

Pharmaceutical Industry in Basel, Switzerland

– Cluster Analysis

Course

Industry Cluster & Firm
Competitiveness –
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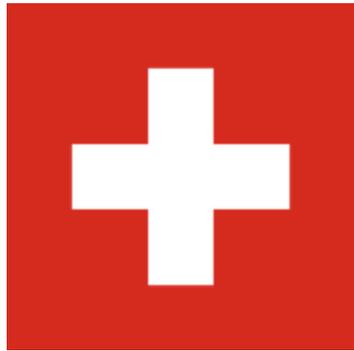


Executive Summary

- Switzerland is the most competitive economy in the world and highly export oriented; within the country's borders several clusters have gained worldwide recognition
- Among them, the Basel Pharma Cluster represents one of the most important economic areas in Switzerland; in fact a substantial part of the countries export strength is rooted in the pharma industry
- The origin of the cluster dates back to the late 19th century, when chemical companies decided to produce synthetic medicines; at that time the world-famous big pharma company Roche emerged
- Growing strongly until the early 21st century the cluster is now standing on a cross road that will decide about revival or decline as current industry trends and increasing competition from other clusters represent opportunities, as well as threats
- Due to the clusters importance throughout the history a highly dynamic environment has evolved, with specialized cluster participants that reduce transaction costs and foster innovativeness
- However, in absolute comparison with the leading pharma clusters in San Francisco & Boston the Basel cluster performs weak in terms of innovation, mainly due to its size
- Innovativeness is the key success-driver in the knowledge intensive pharma industry, where the ability to leverage future trends such as digital healthcare and increasingly sophisticated demand in emerging markets decides about success or failure
- Not only does the connection to the broader Life Science cluster - spanning parts of Germany, France and Switzerland - need to be further enhanced through collaboration with the BioValley Cluster Organization to keep up with demand trends, but a new cluster organization also needs to be established
- The recommended DigiValley cluster organization aims to connect the Basel Pharma Cluster with the ICT clusters in Bern & Zürich in order to make the Basel cluster one of the outstanding areas for digital healthcare
- An increasing connection to the LS and tech clusters in combination with a stronger start-up footprint will increase cluster dynamism, the flow of knowledge, mobility of employees and, finally, also the innovativeness; an emerging start-up scene in the field of digital healthcare benefits large companies that seek innovative healthcare solutions and will make Basel the leading pharma cluster in Europe

Nation Level: Swiss History since 19th century

Scarcity of resources and political neutrality created an export & import oriented economy



19 th century		20 th century		21 st century
1801: Machinery production for textile industry	1859: Emergence of chemical industry as textile industry supplier	1914: Neutrality in 1 st WW and attempts towards independent economy		2002: FTA with the EU
1814: Machinery had replaced textile production by hand	1871: Emergence of machinery suppliers for railway industry	1940: Neutrality in 2 nd WW and delivery of weapons to all main war participants		2005: Member of Schengen area
1848: Foundation of Switzerland and first railway line	1885: Start of synthetic medicine production	20 th century: Shift towards service industry		2006: First time "Most competitive economy in the world" (WTO)

Swiss Industrialization¹

- Swiss industrialization started in the textile industry, where first machines were manufactured 1801; by 1814 the entire textile production was mechanical
- At the same time, watchmaking flourished in the areas of Geneva and Neuchatel
- The pace of industrialization increased when in 1948 Switzerland formally became independent
- A dense railway system was established and more supporting industries such as the chemical industry and further machinery suppliers emerged
- The industrialization of the economy required large amounts of capital, leading to the emergence of the banking sector in the 19th century²
- By the end of the 19th century, the pharmaceutical industry emerged from the chemical industry
- After the turbulences of two World Wars, the economy shifted towards services
- A policy of free trade was adapted in the late 20th century³

Political Neutrality in the World Wars³

- During both World Wars Switzerland adopted a policy of neutrality
- The relatively small size of the country, high population density and low resource endowment imposed harsh economic consequences as the country's economy depended on imports of agricultural products and raw materials to function
- For a long time in the 2nd World War Swiss imports were under control of Germany and its Allies, leading to strong rationing and efforts towards independence in the agricultural production
- However, Switzerland engaged in financial dealings with the Third Reich and exported weapons to all major war participants
- Sharp criticism arose since 1957 about Switzerland's involvement in the 2nd World War despite its neutrality status and led to international isolation⁴
- It took the country until 2002 to abandon political isolationism by becoming member of the UN⁵

Geographical Position

- Located in the center of Europe Switzerland bridges the northern parts of Central Europe (Germany, Netherlands, Belgium) with the Mediterranean area (Italy & Southern France)
- The country is bordering Germany, France, Italy, Liechtenstein and Austria
- Switzerland has no direct access to the ocean, but ships have access to the Northern sea via the Rhine



Nation Level: PESTLE Analysis

Until today, Switzerland has excelled in offering favorable conditions for doing business

Political

- Switzerland is a federal, directorial republic consisting of 26 cantons
- Direct democracy is a pillar of Swiss governance. Citizens are called to vote on legislation several times per year
- Switzerland embraces a policy of neutrality. For this, it is the seat of many international organizations and NGOs
- In 2016 Switzerland has withdrawn its entry application to the EU⁶

Economic

- Small economy, heavily relying on imports & export
- GDP amounts for US\$ 664,0bn (#20 worldwide)⁷ with a GDP per capita of US\$ 80'603 (#4 worldwide)⁸
- The largest shares of exported goods are chemicals (40.2%), tools, watches and clock, jewelry (22.5%), machinery and electronics (16.6%)⁹
- The EU is the main trading partner (56% of exports, 75% of imports)¹⁰
- Free trade agreements with 39 partners¹¹
- Most competitive economy since 2009 in a row¹²

Social

- Switzerland has 4 official languages: French, German, Italian, Romansh
- 23.8% of the 8.35 million Swiss residents are foreign (mainly from Germany, Italy, Portugal)¹³
- The population growth rate is 1.16%¹⁴
- Switzerland was ranked 3rd in the 2015 Human Development Index Report¹⁵
- Almost 50% of the Swiss population in the 25-34 age group has attained tertiary education¹⁶

Technological

- 2.97% of the GDP is spent on R&D, which is higher than the OECD average of 2.38%¹⁷
- 4,481 out of 1,000,000 Swiss people work in R&D; it is the 13th highest number worldwide¹⁸
- 88 out of 100 persons in Switzerland are active Internet users¹⁹

Legal

- Switzerland enjoys the status of a tax haven; however, the tax system is currently changing²⁰
- Similar to most central European countries, Switzerland has a civil law system in place²¹
- The country ranks 7th on the Corruption Perception Index, indicating low corruption levels²²
- It is ranked 5th on the International Property Rights Index²³
- The FDI Regulatory Restrictiveness Index of 0.08 is slightly above OECD average (0.07)²⁴

Environmental

- The topography is an obstacle to agriculture, but the Alps attract millions of tourists
- 6% of Europe's water reserves are in Switzerland; 56% of Swiss electricity comes from water power²⁵
- For its unique position, the country has become a bridge between Northern and Southern Europe
- A strong impact of climate change on Swiss alps and Alpine climate is predicted for the future²⁶

Political neutrality and stability are favorable conditions for businesses. Economically, Switzerland is highly trade oriented and therefore dependent on the EU that accounts for 56% of exports. The Swiss society is highly advanced and culturally diverse. From a technological perspective Switzerland ranks among the most innovative countries. The country has also a strong legal framework. Overall, macroeconomic conditions in Switzerland are favorable for conducting business.

Nation Level: The Swiss Economy

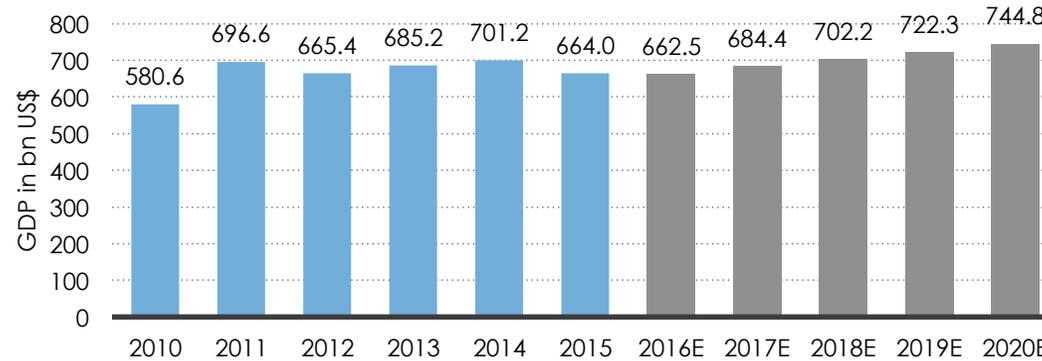
Pharma clusters are increasingly gaining importance in the Swiss economy

Facts & Figures^{7,8,27}



Population:	8'287m
GDP:	\$664.0bn
GDP/capita:	\$80'603
GDP growth:	-0.2%
Exports as % of GDP:	63.5%
CPI:	-0.01%
Unemployment:	4.5%
PPP (Swiss vs. OECD)	148%

Gross Domestic Product Over Time⁷



Facts & Figures²⁸ (Basel area)



Population:	0.48m
GDP:	CHF50.3bn
GDP/capita:	(BS) CHF163,600 (BL) CHF68,500
Unemployment:	(BS) 3.9% (BL) 2.8%

Top 10 competitive nations¹²



- 1) **Switzerland**
- 2) Singapore
- 3) United States
- 4) Germany
- 5) Netherlands
- 6) Japan
- 7) Hong Kong SAR
- 8) Finland
- 9) Sweden
- 10) United Kingdom

Top 10 Industries³⁰ (% of GDP)



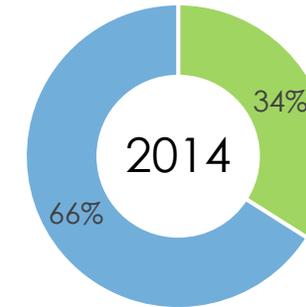
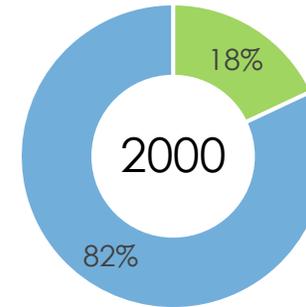
- | | |
|-----------------------|-------------|
| 1) Wholesale | 9.4% |
| 2) Financial Services | 8.4% |
| 3) Healthcare | 6.4% |
| 4) Construction | 5.1% |
| 5) Pharma | 3.9% |
| 6) Consulting | 3.0% |
| 7) Architecture | 2.2% |
| 8) Education | 2.1% |
| 9) ICT | 2.0% |
| 10) Food Industry | 1.9% |

Swiss Exports in 2000 and 2014²⁸



Pharma Exports = CHF22bn

Pharma Exports = CHF71bn



■ Pharma exports ■ Rest



(1) Basel, (2) Lake Geneva area & (3) Zürich-Zug-Lucerne generate roughly 75% of gross value added in Swiss pharma industry

Nation Level: Pharma-related Swiss clusters

A success driver of the Swiss economy is the proximity of knowledge intensive clusters

Relevant pharma-related clusters in Switzerland

1

Basel Area

Chemicals – Basel's chemicals cluster originated in the 19th century and, nowadays, is closely connected as a supplier to the local life science hub. Chemical giants like BASF are part of this cluster.

Life Science – The Basel area boasts one of the largest life science clusters in Europe. Pharma and biotech combined add about 24%²⁸ to the local GDP.

3

Zürich Area

ICT – Like Bern, Zürich boasts an ICT cluster of over 10'000² employees and is supported by the cantonal government and other bridge-building organizations.

Financial Services – Both banking and insurance have a rich history in Zürich. Nowadays, the cluster represents one of the financial centers of Europe and accounts for 27.1%³⁰ of regional GDP.

Life Science – Contrary to the Basel cluster, the Zürich life science cluster is focused on biotech. This is a young, emerging cluster.

2

Bern Area

ICT – More than 10'000³¹ employees work within the ICT cluster in Bern. This cluster is strongly dynamic due to the strong involvement of the local cluster organizations.

Medtech – The medtech cluster in Bern is the largest Swiss medtech cluster with more than 7'000³¹ employees. However, it is dwarfed by the strong medtech clusters of Germany and northern Italy.

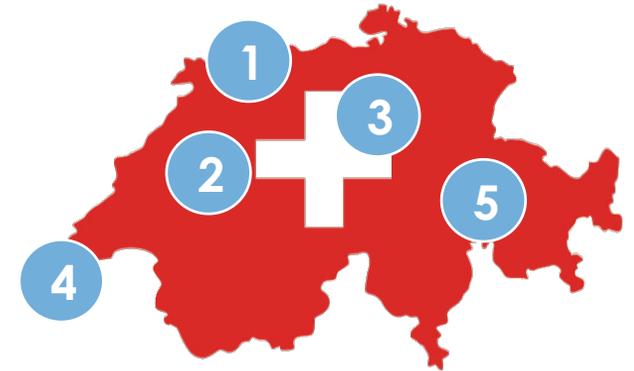
4

Geneva Area

Chemicals – The area around Lake Geneva is the largest chemicals cluster in Switzerland. International chemicals giants like Dupont are part of this cluster.

