The Secret of Lasting Success – The Cases of Switzerland and Denmark*

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In recent decades, the development of Switzerland and Denmark has mainly been characterised by intensive growth, pioneering in innovation and the development of green technologies, high employment rates and fiscal discipline. In this article, we discuss the background of these development factors as well as how these two economies have managed to remain highly advanced for such a long time. The paths taken by Switzerland and Denmark show plenty of similarities, from which Hungary can draw lessons regarding its efforts to catch up with Europe's more advanced economies. In certain areas, however, their success has been enabled by factors dependent on their unique conditions, resources and diverging economic policy approaches.

1. Common factors on the path to success

Switzerland and Denmark were already relatively well-developed economies at the beginning of the 20th century, and even after World War II they showed considerable progress towards catching up with the USA (*Figure 1*). The neutrality or partial neutrality of each of these two countries played a major role in their development. Switzerland has consistently managed to maintain its neutrality. Denmark was occupied by Germany in April 1940 despite its proclaimed neutrality, but it managed to largely avoid devastation during the war. The progress made by Denmark after the war was driven primarily by low import prices, an upswing in industrial production and the stabilisation of agricultural export prices.[1] Despite its rapid growth, Denmark received a generous share of the funds allocated under the Marshall plan, on a per capita basis (*Tarnoff 2018*). Switzerland was able to continue industrial production both during and after the war, without interruptions.

* The papers in this issue contain the views of the authors which are not necessarily the same as the official views of the Magyar Nemzeti Bank.

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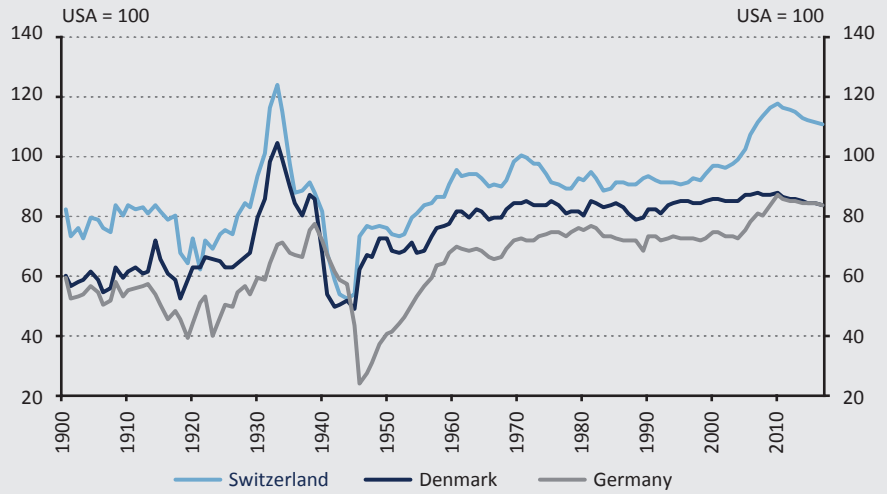
[1] *Encyclopedia Britannica* (*2022*)

Figure 1
Development of Switzerland, Denmark and Germany relative to the USA between 1900 and 2018

