Factors defining Digitalisation in Mexico and Germany and the main challenges for sustainable development

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Digitalisation has been defined in different ways, according the purpose of the studies or projects, however, in this document, it is understood as the use of technology into the everyday activities of people, organisations, and government. It may be also identified as digital revolution or digital change (European Parliament, 2016; TWI2050, 2025), meaning the process where digital tools are transforming the ways to approach, solve or reduce global and local sustainable development problems. Digitalisation can help or threaten those issues set out in the Sustainable Development Goals (SDG) of the Agenda 2030 (UN, 2025; UNDP, 2025), depending of its availability, infrastructure, management, and planning, among others. The indexes of digitalisation help to understand the main characteristics of digitalisation for countries and their challenges.

The Digital Economy and Society Index (DESI) (European Commission, 2022): includes four dimensions: human capital, connectivity, integration of digital technology and digital public services. It includes 28 countries in the EU and has results for Europe and for each country through various years. In Mexico, there Index of Digital Development for the States (Centro Mexico Digital, 2022), measures four levels of achievement for the nation and for the states of the country, namely, basic, entrepreneur, advanced, leader; and it includes three pilars: infrastructure, affordability, and technological innovation by enterprises.

Germany is the European Union's (EU) largest economy. According the DESI 2022, the country has progressed relatively well in each of the factors of the index (Table 1). In terms of human capital, the country was in place 16, below the EU average, and it scored well in

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the indicator of sharing information and communications technology. It had its best position in connectivity, place 4, above the average of the EU, where it had very-high capacity network (VHCN) coverage. In the integration of digital technology by enterprises, it was in place 16, below the EU average, where most indicators were close to the EU average. And finally, in Digital Public Services, it scores well on open data and has position 18, below EU average.

Table 1. Germany position in each factor of the DESI, 2022

DESI 2022	Germany rank	Germany score	EU score
Human capital	16	45.0	45.7
Connectivity	4	67.3	59.9
Integration of digital technology	16	35.8	36.1
Public services	18	63.4	67.3

Source: DESI, 2022

Checking the data of DESI from 2019 to 2022 (Table 2), Germany has scored higher than the EU in each year, although its position has change. In 2019, it was in the 13 place and improved to place 12 in 2020; then, in 2021, it changed to place 11, which also showed a better position, nonetheless, in 2022, it was in the place 13, which meant the loss of two places. In terms of the score, the highest was in 2020 when reached 56.1, while the lowest was in 2019, with 51.2. The closest score with the EU was in 2022, when Germany scored 52.9 and the EU 52.3.

Table 2. Germany position in the DESI, 2019-2022

DESI	Germany rank	Germany score	EU score
2019	13	51.2	49.4
2020	12	56.1	52.6
2021	11	54.1	50.7
2022	13	52.9	52.3

Source: DESI, 2022

According the results of the DESI 2022, there are diverse challenges that Germany has to face in terms of digitalisation. The fibre coverage was 15.4%, which was ranked among the last positions of the members of the EU. The urban-rural digital divide persists, where rural fibre coverage is 11.3%, while the average in the EU is 22.5%. The interaction between government and the public could be improved. And, there is still work to do to achieve the Digital Decade Target of 100% online provision of key public services for European citizens and businesses.

In Mexico, the IDEE in 2022, shows that the national average of digital development was at the beginning of the advance level, which is the third level of four, before reaching the leader level. This Index has data for each state of Mexico, which in total are 32. The results for each state mentioned that 4 are in the leader lever, 13 in advance, 12 in entrepreneur, and 3 in basic. Al least 53% of the states are in the highest levels.

Considering the data from the IDEE in 2022 to 2020, 13 states improved their position, 8 did not change, and 11 reduced their position. The national results showed progress in terms of

coverage, access and quality of the networks, use of internet and introduction of new technologies by enterprises. Specifically, in infrastructure, there is higher coverage and access; in affordability, there was better use, adoption, exploitation, and availability of digital tools by people and society in general. And, in technological innovation by enterprises, there is better use of technological tools in companies, there are more actions about cybersecurity, e-commerce, digital economy and innovation.

The main challenges for digitalisation in Mexico are also diverse. There is need of more coverage in homes with computers and more fibre coverage. Digital change is concentrated in the big cities and those close to the United Stated (US) and less in the rest of the country, mainly in the south. More investment is necessary for digital technologies by the government. There is need for introducing digital technology in all levels of public education. And, there is need to increase coverage in rural areas.

Comparing the results of the indexes in Germany and Mexico, although the factors measured could be different, both countries have shown progress in digitalization. Germany has done better in terms if connectivity, while Mexico has improved mostly in coverage, access and quality of networks. They are related topics in the two countries.

On the other side, when talking about challenges, Germany has to deal with fibre coverage, the urban-rural digital divide, government-public interaction, and the online provision of key public services. Meanwhile, in Mexico, fibre coverage, concentration of digital changes in certain cities, public investment and attention to rural places are the main topics to attend.

In spite of being different countries in terms of economic development and population size, the challenges for Germany and Mexico are similar, and in terms of sustainable development, they are facing problems to reach equality, justice and fairness. They are showing digital gaps and contrasts between urban and rural places, and among big and small cities; likewise, they

show differences in the access to provide infrastructure for digital technology and to increase public investment to improve and promote technological change.

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