# Attracting Life Science Investments in Europe

AN INITIATIVE OF THE **BIOMED ALLIANCE, EUROPABIO & JOHNSON & JOHNSON –** 22 June 2021

# Contents

# Executive Summary

**T**he report "***Attracting Life Science Investments in Europe***" is an initiative of the BioMed Alliance, EuropaBio and Johnson & Johnson.

Considering the magnitude and importance of life sciences in Europe, from education to academia, research, manufacturing, exports and health delivery, the topic deserves a strong and coherent long term policy vision and plan. Europe spends an estimated 1,400 billion euro on healthcare annually, and its life science industry has a production turnover of 260 billion euro. There are around 14.7 million people employed in healthcare in the EU, and another 800,000 in the life science industry.

The objective of this report is to provide a set of indicators of importance for life science investments, allowing each country to identify its position on key aspects and to assess its strengths and weaknesses, making it possible for them to fill specific gaps or to work towards distinct investment profiles by adopting new policy measures.

As a second objective, the report benchmarks Europe versus the United States and China, based on the same set of indicators. Assessing Europe's position and performance in life sciences is essential to better respond to future crises and to protect the health of Europeans.

The **21 selected indicators are grouped in four broad categories**

- **the political, social & economic environment** includes political stability, national competitiveness, innovative environment and gender equality
- **the industrial investment context** includes labour productivity, hourly labour cost, availability of qualified staff, life science trade balance, corporate taxes, payroll taxes
- **life science innovation** includes life science publications, life science staff, the number of clinical trials, life science R&D investments, and life science degrees
- **the healthcare investment environment** includes quality of care, the size of the healthcare budget, pharmaceutical spending, the size of the medtech market, time to availability of medicines, and the digital health index.

The data used for the indicators are sourced from internationally available and published reports, primarily from international organisations such as OECD, the European Commission, the World Bank as well as industry associations and management consultancies. The indicators try to balance both qualitative and size-related measures. Quality aspects are critical but size is equally important in this context: the large availability of highly educated staff is a critical factor for investments, the actual amount of research funds is more important than the per capita amount, and larger markets tend to be prioritised for product launches.

# Executive Summary (Ctd.)

**Analysis within Europe**

Fourteen European countries were selected for the analysis: Belgium, France, Germany, Ireland, Italy, the Netherlands, Spain, Sweden, Denmark, Finland, Poland, Norway, Switzerland, and the United Kingdom. This selection was based on the size of the countries and their role in life science, both academic and industrial, as well as on data availability.

Even if the strength of a life science ecosystem is based on all the different indicators, it is possible for countries to differentiate by developing a unique position. Germany and Switzerland come out well on many indicators, but countries such as Ireland have managed to create a strong position in manufacturing and France in driving innovation. When it comes to building effective biotech start-ups in the last 10 years, the UK and Switzerland show the largest progress.

For each of the selected countries, a Life Science Dashboard is provided, based on the indicators, with a more detailed overview of the specific life science investment characteristics for each country as well as recent policy measures. This allows individual countries to identify their position versus the median and the highest scores in Europe.

**Analysis of Europe versus the United States and China**

The second part of the report compares the position of Europe at a global level, using the 21 indicators and recent facts.

The key findings are:

- Despite the growth of life sciences in Europe, the gap with the United States and China is increasing significantly.
- The United States outperforms Europe on all life science innovation indicators.
- China shows a more contrasted picture but benefits strongly from its size and low costs. In the coming decade and given its strategic industrial focus, China is expected to outperform the rest of the world in life science degrees and in manufacturing capacity.
- Public investments in health research are almost three times higher in the United States than in Europe and four times higher than in the European Union.
- Biotech patent applications doubled in Europe in the last 15 years, yet they increased 3-fold in the United States and 9-fold in China.
- Biotech start-ups in the United States receive almost 5 times as much funding as their European counterparts. It is also telling that 30% of all European start-ups get listed on the US stock exchange to get access to capital.
- The number of life science investment projects is five times higher in the United States than in the whole of Europe.

# Executive Summary (ctd.)

**How the report should be used**

The report should be considered as a 'debate starter'. The 21 selected indicators cannot possibly cover the entire life science ecosystem in all its complexity, but they can be the basis of a discussion for further analysis, identification of a desired positioning and the determination of policy measures to move forward in desired direction.

The report is not meant to compare the countries vis-à-vis each other on each indicator but to serve as a base for assessment by national policy makers and investors on relative positions.

The ultimate question of where to invest for life science companies depends clearly on each company's specific strategic needs (research, start-up, manufacturing, …) and its current physical presence.

**Key policy observations and questions**

It is possible for individual countries to create a distinct profile for life science investments, even within a very competitive environment.

The United Kingdom and Switzerland, two of the strongest life science countries in Europe, are outside of the European Union – the question in the future will be when and how to collaborate while in competition.

Europe has lost its leadership position in life science globally, and the United States and China are investing more and showing faster growth.

Within life science and healthcare, Europe is still strongly fragmented, and not fully taking advantage of its size potential as a region. Research funds are lower than in the US, less concentrated in areas of excellence, with insufficient sustainability of research funding in areas of excellence and healthcare is still a predominantly national matter.

# Executive Summary (Ctd.)

**Key recommendations**

European countries and the European Union should have a stronger long-term vision on how its life science ecosystem should develop. This requires a concerted, collaborative and sustained policy effort. All aspects of this ecosystem are connected and should reinforce each other: political stability, industrial policy, life science education, public life science research investments and sustainability for biomedical research funding, incentives for private research and manufacturing investments, the availability of venture capital and a welcoming regulatory environment for innovative technologies.

Next to a strong and sustained vision and strategy, this requires much more focused public funding in education and research, both at EU level and in the individual countries, to avoid inefficiencies related to fragmentation of resources.

The EU has taken the initiative to build a strong European Health Union with the aim to place Europe as a leader in life science.

The COVID-19 crisis pointed out some of Europe's strengths while revealing a range of weaknesses pointed out in the report as well. The European Commission laid down the EU Health Union vision along with key policy initiatives such as: the Pharmaceutical Strategy, HERA and an upgrade of EMA and ECDC mandates. This new approach is welcomed and should increase Europe's capacity to respond to health challenges and to strengthen its position in life science and biomedical research. Therefore, the EU will have a critical role to ensure proper preparation and implementation of these European initiatives and to propose coordinating mechanisms to help Member States to reinforce their position in life sciences.

Life science investments create value: they contribute to health improvement, they create a strong knowledge base, they create high quality jobs, and enhance manufacturing capacity and exports, which in turn generate more economic value. Strong life sciences are an asset for Europe and being a leader in this field will have direct impact on the European citizens' health and will contribute to excellent research.

# The partners of the Initiative

- The **Biomedical Alliance in Europe** is the result of a unique initiative of 36 leading European medical societies that together include more than 400,000 researchers and health professionals.
- **EuropaBio** the European Association for Bioindustries is the recognised voice of the European biotechnology community championing world-class solutions for society's challenges and representing healthcare and industrial biotechnology sectors.
- **Johnson & Johnson** the world's largest and most broadly based healthcare company. It has more than 130,000 employees worldwide. Johnson & Johnson financed the study.
- The data collection and analysis was made by **Seboio Health Policy Consulting**, a specialised consulting firm in healthcare and life sciences.



# Introduction

The value of life science investments was already well understood, but it becomes even more acutely perceived in the current context of COVID-19, global competitiveness and the changing political landscape in Europe. Despite the health progress made, significant challenges remain, not only from a scientific and medical perspective, but also from a strategic capacity perspective: how excellent research ideas are transformed into solutions, who owns the technology, where the manufacturing plants are located, and how our citizens get access to treatments.

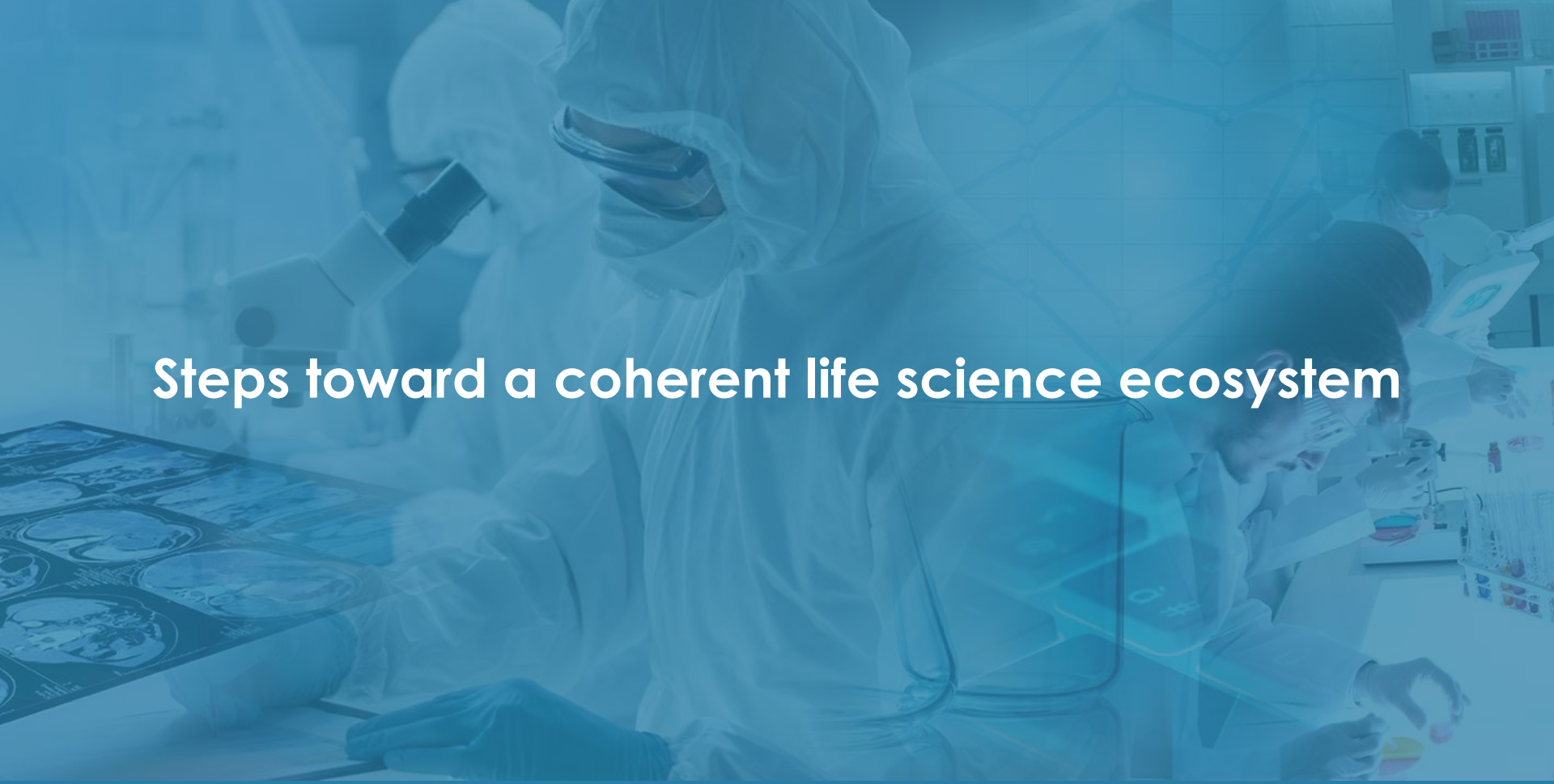
Europe spends an estimated 1,400 billion euro on healthcare annually[1], and its life science industry has a production turnover of 260 billion euro[2]. There are around 14.7 million people employed in healthcare in the EU[3], and another 800,000 in the life science industry[4]. The size and importance of life science in Europe demands dedicated strategies with a long term perspective, as a matter of importance to the health of citizens and the socio-economic strength of the region.

The EU's innovation capacity is falling behind on the global stage. When it comes to innovation, Europe is now lagging not only the US but also China. The United States and China are the leading players in the number of life science mergers and acquisitions. They are ahead in conducting clinical trials, in producing life science patents and they massively invest in health innovation. This loss of leadership is important not only in terms of jobs and growth. It also has much wider ramifications, like being best positioned to create excellent research and provide best solutions to citizens. **The key question today is whether the EU wants to regain its historical leadership and become a frontrunner in life science ecosystem.**

**The objectives of this report are:**

- to provide a set of key indicators and policy considerations for a coherent life science ecosystem
- to identify how selected European countries score on these life science indicators. The selected countries are Belgium, France, Germany, Ireland, Italy, the Netherlands, Spain, Sweden, Denmark, Finland, Poland, Norway, Switzerland and the United Kingdom.
- to offer a snap-shot of Europe's position vis-à-vis the United States and China in the area of life science attractiveness and investments
- to present country dashboards, allowing each of the selected countries to view their position within Europe

[1]Eurostat 2018; [1] EFPIA 2020, [3] Eurostat 2019, [4] EFPIA 2020



# Steps toward a coherent life science ecosystem

# Steps toward a coherent life science ecosystem

## 1. Key factors that facilitate the boost of life science ecosystems

**A country's or a region's success in life science is the result of a strong and sustained effort to create a coherent life science ecosystem**:

- a high quality **education** with sufficient availability of life science graduates;
- a strong academic **research** with the necessary funding of excellent research;
- the availability of **tech transfer** mechanisms allowing academic research to develop into commercial products and solutions that are based on solid interactions between public and private sectors;
- a medical and health environment that **integrates public and private research**, such as for translational medicine and clinical development of new treatments;
- the availability of sufficient **venture capital** to turn ideas into viable businesses;
- a good **industrial policy** allowing to recruit skilled staff, to manufacture and to export;
- a **healthcare investment policy** which embeds digital health, healthcare innovation and medical technology as priority sectors;
- a strong **EU industrial policy**, that strategically invests in innovation (digitalisation and sustainability) of its industry and infrastructure. This includes incentives schemes to invest in staff and modernisation of manufacturing (moving to industry 4.0 etc.);
- a **tax framework** that encourages investments in innovation;
- a flexible and speedy **regulatory framework** combined with a solid healthcare budget that allows for fast uptake of new technologies including digital solutions;
- an effective and efficient healthcare system that allows for **quality of care** at acceptable costs for society.

# Steps toward a coherent life science ecosystem

## 2. Key Policy Considerations

A coherent life science ecosystem can only be achieved by having **a clear and long-term vision** on how all these building blocks fit together to create an environment for life science competitivity. National Member States can create their own vision of national priorities, but the European Union needs to **foster a collaborative vision and rethink its competitiveness towards other continents.**

**Public investments** in education and academic research will have a good return on investment for society if the entire value chain is coherent and efficiently organised. Long-term investments in education and public research can create vibrant economic environments which will pay more money back to governments in the form of employment, exports and taxation. This all may result in the development of new medicines and treatments that contribute to better public health, which in turn also results in clear economic gains.

The unprecedented crisis created by the COVID-19 pandemic has proven the critical importance of ensuring Europe's positioning and capacity in life sciences is on a level playing field with other continents.

In order to achieve this, **an open and constructive dialogue** among different stakeholders is needed to identify how Europe compares with the US and China, and which policy measures can be adopted to advance innovation, investments and quality care, and create an environment for life science excellence in Europe.

It is important for countries to understand that they operate in a very competitive environment. They have to keep track of what's happening in other countries and to identify how they can become or remain attractive for investments or what they can do to generate local value by collaborating with other countries.

Policies are designed to have a **positive balance between high quality and costs**. Relative higher costs for staff or taxes can be acceptable if there is proportionally higher level of quality aspects : high education levels, an innovative and open economy, limited bureaucracy, good collaborations between academic and private partners.

The ultimate measures of success are high quality jobs and high quality healthcare. Policy-makers should understand that the **investments made will generate even more revenue** in terms of job creation and a healthier population

# Steps toward a coherent life science ecosystem

## 3. How the perspectives of investors and policy-makers can be matched

Even if investors and policy-makers have have different perspectives, they should be able to meet and improve the context taking four elements of stability, size, quality and cost into account, critical elements to attract any level of investment.

**Stabiity**

- What investors want is **stability and predictability**. The sustainability of investments and the output and outcome can only be successful if the environment is not disruptive, and that includes political stability, social peace, solid economic foundations. This includes the certainty that the tax systems will not change every few years, and that commitments made by the authorities are also met. That there is a minimum rule of law, including intellectual property protection.
- Europe has strengths at the level of political stability, with clear long-term policies of what it wants to achieve. The recent rise of nationalism goes against the investors' desires for an open economy and access to a large European market.

**Size**

- Establishing or expanding activities in large markets has obvious advantages in getting access to a large market of patients, access to funding that is more substantial in absolute figures and access to more abundant talent (United States, Germany, China). In Europe, the three biggest markets, Germany, France and the UK attract 51% of all foreign direct investments(1) (FDI) across all industries
- Despite the efforts by the European Union to create a single market, to a large extent this remains a far-off reality for healthcare. Even if approvals are now made centrally, the decision-making at the level of pricing & reimbursement becomes even more fragmented and cumbersome. If the European Union wants to use its size to keep a major role at global level, the single market should become a reality in healthcare. This also implies an openness to the world, both from a human resources as from a global supply chain perspective. Export bans, restrictions and protectionism do not create a favourable business context.

# Steps toward a coherent life science ecosystem

## 3. How the perspectives of investors and policy-makers can be matched (ctd.)

**Quality**

- At the same time, smaller countries can take advantage of more qualitative aspects, offering better education in life science, offering more specific programmes for life science research, or having faster and less bureaucracy. Several smaller countries have created dedicated policies to attract life science investors and with success. Ireland and Belgium are good examples. In Europe, two of the major countries for life science research, the UK and Switzerland, are located outside of the European Union. Both countries represent significant public investments in health research, as compared to other EU Member States, as well as a vibrant biotech environment with significant presence of venture capital
- The most attractive countries invest heavily in improving the qualitative aspects of their market: the quality of education, the academic quality, the healthcare system quality, the quality of the interaction between public and private partners. They have set up specific schemes to facilitate early access to treatments, such as France. This also includes a more flexible and agile regulatory framework (eg. for rolling reviews, e-labelling, e-leaflets).

