



Part II-b

FIRES-Reform Strategy for Germany

Sanders, M., M. Fritsch, A. Herrmann, G. Latifi, B. Pager, L. Szerb,
E. Terragno Bogliaccini and M. Wyrwich

Document Identifier

Part II, chapter 1 of D5.12 An institutional reform strategy for Germany, for Italy, and for the UK

Version

3.0

Date Due

M36

Submission date

25-04-2018

WorkPackage

5

Lead Beneficiary

UU



Version	Date	Amended by	Changes
1.0			
2.0			

Partners involved

Number	Partner name	People involved
1.0		
1.0		
1.0		

Contents

List of abbreviations.....	4
List of tables.....	4
List of figures.....	5
Executive Summary.....	7
Introduction	8
Step 1: Historical Roots of Institutions and Recent Policies	9
1.1 United, divided, reunited – a short history of Germany	9
1.2 Institutions governing knowledge transfer	11
1.2.1 A historical background of German education.....	11
1.2.2 The Patent System.....	13
1.3 Financial development of Germany: Banks.....	13
1.4 Labour markets in Germany	14
1.4.1 Employment protection.....	14
1.4.2 Wage bargaining.....	15
1.4.3 Social security	16
1.5 Recent entrepreneurship policies in Germany.....	16
1.5.1 Entrepreneurship in divided Germany: 1945-1989.....	16
1.5.2 Entrepreneurship and entrepreneurship policy after unification	17
1.6 Conclusion	19
Step 2: Data Analysis with GEI & REDI for Germany.....	20
2.1 Self-employment and business formation in Germany since 1991.....	20
2.2 Germany’s international position.....	24
2.3 A more detailed quick scan.....	28
2.4 A tide lifting all boats or investing in excellence?	35
2.5 Overall conclusions GEI-REDI analysis	38
Step 3: Triangulating History, Data and Survey results.....	39
3.1 Regulatory barriers to entrepreneurship in Germany.....	39
3.2 Founders’ suggestions for reforms in Germany	41
3.3 Conclusions	43
Step 4: Mapping onto the FIRES-reform proposals	44
Conclusions	50
Bibliography	51

List of abbreviations

BMWi : Bundesministeriums für Wirtschaft und Energie.....	18
ca : Circa (around about).....	10, 14, 15
e.g. : Example.....	passim
ESF : European Social Funds.....	12, 18
EU : European Union.....	passim
FDIC : Federal Deposit Insurance Corporation.....	45
FIRES : Financial and Institutional Reforms to build an Entrepreneurial Society	passim
FRG : Federal Republic of Germany	10
GDI : Gründerland Deutschland Initiative.....	18
GDP : Gross Domestic Product.....	18
GDR : German Democratic Republic.....	10, 15, 17, 56
GEI : Global Entrepreneurship Index.....	passim
<i>GÖBI : Göttinger Fonds für örtliche Beschäftigungsinitiativen</i>	<i>19</i>
HEI : Higher Education Institution.....	12
ICT : Information and Communication Technology	18, 47
IPR : Intellectual Property Rights	45
KfW : Kreditanstalt für Wiederaufbau	17, 18
MRE : Minimum Required Effort.....	35
NUTS : Nomenclature des unités territoriales statistiques	28, 31
OECD : Organization for Economic Cooperation and Development.....	passim
PISA : Programme for International Student Assessment	48
R&D : Research and Development.....	46, 48, 49, 53
REDI : Regional Entrepreneurship and Development Index	passim
SME : Small and Medium Enterprise	14, 17, 45, 57
TRIPS : Trade-Related Aspects of Intellectual Property Rights	45
UK : United Kingdom.....	passim
US : United States	passim
VC : Venture Capital	45
VDI : Verband Deutscher Ingenieure	11
WEF : World Economic Forum	47, 48, 57
WTO : World Trade Organization.....	45

List of tables

Table 2.1: GEI Ranking Based on 2016 Data	24
Table 2.2: REDI-scores Germany.....	27
Table 2.3: Brandenburg REDI report card.....	31
Table 2.4: Berlin REDI report card	32
Table 2.5: Bavaria REDI report card	33
Table 2.6: Weakest points per region	34
Table 2.7: Summary Table on new REDI scores after different versions of optimisation	36
Table 3.1: <i>Results survey on regulatory obstacles in Germany</i>	40
Table 3.2: <i>Results survey on suggested policies in Germany</i>	42
Table 4.1: <i>The FIRES-reform proposals for Germany</i>	45, 46, 47, 48

List of figures

Figure 2.1: The development of self-employment in Germany (East and West) 1991-2016	20
Figure 2.2: Development of self-employment in Germany 1991-2016 (solo self-employed and employers)	21
Figure 2.3: Numbers of new businesses in Germany 1995-2016	22
Figure 2.4: Numbers of new businesses in innovative manufacturing industries, Germany 1995-2016	22
Figure 2.5: Numbers of new businesses in technology-oriented services, Germany 1995-2016	23
Figure 2.6: Germany GEI-index 2012-2015	25
Figure 2.7: Radar-plot GEI comparison Germany-Italy-UK and EU-average	25
Figure 2.8: Regional distribution of start-up rates 2010-2016	26
Figure 2.9: REDI map of German NUTS2/3 Regions	27
Figure 2.10: Radar-plots REDI 2011-2015	28, 29
Figure 2.11: Comparing Brandenburg, Berlin and Bavaria	30
Figure 2.12: REDI-Scores Original	37
Figure 2.13: REDI-Scores Country Optimisation	37
Figure 2.14: REDI-Scores Original	37
Figure 2.15: REDI-Scores Poorest First	37

Executive Summary

Introduction

In Part I we have introduced 64 proposals for a more Entrepreneurial Society in Europe. Inevitably, however, these proposed reforms are general and motivated from a broad base of evidence and scientific debate. The resulting table thus gives us a menu of possibly useful interventions that would have to be implemented at different levels in the European Union. To support more entrepreneurial venturing in Europe, however, institutions need to be supportive of individual entrepreneurial ventures “on the ground”. That is, supporting institutions should work in very specific contexts. To implement an effective strategy, European policy makers therefore must work simultaneously and coherently across policy making levels and jurisdictions. Reforming e.g. intellectual property rights protection is an international discussion, whereas proposals related to taxation, social security and education are typically matters of national or even regional policy, while policies to promote knowledge exchange between academic and research institutes and the local entrepreneurial ecosystem, is best organised at the regional or local level. In recognition of these layered interactions, we have carefully analysed the relevant policy making institutions and their legal and political competencies on the nine areas of policy making identified in Part I of this report. The results of that analysis in FIRES working package 6 are reported in detail in D6.2. With that analysis in place we now present our seven-step approach to formulating an effective reform strategy at the country level.

- Step 1: Assess the most salient features of the institutional complex in place and trace its deep historical roots (WP2).
- Step 2: Assess the strengths and weaknesses and flag the bottlenecks in the entrepreneurial ecosystem using a structured data analysis (WP4).
- Step 3: Identify, using careful primary data collection among entrepreneurial individuals (i.e. founders) what most salient features characterise the start-up process and where entrepreneurs face barriers (D5.1).
- Step 4: Map the results of step 2 and 3 onto the menu of policy interventions developed in Part I of this report to identify potential interventions for the country under investigation.
- Step 5: Carefully consider the list of proposals in light of the historical analysis under step 1 and fit the proposed reforms to the relevant local, regional and national institutional complex in place.
- Step 6: Identify who should change what in what order for the reform strategy to have the highest chance of success (WP6).
- Step 7: Experiment, evaluate and learn and return to step 1 for the next iteration.

In this second part of this report we will illustrate this cycle from step 1 to 5. Step 6 is described in D6.2 for Part I and D6.3 reports on the results of the policy round tables where the resulting draft reform strategies were discussed. As we cannot implement the proposed policies to execute step 7, instead we have summarised the resulting reform strategies for Italy, Germany and the United Kingdom into three policy briefs that were presented and discussed with policy makers in these respective member states. The policy briefs and summaries of these round tables in the annex complete this deliverable.

Step 1: Historical Roots of Institutions and Recent Policies

1.1 United, divided, reunited – a short history of Germany

Germany is a north-central European country. In the centuries following the regency of Charlemagne, countries such as France, Spain, England, and Habsburg Austria developed into centralised states. In contrast, the so-called Holy Roman Empire of German nation, as Germany was called since the times of Charlemagne, became increasingly fragmented because the emperors had to “buy” the loyalty of kings, princes, and dukes within the empire. This implied granting territorial and governance concessions. When the Treaty of Westphalia ended the Thirty Years' War in 1648, the area that we know as Germany today was comprised of hundreds of sovereign kingdoms, principalities, and dukedoms. This political fragmentation continued until the German Empire was established in 1871 (Falck et al., 2011). The political fragmentation until the late 19th century implied a huge regional variation in culture and institutions that persists until today. One example for these cultural differences is the unique regional fragmentation of areas that have either a predominantly Protestant or Catholic tradition. Religious tensions erupted in the Thirty-Year War (1618-1648) that devastated many of the German states. Between the emergence of Martin Luther's critique of the Church in Rome (1517) and the Treaty of Westphalia (1648), many German states, mostly in the North and Centre adopted the new, Protestant faith while other, more Southern and Western parts of Germany remained Catholic instead (Cantoni, 2012).¹

The historical development until the late 19th century explains the strong federal tradition of the country that is also reflected in the current political system and political decision-making where the so-called 16 *Bundesländer* (states) play an important role. Hence, any well-informed entrepreneurship policy needs to take into account the historically-grown federal character of Germany.

German Unification was pursued by the Prussian chancellor Otto von Bismarck. The German territories marched towards unity and founded the German Empire (Chickering, 2014). The immediate years after the formation of Germany are historically remembered as the era of *Gründerzeit* (start-up boom/founding era) since the country went through a process of economic expansion but also to a first wave of bankruptcies known as the *Gründerkrach* (Ritschl and Übele, 2009; Burhop, 2011). Nevertheless, Germany industrialised rapidly even though there have also been huge regional variations (Tipton, 1976; Gutberlet, 2014). As was the economy as a whole until World War I.

The Great War implied a massive burden in lives lost and resources wasted. In particular due to the massive reparation claims in the aftermath of the Versailles Treaty (Broadberry and Harrison, 2005), Germany had a hard time recovering.² The hyperinflation of 1923 was one of the symptoms of the economic malaise in the post-war years, that left a deep imprint on the German psyche. The economic situation worsened after few years of economic stability in the mid-1920s and left Germany vulnerable for the Great Depression starting in the end of the 1920s. The economic calamity led to

¹ This may also have implications for entrepreneurship today. Nunziata and Rocco (2018) show that Protestants in Germany have a stronger entrepreneurial intention than Catholics under certain conditions.

² The severity of the impact is disputed in the literature (Hantke and Spoerer, 2010).

massive unemployment and the breakdown of leading banks in 1931 (James, 1981; Kopper, 2011) and fuelled the rise of the Nazi movement that also benefitted from the widespread calls for a revision of the Versailles treaty that was perceived as shameful in the German public (*Schmach von Versailles*). The economic system of the Nazi regime that seized power in 1933 was based on autarky and pursuing of central planning principles (Barkai, 1988). This policy promoted an economic concentration and cartelisation of the economy that was observable already since the late 19th century (Reckendrees, 2003). The promotion of small firms and the so-called *Mittelstand* was not on the map of policy makers before World War II. But in a time of slumping demand, the fiscal expansion the Nazi rearmaments and public infrastructural works implied, resulted in economic recovery and much needed employment, whereas autarky kept Germany relatively isolated from shocks abroad.

The Nazi regime and the devastating World War II its policies implied, however, led to a total destruction of the German economy in the 1940s and a second hyperinflation. Upon defeat Germany, was occupied by the four allied powers (US, UK, France, Soviet Union) and lost one third of its territory in Eastern Europe to Poland and Russia. Soon after the War, the country was split into two separate states, namely the Federal Republic of Germany (FRG), which became a western-style market economy, and the German Democratic Republic (GDR), a blue-print of the Soviet centrally planned economy. The Iron Curtain divided Germany for more than 40 years and both Germanies went down distinctly separate paths.

The economy of the FRG prospered in the 1950s and early 1960s; a period referred to as economic miracle (*Wirtschaftswunder*) while the GDR had to cope with and a massive loss of entrepreneurial spirit due to entrepreneurs relocating their firms to West Germany (e.g., Hefele, 1998; Falck et al., 2013). Until 1961, when the Berlin Wall was set up, 1.3 million East Germans fled the communist regime since 1950. The economy also had to cope with massive reparations to the Soviet Union that amounted to ca. 23 percent of the pre-war gross national product (Lieberman, 1966). In the aftermath of the oil price shock as of 1973, Western Germany developed from a managed toward a more entrepreneurial society while the East German economy remained a centrally planned economy until its final collapse in 1989. In contrast to West Germany, in the GDR there have been several waves of expropriations driving down the rate of self-employment to 1.8 percent in 1989 while it was around 10-12 percent in Western Germany (Wyrwich, 2012).

German separation came to an end in the aftermath of a peaceful revolution that prompted the fall of the Berlin Wall in 1989 and which was followed by a quick political reunification of the two German parts followed on the subsequent year. The biggest challenge after re-unification was the integration of the economic structures of the former GDR into the market economy system. This transformation was accompanied by one of the most severe economic dislocations in peace-time 20th century (Hall and Ludwig, 1995; Burda and Hunt, 2001). Around the year 2000, almost none of the companies that existed in 1989 were still active in the market (Fritsch and Wyrwich, 2016). At the same time, there was massive surge in start-up activity in the early 1990s. Therefore, the self-employment rate in East German approached the Western level around the year 2005. Despite this convergence in self-employment, there are striking economic differences between both parts of the countries until today. So, after a period of converging productivity levels in the first years after transition, a productivity gap of 30 percent persists since the late 1990s. There is a massive migration to Western Germany and the legacy of the socialist past continues to have an effect on people's

inclinations, attitudes, principles, but also their behaviour.³ The socialist legacy will be long lasting, but perhaps not all of it is necessarily a barrier to growth and prosperity (e.g. the former GDR has higher female participation rates and smaller gender gaps in wages and incomes).

Altogether, both the federal tradition of Germany and the German separation in the 20th century, are important to understand the regionally different scope for entrepreneurship activities and policy approaches today. The regional differences and deep rooted institutional features are manifest in the institutions that govern the flow of knowledge, finance and labour to existing and new firms alike. We discuss these in sections below.

1.2 Institutions governing knowledge transfer

The institutions that govern the generation and flow of knowledge to businesses in general and entrepreneurial ventures is founded on the educational system and the institutions doing basic and applied research. The system for registering and commercially exploiting knowledge then deserves special mention.

1.2.1 A historical background of German education

The first medieval universities emerged after the end of the Papal schism in 1386 with the University of Heidelberg opening in the very same year. So, Germany was relatively late in developing a university (for details, see Cantoni and Yuchtman, 2014). The political fragmentation of Germany that was mentioned earlier implied that a lot of universities were placed in smaller cities which are not necessarily big economic or administrative agglomerations today. Examples apart from Heidelberg are the universities in Rostock (1419), Greifswald (1456), and Tübingen (1477) but also the university in Marburg (1527), which was the first Protestant university in the world, and the university of Jena (1558). There were several further universities founded before the onset of industrialisation where, like all “medieval” universities, their curriculum consisted of Greek and Latin classics and was focused on the study of the Bible. The art of reading, writing, rhetoric, and logic have been important fields while ability and utility played a minor role. Similarly, universities’ main tasks were to collect, codify, and teach general knowledge (Carlsson et al., 2009).

As a response to the rapid growth of the demand for scientific research and education (Carlsson et al. 2009; Drucker 1998), Germany also saw a wave of universities founded with a technical focus and the adjustment of curricula in already existing universities. The first higher education institutions with a technical focus in Germany were founded in Karlsruhe and Dresden in the early 19th century while the first natural science faculty opened at the University of Tübingen in 1863. Furthermore, there were several technical colleges, known as *Polytechnische Hochschulen* that were upgraded into technical universities around the year 1900. The main political force behind this process was the German Association of Engineers (*Verband Deutscher Ingenieure*, VDI).⁴ All technical colleges

³ There is an emerging literature on this issue. See for example Alesina and Fuchs-Schündeln (2007), Brosig-Koch et al. (2011), Bauernschuster and Rainer (2012), Bauernschuster et al. (2012), Corneo and Grüner (2002), Fuchs-Schündeln and Schündeln, (2005, 2009) and Ockenfels and Weimann (1999).

⁴ A main aim of the initiatives to upgrade technical colleges was to overcome the lower social status of engineers as compared to university graduates. Moreover, upgrading technical colleges to technical universities was regarded an important means for improving the education of engineers (see König 2006).

that became technical universities were located in the capital cities of the Federal States (for details see König 2006, and Manegold 1989). Again, the federal tradition of Germany implied that universities were set up in smaller cities and not necessarily in places that are the largest agglomerations today. In 1900, there were technical universities in Berlin and Munich but also in Karlsruhe, Dresden, Hanover, Stuttgart, Aachen, Darmstadt, and Braunschweig.

Today, there are many more technical universities in Germany. They represent just one specific type of higher education institution that has relatively strong links to private sector firms. Since many areas of their research and teaching are traditionally linked very strongly to industry, technical universities have been assumed to be more adept at fostering knowledge spillovers and technology commercialisation than general universities (Audretsch and Lehmann, 2005a; 2005b). Recent empirical evidence suggests that the entrepreneurial capacity of technical universities is not necessarily higher than that of “classical” universities (Goethner and Wyrwich, 2017). However, places close to or even hosting a technical university that was already present in the year 1900 have a higher level of entrepreneurship in high-tech industries (Fritsch and Wyrwich, 2018). As previously mentioned, since many universities were founded in smaller places, this empirical regularity partly explains why also smaller places (e.g., rural Baden-Württemberg) prosper today although they may lack agglomeration advantages that are found to be supportive for entrepreneurship and innovation in countries such as the US (Glaeser, 2011).

In the 20th century there was a massive expansion of tertiary education in Germany. Therefore, there is no region without any significant university or university of applied science which were established since the 1970s and which have a focus on educating people for the local labour market (e.g., Jaeger and Kopper, 2014). Moreover, the 20th century saw the proliferation of scientific research institutes and networks like the Max-Planck Gesellschaft (1948) and the Fraunhofer Institute (1949). Their mission and substantial (public) resources were aimed at further developing basic research with an explicit mandate to also share and disseminate this knowledge to industry (Gibbons et al., 1994; Beise and Stahl, 1999) and these institutions have grown into important institutions in Germany’s knowledge infrastructure. As for most technical universities, however, the focus in these institutions has long been on serving the needs of, often larger, industrial, incumbent firms. Initiatives to foster entrepreneurship at universities or research institutes did not exist until the late 1990s when the EXIST programme was initiated in a few pilot universities.

Started in 1998, EXIST is a federally funded part of the German government’s “Hightech Strategy for Germany” and is co-financed by the European Social Funds (ESF). The program aims at improving the conditions for academic entrepreneurship. Key objectives of EXIST thus include the establishment of an entrepreneurial culture at German HEIs, the continuous transfer of research results into marketable products and services, the promotion of highly innovative research-based business ideas, and a significant increase in entrepreneurial activity by academics. The EXIST program follows a dual strategy. One building bloc is supporting universities and providing indirect assistance for individuals and start-up projects. In this respect, there have been several phases of EXIST program lines that aimed at creating entrepreneurship-facilitating structures at universities since the late 1990s. In support of these activities, universities receive an allowance from the German Federal Ministry of Economics and Technology over a three-year period (e.g., Kulicke, 2014).

1.2.2 The Patent System

Germany is characterised by regional patent systems since the 18th century (Harhoff and Hoisl, 2007). However, the first Central German patent office set up for the first time, 6 years after Germany became a state, i.e. 1877. It was named Imperial Patent Office (*Kaiserliches Patentamt*) and provided uniform protection for discoveries in the German Empire. The advantage of this authority was that patents were based on uniform principles and were effective for the entire territory of the German empire.⁵ The first 13 years of the patent law enforcement resulted in a total between 4,000 and 5,000 granted patents per year. This number gradually increased into 10,000 before 1906, and around 13,000 after that. The total of annually granted patents did not only increase in quantity. The quality of these documents rose into a more than 10% share of long-living patents (Burhop, 2010). During the separation of the country two patenting agencies co-existed, but after re-unification, Germany adopted a unique patent institution again.

There have been several changes to patent law over the last 120 years. One of the important recent reforms was the *Arbeitnehmererfindergesetz* in 2001, which was a Bayh-Dole-Act-like change in the German patenting system to increase the commercialisation of scientific research. The results of this measure, however, are rather mixed (Von Proff et al., 2012; Czarnitzki, 2016). Without going into detail on the issue, this may be an example of transferring legal institutions to another context, where results are different. The US universities, for which the Bayh-Dole-Act was written, have very different origins and consequently operate very differently than those in Germany. Reforms in the German patent system to achieve similar goals will therefore always have to be tailored to the German context. In addition to knowledge, entrepreneurial venturing requires resources. And Germany's financial system too has distinct and historically rooted traits.

1.3 Financial development of Germany: Banks

The financial system in Germany is characterised by a complex network of financial intermediaries and a three-pillar banking sector. The three sets of banks comprise the private banking sector, the saving and loan banks (*Sparkassen*), and the mutual or cooperative credit unions (*Genossenschaften*). Each savings and loan bank belong to one federal state bank (*Landesbank*) that is run by a state or group of states. The federal state banks fulfil the role of a regional clearing houses for liquidity and transfer liquidity from those banks with an excess liquidity to members with less liquidity. Hence, these financial institutions already have a system of joint liability like in a banking union (for details, on the German banking system, see Hackethal, 2004).⁶

The historical roots of the German banking system can be traced all the way to the Fugger family in Renaissance Augsburg, but the fine-grained network of local banks has its origins in the late 18th century (Allen and Gale, 2000; Kindleberger, 2015). During the 19th century savings banks spread across the whole country. They played a decisive role in financing the industrialisation of Germany. The world-wide first credit unions originated in the mid-19th century through different initiatives. The focus of these cooperatives was either on traders, shop owners and artisans or were set up in rural

⁵ The territories as of Bückeburg - Principality of Schaumburg-Lippe, Neustrelitz - Grand Duchy of Mecklenburg-Strelitz or Greiz - Principality of the Reuss Elder Line were exempted.

⁶ In addition the federal state banks secure market funding by issuing bonds. They are also internationally operating wholesale and investment banks. Therefore, they follow a business model different from savings banks.

areas to serve the needs of agrarian communities, in particular farmers. Credit cooperatives were widespread in nineteenth-century Germany and by 1914 the ca. 19,000 credit cooperatives had issued around 7 percent of all banking liabilities. Guinane (2001) explains their success by their ability to make use of superior information and their capacity to impose cheap but effective sanctions on potential defaulters. These characteristics presumably permit credit unions to lend to clients whom commercial banks typically did not provide credits, and also to develop loan terms more closely to the needs of the borrowers.