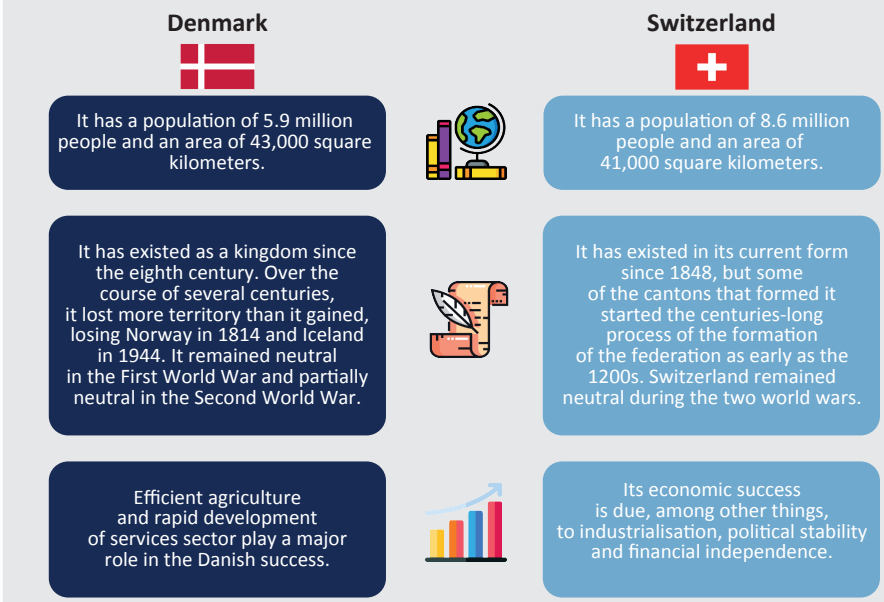


Note: Per-capita GDP at 2011 prices, based on data at purchasing power parity
Source: Calculated on the basis of the Maddison database

Switzerland maintained stable economic growth rate throughout the 1950s and 1960s. Denmark's growth rate fell short of the European average in the 1950s, partly because of highly regulated agricultural export prices, the devaluation the British pound in 1949, and the Korean war. In the 1960s and early 1970s, however, the Danish economy grew more dynamically and at the same time underwent a restructuring process, as agriculture lost its dominant position to the services sector (*Figure 2*). The oil crisis of the 1970s slowed growth in both countries. Between 1971 and 1979, the development of Switzerland and Denmark fell by 11 and 3 percentage points, respectively, in comparison to that of the US. Moreover, unemployment increased significantly in Denmark (to over 10 per cent in 1980), and improvement in this regard was not seen until the early 1990s.[2] A significant rise in the Swiss unemployment rate was not observed.[3]

[2] *Henriksen* (*2006*)
[3] *Registered Unemployment Rate for Switzerland*. https://fred.stlouisfed.org/series/LMUNRRTTCHA156S. Downloaded: 13 June 2022.