**Cost**

- The fourth factor is cost. Cost can be calculated in terms of the inputs needed to obtain results. At the most basic level it is to be measured in labour cost and productivity, but other factors such as slow or complex bureaucracy and high taxes will also play a role.
- Countries can work on the cost aspects of doing business, by reducing taxes on people and profits. Many countries have set up specific tax schemes, either for innovation or for manufacturing. These incentives can also include direct subsidies, either at national or subregional level, in the form of financial support or cheap access to land.

# Methodology

# Methodology

We have identified **21 indicators** that are of relevance for life science investors, based on four major pillars of a country's life science context: the socio-economic situation, the industrial capacity, life science innovation and healthcare organisation. The indicators were selected based on "inward investment" publications and based on the input of specialists from the BioMed Alliance, Europabio and Johnson & Johnson. We also want to thank EU-LIFE, the association of European life science research institutes for their valuable input. Some initial indicators were dropped because there were no data available or insufficiently available for all countries.

**Fourteen European countries** were selected for this overview: Belgium, France, Germany, Ireland, Italy, the Netherlands, Spain, Sweden, Denmark, Finland, Poland, Norway, Switzerland and the United Kingdom. This selection was based on the size of the countries and their role in life science, both academic and industrial. Unfortunately not all countries were represented with comparable indicators in the published data sets, meaning that for some indicators were left open for some countries.

This report gives **a snap-shot** of reality based on a number of indicators at a given moment in time. It does not give the final answer on which country is the absolute best to invest in today.

Rather, it forms the **basis for open debate** and constructive discussions with stakeholders and policy-makers interested to attract life science investments in their country. In a rapidly evolving environment such as life sciences the report intends to give a snapshot of the ecosystem to benchmark the European countries but might be subject to updates related to the time between the collection of data and their official publication.

**All sources of information to develop the country indices are available for further consultation and their references can be found at the back of this document.**

# Methodology

**The analysis is made on the basis of 21 indicators, grouped in the following four categories:**

## Political, Social & Economic criteria

We selected "political stability & absence of violence", "national competitiveness", "innovative environment" and "gender equality" as key criteria. All metrics in this cluster are indices, in the sense that they aggregate a number of other data to evaluate the very abstract items discussed.

## The Industrial Investment Context

The metrics in this group are the ones that are most common in investment reports. Availability of qualitied staff and their relative cost are critical for any investment decision, together with the costs involved in taxation. Many countries offer tax exemptions for innovative companies, or offer subsidies for manufacturing investments in less developed regions. Since there are no easy comparators, we refer to the second page of each country analysis for more details.

## Life Science Innovation

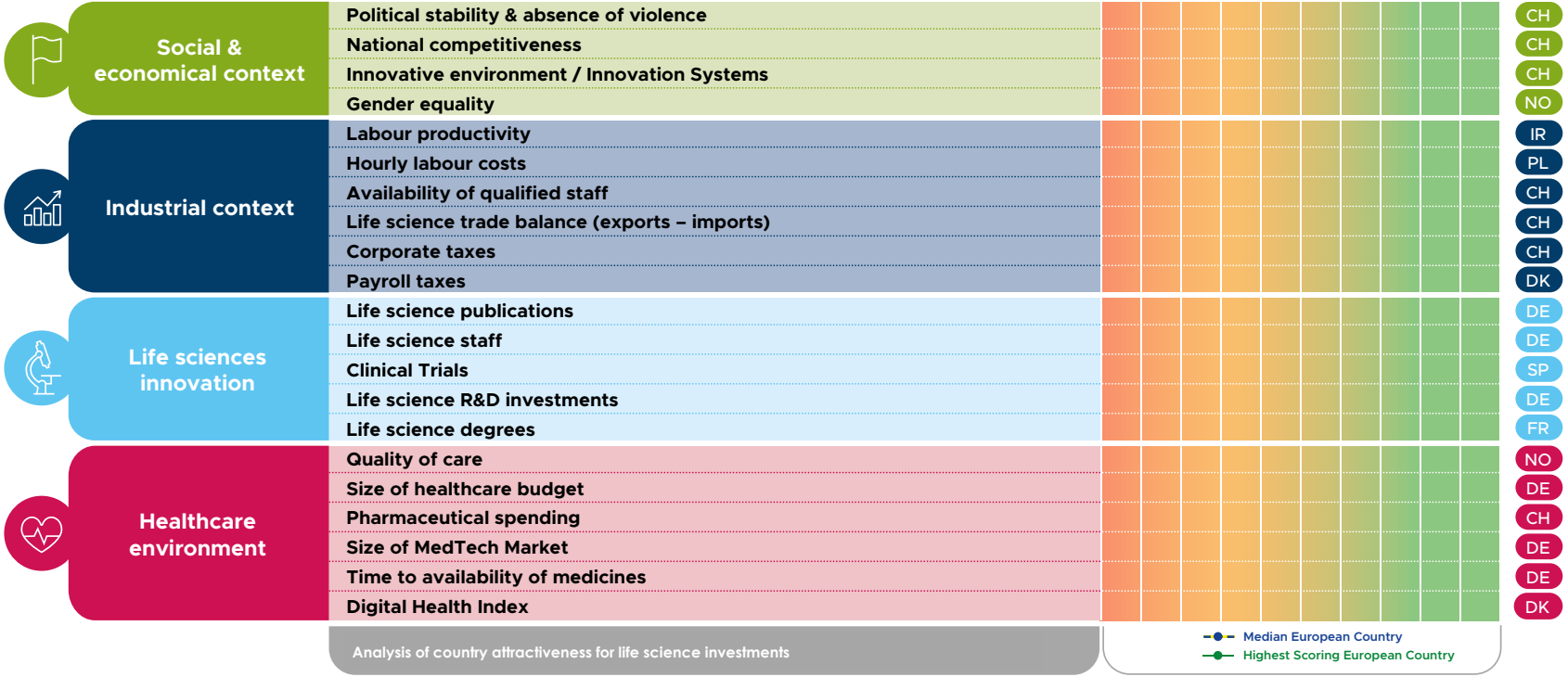
Specifically for life science investments, the quality of education, and the availbility of staff is an important factor. To get a feel of the opportunities for research, we included the local life science R&D investments by industry and the number of clinical trials, both of which give a good indication of the life science ecosystem in the country. We included the life science university degrees (both Master and PhD) in health and biological sciences by country.

## The Healthcare Investment Environment

We selected the "quality of care" index as a general metric that covers access, innovativeness and outcomes data. We included the overall size of the healthcare budget and pharmaceutical expenditure per capita indicators of the importance the political world gives to new technological innovations. We also include the time between formal approval of new technologies and the availability in the market. We finally used a "digital health index" to measure the progress in electronic health records, telemedicine and other digital achievements. This measure is itself a composite of different statistics.

# EUROPE

Overview of the selected criteria



# Methodology

## Types of metrics:

- **Absolute figures** - are used when size matters in the decision-making process.
- **Rankings and indices** - rankings are used when the metrics behind the rankings are indices themselves, for instance the "Competitive Economy Index" of the World Economic Forum. In this case we took the actual index.
- **Percentages** - percentages are used when this is deemed the most relevant figure.

## Choice of scale values in metrics chart:

- The choice of values on the left and right determine the relative position of the individual countries. The values are chosen to make a meaningful distinction between the selected countries in this overview.
- The graphic representation shows relative data. This represents how each individual country scores vis-à-vis the other selected countries. For instance, when Germany has a relatively average score on the "Quality of Care" indicator, this does not mean that "Quality of Care" in Germany is average, it just demonstrates that it has an average score compared to the other countries in this study.
- The "highest scores" is an aggregation of the selected countries.

All metrics originate from public and existing analyses and surveys, conducted by international organisations such as WHO, OECD, Eurostat, the European Commission, by industry associations, or by consulting firms such as KMPG, Ernst & Young, PWC, Deloitte and others.

**All sources of information to develop the country indices are available for further consultation and their references can be found at the back of this document.**

# Methodology

## Indicators have only indicative value

All the indicators are almost by definition a simplification of a complex underlying reality. The figures offer a snap-shot based on the most recent published data available for each selected  criteria. Between the international analysis and the publication of this report, many decisions have been made by governments that may potentially change the landscape too.

The example of taxation : as with many indicators, the appreciation between high and low scores may be determined by the company's specific strategic needs and environment.  in tax planning at a corporate level, low tax levels are not necessarily always the best context for a company's specific situation. A high tax rate might be useful for high, risky R&D investments spread over a long period, whereas future profits are preferably taxed at a low rate (so low risk R&D investment that may give a short-term return might be better made in low tax countries). These rates then need to be combined with R&D tax credits and patent & IP box regimes. Comparing the patent box regimes in Europe is quite a challenge and it can't be summarised in a single tax rate. The nature of the company also matters: a US multinational company has a different tax context than a local medium-sized company.

The example of the EFPIA Patient W.A.I.T. Indicator : the indicator gives the average period in every geography between EMA approval and actual market access in the respective country. The reality behind this figure may vary significantly depending on each specific medicined introduction.

So, as for any indicator, this high level picture gives exactly that : a general picture. Recent changes and complexities will have to be taken into account for actual corporate investment decisions. That being said, it is clear from this report, that the overall environment for life sciences may differ strongly from country to country.

This selection of indicators intends to give an overall picture on a broad landscape of criteria and does not take into account particularities and additional complexities necessary for actual corporate investment decisions. The report shows that the overall environment for life sciences differs significantly from country to country.

# Methodology

## Explanation of some indicators

*All indicators and sources are further explained in the annex*

**Political stability index.** The index is a composite measure as it is based on several other indexes from multiple sources including the Economist Intelligence Unit, the World Economic Forum, and the Political Risk Services, among others. The underlying indices reflect the likelihood of a disorderly transfer of government power, armed conflict, violent demonstrations, social unrest, international tensions, terrorism, as well as ethnic, religious or regional conflicts.

**Performance of innovation systems** is measured by average performance on 27 indicators of the European Innovation Scoreboard (EIS). The new EIS measurement framework distinguishes between four main types of indicators and ten innovation dimensions, capturing in total 27 different indicators. Framework conditions capture the main drivers of innovation performance external to the firm and cover three innovation dimensions: Human resources, Attractive research systems, as well as Innovation-friendly environment.

**Availability of Qualified Staff.** The INSEAD Global Talent Competitiveness Index measures how countries' policies and practices enable them to attract, develop and retain human capital that contributes to productivity. In the context of the GTCI, talent competitiveness refers to the set of policies and practices that enable a country to develop, attract, and optimise the human capital that contributes to productivity and prosperity.

**Quality of Life Science Academia.** The Leiden Ranking takes a multidimensional perspective on the ranking of universities around the world, and by research discipline: universities can be ranked by their performance for a combination of parameters. For this analysis we selected the number of publications in top 5% journals for biomedical and life sciences by the top-20 universities in each country.

# Analysis within Europe

# Analysis within Europe

For national policy-makers and investors to make their analysis, we graphically represent the highest scoring countries and the median for each indicator as a standard on the national table.

- The **highest scoring** country list allows each country to view its position on each indicator relative to the highest score within the group of fourteen countries and within a given data set. The names of the country's with the highest score are indicated on the right of the graph (slide 22)
- The **median** allows to view a country's position vis-à-vis the median score (slide 23).

Both Germany and Switzerland have the highest score on 7 indicators.

Germany leads primarily because of size-related indicators: life science publications, life science staff, life science R&D investments, size of the healthcare budget, pharmaceutical spending per capita, size of the medtech market and availability of pharmaceuticals after EMA approval.

Switzerland leads in more qualitative criteria: political stability, most innovative environment and most competitive economy, availability of qualified staff, life science trade balance and corporate taxes.

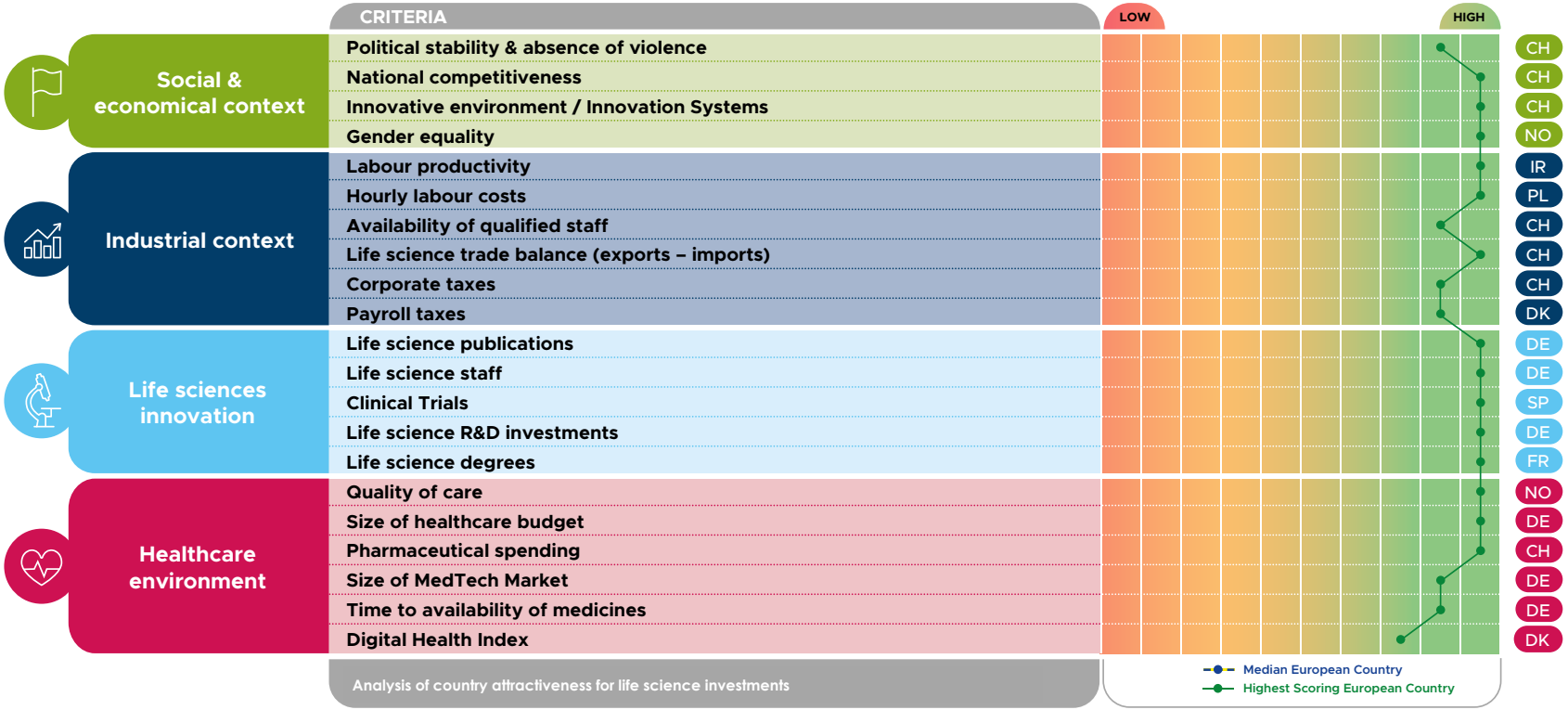
Ireland scores best for manufacturing, with highest labour productivity, low taxes and per capita pharmaceutical spending. France has relatively high scores on all life science innovation indicators.

The metrics and the way the analysis was developed makes it clear that it is almost impossible to have the highest score on every single indicator. There is a clear discrepancy between low wages and high innovation, with the most innovative countries also being the most expensive. Quality and cost tend to keep each other in balance.

Countries can work on a distinct investment profile within the life science ecosystem.