Today in Germany, there are 423 savings banks and 1,116 cooperative credit unions. Savings banks and credit unions typically foster close relationships with their local clients, particularly the small and medium-sized companies. The savings banks and cooperative banks provide about two-thirds of all lending to *Mittelstand* companies and 43 percent of lending to all companies and households (Audretsch and Lehmann, 2016). Therefore, savings banks and credit unions can be regarded as important building blocks for the success of the German *Mittelstand*. When it comes to new start-ups, however, banks are typically hesitant to invest in innovative projects with risky outcomes. Therefore, such projects have to rely on venture capital. Empirical evidence shows that the market for venture capital in Germany is functioning relatively well (Fritsch and Schilder, 2008), but is much smaller in size and scope than in the Anglo-Saxon world. This, however, arguably is not a supply but a demand issue. The German financial system, with its many small and locally well-connected banks serving many SMEs across the country, has co-evolved with the German economy. It serves the needs of the decentralised, export oriented and industrial economy of organically, slow growing medium sized industrial firms and *Mittelstand*. Typically, such firms have long standing relationships with their banks, that use that relationship and trust as collateral and security for credit. But that system supplies little capital in the form of equity to newcomers and may thus consolidate Germany's somewhat conservative and cautious nature. This complements well the way in which also the German labour market is organised.

1.4 Labour markets in Germany

Labour in Germany is generally well trained and very productive, justifying high wage incomes while maintaining a strong international competitive position. Strong vocational education combined with on-the-job training promote the accumulation of firm specific human capital in Germany's small and medium sized high-tech industrial sector. Consensus oriented labour relations supported moderate wage growth with high productivity growth. German export oriented, firms thus remain competitive in global markets with high quality, high value-added products and services. But this peace and high level of investments was "bought" with generous social security and labour protection. It is important to realise that such institutions have long historical roots and have coevolved with the German economy into highly complementary and interconnecting institutions that constitute a major pillar under its competitive strengths.

1.4.1 Employment protection

The German system of employment protection was built up in its modern guise in the period of the German miracle (*Wirtschaftswunder*) in the 1950s and 1960s. This was the golden era of the so called *Normalarbeitsverhältnis* (standard employment relationship) which describes dependent, permanent

full-time job with strict dismissal protection, a full integration into status-protecting social insurance and collectively set wages significantly above the subsistence level (Eichhorst and Marx, 2011).

The German system implied high wages for insiders but also led to underutilisation of the labour force which is reflected, for example, by low labour force participation of women and a male-breadwinner family model (specifically in the West). Such a system comes under pressure when women push into the labour market (Esping-Andersen, 2002), especially after German re-unification since about 90 percent of all women in working age were full-time employees in the former GDR (Maier, 1993).⁷ The system that emerged also proved less suitable for developing a modern service sector (Eichhorst and Marx, 2001) and demographic change puts a heavy burden on the economy to finance the pension system. Reforms were deemed necessary to increase the utilisation of labour resources.

The change in the labour market structure, however, did not come along with a systematic flexibilisation of the rigid *Normalarbeitsverhältnis*. Rather a second tier labour market consisting of atypical and much less protected employment (e.g., part-time work, marginal employment) forms emerged. Streeck (1997) argues that this pattern is explained by the German manufacturing system that is based on “diversified quality production.” This model requires skilled labour and is associated with incremental innovation which is determined by employees’ experience (e.g., industry-specific knowledge). Tight employment protection incentivises employees to invest in such specific skills which otherwise become sunk costs in case of a job loss.⁸

Even today employment regulation is relatively rigid in Germany but there are some changes that might be also relevant for entrepreneurship. So, in the mid-1990s the firm size threshold for dismissal protection was raised from 5 to 10 employees (Eichhorst and Marx, 2011).⁹ This may provide more leeway to new firms that start small. Bauernschuster (2013) indeed finds a positive effect of this reform on hiring by small firms. The duality of the labour market, however, persists with these measures that target only small firms and may shift the burden from a start-up to firms in the early growth stage.

1.4.2 Wage bargaining

Unions played an important role in the first decades after World War II in Western Germany. Wages were collectively set and wages have been much higher than the subsistence level.¹⁰ There was some modest flexibilisation in collective bargaining (e.g., single enterprise exceptions, introduction of working time accounts) since the 1980s. With re-unification the West German model was extended East and the system remained relatively stable for the still dominant standard employment contracts (Eichhorst and Marx, 2011; Dustmann et al., 2014). For the labour market as a whole one could observe that in the mid-2000s only ca. 20-30 percent of all employees that were covered by opening clauses due to a collective agreement, which meant specific exceptions from the general wage setting (Kohaut and Schnabel 2007; Burda et al., 2008).

⁷ There is still an East-West gap in terms of female labour force participation in the year 2015. However, recent analyses show that only about 40 percent of the difference can be attributed to the socialist treatment effect (Wyrwich, 2017).

⁸ This explanation is perfectly in line with basic human capital theory (Becker, 1964). See Hall and Soskice (2001) for further explanations on the relationship between employment regulation and incremental vs. radical innovation.

⁹ This change was reversed already in 1999 but re-established in the early 2000s.

¹⁰ The wage agreements are negotiated between labour unions and so called employers’ associations. The negotiations are at the regional level (so-called Tarifbezirk).

A very important recent development is the introduction of a minimum wage in 2015 of €8.50/hour which a priori was widely accepted by the German public (Burda, 2016).¹¹ While this minimum wage might destroy jobs in the atypical labour market (Burda, 2016), its effect on entrepreneurship is unclear and not yet empirically investigated.

1.4.3 Social security

Social security has a long tradition in Germany. The introduction of social insurances dates back to an initiative by von Bismarck in the 1880s which implied the implementation of the first social security net in the world. The Compulsory Health Insurance Act of 1883 can be regarded the starting point of this system. This was followed by the Accident Insurance Act (1884) and the Disability/Old-age Pension System Act (1891). Arguably the build-up of a social security net enabled von Bismarck to pacify the threat of class struggle and create loyalty to the new state (Rimlinger, 1968; Pflanze, 2014). The German security system around this time is a blueprint for Germany's current health system and was a role-model for many insurance systems in other countries (Abrams, 2007; Weichlein, 2011; Bauernschuster et al., 2017).

The social insurance system underwent several reforms since the 1880s. So, unemployment insurance was introduced in 1927. Finally, the care insurance was set up in 1995. The current pension system is based on a reform in 1957 and follows the pay-as-you-go principle. There is also state-supported private pension schemes. These were introduced in the early 2000s to make up for the demographic transition that implies fewer contributors in the pay-as-you-go scheme that face a growing number of retired people.

A significant reform of the unemployment insurance was associated with the “Agenda 2010.” It was a shift from policies that were rather generous towards an approach where stricter job search monitoring, harsher sanctioning of unemployment provisions and reducing the duration of job training. Another element was combining the earnings-related and means-tested unemployment assistance with social assistance (*Sozialhilfe*) into ‘*Arbeitslosengeld II*’. This transfer can be regarded a general minimum income support scheme (Eichhorst and Marx, 2011). The regulation also came along with new active labour market policy tools to promote start-ups by the unemployed (Ich AG/“Me Inc.”). The evidence of the success of these measures to date is mixed (Fritsch et al., 2016).

1.5 Recent entrepreneurship policies in Germany

1.5.1 Entrepreneurship in divided Germany: 1945-1989

The post-war “German model” before re-unification can be described as a rather distinctive kind of capitalist economy that was governed by nationally specific social institutions yielding high international competitiveness despite high wages and low dispersion with respect to inequality of incomes and living standards (Streeck, 1997). An important feature of the German model is the existence of a *Mittelstand* which alludes to firms employing between 50 and 500 employees. Audretsch and Lehmann (2016) argue that this dynamic group of middle-sized firms is one of the seven

¹¹ There have been sector-based minimum wages already in the 2000s. In the West German construction sector a minimum wage became effective in 1997.

secrets of Germany in achieving economic resilience in an era of global turbulence. But there is more to *Mittelstand* than size. The authors argue that *Mittelstand* firms represent a sort of “main street entrepreneurship”. They are deeply embedded in local communities. The governance of *Mittelstand* firms is peculiar as well. Typically, they are decades-old, family-owned firms with strong linkages and social ties to their local communities. This enables these firms to attract and retain highly skilled employees, for example, by local apprentice programs. They also often have close ties with local banks providing them with financial resources. These are legally in the form of loans and credit, but long relations and trust enables firms to use them to finance intrapreneurial ventures and innovative projects also. Their products are successful in niches in the global markets. Policy promoted the German *Mittelstand* in the post-war period. A key actor in this regard was the so-called *Kreditanstalt für Wiederaufbau* (KfW) as its mission was to provide finance for the development of technological capabilities of *Mittelstand* firms (e.g., long-term investment loans as well as working capital loans). The KfW measures can be regarded as SME policies. Policy programs directly targeted at start-ups, however, were not on the policy map in the first post-War decades.

During the years of communism, private business ownership was very much confined to small craft enterprises and private shops in East Germany (Pickel, 1992). Entrepreneurship was perceived as a bourgeois anachronism in the former GDR. Hence, there were many outright anti-entrepreneurship policies and anti-capitalist indoctrination (Wyrwich, 2012). As a result, the share of self-employed people in the East German workforce at the end of the socialist era amounted to only 1.8 % as compared to about 10 % in West Germany (Fritsch et al., 2014).

1.5.2 Entrepreneurship and entrepreneurship policy after unification

The self-employment rates were steadily increasing in West Germany in the 1990s (see also section 2.1) partly reflecting the increased role of service but also the fundamental shift towards a more entrepreneurial society. In East Germany there was a massive surge in start-up activity in the early 1990s that took place despite the absence of any entrepreneurship policies targeted at the East German transition process. Policies in the early 1990s were rather focussed on the privatisation of the state-owned enterprises (Brezinski, 1992), eventually implying spin-outs. The number of self-employed rose dramatically and more than doubled from 154,000 in 1988 to 348,000 in 1991 while the level of self-employment converged to Western levels. It reached parity around the year 2005 (Welter, 2007; Fritsch et al., 2014). One of the remarkable features of this development is that areas that had already a high level of entrepreneurship in the pre-socialist period were those places where the entrepreneurial catch-up was particularly pronounced. This pattern suggests that an entrepreneurial culture survived four decades of socialism (Wyrwich, 2012; Fritsch and Wyrwich, 2014).

While there is survey evidence that several new entrepreneurs would have like to start their own venture in the socialist GDR where this was impossible (Thomas, 1996), a lot of start-up activity was induced by unemployment even though early assessments show that the job situation was not that decisive (Lechner and Pfeiffer, 1993). Unemployment rose from almost zero to virtually 15 percent between 1989 and 1992 (Fritsch and Wyrwich, 2016). Other factors, such as limited existing competition in many markets in the East, market opportunities from restricted supply of goods, the suppressed consumer demand which began to open up and the existing pool of potential entrepreneurs, all helped entrepreneurial activity to explode (Fritsch, 2004; Welter, 2007).

A main difference between East and West German firms, even more than 20 years after re-unification, is that East German businesses tend to be much smaller. Large firms are rather sparse and a considerable number of East German establishments are subsidiaries (“extended workshop benches”) of West German or international companies. One reason for the on average smaller firm size of East German businesses is that many of them are hardly competitive. This is reflected in their comparatively low level of productivity and much lower survival rates (Fackler 2014). There are several explanations for this weakness of East German companies, ranging from unfavourable economic framework conditions to lacking managerial and entrepreneurial skills among East German entrepreneurs. E.g. Wyrwich (2010) demonstrates that the likelihood of achieving growth is higher among those East German firms where West German co-founders play an important role. Furthermore, East German businesses tend to have a stronger focus on regional markets while their export orientation is rather low (IWH, 2010; Mattes et al., 2015).

The overall increase of self-employment made German policy makers start to develop entrepreneurship programmes since the late 1990s. Realising the increased relevance of start-ups, the KfW began creating more programmes and diversifying into more inclusive opportunities (Audretsch et al. 2007). One example of a KfW policy is the *Eigenkapitalhilfe-Programm* which consisted of subordinated capital for (young) entrepreneurs that were active in the market for less than three years. Other programs to support start-ups financially are *INVEST - Zuschuss für Wagniskapital* and *Mikromezzaninfonds-Deutschland*. The former achieves its goal by providing a subsidy of 20% for venture capital –which was aided by a tax exemption law passed in 2014. Whereas the latter provides specific support for unemployed persons, women or migrants in creative industries. Bøggild et al. (2011) show this type of programmes yielded an increase in competitiveness and innovativeness for subsidised start-ups as well as positive employment effects. The programmes *INVEST* and *Mikromezzaninfonds-Deutschland* were introduced under the umbrella of the *Gründerland Deutschland Initiative* (GDI) was implemented by the BMWi in 2010 with the aim of strengthening and developing further the entrepreneurial culture of Germany. Overall the main prospects of the initiative include: the provision of information on self-employment (i.e. by participating in the *Gründerwoche Deutschland*), the provision of special measures to strengthen interest in entrepreneurship in the education system and the improvement of the financing options available for innovative start-ups. The GDI, additionally, provides an online portal to make all information available to the public and provides young ICT entrepreneurs with means for a stay in innovative regions such as Silicon Valley under the *German Accelerator* program.¹²

Apart from the Federal initiatives the German states are also quite active in developing entrepreneurship promotion programmes (Welter, 2007). In East Germany, such initiatives often relied massively on ESF funding which was relatively generous based on the low GDP per capita of the East German states. It is noteworthy that there is a huge heterogeneity across States in promoting entrepreneurship. It is particularly Bavaria in West Germany and Saxony in East Germany that developed multifaceted programs to promote innovative entrepreneurship (see Fritsch et al., 2010; 2015).

Finally, at the local level, some municipalities and districts focus on the development of the entrepreneurial culture within their own region, and the main players include business associations, chambers of commerce, economic development departments and business development agencies, all

¹² There have been further measures within the framework of the GD initiative that are not active in 2018 anymore. example, the *Gründerwettbewerb – IKT Innovativ* which consisted of a contest for young entrepreneurs in the ICT industry.

of which are often partly owned or controlled by the local government and generally act as intermediaries between the local government and the investors. However, there is a significant difference between regions in this respect.

An example for local funding initiatives is the *GÖBI-fonds (Göttinger Fonds für örtliche Beschäftigungsinitiativen)*, which was set up in 1997 and is actually one of the first cases of public-private collaboration – at the regional level- where banking institutions were involved. It targeted unemployed and young entrepreneurs and it was organised in such a way that the banks would provide the funding, while the regional government would bear 50% of the default risk and (thus) would subsidise the interest rate.

Although the three levels of policy regulation try to remain closely integrated in the policies they apply, inconsistencies and incoherence across these levels is a real danger. For example, most state programmes do not consider part-time entrepreneurship desirable with the argument that this type of entrepreneurship tends contribute little to economic growth and employment growth, whereas at the federal level part-time entrepreneurship is supported and recognised as a potential first step to full time self-employment and eventually business formation.

1.6 Conclusion

In the twentieth century, two devastating World Wars and almost 50 years of division in a capitalist West and communist East have left a deep imprint on the country, its institutions and its people. Reunification in 1989 is arguably still ongoing (Mertes, 2018; Verheyen, 2018) and to date this turbulent past persists. After World War II the entire country experienced a reset and East and West set off on diverging trajectories. The West developed its own unique Variety of Capitalism, with moderate wage growth with high productivity growth driven by on-the-job learning and firm specific skill accumulation. This supported an export-oriented industry built on a historic legacy of strongly regionally embedded *Mittelstand*, financed by a regionally branched bank-based financial system and fuelled by science and knowledge in technical universities and knowledge institutes. In the East, meanwhile, socialist doctrine led to a destruction of the *Mittelstand*, while especially before the Wall, massive migration drained the East of its entrepreneurial talent.

At reunification the West had grown into the economic powerhouse of Europe, whereas the East had fallen far behind. Almost 30 years after reunification and in spite of enormous efforts, that gap has still not been bridged (Canova and Ravn, 2000; Lindner, 2017). Against this background, it is impossible to treat Germany as a blank canvas. We should rather suggest policies and reforms that fit its historical heritage and build on its strengths to address its weaknesses. To identify the latter in the German entrepreneurial ecosystem, the next chapter turns to the present and the data.

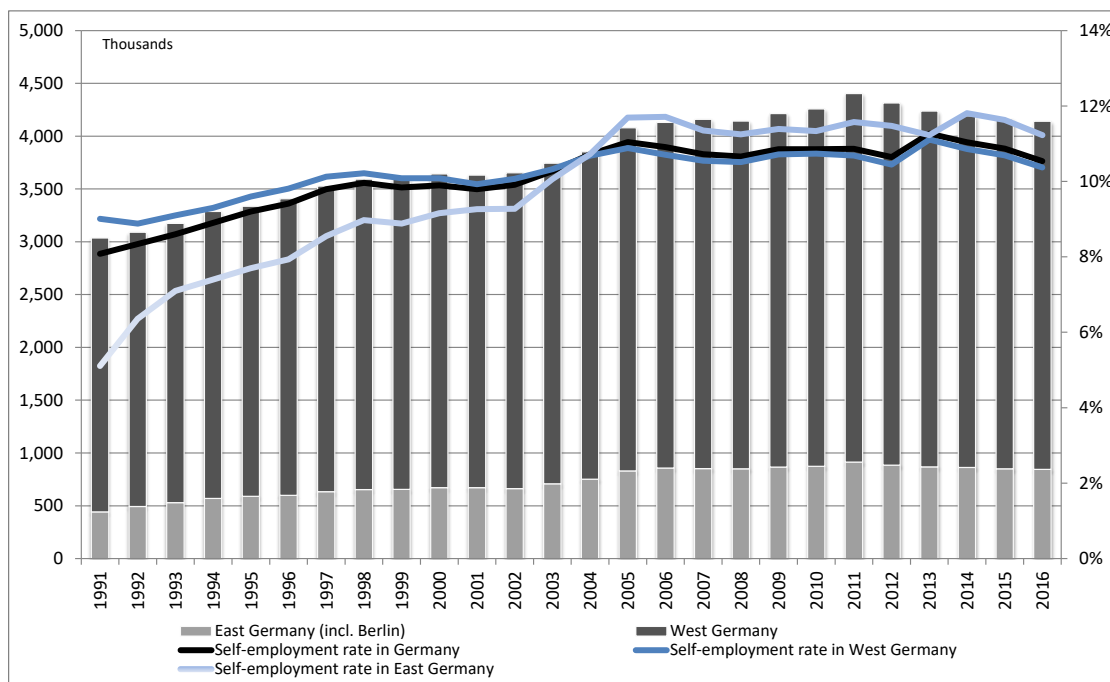
Step 2: Data Analysis with GEI & REDI for Germany

Before we delve into the GEI-REDI assessment for the German territory, it is useful to first establish some trends and stylised facts on more traditional performance measures for the entrepreneurial ecosystem. These data and trends signal that, although Germany is performing well on most macro-economic indicators, there are causes for concern and action. We then illustrate how the GEI-REDI index-based approach can help us identify where interventions are expected to be most needed and most effective.

2.1 Self-employment and business formation in Germany since 1991

Between 1991 and 2016 the numbers and the share of self-employed persons has strongly increased with a relatively small decline after 2011 (Figure 2.1). A main source of this increase of self-employment was the strong rise in East Germany where the share of self-employed in the workforce more than doubled since 1991.¹³

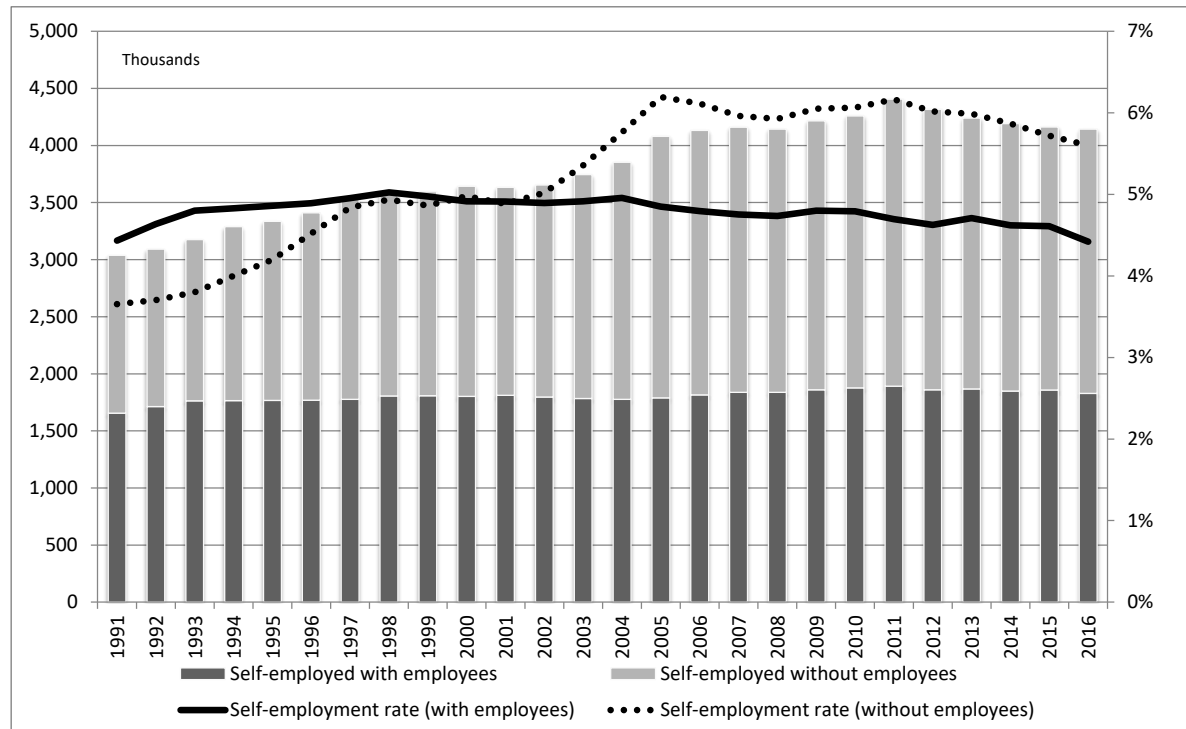
Figure 2.1: The development of self-employment in Germany (East and West) 1991-2016



¹³ The calculations are based on German Micro-Census data provided from the German Federal Statistical Office. The Micro-Census is a representative annual survey offering information on the socio-economic situation of about 1 percent of the German population (currently about 820,000 persons living in 380,000 households across Germany). The Micro-Census was started in 1957 as an annual survey of private households and persons in West Germany. In 1991 it was expanded to include the former East German states. The central aim of the survey is to collect nationally representative micro-data about the population structure, economic and social situation of individuals and households, labour activity, education, as well as living conditions and health. For further details see: <https://www.destatis.de/DE/ZahlenFakten/GesellschaftStaat/Bevoelkerung/Mikrozensus.html>

The strong increase in self-employment was particularly an increase in solo-entrepreneurs, i.e., those self-employed who do not have further employees (Figure 2.2). In contrast, the number of employers (self-employed with employees) has remained fairly constant in the 1991-2016 period. The total number of self-employed in both categories has declined somewhat from 2012 on.

Figure 2.2: Development of self-employment in Germany 1991-2016 (solo self-employed and employers)



Self-employment and employing others are not necessarily what we consider “entrepreneurs”.¹⁴ The decline of new firm formation in Germany also becomes obvious when looking at the number of newly established businesses. Figure 2.3 shows a declining trend of the number of new business from the year 1999 onwards.¹⁵ Moreover, this declining trend is particularly pronounced for the numbers of new businesses in innovative manufacturing industries (Figure 2.4), i.e., high-technology manufacturing industries and technologically advanced manufacturing industries.¹⁶ The number of start-ups in these industries has more or less steadily declined since 1995 and the number of new businesses in these industries in 2016 is less than half of the number that was recorded for the year 1995.

¹⁴ There are many definitions and different scholars use different measures to proxy for entrepreneurship. Here we want to stay away from such academic debates and simply present the numbers for what they are.