Life Science – This life science cluster, branded as BioAlps, boasts both pharma and biotech companies, and a multitude of bridge builders.

Financial Services – Focused on private banking and asset management, this Financial services cluster is a valuable source of capital for pharma start-ups.



5

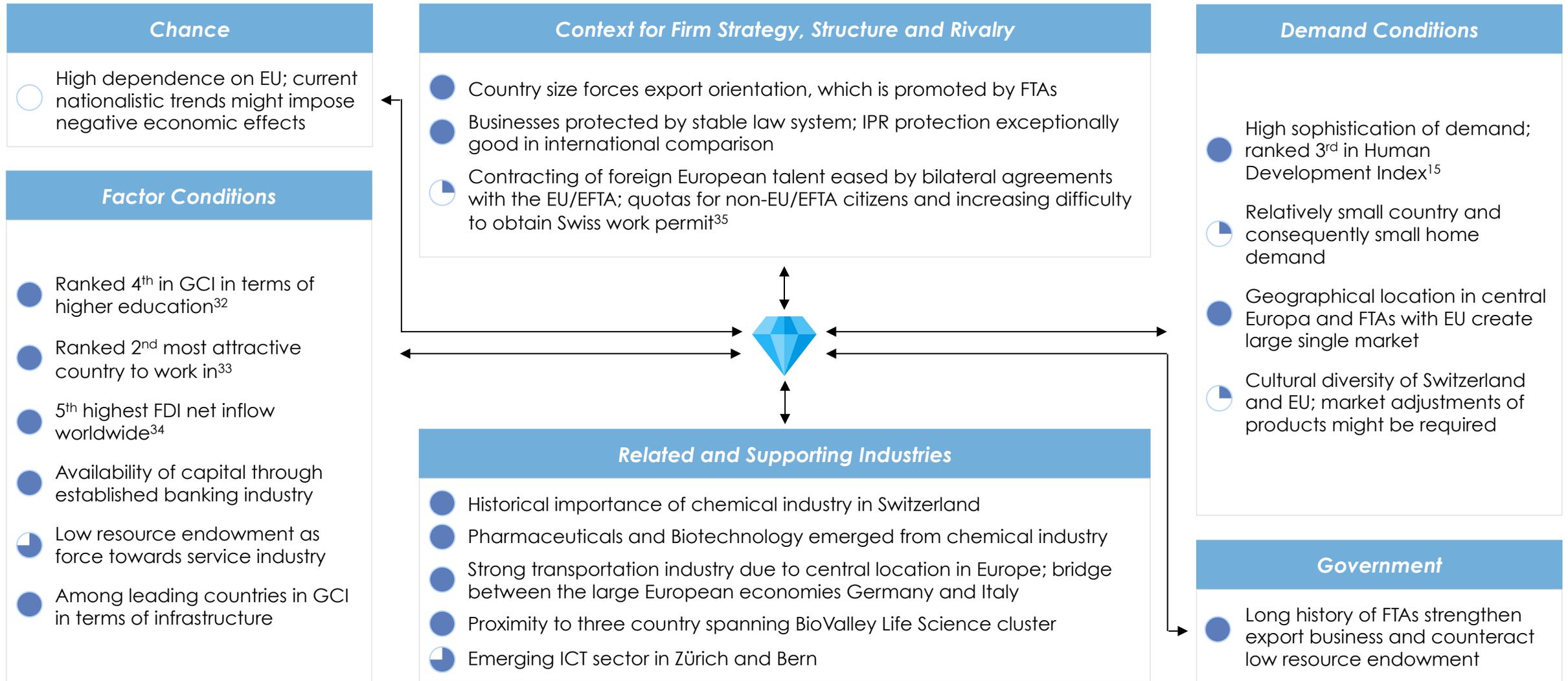
Eastern & Southern Switzerland

There are no strong pharma-related clusters in Eastern & Southern Switzerland. Many strong industries in these areas are related to agriculture or tourism, due to Alpine landscape.

The Swiss economic situation is characterized by a strong tertiary industry sector, which reflects the high education and salary levels. Pharmaceuticals is one of the main Swiss industries with clusters in Basel and Geneva. There are several pharma-relevant cluster within commuting distance of Basel. Most noteworthy from a supply chain perspective are the close chemicals and medtech clusters in Basel, Bern and the Geneva area.

Nation Level: National Diamond

Knowledge intensive industries such as pharma are fostered by favorable conditions



Switzerland's business-friendly environment is favorable for innovation-focused pharma

- Stable political system
- Sophisticated industries based on innovation
- Highly-developed infrastructure
- High productivity in workforce
- Efficient capital market
- Highly-educated workforce following strong national education system
- Strong geopolitical positioning in Europe

Strengths

- Little international influence due to size
- High wage and price levels
- Limited labor market
- Land-locked country

Weaknesses

Opportunities

- Aging populations favoring key Swiss industries (robotics & pharmaceuticals)
- Sophisticated cluster landscape have potential for worldwide recognition (e.g. financial clusters in Geneva and Zürich) – *Potential Hollywood*
- Transformation towards green energy

SWOT

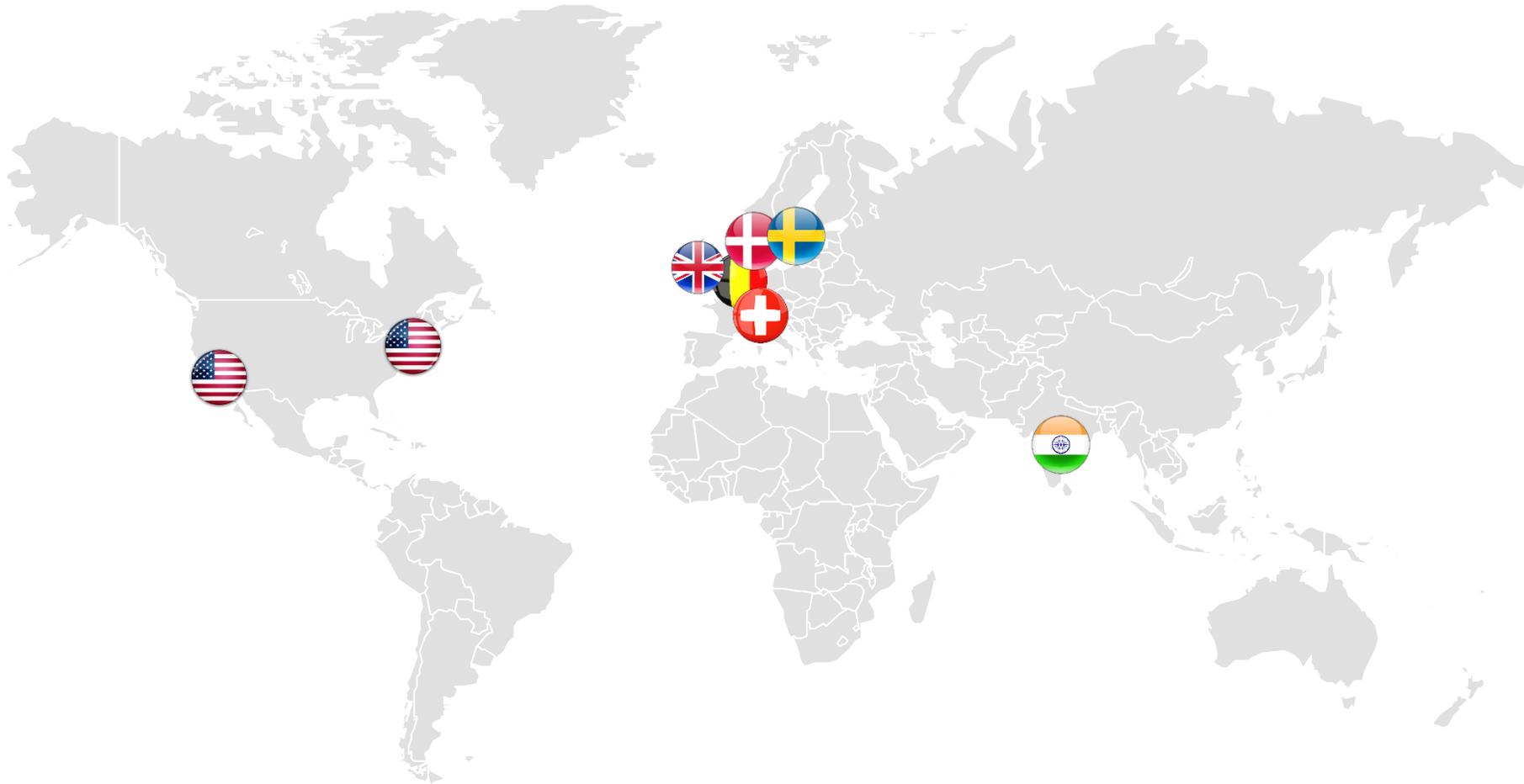
Threats

- High dependence on European Union in terms of imports and exports
- Uncertainty of EU's future
- High energy dependency
- Slowdown of growth in Western markets
- Currency fluctuations
- Closing labor market towards non-EU countries

Switzerland's business-friendly environment combined with high price and wage levels are favorable for innovation-focused and technology-based companies. However, the dependence on Europe and its uncertain future imposes a large threat on the Swiss economy that is hard to hedge against. Additionally, nationalistic and protectionist trends despite Switzerland's long open and free trade history can be observed.

Cluster Level: Selected major pharmaceuticals clusters

The concentration of pharma clusters focusing on innovative medicines is high in Western Europe



The leading pharma clusters are currently located within the major global pharmaceuticals markets. The two **US clusters** (Boston & SF Bay Area), and the **European clusters** (e.g. Basel) are **world-leading clusters in the fields of innovative drugs**, and research and development. During the last century clusters in emerging markets have gained size as well. One example of this is the pharmaceutical cluster in Maharashtra in India. Maharashtra emerged as one of the world's largest producers of bulk drugs³⁶, stressing the **demand for cheaper generic drugs in emerging nations**.

Cluster Level: Stairway Model

The industry structure is multidomestic with certain players pursuing global strategies

Global Market Matrix

	US ³⁷	EU ³⁷	CN ³⁸	JP ³⁷	LA ³⁹
1	Gilead Science	Novartis	Pfizer	Takeda	Sanofi
2	Johnson & Johnson	Sanofi	Astra Zeneca	Astellas Pharma	EMS
3	Roche	Pfizer	Bayer	Pfizer	Novartis
4	Pfizer	Roche	Sanofi	Daachi Sankyo	Pfizer
5	Novartis	Merck	Roche	Roche	Bayer

Firm Strategy Matrix

	National	Multidomestic	Global
Global			
Multidomestic	Gilead Science +4 Johnson & Merck Johnson Takeda	Novartis Roche Bayer Sanofi	Pfizer
National			

Evaluation

When mapping the 5 companies with the highest market share for the 5 largest regions worldwide a total of 13 different players that dominate the industry can be identified. This makes the pharmaceutical industry a multidomestic one. But while only a handful of companies pursue a multidomestic strategy, the majority pursues national strategies.

Certain industry characteristics distort the analysis. Most notably, the industry is highly fragmented and competitive with the Top 10 world market players ranging between 3.1% and 5.8% market share only (see Figure 1). The position in the Top 5 per region is also highly dependent on the innovation pipeline and yearly performance of companies. The composition of the Top 5 changes every year. Gilead Science for example jumped from place 16 in 2013 to place 1 in the U.S. due to the market introduction of one specific drug (Sovaldi – a hepatitis C treatment) that was acquired with the incorporation of Pharmasset for \$11.2bn in 2013³⁷. One can note that almost all major players pursue at least multidomestic strategies, while in certain regions (e.g. Japan) national strategies seem to work best.

