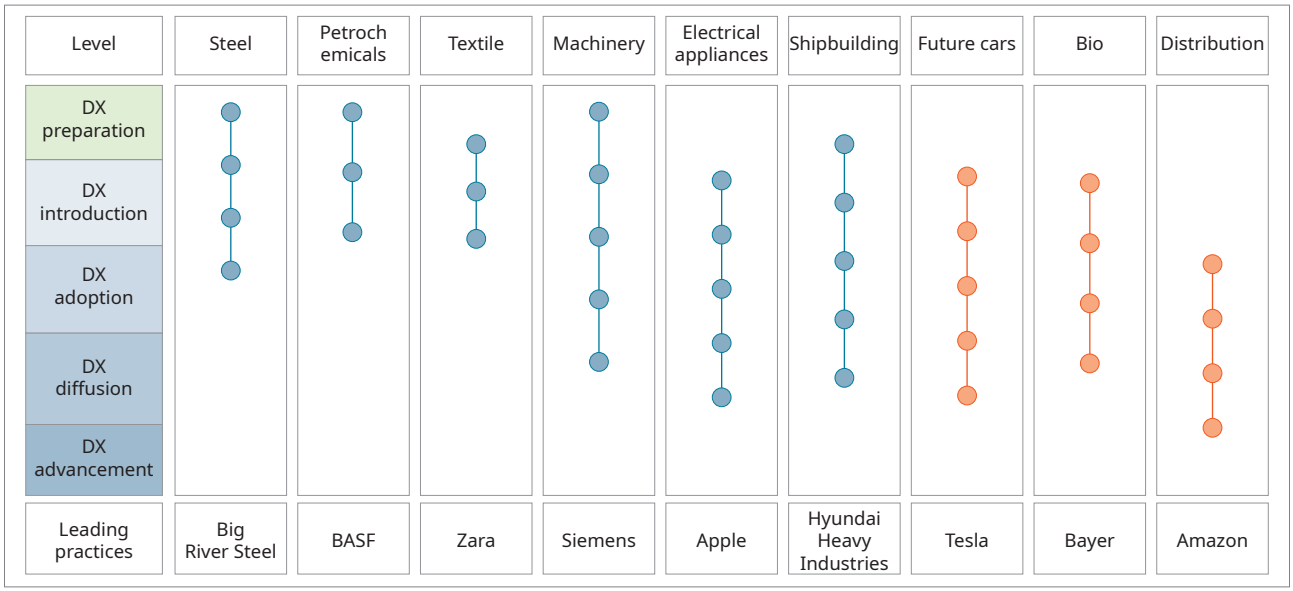


Source: Ministry of Trade, Industry and Energy, Press Release (April 1, 2021, in Korean)

  - The level of industrial DX varies depending on the characteristics of the industry, global competitiveness, and market leader involvement.

- The general-purpose materials and parts sector, which is dominated by small and medium enterprises (SMEs) and medium-sized firms, exhibits low levels of DX, whereas conglomerate-led service sectors display progress in innovation.

[Figure 2] DX levels of key industries



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Industry-specific Barriers to DX

| Challenges with data acquisition and utilization, the absence of shared data and a common engineering platform, and a lack of digital technology talent are all impediments to DX.

- **The use of digital technology is limited by the inefficiency of current business systems in acquiring and utilizing data, which is a precondition for DX.**
  - **(Electronics ISC)** It is challenging to obtain essential data (e.g., industry data for developing AI-based goods and services) and achieve process innovation.
    - General industrial data collected without a specific goal are not only difficult to utilize but also expensive and time-consuming to analyze and process further.
    - The process and technical data of a business are considered trade secrets and unique competitiveness factors; hence, externally disclosing or sharing them is often avoided.
    - The use of different business operating systems (e.g., ERP, MES) and the difficulty of data standardization hinder data connectivity and utilization across businesses and industries.
  - **(Root ISC)** Although it is customary for many businesses in the root industry to provide quality data to large enterprises as contractors, they almost never use data for their own purposes.
    - Small subcontractors lack data aggregation and management capabilities, and they must use different types of datasets when multiple suppliers are involved, which increases their cost burden.
    - It is necessary to establish a comprehensive data management system based on a few key software programs utilized in various sectors.
- **Because of the absence of shared industry data or a common engineering platform, it is difficult to enable fundamental conditions for DX .**
  - **(Electronics ISC)** A practical approach to exposing data as an open asset entails incremental opening and expansion, starting with a closed group.
    - To increase the level of industrial data usage, it is necessary to promote data standardization and industry-wide compatibility.

- **(Root ISC)** Efficiency must be improved by creating a platform for the interdisciplinary engineering competencies required for product manufacturing.
  - Tying the shared engineering platform to the National Competency Standards (NCS) and Sectoral Qualification Framework (SQF) can enhance the efficiency of human resource management, which is challenging for SMEs to address.

● **Practically every industry is experiencing a shortage of experts in digital technologies, including data and AI.**

- **(Electronics ISC)** According to the 2020 Digital Transformation Workforce Demand Survey, the biggest obstacle to DX is the lack of technical talent (50.8%).
  - There is a particular need for talent in convergence with both industry-specific knowledge and digital innovation skills.
- **(Design and Cultural Contents ISC)** With DX, platforms focusing on the new user experience are emerging, and design software is constantly advancing to implement technologies such as augmented reality (AR), virtual reality (VR), and extended reality (XR).
  - As design software diversifies, the need for talent capable of employing the proper software is rising, and the supply shortage is projected to intensify.

Talent Training Tasks for DX by Industry

● **Train talent in D.N.A. and convergence.**

- **(Shipbuilding and Offshore ISC)** Implement DX education that integrates D.N.A. technology through industry, academia, research, and government partnerships.
  - Actively promote the education and training of digital talent tailored to the shipbuilding and offshore industries.
- **(Electronics ISC)** Develop industry-specific professional education programs in partnership with associations and organizations, AI and big data companies, and institutions.
  - Incorporate digital management and business innovation components into curricula to establish DX strategies and train core talent for task execution.

● **Enhance workforce capabilities at DX entities, including smart factories.**

- **(Root ISC)** Shift the emphasis of the smart factory program, a representative DX initiative, from facilities and equipment to operator capability enhancement.
  - Recommend data utilization methods to induce companies to understand the effectiveness and generate results that are consistent with the realities of domestic production.

● **Develop an innovative education system for the practical application of design software.**

- **(Design and Cultural Contents ISC)** Enhance the capacity to employ design software in response to the expansion of digital interfaces in the design sector.
  - Introduce new educational techniques: benchmarking innovative cases of software education at Ecole 42 of France or 42 Seoul of Korea.

● **Introduce digital literacy training for office workers to facilitate their occupational transition.**

- **(Management, Accounting, and Clerical ISC)** Implement digital literacy education to support office workers who retire without digital competency in transferring into digital convergence occupations.
  - Office workers independently acquire digital skills while using digital devices for work, which allows for the implementation of a modular, self-diagnosis-based program for office workers.