¹⁵ The data on start-ups is from the Enterprise Panel collected by the Center for European Economic Research (ZEW-Mannheim). This source includes nearly all firms established between 1995 and 2016. These data are based on information from the largest German credit-rating agency (*Creditreform*). As in the case of many other data sources on start-ups, these data may not have complete coverage of solo entrepreneurs. However, once a firm is registered, hires employees, requests a bank loan, or conducts reasonable economic activities, even as a solo entrepreneur, it is included, and its information is gathered starting from the ‘true’ date the firm was established. Hence, most solo-entrepreneurs are captured, including their correct business founding date (for details see Bersch et al. 2014).

¹⁶ This classification of industries according to their innovativeness is based on OECD (2005) and adapted to Germany by Gehrke et al. (2013). High-technology manufacturing industries are those who spend more than 9 percent of their annual turnover on Research and Development (R&D); technologically advanced manufacturing industries have R&D intensities between 3 and 9 percent. The innovative manufacturing industries make only 0.77% of all start-ups of the 2010-2016 period (high-technology manufacturing: 0.21%; technologically advanced manufacturing: 0.56%).

Figure 2.3: Numbers of new businesses in Germany 1995-2016

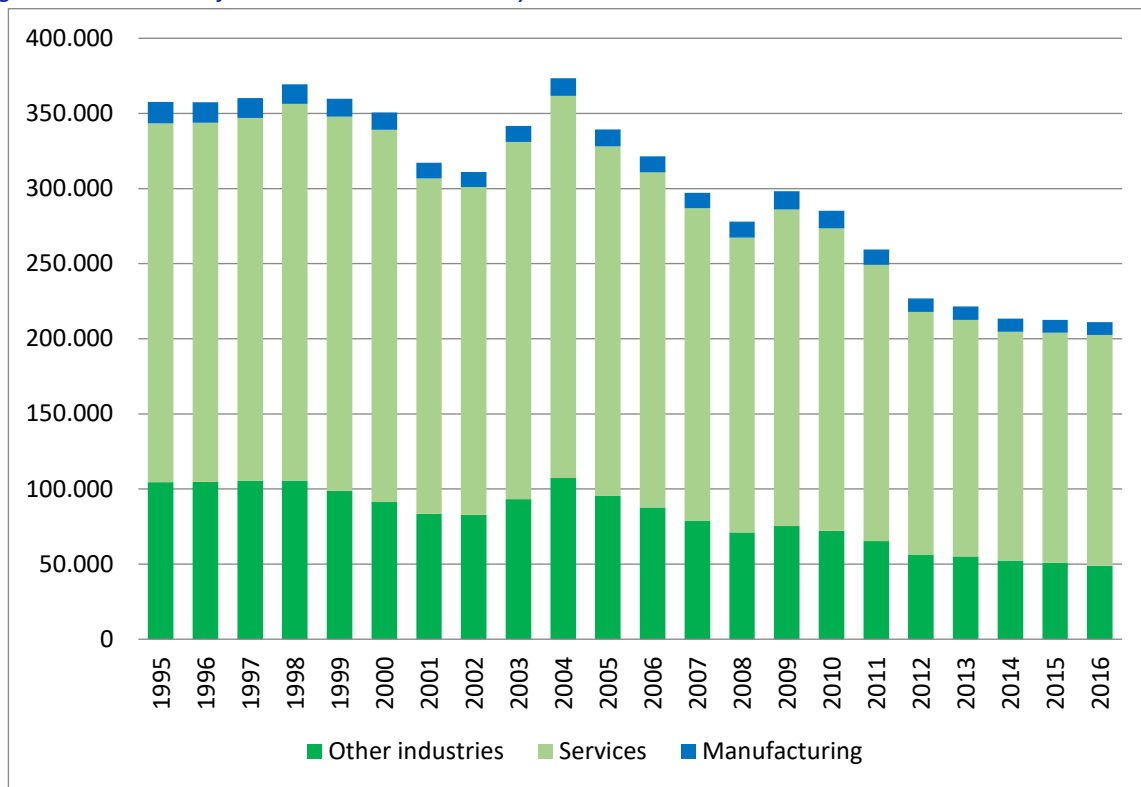


Figure 2.4: Numbers of new businesses in innovative manufacturing industries, Germany 1995-2016

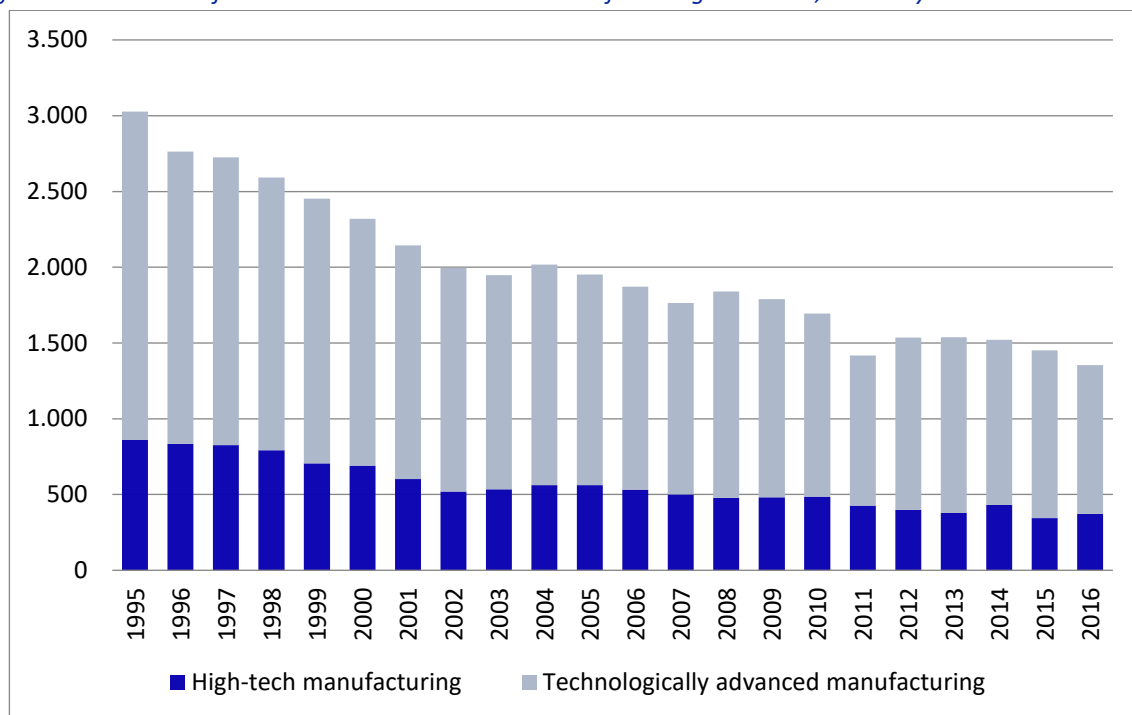
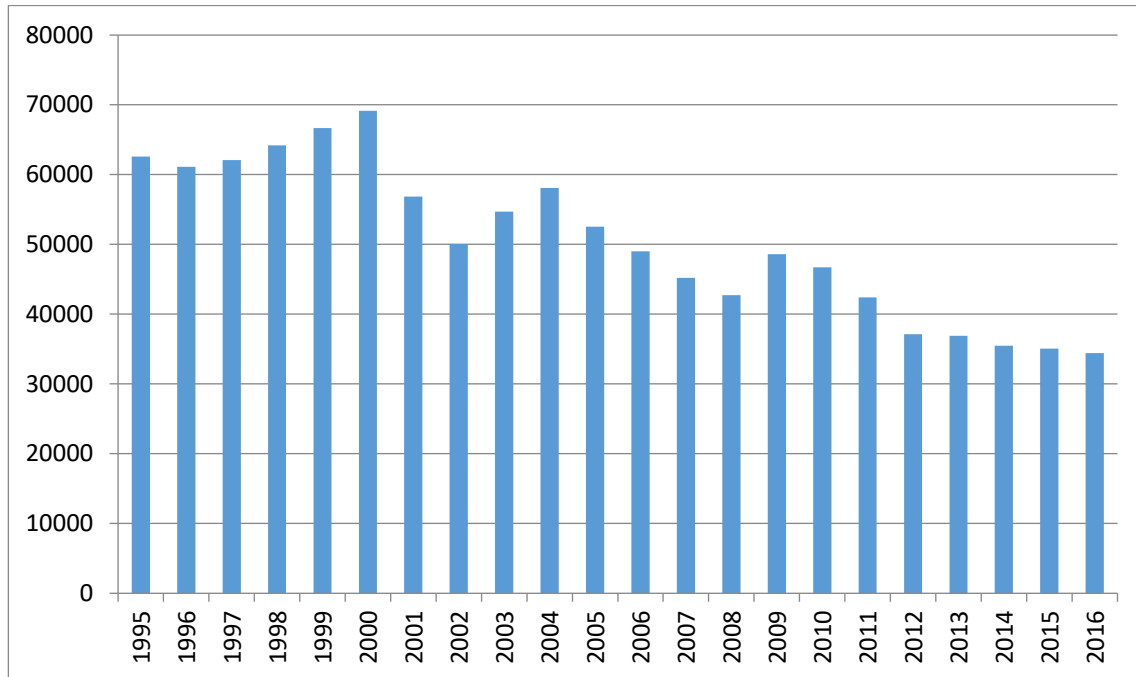


Figure 2.5: Numbers of new businesses in technology-oriented services, Germany 1995-2016



This decline of new business formation in innovative manufacturing industries is not driven by a more general shift from the manufacturing to the service sector. As can be seen from Figure 2.5 also the number of start-ups in the innovative part of the service sector; the technology-oriented services, shows a declining trend from the year 2001 onwards.¹⁷

Summarising, we can say that Germany has seen a considerable increase of self-employment, particularly in solo self-employment in the new *Länder*, from 1991 to 2011. But several years after this catch-up, we observe a modest decline in self-employment, especially the employing kind, from 2012 onwards. The number of new businesses shows a declining trend since 1999. This decline pertains particularly for the number of start-ups in innovative manufacturing industries that has more than halved since the year 1995. This decline of innovative entrepreneurship is rather alarming, particularly if one has in mind the strongly increasing share of people with a tertiary degree and the massive policy attempts to stimulate innovative start-ups during the period under analysis. The reasons for this decline of entrepreneurship in general and particularly of innovative start-ups are largely unknown. One reason might be the increase of the average age of German population, but this alone can at best explain only a rather small part of the development. Alternatively, some have argued that Germany is operating under a routinised model of innovation (Audretsch and Fritsch, 2002) implying innovation in Germany comes from incumbent firm and consequently is less radical and more incremental in nature. Although highly relevant in maintaining a position close to the global technology frontier, relying only on this type of innovation ultimately risks lock-in in declining industries. A healthy entrepreneurial ecosystem supports both incremental intrapreneurial and radical entrepreneurial ventures.

¹⁷ The technology-oriented services comprise industries such as architectural and engineering activities, technical consultancy, and technical testing and analysis.

2.2 Germany's international position

In the Global Entrepreneurship Index (GEI) Germany ranks 13th with 65.9 points between Austria and Israel (Table 2.1). Among the G7 countries Germany ranks second-to-last.

Table 2.1: GEI Ranking Based on 2016 Data

Rank	Country	GEI	Rank	Country	GEI
1	United States	83,6	34	Colombia	38.2
2	Switzerland	80,4	35	Greece	37.1
3	Canada	79,2	36	Jordan	36.5
4	United Kingdom	77,8	37	Hungary	36.4
5	Australia	75.5	38	Uruguay	35.0
6	Ireland	73,7	39	Croatia	34.0
7	Sweden	73,1	40	South Africa	32.9
8	France	68,5	41	Malaysia	32.7
9	Netherlands	68,1	42	Lebanon	31.5
10	Finland	67,9	43	Belize	30.0
11	Hong Kong	67,3	44	Kazakhstan	29,7
12	Austria	66,0	45	Morocco	29,2
13	Germany	65,9	46	Macedonia	29,1
14	Israel	65,4	47	Peru	28,4
15	Taiwan	59,5	48	India	28,4
16	Chile	58,5	49	Bulgaria	27,8
17	Luxembourg	58,2	50	Panama	27,7
18	Qatar	55,0	51	Thailand	27,4
19	Estonia	54,8	52	Iran	26,8
20	Korea	54,2	53	Mexico	26,4
21	Slovenia	53,8	54	Egypt	25,9
22	United Arab Emirates	51,7	55	Georgia	25,8
23	Poland	50,4	56	Russia	25,2
24	Portugal	48,8	57	Argentina	24,0
25	Cyprus	48,0	58	Jamaica	22,2
26	Spain	45,3	59	Indonesia	21,0
27	Slovakia	44,9	60	Ecuador	20,5
28	Turkey	44,5	61	Brazil	20,3
29	Puerto Rico	42,1	62	Guatemala	18,5
30	Italy	41,4	63	El Salvador	16,7
31	China	41,1	64	Cameroon	15,4
32	Latvia	40,5	65	Burkina Faso	13,2
33	Saudi Arabia	40,2			

Figure 2.6 below shows that Germany's score is relatively stable between 62 and 65 and shows a slight positive trend. Overall, Germany is performing well. To identify where reforms would help to improve

its performance even more, however, we need to delve a little deeper into where the entrepreneurial ecosystem in Germany could be improved.

Figure 2.6: Germany GEI-index 2012-2015

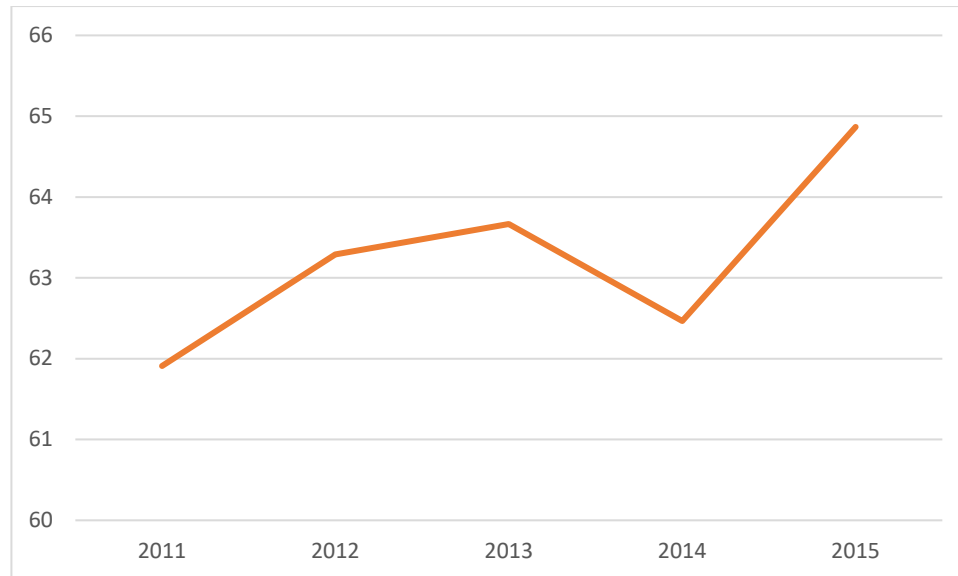
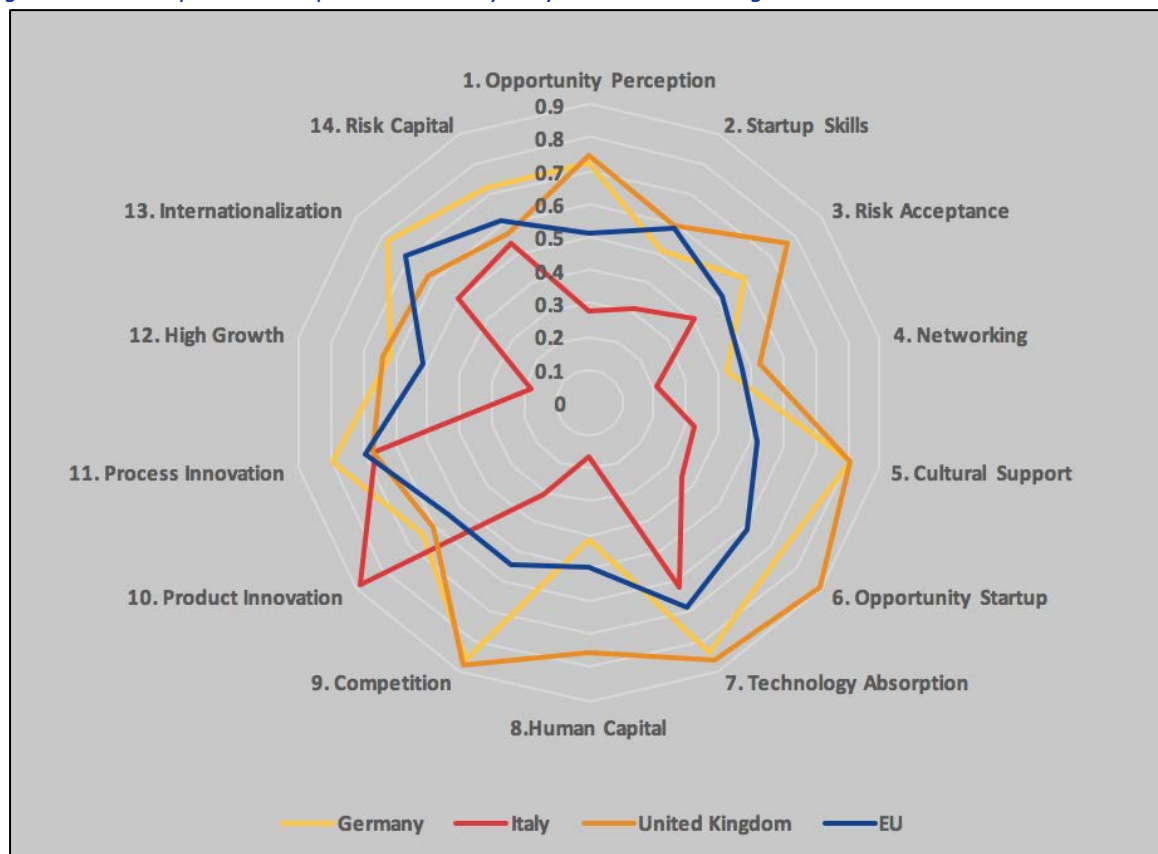


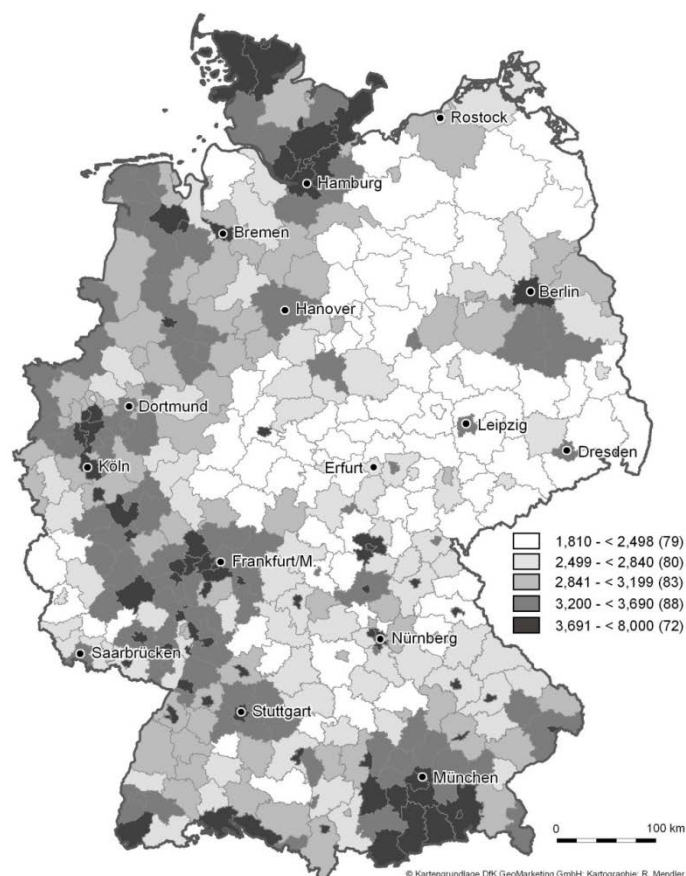
Figure 2.7: Radar-plot GEI comparison Germany-Italy-UK and EU-average



The GEI-index is composed of 14 underlying pillars that together make up 3 sub-indices: Entrepreneurial Attitudes, Abilities and Aspirations (see D4.1 and D4.2). Figure 2.7 gives us a first glance at how Germany is performing relative to the UK, Italy and the EU average on these 14 pillars.

The data show that Germany overall performs about at the EU-average and only slightly underperforms the EU average on three pillars: “Startup Skills”, “Networking” and “Human Capital”. Germany is relatively weak in the sub-index Attitudes (upper right pillars 1-5), and somewhat stronger in Abilities (lower pillars 6-9). In Aspirations in the upper left side of the radar-plot (pillars 10-14) Germany seems relatively well developed. The underlying algorithm in the GEI-index puts a penalty on bottlenecks in the ecosystem, such that a rounded radar-plot scores higher than a more erratic one and policy interventions should be aimed at alleviating bottlenecks with priority. For Germany it seems that improving the “Human Capital”, “Startup Skills”, “Networking” and “High Growth” pillars are most urgent. But the national level analysis may well hide a lot of regional heterogeneity. Bottlenecks in Hamburg and Berlin may well prove to be very different from the bottlenecks in Brandenburg and Hessen. Before we draw too strong a conclusion on how to improve the German entrepreneurial ecosystem, let us zoom in at the regional level. A first strong indication that such a regional lens is required can be found in Figure 2.8 below. The map clearly shows start-up rates (average yearly number of start-ups over 1,000 regional workforce) differ a lot across regions. What stands out from this map is that, as is common in all countries, that start-up activity is highly concentrated in the larger cities.

Figure 2.8: Regional distribution of start-up rates 2010-2016



Despite higher population densities most of Germany’s larger cities show up as having more start-ups per population than the surrounding rural regions. This is a first indication that possibly the structural

strengths, weaknesses and bottlenecks in the more regional entrepreneurial ecosystems differ significantly by region as well.