Figure 2
Background information on Denmark and Switzerland

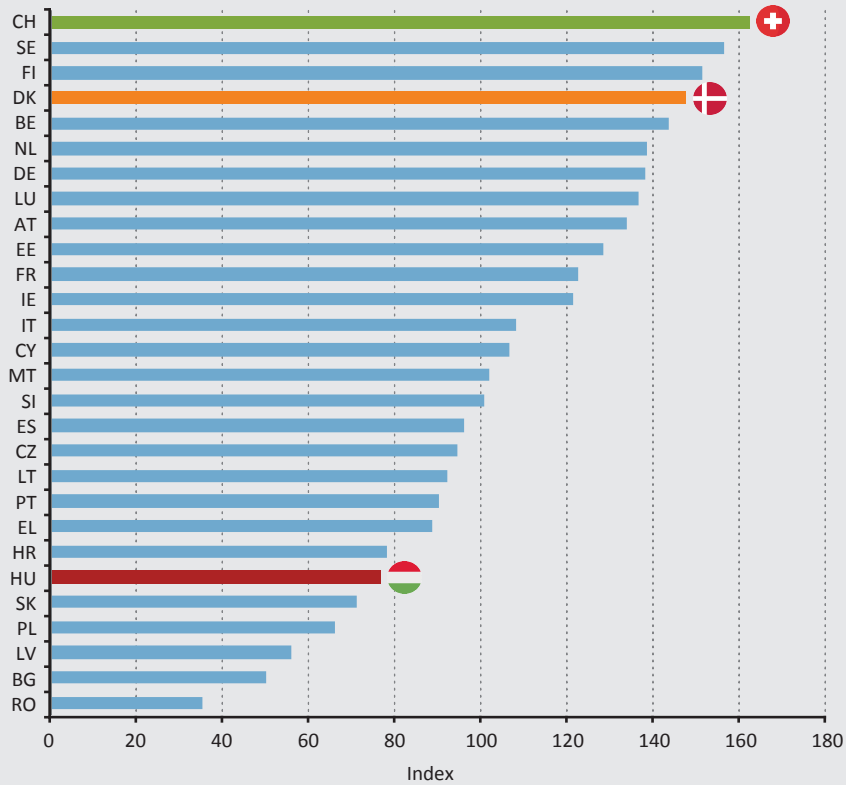


Shifting our focus to current times, recent analyses show that success in the economic catch-up game primarily hinges on the level of investments and the framework within which they occur (*Várnai 2022*). Both countries under review perform well in this regard: The rate of intangible investments is 8.3 per cent in Switzerland and 5.5 per cent in Denmark, in contrast to the EU average of just 3.4 per cent. To a large extent, this can be attributed to the high degree of digitalisation in both countries, which not only enhances the role of information and communication technologies, but also puts emphasis specifically on intangible investments. Such investments substantially improve productivity and corporate efficiency, as well as the optimisation of production and sales processes, and thus create opportunities for rising production levels.

Both Switzerland and Denmark are leaders in innovation. Switzerland ranked 1st and Denmark 4th in the 2021 EU innovation index (*Figure 3*). The index is calculated from several sub-pillar values by weighting them together. The areas taken into account include: innovative human capital, research-stimulating ecosystems, innovative finances, digitalisation performance and intellectual capital. Innovation potential is also reflected by patent statistics. The number of patent applications submitted per one million persons in Switzerland was 943 in 2020, more than six times the EU average of 147. The corresponding number in Denmark was 413, the third highest

in the EU (*Table 1*). From the sub-pillars mentioned, digitalisation performance deserves further attention.

Figure 3
EU Innovation Index 2021



Note: The European innovation scoreboard compares the innovation capabilities of all EU Member States and some non-EU countries. It covers a number of categories, including, inter alia, human capital, investments, innovation activities and innovation impacts (e.g. ecological sustainability).

Source: Eurostat

Table 1
Patent applications per one million persons in EU countries and Switzerland in 2020 (TOP10 and Hungary)

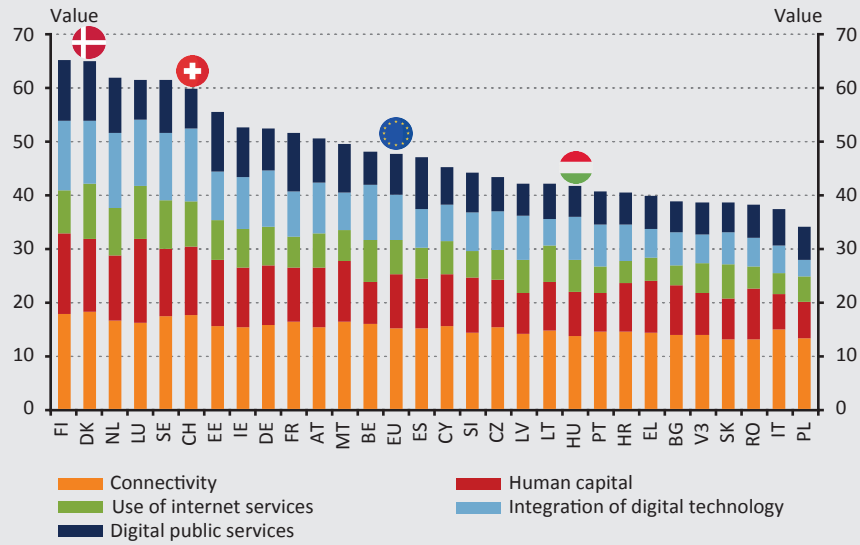
Countries	Rank	Patents/million persons
CH	**1**	**943**
LU	2	629
SE	3	428
DK	**4**	**413**
NL	5	366
FI	6	343
DE	7	312
AT	8	259
BE	9	208
IE	10	195
HU	**25**	**11**