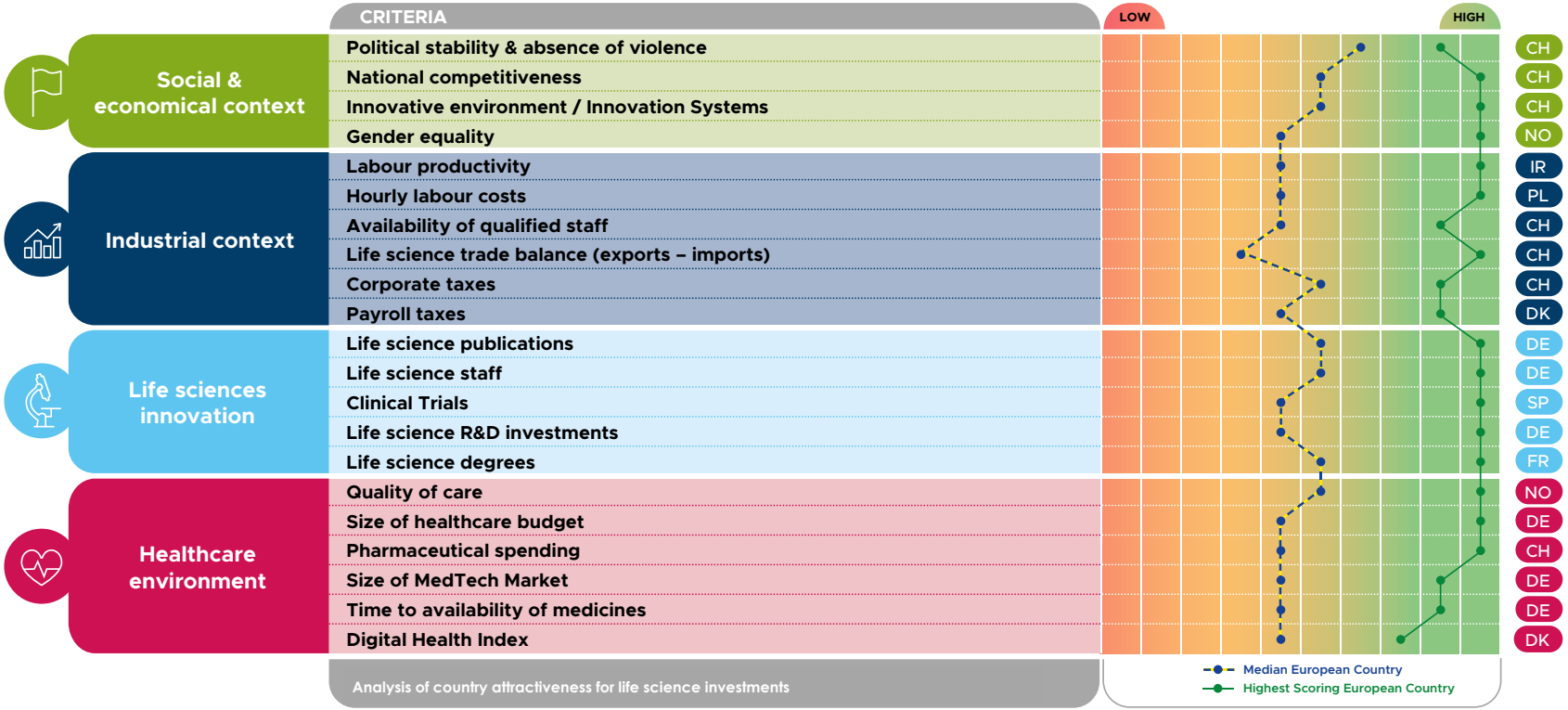
# EUROPE – the highest scores

Overview of the selected criteria



# EUROPE – the median score

Overview of the selected criteria



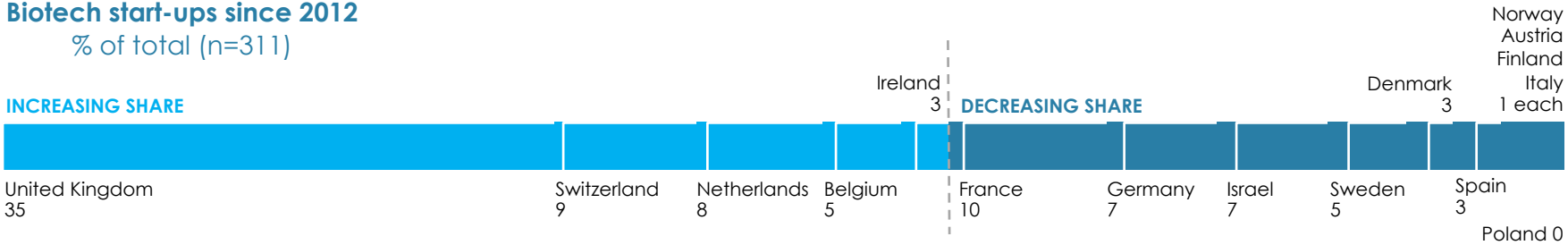
# Analysis within Europe

Outside of the structural indicators in our analysis, it is also good to check where actual investments in life sciences took place in recent years.

Within Europe, two non-EU countries have a strong life science investment position: the United Kingdom and Switzerland. In 2019 and 2020, European investors invested significantly more in the United Kingdom. Both countries together have 36 investments, compared to 54 in the European Union (*CipherBio, 2020*)

The United Kingdom has not only played a disproportionate part in multiple technologies and disease areas but also been home to 35 percent of all biotech start-ups in Europe since 2012. Belgium, the Netherlands, and Switzerland are also growing, although from a lower base. In contrast, biotech start-up activity in France, Germany, and Sweden has decelerated over the past few years (*McKinsey: Biotech in Europe: A strong foundation for growth and innovation, 2019*).

| Investments Jan 2019-Sept 2020 | |
|---|---|
| COUNTRY | N° |
| UK | 27 |
| France | 18 |
| Germany | 15 |
| Switzerland | 9 |
| Belgium | 7 |
| Ireland | 5 |
| Netherlands | 4 |
| Sweden | 2 |
| Italy | 2 |
| Austria | 1 |



# Analysis within Europe

The key findings for Europe are:

- Overall, Europe is doing well especially when it comes to political, social and economic criteria, the industrial context and quality of care.
- However, there is a clear need for efforts to further improve the life science environment, for example when it comes to facilitate life science publications, degrees and the availability of life science staff.
- Europe and the European Union are not taking advantage of their size: the healthcare market and life science research funding are still very fragmented
- There is a lack of strategic coordination and a long-term vision in European health research funding.
- It is important to compare European performance to its competitors at the global level, to truly get a sense of EU performance.

# Europe vs the United States and China

# Europe vs the United States and China

**In the last few years three events shaped the international trade and investment environment.**

- The **COVID-19 crisis** has at its start brought to light a strong international dependence on production for some medical equipment, test material and the active pharmaceutical ingredients (API) of some generic medicines. This demonstrates the need in Europe to build more sustainable production capacities and rethink strategic value chains.
- The **economic tensions between the United States and China** have lowered the scientific collaboration and life science trade between both countries, offering an opportunity for Europe. Both China and the United States have taken measures to control and restrict investments in each other's countries. It also pushed the Chinese government to invest even more in national research and manufacturing. With its "Made in China 2025" plan, the Chinese government wants to have at least 70% of its medtech products to be produced locally, from consumables over in vitro diagnostics to gene sequencing. The plan also sets biotechnology as a Strategic Emerging Industry and its "Thousand Talents" program annually recruits more than 10,000 Chinese citizens working in the US to return to China. All this next to significant other tax measures and incentives. At the same time, China shifts its biotech investment attention to Europe, as a result of the investment restrictions in the US.
- The **Brexit** which forces the United Kingdom, already the leading life science innovator in Europe to take measures for investment attractiveness to further strengthen its position, but now not within but vis-à-vis the European Union. Within Europe, the UK still attracted the biggest number of life science investments in 2019 and 2020, with a total of 43 deals, of which 18 included investors from across the Atlantic and 25 from Europe. Next in line is France, with 11 companies attracting US investors and 18 European, followed by Germany, where 10 US investors and 15 European investors closed deals (CipherBio, Sept 2020).

These are three current drivers that illustrate how the European Union could be further lagging behind the other regions.

# Europe vs the United States and China

In the comparison with the United States and China, Europe is characterised by more limited public funding for basic research, insufficient capacity for turning knowledge into health products and solutions, the lack of a harmonised and collaborative vision between European countries, insufficient incentives for venture capital, higher regulatory complexities are hampering Europe's international position. European Life Sciences are at a crossroads and at a time when innovation in biosciences and digital technologies are accelerating, the European Union is at risk of losing its international standing.

One important factor in this respect is the amount of public research investments made by the United States in health research, which represents 28.4 billion euro in 2019, as compared to 6.9 billion euro annually in the European Union. Because of Brexit, the EU lost 2.5 bln euro public research in health from the UK and Switzerland invests around 400 milion euro in life science research.

The number of clinical trials is also very low in some European countries, creating important discrepancies from one European country to another. Such differences are also important with regards to R&D investments, the size of the MedTech market and overall pharmaceutical spending. This shows how, in some aspects, Europe lacks a harmonised approach to medical innovation.

The COVID crisis also highlighted the relevance of investing in research & innovation to retain authorship of breakthroughs. This does not mean that everything should be manufactured in Europe. Global supply chains are essential for all of us, but we need to strengthen investment in the EU while keeping our borders open and working in a global open trade framework.

The key question today is whether the EU wants to regain its historical leadership or become a follower in life sciences in the future. In our analysis it is clear that Europe has some strengths versus the other continents. On the other hand, there is also a lack of strategic coordination and a long-term vision in European health research funding.

# Europe vs the United States and China

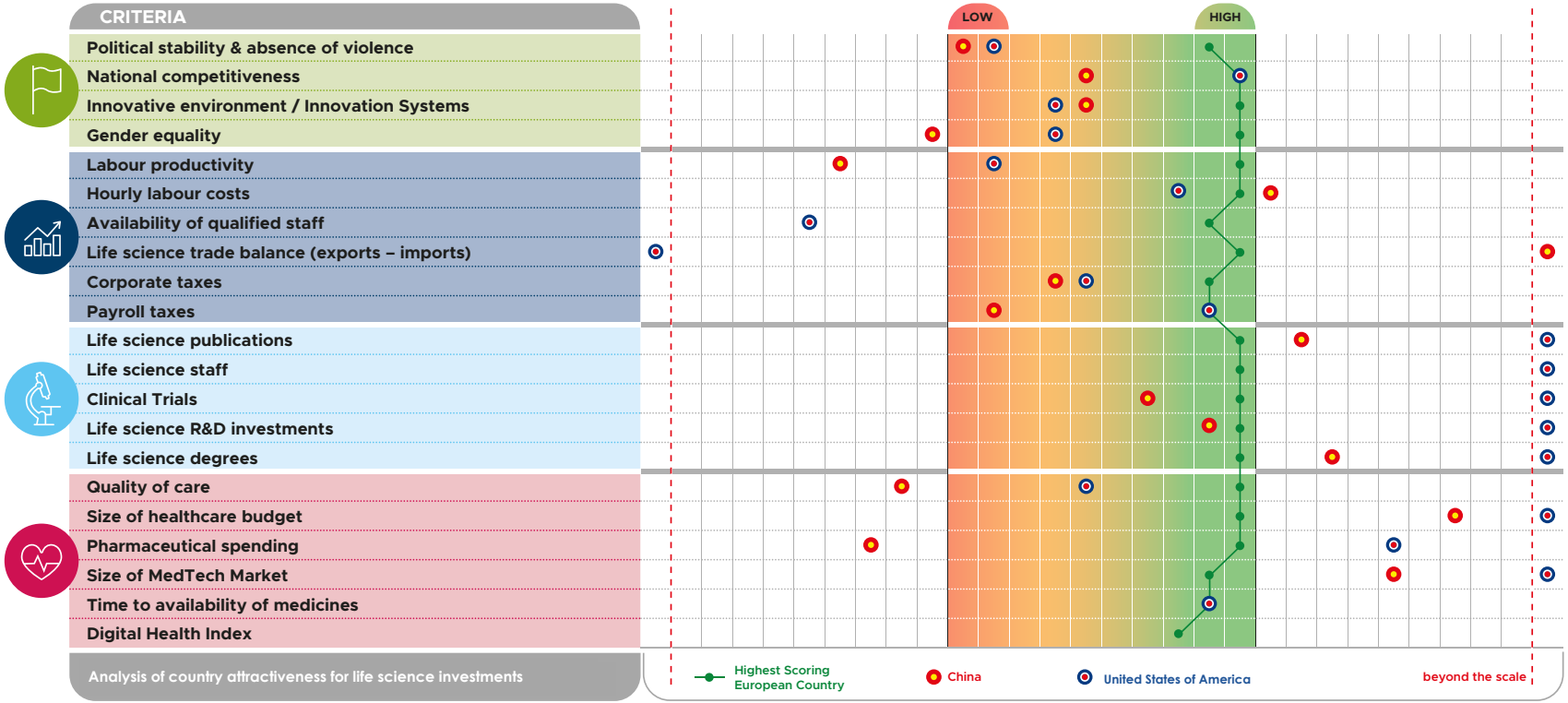
The graph on the next page shows that The United States and China are beyond the scale of Europe, and even to the extent that their actual score would fall outside the page of this document ("beyond the scale"). From a life science innovation perspective, the United States outperform all other regions in the world. China takes at the moment all the benefits of its size and low cost manufacturing, resulting in a very positive trade balance.

**The United States** scores very well on all issues related to life science innovation. They are the life science leader of the world, combining massive life sciences investments with attracting global talent and strong incentives to turn basic research into commercial applications.
The United States also has huge healthcare budgets and good healthcare outcomes, as well as fast access. The United States has lower scores on labour productivity and international trade balance.

**China** shows a more diffuse picture, with strengths primarily resulting from the country's size. The country has taken a strong position on its future global leadership in life science. In the coming decade, China is expected to outperform the rest of the world in life science degrees and in manufacturing capacity.

# INTERNATIONAL COMPARISON

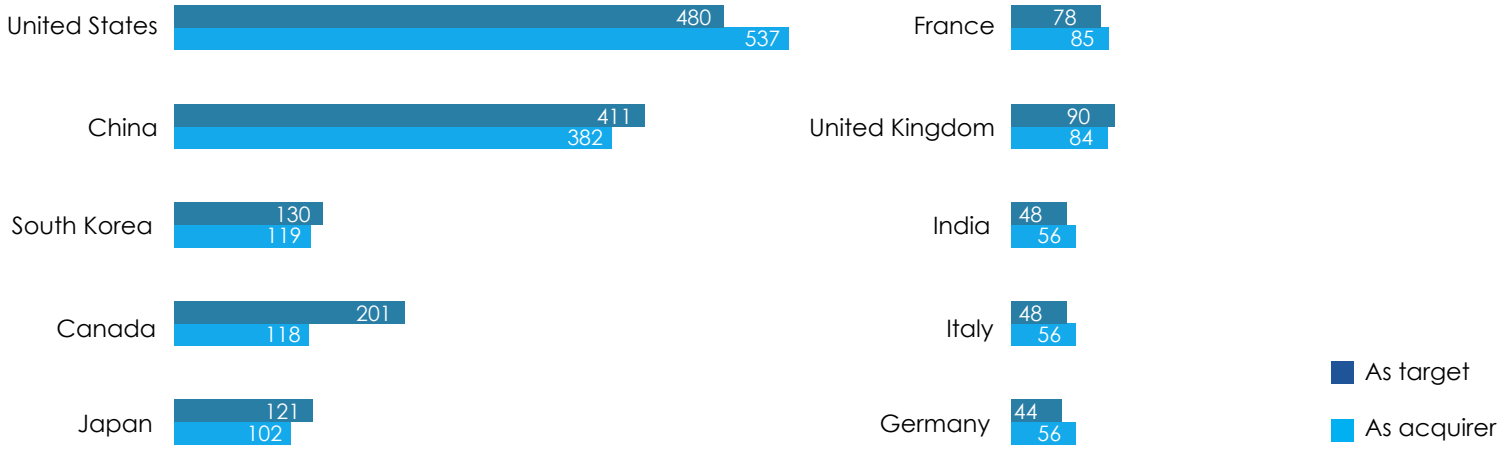
EUROPE - CHINA - THE UNITED STATES



# Europe vs the United States and China

- The number of **life science mergers and acquisitions** are a good measure of life science activity: the United States and China are the leading players globally. France, the UK, Germany and Italy still figure in the top-10 countries, but they do not play a very significant role (*Deloitte, Global Life Science Outlook, 2020*).
- In the past few years biotech advanced strongly in Europe, but the United States and especially China did even better.

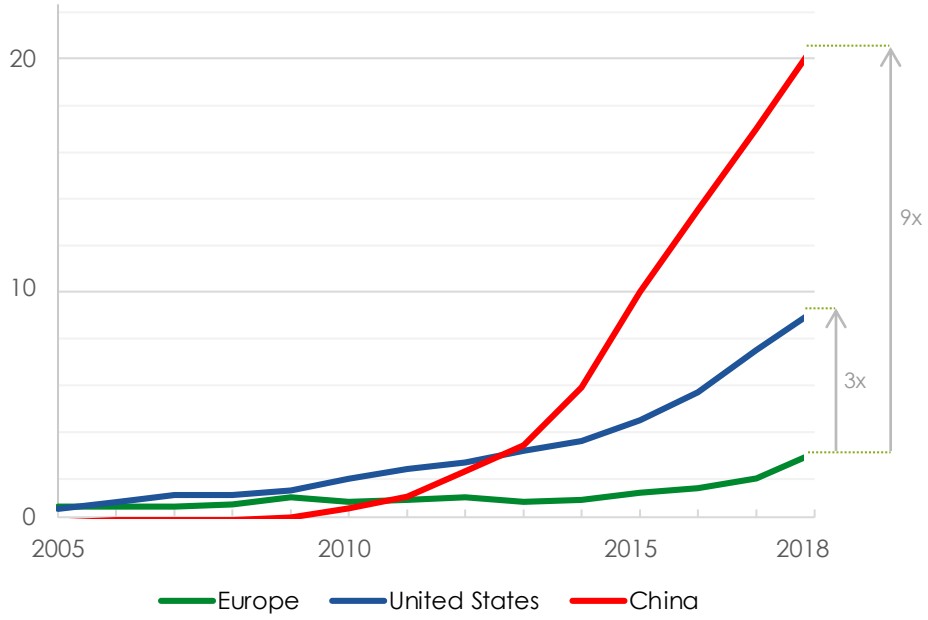
**Global life sciences mergers and acquisitions among 10 leading countries**
(Q1-Q3, 2019)



# Europe vs the United States and China

- Despite the obvious growth of the biotechnology industry in Europe, this has not resulted in a strong increase in the number of life science patents. The growth rate of patent applications in China and the United States are much more impressive, with growth rates that are 9-fold and 3-fold (*McKinsey: Biotech in Europe: A strong foundation for growth and innovation, 2019*)
- Biotech start-ups in the United States receive almost 5 times as much funding as their European counterparts, and almost 30% of all European biotech start-ups went public on the United States stock exchanges. (*McKinsey: Biotech in Europe: A strong foundation for growth and innovation, 2019*)

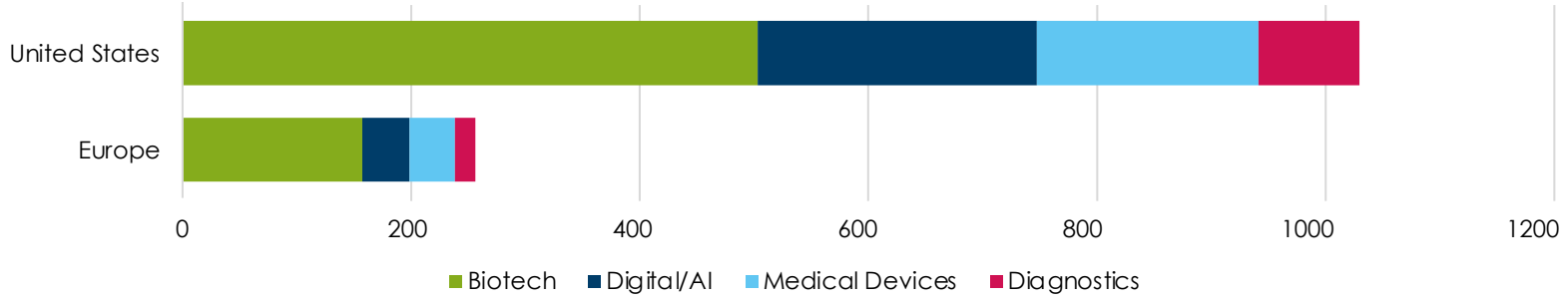
**Patent registrations for new medicines, by region**
(in thousands)



# Europe vs the United States and China

- With regard to life science venture capital, the United States is still strongly in the lead, with investments of more than USD 30 billion in 2019 vs USD 11 billion in Europe (*Statista, 2021, European Court of Auditors Special Report on Venture Capital*)
- In the period January to September 2020, the United States strongly outperformed Europe with regard to the number of life science investments
- It is even more worrying that not only for US investors but also for their European counterparts, the favorite location for both is undoubtedly the US, with 634 out of 802 deals involving US companies (*CipherBio, 2020*)

**Total number of investments by US and European Life Science Actors across sectors**
(Jan 2019-Sept 2020)



# Europe vs the United States and China

The table on the right gives an overview of where US-based investors put their life science money across the world. Within Europe, the United Kingdom scores well, as does Switzerland.