Figure 2.9: REDI map of German NUTS2/3 Regions

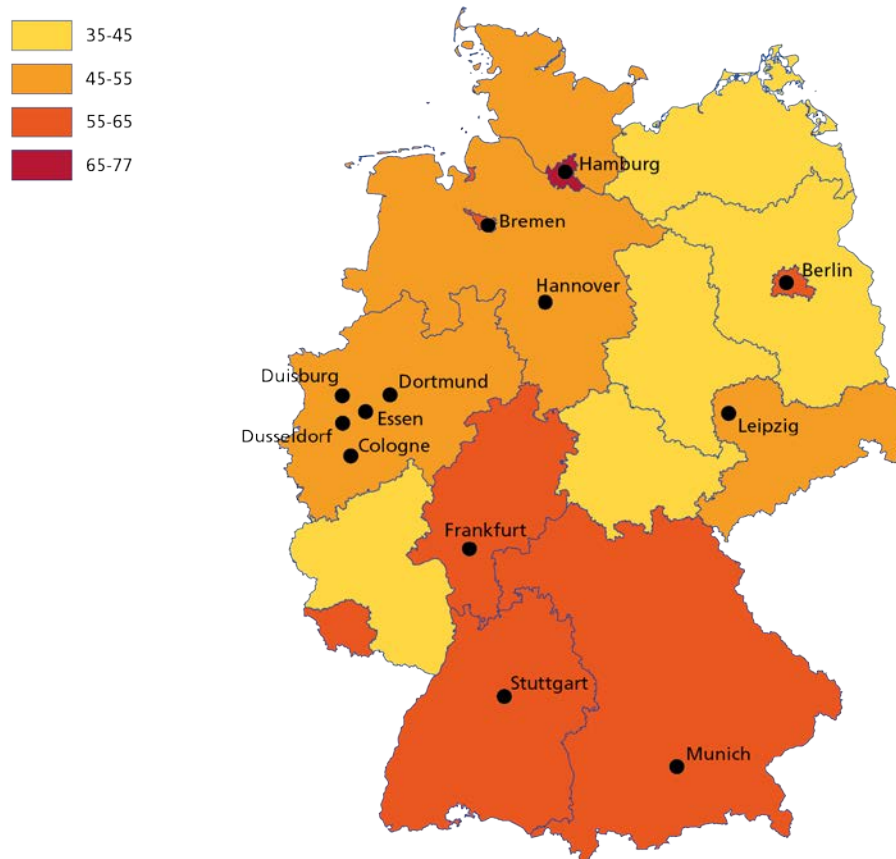


Table 2.2: REDI-scores Germany

Region	REDI-scores 2012-2014
Baden-Württemberg	62,0
Bayern	60,6
Berlin	62,4
Brandenburg	35,1
Bremen	57,1
Hamburg	69,5
Hessen	58,9
Mecklenburg-Vorpommern	40,2
Niedersachsen	50,3
Nordrhein-Westfalen	54,8
Rheinland-Pfalz	44,6
Saarland	56,7
Sachsen	50,5
Sachsen-Anhalt	38,2
Schleswig-Holstein	49,8
Thüringen	41,1

To do justice to this regional heterogeneity, the analysis must zoom in at the regional level. Unfortunately, we do not have the data available to compute the regional equivalent of the GEI, the REDI, at the spatial resolution given in Figure 2.8. The data we need is available at the NUTS-2/3 level. For Germany this coincides with the level of the *Länder*. Developing reform proposals based on an analysis at that level makes sense as at that level there is a competent and effective layer of policy making we can address.

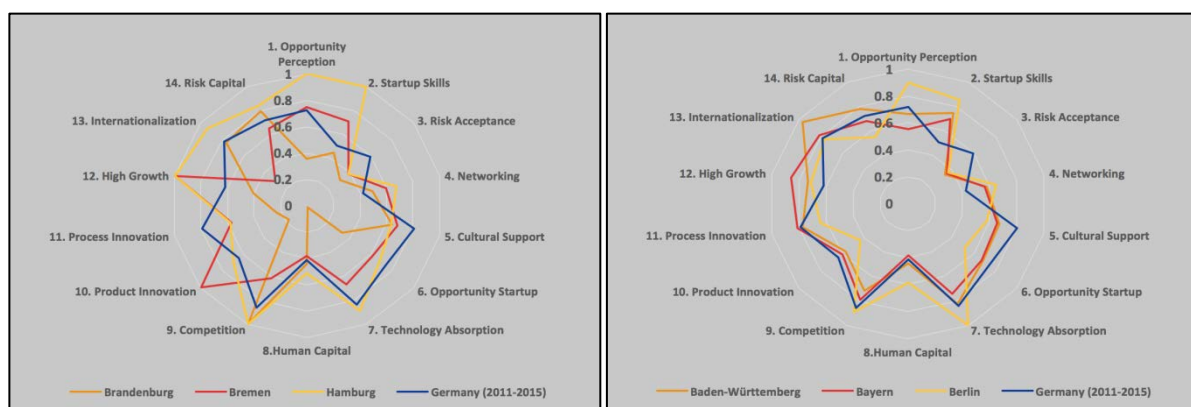
In Figure 2.9 and Table 2.2 we observe that indeed there is quite some variation among German regions. The REDI-scores range between 35 (Brandenburg) and 70 (Hamburg). It should be noted that these index numbers are not directly comparable to the GEI-scores above as both the data period and the reference group are different. The latter were obtained in a comparison among 65 countries based on 2016 data, whereas the REDI-scores presented here were computed relative to 125 European NUTS2/3 regions for 2012-2014. Nevertheless, the map and table illustrate that even at this low spatial resolution, the aggregated REDI-scores capture quite a bit of the regional heterogeneity that Figure 2.8 already hinted at.

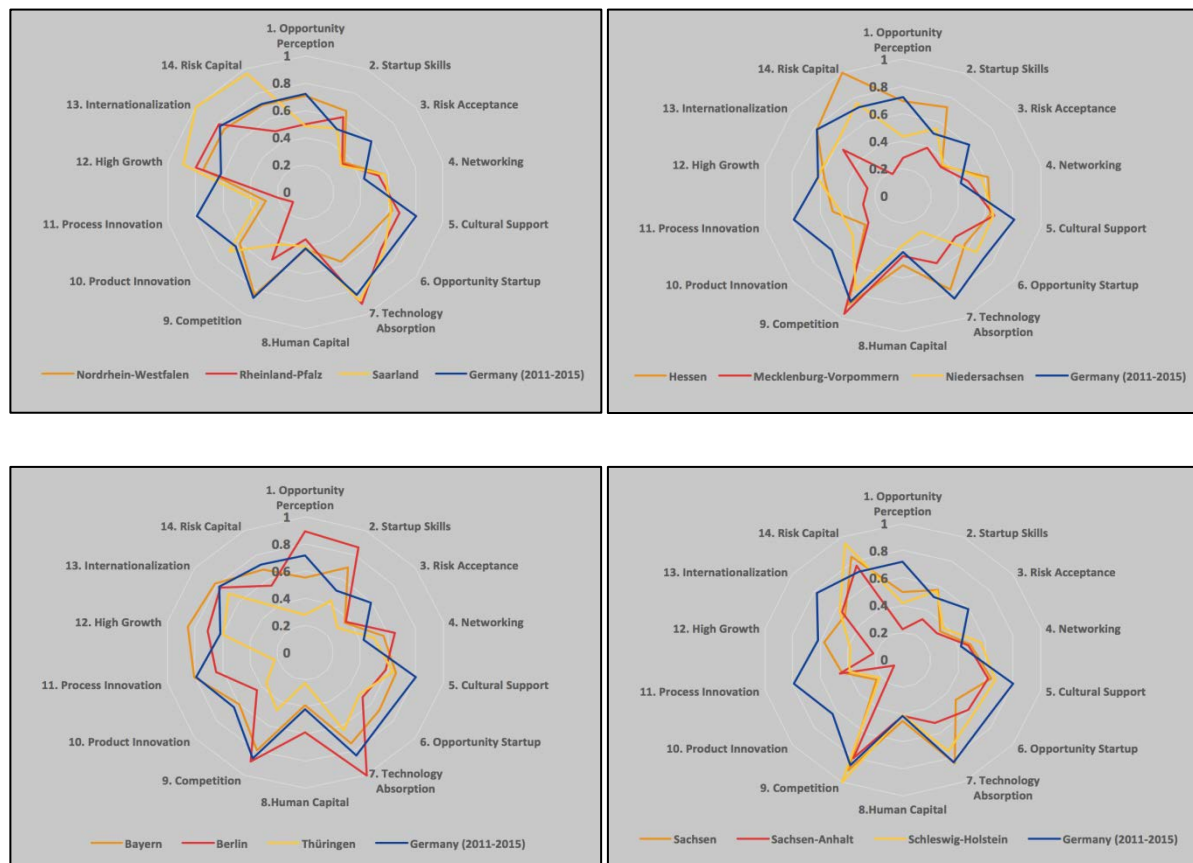
2.3 A more detailed quick scan

A first step in assessing the quality of entrepreneurial ecosystems in German regions is to plot their respective radar plots and compare each region to the German average scores. Figures 2.10 a-f show these plots for three regions and the country average benchmark. From these plots we can observe that what seems to be a bottleneck in one region, is not in another.

German *Länder* thus need their own specific approaches and reforms to strengthen the entrepreneurial society in Germany should probably be initiated, managed and coordinated at the level of the *Länder*. Still, some of the reforms that would benefit some of the *Länder*, do require national or even European action. The fact that weaknesses differ by region, does not imply the national and European framework conditions for these *Länder* are optimal. To keep the development of a tailored reform strategy for the *Länder* manageable, we focus our attention here on three more or less representative regions: Berlin as exemplary of a strong urban ecosystem (like Hamburg and to a lesser extent Bremen), Brandenburg as the least performing Eastern state with such a strong urban centre nearby and Bavaria as representative for the Southern *Länder*.

Figure 2.10: Radar-plots REDI 2011-2015

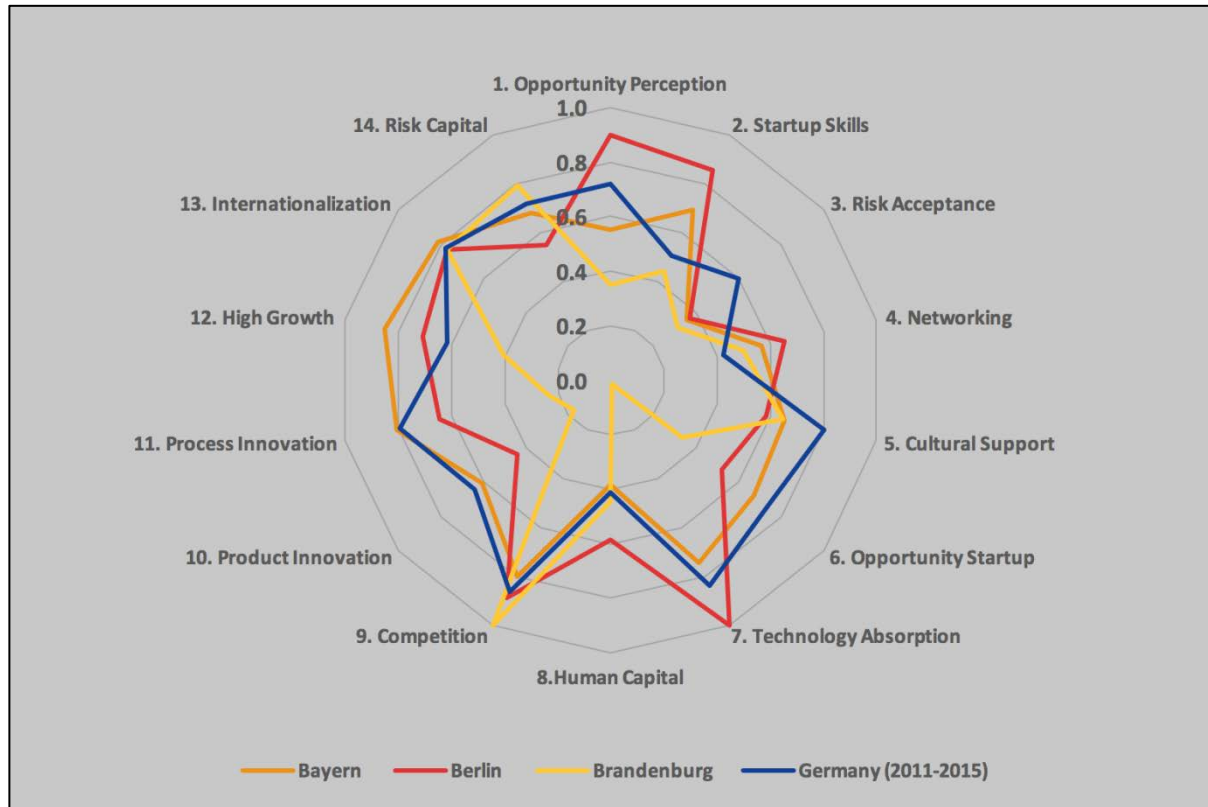




The full analysis was done for all other regions, but we report only the main conclusions in Table 2.6 on these *Länder* below.

Figure 2.11 shows us that Brandenburg scores very low on the REDI because of very weak “Technology Absorption” and “Process Innovation” pillar scores. This is remarkable, as Germany as a whole and many German *Länder* actually score very high on these pillars in a European comparison. In part this feature might be explained because Berlin, scoring very high on “Technology Absorption” and “Process Innovation” is situated in Brandenburg and as such might attract the resources from the wider region into the city. This pattern of core and periphery is quite common and well established in regional and economic geography literatures. The fact that in the case of Berlin and Brandenburg the core city and the peripheral countryside can be split in the data, may bring out this stark contrast. The city-states of Hamburg and Bremen have a similar, though less pronounced, impact on the *Länder* Schleswig-Holstein and Lower Saxony. These *Länder* too score low on pillars that are generally strong in Germany as a whole. Of course, Figure 2.8 already strongly suggested that e.g. Munich and Stuttgart play quite similar roles in their respective *Länder* of Bavaria and Baden-Württemberg, but here the big cities are not separated out in our data and the core-periphery pattern is obscured. We will return to this issue when we discuss the regional differentiation of reforms in more detail below.

Figure 2.11: Comparing Brandenburg, Berlin and Bavaria



As explained in FIRES-reports D4.2 and D4.4, the REDI-index is composed of 14 pillars that bring together information on institutions and individual entrepreneurial agency. Together, this data reveals the quality of the entrepreneurial ecosystem along fourteen relevant dimensions. Without going into technical details in this report¹⁸, the intuition behind each of the pillars is that data on individual entrepreneurial agency (taken from the Global Entrepreneurship Monitor adult population survey data) is combined with relevant institutional quality indicators (taken from a wide variety of reputed international institutions, such as World Bank, Freedom House and OECD). The unique feature of the REDI-index is that it builds on the assumption that institutions and individual agency are complements. That is, high levels of e.g. high opportunity perception in a low-quality institutional environment, will contribute little. Likewise, low opportunity perception in a high-quality institutional environment is also a sign of weakness in the entrepreneurial ecosystem. To improve the score on a given pillar, policies should seek to first improve the weakest link and then aim to increase both institutional quality and individual agency together. Especially because of the latter, the menu of possibly effective interventions is not limited to improving the scores on the institutional quality indices alone. The same logic is then also imposed on the pillars that make up the three sub-indices: Attitudes, Abilities and Aspirations.

¹⁸ We refer interested readers to the relevant FIRES-deliverables D4.2 and D4.4 and the technical annex to D4.1 for further details.

Table 2.3: Brandenburg REDI report card

	PILLARS		INSTITUTIONAL VARIABLES		INDIVIDUAL VARIABLES	
Entrepreneurial Attitudes	Opportunity perception	0.35	Market Agglomeration	0.39	Opportunity Recognition	0.64
	Start-up skills	0.45	Quality of Education	0.63	Skill Perception	0.58
	Risk Acceptance	0.31	Business Risk	0.48	Risk Perception	0.51
	Networking	0.50	Social Capital	0.74	Know Entrepreneurs	0.48
	Cultural support	0.65	Open Society	0.78	Career Status	0.65
Entrepreneurial Attitudes 36.3						
Entrepreneurial Abilities	Opportunity startup	0.33	Business Environment	0.65	Opportunity Motivation	0.31
	Technology Absorption	0.01	Absorption Capacity	0.64	Technology Level	0.04
	Human Capitals	0.44	Education and Training	0.50	Educational Level	0.79
	Competition	1.00	Business Strategy	0.92	Competitors	0.92
Entrepreneurial Abilities 32.6						
Entrepreneurial Aspirations	Product innovation	0.17	Technology Transfer	0.90	New Product	0.37
	Process innovation	0.24	Technology Development	0.54	New Technology	0.41
	High growth	0.41	Clustering	0.69	Gazelle	0.59
	Globalisation	0.77	Connectivity	0.87	Export	0.73
	Financing	0.79	Financial Institutions	0.70	Informal Investment	0.85
	Entrepreneurial Aspirations 36.2					
GEI		35.1	Institutional	0.67	Individual	0.56

In Table 2.3 we present the full REDI-report card for the region “Brandenburg” and illustrate how this report card can be used to identify the areas in which institutional reform is urgently advised.¹⁹ For example, the score on the pillar on “Technology Absorption” signifies that in Brandenburg the score on this pillar is only 1% of the highest score observed in 125 European NUTS-2/1 regions on this pillar. The pillar combines information on Absorption Capacity (64) in the region with the prevalence of Technology Level (4) among the new firms founded in the region. Using an algorithm that combines the scores on individual agency and institutional quality, a score per pillar, per sub-index and ultimately for the entire region is computed. At every level, the algorithm rewards a balanced development within and across pillars and punishes the score when bottlenecks are present. The relatively low scores are marked red, whereas the relatively high scores are marked in green. Recall, these scores are high relative to 125 European NUTS 1/2 regions.

From Table 2.3 we should read that in Brandenburg the very low technology level of start-ups creates a strong drag on the overall quality of the entrepreneurial ecosystem. This is consistent with exceptionally low scores on new technology and new product introducing ventures in the region. It seems likely that those seeing opportunities to start up with new and advanced technologies, move to the core-city in this region, Berlin, to do so. This is not necessarily a bad thing. Brandenburg could, and probably also does benefit a great deal from Berlin as a hub of entrepreneurial venturing. Entrepreneurs from Brandenburg can benefit from the availability of capital, talent and knowledge

¹⁹ The REDI- report cards for the rest of the area scans be found in Appendix I. Rural, Eastern *Länder* have somewhat similar profiles to Brandenburg, except for the dramatically low scores on

there, while not suffering the correspondingly high real estate prices, congestion and other downsides of living in the city. If that is the case, Brandenburg should aim to be complementary and try to strengthen its ties with the entrepreneurial ecosystem in Berlin. Or rather, the Berlin and Brandenburg authorities should work together to create productive spillovers between the two rather different ecosystems that have evolved.

Table 2.4: Berlin REDI report card

	PILLARS		INSTITUTIONAL VARIABLES		INDIVIDUAL VARIABLES	
Entrepreneurial Attitudes	Opportunity perception	0.90	Market Agglomeration	1.00	Opportunity Recognition	0.82
	Start-up skills	0.86	Quality of Education	0.93	Skill Perception	0.63
	Risk Acceptance	0.37	Business Risk	0.48	Risk Perception	0.67
	Networking	0.65	Social Capital	0.81	Know Entrepreneurs	0.63
	Cultural support	0.58	Open Society	0.75	Career Status	0.52
Entrepreneurial Attitudes 61.6						
Entrepreneurial Abilities	Opportunity startup	0.52	Business Environment	0.62	Opportunity Motivation	0.80
	Technology Absorption	1.00	Absorption Capacity	0.86	Technology Level	1.00
	Human Capital	0.58	Education and Training	0.60	Educational Level	0.87
	Competition	0.89	Business Strategy	1.00	Competitors	0.61
	Entrepreneurial Abilities 67.1					
Entrepreneurial Aspirations	Product innovation	0.44	Technology Transfer	0.92	New Product	0.57
	Process innovation	0.64	Technology Development	0.94	New Technology	0.51
	High growth	0.71	Clustering	0.79	Gazelle	0.76
	Globalisation	0.77	Connectivity	0.87	Export	0.73
	Financing	0.55	Financial Institutions	0.69	Informal Investment	0.69
	Entrepreneurial Aspirations 58.6					
GEI		62.4	Institutional	0.81	Individual	0.70

In Table 2.4 we observe the report card for Berlin, that in contrast to and highly complementary with Brandenburg, scores 1.00 on Technology Absorption pillar, indicating it scores highest among the 125 EU NUTS1/2 regions compared in our analysis. Berlin only scores below the benchmark on Career Status in the Cultural Support pillar and on New Technology in the Process Innovation pillar. But both are more than compensated for by overall excellent scores on institutional indicators. The Berlin ecosystem, although performing well relative to the rest of Europe, could improve its entrepreneurial ecosystem by improving its scores on pillars 3, 6, 8, 10 and 14. There it scores high relative to the rest of Europe, but these pillars do represent Berlin's bottlenecks in the ecosystem. Risk Acceptance, Cultural Support, Human Capital and more radical Product Innovation and Risk Capital all point towards an ecosystem that would benefit from taking on more risk. Berlin (and Germany in general) is strong in developing world class high tech incremental innovations in manufacturing and industry, but it seems to be less inclined to engage in riskier, more radical and more disruptive innovations. This may well be founded on deep historical roots and cultural traits. The German bank dominated financial

system, its generous welfare state and a preference for high quality, well designed and engineered technological solutions all steer away from risk and possibly costly and disruptive failures. “*Ordnung muss sein*” helped Germany to develop into a world class industrial and export-oriented economy but is perhaps not the best philosophy for a very experimental and open entrepreneurial society.

Table 2.5: Bavaria REDI report card

	PILLARS		INSTITUTIONAL VARIABLES		INDIVIDUAL VARIABLES	
Entrepreneurial Attitudes	Opportunity perception	0.55	Market Agglomeration	0.46	Opportunity Recognition	0.87
	Start-up skills	0.70	Quality of Education	0.84	Skill Perception	0.59
	Risk Acceptance	0.35	Business Risk	0.48	Risk Perception	0.63
	Networking	0.56	Social Capital	0.81	Know Entrepreneurs	0.51
	Cultural support	0.65	Open Society	0.77	Career Status	0.73
Entrepreneurial Attitudes 53.8						
Entrepreneurial Abilities	Opportunity startup	0.67	Business Environment	0.76	Opportunity Motivation	0.78
	Technology Absorption	0.74	Absorption Capacity	0.70	Technology Level	0.86
	Human Capitals	0.38	Education and Training	0.52	Educational Level	0.63
	Competition	0.80	Business Strategy	0.90	Competitors	0.65
	Entrepreneurial Abilities 59.9					
Entrepreneurial Aspirations	Product innovation	0.60	Technology Transfer	0.86	New Product	0.68
	Process innovation	0.81	Technology Development	0.85	New Technology	0.68
	High growth	0.85	Clustering	0.83	Gazelle	0.82
	Globalisation	0.81	Connectivity	0.92	Export	0.74
	Financing	0.68	Financial Institutions	0.88	Informal Investment	0.72
Entrepreneurial Aspirations 67.9						
	GEI	60.6	Institutional	0.76	Individual	0.71

Still Table 2.5, presenting the Bavarian case, shows that in the South the Attitudes seem to be the bottleneck, whereas in the region of Berlin it is the (relative) lack of Aspirations that holds the ecosystem back. In Bavaria (and also in Baden-Württemberg) entrepreneurs are less entrepreneurially oriented, perhaps, but if they start a venture, they do so with more ability and ambition. As was stated above, the report card for Bavaria does not distinguish between Munich and the other core cities and the peripheral country side, but it is likely that here too the entrepreneurial talent tends to cluster with knowledge and human capital in the core cities. For Bavaria it seems that strengthening Risk Acceptance, Networking, Human Capital and Product Innovation would alleviate the biggest bottlenecks in the ecosystem. As this list shows considerable overlap with the Berlin and even Brandenburg list derived above, it is likely that also at the national level, some actions can be taken to benefit all ecosystems in the country, even if they start from very different levels. Before we can draw that conclusion, however, we have to identify and list the respective ecosystem weaknesses systematically. Table 2.6 shows the results of that exercise.