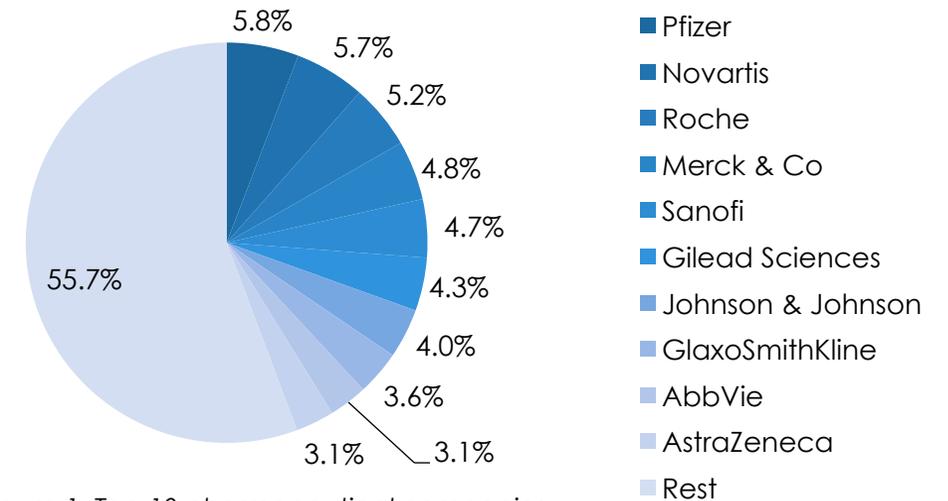


Figure 1. Top 10 pharmaceutical companies worldwide based on prescription drug market share⁴⁰

The main product focus of the Western pharma clusters is patent-protected innovative drugs

Products

By nature, pharmaceuticals are very diverse in what they treat and which effect they have on the patient. Major product groups include for example cancer drugs, antiviral drugs and antibiotics. However, from the perspective of pharmaceutical companies drugs can generally be divided into either patent-protected innovative drugs or generic drugs.



Patent-protected innovative drugs

- Characterized by ownership of a patent giving the pharmaceutical company the exclusive rights to produce & sell the drug
- Implies the creation of a temporary monopoly for a certain drug and, by extension, higher prices than in a competitive market



Generic drugs

- When the patent protection expires, generic drugs can enter the market which leads to lower prices
- Since no additional R&D is required and companies compete over the price of the products, an efficient production process is crucial

Customers

Due to the nature of pharmaceutical products and to patent protections, the final customer (i.e. the patient) often faces a monopoly and has little choice in which drug to acquire. This extends along the supply chain towards pharmacies and hospitals who buy the drugs either directly from the pharmaceutical company or through a wholesaler. Depending on the country, a part of the costs is borne by public or private health insurance.



Pharmacies & Hospitals

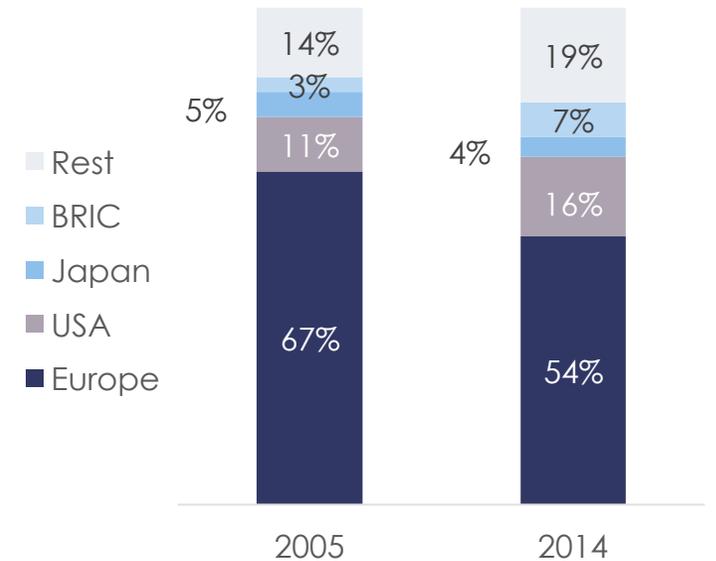
- Act as the main port towards consumer. Both innovative medicines as well as generics are either sold, or directly administered to the consumer
- Can acquire the drugs either directly from a pharmaceutical company or from a wholesaler



Wholesaler

- Act as middlemen between pharmaceutical companies and pharmacies or hospitals
- Generally characterized by the large quantities it buys and its warehouse facilities. From a pharmaceutical company's perspective, dealing with a wholesaler has the advantage of being able to sell in bulk

Export Markets of Cluster²⁸



- The Basel cluster exports about a quarter of their products to countries other than Europe, USA or Japan. This is an increase of 9 percentage points in comparison to ten years ago
- While the share of pharmaceuticals exported towards those emerging markets is on the rise, the maturing Western markets remain the main export targets of Basel pharma due to their sizes
- The dominance of the European market can be attributed to geographical proximity. Drugs targeted towards the US or Japanese market are in many cases produced closer to those markets

Cluster Level: Industry Dynamics

Threat of generics and a lack of innovation have caused sluggish industry growth

5 Forces

Supplier Power

Raw materials are commodity chemicals, available from numerous sources. Same for research & manufacturing supplies.

Substitutes

Mainly generics in case of patent run-out; currently weak innovation pipeline. Problem of counterfeit drugs that destroy reputation.

Rivalry:
High competition for high-level workers & researchers. Firms merging and big firms buying smaller firms.

Buyer Power

Medical patient lacks power. Insurance company with Power towards distributor. Pharmacy and hospital little power if patented.

New Entrants

Many new smaller companies with good ideas and venture capital funding But: Goal of startup is a sell-out to big Pharma companies.

Value Chain

Drug Discovery

Trials

New Drug Approval

Manufacturing

Marketing

Distribution & Sales

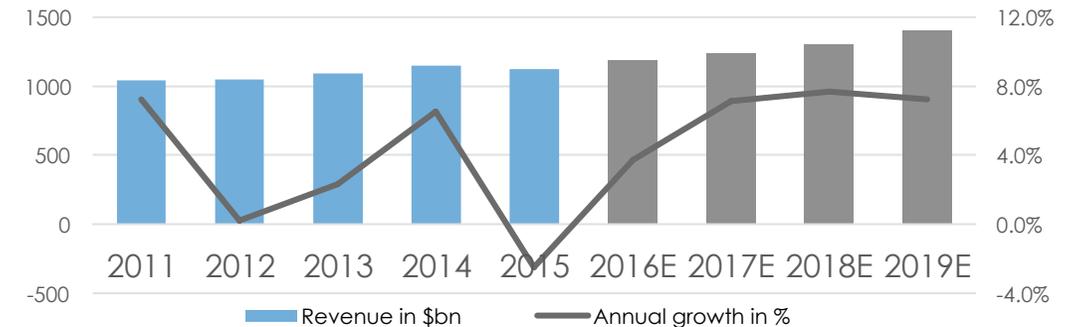
Research & Development Phase

Production Phase

- Can be divided into the **R&D phase** and the **production phase**⁴¹. Pharma companies who focus on innovative drugs usually invest heavily into the R&D phase. This in turn creates competition for highly-skilled researchers. Pharma companies specialized in generic drugs focus on making the production phase more efficient to gain cost-advantages
- Due to continuous product development, pharma's portfolio is changing constantly. Current fields of research involve nanotechnology and tissue re-engineering⁴²

Global Market Size

- In 2011 the global pharma market reached the mark of **\$1 trillion in sales**. Deloitte expects the market to reach the size of \$1.4 trillion by 2019⁴³. The two largest markets are the North American market with 36% of global pharmaceutical sales and Europe with 28%, but a large share is forecast to come from the emerging markets
- Relative to other industries, the pharma industry has performed poorly over the last decade (average share price development of pharma companies on par with STOXX Europe 600 Index, but trailing up to 50% behind other industries like utilities or FMCG)⁴⁴

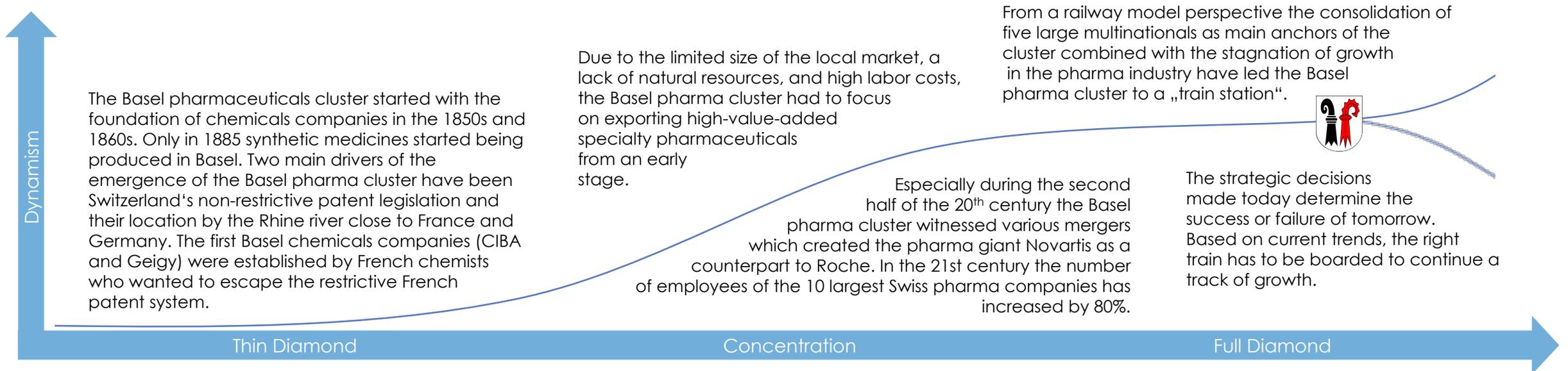
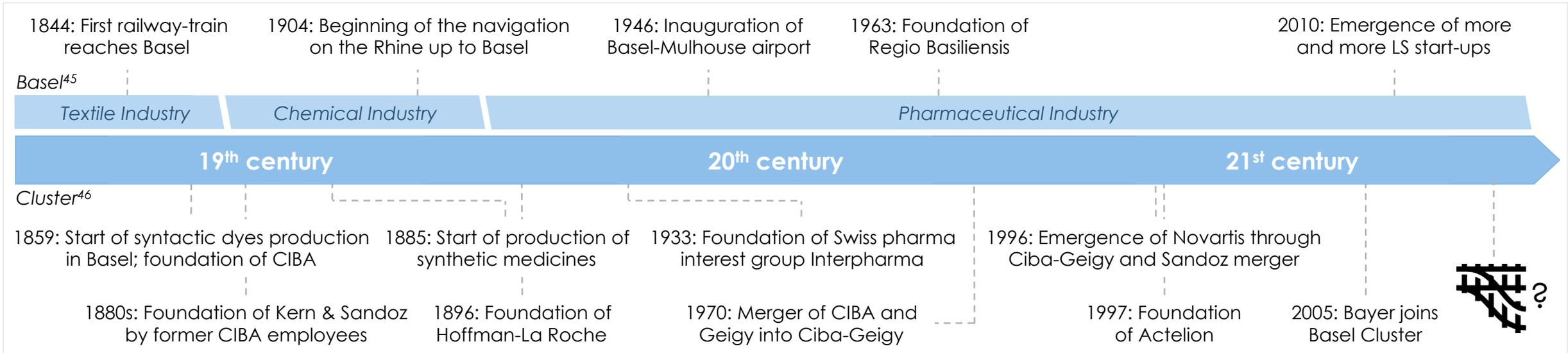


The position of pharmaceutical companies towards suppliers and buyers is, in general, favorable. Threat from new entrants is low as these rather function as a supplier of new product ideas and licenses than as competitors. However, threat from generic products and especially counterfeit products makes the industry unattractive. The high degree of competition from a number of multinational companies continues to decrease profit margins in the industry. Additionally, when looking at the global market size, it stands out that the last years have been characterized by sluggish growth. The threat of the patent cliff and generics, and a decline in pharma innovations have led to this decline in growth (2011-2015: ~5.5% CAGR vs. 2001-2010: ~8% CAGR)⁴³.