Only three European Union Member States figure in the top-10 of the list (*CipherBio, 2020*).

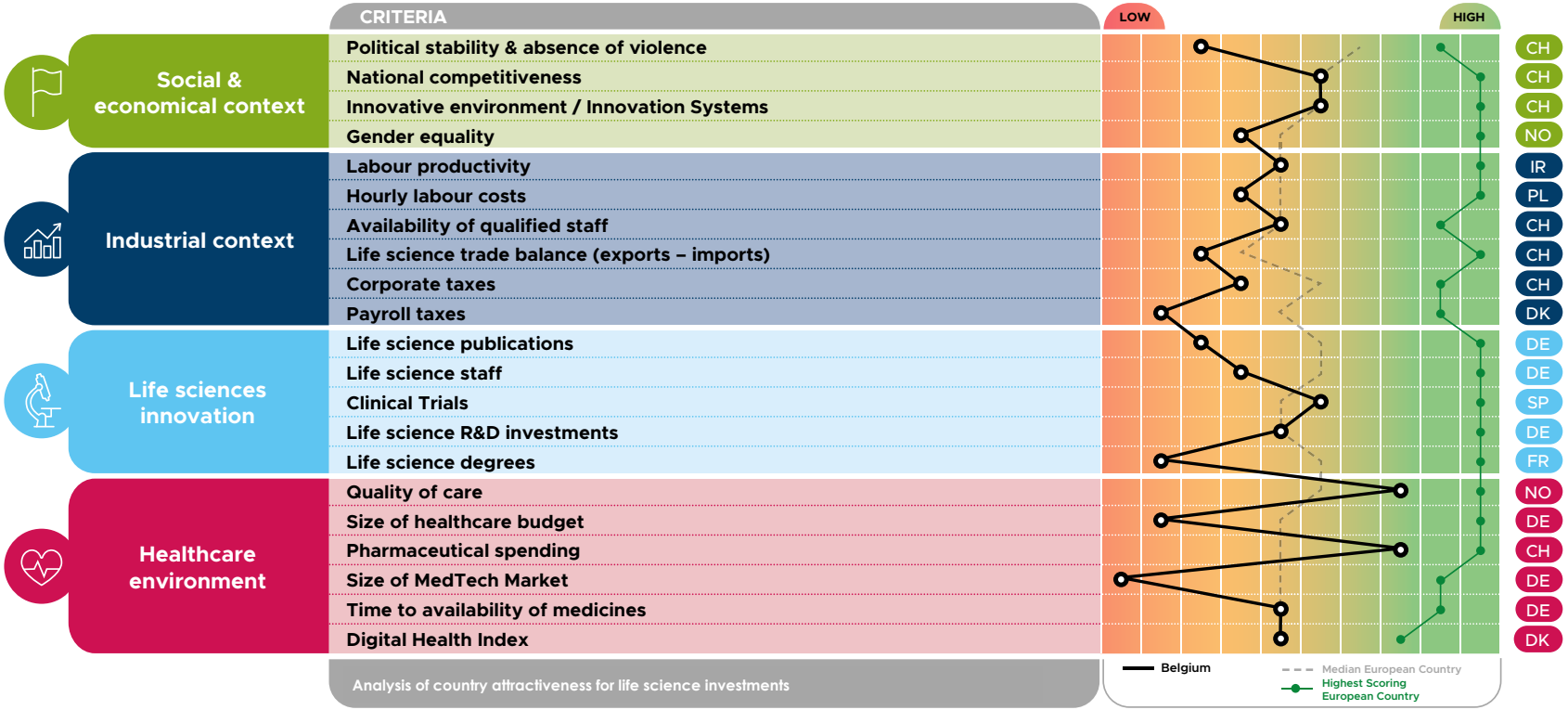
It is clear from all of the above that European Member States need to invest more in life science, despite the increase of the last few years. At the European Union level, efforts will need to be made to have a better common policy approach.

| Top 10 Biotech Investor Locations | |
|---|---|
| COUNTRY | DEALS |
| United Stated | 358 |
| United Kingdom | 25 |
| China | 24 |
| Japan | 21 |
| Korea (South) | 16 |
| France | 16 |
| Belgium | 16 |
| Germany | 15 |
| Switzerland | 14 |
| Hong Kong | 14 |

# Country Dashboards

# BELGIUM

Overview of the selected criteria



# BELGIUM

Overview of Structural advantages per country, with addition of specific tax measure and recent policy measures to encourage investments in life science and healthcare

## STRUCTURAL

- fastest clinical approval in EU - 15 days
- #1 in Europe for number of trials per capita
- 18% of EU biotech market cap was generated in Belgium in 2016
- Formal quarterly concertation between the government and the pharmaceutical industry to improve the investment context
- The creation of an "observatory" to benchmark how Belgian scores vis-à-vis other countries in terms of investment attractiveness.

## TAX MEASURES

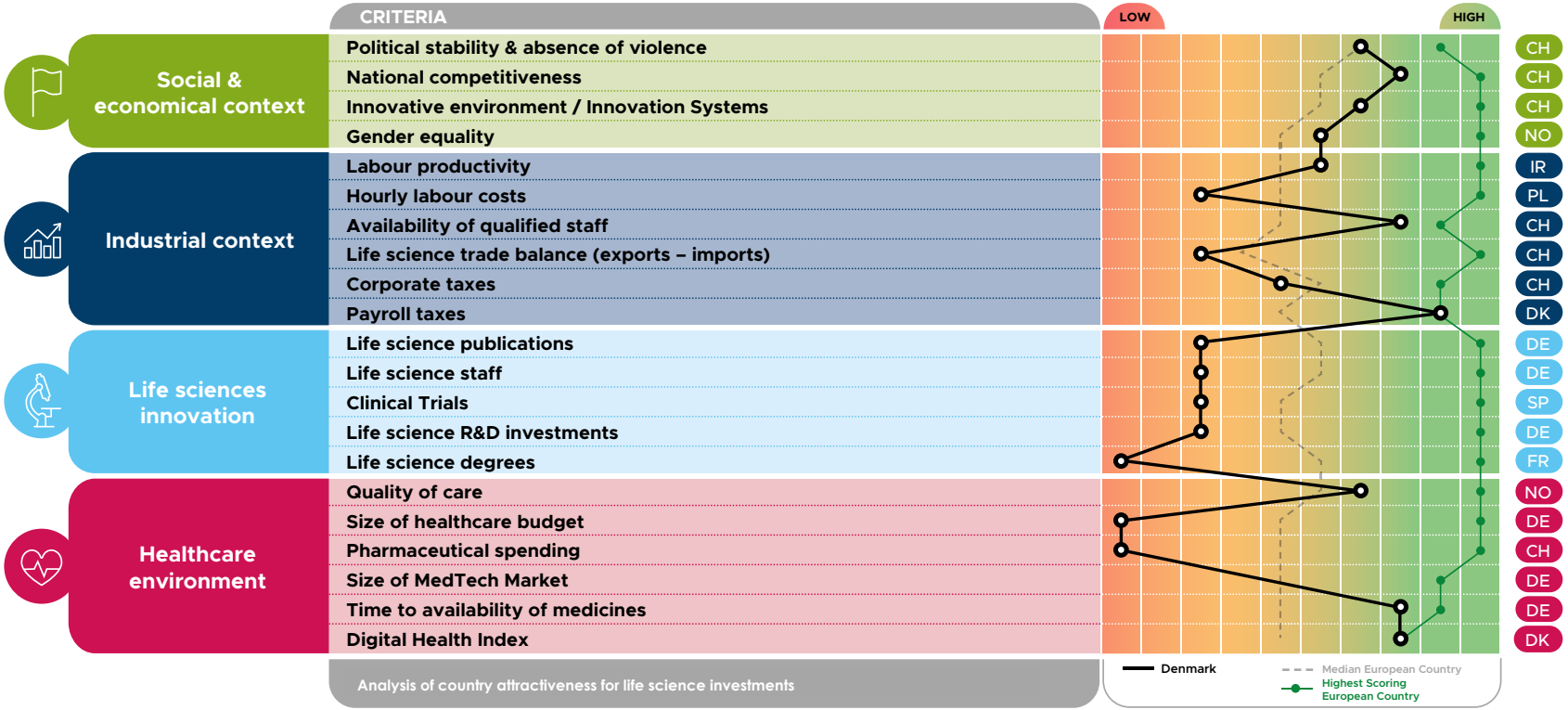
- Investment deduction for R&D – 13.5% of acquisition value/qualifying asset or 20.5% of the depreciated amount;
- Exemption of payment of 80% – of the personal income withholding tax of researchers in certain scientific fields;
- Innovation income deduction – up to 85% of a firm's net earnings from innovation is tax exempt

## RECENT POLICY MEASURES

- Reduction of corporate taxes from the current 33.9% to 29% in 2018 and 20% in 2020.

# DENMARK

Overview of the selected criteria



# DENMARK

Overview of Structural advantages per country, with addition of specific tax measure and recent policy measures to encourage investments in life science and healthcare

## STRUCTURAL

- Home of Medicon Valley, one of Europe's leading life science clusters, based in the South of Sweden and Denmark
- Denmark was ranked the best country in Europe for biotech research and development in 2019 (Nordic Life Science News).
- Denmark was in 2019 one of the most R&D-intensive countries in the world, and the best in Europe regarding researcher concentration (Bloomberg Innovation Index).

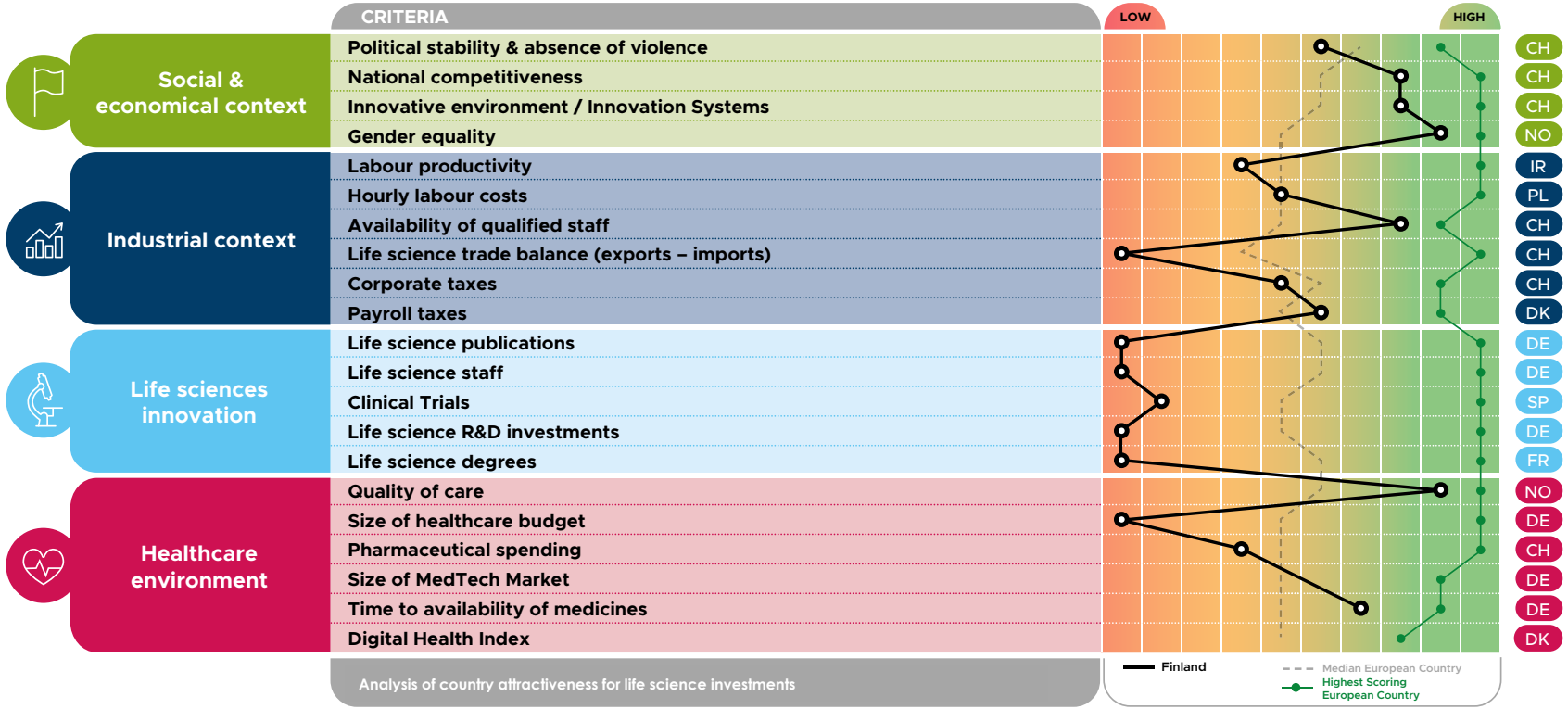
## TAX MEASURES

- the system offers a corporate tax rate of 22%, an extensive network of tax treaties, and tax rules for expatriates.
- Other tax incentives include full deduction of patents and expertise in the year of acquisition and deduction of R&D expenses when such expenses are incurred.
- a special taxation scheme is available for high salaried expats. The scheme enables the expat to pay a reduced income tax of 27 % for up to 7 years.
- businesses with R&D costs resulting in losses are currently entitled to a cash reimbursement of 22% of the losses relating to R&D costs. The cash credit amount is maximised to the tax value of DKK 25 million.

## RECENT POLICY MEASURES

# FINLAND

Overview of the selected criteria



# FINLAND

Overview of Structural advantages per country, with addition of specific tax measure and recent policy measures to encourage investments in life science and healthcare

## STRUCTURAL

- As one of the first countries to compile social and welfare data in digital registries, and with a 100% population penetration in electronic health records, Finland's digital health data is globally unique when it comes to scope and depth.
- the Finnish data system is unique in terms of breadth and depth. It is fully digitized and assessible reflecting recent legislation – Finnish Biobank Act (2012) and Act on the Secondary Use of Health and Social Data (2019). It is further linked to all electronic health records, which include all clinical information, social care, prescription records, patient reported outcomes, and biobank and genomic data.
- Foreign-owned companies in Finland can benefit from several different types of aid, especially for certain regions of Finland: the 15 regional offices of Centers for Economic Development, Transport and the Environment (ELY Centers), provide advisory, training and expert services and funding for investment and development projects.
- Next to its visionary use of health data, the country is also trying to take a lead position in the use of Artificial Intelligence and Augmented/Virtual Reality in health and life sciences.