Table 2.6: Weakest points per region

Region	Weakest Pillars	Weakest Variables
Hamburg	3,8,11	Business Risk, Education and Training and New Technology
Schleswig-Holstein	3,8,10	Business Risk, Education and Training and New Product
Bremen	3,8,13	Business Risk, Education and Training and Exports
Niedersachsen	3,7,10	Business Risk, Technology Level and New Product
Nordrhein-Westfalen	3,8,11	Business Risk, Education and Training and New Technology
Rheinland-Pfaltz	3,8,10	Business Risk, Education and Training, Educational Level and New Product
Hessen	3,8,10	Business Risk, Education and Training and New Product
Saarland	3,8,11	Business Risk, Risk Perception, Education and Training and New Technology
Baden-Württemberg	3,8,10	Business Risk, Education and Training and New Product
Bayern	3,8,10	Business Risk, Education and Training and New Product
Thüringen	1,8,11	Market Agglomeration, Education and Training, Educational Level and New Technology
Sachsen-Anhalt	1,8,10	Market Agglomeration, Education and Training and New Product
Sachsen	3,8,10	Business Risk, Risk Perception, Education and Training and New Product
Brandenburg	3,7,10	Business Risk, Technology Level and New Product
Berlin	3,8,10	Business Risk, Education and Training and New Product
Mecklenburg-Vorpommern	1,8,14	Market Agglomeration, Education and Training and Informal Investment

For all the *Länder* we have identified the most important weaknesses in the report cards. That is, we identified what 3 pillars and 3-6 underlying variables are holding back the respective *Länder* most. We then compared across the *Länder* and identified the most common weak spots in regional ecosystems. This exercise gives us some direction in formulating reforms at the national level. The Table gives us a clear sense of direction. Across the best and the weakest entrepreneurial ecosystems in Germany, the bottlenecks seem to most frequently arise in Business Risk, that is reducing the score on Risk-Acceptance and thereby Entrepreneurial Attitudes. On Entrepreneurial Abilities the scores are held back by low Human Capital scores due to Education and Training, whereas a lack of New Product or New Technology in Product or Process Innovation respectively generally hold back performance on Aspirations. So despite significant heterogeneity across German *Länder*, there certainly seems room for national level interventions and reforms. In the section below we will triangulate this information with the more qualitative information we collected through surveys and for the national level will focus on interventions from our menu in Part I of this report to create the backbone of the German reform strategy. At the regional level, *Länder* must then always add specific interventions to

strengthen specific regional weaknesses and bottlenecks, considering also that, as with Berlin and Brandenburg, it is perhaps not necessary to develop all pillars in all regions equally if very open borders and high mobility can be ensured. It should be kept in mind at all times that an entrepreneurial society is there to benefit German citizens, not German *Länder*, regions or cities per se. We will then propose additional measures in this report for the Bavarian and Brandenburg-Berlin ecosystems as an illustration of how such refinements are made. But before turning to the national level, the next section will present the results of some counterfactual policy experiments that highlight how improving the underlying institutions would affect the regional distribution of entrepreneurial ecosystem quality.

2.4 A tide lifting all boats or investing in excellence?

Having identified the weakest pillars for the *Länder*, we can simulate what would happen if we could address these weaknesses. Of course, such an exercise has a high counterfactual character and it is far from clear what it would entail to actually change the (situation and then the) scores in reality. But it does bring to the fore an important trade off that policy makers face. In Table 2.7 we list the *Länder* of Germany and their original REDI-scores in column 3. In column 4 we have increased all regional scores by 10% as a benchmark scenario. By reversing the algorithm, we can then compute by how much what pillars and variables would have to be increased to achieve that 10% increase. Assuming (quite arbitrarily and without claiming any empirical support for this assumption) that increasing a pillar score by one unit of the index is about equally difficult across pillars and variables, we can then compute the minimum required effort (MRE) to achieve this improvement.

By taking this total MRE and reallocating it across *Länder*, we then compute a scenario in which we maximise the country score for Germany in column 5. Interestingly, and in contrast to e.g. Italy, for Germany as a whole the optimisation would imply a slight redistribution of effort to the lagging *Länder*. This is the result of the fact that Germany's leading *Länder* have already relatively well rounded ecosystems, whereas the lagging *Länder* have a few very important bottlenecks. The overall ecosystem can then be improved most efficiently by addressing these bottlenecks specifically. In column 6 we report the regional REDI-scores when instead the MRE is allocated to maximise the score of the least performing regions up to a common minimum score (here 51). This exercise, although one should not attach too much weight to the exact numbers, does reveal an important trade-off that our research has revealed is generally important.

Table 2.7: Summary Table on new REDI scores after different versions of optimisation

Region code	Region Name	Original REDI score	Modified REDI score (10% increase)	Modified REDI score (country optimisation)	Modified REDI score ('poorest region')
DE1	Baden-Württemberg	62.0	68.2	69.0	62.0
DE2	Bayern	60.6	66.6	67.0	60.6
DE3	Berlin	62.4	68.7	67.2	62.4
DE4	Brandenburg	35.1	38.6	46.2	51.0
DE5	Bremen	57.1	62.8	63.1	57.1
DE6	Hamburg	69.5	76.4	76.8	69.5
DE7	Hessen	58.9	64.8	64.4	58.9
DE8	Mecklenburg-Vorpommern	40.2	44.3	42.9	51.0
DE9	Niedersachsen	50.3	55.3	52.3	51.0
DEA	Nordrhein-Westfalen	54.8	60.3	59.2	54.8
DEB	Rheinland-Pfalz	44.6	49.1	53.2	51.0
DEC	Saarland	56.7	62.3	60.6	56.7
DED	Sachsen	50.5	55.6	56.5	51.0
DEE	Sachsen-Anhalt	38.2	42.0	45.4	51.0
DEF	Schleswig-Holstein	49.8	54.8	55.0	51.0
DEG	Thüringen	41.1	45.2	41.4	51.0

It is clear from Table 2.7 that what is best for the country is not best for all regions. This is a dilemma that we typically identify at the regional, national and EU-level. A one-size-fit-all approach is likely to work out differently in different regions and a trade-off is evident when political resources are limited, as they always are. In a globalised economy, where competition implies that only the best can thrive, countries (and regions and cities within regions) do best if they concentrate their efforts and talent to excel. Clustering, density and smart specialisation have large benefits in creating sustainable competitive advantages. But as the core-regions join cities and regions on the global frontier, they also tend to pull away from the regions that stay behind. Obviously, a few of Germany's lagging *Länder* risk ending up in that second category as well, although for Germany as a whole there seems little to really worry about. Policy makers, however, often with a distinctly geographically defined mandate and constituency, must always balance centripetal and centrifugal forces at every level of policy making. What is true within regions (economic activity and innovation tend to cluster in the cities) is true in countries and the European Union as a whole.

Such unequal outcomes, if ignored, may have severe political backlashes and are hard to justify from an equity perspective. We have identified that most *Länder*, although starting at different levels, will benefit from improvements in a limited set of pillars that can be the starting point for a national reform strategy. For some of the lagging regions, a large city close by attracts the talent and (high tech) start-ups (see Figure 2.8 and Berlin and Hamburg) from these regions. For the other laggards, mainly the former Eastern *Länder*, a limited number of very clear bottlenecks can be identified and could be addressed at the *Länder*-level. At the European level there is not a very strong case for reforms and policies that would benefit especially the already strong German entrepreneurial ecosystems. Germany's least performing regions still outcompete much of the European periphery,

also on the quality of the entrepreneurial ecosystem as measured by our REDI. It is therefore unlikely that European initiatives will target especially German bottlenecks and the responsibility for reforming Germany's entrepreneurial ecosystem will lie at the national level.

Figure 2.12: REDI-Scores Original

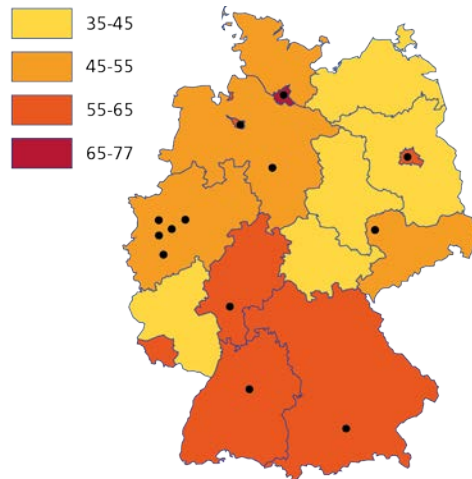


Figure 2.13: REDI-Scores Country Optimisation

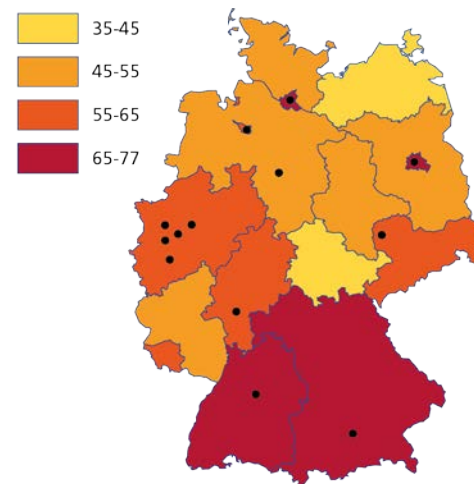


Figure 2.14: REDI-Scores Original

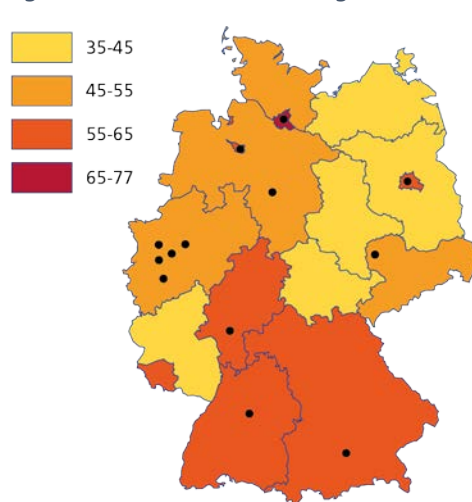
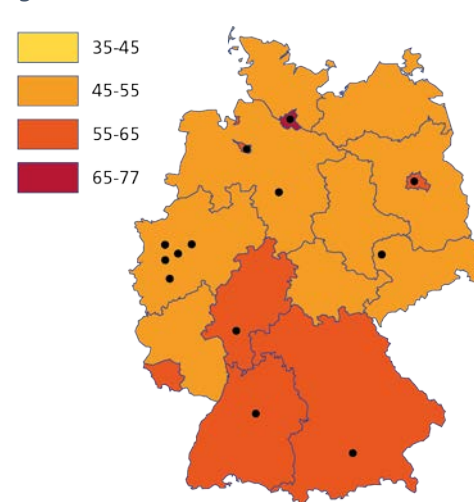


Figure 2.15: REDI-Scores Poorest First



We can illustrate the resulting distribution of REDI-scores in the maps in Figures 2.12. From our counterfactual policy experiments it is clear that what is best for the country as a whole is not necessarily optimal for all regions and tough choices have to be made. Although the situation improves for all *Länder* in all experiments, the country level optimisation does allow for larger between *Länder* differences, leaving in particular the former Eastern *Länder*, Thüringen and Mecklenburg-Vorpommern, behind. High geographic mobility in the country would ensure that all Germans can benefit, even if not all German regions do so to the same extent. But given low mobility, especially in lower income classes, a policy that invests in strengthening already strong regions may be politically infeasible and the national reform strategy should rather aim to lift all boats on the tide.

2.5 Overall conclusions GEI-REDI analysis

Our reading of the data above reveals that in all German *Länder* and the country as a whole the main bottlenecks in the entrepreneurial ecosystem are a limited willingness to take risk (Business Risk), an educational system that could use improvement (Education and Training) and a lack of radical innovation (New Products and Technology) that feeds back into a low familiarity with ambitious entrepreneurship and a rather closed culture (Networking and Cultural Support). It is dangerous, however, to rely exclusively on data and aggregate indices, even if they are composed of a broad set of sub-indicators. It is always important to complement a data based quick scan with common sense and more qualitative information to contextualise and complete the diagnosis. Only after triangulating the results above with the historical analysis, literature review, expert judgement and more qualitative survey results below, we can map the diagnosis onto our menu of interventions to propose tailored reforms for Germany.

Step 3: Triangulating History, Data and Survey results

3.1 Regulatory barriers to entrepreneurship in Germany

Table 3.1 below shows the results of a survey conducted among some 313 German founders in 2015-2018. The results largely confirm but also nuance the impressions from the coarser data-based analysis presented in the previous section. The survey elicited a lot more information, specifically about the order of labour, financing and knowledge acquisition decisions in young firms and in the FIRES-project these results were presented in much more detail in D5.1 and the three scientific publications that came out of this work. Here we only briefly show the results of an open question: “Which regulatory requirements did you perceive as major obstacles during venture creation?” that was asked towards the end of the survey.

Respondents mentioned stringent environmental regulation and building requirements as major obstacles most. The answers to this open question obviously differed from one respondent to the next, but they were coded to compare the answers also across countries. Table 3.1 below reports the number of times the respondents mentioned a coded aspect, but it should be clear that respondents were not prompted to list these topics in the survey. That is, they were free to answer the question in any way they wanted unrestricted by a pre-defined list of options. Coding terms were based on clusters that were identified in the raw data ex post. On the one hand, the way the question was asked, however, did perhaps lead the respondents in a specific direction. In this question, respondents were asked to think about *regulatory requirements* explicitly. This may have led to respondents thinking about environmental and building regulations and regulatory obstacles related to documentation, bureaucratic and legal procedures first. On the other hand, however, this question was asked after more general questions about barriers to founding a firm and respondents generally answered this set of questions quite consistently.²⁰ This suggests that most barriers founders perceive to be important in Germany are of a regulatory nature. That is, they were faced with regulatory requirements that were hard to understand or satisfy. Only “high taxes” in the Table mildly suggest that founders considered financial constraints important.

From the GEI-REDI analysis we observed that regulatory barriers did not seem to be the most pressing problem, but considering other sources and rankings, i.e. the World Bank’s Doing Business index (World Bank, 2018), regulatory barriers to starting up are indeed a matter of concern. This confirms the importance of triangulating across methods to formulate an accurate and full diagnosis. It is also worth mentioning here that environmental and energy sector specific regulation, as well as safety and building codes, were not very much in scope in the FIRES-project. When linked to the famous Porter-Hypothesis (Porter and van der Linde, 1995; Ambec et al. 2013), however, one might argue that strict environmental regulation can be a source of dynamic competitive advantage, whereas evidence by Stenholm et al. (2013) shows tight regulation may prevent the entry of less viable

²⁰ These questions were: “Which aspects did you experience as particularly important during venture creation?” and “Which aspects did you experience as particularly difficult during venture creation?”.

and low quality entrepreneurs. But then such administrative hurdles should serve to weed out lower quality entrepreneurs and regulations should set clear and ambitious goals and standards for those that remain. The 'complaints' about tedious administrative processes, building and environmental permits etc. in our survey came - almost exclusively - from alternative energy ventures. The core problem here is that there are separate *Umweltauflagen* that need to be fulfilled by founders in this sector - and this is quite cumbersome and a lengthy process.

Table 3.1: Results survey on regulatory obstacles in Germany

Regulatory Obstacle	Times mentioned ²¹
Which regulatory requirements did you perceive as major obstacles during venture creation?	323
None	130
Does not answer question	32
Stringent Environmental Regulations	18
Regulatory requirements for buildings	12
Bureaucracy in general	11
Specific requirements related to energy sector	10
Legal requirements for approval	10
Onerous requirements for documentation	10
Tax Laws in general	8
Legal requirement to be member of IHK	7
Lengthy approval process	5
Registration procedure	5
Difficulties with obtaining finance	5
Employment regulations which hamper ability to hire employees	5
High Taxes in early phases of venture creation	4
Legal Initial Capital Requirements	4
Constantly changing regulatory environment	4
Difficulties with transition of legal form	3
Insecurity about details of law	3
Lacking knowledge about regulatory requirements relevant for venture creation	2
Legal requirements to involve a notary	2
Data protection laws	2
Local regulations	2

In the top-10 we also see that the founders confirm the problem of a cumbersome bureaucracy that is not always very transparent. But only some (<5%) mention bureaucracy and complicated legal and regulatory requirements as a real obstacle to start a firm. In the reports and papers in FIRES-deliverable D5.1 it is shown that this does not significantly differ for founders in leading entrepreneurial ecosystems such as the UK and US. As we have argued in part I of this report, some

²¹ More than one answer was possible.

barriers to entry can be justified and work to increase the quality of start-ups that overcome such barriers. From the survey we get the impression that German barriers to entry are perhaps excessive and not always justified in selecting on the right criteria. That is certainly confirmed in Germany's 113 out of 190 ranking in the World Bank (2018) Doing Business index on "ease of starting a firm". In this respect, however, it matters a great deal if you are interested in high-quality innovative entrepreneurial venturing or rather care more about quantity and a more broadly accessible entrepreneurial ecosystem. The German ecosystem is tougher to get into, but that is arguably much in line with the German attitudes towards venturing and entrepreneurship in general. German founders do not start a firm on a whim and "just give it a try". They take their responsibilities as an employer, creditor and supplier seriously and some bureaucratic verification of a prospective business seems justified in the German context.

3.2 Founders' suggestions for reforms in Germany

In the same survey we also asked: "What can policy makers do to facilitate venture creation?". The results of that survey are listed in Table 3.2 below. The most common suggestions by the founders fall under the category of financial support. This is remarkable in light of the fact that financial barriers were rarely mentioned in the previous question. Importantly, the founders do not call for generic deregulation, but for better and more transparent procedures. That is, frequent changes to the programs cause policy to become a liability for entrepreneurs and should be avoided.

It is also interesting that again, German founders mention the energy sector relatively often (compared to e.g. founders in Italy and the UK). This suggests that German founders are relatively active in this field and in light of the huge challenges in the *Energiewende*, this is of course a good thing. It would be wrong, however, to conclude from these survey results, that regulation in that sector is only a barrier. Entrepreneurs may consider such regulations a nuisance, but the energy system is of course one of the most important infrastructures in a modern economy. Making sure all that are active in that sector comply to shared standards and security measures is a matter of common sense. But such common-sense regulation should of course be clear, transparent, stable and unambiguous. And we interpret the calls for reduced bureaucracy and improving the situation for the energy sector in that way.

Two other suggestions stand out. In slightly different wordings the founders suggest a simplification of procedures, which in itself need not make regulations less strict and tight, only more transparent and easy to follow. And again in different ways they argue the government could promote venture creation by allowing founders to benefit more from the venture they create. Although not strongly and perfectly so, the German founders clearly identified some of the same weaknesses in the entrepreneurial ecosystem our data analysis above has flagged. Recall that the weaknesses the GEI-REDI analysis revealed are low risk acceptance, lacking training and education and a lack of radical innovation. The founders' calls for better networking, a more entrepreneurial culture and general feelings of support resonate with those weaknesses, but the founders' do not mention a lack of knowledge, absorptive capacity or new product and process technology. It is very possible that founders that did start a firm, perceive their ventures as quite risky and innovative. Consequently, they are perhaps not inclined to recognise these more general features of the wider ecosystem. Indeed, the surveyed founders may find themselves in a vibrant entrepreneurial scene and perceive a strong ecosystem where only external constraints hold venturing back, when they could be less

informed and aware of the barriers to entrepreneurship in the lagging *Länder* and the macro conditions of the broader ecosystem.

Table 3.2: Results survey on suggested policies in Germany

Policy Suggestions	Times mentioned ²¹
In your view, what could policy makers do to facilitate venture creation?	455
None	37
Does not answer question	30
Facilitate financing for small businesses	89
Make loans more available	16
More financing programmes for start ups	10
Make more subsidies available	8
Incentives for private investors to invest in start-ups	5
Guarantee loans	5
State funds	3
Reduce bureaucracy	39
Avoid constant policy changes	28
Provide competent advice to people starting businesses	24
Improve situation specific to energy sector	23
Reduce tax rates for small businesses	20
Provide better information about how to start a business	18
Provide better training to people for starting businesses	13
Simplify tax laws	12
Clear regulations	10
More flexible tax law adjustable to liquidity of start-up	10
Provide guidance	9
Provide incentives for hiring people	9
Reduce costs	9
Financial benefits for founder	9
Facilitate procedures for approval	8
Create feeling of support for entrepreneurs	5
Abolish compulsory membership in IHK	5
Reduce initial capital requirement	4
Offset risk of starting business	4
Simplify regulatory requirements for buildings	4
Simplify venture creation process	3
Provide better networking opportunities	3
Create entrepreneurial culture	3
Adjust tax system to encompass start-ups	3
Help market start-ups	3
Ease environmental regulations	3
Allow founders to take out public social insurance	2

Instead the survey therefore reveals frustration with the regulatory framework and bureaucracy than the REDI-analysis is ill equipped to reveal. With this final question, moreover, we guided respondents to think about what active policies the government could undertake. This may explain the high incidence of suggestions to support start-ups and new ventures financially despite the fact that capital does not seem to be a major barrier to venturing in Germany. The policies suggested are naturally all action oriented, and financial instruments are typically top-of-mind, also for founders. The FIRES-approach to improving the broader entrepreneurial ecosystem, however, sometimes justifies more long-term perspective and we propose rather indirect measures to improve the overall institutional environment. It is probably better to not take the survey responses too literally and rather interpret what founders are really signalling when they propose the government provide more guidance, information and training. Where founders signal a lack of information and training and call for a more stable policy environment, we can interpret this as general support for a more fundamental reform approach that creates institutional support for those providing such services and knowledge.

When they call for lower taxation and higher financial support for founders, we should of course be very cautious. Nobody likes to pay taxes, and founders are no exception. And throwing more money at a problem is easier said than effectively done. Still, perhaps their complaints are not unjustified in this case. The level of taxation and social security contributions out of total profits is estimated to be about 50% (World Bank 2018) in Germany and on “paying taxes” Germany ranks 41 out of 190. Moreover, more federal funding for start-ups and new entrants may also serve as an important signal and push also cultural support and risk acceptance in the right direction indirectly.

3.3 Conclusions

In sum, the survey confirms some, but not all the weaknesses identified in the data based quick scan. Moreover, it provides some interesting additional information. For example, the need to create a stable institutional framework that is above all transparent and clear. And the suggestion that overall taxation on new ventures is perhaps too high. Such information is hard to gather from quantitative data. The survey was therefore useful in complementing the results we obtained above. But because of the way the questions were phrased and because of the limited perspective also founders have, the proposed interventions they come up with typically fall in the “inform, deregulate, subsidise more and tax less” approach that characterises any entrepreneurship strategy for three decades now. It is only logical that founders should mention, when asked for the most important barriers and possible policies, those they perceived most important in their personal experiences and direct environment. And there certainly is valuable information in that experience. But as a guide to policy it is insufficient (as is an approach based on data only). The true value of this information is revealed when combined with information from other sources. The triangulation of our historical, quantitative and qualitative information for Germany, though necessarily limited in scope and depth, now reveals enough information to now draw up a diagnosis for Germany and turn to proposed treatments.

Step 4: Mapping onto the FIRES-reform proposals

Formulating a reform strategy to strengthen the entrepreneurial ecosystem is not unlike treating a patient. In the previous sections we have considered the medical history of the patient, used an advanced diagnostic tool to scan for her health problems and asked the patient how she felt and what she believed would be good treatments. Based on all this information we can come to a diagnosis and mapping that diagnosis onto the menu of available treatments, propose a treatment that fits the patient. Germany boasts a strong entrepreneurial ecosystem in general. There are, as in most other countries, hotbeds of entrepreneurship in major cities alongside more rural regions. The geographic resolution of our data reveals that arguably Germany's entrepreneurial talent and resources tend to cluster in its major cities, but as these cities are themselves spread across the country, so is entrepreneurship in Germany. Quantitative data analysis then suggests large heterogeneity in entrepreneurial ecosystem performance, whereas for the country as a whole and the regions affected, this is not necessarily a big problem. It looks more dramatic that it is because of the way the data is collected.