Source: Eurostat

Digitalisation and the technological progress it induces represent new opportunities, but also require adjustment by all economic agents. By harnessing the achievements of the fourth industrial revolution, a competitive advantage can be gained that may result in a long-term improvement in productivity, and thus boost welfare in a sustainable manner. The high level of digitalisation provided a significant competitive advantage during the Covid-19 pandemic as well. Lifestyle changes caused by the lockdowns posed new challenges to the corporate and the governmental sectors, as well as households, and digitalisation played a key role in addressing these. Companies already possessing advanced digital infrastructures enjoyed a competitive advantage in this situation and citizens with a high level of digital skills also found it easier to adapt. The pandemic gave an extraordinary impetus to the digitalisation of various elements of society and, as a result of the increasing role of big data and artificial intelligence, digitalisation is expected to continue spreading in the coming years as well. *Denmark and Switzerland were ranked 2nd and 6th, respectively, by the European Commission in terms of digitalisation in 2020* (*Figure 4*).[4]

[4] The ranking order is made up of the weighted values of the following sub-indices: network quality, digital skills of the workforce, use of online services, corporate integration of digital technologies and digital public services.

Figure 4
EU digitalisation ranking in 2020



Source: European Commission

Both Denmark and Switzerland have well-established, highly developed start-up ecosystems. The number of start-ups per one million persons is three times and two times as high as the EU average in Denmark and Switzerland, respectively. Worth mentioning is for instance the Danish firm "Tradeshift" (with capital investment of USD 432 million) (*Irish Tech News 2018*), automating supplier invoicing processes, or "Trustpilot", an independent valuation platform (with capital investment of USD 193 million).[5] Noteworthy Swiss start-ups include "Planted Foods AG" (with capital investment of USD 38 million) (*Coldewey 2021*), which manufactures alternative protein products, and "Cutiss AG" (with capital investment of USD 32 million),[6] which develops robotised skin regeneration technologies.

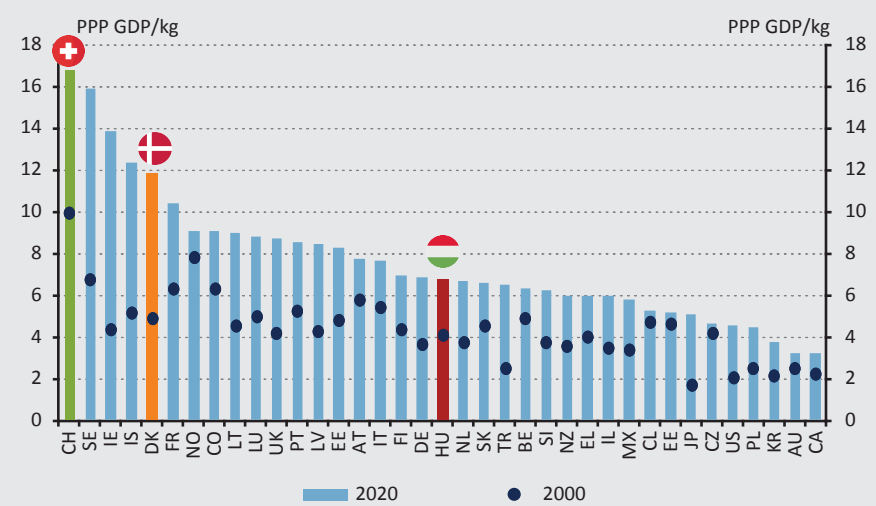
Switzerland and Denmark are also in the vanguard in terms of green efficiency. GDP per unit of carbon dioxide emissions is highest in Switzerland and the 5th highest in Denmark among the OECD countries (*Figure 5*). Switzerland intends to cut its carbon dioxide emissions by one half by 2030 relative to 1990 and aims to achieve full carbon-neutrality by 2050 (*Jorio 2021*). The Swiss are planning a green energy revolution based on solar energy: the share of solar in the Swiss energy mix should rise from the current 4 per cent to more than 40 per cent within the next 30 years. Another important renewable source is hydropower, which currently supplies 60

[5] *Top 221 Startups from Denmark*. https://www.failory.com/startups/denmark. Downloaded: 13 June 2022.
[6] https://www.cipherbio.com/data-viz/organization/Cutiss%2BAG/news. Downloaded: 13 June 2022.