## TAX MEASURES

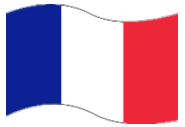
- Corporate tax at 20%

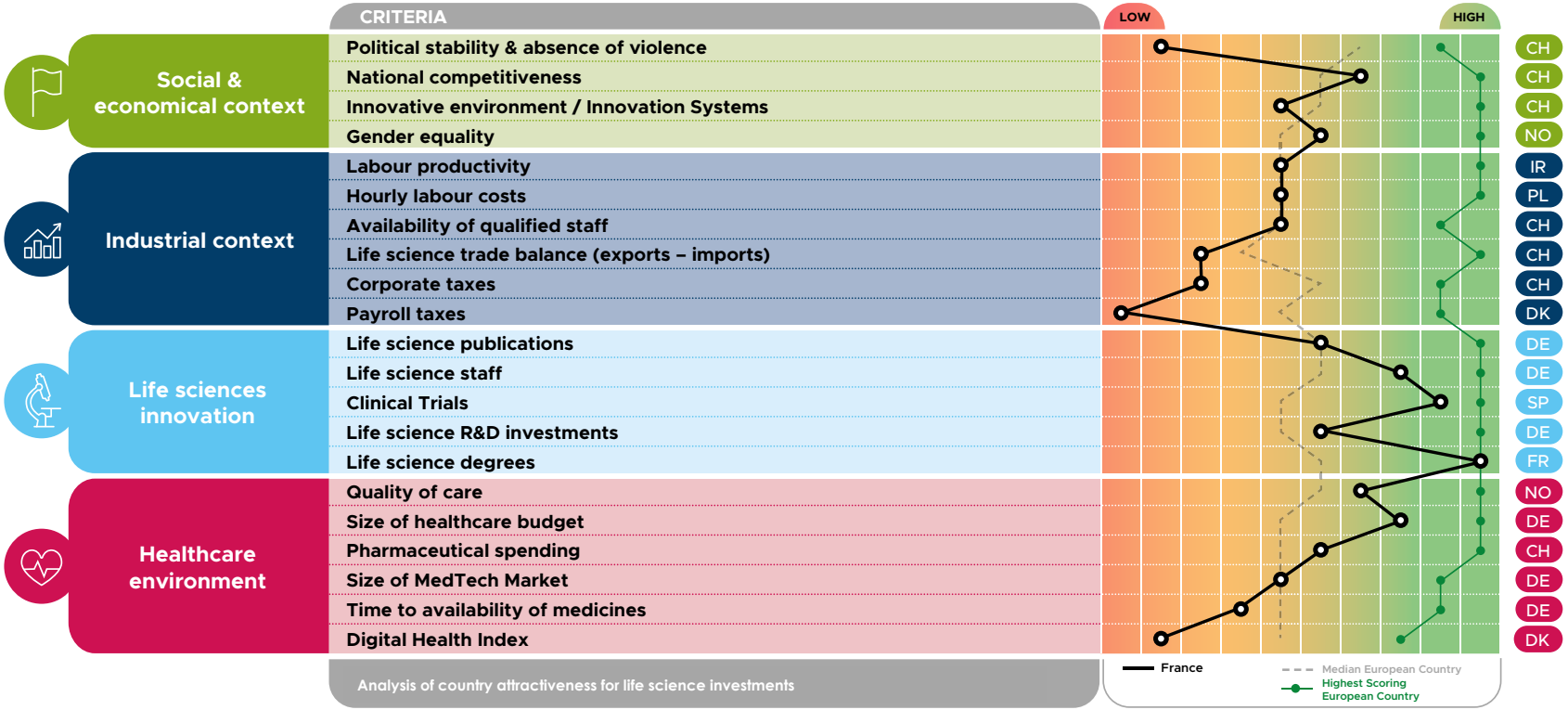
## RECENT POLICY MEASURES

- The current Finnish Minister of Finance announced that "companies will be encouraged to make intangible investments through the introduction of a fixed-term additional tax deduction for R&D related research cooperation in 2021-2024. The companies would be granted an additional tax deduction of 50 per cent for expenditure on research and innovation projects carried out in cooperation with higher education institutions and research institutes".

# FRANCE

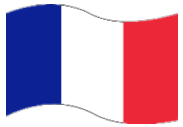
Overview of the selected criteria





# FRANCE

Overview of Structural advantages per country, with addition of specific tax measure and recent policy measures to encourage investments in life science and healthcare



## STRUCTURAL

- In 2019, France was the leading host country for foreign investment in Europe, attracting 19% of all job-creating foreign investments in Europe.(E&Y, 2020)
- With seven healthcare sector innovation clusters, France's ecosystem fosters synergies and partnerships that lead to the emergence of innovations, products and services offering high-quality personalized healthcare.
- With more than €1.6 billion of funds raised (all forms of venture capital), including €600 million through 14 stock market flotations in 2015, Euronext (Paris) is the leading stock market in Europe for biotechs and in the world for medtechs.
- France is ranked fourth in the world and second in Europe for medical devices and technologies. There are more than 1,340 companies in the French medical device sector, generating revenues of €28 billion.
- France is the fifth largest market in the world for human medicines, and the second largest in Europe.
- France has the third largest number of products in development, with a heavy focus on early stage products,
- Pharmaceutical specialties whose efficacy and safe use can be assumed, but which have not yet obtained market approval or been tested in clinical trials, may nevertheless be granted temporary authorization for use (Autorisation temporaire d'utilisation - ATU) in exceptional circumstances as a last resort.

## TAX MEASURES

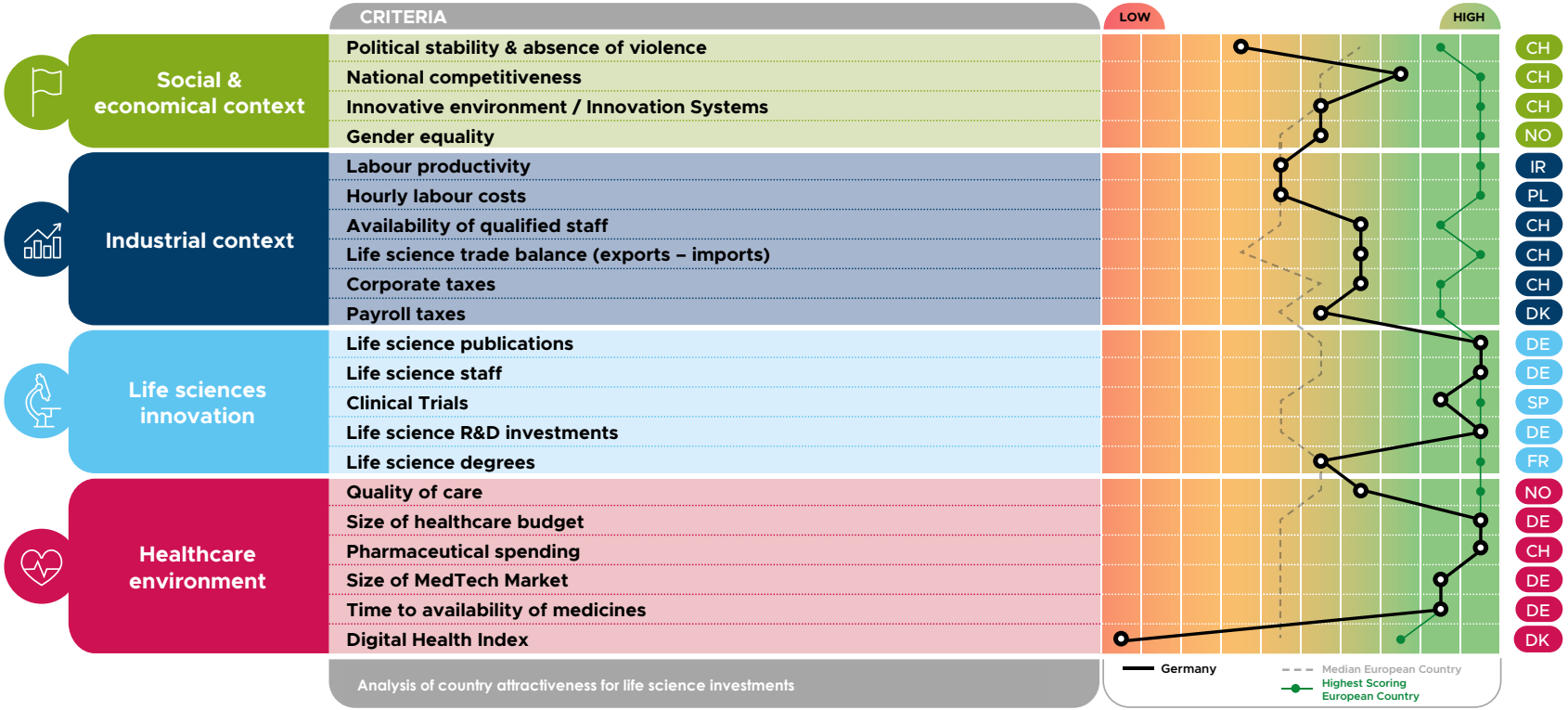
- Tax on income from IP at 15%
- R&D tax credit of 30% is available for the portion of R&D expenses below EUR 100 million, reduced to 5% for the portion exceeding that amount. France's research tax credit is specifically designed to take into account 200% of the cost of subcontracting to public-sector organizations (INSERM, hospitals, etc.). Moreover, a rate of 400% is applied for two years to the cost of employing a recent PhD graduate. R&D expenses are eligible until marketing authorization is received for medicines and CE marking is obtained for medical devices.
- Basic CIT rate step-by-step decrease, from 33.33% to 25% (2022)
- 50% decrease of the late penalties applied in case tax reassessment (from yearly 4.8% to 2.4%)
- Additional deductible tax depreciation (40% above the initial 100%) for investments made in industrial/R&D areas before April 2017

## RECENT POLICY MEASURES

- R&D tax credit maintained as it has been since 2008 (new government has confirmed its strong willingness to maintain it)
- New labor law that should provide more flexibility to the French job market
- French government has decided to dedicate a €10 billion fund to innovation.
- France is planning to invest massively through the Recovery of €100 billion euro: 7 billion euro for digital, 19 billion euro for the health plan (especially hospital modernisation and digital health space), and €20 billion euro for the Plan Investissement Avenir. (Future Investment Plan).
- Bioproduction and digital health are priority areas to be supported over the next five years

# GERMANY

Overview of the selected criteria



# GERMANY

Overview of Structural advantages per country, with addition of specific tax measure and recent policy measures to encourage investments in life science and healthcare

## STRUCTURAL

- Representing Europe's most populous country, Germany's healthcare market is No. 1 in Europe by market volume, number of patients, medical technology manufacturers, and healthcare providers.
- A highly attractive R&D location, the country ranks first and second in clinical trial terms in Europe and the world respectively. Having established itself as the "world's pharmacy" as part of a tradition of medical innovation, Germany is also the world's leading medical biopharmaceuticals producer – second only to the USA.
- In 2019, healthcare spending in Germany totaled EUR 407 billion
- Largest number of biotech and pharmaceutical companies
- The world's leading exporter of pharmaceuticals
- 30 BioRegions - with facilities dedicated to biotech research
- the pharmaceutical industry consists of more than 640 companies, employing a workforce of 120,000, which is the second highest in the world (2019 figures)
- German Federal Government's "High-Tech Strategy" programs also include healthcare as a major focal point. A number of federal programs, including the Central Innovation Programme (Zentrales Innovationsprogramm Mittelstand – ZIM), promote cooperation between research institutions and the private sector.
- Highest percentage of global HQs with manufacturing in-country.
- The German Trade And Invest (GTAI) agency offers a one-stop shop for foreign investments in Germany, from the initial concept to its finalisation

## TAX MEASURES

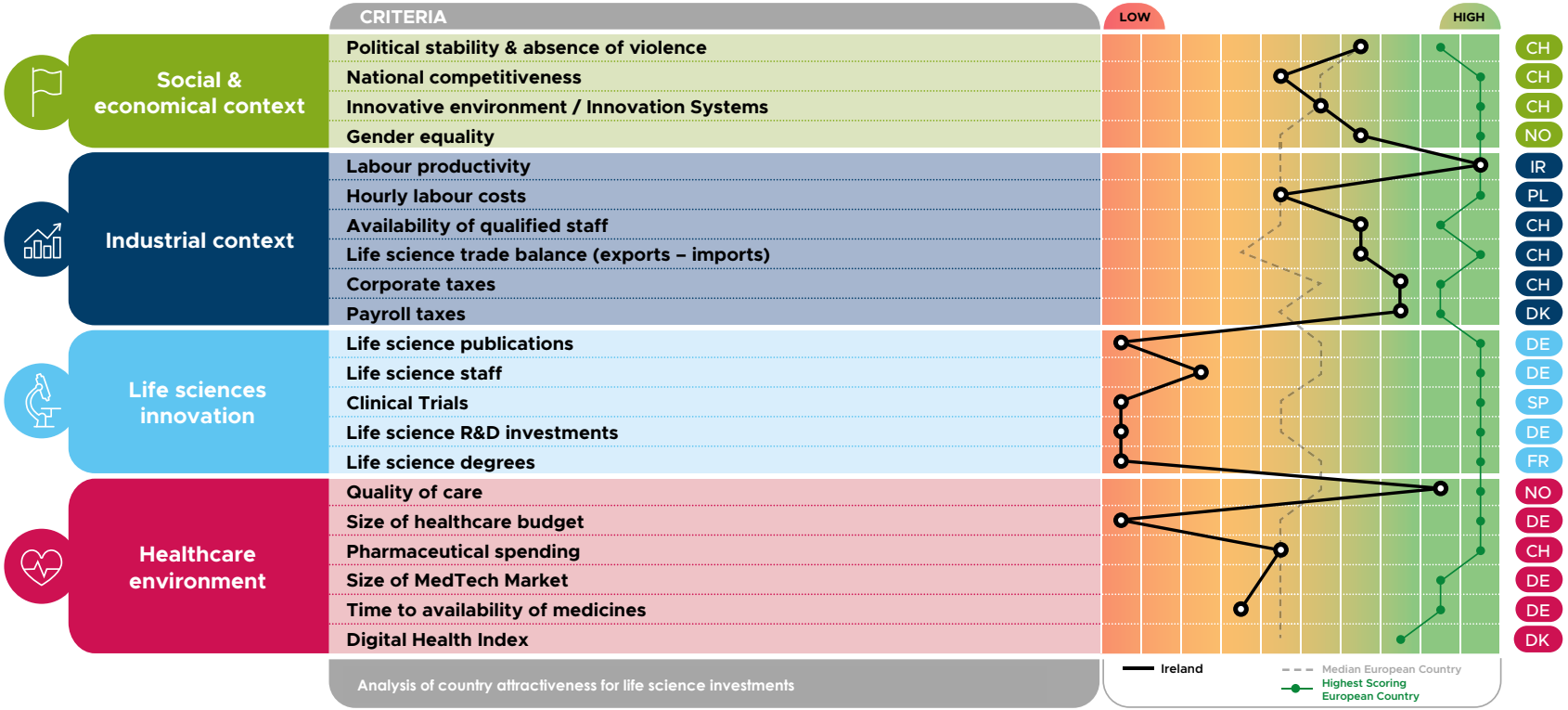
- The average overall tax burden for corporations is just below 30 percent. Significantly lower rates are available in certain German municipalities – up to eight percentage points less – with the overall corporate tax burden as low as 22.3 percent in some cases.
- Germany does not offer R&D tax incentives. State grants in cash for eligible R&D projects are applicable instead

## RECENT POLICY MEASURES

- Creation of life science industry expert committee in the German Trade And Invest department to discuss with stakeholders how to establish a welcoming investment environment

# IRELAND

Overview of the selected criteria



# IRELAND

Overview of Structural advantages per country, with addition of specific tax measure and recent policy measures to encourage investments in life science and healthcare

## STRUCTURAL

- Ireland evolved into a strong manufacturing hub for biopharmaceuticals and medtech. Collaborative clusters in Pharmaceutical, Biotechnology, Medical Devices and Diagnostics have been a key element behind the remarkable growth of a sector that directly employs 25,000 people.
- The biopharmaceutical industry has made a capital investment of approximately $8 billion in new facilities in Ireland, most of which has come in the last 10 years. This represents close to the biggest wave of investment in new BioTech facilities anywhere in the world.
- An attractive hub for overseas groups. There is rather little in terms of SME Biotech activity.
- Strong tailor-made approach for investors through the Industrial Development Authority.

## TAX MEASURES

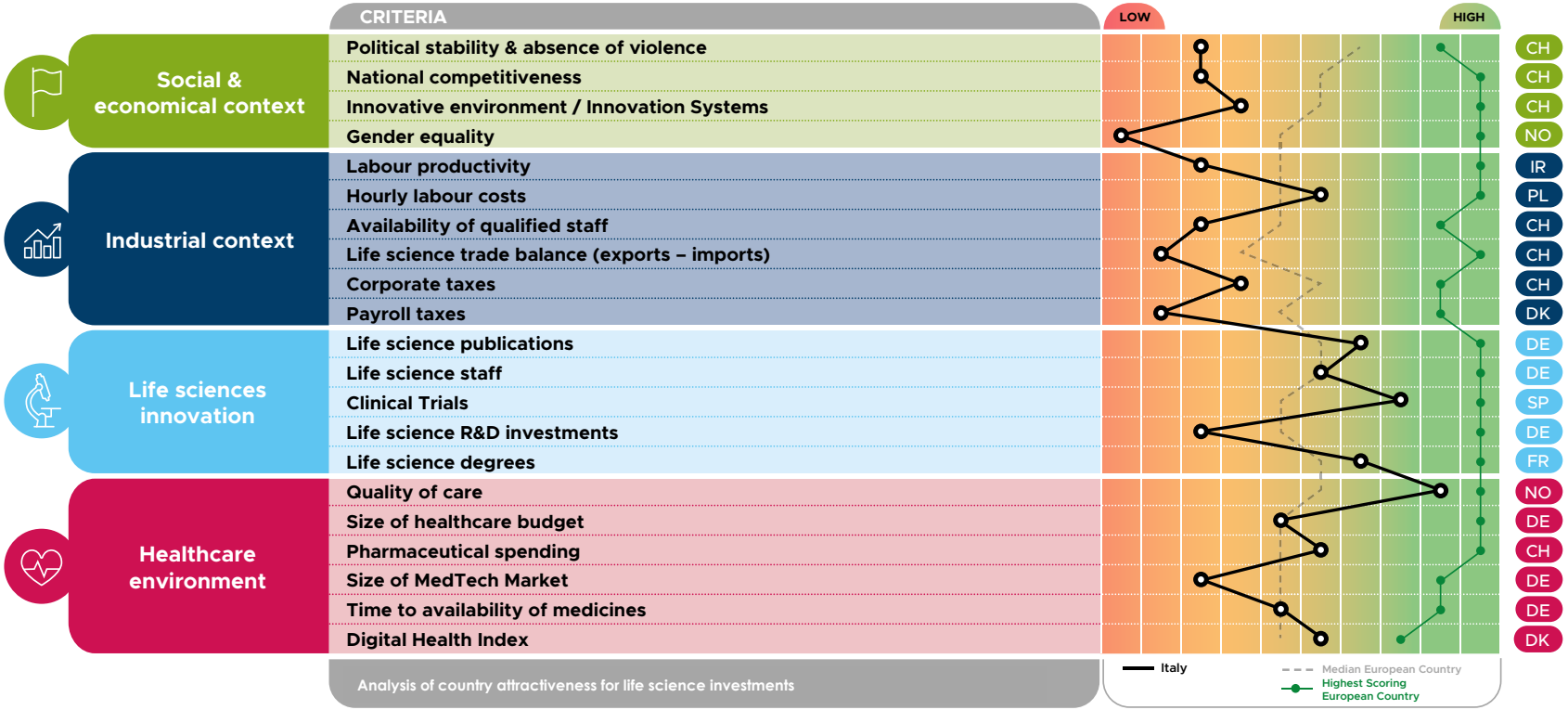
- Tax credit of 25% on capital and revenue expenditure on qualifying R&D expenditure. It is possible to claim excess R&D credits as a cash refund
- Effective zero tax rate for foreign dividends.
- 12.5% corporate tax rate

## RECENT POLICY MEASURES

- The government has committed €8 billion to research funding to further bolster Ireland's reputation as a growing hub for research and development.
- The National Institute for Bioprocess Research and Training (NIBRT), created from a €60million investment by the IDA organises staff training for the biotech industry. Senior executives from the sector sit on the NIBRT board in the knowledge that the availability of suitably trained staff is a key determinant of success in Biopharmaceutical manufacturing.
- The Stability and Investment Compact Law reduces labour costs for investors and for jobs for young people.