The results from the surveys do not suffer from this problem and confirm that indeed the challenges and bottlenecks in the German ecosystem are not formidable. Founders suggest regulation makes the founding of new ventures difficult, especially in green tech and renewable energy sector. This is confirmed in Germany's rankings on traditional indicators like self-employment and firm formation, especially in high tech sectors, show Germany is lagging in an international comparison. But the problems do not seem nearly as big as in for example Italy. Importantly, founders do not complain about lack of funding, the lack of skilled personnel or the lack of knowledge. The data analysis does reveal, however, that German entrepreneurship is less bold and risk seeking than perhaps is common in the Anglo-Saxon world. New ventures in Germany score (comparatively) low in radically new products and technology and risk acceptance. Moreover, if due to demographic trends or other reasons, the rates of self-employment and start-up activity in Germany are falling and that trend should worry a country that is already scoring low on these indicators. Incremental innovation is routine in German industry, but the pillars related to more radical innovation in the ecosystem seem the weakest link in an otherwise well developed and functional entrepreneurial ecosystem. This diagnosis roughly holds for the country as a whole and the individual *Länder* separately.

It is, however, not easy to change. German preferences for well-designed and (over)engineered solutions, an emphasis on quality over price and a dislike for disruptive technologies that destroy incumbent firms and employment and upset social relations, are deeply entrenched in the German culture. And arguably it constitutes the core of a carefully built up and cherished "made in Germany" brand and reputation. It is important to not advise the patient to become a person she is not. Still, a little more adventurous spirit would not hurt and improve Germany's position vis-a-vis competition from East-Asian tigers that rival its industrial and engineering dominance. So making it easier to start (and end) a venture and supporting truly innovative (intra- and) entrepreneurship financially, could go a long way in improving the entrepreneurial ecosystem in the country and its *Länder*. Taking these prescriptions to our menu of policy interventions and reform proposals in Part I of this report, we can select the seventeen most suitable interventions. They are listed in Table 4.1. In column 1 we find the number under which they were presented in Part I and column 2 gives the section number where one can read more of the background and general motivation for the

proposals. Column 3 lists the title and 4 the full proposal, where column 5 gives a brief general motivation and column 6 gives links the proposal to the analysis presented above.

Table 4.1: The FIRES-reform proposals for Germany

#	Section	Title	Proposal	Explanation	In Germany
3	3.1.3	Patents and Intellectual Property	Limit the breadth, width and span of patent protection to cover working prototypes and market ready innovations only for a short period of time.	Of course, the European union is party to international treaties, such as the WTO TRIPS Agreement, that sets minimum requirements to IPR. We do not propose the European Union violate or disregard these treaties but encourage the Union to use its influence in the governing bodies to get them reformed to accommodate our proposals. These limitations of patent rights would still fall well within the institutional structure in place but would significantly reduce the risk entrepreneurs face of being sued for infringements on patents they did not even know existed (Jaffe and Lerner 2011).	Of course, this is an international issue, but it would certainly help if Germany were to advocate this at the appropriate levels. Because Germany is an important player in this field. It may, on first sight, go against the interests of a country that patents a lot. But this will stimulate commercialisation also in Germany.
11	3.2.6	Taxation of Private Wealth	We therefore propose to increase the wealth available for informal entrepreneurial finance by reducing taxes on private wealth, private wealth transfers and inheritance.	Kotha and George (2012) show that entrepreneurs distribute ownership rights to informal investors and their investments early in the start-up process, suggesting triple-F financiers are not mere charities. And Burke et al. (2014) show that the supply of triple-F informal entrepreneurial finance typically follows demand closely and that amounts invested are typically in the same order of magnitude as those committed by angel investors discussed below (in the 0000s). That is, entrepreneurs mobilise significant funds from their personal networks and these funds help them develop their venture in its earliest stages. It is possible that more supply of informal finance would thus enable or even cause more entrepreneurial venturing.	The transfer of wealth across generations, especially in the form of business assets, is a major issue in the family-firm dominated <i>Mittelstand</i> in Germany. The ageing demographic may add to the problem (Ellul et al. 2010; Getz and Peterszen, 2004). By reducing taxation on private wealth transfers, the transition in these firms can be improved, but this also frees up more so-called triple-F finance in Germany.
19	3.3.4	Banking	Increase the mandatory equity ratio in banking gradually to 10-15% to have more skin in the game and allow banks to take on more risk responsibly in their lending portfolios.	Given that European banks operated profitably at much higher equity ratios in the past whereas non-European banks continue to do so, this proposal only requires a sound implementation and transition strategy. Gradually building up the equity buffer while at the same time accumulating more publicly guaranteed SME-loans in the portfolio is a balanced approach. Higher required equity buffers will increase the price of credit and some might argue that this will reduce credit and investment in the aggregate. We feel, however, that such price increases will only drive out the marginal investment projects and most of these are currently found in the secondary, speculative investments that Bezemer (2014) deems unproductive.	German banking landscape has a few very large banks, Deutsche Bank in particular and many small, often locally operating banks (<i>Sparkassen</i>). European and international minimum standards are applied but allow for rather low reserves and high leverage. German banks currently are well capitalised and operate on average with low leverage, but Deutsche Bank was branded the worlds' riskiest bank by the US FDIC in 2016 using its simpler method of computing leverage (Hofbauer et al. 2017; Business Insider 2016).
22	3.3.5	Angel and Venture Capital	Reduce barriers to the sale, acquisition and IPO of VC-funded start-ups.	An option to ensure that incentives to invest are stronger while possibilities to offload risks onto taxpayers and financiers are kept small, is to reduce capital gains taxation for venture capital equity investments (but NOT for private equity used for leveraged buy-outs, speculation and mergers and acquisition). And to improve the opportunities to exit. In that way, VC investments are not subsidised directly but become more interesting as there are more options for a quick exit.	Germany does not seem to suffer from a direct lack of VC funds and its geographical distribution nicely matches the entrepreneurial ecosystem (Klagge et al. 2017). However, the German market remains small because of low demand. We propose to stimulate this market by strengthening the pull-factors as direct subsidies in these circumstances will only cause too much cheap money chasing too few projects.
23	3.3.6	Alternative Finance and Disintermediation	We propose to implement a light-touch regulatory regime for equity crowd funding.	Light touch regulation has been successful in Britain (Vulkan et al. 2016, Hornuf and Schwenbacher 2017, Estrin 2018) and could work well in all European Member States. This is not controversial as the European Commission and most of the member states have already expressed their intentions to do so.	Crowdfunding Insider (2017) argues that German crowdfunding regulation introduced in 2015 and reviewed in 2017 seeks to limit crowd funding for real estate investment. The arguments are all about stability. We would encourage experimentation with this new form of finance under tight supervision, but loose regulation.

Table 4.1 (continued): The FIRES-reform proposals for Germany

#	Section	Title	Proposal	Explanation	In Germany
26	3.4.1	The Organisation of Labour Markets and Social Insurance Systems	We propose below to make important social insurance benefits “portable” between jobs and between regular employment and self-employment.	Public income insurance systems in combination with strict labour security legislation tend to penalise individuals who assume entrepreneurial risk (Ilmakunnas and Kanninen 2001). This is because these systems confer a relative advantage on employees with many social security benefits—such as disability, sickness, unemployment and pension benefits—being explicitly linked to formal employment. These benefits further increase the opportunity cost of leaving a tenured position as an employee and thus reduce the incentives for entrepreneurship (Audretsch et al. 2002).	Labour market mobility in Germany is relatively low. Geographically (Niebuhr et al. 2012; Bentivogli and Pagano, 1999), occupationally (Korpi and Mertens, 2003; König and Müller, 1986) and across LM-statuses. It seems in Germany this is also due to the “orderly” educational system that sets people on a very predictable career path. Linking social security entitlements to jobs is perhaps consequence as much as cause but it is a good place to start.
30	3.4.3	Employment Protection Legislation	Relax the stringency of employment protection legislation for permanent contracts.	A competently implemented liberalisation will reduce job security but increase employment security for workers, as labour demand will increase and more opportunities will be created in the labour market. That said, the impact and strictness of employment protection legislation depends on a complex combination of components, such as grounds for individual dismissal, redundancy procedures, mandated periods of advanced notice, severance payments, special requirements for collective dismissals, rules favouring disadvantaged groups, and so forth. For liberalisation to have the desired results, countries must develop carefully tailored strategies to avoid jeopardising the process, ideally by considering and possibly emulating the paths already taken by similar countries.	Germany ranks 4th for permanent and 44th for temporary contracts protection in the OECD ranking. The gap is huge. Not many countries show such a difference. It may be argued that tight labour protection is needed to maintain the high levels of firm specific human capital that characterise Germany, but that cannot justify the gap with temporary workers. This disparity implies not all employers compete for talent on a level playing field and government enforced regulation benefits large corporates over new entrants.
31	3.4.3	Employment Protection Legislation	Establish or strengthen training programs to prepare workers for new occupations	Archanskaia et al. (2017) show that countries with a low rate of substitution between inputs in routine production, will not be able to gain a comparative advantage in high-value products that are intensive in non-routine tasks. As a result, they will end up specialising more and more in routine-intensive products and experience lower wage growth. Geurts and Van Biesebroeck (2016) further show that the pattern of firm-growth in Belgium indicates that young firms under-adjust to good news. As a result, many promising firms scale up too slowly and they might miss out on opportunities in a fast-paced global market.	On the job training for mobility has to be publicly funded. Or by employees. Because we cannot expect employers (let alone start-ups) to pick up the bill. This can be a first step towards addressing the lock-in effect of the German dual educational system mentioned also under proposal 26.
33	3.4.4	Other Barriers to Mobility	Experimenting with a guaranteed return to a job after time spent with a start-up and/or a publicly funded “venture creation leave” for people engaged in a firm start up.	It was generally agreed that a policy to promote mobility would involve both pull (eliminating barriers) and push (encouraging mobility) instruments. However, the desirable mobility and flexibility in the labour market can only be achieved when a basic level of income and job security is ensured for those involved. People will not take the risks associated with working as or for a young start-up when necessities of modern life are not met and reasonably secure.	Germany would stand to gain from R&D workers leaving their employer when especially serendipitous discoveries are outside the strategic scope of the incumbent. This may be important to support not only R&D workers that could start up innovative high-tech ventures but support also the everyday entrepreneurs Welter et al. (2017) claim are important in an entrepreneurial society.
34	3.4.5	Social Insurance Systems	Guarantee equal access to welfare state arrangements for all, regardless of tenure in a specific job or labour market status, to make all potential employers compete on a level playing field.	An Entrepreneurial Society will see more people active in the labour market as self-employed or freelance worker or working in inherently risky ventures and SMEs with corresponding intervals of being between jobs. It is evident that these people face income and health risks that they cannot (self-) insure, as much as anyone else. Therefore, in a modernised labour market, these citizens should be given access to collective arrangements on an actuarially fair basis.	We could even make this proposal a bit stronger and argue that joining such collective arrangements should be mandatory to avoid competition resulting in underinsurance and eventually transferring the risk on society, as is the case with for example health costs and pension insurance.

The first proposal (3), and similar ones developed in the menu of treatments in Part I of this report, refers to intellectual property and is beyond the competencies of even national authorities. Still, the voice of the German patent office in international negotiations that do establish the legal framework, is heard. Our proposal here is to be interpreted as a suggestion to raise the issue at the appropriate governing bodies and treaty negotiations.

The proposals in taxation and financial regulation (11, 19, 22 and 23) do lie clearly within national competencies and here, serve the dual purpose of mobilising more capital for riskier, radically innovative ventures and increasing the financial rewards for such venturing and investing in it. We disagree here with the founders that in our survey called for more public funding and financial support. Instead, we believe that mobilising the so-called triple-F finance can be promoted by allowing for more wealth to accumulate and be transferred among private individuals.

Proposals on social security and labour market regulation (26, 30, 31, 33 and 34) all aim to mobilise Germany's most knowledgeable and valuable employees. Portability of social security entitlements across jobs, sectors and labour market statuses will eliminate the lock-in of skilled labour in gilded jobs and reduces the barriers for employers and creates a level playing field for start-ups on the demand side and for marginalised groups in the labour market on the supply side. Creating a level playing field will also entail forcing self-employed to join collective social insurance, e.g. for pension and health costs. This will make growth in Germany more inclusive and equitable as well as more innovative.

Table 4.1 (continued): The FIRES-reform proposals for Germany

#	Section	Title	Proposal	Explanation	In Germany
40	3.5.2	Product Market Regulation	Excessive barriers to new business formation and new entry should be lifted where possible.	This, however, seems to be part and parcel of the EU policy agenda already. Our consortium supports that effort with the caveat that well justified barriers to entry are useful to keep unproductive or even destructive ventures out (Stenholm et al. 2013; Darnihamedani et al. 2018). It should be easy for challengers to enter (and exit) but these challengers should be serious.	The survey above clearly indicates founders think bureaucracy and regulation is a barrier to business formation and the Doing Business Index of the World Bank (World Bank, 2018b) ranks Germany 113 out of 190 in ease of starting a business. Compared to Georgia, at 20% below the global frontier and not improving as fast (World Bank, 2018c).
42	3.5.4	Digitalisation	Invest in an excellent, open access digital infrastructure for European citizens and businesses.	To allow entrepreneurs to act on the opportunities and protect European citizens from the risks involved in digitalisation, it is important to embrace these trends. No regret policy proposals to do so are to provide an excellent ICT-infrastructure in Europe that allows entrepreneurs to quickly scale their innovative ideas to the EU and global level. The same infrastructure can also integrate more European citizens in the common market and facilitate information exchange.	Providing such an infrastructure would promote scaling of new digital ventures and high-tech services (WEF, 2016a). Germany ranks 15 out of 139 in the WEF (2016a) Networked Readiness Index, down from 13 and below the Nordics and UK. As this is a fertile ground for new firm formation, Germany could invest here to promote a more adventurous entrepreneurial ecosystem without jeopardising upsetting its existing routine innovation paradigm in manufacturing.
44	3.6.2	Bankruptcy Law	Insolvency regulation should protect inherently healthy and promising ventures and allow for a quick and ex ante transparent liquidation of those that are not.	It should not be too easy to file for bankruptcy. That would give the firm too much bargaining power in such negotiations. If writing off debt and starting anew is too convenient a resort for failing entrepreneurs, it may encourage exploitation and destructive entrepreneurship, harming creditors and the rest of society. That, in turn, will limit their willingness to finance, supply or work for legitimate start-ups. On the other hand, a person who goes bankrupt because of a failed venture should not be stigmatised and forever haunted by debt and ostracised from future entrepreneurship.	This proposal ties in with the Business Risk Acceptance and Fear of Failure but this necessarily is a long run intervention. Only by signalling strongly to society that failure in business is accepted and forgiven, can cultural attitudes gradually become more supportive. No quick results to be expected. German bankruptcy law seems stringent (see e.g. EC, n.d.).

Proposal 33 explicitly targets barriers to spin-out and spin-off entrepreneurship. It is true that in German firms a lot of knowledge generated in R&D labs will reach markets through intrapreneurship and innovation inside existing firms. But that could be complemented by opportunities for more radical ideas to spin-out. As such experiment create a public good, while entailing high personal private risks and costs, we propose public investment is justified in this case.

Table 4.1 (continued): The FIRES-reform proposals for Germany

#	Section	Title	Proposal	Explanation	In Germany
48	3.7.2	Knowledge Generation	Both the EU and its member states should create healthy, well-funded, academic institutions that allow Europe's best and brightest to pursue their research interests.	In the literature, there is also broad consensus that basic research is a pure public good (Pavitt, 1991). It therefore makes perfect sense to channel more of the EU and national budgets to an activity that provides such evident positive spillovers throughout the Union.	For Germany this should be interpreted as a call for increasing the public funding for universities in particular. These institutions have a strong educational focus in Germany as it is and spending per student has declined (Füller, 2017) and at €9000 per students is less than the OECD average of €10.400. Underinvesting in academic teaching and basic research jeopardises the knowledge base in the long run.
49	3.7.3	R&D	We propose to limit R&D subsidies and tax breaks to "new to the market" activities.	The reasoning behind that proposal is that only "new to the market" R&D generates the positive external effects that justify public support. New to the market should here be understood as new to the global markets and therefore truly innovative.	Ties in with shortage in radical product and technology innovations. "New to the market" is by definition more radical. Current programs support using grants and loans (not tax breaks) and incremental projects are eligible (Deloitte, 2015).
53	3.7.4	Knowledge Diffusion and Commercialisation	We propose to strengthen and facilitate the tradition in many European countries of harbouring innovations, even of a radical kind, inside large firms through intrapreneurship.	Our consortium agrees that perhaps intrapreneurship, entrepreneurial venturing in the relative security of a formal employment relationship, is more complementary to the European model of the welfare state. Promoting intrapreneurship is then probably a more efficient way to push Europe in the direction of a more Entrepreneurial Society.	Liebrechts et al. (2018) shows the importance of intrapreneurial venturing. In the German case it is important to promote more radical intrapreneurship. Intrapreneurs in Germany are still too often seen as enemies and policies should be designed to support them (Baltes, 2016; WEF, 2016b.).
55	3.8.2	Creativity in primary and secondary education	Push for reforms in primary and secondary education that promote creativity, a willingness to experiment, a tolerance of failure and out-of-the-box thinking.	More appreciation for creativity (and therefore tolerance of deviant behaviour) will probably shift the balance from business oriented to more creative entrepreneurship. Evidence from field experiments (Weitzel et al. 2010; Urbig et al. 2012) and in the FIRES-project (Lauritzen et al. 2017) suggest that creative entrepreneurs are more socially oriented than strictly business-oriented entrepreneurs. Promoting creativity in primary and secondary education, to the extent possible, is therefore a long-term strategy to promote productive entrepreneurship that will create innovative, sustainable and inclusive growth (Audretsch and Belitski, 2013; Stam et al., 2012).	If we combine German performance on PISA scores and low scores on Education and Training plus need for more risk acceptance in the REDI-data analysis, it is clear that also in the educational system reforms are desirable. The government has put some programs in place in the 2000s already, but a focus on creativity and out-of-the-box thinking was not part of these programs. A lot has been achieved in recent decade. But education in the 21 st century requires different skills and brave leadership alongside professional teachers in German schools. It has been on the agenda since 2001 ²² but even in 2018 reforms remain urgent (Rothman, 2017).

²² Where PISA-researchers remarked: "Back in the industrial age, the tripartite system worked, since the goal was to maximise the academic potential of only a few, but it has no place in a modern society," Andreas Schleicher, coordinator of the PISA studies for OECD said in a DW-World.DE interview (DW, 2008).

A fourth group of proposals (40, 42 and 44) aims to improve the regulatory situation for start-ups and founders both at the start and possibly the end of their venture, as well as strengthen the digital infrastructure of Germany, that is an essential and vital infrastructure for platform based services that account for most spectacular new firm formation in the world today.

Finally, a group of proposals (48, 49, 53 and 55) suggests reforms to make Germany's strong knowledge generation sector more open to entrepreneurs penetrating the knowledge filter (Acs and Plummer, 2005) also and in particular for more radical ideas. By shifting traditional R&D subsidies more in the direction of more radical innovation, a direct incentive is given to incumbent firms to become more adventurous in innovation whereas the promotion of creativity and experimental mindsets in primary and secondary education will support this shift in the long run. Policies to support intrapreneurial ventures will have to be designed in close cooperation with knowledge intensive firms in Germany, as this concept is relatively new and policy making is still experimental in this area, whereas higher investment in higher education and basic research in contrast is a proven recipe for improving the quality of life in the long run.

The proposals individually and in combination aim to make German entrepreneurs a bit more adventurous and change their environment in such a way that such adventures are rewarded more if successful and punished less if failed. In addition, the proposals aim more directly at allowing these more adventurous entrepreneurs to start a venture with less administrative hurdles and grow them with capital, labour and knowledge obtained on a level playing field. These reforms would have to be implemented while keeping sensible and important regulation in place to screen out business models that add no social value but should not block potentially disruptive technologies and products from entering the German economy. It is likely that, even though all regions stand to benefit from these interventions, the fact that density and clustering tends to promote the quality and impact of entrepreneurial venturing, will imply that the same policy improvements will benefit already prosperous cities and regions most. Still, that should not stop policy makers from pursuing these interventions as it is the wellbeing of German citizens, not the GRP of its administrative units per se that the national government should care about. In addition, Germany has effective automatic transfer systems that will help maintain a high quality of life throughout the country, even if the available entrepreneurial resources are attracted to and deployed in only parts of the territory.

Of course these proposals will need a much more detailed discussion and form the starting point, not the final word on the policy debate. Moreover, even if adopted, our proposals all require careful implementation and evaluation to complete the 7-step policy cycle presented in the introduction to this Part. But based on our analysis of the situation, we propose the patient consider this set of interventions to improve and maintain the health of its entrepreneurial ecosystem.

Conclusions

Bibliography

- Abrams, L. (2007). *Bismarck and the German Empire: 1871–1918*. Routledge.
- Acs, Z. J., D. B. Audretsch and E. Lehmann (2013). The knowledge spillover theory of entrepreneurship. *Small Business Economics*, 41(4), 767–774.
- Acs, Z. J., and L. A. Plummer (2005). Penetrating the “knowledge filter” in regional economies. *The Annals of Regional Science*, 39(3), 439–456.
- Alesina, A., and N. Fuchs-Schündeln (2007). Good-Bye Lenin (or Not?): The Effect of Communism on People's Preferences. *American Economic Review*, 97(4), 1507–1528.
- Allen, F., and D. Gale (2000). *Comparing financial systems*. MIT press.
- Ambec, S., M. A. Cohen, S. Elgie, and P. Lanoie (2013). The Porter hypothesis at 20: can environmental regulation enhance innovation and competitiveness? *Review of environmental economics and policy*, 7(1), 2–22.
- Archanskaia L., J. Van Biesebroeck and G. Willmann (2017). *Comparative advantage in routine production*.
- Audretsch, D. B., and M. Belitski (2013). The missing pillar: The creativity theory of knowledge spillover entrepreneurship. *Small Business Economics*, 41(4), 819–836.
- Audretsch, D. B., M. A. Carree, A. J. Van Stel and A. R. Thurik (2002). Impeded industrial restructuring: the growth penalty. *Kyklos*, 55(1), 81–98.
- Audretsch, D. B., and E. E. Lehmann (2005a). Does the knowledge spillover theory of entrepreneurship hold for regions? *Research Policy*, 34(8), 1191–1202.
- Audretsch, D. B., and E. E. Lehmann (2005b). Do University policies make a difference? *Research Policy*, 34(3), 343–347.
- Audretsch, D. B., & Lehmann, E. (2016). *The seven secrets of Germany: Economic resilience in an era of global turbulence*. Oxford University Press.
- Audretsch, D. B., I. Grilo and R. Thurik (2007). *Entrepreneurship Policies in Germany: From small business to entrepreneurship policy*. In *Handbook of Research on Entrepreneurship Policy*. pp. 47–50. Edward Elgar Publishing, Inc.
- Audretsch, D. B., & Fritsch, M. (2002). Growth regimes over time and space. *Regional Studies*, 36(2), 113–124.
- Baltes, G. (2016). The State of Intrapreneurship in Germany 2016. Retrieved from <https://intrapreneurship.world/the-state-of-intrapreneurship-in-germany-2016-guido-baltes/> on 16-04-2018.
- Barkai, A. (1988). *Das Wirtschaftssystem des Nationalsozialismus: Ideologie, Theorie, Politik. 1933–1945*. Fischer-Taschenbuch-Verlag.
- Bauernschuster, S., Falck, O., and Heblich, S. (2010). Social capital access and entrepreneurship. *Journal of Economic Behavior and Organization*, 76(3), 821–833.
- Bauernschuster, S., Falck, O., Gold, R., and Heblich, S. (2012). The shadows of the socialist past: Lack of self-reliance hinders entrepreneurship. *European Journal of Political Economy*, 28(4), 485–497.
- Bauernschuster, S., and Rainer, H. (2012). Political regimes and the family: How sex-role attitudes continue to differ in reunified Germany. *Journal of Population Economics*, 25(1), 5–27.
- Bauernschuster, S. (2013). Dismissal protection and small firms' hirings: evidence from a policy reform. *Small Business Economics*, 40(2), 293–307.
- Bauernschuster, S., A. Driva and E. Hornung (2017). Bismarck's Health Insurance and the Mortality Decline. *CESifo Working Papers*, 6601. Munich Society for the Promotion of Economic Research.
- Beise, M., and H. Stahl (1999). Public research and industrial innovations in Germany. *Research policy*, 28(4), 397–422.