per cent of the power capacity. Switzerland is also a pioneer in the emissions-reducing method of carbon capture and storage (CCS). Climeworks AG, a company headquartered near Zurich, opened the world's first CCS plant, which will absorb 900 tonnes of carbon dioxide per year and use it in crop production. Although this is not a substantial amount in comparison with global emissions, this technology could potentially compensate for 1 per cent of global CO_2 emissions (*Marshall 2017*). Denmark has set itself a more ambitious short-term target, planning to reduce its emissions by 70 per cent by 2030 and achieve climate neutrality by 2050, just like Switzerland (*Ministry of Foreign Affairs of Denmark 2022*).

In Denmark, wind energy is the key factor in the green transition. Energy generated by turbines accounted for 50 per cent of energy production in 2021, a ratio that is planned to increase further in the years ahead. In line with this plan, Denmark will construct the world's first "energy islands". These islands will make it possible to erect wind turbines much further off shore than before. The turbines will generate a total of 5 GW energy, enough to supply at least 5 million households (in 2020, Denmark had 2.7 million power-consuming households) without consumers having to put up with the drawbacks of wind turbines operating in their neighbourhood. Switzerland and Denmark are also leaders in the number of green technology patent applications. Amongst the OECD countries, Denmark leads the way in terms of patent applications submitted per million persons and Switzerland also performs well, claiming the 7th spot*(Table 2)*.

Figure 5
GDP per unit of carbon dioxide emissions (PPP) in OECD countries



Source: OECD

Table 2
Number of green patent applications per million persons in OECD countries in 2018 (TOP10 and Hungary)

Countries	Rank	Patents/million persons
DK	**1**	**60**
SE	2	43
KR	3	42
JP	4	36
FI	5	33
DE	6	31
CH	**7**	**25**
AT	8	25
NO	9	24
NL	10	19
HU	**25**	**3**

Source: OECD

Both Denmark and Switzerland are characterised by fiscal discipline. Over the past 30 years, Switzerland's fiscal balance has fluctuated between –3.5 per cent and 2 per cent. Between 1995 and 2019, Denmark was able to generate fiscal surpluses of an average of 0.4 per cent of GDP. Government debt has always been low in both Switzerland and Denmark since the early 2000s. In 2020, this rate was 40 per cent of GDP in both countries; significantly below the 90 per cent EU average.

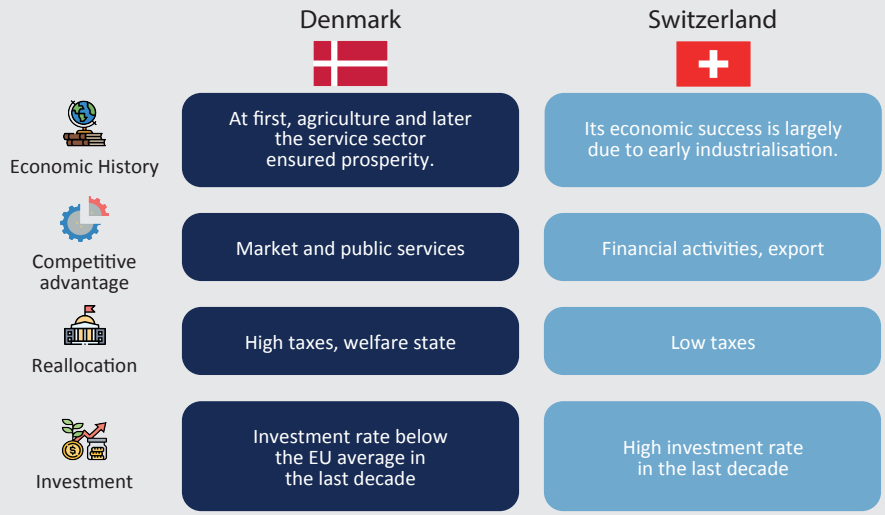
Both countries are work-based societies with high employment rates: at 75 per cent in Denmark and 80.5 per cent in Switzerland, both of which are much higher than the 68.5 per cent EU average. Moreover, the ratios of people with higher qualifications are higher (Switzerland: 43.3 per cent, Denmark: 39.1 per cent) than the 35.8 per cent EU average, indicating advanced, knowledge-based societies. It should be noted in this regard, however, that the so-called brain-drain mechanism might be functioning in both countries, as each have substantial proportions of highly trained workforce flowing in from other countries.