# ITALY

Overview of the selected criteria



# ITALY

Overview of Structural advantages per country, with addition of specific tax measure and recent policy measures to encourage investments in life science and healthcare

## STRUCTURAL

- The 8th largest economy in the world, the fourth largest in Europe with a GDP of 2.4 trillion dollars1 On a world scale, the Italian pharmaceuticals market ranks seventh for total sales
- In 2019, the value of production increased to 34 Bn €, thanks to the growth of exports (+26%), which accounted for 85% of it in the last three years2 Italy has been a leading player in the EU for years in terms of production value. The growth has been generated by the exports, for which Italy has recorded, in the last ten years, the highest increase among the big European countries (+168% compared to +86% for the EU average).
- Between 2014 and 2019, the pharmaceutical industry increased employment more than all sectors, +10% compared to +5% for the average. There are 66,500 pharmaceutical employees in 2019 (252,000 in downstream and upstream sectors), 90% graduate (43% women - 29% in other sectors - reaching 52% in R&D activities)2 In 2019, pharmaceutical companies invested in research and development 1.6 Bn €, 7% of total investments in Italy 2. Pharmaceutical research is focused on biotechnologies with more than 300 biotech products in development and a European leadership in advanced therapy medicinal products (2 out of 10 advanced therapies authorized in Europe are Italian) 2 In 2019, healthcare spending in Italy totaled 117,3 Bn €, with an increase of 1.3B over 2018.
- In 2020, public healthcare budget grew by 5% (+5,2 Bn €)
- Italy's Recovery Plan aims at investing approximately 20 Bn € of EU resources to strengthen and reform Healthcare
- Starting from 2017, the Government has allocated on a yearly basis, 1B€ to fund innovative drugs.
- The Medical Devices sector in Italy consists of more than 4.300 companies (including + 300 start-ups), employing a workforce of more than 95.000 (46% women).
- The Md industry investment: +930 Bn €, investments in R&D and 115.9 Bn €, in clinical trials
- 2.354 MD manufacturing sites and Mirandola (Emilia Romagna) represents the most important medical devices district in Italia and in Europe. At third ranking in the world after Minneapolis and Los Angeles. It's called the Italian Silicon Valley of Medical Devices.
- MD 11 Bn € turnover, 5.7 Bn € export, 6.9 Bn € manufacturing

## TAX MEASURES

**Incentives to investors:**

- Italy's Industria 4.0 plan
- Tax credit for Research and Development4 Companies that increase their R&D expenditure in the 2017-2020 period benefit from a 50% tax credit on their additional expenses (incremental credit), with an annual ceiling of €20M. The measure applies to basic research, industrial research and experimental development – including personnel expenditure, research agreements with other entities – and IP costs. Moreover, the tax credit can be used to offset a wide range of taxes and contributions, even if companies report losses.

**Patent Box**

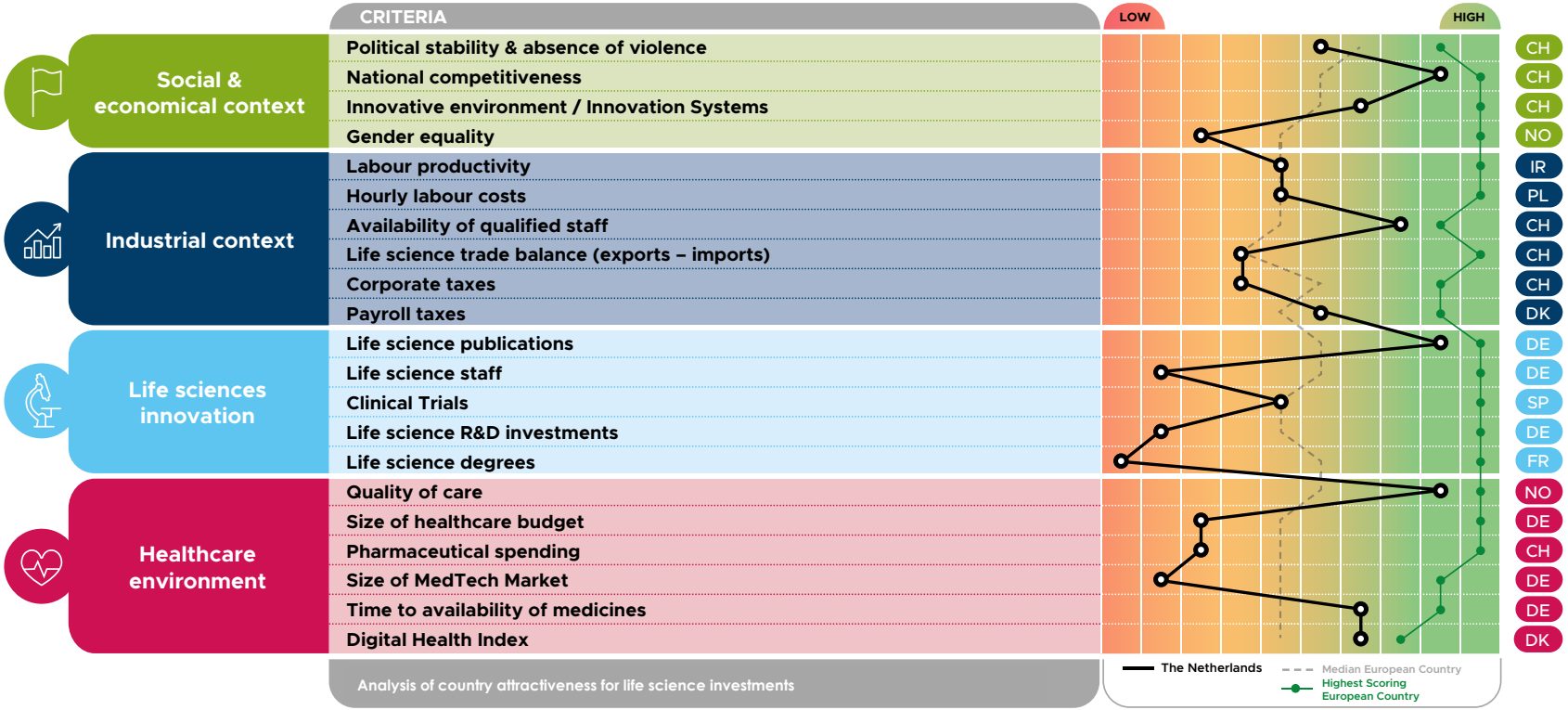
- It is a special fiscal regime consisting of a 50% reduction in corporate tax on income deriving from direct and indirect use of intangible assets (i.e. industrial patent rights, industrial design and models, know-how and copyrighted software).

## RECENT POLICY MEASURES

- National Research Programme 2021-2027 implemented in December 2020 which contains a cluster focused on Health (health technologies, biotechnology, pharmaceutical and pharmacological technologies)
- Recent implementation of a working table between the Italian Government (Minister of Economic Development) and Farmindustria to create a public-private vaccine production centre with government's funds and the participation of major pharmaceutical companies
- Starting from 2017: Implementation of 2 Innovative Drug Funds (Oncological and non-oncological) with a yearly financial allocation of 500 M€ each
- 2019: new process in place to update the list of essential services provided by NHS (LEA) based on a comprehensive assessment of the value of the technology (HTA) and on the outcome measurement , new HTA program on Medical Device to foster adoption and uptake of innovation, new governance of Medical Device to assess the demand and supply of medical devices, through the early recognition of innovation and the evaluation of the additional clinical care value of innovative medical device, by the application of Health Technology Assessment (HTA), a tool that favors development and innovation, safeguarding the sustainability of universal health systems and qualifying care processes
- 2019: Memorandum of understanding between Confindustria Dispositivi Medici and Milano Innovation district for the creation of a LifeScience Hub in Milan

# THE NETHERLANDS

Overview of the selected criteria



# THE NETHERLANDS

Overview of Structural advantages per country, with addition of specific tax measure and recent policy measures to encourage investments in life science and healthcare

## STRUCTURAL

- Home of the European Medicines Agency since March 2019
- Life Sciences & Health is one of nine "top sectors"(designated by the Dutch government and selected on their ability to contribute substantially to global societal challenges)
- The life sciences sector in the Netherlands is on the rise, it has doubled in size over the past 10 years
- Biotechgate (the leading global biotech database) currently lists 678 R&D life sciences companies in the Netherlands, 87% of the companies are SMEs. Oncology remains the most prominent therapeutic area, followed by neurology and infectious diseases.
- Creation of collaborative initiatives such as Lygature. an independent third party to help preserve Dutch R&D expertise and to support new initiatives, including any arising from the Netherlands government, to drive the development of new medical solutions. Another initiative is the Innovative Medical Device Initiative.
- Fertile grounds for VBHC collaborations: despite the Ministry of Health particularly focusing on costs only, many stakeholders in Dutch healthcare are looking for ways to focus on outcomes and to move to outcomes-based commissioning.
- The Netherlands currently rank No. 4 worldwide in patent applications for MedTech, No. 6 for biotechnology patents, and No. 8 for pharmaceutical patents.

## TAX MEASURES

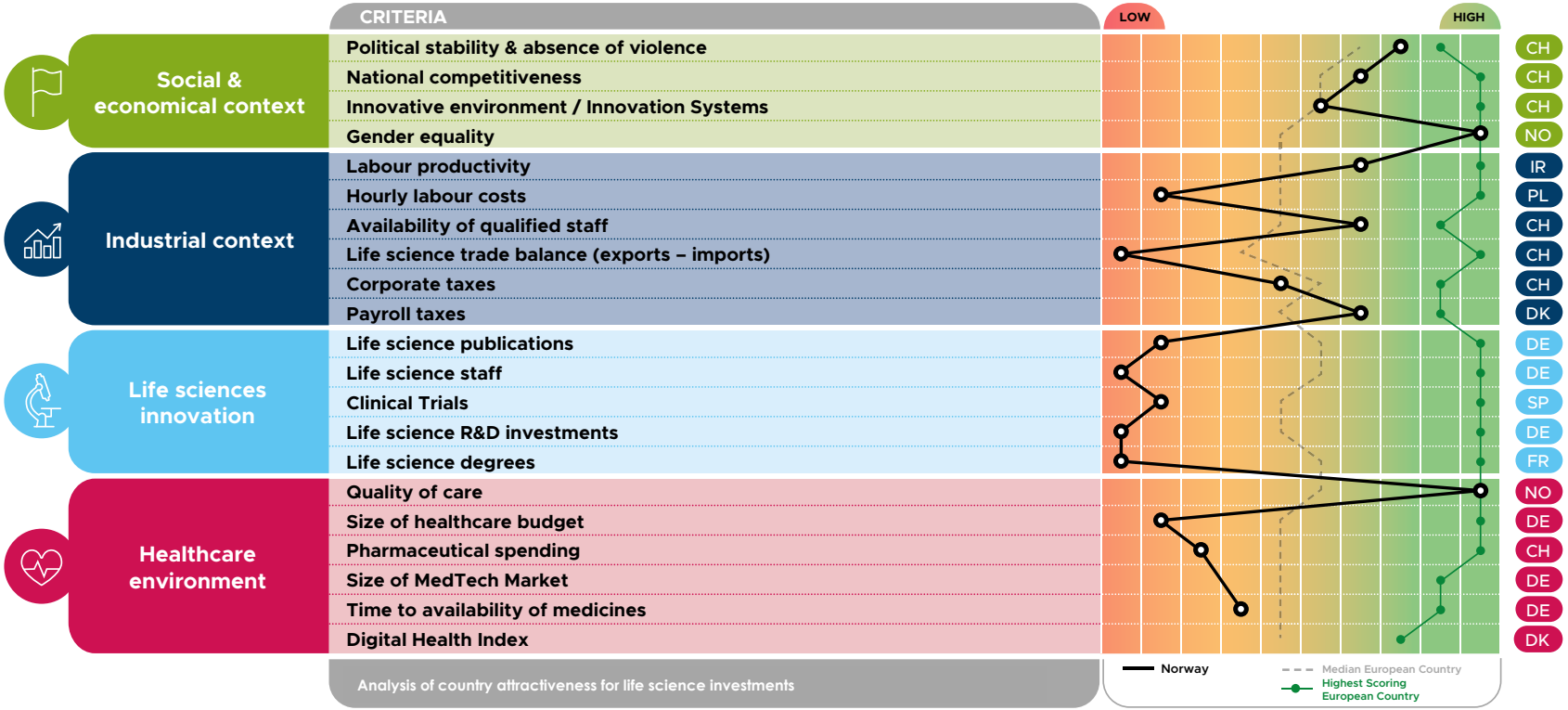
- Tax on income from IP at 5% is among the lowest in Europe
- Companies deriving income from qualifying R&D activities are entitled to an additional 60% deduction of the costs and expenses relating to these activities.

## RECENT POLICY MEASURES

- The Dutch government wants to capitalize on the opportunities offered by biotechnology. The government considers biotechnology a key high-tech area in its contribution to solving problems in the fields of health, food safety, nature conservation, biodiversity and the environment.
- The vision on future-proof biotech policy of Dutch biotech industry association HollandBIO is gaining support. That optimal policy is comprehensive, mission- and product-driven, and has clear, rapid procedures for its implementation
- Since the beginning of 2021, companies and scientific institutions can start more quickly with clinical research into medicines and vaccines with genetically modified organisms. The duration of the mandatory licensing procedure for much of this type of research has been shortened, thanks to the efforts of HollandBIO and their members
- Considering the impact of Covid-19 investment fund Invest-NL makes an additional € 100 million available for startups and scaleups
- Broad Based Program MedtechNL: involves MedTech innovation (including e-health) to enable and accelerate three transitions, Prevention and early diagnosis/ Effective and efficient treatment/ Treatment in one's own environment. Program will be worked out and linked to a more concrete proposal for the implementation of such commitments in the form of a growth fund application.

# NORWAY

Overview of the selected criteria



# NORWAY

Overview of Structural advantages per country, with addition of specific tax measure and recent policy measures to encourage investments in life science and healthcare

## STRUCTURAL

- Norway was recently ranked the world's most resilient country. It also rank among the top ten countries in the world on the world happiness ranking, the world talent ranking, the world competitiveness ranking, the environmental performance index and the ease of doing business ranking.
- Norway's industry is largely defined by its natural resources: it has a strong presence in energy, both fossil fuel and green energy.
- The country has set up specific integrated clusers for cancer and dementia: the Oslo Cancer Cluster and the Center of Biology of Memory.

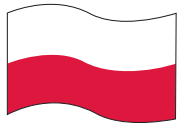
## TAX MEASURES

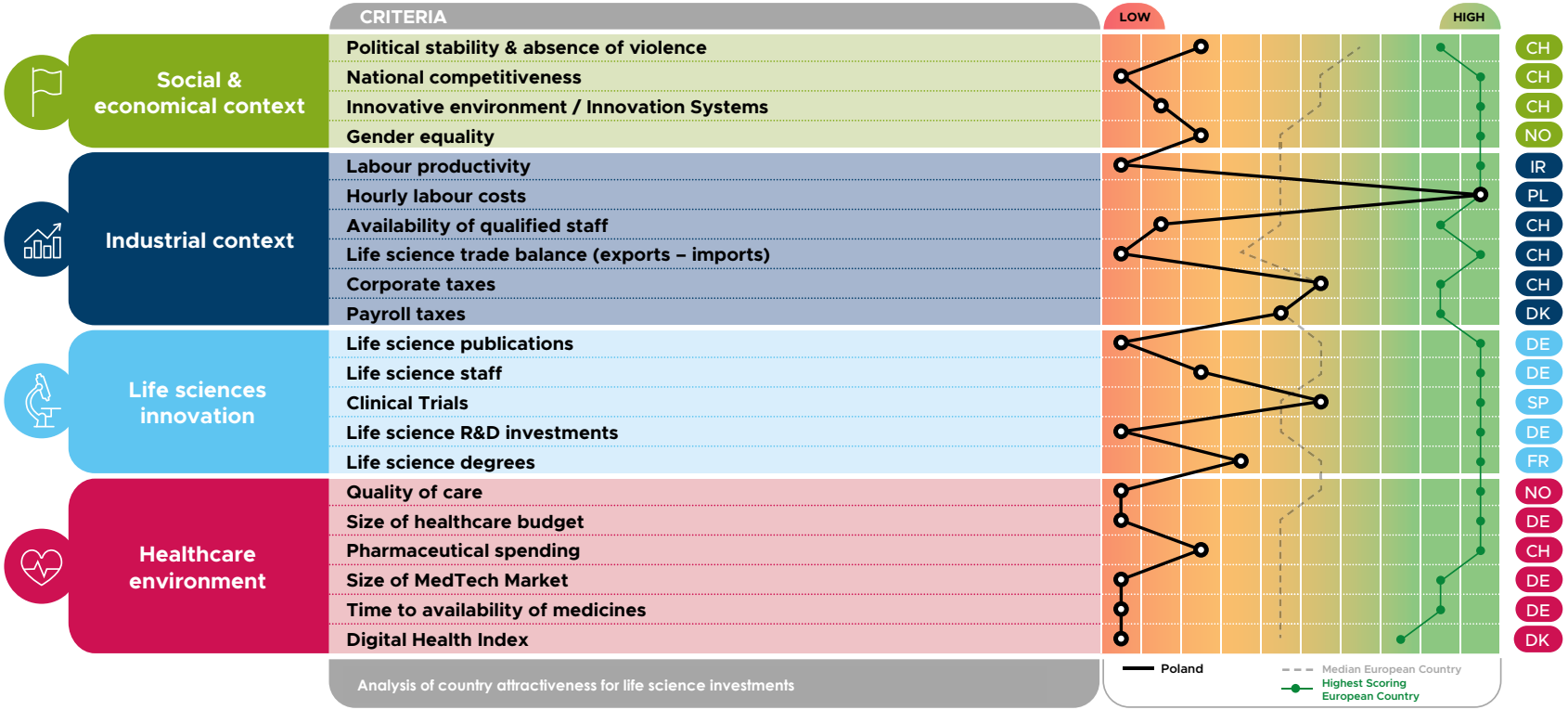
- Companies in Norway are subject to a corporate income tax of 22% on their net income.
- Norwegian tax rules do not offer many incentives, but an R&D incentive scheme called "SkatteFUNN" offers tax credit for R&D costs up to certain thresholds. The scheme is funded and administered by the Research council of Norway.