- Becker, G. (1964). *Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education*. University of Chicago Press: Chicago.
- Becker, S. O., and Woessmann, L. (2009). Was Weber wrong? A human capital theory of Protestant economic history. *The Quarterly Journal of Economics*, 124(2), 531-596.
- Bentivogli, C., and P. Pagano (1999). Regional Disparities and Labour Mobility: The Euro-11 versus the USA. *Labour*, 13(3), pp. 737-760.
- BMBF (Bundesministerium für Bildung und Forschung) (2014). *The High-Tech Strategy Innovations for Germany*.
- Bøggild, N., L. Heyn, J. Käser-Erdtracht, T. J. Richter, F. Wallau, A. Werner and G. Zinke (2011). *Evaluierung der ERP-Programme – Endbericht*. Hamburg: Rambøll Management Consulting.
- Brezinski, H. (1992). Privatisation in East Germany. *MOCT-MOST 1*: 3-21.
- Brezinski, H., and Fritsch, M. (1995). Transformation: the shocking German way. *MOCT-MOST: Economic Policy in Transitional Economies*, 5(4), 1-25.
- Broadberry, S. and Harrison, M. (2005). *The Economics of World War I*. Cambridge: Cambridge University Press. Hardback edition (xvi+345 pp.)
- Brosig-Koch, J., Helbach, C., Ockenfels, A., and Weimann, J. (2011). Still different after all these years: Solidarity behavior in East and West Germany. *Journal of Public Economics*, 95(11-12), 1373–1376.
- Burda, M. (2016). The German Labour Market “Miracle”, an assessment. *SFB 649 Discussion Paper* 2016-005
- Burda, M., B. Fitzenberger, A. Lembke and T. Vogel (2008). “Unionization, Stochastic Dominance, and Compression of the Wage Distribution: Evidence from Germany” *SFB 649 Discussion Paper 2008-041*, March.
- Burda, M. and J. Hunt (2001). From Reunification to Economic Integration: Productivity and the Labor Market in Eastern Germany. *Brookings Papers on Economic Activity* 2: 1-92.
- Burhop, C. (2010). The transfer of patents in Imperial Germany. *The Journal of Economic History*, 70(4), 921-939.
- Burhop, C. (2011). *Wirtschaftsgeschichte des Kaiserreichs, 1871-1918*. Vandenhoeck and Ruprecht, Göttingen.
- Burke, A., A. van Stel, C. Hartog, and A. Ichou (2014). What determines the level of informal venture finance investment? Market clearing forces and gender effects. *Small Business Economics*, 42(3), 467-484.
- Canova, F., & Ravn, M. O. (2000). The macroeconomic effects of German unification: real adjustments and the welfare state. *Review of Economic Dynamics*, 3(3), 423-460.
- Cantoni, D. (2012). Adopting a new religion: The case of Protestantism in 16th century Germany. *Economic Journal* 122, 502-531.
- Cantoni, D. and N. Yuchtman (2014). Medieval Universities, Legal Institutions, and the Commercial Revolution. *The Quarterly Journal of Economics*, 129(2), 823-887.
- Carlsson, B., Acs, Z. J., Audretsch, D. B., & Braunerhjelm, P. (2009). Knowledge creation, entrepreneurship, and economic growth: a historical review. *Industrial and Corporate Change*, 18(6), 1193–1229.
- Chickering, R. (2014). *Imperial Germany and the Great War, 1914–1918*. Cambridge University Press.
- Corneo, G., and Grüner, H. P. (2002). Individual preferences for political redistribution. *Journal of public Economics*, 83(1), 83-107.
- Czarnitzki D, T. Doherr, K. Hussinger, P. Schliessler and A. Toole (2016). Knowledge creates markets: The influence of entrepreneurial support and patent rights on academic entrepreneurship. *European Economic Review*, Vol. 86, 131-146.
- Darnihamedani, P., J. H. Block, J. Hessels and A. Simonyan (2018). Taxes, start-up costs, and innovative entrepreneurship. *Small Business Economics*, 1-15.

- Deloitte (2015). *Global Survey of R&D Incentives*. Retrieved from <https://www2.deloitte.com/content/dam/Deloitte/nl/Documents/tax/deloitte-nl-tax-global-survey-r-and-d-incentives-2015.pdf> on 16-04-2018.
- Drucker, P. F. (1998). From capitalism to knowledge society. In N. Dale (Ed.), *The knowledge economy* (pp. 15–34). Boston: Butterworth-Heinemann.
- Dustmann, C., B. Fitzenberger, U. Schönberg and A. Spitz-Oener (2014). From sick man of Europe to economic superstar: Germany's resurgent economy. *Journal of Economic Perspectives*, 28(1), 167-188.
- DW (2008). *Merkel Announces Major Education Offensive*. Retrieved from <http://www.dw.com/en/merkel-announces-major-education-offensive/a-3409603> 16-04-2018.
- Dyson, K. (1998) Chancellor Kohl as strategic leader: The case of economic and Monetary Union. *German Politics* 7(1), 37-63.
- Eaton, D., (2013). *The economists of the reformation: an overview of reformation teaching concerning work, wealth, and interest*. SAGE Open, 1-9.
- EC (n.d.). *Bankruptcy – Germany*. Retrieved from http://ec.europa.eu/civiljustice/bankruptcy/bankruptcy_ger_en.htm on 16-04-2018.
- Eichhorst, W. and P. Marx (2011). Reforming German labour market institutions: A dual path to flexibility. *Journal of European Social Policy* (21)1, 73-87.
- Ellul, A., M. Pagano, and F. Panunzi (2010). Inheritance law and investment in family firms. *American Economic Review*, 100(5), 2414-50.
- Esping-Andersen, G. (2002): A New Gender Contract, in: Esping-Andersen, G. (ed.): *Why We Need a New Welfare State*, Oxford, 68-95.
- Fackler, D. (2014). Establishment Survival in East and West Germany: A Comparative Analysis. *Schmollers Jahrbuch* 134, 183-208.
- Falck, O., M. Fritsch, and S. Heblich (2011). The phantom of the opera: Cultural amenities, human capital, and regional economic growth. *Labour Economics*, 18(6), 755-766.
- Falck, O., C. Günther, S. Heblich and W. R. Kerr (2013). From Russia with love: The impact of relocated firms on incumbent survival. *Journal of Economic Geography* (13), 419-449.
- Feldenkirchen, W. (1991). Banking and economic growth: banks and industry in the nineteenth century and their changing relationship during industrialisation. In: Lee, W.R. (ed) *German industry and German industrialisation*. Routledge, London.
- Foerder Daten Bank (n.d.). <http://www.foerderdatenbank.de/Foerder-DB/Navigation/Foerderrecherche/suche.html?get=77304d72f76d515d0cc28811147c3014%3Bsearch%3Bindex&typ=qk&act=exe&clt=Y&gbt=&brh=&brt=1&art=&gbrb=1&qry=&execsrh=Finden&cgparam.formCharset=ISO-8859-1>
- Friehe, T., and Mechtel, M. (2014). Conspicuous consumption and political regimes: Evidence from East and West Germany. *European Economic Review* (67), 62-81.
- Fritsch, M. (2004). Entrepreneurship, entry and performance of new business compared in two growth regimes: East and West Germany. *Journal of Evolutionary Economics* (14), 525-542.
- Fritsch, M. and M. Wyrwich (2014). The Long Persistence of Regional Levels of Entrepreneurship: Germany, 1925-2005. *Regional Studies* (48)6, 955-973.
- Fritsch, M., E. Bublitz, A. Sorgner and M. Wyrwich (2014) How Much of a Socialist Legacy? The Re-emergence of Entrepreneurship in the East German Transformation to a Market Economy. *Small Business Economics* (43), 427-446.
- Fritsch, M., F. Noseleit, V. Slavtchev and M. Wyrwich (2010). *Innovative Gründungen und ihre Bedeutung für den Standort Thüringen*. Jena.
- Fritsch, M., A. Sorgner, M. Wyrwich and M. Zöllner (2015). *Entwicklung und Perspektiven der Förderung innovativer Gründungen im Freistaat Thüringen*. Jena.
- Fritsch, M. and D. Schilder (2008). Does Venture Capital Investment really require Spatial Proximity? An Empirical Investigation. *Environment and Planning A*, 40, 2114-2131.

- Fritsch, M. and M. Wyrwich (2016). Entrepreneurship in the East German Transition Process: Lessons for the Korean Peninsula. *Historical Social Research / Historische Sozialforschung*, 41(3), 256-280.
- Fritsch, M. and M. Wyrwich. (2018). Regional Knowledge, Entrepreneurial Culture and Innovative Start-ups over Time and Space—An Empirical Investigation. *Small Business Economics*, forthcoming. <https://doi.org/10.1007/s11187-018-0016-6>.
- Fuchs-Schündeln, N., and Schündeln, M. (2009). Who stays, who goes, who returns? *Economics of Transition*, 17(4), 703-738.
- Fuchs-Schündeln, N., and Schündeln, M. (2005). Precautionary Savings and Self-Selection: Evidence from the German Reunification "Experiment". *The Quarterly Journal of Economics*, 1085-1120.
- Füller, C. (2017). *Educational expenditure: More money for schools and universities*. Goethe Institut. Retrieved from <https://www.goethe.de/en/kul/wis/20925479.html> on 16-04-2018.
- Getz, D., and T. Petersen (2004). Identifying industry-specific barriers to inheritance in small family businesses. *Family Business Review*, 17(3), 259-276.
- Geurts, K., and J. Van Biesebroeck (2016). Firm creation and post-entry dynamics of de novo entrants. *International Journal of Industrial Organization*, 49, 59-104.
- Gibbons, M., Limoges, C., Nowotny, H., Schwartzman, S., Scott, P., and Trow, M. (1994). *The new production of knowledge: The dynamics of science and research in contemporary societies*. Sage.
- Glaeser, E. (2011). *Triumph of the City: How Our Greatest Invention Makes Us Richer, Smarter, Greener, Healthier, and Happier*. Penguin Social Science.
- Guinane, T. (2001). Cooperatives as information machines: German rural credit cooperatives, 1883-1914. *The Journal of Economic History*, 61(2), 366-389.
- Goethner, M. and M. Wyrwich (2017). Cross-faculty proximity and academic entrepreneurship: The role of business schools. *Jena Economic Research Papers # 2017-17*.
- Gutberlet, T. (2014). Mechanization and the spatial distribution of industries in the German empire, 1875 to 1907. *The Economic History Review* 67(2), 463–491
- Hackethal, A. (2004). Banks and Banking Structure. In Krahen, J. P. and R. H. Schmidt, eds.: *The German Financial System*. Oxford University Press.
- Hall, J. B. and U. Ludwig (1995). German Unification and the “market adoption” Hypothesis. *Cambridge Journal of Economics* 19, 491-507.
- Hall, P. A. and D. Soskice (2001). *Varieties of Capitalism: The Institutional Foundations of Comparative Advantage*. Oxford.
- Hantke, M. and M. Spoerer (2010). The imposed gift of Versailles: the fiscal effects of restricting the size of Germany's armed forces, 1924-9. *Economic History Review*, 63(4), 849-864.
- Harhoff, D., and Hoisl, K. (2007). Institutionalized incentives for ingenuity—patent value and the German Employees’ Inventions Act. *Research Policy*, 36(8), 1143-1162.
- Hefe, P. (1998). *Die Verlagerung von Industrie- und Dienstleistungsunternehmen aus der SBZ/DDR nach Westdeutschland: unter besonderer Berücksichtigung Bayerns (1945-1961)*. Volume 4 of Beiträge zur Unternehmensgeschichte. Franz Steiner Verlag, 1998.
- Hofbauer, G., M. Klimontowicz, and A. Nocoń (2017). The changes in capital structure of selected banking markets as a result of new regulations. *European Financial Systems*, 222.
- Ilmakunnas, P., and V. Kanninen (2001). Entrepreneurship, economic risks, and risk insurance in the welfare state: Results with OECD data 1978–93. *German Economic Review*, 2(3), 195-218.
- IWH (2010). *Ostdeutschlands Transformation seit 1990. Im Spiegel wirtschaftlicher und sozialer Indikatoren*, 2nd ed. Halle: Institut für Wirtschaftsforschung (IWH).
- Jaeger, A. and J. Kopper (2014). Third mission potential in higher education: measuring the regional focus of different types of HEIs. *Review of Regional Research*, 34(2), 95-108.

- Jaffe, A. B., & Lerner, J. (2011). *Innovation and its discontents: How our broken patent system is endangering innovation and progress, and what to do about it*. Princeton University Press.
- James, A. (1981). State, Industry and Depression in Weimar Germany. *The Historical Journal*, 24(1), 231-241.
- Keilbach, M. (2009). Why Entrepreneurship Matters for Germany. In Z. Acs, D. Audretsch, and R. Strom (Eds.), *Entrepreneurship, Growth, and Public Policy* (pp. 202-216). Cambridge: Cambridge University Press.
- KFW (n.d). *ERP-Kapital für Gründung*. Retrieved from [https://www.kfw.de/Download-Center/F%C3%B6rderprogramme-\(Inlandsf%C3%B6rderung\)/PDF-Dokumente/6000000213-Merkblatt-058.pdf](https://www.kfw.de/Download-Center/F%C3%B6rderprogramme-(Inlandsf%C3%B6rderung)/PDF-Dokumente/6000000213-Merkblatt-058.pdf) on 18-03-2018.
- Kindleberger, C. P. (2015). *A financial history of Western Europe*. Routledge.
- Korpi, T., and A. Mertens (2003). Training systems and labour mobility: A comparison between Germany and Sweden. *The Scandinavian journal of economics*, 105(4), 597-617.
- Klagge, B., Martin, R., & Sunley, P. (2017). The spatial structure of the financial system and the funding of regional business: a comparison of Britain and Germany. *Handbook on the Geographies of Money and Finance*, Chapter 7, 125-155. Edward Elgar Publishing.
- Kohaut, S. and C. Schnabel (2007). Tarifliche Öffnungsklauseln: Verbreitung, Inanspruchnahme und Bedeutung. *Sozialer Fortschritt*, 56(2), 33-40.
- König, W., and W. Müller (1986). Educational systems and labour markets as determinants of workforce mobility in France and West Germany: a comparison of men's career mobility, 1965–1970. *European Sociological Review*, 2(2), 73-96.
- König, W. (2006). Vom Staatsdiener zum Industrieangestellten: Die Ingenieure in Frankreich und Deutschland 1750-1945 (From Public Servant to Industry Employee: Engineers in France and Germany 1750-1945). In W. Kaiser & W. König (Eds.), *Geschichte des Ingenieurs (history of the engineer)* (pp. 179–231). Munich: Carl Hanser.
- Kopper, C. (2011). New perspectives on the 1931 banking crisis in Germany and Central Europe. *Business History*, 53(2) 216-229.
- Kotha, R., & George, G. (2012). Friends, family, or fools: Entrepreneur experience and its implications for equity distribution and resource mobilization. *Journal of business venturing*, 27(5), 525-543.
- Kuhn, A. (2013). Inequality perceptions, distributional norms, and redistributive preferences in East and West Germany. *German Economic Review* 14(4), 483–499.
- Kulicke, M., F. Dornbusch, K. Kripp, M. Schleinkofer. (2012). Nachhaltigkeit der EXIST-Förderung Gründungsunterstützung an Hochschulen, die zwischen 1998 und 2011 gefördert wurden. *Bericht der wissenschaftlichen Begleitforschung zu "EXIST – Existenzgründungen aus der Wissenschaft"*. Stuttgart: Fraunhofer Verlag.
- Kulicke, M. (2014). *15 Years of EXIST "University-based start-up programmes". Development of the EXIST funding programme between 1998 and 2013*. Fraunhofer-Institut für Systemund Innovationsforschung.
- Lauritzen, C., M. Sanders and H. Schenk. (2017) *Policy brief on Social and Corporate Responsibility and Governance in Young SMEs*. FIRES-policy brief.
- Lechner, M. and F. Pfeiffer. (1993). Planning for Self-Employment at the Beginning of a Market Economy: Evidence from Individual Data of East German Workers. *Small Business Economics*, (5)2, 111-128.
- Lieberman, P. (1996). *Does Conquest Pay? The Exploitation of Occupied Industrial Societies*. p. 147. Princeton University Press.
- Liebrechts, W. J. (2018). *Hidden entrepreneurship: Multilevel analyses of the determinants and consequences of entrepreneurial employee activity* (Doctoral dissertation, University Utrecht).

- Lindner, A. (2017). German unification: Macroeconomic consequences for the country. In: *Monetary Policy, Financial Crises, and the Macroeconomy* (pp. 239-263). Springer, Cham.
- Maier, F. (1993). The labour market for women and employment perspectives in the aftermath of German unification. *Cambridge Journal of Economics* 17, 267-280.
- Manegold, K. H. (1989). Geschichte der Technischen Hochschulen (History of Technical Universities). In L. Boehm & C. Schönbeck (Eds.), *Technik und Bildung (technology and education)* (pp. 204-234). Düsseldorf: VDI Verlag.
- Mattes, A., M. Arnold, A. Eickelpasch, M. Fritsch, and A. Schiersch (2015). *Kleinteiligkeit der ostdeutschen Wirtschaft – Gibt es spezifische Wachstumshemmnisse für die Bildung größerer Unternehmenseinheiten?* Final project report submitted to the German Ministry of the Interior. Berlin: DIW econ (Mimeo).
- Mertes, M. (Ed.). (2018). *In search of Germany*. Routledge.
- Moshinsky, B. (2016). *Meet the riskiest bank in the world*. Business Insider Netherlands. Retrieved from <https://www.businessinsider.nl/fdic-report-on-leverage-ratio-names-deutsche-bank-as-riskiest-2016-9/?international=true&r=UK> on 16-04-2018.
- Niebuhr, A., N. Granato, A. Haas, and S. Hamann (2012). Does labour mobility reduce disparities between regional labour markets in Germany? *Regional Studies*, 46(7), 841-858.
- Nunziata, L. and L. Rocco (2018). The Protestant ethic and entrepreneurship: Evidence from religious minorities in the former Holy Roman Empire. *European Journal of Political Economy*, (51), 27-43.
- Ockenfels, A., and Weimann, J. (1999). Types and patterns: an experimental East-West-German comparison of cooperation and solidarity. *Journal of Public Economics*, 71(2), 275-287.
- OECD (n.d.). *OECD Indicators of Employment Protection*. Retrieved from <http://www.oecd.org/els/emp/oecdindicatorsofemploymentprotection.htm> on 16-04-2018.
- Ortlieb, R. and S. Weiss (2015). Business Start-ups and Youth Self-Employment in Germany: A Policy Literature Review. STYLE-WP7: Business Start-Ups and Youth Self-Employment National Report from Germany Contributing to D.7.1.
- Pavitt, K. (1991). What makes basic research economically useful? *Research policy*, 20(2), 109-119.
- Pflanze, O. (2014). *Bismarck and the Development of Germany, Volume II: The Period of Consolidation, 1871-1880 (Vol. 2)*. Princeton University Press.
- Pickel, A. (1992). *Radical transitions: the survival and revival of entrepreneurship in the GDR*. Boulder: Westview Press.
- Porter, M. E., and C. Van der Linde (1995). Toward a new conception of the environment-competitiveness relationship. *Journal of economic perspectives*, 9(4), 97-118.
- Rainer, H., and Siedler, T. (2009). Does democracy foster trust? *Journal of Comparative Economics*, 37(2), 251-269.
- Reckendrees, A. (2003). From Cartel Regulation to Monopolistic Control? The Founding of the German 'Steel Trust' in 1926 and its Effect on Market Regulation. *Business History*, 45(3) 22-51.
- Rimlinger, G. V. (1968). Social change and social security in Germany. *Journal of Human Resources*, 409-421.
- Rothman, B. (2017). *After the shock: the German education system in 2017*. National Center on Education and The Economy. Retrieved from <http://ncee.org/2017/09/after-the-shock-the-german-education-system-in-2017/> on 16-04-2018.
- Scherer, S. (2004). Stepping-stones or traps? The consequences of labour market entry positions on future careers in West Germany, Great Britain and Italy. *Work, employment and society*, 18(2), 369-394.
- Stam, E., N. Bosma, A. van Witteloostuijn, J. de Jong, S. Bogaert, N. Edwards, and F. Jaspers (2012). *Ambitious entrepreneurship: a review of the state of the art*. Advisory Council for Science and Technology Policy.

- Stenholm, P., Z. J. Acs, and R. Wuebker (2013). Exploring country-level institutional arrangements on the rate and type of entrepreneurial activity. *Journal of Business Venturing*, 28(1), 176-193.
- Streeck, W. (1997). German capitalism: Does it exist? Can it survive? *New Political Economy*, 2(2), 237-256.
- Thomas, M. (1996). How to Become an Entrepreneur in East Germany: Conditions, Steps and Effects of the Constitution of New Entrepreneurs. In: H. Brezinski and M. Fritsch ed., *The Economic Impact of New Firms in Post-Socialist Countries: Bottom Up Transformation in Eastern Europe*, (pp. 227-32). Cheltenham: Edward Elgar.
- Tipton, F. (1976). *Regional variations in the economic development of Germany during the nineteenth century*. Middletown, Conn.: Wesleyan Univ. Press.
- Torris, T. (2017). *German Crowdfunding Association Urges Regulator Not to Exclude Real Estate from Crowdfunding Regulation*. Crowdfund Insider. Retrieved from <https://www.crowdfundinsider.com/2017/05/99687-german-crowdfunding-association-urges-regulator-not-exclude-real-estate-crowdfunding-regulation/> on 16-04-2018.
- Uebele, M. and A. Ritschl (2009). Stock markets and business cycle comovement in Germany before World War I: evidence from spectral analysis. *Journal of Macroeconomics*, 31(1), 35-57.
- Urbig, D., U. Weitzel, S. Rosenkranz and A. van Witteloostuijn (2012). Exploiting opportunities at all cost? Entrepreneurial intent and externalities. *Journal of Economic Psychology*, 33(2), 379-393.
- Verheyen, D. (2018). *The German Question*. Routledge.
- Von Proff, S., G. Buenstorf and M. Hummel (2012). University Patenting in Germany before and after 2002: What Role Did the Professors' Privilege Play? *Industry and Innovation*, 19, 23-44.
- WEF (2016a). *Country and regional trends from the NRI*. Global Information Technology Report. Retrieved from <http://reports.weforum.org/global-information-technology-report-2016/country-and-regional-trends-from-the-nri/> on 16-04-2018.
- WEF (2016b). *Europe's Hidden Entrepreneurs: Entrepreneurial Employee Activity and Competitiveness in Europe*. Retrieved from <https://www.weforum.org/whitepapers/europe-s-hidden-entrepreneurs-entrepreneurial-employee-activity-and-competitiveness-in-europe> on 16-04-2018.
- Weichlein, S. (2011). Nation state, conflict resolution and culture war, 1850–1878. *The Oxford handbook of modern German history*, 281-306.
- Weitzel, U., D. Urbig, S. Desai, M. Sanders and Z. Acs (2010). The good, the bad, and the talented: Entrepreneurial talent and selfish behaviour. *Journal of Economic Behavior & Organization*, 76(1), 64-81.
- Welter, F. (n.d.). *Policy delivery: challenges and opportunities for entrepreneurship and SME development*. Chapter 6: Entrepreneurship policy design and delivery framework. Key policy issues in entrepreneurship and SME development. OECD.
- Welter, F. (2007). Deutsche Gründungsregionen, edited by Rolf Sternberg, Berlin/Münster: Lit Verlag. *Raumforschung und Raumordnung*, 65(2), 163-164.
- Welter, F. (2007). Entrepreneurship in West and East Germany. *International Journal of Entrepreneurship and Small Business*, 4(2).
- Welter, F., T. Baker, D. B. Audretsch and W. B. Gartner (2017). Everyday entrepreneurship—a call for entrepreneurship research to embrace entrepreneurial diversity. *Entrepreneurship Theory and Practice*, 41(3), 311-321.
- World Bank (2018a). *Doing Business 2018: Reforming to Create Jobs*. International Bank for Reconstruction and Development / The World Bank.
- World Bank (2018b). *Economy Rankings*. Doing Business: Measuring Business Regulations.
- World Bank (2018c). *Distance to Frontier*. Doing Business: Measuring Business Regulations.