Cluster Level: Regional & Cluster History

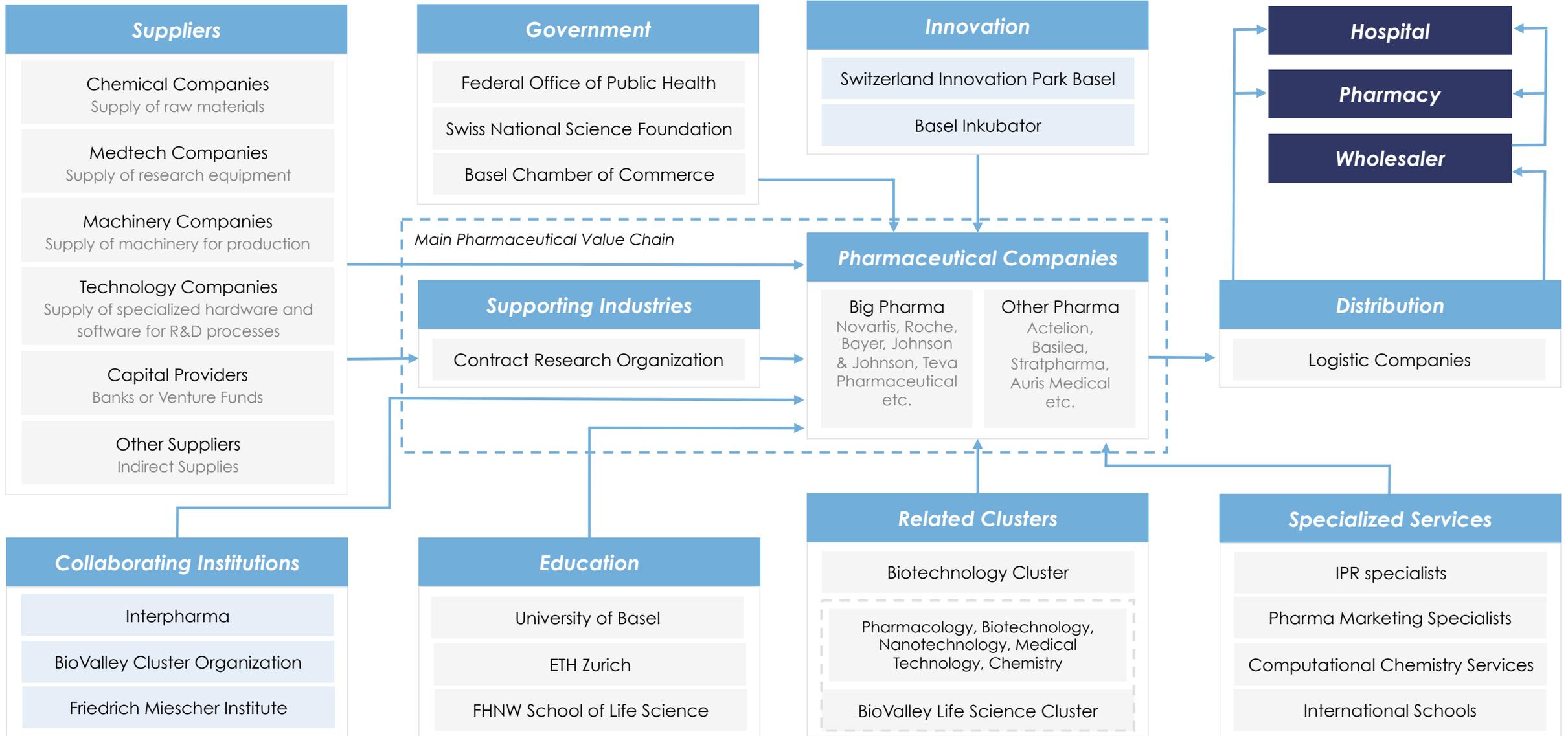


The Basel pharma cluster stands at a crossroad that decides about revival or decline



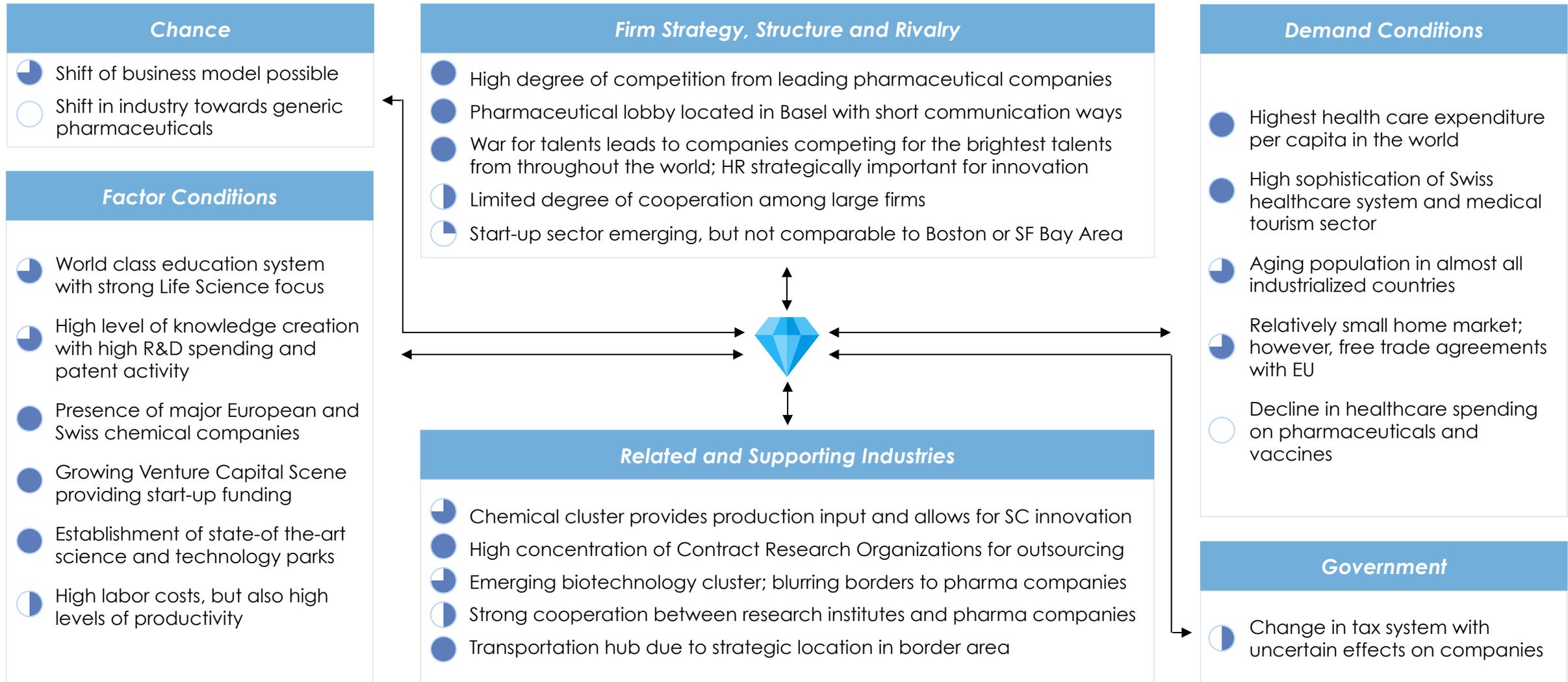
Cluster Level: Cluster Map

Today, a dense network of players and bridge builders explains the success of the cluster



Cluster Level: Cluster Diamond

The majority of cluster conditions is very positive; Current demand trends impose challenges



Cluster Level: Cluster Diamond – Factor Conditions

Input of knowledge by universities and research constitutes main factor conditions

	Description	Evaluation	
Human Capital	Basel shows an abundance of quality higher education institutions with a strong focus on Life Science. The University of Basel and the ETH Zürich contribute to a high ranking in the Shanghai index (52), only slightly behind London (53) ²⁸ .	World class university education provides human for research intensive pharma companies. It also serves as an innovation engine through research findings and start-up spin-offs. However, Basel is behind SF (72) & Boston (68) in the ranking ²⁸ .	
Knowledge	Basel shows an exceptional amount of R&D expenditure of 14.1% of the regional GDP, thus clearly outperforming Boston (5.8%) and SF (4.3%). Patent activity is also much higher with 170 Pharma patents compared to 91 and 68 respectively ²⁸ .	Innovation is a success driver in the industry. Basel seems to outperform other clusters in terms of innovativeness. However, the numbers provided do not account for the concentration of research intensive industries in Basel and their share of GDP.	
Material Supply	As part of the BioValley, Basel is in close proximity to suppliers of medical technology equipment and chemical products. Especially the latter is abundant in the area due to the historical development of the chemical industry in Switzerland ⁴⁷ .	The presence of local suppliers such as BASF and Brenntag Schweizerhall allow for close cooperation, the design of more efficient supply chains, knowledge sharing and can be key to innovations on process and product dimensions ⁴⁷ .	
Venture Capital	In recent years, more and more venture capital firms have established operations in Basel to fund local start-ups or provide training, facilities and the-like ²⁸ . Additionally, large players such as Novartis ⁴⁸ and Roche ⁴⁹ have set up own venture funds.	A vital start-up scene increases dynamism in clusters. Thus, the support for start-ups is important to promote the incentive to start ventures locally. Large firms benefit from the flow of new ideas or by acquiring start-ups and their respective innovations.	
Infrastructure	The infrastructure in Switzerland is ranked among the best in the world ³² . The history of pharma in Basel has lead to the specialization of local infrastructure to its specific needs. In recent years, 7 science parks have opened in the Basel area ⁵⁰ .	Functioning infrastructure is important to secure operations. This can include logistics, electricity supply and international schools for children of employees. Science parks aim to promote innovation by researchers coming together and sharing ideas.	
Labor Costs	Switzerland has the second highest hourly labor cost in Europe ⁵² . At the same time, Swiss LS employees show the highest level of productivity worldwide with 286,000 US\$ p.a compared to 275,000 US\$ in Boston & 265,000 US\$ in Oresund ²⁸ .	Labor costs impose immediate financial burdens for large and medium sized companies, but high productivity levels of labor can largely compensate for it in the long-run. However, the high labor cost still represent strong obstacles for founding start-ups.	

Factor conditions in the Basel cluster are largely positive and contribute to high dynamism. However, the Basel cluster also has potential for improvement, which is needed to keep track of more innovative clusters such as Boston and SF. Further progress has to be made in the areas R&D and in the start-up sector.

Cluster Level: Cluster Diamond – Demand Conditions

Demand conditions have been favorable, but a decline in spending poses a major threat

	Description	Evaluation	
Health Care Expenditure	In 2014 Switzerland showed the highest health care expenditure per capita with 9,674\$ per year, followed by Norway (9,522\$), the United States (9,403\$), Monaco (8,149\$), Luxembourg (8,138\$) and Sweden (6,808\$) ⁵² .	This leading position signals high demand and makes the country attractive for companies. It increases competition and the necessity to reinvest profits to stay ahead of competitors in order to fulfill sophisticated demand in western economies.	
Sophistication of Health Care System	The Swiss health care system was assigned high quality, high patient satisfaction and one of the longest life expectancies in the world ⁵³ . Furthermore, it is attractive for medical tourism; it is the 2 nd largest health & wellness tourism market in Europe ⁵⁴ .	Sophistication forces companies to innovate in order to quickly meet emerging demand. In order to remain attractive for medical tourism newest medical care has to be provided, increasing the demand and incentive for innovative products.	
Demography	The LS sector is expected to grow in the future, especially due to aging populations in western economies as the main long-term growth driver; the growth rates in population over 65 years from 2014 to 2019 in Western Europe is expected to be 21% ⁵⁵ .	Demographic trends increase the demand for pharmaceutical products and increase attractiveness and competition in the market segment for elderly healthcare. However, these trends are not limited to the Basel cluster.	
Size of Home Market	Despite active medicine tourism and a highly sophisticated medical sector the Swiss home market is relatively small with a population of 8.3 million, comparable to Denmark (5.7 million), Austria (8.5 million) and Sweden (9.8 million) ⁵⁶ .	However, due to its strategic location in central Europe and a bilateral free trade agreement with the European Union from 1972 the 'home market' currently has a population of over 500 million, forcing Swiss companies to compete internationally.	
Health Care Spending Trends	Health care spending on pharmaceuticals and vaccines declined in the past years in many OECD countries. This can be largely attributed to budget cuts in the health care sector, the run-out of patents and the resulting rise of generic products ⁵⁷ .	The rise of generics represents a threat for Swiss companies. The long R&D process of drugs forces companies to get innovations from outside-in. However, innovation from start-ups and research institutes is comparably scarce in the Basel cluster.	

Demand conditions have a slightly positive tendency; especially, trends in the demography and the consideration of Europe as a 'home market' are favorable. Nevertheless, current trends pose a risk to the Basel cluster. The rise of generics, decreasing profit margins and the long development time of drugs harm the competitiveness of Swiss pharma companies, which currently lack strong innovation pipelines. As the ability to spin-in innovation in the Basel cluster is rather limited compared to other pharma clusters with higher research and startup activity, the innovativeness of the cluster is in danger

Cluster Level: Cluster Diamond – Firm Strategy, Structure & Rivalry

A major drawback of the cluster is the lack of a sophisticated start-up culture

	Description	Evaluation	
Competition	The headquarters, manufacturing and / or R&D facilities of leading European and global pharmaceutical companies are located in the Basel region. This includes for example Novartis, Roche, Boehringer Ingelheim, Bayer and Actelion ⁴⁷ .	High comparability of core activities and agglomeration of companies that operate in similar markets – especially Novartis and Roche – leads to high degrees of competition and thus high pressure to be innovative.	
War for Talents	Switzerland ranks among the countries with the highest labor costs worldwide. However, this also signals the quality of the job market. Currently Switzerland is ranked after the U.S. as the 2 nd most attractive country to work in ³³ .	The war for talents in Basel contributes to further increasing the attractiveness of the Swiss job market. Apart from attracting talent from high ranked local universities, Switzerland will also remain attractive for foreigners.	
Lobbying	The interest / lobbying organization Interpharma is located in Basel. Interpharma handles PR issues, lobbies for strengthening IPRs and decreasing trade barriers. It also aims to strengthen the research and pharmaceutical site Switzerland ⁵⁸ .	Lobbying efforts were quite successful in the past, including the relocation of the systems biology department of ETH Zürich to Basel ⁵⁹ . Especially the strong focus on research might be beneficial in increasing the cluster innovativeness in the future.	
Cooperation	Due to the nature of the industry with firms competing for innovation and establishing a patent protected monopoly, cooperation among the pharmaceutical companies is limited to areas such safety, environmental protection and lobbying ⁵⁹ .	Nevertheless, large pharmaceuticals cooperate with other players in the cluster such as local suppliers, research institutes, biotech companies and start-ups. There are also indirect knowledge spillovers through employee mobility.	
Start-Up Culture	The majority of startups in the region operates in the LS sector. Just recently PIQUR, a local pharmaceutical startup, was awarded as the best startup in Switzerland ⁶⁰ . The startup sector is promoted by VCs and funds of large pharmaceuticals.	A rich vital startup scene that builds around innovation can be valuable for large companies through collaboration or spin-ins. However, the Basel region's start-up environment still lags behind other LS clusters such as Boston or SF.	