## RECENT POLICY MEASURES

# POLAND

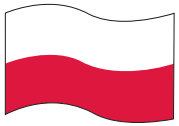
Overview of the selected criteria





# POLAND

Overview of Structural advantages per country, with addition of specific tax measure and recent policy measures to encourage investments in life science and healthcare



## STRUCTURAL

- In 2019, Poland was also ranked highest in the CEE region and third in Europe in terms of greenfield investment value - USD 21.8 billion.

## TAX MEASURES

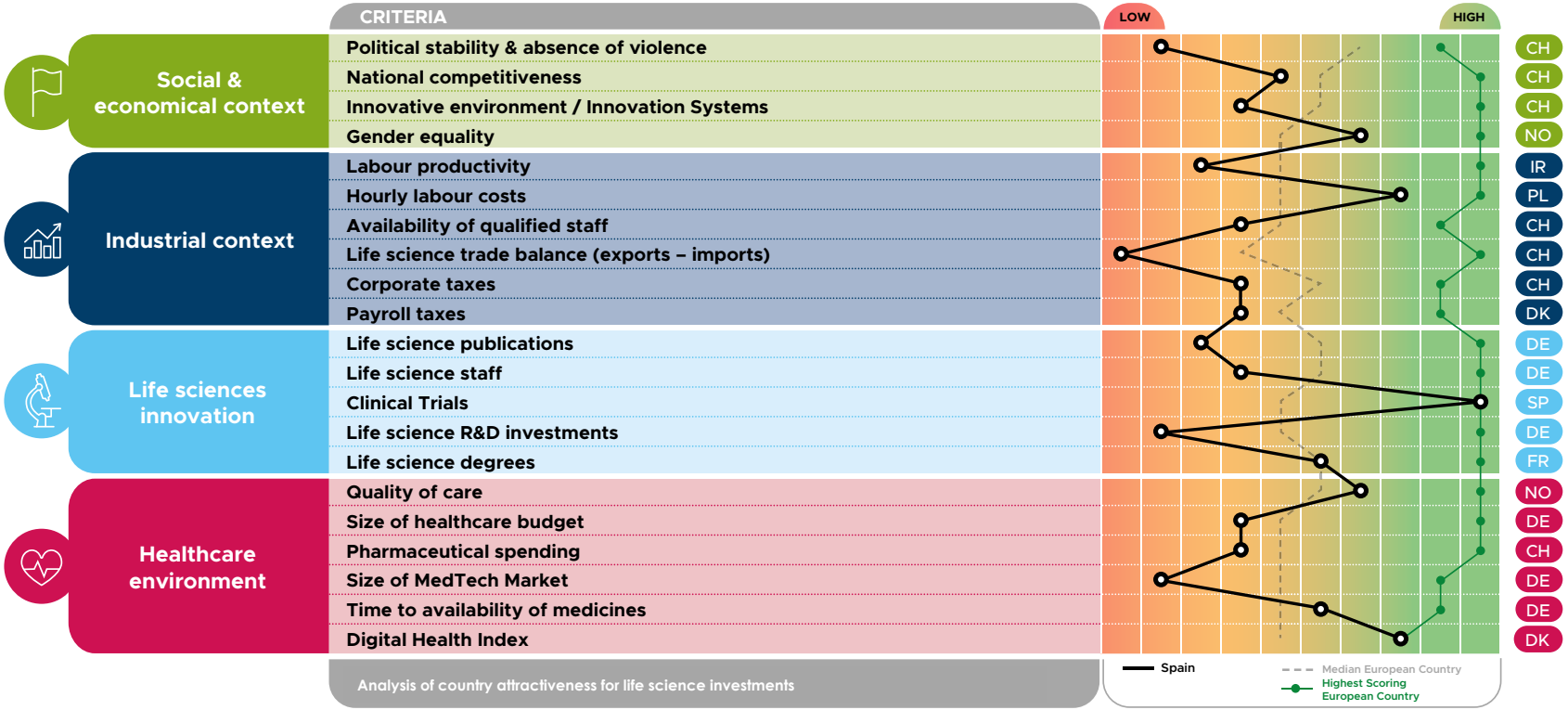
- Since 1st January 2019 Poland offers support instruments for investors conducting R&D activity: R&D tax relief, Innovation Box, governmental R&D grants as well as several programmes co-financed with EU funds.
- Poland's Innovation Box complements the existing tax preference system for innovative activities and introduces a preferential 5% tax rate of qualified income from qualifying intellectual property rights (instead of 19% tax rate); Polish intellectual property rights catalogue is one of the broadest worldwide and the reduced 5% tax rate is one of the lowest of all developed countries.

## RECENT POLICY MEASURES

- the Act of the 10th May 2018 amended the establishment of the Special Economic Zones (SEZ), in order to adjust the provisions to the current market situation and entrepreneur's needs. The major difference introduced is that the tax exemption is now available across the entire territory of Poland, for companies carrying out new investments, on publicly as well as privately owned land.
- The currently binding Special Economic Zone (SEZ) permits shall remain in force until 2026.

# SPAIN

Overview of the selected criteria



# SPAIN

Overview of Structural advantages per country, with addition of specific tax measure and recent policy measures to encourage investments in life science and healthcare

## STRUCTURAL

- 5th largest pharmaceutical market in the European Union
- Good hospital infrastructure and large population make the country attractive for clinical trials
- Wages are below EU average yet the country is attractive for young science graduates
- A pre-clinical pipeline of more than 200 projects and the R&D focus of the majority of companies (51%) shows potential and focus for innovative therapeutic companies.
- Spain has a strong local, mid-sized Pharma industry.

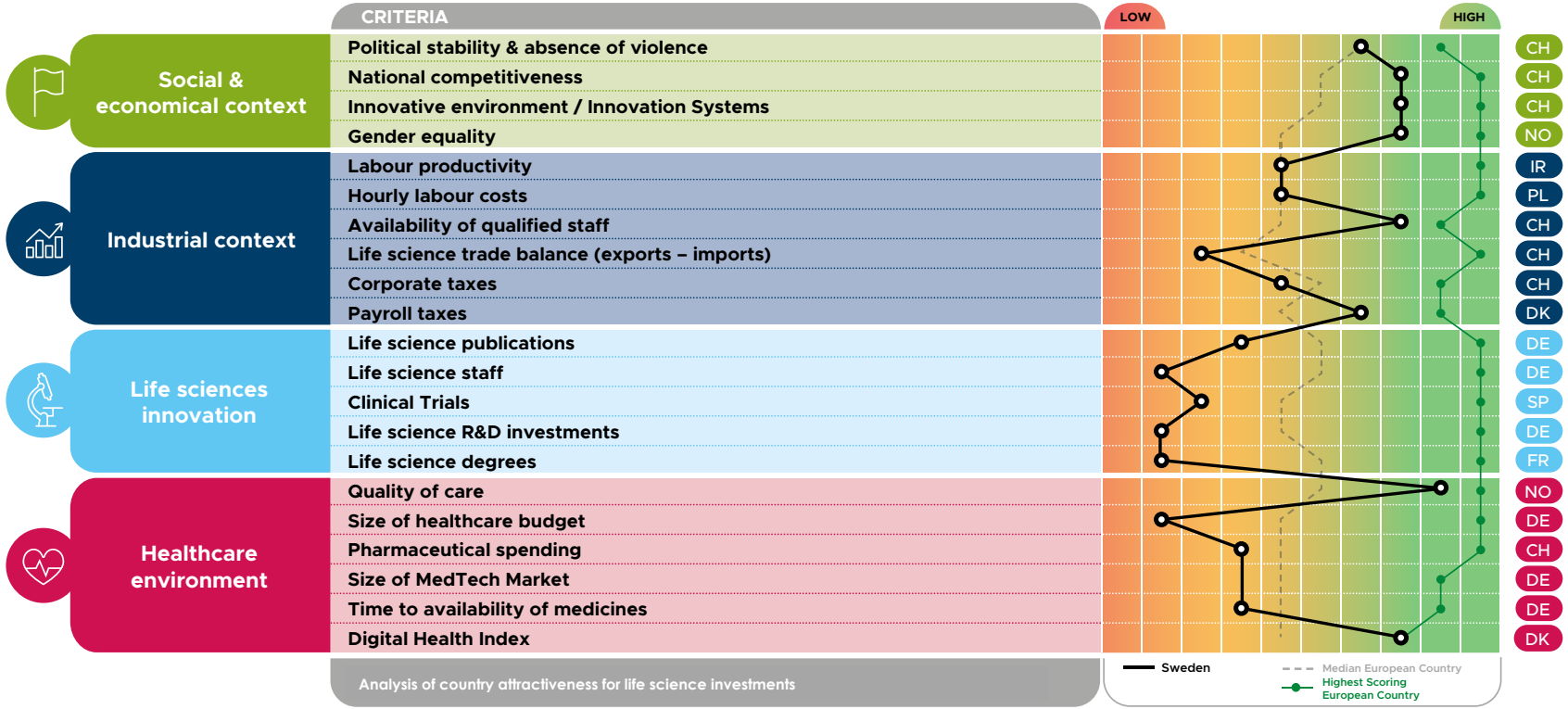
## TAX MEASURES

- Corporate tax deductions up to 42% for R&D investments and up to 12% for innovation
- Companies can deduct up to 40% of the social security contributions of R&D workers
- The general applicable fixed percentage rate for R&D tax credit is 25%
- Along with incentives and tax deduction, the Spanish government offers funding and low interest loans during the startup and growth phases,

## RECENT POLICY MEASURES

# SWEDEN

Overview of the selected criteria



# SWEDEN

Overview of Structural advantages per country, with addition of specific tax measure and recent policy measures to encourage investments in life science and healthcare

## STRUCTURAL

- There are 256 manufacturing sites within the pharma and chemicals sector, of which 129 (50.4%) have foreign ultimate owners. This makes it the sector with the highest share of foreign owners.
- Sweden traditionally has adopted a liberal attitude toward inward foreign investment. Foreign investors generally are treated the same as Swedish investors. Subject to certain reporting requirements, foreign companies are free to make direct investments in Sweden and in Swedish property without prior approval from the central bank, and no approval is necessary from the Competition Authority to establish or acquire a subsidiary company in Sweden (Deloitte, 2017)
- Home of Medicon Valley, one of Europe's leading life science clusters, based in the South of Sweden and Denmark

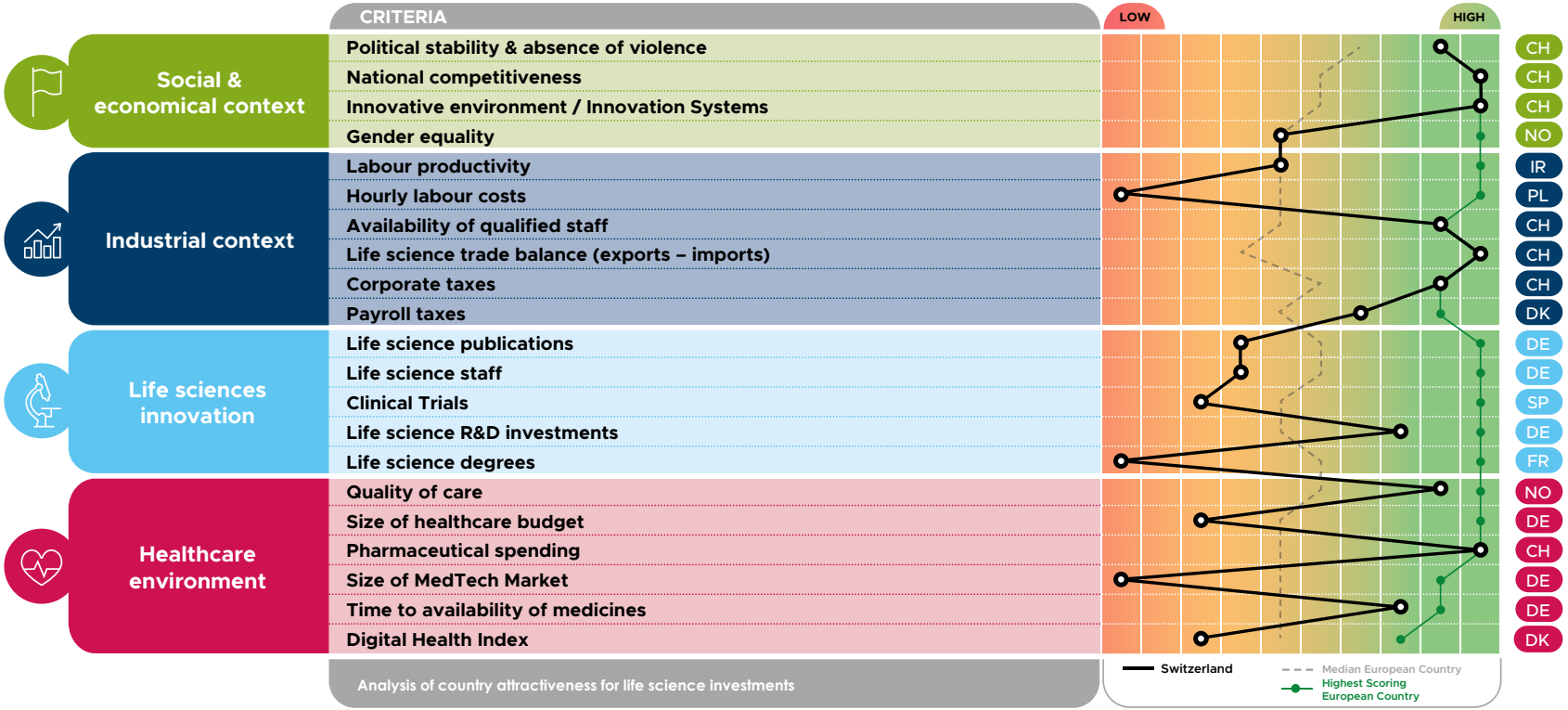
## TAX MEASURES

- The corporate income tax in Sweden is at 22 percent. The effective rate can be lower, as companies have the option to make deductible annual appropriations to a tax allocation reserve of up to 25 percent of their profits
- Sweden offers a limited range of financial incentives to help companies set up a business and expand in Sweden. This support is primarily regional in nature and comprises regional investment grants, support for establishment costs, regional transportation contributions, and special tax reliefs related to key staff and R&D personnel.
- Companies can benefit from reduced employer social fees for employees engaged in research or development work within Sweden. The reduction amounts to 10% of the employee's salary within certain brackets. The social fee reduction is maximized at SEK 230,000 per month.

## RECENT POLICY MEASURES

# SWITZERLAND

Overview of the selected criteria



# SWITZERLAND

Overview of Structural advantages per country, with addition of specific tax measure and recent policy measures to encourage investments in life science and healthcare

## STRUCTURAL

- Life science represents 45% of Swiss Exports
- Very strong biotech venture capital environment - Switzerland performs strongly when it comes to financing private companies. Overall Venture Capital investments in Switzerland increased by 86% from 2018 to 2019. Translating innovation into Venture capital investment Health Care is lagging ICT.
- Switzerland is one of the countries offering the best conditions for Life Sciences companies to maintain and increase their agility due to flexible labor regulations, strong opportunities to enhance collaboration with peers and universities, and the ability to increase the company's value through tax models which are compliant with new OECD regulations on Base Erosion and Profit Shifting (BEPS).
- Compared to the size of the population, Switzerland's Life Sciences Industry in the "core activities" such as Biotech Therapeutics, Medtech Manufacturing and Pharma by far outnumbers the other 14 countries covered in this report (Belgium, France, Germany, Netherlands, Ireland and the UK).
- Traditionally strong in life science and fueled by the two Pharma giants Novartis and Roche, Switzerland has a keen focus on innovative therapeutic Biotech companies but also a strong Medtech sector.
- Switzerland is one of Europe's leading MedTech Hubs. Approximately 50% of the trauma kits used in Europe are of Swiss origin. This includes, Home, traffic and work accidents.