- Wyrwich, M. (2010). Assessing the role of strategy and “socioeconomic heritage” for rapidly growing firms: Evidence from Germany. *International Journal for Entrepreneurial Venturing* 1: 245-263.
- Wyrwich, M. (2012) Regional entrepreneurial heritage in a socialist and a post-socialist economy. *Economic Geography*, 88: pp. 423–445.
- Wyrwich, M. (2013). Can socioeconomic heritage produce a lost generation with regard to entrepreneurship? *Journal of Business Venturing*, 28(5), 667.
- Wyrwich, M. (2017). Women and the labour market in East and West Germany: Socialist legacy and pre-socialist tradition. *Jena Economic Research Paper* 2017-015.
- Zöllner, M., M. Fritsch and M. Wyrwich (2016). An Evaluation of German Active Labor Market Policies and its Entrepreneurship Promotion. *Jena Economic Research Papers* 2016-022.

Appendix

Table A1: Baden-Württemberg

	PILLARS		INSTITUTIONAL VARIABLES		INDIVIDUAL VARIABLES	
Entrepreneurial Attitudes	Opportunity perception	0.67	Market Agglomeration	0.59	Opportunity Recognition	0.90
	Start-up skills	0.74	Quality of Education	0.83	Skill Perception	0.65
	Risk Acceptance	0.34	Business Risk	0.48	Risk Perception	0.60
	Networking	0.58	Social Capital	0.80	Know Entrepreneurs	0.54
	Cultural support	0.67	Open Society	0.79	Career Status	0.68
Entrepreneurial Attitudes 56.3						
Entrepreneurial Abilities	Opportunity startup	0.68	Business Environment	0.75	Opportunity Motivation	0.84
	Technology Absorption	0.83	Absorption Capacity	0.73	Technology Level	0.92
	Human Capitals	0.45	Education and Training	0.54	Educational Level	0.72
	Competition	0.72	Business Strategy	0.82	Competitors	0.67
	Entrepreneurial Abilities 61.4					
Entrepreneurial Aspirations	Product innovation	0.57	Technology Transfer	0.91	New Product	0.65
	Process innovation	0.77	Technology Development	1.00	New Technology	0.50
	High growth	0.74	Clustering	0.88	Gazelle	0.74
	Globalisation	0.97	Connectivity	0.93	Export	0.84
	Financing	0.78	Financial Institutions	0.81	Informal Investment	0.80
Entrepreneurial Aspirations 68.3						
GEI		62.0	Institutional	0.78	Individual	0.72

Table A2: Brandenburg

	PILLARS		INSTITUTIONAL VARIABLES		INDIVIDUAL VARIABLES	
Entrepreneurial Attitudes	Opportunity perception	0.35	Market Agglomeration	0.39	Opportunity Recognition	0.64
	Start-up skills	0.45	Quality of Education	0.63	Skill Perception	0.58
	Risk Acceptance	0.31	Business Risk	0.48	Risk Perception	0.51
	Networking	0.50	Social Capital	0.74	Know Entrepreneurs	0.48
	Cultural support	0.65	Open Society	0.78	Career Status	0.65
Entrepreneurial Attitudes 36.3						
Entrepreneurial Abilities	Opportunity startup	0.33	Business Environment	0.65	Opportunity Motivation	0.31
	Technology Absorption	0.01	Absorption Capacity	0.64	Technology Level	0.04
	Human Capitals	0.44	Education and Training	0.50	Educational Level	0.79
	Competition	1.00	Business Strategy	0.92	Competitors	0.92
Entrepreneurial Abilities 32.6						
Entrepreneurial Aspirations	Product innovation	0.17	Technology Transfer	0.90	New Product	0.37
	Process innovation	0.24	Technology Development	0.54	New Technology	0.41
	High growth	0.41	Clustering	0.69	Gazelle	0.59
	Globalisation	0.77	Connectivity	0.87	Export	0.73
	Financing	0.79	Financial Institutions	0.70	Informal Investment	0.85
Entrepreneurial Aspirations 36.2						
	GEI	35.1	Institutional	0.67	Individual	0.56

Table A3: Bremen

	PILLARS		INSTITUTIONAL VARIABLES		INDIVIDUAL VARIABLES	
Entrepreneurial Attitudes	Opportunity perception	0.74	Market Agglomeration	1.00	Opportunity Recognition	0.71
	Start-up skills	0.71	Quality of Education	0.85	Skill Perception	0.58
	Risk Acceptance	0.39	Business Risk	0.48	Risk Perception	0.74
	Networking	0.60	Social Capital	0.82	Know Entrepreneurs	0.55
	Cultural support	0.68	Open Society	0.79	Career Status	0.72
Entrepreneurial Attitudes 57.1						
Entrepreneurial Abilities	Opportunity startup	0.61	Business Environment	0.71	Opportunity Motivation	0.78
	Technology Absorption	0.66	Absorption Capacity	0.60	Technology Level	0.86
	Human Capitals	0.39	Education and Training	0.51	Educational Level	0.65
	Competition	0.61	Business Strategy	0.88	Competitors	0.49
Entrepreneurial Abilities 53.2						
Entrepreneurial Aspirations	Product innovation	1.00	Technology Transfer	1.00	New Product	1.00
	Process innovation	0.57	Technology Development	0.90	New Technology	0.48
	High growth	1.00	Clustering	0.60	Gazelle	1.00
	Globalisation	0.30	Connectivity	0.89	Export	0.37
	Financing	0.65	Financial Institutions	0.65	Informal Investment	0.78
Entrepreneurial Aspirations 60.9						
GEI		57.1	Institutional	0.76	Individual	0.69

Table A4: Hamburg

	PILLARS		INSTITUTIONAL VARIABLES		INDIVIDUAL VARIABLES	
Entrepreneurial Attitudes	Opportunity perception	1.00	Market Agglomeration	1.00	Opportunity Recognition	0.98
	Start-up skills	1.00	Quality of Education	1.00	Skill Perception	0.77
	Risk Acceptance	0.39	Business Risk	0.48	Risk Perception	0.74
	Networking	0.67	Social Capital	0.82	Know Entrepreneurs	0.66
	Cultural support	0.64	Open Society	0.77	Career Status	0.64
Entrepreneurial Attitudes 66.6						
Entrepreneurial Abilities	Opportunity startup	0.68	Business Environment	0.70	Opportunity Motivation	1.00
	Technology Absorption	0.89	Absorption Capacity	0.77	Technology Level	0.94
	Human Capitals	0.51	Education and Training	0.55	Educational Level	0.83
	Competition	1.00	Business Strategy	1.00	Competitors	0.57
	Entrepreneurial Abilities 69.4					
Entrepreneurial Aspirations	Product innovation	0.69	Technology Transfer	0.91	New Product	0.72
	Process innovation	0.58	Technology Development	0.80	New Technology	0.56
	High growth	1.00	Clustering	0.75	Gazelle	0.96
	Globalisation	0.94	Connectivity	0.90	Export	0.84
	Financing	0.84	Financial Institutions	0.89	Informal Investment	0.81
Entrepreneurial Aspirations 72.5						
GEI		69.5	Institutional	0.81	Individual	0.79

Table A5: Hessen

	PILLARS		INSTITUTIONAL VARIABLES		INDIVIDUAL VARIABLES	
Entrepreneurial Attitudes	Opportunity perception	0.70	Market Agglomeration	0.76	Opportunity Recognition	0.82
	Start-up skills	0.72	Quality of Education	0.82	Skill Perception	0.65
	Risk Acceptance	0.36	Business Risk	0.48	Risk Perception	0.63
	Networking	0.62	Social Capital	0.82	Know Entrepreneurs	0.58
	Cultural support	0.63	Open Society	0.78	Career Status	0.60
Entrepreneurial Attitudes 56.6						
Entrepreneurial Abilities	Opportunity startup	0.56	Business Environment	0.71	Opportunity Motivation	0.66
	Technology Absorption	0.77	Absorption Capacity	0.71	Technology Level	0.88
	Human Capitals	0.51	Education and Training	0.53	Educational Level	0.88
	Competition	0.89	Business Strategy	1.00	Competitors	0.52
Entrepreneurial Abilities 62.2						
Entrepreneurial Aspirations	Product innovation	0.34	Technology Transfer	0.79	New Product	0.53
	Process innovation	0.51	Technology Development	0.80	New Technology	0.50
	High growth	0.57	Clustering	0.80	Gazelle	0.67
	Globalisation	0.78	Connectivity	1.00	Export	0.68
	Financing	1.00	Financial Institutions	1.00	Informal Investment	0.87
Entrepreneurial Aspirations 57.9						
GEI		58.9	Institutional	0.79	Individual	0.68

Table A6: Mecklenburg-Vorpommern

	PILLARS		INSTITUTIONAL VARIABLES		INDIVIDUAL VARIABLES	
Entrepreneurial Attitudes	Opportunity perception	0.28	Market Agglomeration	0.38	Opportunity Recognition	0.53
	Start-up skills	0.39	Quality of Education	0.64	Skill Perception	0.48
	Risk Acceptance	0.34	Business Risk	0.48	Risk Perception	0.60
	Networking	0.47	Social Capital	0.75	Know Entrepreneurs	0.44
	Cultural support	0.66	Open Society	0.79	Career Status	0.66
Entrepreneurial Attitudes 39.3						
Entrepreneurial Abilities	Opportunity startup	0.48	Business Environment	0.71	Opportunity Motivation	0.49
	Technology Absorption	0.55	Absorption Capacity	0.56	Technology Level	0.77
	Human Capitals	0.44	Education and Training	0.47	Educational Level	0.87
	Competition	0.97	Business Strategy	0.78	Competitors	1.00
	Entrepreneurial Abilities 51.4					
Entrepreneurial Aspirations	Product innovation	0.32	Technology Transfer	0.69	New Product	0.53
	Process innovation	0.29	Technology Development	0.62	New Technology	0.41
	High growth	0.26	Clustering	0.57	Gazelle	0.51
	Globalisation	0.54	Connectivity	0.66	Export	0.68
	Financing	0.18	Financial Institutions	0.55	Informal Investment	0.39
Entrepreneurial Aspirations 30.0						
	GEI	40.2	Institutional	0.62	Individual	0.60

Table A7: Niedersachsen

	PILLARS		INSTITUTIONAL VARIABLES		INDIVIDUAL VARIABLES	
Entrepreneurial Attitudes	Opportunity perception	0.44	Market Agglomeration	0.42	Opportunity Recognition	0.74
	Start-up skills	0.55	Quality of Education	0.67	Skill Perception	0.68
	Risk Acceptance	0.36	Business Risk	0.48	Risk Perception	0.66
	Networking	0.58	Social Capital	0.83	Know Entrepreneurs	0.50
	Cultural support	0.65	Open Society	0.78	Career Status	0.65
Entrepreneurial Attitudes 48.9						
Entrepreneurial Abilities	Opportunity startup	0.67	Business Environment	0.76	Opportunity Motivation	0.75
	Technology Absorption	0.29	Absorption Capacity	0.57	Technology Level	0.47
	Human Capitals	0.36	Education and Training	0.45	Educational Level	0.71
	Competition	0.77	Business Strategy	0.82	Competitors	0.73
	Entrepreneurial Abilities 48.2					
Entrepreneurial Aspirations	Product innovation	0.46	Technology Transfer	0.69	New Product	0.63
	Process innovation	0.47	Technology Development	0.75	New Technology	0.50
	High growth	0.62	Clustering	0.80	Gazelle	0.70
	Globalisation	0.61	Connectivity	0.80	Export	0.65
	Financing	0.75	Financial Institutions	0.84	Informal Investment	0.77
Entrepreneurial Aspirations 53.8						
	GEI	50.3	Institutional	0.69	Individual	0.65

Table A8: Nordrhein-Westfalen

	PILLARS		INSTITUTIONAL VARIABLES		INDIVIDUAL VARIABLES	
Entrepreneurial Attitudes	Opportunity perception	0.70	Market Agglomeration	0.86	Opportunity Recognition	0.78
	Start-up skills	0.66	Quality of Education	0.77	Skill Perception	0.65
	Risk Acceptance	0.35	Business Risk	0.48	Risk Perception	0.62
	Networking	0.57	Social Capital	0.82	Know Entrepreneurs	0.52
	Cultural support	0.63	Open Society	0.77	Career Status	0.63
Entrepreneurial Attitudes 54.0						
Entrepreneurial Abilities	Opportunity startup	0.55	Business Environment	0.68	Opportunity Motivation	0.70
	Technology Absorption	0.57	Absorption Capacity	0.59	Technology Level	0.77
	Human Capitals	0.42	Education and Training	0.46	Educational Level	0.83
	Competition	0.84	Business Strategy	0.89	Competitors	0.70
	Entrepreneurial Abilities 54.5					
Entrepreneurial Aspirations	Product innovation	0.60	Technology Transfer	0.71	New Product	0.71
	Process innovation	0.29	Technology Development	0.67	New Technology	0.38
	High growth	0.75	Clustering	0.83	Gazelle	0.77
	Globalisation	0.74	Connectivity	0.99	Export	0.66
	Financing	0.71	Financial Institutions	0.84	Informal Investment	0.75
Entrepreneurial Aspirations 56.0						
	GEI	54.8	Institutional	0.74	Individual	0.68

Table A9: Rheinland-Pfalz

	PILLARS		INSTITUTIONAL VARIABLES		INDIVIDUAL VARIABLES	
Entrepreneurial Attitudes	Opportunity perception	0.50	Market Agglomeration	0.54	Opportunity Recognition	0.73
	Start-up skills	0.61	Quality of Education	0.72	Skill Perception	0.67
	Risk Acceptance	0.33	Business Risk	0.48	Risk Perception	0.56
	Networking	0.53	Social Capital	0.82	Know Entrepreneurs	0.45
	Cultural support	0.68	Open Society	0.79	Career Status	0.72
Entrepreneurial Attitudes 44.9						
Entrepreneurial Abilities	Opportunity startup	0.68	Business Environment	0.76	Opportunity Motivation	0.80
	Technology Absorption	0.91	Absorption Capacity	0.61	Technology Level	1.00
	Human Capitals	0.34	Education and Training	0.48	Educational Level	0.60
	Competition	0.55	Business Strategy	0.77	Competitors	0.53
	Entrepreneurial Abilities 49.8					
Entrepreneurial Aspirations	Product innovation	0.11	Technology Transfer	0.68	New Product	0.32
	Process innovation	0.20	Technology Development	0.63	New Technology	0.30
	High growth	0.80	Clustering	0.80	Gazelle	0.80
	Globalisation	0.79	Connectivity	1.00	Export	0.67
	Financing	0.49	Financial Institutions	0.87	Informal Investment	0.60
	Entrepreneurial Aspirations 39.1					
	GEI	44.6	Institutional	0.71	Individual	0.63

Table A10: Saarland

	PILLARS		INSTITUTIONAL VARIABLES		INDIVIDUAL VARIABLES	
Entrepreneurial Attitudes	Opportunity perception	0.48	Market Agglomeration	0.72	Opportunity Recognition	0.62
	Start-up skills	0.52	Quality of Education	0.69	Skill Perception	0.58
	Risk Acceptance	0.32	Business Risk	0.48	Risk Perception	0.52
	Networking	0.58	Social Capital	0.80	Know Entrepreneurs	0.54
	Cultural support	0.62	Open Society	0.79	Career Status	0.47
Entrepreneurial Attitudes 48.2						
Entrepreneurial Abilities	Opportunity startup	0.70	Business Environment	0.75	Opportunity Motivation	0.86
	Technology Absorption	0.89	Absorption Capacity	0.54	Technology Level	1.00
	Human Capitals	0.40	Education and Training	0.43	Educational Level	0.87
	Competition	0.43	Business Strategy	0.80	Competitors	0.38
Entrepreneurial Abilities 55.2						
Entrepreneurial Aspirations	Product innovation	0.69	Technology Transfer	0.75	New Product	0.76
	Process innovation	0.34	Technology Development	0.71	New Technology	0.41
	High growth	0.89	Clustering	0.63	Gazelle	0.93
	Globalisation	1.00	Connectivity	0.86	Export	0.91
	Financing	0.97	Financial Institutions	0.80	Informal Investment	0.91
Entrepreneurial Aspirations 66.7						
	GEI	56.7	Institutional	0.70	Individual	0.70

Table A11: Sachsen

	PILLARS		INSTITUTIONAL VARIABLES		INDIVIDUAL VARIABLES	
Entrepreneurial Attitudes	Opportunity perception	0.49	Market Agglomeration	0.58	Opportunity Recognition	0.70
	Start-up skills	0.57	Quality of Education	0.76	Skill Perception	0.55
	Risk Acceptance	0.34	Business Risk	0.48	Risk Perception	0.58
	Networking	0.49	Social Capital	0.77	Know Entrepreneurs	0.45
	Cultural support	0.64	Open Society	0.78	Career Status	0.62
Entrepreneurial Attitudes 46.9						
Entrepreneurial Abilities	Opportunity startup	0.48	Business Environment	0.70	Opportunity Motivation	0.50
	Technology Absorption	0.85	Absorption Capacity	0.68	Technology Level	0.98
	Human Capitals	0.45	Education and Training	0.53	Educational Level	0.75
	Competition	0.90	Business Strategy	0.79	Competitors	0.95
	Entrepreneurial Abilities 57.6					
Entrepreneurial Aspirations	Product innovation	0.24	Technology Transfer	0.79	New Product	0.44
	Process innovation	0.44	Technology Development	0.82	New Technology	0.43
	High growth	0.57	Clustering	0.57	Gazelle	0.76
	Globalisation	0.52	Connectivity	0.70	Export	0.64
	Financing	0.84	Financial Institutions	0.68	Informal Investment	0.89
Entrepreneurial Aspirations 47.1						
	GEI	50.5	Institutional	0.69	Individual	0.66

Table A12: Sachsen-Anhalt

	PILLARS		INSTITUTIONAL VARIABLES		INDIVIDUAL VARIABLES	
Entrepreneurial Attitudes	Opportunity perception	0.22	Market Agglomeration	0.33	Opportunity Recognition	0.48
	Start-up skills	0.33	Quality of Education	0.55	Skill Perception	0.51
	Risk Acceptance	0.31	Business Risk	0.48	Risk Perception	0.49
	Networking	0.47	Social Capital	0.78	Know Entrepreneurs	0.41
	Cultural support	0.62	Open Society	0.75	Career Status	0.69
Entrepreneurial Attitudes 33.8						
Entrepreneurial Abilities	Opportunity startup	0.60	Business Environment	0.60	Opportunity Motivation	1.00
	Technology Absorption	0.52	Absorption Capacity	0.56	Technology Level	0.74
	Human Capitals	0.41	Education and Training	0.46	Educational Level	0.80
	Competition	0.81	Business Strategy	0.74	Competitors	0.93
	Entrepreneurial Abilities 46.6					
Entrepreneurial Aspirations	Product innovation	0.07	Technology Transfer	0.65	New Product	0.27
	Process innovation	0.46	Technology Development	0.55	New Technology	0.70
	High growth	0.21	Clustering	0.48	Gazelle	0.49
	Globalisation	0.56	Connectivity	0.79	Export	0.62
	Financing	0.76	Financial Institutions	0.67	Informal Investment	0.85
	Entrepreneurial Aspirations 34.1					
	GEI	38.2	Institutional	0.60	Individual	0.64

Table A13: Schleswig-Holstein

	PILLARS		INSTITUTIONAL VARIABLES		INDIVIDUAL VARIABLES	
Entrepreneurial Attitudes	Opportunity perception	0.41	Market Agglomeration	0.47	Opportunity Recognition	0.67
	Start-up skills	0.56	Quality of Education	0.69	Skill Perception	0.65
	Risk Acceptance	0.37	Business Risk	0.48	Risk Perception	0.67
	Networking	0.56	Social Capital	0.81	Know Entrepreneurs	0.50
	Cultural support	0.67	Open Society	0.80	Career Status	0.64
Entrepreneurial Attitudes 47.0						
Entrepreneurial Abilities	Opportunity startup	0.64	Business Environment	0.77	Opportunity Motivation	0.67
	Technology Absorption	0.75	Absorption Capacity	0.59	Technology Level	0.96
	Human Capitals	0.41	Education and Training	0.46	Educational Level	0.79
	Competition	1.00	Business Strategy	0.88	Competitors	0.94
	Entrepreneurial Abilities 58.4					
Entrepreneurial Aspirations	Product innovation	0.21	Technology Transfer	0.68	New Product	0.44
	Process innovation	0.39	Technology Development	0.54	New Technology	0.63
	High growth	0.38	Clustering	0.66	Gazelle	0.59
	Globalisation	0.57	Connectivity	0.81	Export	0.62
	Financing	0.95	Financial Institutions	0.85	Informal Investment	0.88
	Entrepreneurial Aspirations 44.1					
	GEI	49.8	Institutional	0.68	Individual	0.69

Table A14: Thüringen

	PILLARS		INSTITUTIONAL VARIABLES		INDIVIDUAL VARIABLES	
Entrepreneurial Attitudes	Opportunity perception	0.28	Market Agglomeration	0.36	Opportunity Recognition	0.55
	Start-up skills	0.43	Quality of Education	0.64	Skill Perception	0.53
	Risk Acceptance	0.29	Business Risk	0.48	Risk Perception	0.45
	Networking	0.50	Social Capital	0.81	Know Entrepreneurs	0.42
	Cultural support	0.64	Open Society	0.76	Career Status	0.68
	Entrepreneurial Attitudes 40.1					
	Opportunity startup	0.49	Business Environment	0.63	Opportunity Motivation	0.69
	Technology Absorption	0.63	Absorption Capacity	0.65	Technology Level	0.80
	Human Capitals	0.23	Education and Training	0.52	Educational Level	0.31
	Competition	0.47	Business Strategy	0.71	Competitors	0.51
	Entrepreneurial Abilities 42.2					
	Product innovation	0.36	Technology Transfer	0.71	New Product	0.55
	Process innovation	0.23	Technology Development	0.69	New Technology	0.30
	High growth	0.60	Clustering	0.60	Gazelle	0.77
	Globalisation	0.69	Connectivity	0.67	Export	0.81
	Financing	0.36	Financial Institutions	0.63	Informal Investment	0.56
	Entrepreneurial Aspirations 41.2					
	GEI	41.1	Institutional	0.63	Individual	0.57