The high concentration of large pharmaceutical companies increases competition and forces the players to constantly innovate. However, innovation tends to emerge more and more from SMEs and startups in the pharmaceutical industry. In specific, the radical innovations from small, new ventures are limited in the cluster, the innovativeness of the region is low. This -problem is further intensified by a lack of product related competition of big pharma companies.

Cluster Level: Cluster Diamond – Relating and Supporting Industries

Due to the history of the cluster a dense network of related industries has developed

	Description	Evaluation	
Chemical Cluster	Chemical commodities are the main manufacturing input for pharmaceutical companies. The region contains numerous potential suppliers, ranging from producing multinationals such as BASF to chemical distributors such as Brenntag Schweizerhall.	Close vicinity enables players in the cluster to better coordinate operations along the supply chain and work together on process and product related innovations. However, many chemical companies started to relocate towards Asia ⁵⁹ .	
CROs	Global trends in the pharmaceutical industry include the fragmentation of value chain activities and outsourcing of prior insourced activities to specialized providers. Research and clinical trials for example are often outsourced to CROs.	The cluster shows the highest number of CROs in Switzerland with more than 50 CROs (out of 186) in commuting distance ⁶¹ . This infrastructure allows to outsource clinical research to specialized providers that are faster and offer higher quality.	
Biotechnology Cluster	The border of the biotechnology industry to the pharma industry, where the use of biotechnological processes for manufacturing becomes more and more common (e.g. use of E. coli to produce human insulin) are currently blurring.	The biotechnology cluster in Basel competes with clusters in the U.S., the UK, Germany and Scandinavia. As the use of biotechnology in pharmaceutical R&D increases, the cluster can serve as an important source of innovation.	
Research Institutes	Private research by companies contributes the lion share of R&D (93%). The remaining 7% are investments by university research institutes. The investment accounts for 1% of the regional GDP (compared to 1.2% in Boston and 0.3% in SF) ²⁸ .	University research provides new insights and findings that might be outside immediate commercial use, but still valuable in the sector. However, in R&D spending in absolute terms is clearly not comparable to the competing clusters.	
Logistic Cluster	Basel is often referred to as the "gate to Switzerland" in terms of passenger transportation and cargo with a strategic position in central Europe and connections through motorways, railways and the EuroAirport Basel-Mulhouse-Freiburg.	In 2011 the cluster initiative Logistikcluster Region Basel was founded to promote Basel as a transportation hub ⁶² . Local companies benefit from the dense network, reaching customers in all over Europe and many parts of the world.	

In terms of supporting industries, the Basel pharmaceutical cluster can benefit from the emerging biotechnology cluster; these two areas tend to merge more and more, allowing for collaboration and innovation spillovers used in both industries. As mentioned before, innovation is a vital point in every pharmaceutical cluster. While relative numbers indicate the strength of the Basel region, absolute numbers indicate a lack of innovativeness compared to SF and Boston.

Cluster Level: Cluster Diamond – Government & Chance

The rise of generics is the largest threat for the cluster, pushing it towards decline

	Description	Evaluation	
Taxation	For a long time the low corporate tax rates of Switzerland were one of the main reasons for businesses to go there. 68% of respondents in a KPMG study stated that the low tax rate was one of the reasons for them to go to Switzerland ⁶³ .	Recently, the Swiss government has started to align corporate tax rates with those of other countries, making the tax system less favorable. To compensate for that R&D costs are planned to be tax deductible. The reform comes into action latest 2020.	
Business Model Innovation	Strong pressure for cost reduction due to increasing regulations, spending control of governments and the rise of generics force pharma companies that base success on patent-protected monopolies to change their business models.	Innovative firms with high R&D spending in the Basel cluster can fragment their value chain and decrease costs and pressure for innovation by outsourcing activities or change their strategic focus towards personalized or digital medicine	
Trend towards Generics	The industry currently shows high pressure from declining governmental spending on drugs, introduction of spending control measures in emerging markets and tightened regulatory requirements that all increase effort and costs of pharmaceutical companies. At the same time the industry pipeline does not hold sufficient innovation in order to compensate for these developments ⁶⁴ .	This signals that the industry is heading towards decreasing profit margins and a further increase of demand for generics. In general it is argued that R&D spending at big pharmaceutical companies rather destroys than builds shareholder value and that most of the innovation comes from start-ups and biotechnology companies. As these are less present in the cluster, Basel pharma heads towards an innovation gap.	

The undergoing changes in the tax system might decrease the attractiveness of Switzerland for corporations. But industry trends such as decreasing profit margins and the shift towards generics are more threatening to the cluster. It imposes high pressure on the companies that almost have to shift their business models to enhance competitiveness by either finding a market niche (e.g. personalized or digital medicine) or being a first mover in effective value chain fragmentation.

Cluster Level: 7 Cluster Gap Model

The disconnection with ICT clusters is the main obstacle towards a revival of the cluster

Firm-to-Firm

- “Anchors” Roche & Novartis interact mainly through competition on innovations or HR
- SME's and start-ups show no gap in interactions, mostly due to the establishment of **joint networks** and the efforts of bridge builders like the **cluster initiative**
- Additionally, the “anchors” support start-ups with venture capital

Firm-to-Capital

- The connection between firms and capital providers is strong
- Anchor players are part of the Swiss Market Index (SMI)
- Basel pharma start-ups have a number of possible sources for **venture capital**: „Anchors“, as well as the cantonal banks and private venture capitalists close the gap between cluster firms and capital.

Firm-to-Global-Markets

- Switzerland is closely integrated into the world economy; its economic structure is characterized by its **pronounced outward orientation**
- Consequently, the constant improvement of access to foreign markets represents a core objective of Swiss foreign economic policy
- This is represented by their 39 FTAs¹¹, and **increasing exports of the Basel cluster** into the world markets

Firm-to-Research

- As research is core to the pharma industry, a significant part of research happens within firms
- **Co-operation** with **University** of Basel, ETH Zürich, and FHNW facilitate a high level of innovativeness within the cluster
- Innovativeness gets amplified by the Basel start-up incubator, the technology park Basel, and the Swiss innovation park, supported cluster participants

Firm-to-Public

- No gap between the firms of the Basel cluster and the cantonal or federal government authorities
- On the contrary, many governmental bodies (chamber of commerce or canton) actively support the cluster in its development
- They establish the necessary **innovation infrastructure**, engage in **lobbying** and create initiatives for better cross-firm communication

Firm-to-Education

- Firm-to-education-gap is minimal
- **Co-operations, common research projects, and guest lectures** with University of Basel, ETH Zürich, and FHNW are indicators of a largely closed gap
- These strong ties can be explained by the positive incentives both sides have to collaborate: Pharma firms gain access to highly-skilled HR, while universities gain, among other things, financing

Firm-to-Cluster

- Strong ties towards the connected clusters relevant for the pharma supply chain (i.e. chemicals and medtech) in Basel, Bern and Zürich.
- Additionally, organizations like **BioValley** connect Basel's pharma cluster internationally to the LS clusters in southern Germany and eastern France
- There is a significant **gap towards the Swiss ICT clusters** (lack of forums and research projects)

Basel's pharma cluster is very well-connected. Due to positive incentives to collaborate, the gaps between the cluster firms and research, education, public authorities and capital providers are especially well-bridged. Additionally, Switzerland's dependency on the global market drives a constant governmental effort to bridge any gap between Basel and the global markets. Due to the nature of Novartis' and Roche's relationship as competitors, interaction between them mainly takes the form of competition. However, their interactions with the start-ups reach the extent of investing in them. Due to common platforms start-ups interact frequently with each other. One large gap is between Basel's pharma firms and the **ICT clusters in Bern and Zürich**. Unlike, the SF cluster, that has Silicon Valley in front of their doorstep, Basel currently does not utilize close ICT clusters as a source of technical innovations.

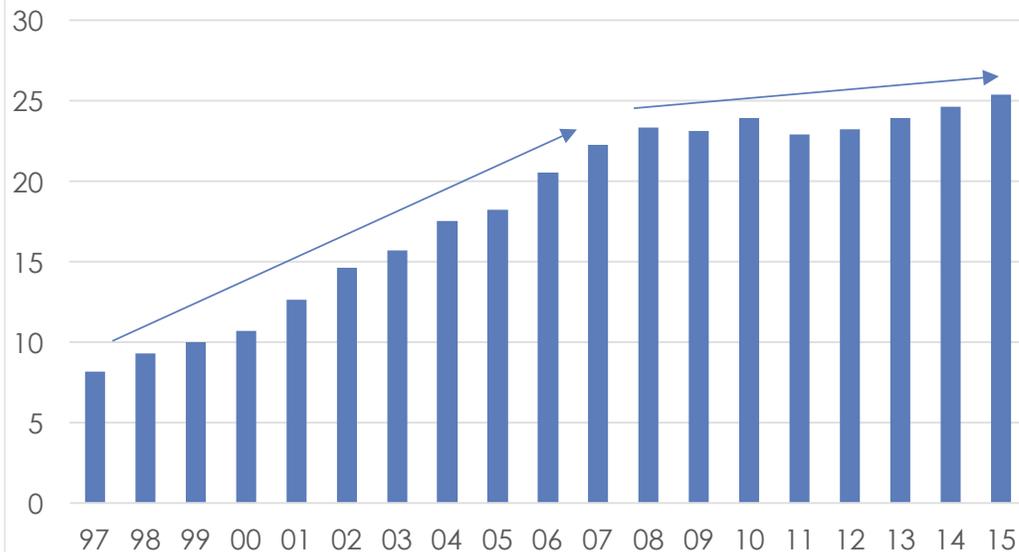
Cluster Level: Performance

Basel's growth is stagnating in spite of strong innovativeness, due to industry trends

Gross value added over time

- Similarly to the cluster dynamism, the cluster performance measured in nominal gross value added (NGVA) has started to **stagnate over the last decade**
- While the NGVA has tripled over the past 19 years, the largest fraction of this growth occurred in the period between 1997 and 2007 after the merger of Ciba-Geigy and Sandoz into Novartis, and the foundation of rare diseases drug specialist Actelion
- The overall slowdown of cluster performance growth is comparable to the overall development of the global pharmaceuticals industry (i.e. a decrease of growth towards ~4% p.a.)²⁸.

Nominal gross value added of cluster (in CHFbn)²⁸



Static advantages

- In terms of competitiveness, Basel's **advantageous access** to a **highly-educated workforce** stands out. Within commuting distance, Basel's pharma cluster can access a multitude of universities and research facilities in the Basel, Bern and Zürich areas.
- The country's **stable environment** in combination with a **business-friendly tax system** increases Basel's competitiveness. This is reflected in the competitiveness report of the World Economic Forum where Basel scores in the top 11 of all basic requirements³².
- Switzerland's relatively high labour costs and small domestic demand negatively impact the Basel cluster's competitiveness from a static perspective.



Dynamic advantages

- In terms of innovativeness, on the other hand, Basel's pharma cluster benefits from the relatively **high labour cost**, since it attracts highly-skilled researchers from other areas and forces pharma companies to be efficient in their use of human resources (signified by the highest relative productivity for any life science cluster with \$282,000)²⁸.
- Basel's small Swiss home market forces them to be successful across borders leading to **partnerships in Europe, the US and emerging markets**.
- Another long-term positive driver leading towards more innovativeness is the **Swiss focus on tertiary industries** and more specifically research. This is reflected in the global competitiveness ranking of the World Economic Forum where Switzerland is consistently ranked first in terms of business sophistication and innovation³².