2. Differences – there's no single recipe for success

While there are numerous similarities between the two countries' growth models, in some areas they have opted for different paths towards economic development (*Figure 6*). It is clear from the foregoing that the economies of both countries managed to achieve, and thus far also maintain, high levels of development. Nonetheless, there are also major structural differences between them, which might

indicate that there is no single recipe for success. Rather, each unique economy's existing potential and opportunities must be exploited and utilised, in which active economic policy plays a key role.

Figure 6
Differences between Denmark and Switzerland

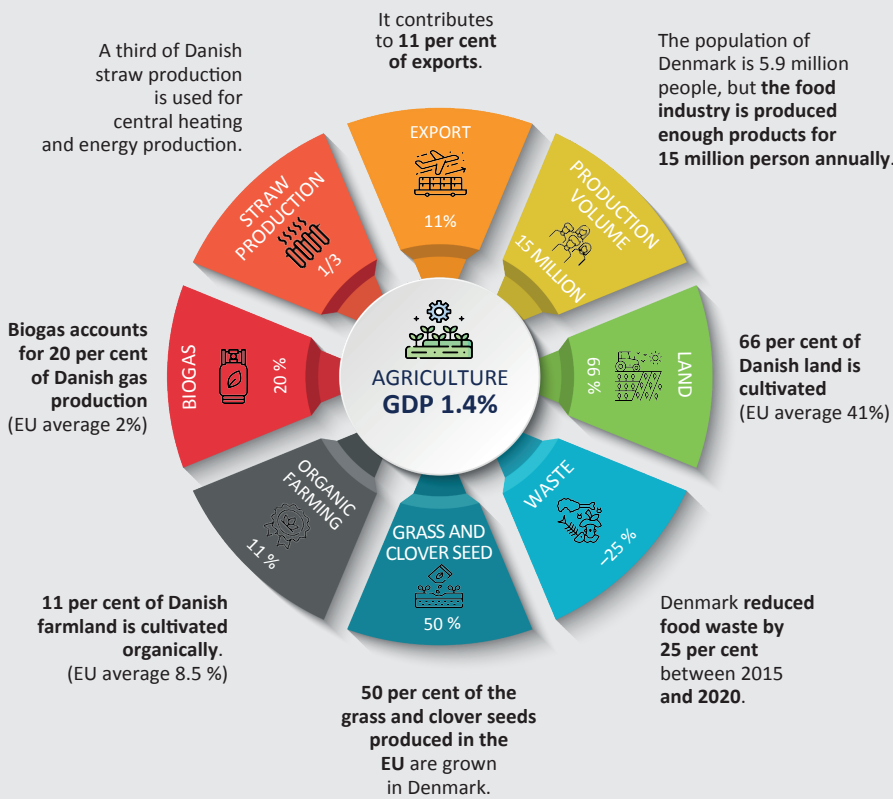


Source: OECD

The first such area pertains to the early achievements of both countries that can be traced back to their differing sectoral compositions. In Denmark, welfare was ensured first by agriculture and later by the services sector, while Switzerland has, for the most part, industrialisation to thank for its early achievements. Switzerland managed to boost its industrial output by exploiting the absence of patent regulation during the second industrial revolution. Moreover, as a small and open economy it became a dominant player in global value chains focusing on specific product categories and quality, riding the wave of globalisation at the end of the 1800s. Finally, its banking system, famous for confidentiality, stimulated capital influx. By contrast, economic growth in Denmark was – quite uncharacteristically – driven by industry only briefly. Agriculture remained dominant for quite some time, due to the effective and efficient smallholder-cooperative sector and a low customs tariffs policy. The latter enabled the import of cheap grain, which initially facilitated the switch from growing grain to raising livestock, and later a pivot towards the production of processed animal products. Only in the 1970s did agriculture lose its dominant position to the services sector, but it has remained an important part of the economy to this day. Agriculture in Denmark has become a sustainable, R&D-