## TAX MEASURES

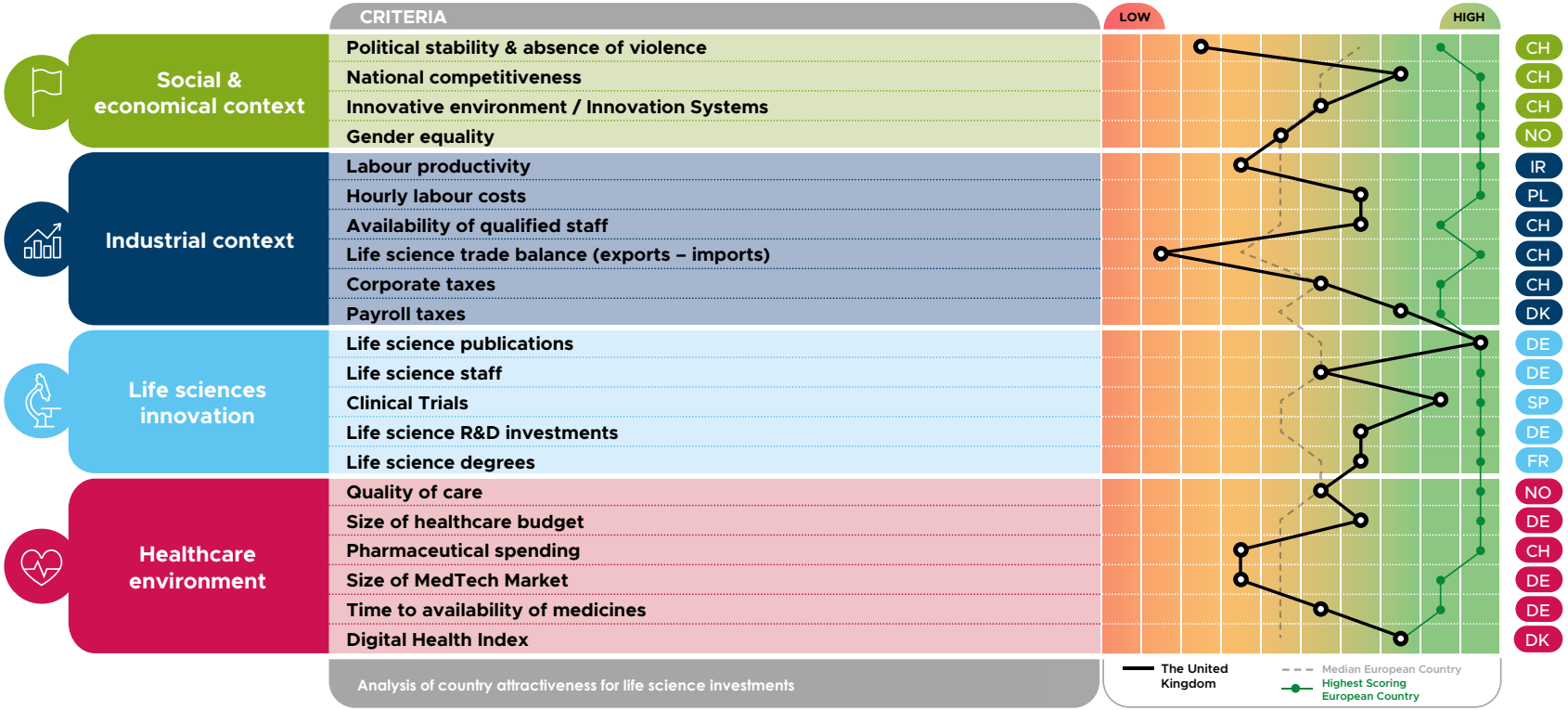
- Tax on income in the Canton of Zug up to 11.9%. May be reduced to 9.1% based on tax incentives called Patent Box and R&D super deduction. The tax on income may be higher in other cantons (states).
- The Patent Box and R&D super deduction are in force as of 1 January 2020 and have been introduced in the context of the Swiss Tax Reform ("TRAF"). Patent Box provides for a tax reduction up to 90% on income deriving from Patens (IP). The R&D super deduction provides for an extraordinary extension of R&D expenses to up to 150%. These measures fully comply with the OECD guidelines.
- Thus, TRAF represents a well-balanced and internationally competitive solution that ensures that Switzerland stays an attractive location for multinationals and domestic companies alike, while at the same time providing an internationally aligned tax system that is in conformity with international standards.
- Further tax incentives such as subsidies and tax holidays may be offered by cantons, in order to attract companies to establish operations and invest in their jurisdictions. Some cantons go as far as to waive taxes (tax holidays) for new firms for a period that can go up to ten years.
- Moreover, high planning and legal certainty including a well established ruling process and business-friendly approach on the part of the authorities.

## RECENT POLICY MEASURES

- The Swiss Government wants more flexibility in innovation funding. The government presented therefor bill in February 2021 which focuses on increasing the room for maneuver and flexibility of Innosuisse, the Swiss Agency for Innovation Promotion, among other things in the promotion of innovation projects and start-ups. Further adjustments concern the reserves of Innosuisse and the Swiss National Science Foundation.
- SWITZERLAND INNOVATION forms an ecosystem that allows universities and innovative companies to collaborate and use their research results for the development of new marketable products and services; provides breeding grounds for innovations; and strengthens Switzerland as one of the most innovative countries in the world.

# THE UNITED KINGDOM

Overview of the selected criteria



# THE UNITED KINGDOM

Overview of Structural advantages per country, with addition of specific tax measure and recent policy measures to encourage investments in life science and healthcare

## STRUCTURAL

- Because of Brexit, the United Kingdom is re-designing its international approach to attract investors, particularly in the area of regulations.
- Number one country in Europe for inward life science investments
- Leading investor in public and non-profit life science research, with over 3 billion euro
- Excellent academic research in the London/Oxford/Cambridge cluster
- High level of biotech venture capital - UK companies received nearly £1.39 billion in venture capital in 2020, more than a third of the total venture capital raised in Europe and more than any other European country.
- National Institute for Health Research is a dedicated government body for clinical research
- Clinical Practice Research Datalink (CPRD) to provide researchers with access to patient data for clinical trials recruitment and observational studies. The establishment in 2017 of Health Data Research UK in 2017 to fund Masters Programmes in Health Data Science
- The UK has the second highest number of life science companies in Europe, but the highest number of innovative companies in Biotech therapeutics. The UK also leads in Pharma companies.
- For products in development, the UK has the strongest pipeline in Europe, with an emphasis on pre-clinical and a strong showing in clinical (primarily oncology).

## TAX MEASURES

- Patent Box, to reduce the corporation tax on profits from patents to 10% R&D tax credits
- Tax incentives for R&D expenditure are available, with an enhanced deduction of 130% for large companies and of 230% for small and mid-sized enterprises.
- Recently announced increase in corporate tax from current 19% to 25% from April 2023

## RECENT POLICY MEASURES

- Academic researchers are also evaluated by their collaboration with industry and the impact of their work on social and economic level
- Creation of the Catapult Porgramme to help UK SME biotechs, academics and innovators to have access to the laboratory facilities, knowledge, data, technologies and networks they need to be able to progress their programmes of medicines research and development.
- Creation of Healthcare UK to help healthcare companies with their overseas activities, investments and exports.
- Recently updated: the Voluntary Pricing and Access Scheme (VPAS) is a voluntary agreement between the Government and the pharmaceutical industry with the dual aim of seeking to create an environment that ensures safe and effective medicines are available on reasonable terms to the NHS, and that maintains a strong, efficient and profitable pharmaceutical industry
- a commitment to increase R&D spending to 2.4% of GDP by 2027
- A Grand Challenge mission, (which brings government, industry and organisations together to tackle problems), will transform the prevention, diagnosis and treatment of chronic diseases by 2030
- Life Sciences Industrial Strategy, in August 2017 after engagement across the ecosystem. This partnership working approach has already delivered billions of pounds of new funding in joint investment since 2017, including investing in programmes to keep the UK at the forefront of life sciences and health innovation
- Establishment of Office for Life Sciences to support companies engagement across the department for health and department for business

# Sources & References

1 **Political stability**
World Bank Index

2019 Data
Source: the world bank – Worldwide Governance Indicators
http://info.worldbank.org/governance/wgi/#reports

Construction of the political stability index:
The index is a composite measure as it is based on several other indexes from multiple sources including the Economist Intelligence Unit, the World Economic Forum, and the Political Risk Services, among others. The underlying indeces reflect the likelihood of a disorderly transfer of government power, armed conflict, violent demonstrations, social unrest, international tensions, terrorism, as well as ethnic, religious or regional conflicts.

Countries score between -2.5 (weak) & + 2.5 (Strong)

2 **Competitiveness of economy**
Index World Economic Forum

2019 Data
Source: World Economic Forum - The Global Competitiveness Report 2017-2018.
http://www3.weforum.org/docs/WEF_TheGlobalCompetitivenessReport2019.pdf

(page 15)

Construction of the index:
Competitiveness is defined as the set of institutions, policies, and factors that determine the level of productivity of a country. The level of productivity, in turn, sets the level of prosperity that can be reached by an economy. The productivity level also determines the rates of return obtained by investments in an economy, which in turn are the fundamental drivers of its growth rates. In other words, a more competitive economy is one that is likely to grow faster over time. This open-endedness is captured within the GCI by including a weighted average of many different components, each measuring a different aspect of competitiveness. The components are grouped into 12 categories, the pillars of competitiveness.

Countries score on a scale from 1 to 7

| | | |
|---|---|---|
| 3 | **Innovative environment**<br>EU Innovation Scoreboard – performance index | 2019 Data<br>Source EU Innovation Scoreboard 2020<br>https://ec.europa.eu/commission/presscorner/detail/en/QANDA_20_1150<br><br>Construction of index:<br>Performance of innovation systems is measured by average performance on 27 indicators<br>The new EIS measurement framework distinguishes between four main types of indicators and ten innovation dimensions, capturing in total 27 different indicators. Framework conditions capture the main drivers of innovation performance external to the firm and cover three innovation dimensions: Human resources, Attractive research systems, as well as Innovation-friendly environment. Investments capture public and private investment in research and innovation and cover two dimensions: Finance and support and Firm investments. Innovation activities capture the innovation efforts at the level of the firm, grouped n three innovation dimensions: Innovators, Linkages, and Intellectual assets. Impacts cover the effects of firms' innovation activities in two innovation dimensions: Employment impacts and Sales effects.<br><br>Measurement: EU average in 2010 represents '100' value, countries score above or below |
| 4 | **Gender equality**<br>Index World Economic Forum | 2019 Data<br>Source: World EconomicForum: Global Gender Gap Index 2020<br>http://www3.weforum.org/docs/WEF_GGGR_2020.pdf<br>(page 9)<br><br>The Global Gender Gap Index examines the gap between men and women in four fundamental categories (subindexes): Economic Participation and Opportunity, Educational Attainment, Health and Survival and Political Empowerment.<br><br>Countries score between 0 and 1 |

5 **Labour productivity - GDP per hour worked**
OECD Data

2019 Data
OECD: GDP per hour worked in USD

Source: https://data.oecd.org/lprdty/gdp-per-hour-worked.htm

Definition
GDP per hour worked is a measure of labour productivity. It measures how efficiently labour input is combined with other factors of production and used in the production process. Labour input is defined as total hours worked of all persons engaged in production. Labour productivity only partially reflects the productivity of labour in terms of the personal capacities of workers or the intensity of their effort. The ratio between the output measure and the labour inpu depends to a large degree on the presence and/or use of other inputs (e.g. capital, intermediate inputs, technical, organisational and efficiency change, economies of scale).

This indicator is measured in USD

6 **Hourly wages per hour**
Eurostat

Source: Europe: Eurostat: https://ec.europa.eu/eurostat/databrowser/view/lc_lci_lev/default/table?lang=en
; Switzerland: https://www.bfs.admin.ch/bfs/en/home/statistics/work-income/wages-income-employment-labour-costs/wage-levels-switzerland.html
US: Trading Economics 2020: https://www.conference-board.org/ilcprogram

Total labour cost consists of: employee compensation (including wages, salaries in cash and in kind, employers' social security contributions); vocational training costs; other expenditure such as recruitment costs, spending on working clothes and employment taxes regarded as labour costs; minus any subsidie received.

7 **Availability of qualified staff**
INSEAD Index

2018-2020 Data

Source: INSEAD Global Talent Competitiveness Index 2020 https://gtcistudy.com/the-gtci-index/

Construction of the index:
The global Talent Competitiveness Index measures how countries' policies and practices enable them to attract, develop and retain human capital that contributes to productivity. In the context of the GTCI, talent competitiveness refers to the set of policies and practices that enable a country to develop, attract, and optimise the human capital that contributes to productivity
and prosperity. The GTCI is an Input-Output model in the sense that it combines an assessment of what
countries do to produce and acquire talents (Input) and the kind
of skills that are available to them as a result (Output).

Countries score between 4 & 85 out of maximum 100

| | | |
|---|---|---|
| 8 | **Life science trade balance**<br>EFPIA Pharmaceutical Industry in Figures | 2020 data<br>EFPIA Pharmaceutical Industry in Figures 2020: https://www.efpia.eu/media/554521/efpia_pharmafigures_2020_web.pdf<br>Exports-imports - Pharmaceutical Trade Balance In € million |
| 9 | **Corporate Tax Level**<br>Deloitte | Deloitte Corporate Tax Rates 2020 in %<br>https://www2.deloitte.com/content/dam/Deloitte/global/Documents/Tax/dttl-tax-corporate-tax-rates.pdf<br>Includes information on statutory national and local corporate income tax rates applicable to companies and branches, as well as any applicable branch tax imposed in addition to the corporate income tax (e.g., branch profits tax or branch remittance tax). |
| 10 | **Payroll tax level**<br>PWC | PWC Study 2020<br>https://www.pwc.com/gx/en/services/tax/publications/paying-taxes-2020/explorer-tool.html<br>Labour Total Tax and Contribution Rate in % |
| 11 | **Life science publications**<br>Leiden Ranking | 2020 Leiden ranking. Field of Biomedical & health sciences.<br>Number of publications by top-20 universities in top-10% scientific journals for 2015-2018<br>Source: http://www.leidenranking.com/<br><br>The Leiden Ranking takes a multidimensional perspective on University Ranking: universities are ranked for performance according to a combination of parameters. Rankings may vary per the view selected.<br>Universities are by default ordered based on the size of their publication output. Rankings based on an impact or collaboration indicator are also available. Also, size-dependent and size-independent indicators (e.g., the number and the percentage of highly cited publications) are consistently presented together in the Leiden Ranking, highlighting that both types of indicators are considered.<br><br>For this analysis criteria were: the number of life science articles published in top 5% journals by the top-20 life science institutes in each country. |

| | | |
|---|---|---|
| 12 | **Life science staff**<br>EFPIA | EFPIA Pharmaceutical Industry in Figures 2020.<br>Employment in the pharma industry in Units.<br>Source: EFPIA: "The Pharmaceutical Industry in Figures, Key data 2020":<br>https://www.efpia.eu/media/554521/efpia_pharmafigures_2020_web.pdf |
| 13 | **Number of Clinical trials**<br>Clinical Trials.gov data | Clinical Trials.Gov<br>Source: Clinical Trials.gov https://clinicaltrials.gov/ct2/search/map<br>Trials included:<br>• Only trials currently recruiting, trials enrolling by invitation or active trials that are not recruiting anymore<br>• Only Interventional studies<br>• Only trials funded by Industry |
| 14 | **Life science R&D investments**<br>EFPIA | 2019 Data<br>Absolute figures in € million<br>Source: EFPIA: "The Pharmaceutical Industry in Figures, Key data 2020":<br>https://www.efpia.eu/media/554521/efpia_pharmafigures_2020_web.pdf |
| 15 | **Life science degrees**<br>OECD | OECD Stats - graduates by degree. Sum of all "Biological and related sciences" and "Health" Masters and PHD degrees in 2018.<br>Source: https://stats.oecd.org/Index.aspx?DataSetCode=EDU_GRAD_FIELD |
| 16 | **Quality of care**<br>The Lancet | The Lancet 2018 Healthcare Access and Quality Index Article.<br>Source: https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(18)30994-2/fulltext<br>Ranking 0-100<br>Study uses the Global Burden of Diseases, Injuries, and Risk Factors Study 2016 (GBD 2016) to assess personal health-care access and quality with the Healthcare Access and Quality (HAQ) Index for 195 countries and territories, as well as subnational locations in seven countries, from 1990 to 2016. |

| | | |
|---|---|---|
| 17 | **Size of healthcare budget**<br>Eurostat | Eurostat. Healthcare expenditure 2017: https://ec.europa.eu/eurostat/statistics-explained/index.php/Healthcare_expenditure_statistics#Healthcare_expenditure<br><br>USA. Health Affairs. 2018 figure.<br><br>Absolute figures in million Euros |
| 18 | **Pharmaceutical spending**<br>OECD Data | OECD Statistics<br><br>Total US dollars per capita, 2019 or latest available<br>Source: OECD Pharmaceutical spending: https://data.oecd.org/healthres/pharmaceutical-spending.htm<br>Pharmaceutical spending covers expenditure on prescription medicines and self-medication, often referred to as over-the-counter products. In some countries, other medical non-durable goods are also included. Pharmaceuticals consumed in hospitals and other health care settings are excluded. Final expenditure on pharmaceuticals includes wholesale and retail margins and value-added tax. |
| 19 | **Size of MedTech Market**<br>Medtech Europe | Medtech Europe. The European Medical Technology Industry in Figures 2020.<br>Source: https://www.medtecheurope.org/wp-content/uploads/2020/05/The-European-Medical-Technology-Industry-in-figures-2020.pdf<br>Size Medtech Market in billion € |
| 20 | **Time to availability of medicines**<br>EFPIA | EFPIA Patients W.A.I.T. Indicator 2019 Survey, May 2020<br><br>Number of days from EMA authorisation to patient access<br>Source: https://www.efpia.eu/media/554526/patients-wait-indicator-2019.pdf |
| 21 | **Digital Health Index**<br>Bertelsmann-Stiftung | Subindices include political activity, digital readiness and actual use of data.<br>Source: https://www.bertelsmann-stiftung.de/fileadmin/files/Projekte/Der_digitale_Patient/VV_SHS_Europe_eng.pdf |

**SEBOIO**
Health Policy Consulting

This report was written by Seboio Health Policy Consulting, an independent consultancy specialised in the development of life science and health policies, and specifically in organising multi-stakeholder events and workshops, writing consensus statements or the production of reports offering a broad and fact-based perspective on the subject matter. Reports were published on Global Health, on Life Science Investments in Europe, on Back-to-Work Strategies after Disease, on Breast Cancer, on Lung Cancer, on Digestive Cancers and on Cystic Fibrosis. Clients include patient organisations, health foundations, public health authorities, industry and industry associations.

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