Cluster Level: Cluster benchmark – An overview

Basel is the most important European cluster, but boasts fewer large players than US clusters

<p>Boston⁶⁵ </p> <p>Market position: Globally leading cluster</p> <p>Approximate # of employees: 74'000</p> <p>Main players: Novartis, Merck, Takeda, Pfizer, Bayer, Roche, Johnson & Johnson, Sanofi, Boston Scientific</p> <p>Cluster focus: Mainly innovative medicines, but also generic drugs. Additionally, massive biotech cluster.</p>	<p>Basel²⁸ </p> <p>Market position: European leading cluster</p> <p>Approximate # of employees: 25'000</p> <p>Main players: Novartis, Roche, Actelion, Bayer, Boehringer Ingelheim, Basilea, Vifor Pharma, Johnson & Johnson</p> <p>Cluster focus: Mainly innovative medicines, but also generic drugs. No general product focus due to size of cluster</p>	<p>Øresund^{31,66}  </p> <p>Market position: European leading cluster</p> <p>Approximate # of employees: 22'000</p> <p>Main players: Novo Nordisk, LEO Pharma, Baxter Gambro, Lundbeck, AstraZeneca</p> <p>Cluster focus: Focus on oncology, nervous system and immunology for drug compound development</p>
<p>SF Bay Area⁶⁷ </p> <p>Market position: Globally leading cluster</p> <p>Approximate # of employees: 52'000</p> <p>Main players: Pfizer, Novartis, Roche, Boehringer Ingelheim, Bayer, Merck, Actelion, Boston Scientific, Google</p> <p>Cluster focus: Mainly innovative medicines, but also generic drugs. Additionally, massive biotech cluster.</p>	<p>Flanders⁶⁸ </p> <p>Market position: European leading cluster</p> <p>Approximate # of employees: 11'000</p> <p>Main players: Johnson & Johnson, Bayer, Pfizer, Novartis, Omega Pharma</p> <p>Cluster focus: Mainly innovative medicines, but also generic drugs. More specialized on biopharma.</p>	<p>Cambridge⁶⁹ </p> <p>Market position: Smaller European cluster</p> <p>Approximate # of employees: 5'000</p> <p>Main players: AstraZeneca, Pfizer</p> <p>Cluster focus: Numerous local SME'S (93% of cluster participants have less than 250 employees. Additionally, boasts Europe's largest hospital network.</p>

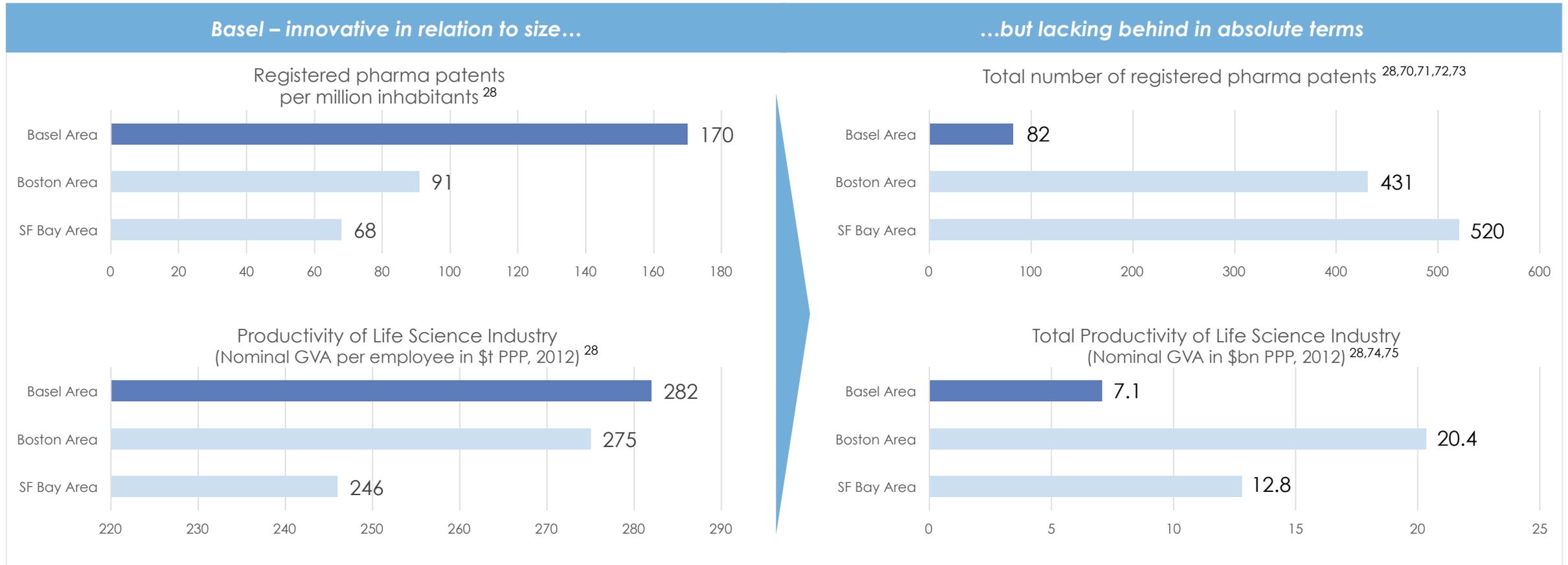
Evaluation

The analysis makes it obvious that there is **no central European pharma cluster**. In Europe, Basel is currently the leading pharma cluster. A major strength includes the location of Roche's and Novartis' headquarters in Basel. The main competing European clusters are Øresund and Flanders. Øresund is home to the major growing Nordic pharma companies while Flanders is popular with many of the globally operating MNCs (e.g. J&J, Bayer, Novartis). Cambridge, on the other hand, is the main cluster for AstraZeneca and many local SME-like research labs, fueled by their location close to major universities. The American clusters outscale the Basel pharma cluster by a wide margin and host all global MNCs including Novartis and Roche.



Cluster Level: Cluster benchmark

Basel is innovative in relative terms but lacks behind the US clusters by absolute numbers



The fact that Novartis and Roche have their headquarters in Basel combined with the relatively small population of the Basel area (i.e. ~480,000) leads to an extremely high density of pharma-related patents and innovation within this part of Switzerland. However, when we multiply the number of patents per million inhabitants with the respective populations (Boston area: ~4,730,000, SF Bay Area ~7,650,000) the differences between the large US clusters and the smaller Basel cluster become apparent. The Basel area's productivity is also comparatively high in relative terms. It could be argued that, due to the higher labor costs in Switzerland, this cluster was forced to use their human resources more efficiently which in turn results in a higher productivity. However, the GVA lacks behind the larger US clusters in absolute terms.

Cluster Level: Industry Trends

Cluster trends stress the need for more innovation & connection between pharma and tech

New Cluster Participants

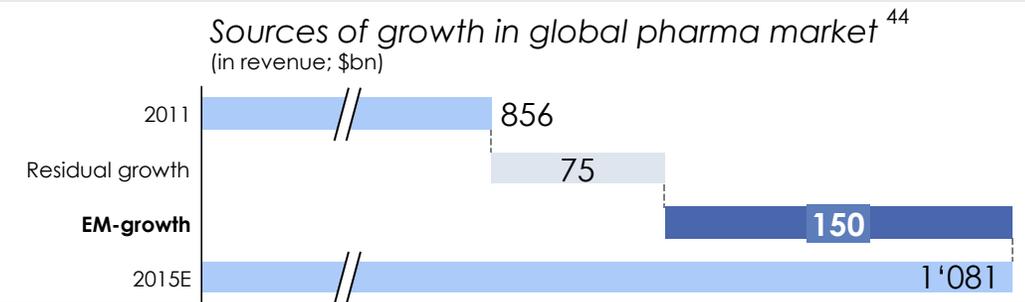
In the last two decades **two new major players** (both multi-billion dollar companies) have entered the cluster in Actelion and Bayer. While Bayer entered the cluster through the acquisition of the consumer care division of Roche, the rare diseases drug specialist Actelion grew organically within the cluster. Additionally, **university-based start-ups** have been adding to the growth and potential of the cluster. A disproportionate share of Basel start-ups are focusing on Life Sciences (50%)⁷⁶.

Digitalization of Pharma

The digitalization of pharma gives the industry the opportunity of **more intensive research and technological innovations**⁷⁷. For the Basel cluster, this trend also stresses the need for a **connection to local ICT clusters** in Bern and Zürich with the pharma cluster in Basel. While other clusters like SF Bay Area are well-connected with their tech counterparts in Silicon Valley, Basel lags behind in that regard. Not following the trend of increased interconnectedness of pharma and technology imposes the threat of being a late follower and having competitive disadvantages in the future.

Demand shift towards emerging markets

The two largest pharma markets are the North American market with 36% of global pharmaceutical sales and Europe with 28%. For the past years, the **emerging markets** have played an **increasing role** in the generation of growth. Between 2010 and 2015 ~67% of global pharma growth originated in emerging markets. This trend is expected to continue over the next years. Two reasons for this are the economic growth in the emerging markets and patent expirations in maturing markets⁴⁴.



Patent Cliff

The patent cliff is especially **problematic for the two largest established players** in the Basel cluster. 2016, Novartis has lost the patent protection for the cancer drug Gilevec which produced sales of \$3.4bn during three quarters in 2015. Through product diversification Roche stayed more immune towards the patent cliff, but is facing a decrease of revenues as well⁷⁸. A well-known antidote against the patent cliff is to improve the innovation pipeline and ensure a steady flow of new drugs.

The future holds a number of hurdles for the Basel pharma cluster. While the challenge of the patent cliff is becoming a headache for pharma companies, the digitalization of the healthcare industry and the growth shift towards emerging markets offers opportunities. On one hand, when mastered, both the connection of ICT and pharma, and the rising demand in emerging markets can lead to a competitive advantage of the Basel pharma cluster. On the other hand, should the challenges not be mitigated, the cluster risks falling behind. The key question is whether the Basel pharma cluster can leverage the opportunities of increasing digitalization, growth in emerging markets and new cluster participants while mastering the patent cliff and tackling the issue of maturing Western market.

General Information

- Novartis was established in 1996 through the merger of Ciba-Geigy and Sandoz⁷⁹
- **Headquarter in Basel, Switzerland**
- **2nd largest pharmaceutical company in the world** in terms of revenues
- In 2014 Novartis employed over 130,000 people in different sites around the world⁸⁰
- From 2007 to 2011 revenues of Novartis increased with a CAGR of 8.0%⁸¹ slightly above industry growth (CAGR of 7.3%⁸²)
- When growth in the industry started to slow down, Novartis' revenues also stagnated; the drop in 2015 is attributable to the spin-off of OTC and consumer health division

Strategy

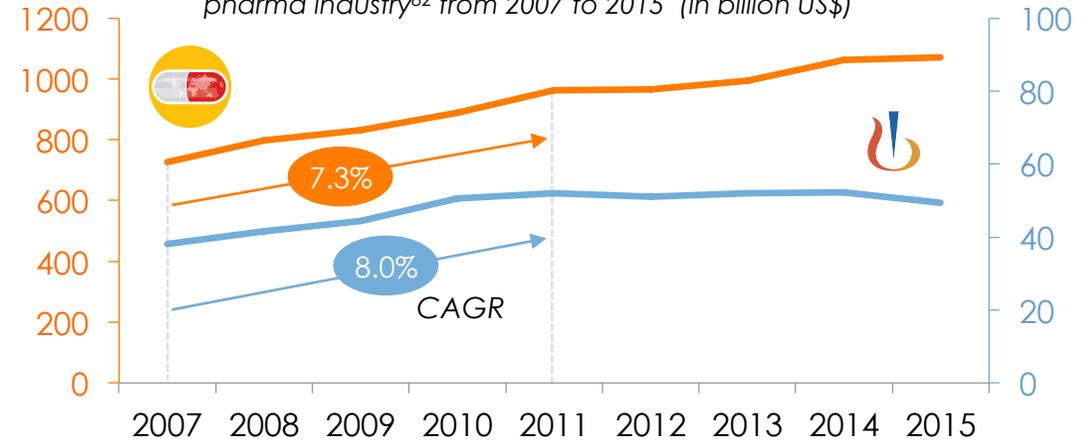
“Our strategy is to use science-based innovations to deliver better patient outcomes”

Products – Following a corporate restructuring towards being a focused provider of innovative medicine, Novartis product portfolio includes **pharmaceuticals, generics and eye care**, which is reflected in the corporate structure⁸³.

Innovation – A core pillar of Novartis' **strategy is science-based innovation**. Novartis aims to completely fund R&D with internally generated resources and in 2013 invested 15.3% of its revenues in R&D⁸⁴, compared to 17.9% industry average⁸⁵. However, through the company restructuring the number increased to 17.7% in 2015. The ration of in-house produced to licenced drugs is approximately 70:30⁸⁶.

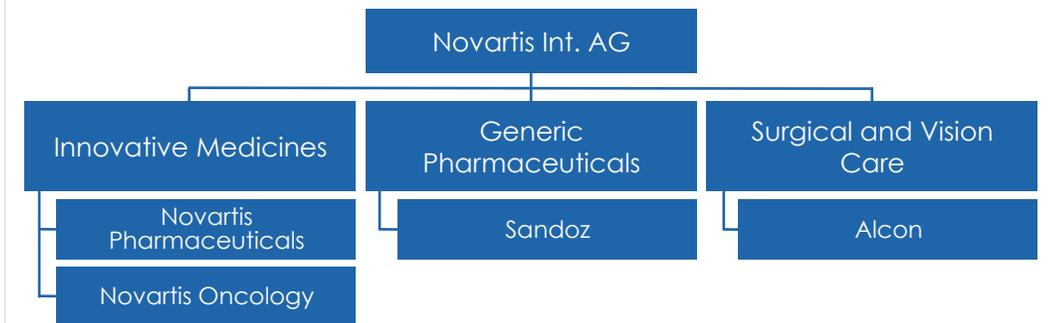
Growth Areas – Novartis operates at a **global scale** and aims to further focus on growth areas in the health care sector. The company is currently among the Top 5 pharma companies in the U.S., Europe, Latin America and are also present in China and Japan. Novartis **aims to further strengthen presence in emerging markets** were demand becomes more sophisticated⁸⁷.