intensive sector with a focus on green production, which makes up only a small part of GDP directly, but accounts for a significant share of Danish exports indirectly via production chains (*Figure 7*). Denmark's relatively small land area is cultivated as efficiently as possible, maintaining the highest quality standards. The country's food industry is vertically integrated (*Figure 8*); high value-added processed food products are much more significant in exports than unprocessed foodstuffs.

Figure 7
Significance of Danish agriculture



Source: Danish Agriculture and Food Council, World Bank, Eurostat, IEA

Figure 8
Ratios of exports of unprocessed and processed foodstuffs of various EU countries in total exports, 2019

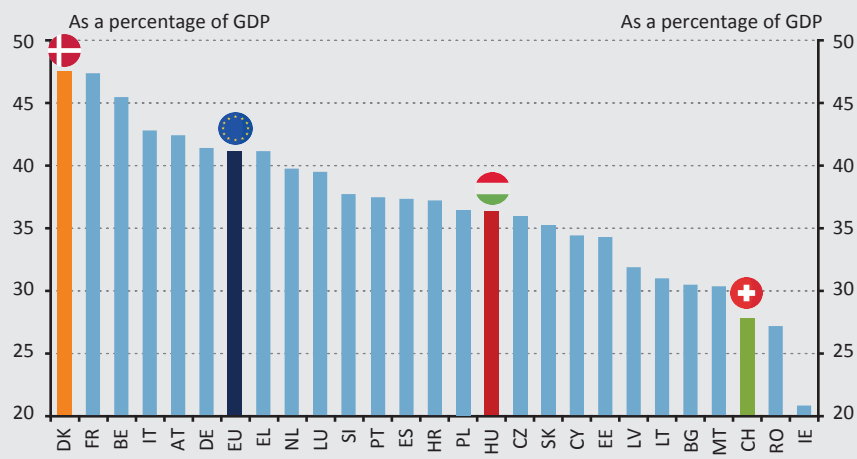
Source: Based on Eurostat data

The competitive advantage enjoyed by both countries also stems from different sources. While growth in Denmark is generated by the effective and efficient operation of private and public services, Switzerland enjoys success due to its financial sector and export products. In Denmark, 24 per cent of the cumulative GDP growth between 1995 and 2019 was attributable to the governmental sector and 43 per cent was generated by household consumption. The corresponding ratios in Switzerland were 7 per cent and 45 per cent. During the same period, net export sales accounted for 30 per cent of Swiss GDP growth, while in Denmark they contributed only 7 per cent. Clearly, while household consumption is important in both countries, growth in Denmark is largely driven by the public sector, while in Switzerland a similar role is played by exports. The Danish public sector owes its significant role to the Scandinavian welfare model, while exports of goods play a dominant role in the foreign trade growth of the Swiss economy. Key Swiss export product categories include machines and electronic products (24.3 per cent), chemical products (20.7 per cent), wholesale and retail products (11.4 per cent), as well as financial and insurance products (10.5 per cent). A breakdown of 2019 GDP for both countries shows that financial services accounted for nearly 10 per cent in Switzerland and 5.5 per cent in Denmark. At the end of 2020, the portfolio

of financial instruments managed in the Swiss banking sector exceeded 500 per cent of Swiss GDP.