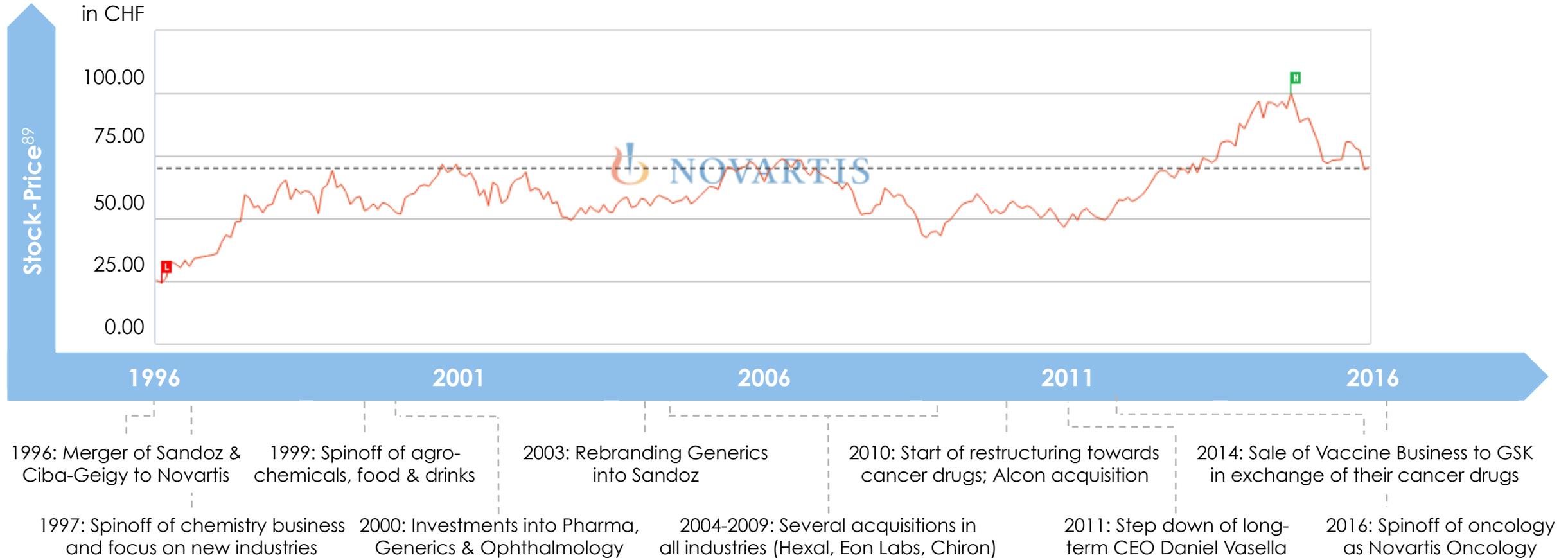
Figure 2. Revenues of Novartis AG⁸¹ and worldwide pharma industry⁸² from 2007 to 2015 (in billion US\$)



Corporate Structure

- Innovative medicine with high research focus and mostly innovative and patented drugs
- Sandoz is a provider of generic pharmaceuticals
- Alcon responsible for eye care⁸⁸; acquired in 2010⁷⁹.



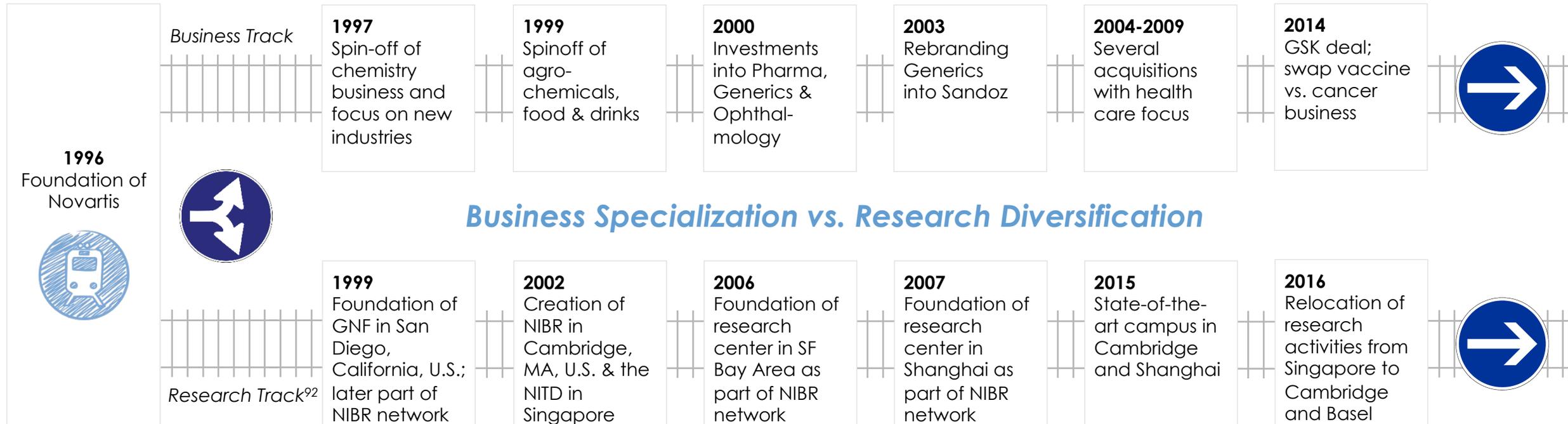


Performance Evaluation

When looking at the stock price, one can observe stability from the late 1990s until 2011, indicating a good performance in a very competitive and growing industry. Even during the financial crisis the stock price did not drop significantly. Starting in 2011 the stock price of Novartis increased to its all-time peak in 2015 as increasing specialization towards pharmaceuticals, generics and eye care through the GSK deal enables more efficient R&D and therefore promises increasing profit margins²⁰. Switching from Novartis' suffering vaccine business towards their strong performing cancer business was appreciated by investors²¹. However, profit margins did not improve and corporate restructuring in 2016 led to a decrease in the stock price.

Firm Level: Novartis Strategy from a Railway Model Perspective

Novartis focused early on innovative pharma and diversified R&D



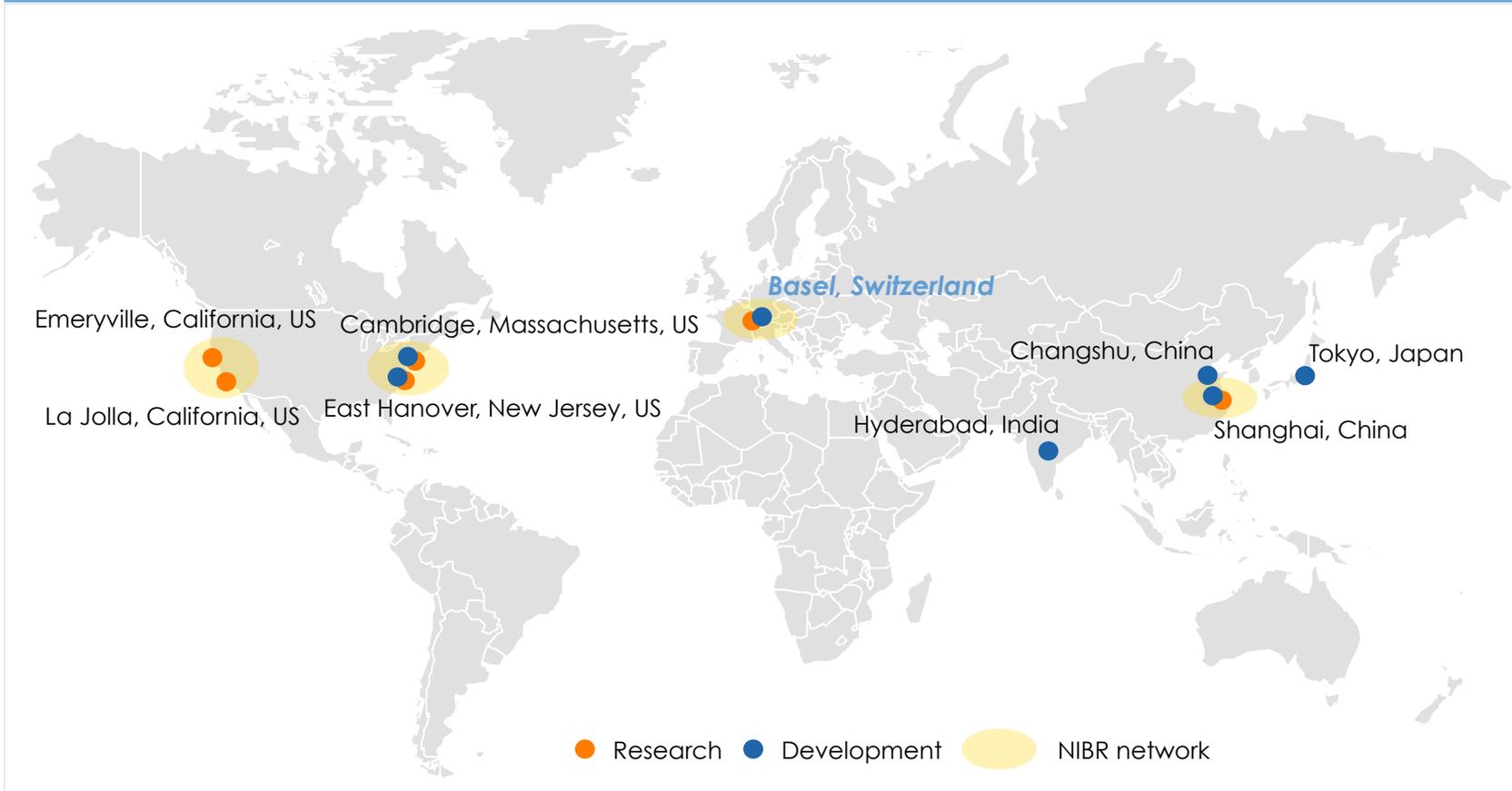
Strategic Lock-In

Novartis follows a strict strategy of business specialization towards innovative pharmaceuticals, generics and eye care and a geographical diversification trend of research & development. These strategic decisions, taken early on since the company's foundation largely bind Novartis direction for the future as a diversification would require time and a large amount of capital. However, similar business specialization trends can be observed throughout the industry.

R&D Approach

While the focus on certain product categories makes sense from a business perspective, as narrowing on fewer research areas comes with more efficiency and reduced R&D expenditure / costs, the geographical dispersion of R&D activities as such is of special interest. Even though the company is headquarter in Basel, R&D centers are spread around the globe. Novartis had formed the Novartis Institutes for BioMedical Research Network (NIBR), consisting of 7 research facilities and being headquartered in another pharma cluster than Basel – Cambridge, Massachusetts, U.S.). To understand the strategy of geographical dispersion of research centers Novartis' and its rivals' approaches towards R&D and implications for the Basel cluster have to be analyzed more closely.

Novartis Global R&D Approach⁹²



Industry Standard

Similar to many leading players in the pharma industry Novartis applies a global R&D strategy by forming and connecting research hubs across important Life Science clusters around the world.

The reason behind globally dispersed R&D is the belief that a single company can never fully understand the complexity of human diseases and that collaboration with different stakeholder groups – that are spread across the globe – is essential to be innovative.

Conclusion

This also reveals that there can never be a single *Hollywood Cluster* in the Pharma industry with global importance. On the contrary, one can observe that the majority of pharma companies is present in many regions worldwide.

Implication

For the Basel cluster this implies that competing clusters are other European clusters such as Flanders, Øresund and Cambridge (UK). SF and Cambridge (US) are rather potential allies towards a global pharma cluster of innovation.

Other Global R&D Approaches



Firm-to-Firm

- Inter firm collaboration limited to areas as health & safety, education and lobbying, due to strong competition in core product segments
- However, competition fosters the war for talents and employee mobility leads to knowledge spill-overs between firms
- Cooperation with start-ups through venture fund
- Among suppliers are many local and national SMEs

Firm-to-Capital

- Listed at stock exchange
- Capital is provided by equity and regular debt capital from banks
- Novartis has a comparably high and stable credit rating at major rating agencies such as Fitch, S&P and Moody's⁹⁶

Firm-to-Global-Markets

- According to the Stairway Model classified as a multidomestic company
- However, Novartis generates sales in almost all markets worldwide and is currently expanding global reach through emerging market strategy⁹⁸

Firm-to-Research

- Historical connection to research institutes: 1970 establishment of Friedrich Miescher Institute with the aim to bring together Novartis' and public research strength
- Furthermore, board members of the company are professors at local universities
- Novartis maintains alliances with over 300 academic institutions, locally and internationally⁹³

Firm-to-Public

- Public relations handled by local public affairs office
- Striving towards constructive dialogue with policy makers and trade associations; Novartis even contributes financial resources if this is allowed under local regulations⁹⁷
- Member of the pharma interest group Interpharma, located in Basel

Firm-to-Education

- Offering tailored education programs in cooperation with higher education institutions such as the University of Basel (Next Generation Scientist (NGS) program⁹⁴ and the Novartis International Biotechnology Leadership Camp⁹⁵)
- Personal sponsoring of talents aims at professional development towards careers in the pharmaceutical industry

Firm-to-Cluster

- Globally connected to other important pharma clusters such as Cambridge (U.S.), SF and Shanghai
- Connection through other local clusters either via business relationships or the BioValley Cluster organization
- No information can be found about connections to Swiss ICT clusters, but Novartis plans to introduce a digital health strategy in 2017

Novartis is well connected in the Basel cluster due to its history and the established 'anchor' status, using its vast resources, reputation and best practices to keep gaps to important actors as close as possible. Novartis and other big pharma companies shape the picture of the cluster, which is why the firm-level analysis of the 7 gaps only varies slightly to the cluster-level analysis.

However, through the analysis important information towards the importance of the cluster in a worldwide context can be inferred. (1) While the cluster is innovative, current stagnation endangers its ranking among major European pharmaceutical clusters. (2) Especially the future outlook is not promising when considering emerging trends in digital healthcare. (3) Thus, to remain innovative and maintain importance, gaps to local and international ICT clusters have to be closed.

Policy Recommendation: Hollywood Model

The global pharma industry has no definite Hollywood, but regionally important clusters



- No definite Hollywood in the pharma industry
- There are places where every company has to be present in order to be successful (e.g. Cambridge)
- But presence in other clusters is of vital importance for pharma companies to be competitive and successful



- Therefore, a single cluster with Hollywood will never dominate the pharma industry alone
- There will rather be competition for regional Hollywood status, e.g. in central Europe, to attract firms to include the respective cluster into the global R&D network
- An adaption of the Hollywood Model is recommended

The Bollywood Model



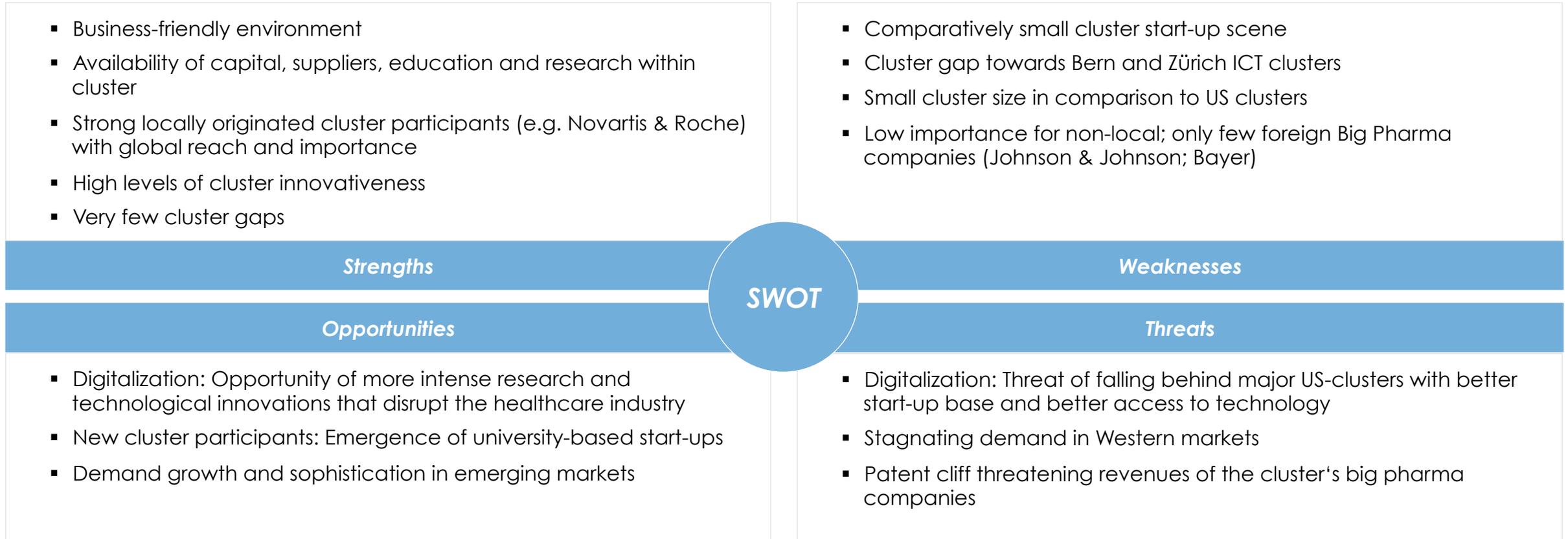
In a knowledge-based industry where innovation is a key success driver, it is no longer sufficient to be present in one single successful cluster. Rather than having a Hollywood Cluster, these industries have several clusters with regional importance, similar to what Bollywood is in the Film-Industry. But on the contrary to film-making firms have to diversify operations, especially R&D, across the globe by establishing research centers in different clusters, where the interconnectedness gives rise to Super Clusters of Innovation⁹⁹, characterized by intense knowledge sharing of locally generated ideas.

The analysis with the Bollywood Model reveals that clusters such as San Francisco, Cambridge (U.S.) and Shanghai do not compete with Basel, but represent potential allies. Basel rather competes with European Clusters such as Flanders, Øresund and Cambridge (UK) to attract companies.

In every of the European clusters, locally founded companies have headquarters or major subsidiaries therein. Furthermore, some international players settled down in the clusters. As local players are largely bound by heritage and high investment in facilities (Railway Model) attracting international players and start-ups needs to be the major goal for the Basel cluster in order to remain its competitiveness and innovativeness.

Policy Recommendation: SWOT Analysis of Cluster

Recommendations need to address risks that make Basel loosing ground in terms of innovation



Basis for Policy Recommendation

A SWOT analysis of Basel's pharma cluster shows the need for policy intervention to address the threat of falling behind major U.S. clusters in terms of innovation and access to technology. Weaknesses like the comparatively small start-up scene and the cluster gap towards Swiss ICT clusters need to be countered in order for Basel's pharma cluster to stay competitive in the fight for being Europe's main pharmaceuticals cluster and to avoid irrelevancy in comparison to Boston and the SF Bay area.

Policy Recommendation: The Basel Cluster Strategy 2017

All cluster participants need to fulfill their tasks to ensure the cluster revival

Strategy

“Leverage the digitalization of healthcare and the increasing sophistication of emerging markets, and establish Basel as Europe’s prime pharma start-up hub!”

Create start-up branding concept



- **What:** To increase Basel's pharma start-up footprint, local institutions develop a branding concept that promotes Basel Europe-wide as the main pharma start-up hub boasting venture capital, incubators, and large pharma giants
- **By whom:** Cantonal Government, chamber of commerce

Establish Swiss Cluster organization

- **What:** To connect technology and pharma a local cluster organization, similar to the BioValley (e.g. DigiValley) needs to be established, organizing joint communications platforms, symposia and workshops for tech and pharma companies
- **By whom:** Trade associations, Basel cluster organizations



Launch joint university research programs



- **What:** To boost the creation of innovations in the area of digital healthcare, joint ICT/pharma workshops, seminars and research projects are launched in a collaboration of cluster organizations, big pharma and universities
- **By whom:** Universities, research institutes, Basel cluster organizations, local ICT cluster, big pharma

2017

2018

2019

2020

2021

Create differentiated targeting strategies



- **What:** A strategy for developed and emerging markets respectively is developed. Thereby, the differences in demand and industry trends are taken into consideration (Developed markets: digitalization of healthcare vs. emerging markets: sophistication of demand)
- **By whom:** Big pharma

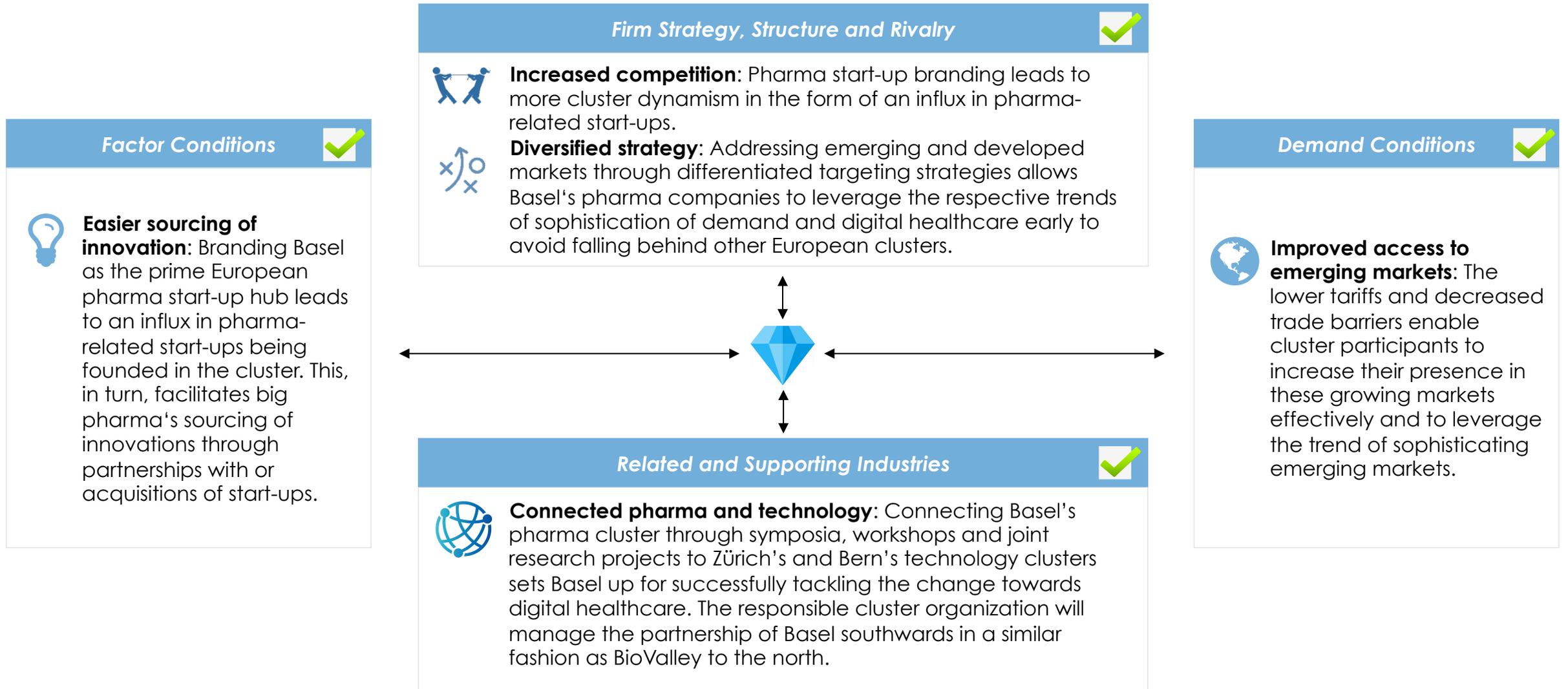
Ensure effective market access to EM

- **What:** To ensure that Basel's pharma companies can access the growing emerging markets effectively, the reduction of tariffs and other trade barriers is a focus of the federal government and Interpharma
- **By whom:** Federal government, Interpharma



Policy Recommendation: Adjusting the Diamond

The Basel Cluster Strategy 2017 will improve factors on all four sides of the Diamond



Vision 2030

By 2030, a global pharma cluster of innovation has emerged, focusing on high quality patented drugs and digital healthcare. This super cluster includes San Francisco, Cambridge (Massachusetts), Shanghai and Basel. Big Pharma companies like Pfizer, Novartis and Roche have opted to base institutes of their global research networks in all of these clusters in order to leverage promising innovations that arise from high dynamism within these clusters.

SF Bay Area, California, US

Cambridge, Massachusetts, US

Basel has defended its position as the leading European pharma cluster by utilizing trends of higher demand sophistication in emerging markets and the beginning of digital healthcare early on. Private and public research in both fields is on par with its North American and Asian counterparts, related ICT clusters in Switzerland and other parts of Europe constantly provide innovation and firms have learned to leverage the power of clusters by collaboration and open innovation.

The foundation of the DigiValley Cluster Organization in 2017 and the connection through Europe's major Life Science cluster through BioValley created to largest Digital Pharma Cluster in the Europe, Middle East and Africa region.

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