The two countries under review also have fundamentally different social redistribution systems in place. In Switzerland, a high investment rate based on low tax rates drives economic growth, while by contrast, in Denmark, high tax rates finance the Scandinavian welfare model. Danish tax revenue, amounting to 47 per cent of GDP, was the highest among EU countries in 2020. The revenue was significantly lower, at 28 per cent of GDP, in Switzerland (*Figure 9*). Meanwhile, the investment ratio relative to GDP was 21 per cent in Denmark and 26 per cent in Switzerland (EU average: 22 per cent) in 2019. Such diverging paths began to appear in the early 1950s, but became prominent only in the 1960s and 1970s. The timing of the process aligns closely with the evolution of the Danish welfare model which reached its peak relatively late, in the 1970s. As late as in the early 1960s, public spending in Denmark as a percentage of GDP equalled that of the United States of America. Only at the end of the 1960s did a transformation occur when two successive governments increased the tax burden by a total of 10 per cent which was then further increased to compensate for the effects of the 1973 oil crisis (*Brøns-Petersen 2015*). To this day, Denmark follows the Scandinavian welfare model, although public expenditures as a percentage of GDP have decreased somewhat during the past decade.

Figure 9
Total tax revenue in the EU countries and Switzerland, as a percentage of GDP (2020)



Source: OECD

3. Conclusion

Overall, it can be concluded that stable economic catching up requires adequate performance in a number of areas, while the recognition of individual country specifics and the utilisation of their potentials is also a key aspect. Shared points, indispensable for success, and from which Hungary can also learn are the following: digitalisation, environmental sustainability (green effectiveness), smart capital and intangible investment, innovative economies, developed start-up ecosystem, work-based society and fiscal discipline. At the same time, each country may possess structural factors individual to them, and as such there is no single recipe for success; the potentials of each economy need to be exploited, in which an active economic policy plays a major role.

References

Brøns-Petersen, O. (2015): *The Danish Model – Don't Try This at Home.* Economic Development Bulletin No. 24, Cato Institute. https://www.cato.org/economic-development-bulletin/danish-model-dont-try-home

Coldewey, D. (2021): *Planted raises another 18m to expand its growing plant-based meat empire and add schnitzel.* Techcrunch.com, August 2. https://techcrunch.com/2021/08/02/planted-raises-another-18m-to-expand-its-growing-plant-based-meat-empire-and-add-schnitzel/. Downloaded: 13 June 2022.

Encyclopedia Britannica (2022): *Denmark – Postwar Denmark, 1945–c. 1990*. https://www.britannica.com/place/Denmark/Postwar-Denmark-1945-c-1990

Henriksen, I. (2006): *An Economic History of Denmark*. EH.Net Encyclopedia, edited by Robert Whaples. October 6. https://eh.net/encyclopedia/an-economic-history-of-denmark/

Irish Tech News (2018): *Top 25 Most Badass Startups in Denmark*. https://irishtechnews.ie/top-25-most-badass-startups-in-denmark/

Jorio, L. (2021): *Switzerland rated 'insufficient' for climate commitment*. SWI swissinfo.ch, June 15. https://www.swissinfo.ch/eng/business/switzerland-rated--insufficient--for-climate-commitment/46705920. Downloaded: 13 June 2022.

Marshall, C. (2017): *In Switzerland, a giant new machine is sucking carbon directly from the air*. Science.org, June 1. https://doi.org/10.1126/science.aan6915

Ministry of Finance of Denmark (2022): *Global Climate Action Strategy: A Green and Sustainable World*. https://um.dk/en/foreign-policy/new-climate-action-strategy. Downloaded: 13 June 2022.

Tarnoff, C. (2018): *The Marshall Plan: Design, Accomplishments, and Significance.* CRS Report, Congressional Research Service, January 18. https://sgp.fas.org/crs/row/R45079.pdf. Downloaded: 13 June 2022.

Várnai, T. (2022): *A tőke és a gazdasági növekedés kapcsolata: a mennyiségi szemléletből a minőség felé* (*Relationship between capital and economic growth: from a quantitative to a qualitative approach*) In: MNB: Új Közgazdaságtan a Fenntarthatóságért (New economics for sustainability). Magyar Nemzeti Bank, pp. 203–229. https://www.mnb.hu/web/sw/static/file/az-uj-fenntarthato-kozgazdasagtan-hun.pdf