Structure and agency in local path development: A comparative study of the online games industry in Shanghai and Hamburg

In fulfillment of the requirements for the degree “Dr. rer. nat”

Of the Faculty of Mathematics and National Sciences

At Kiel University

Submitted by

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Kiel, 2019

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Defense of doctoral dissertation: August 27th 2019

Approval for publication:

The research project of this dissertation was conducted at the Department of Geography, Faculty of Mathematics and Natural Sciences at the Christian-Albrechts-Universität zu Kiel (CAU). The project is primarily sponsored by Chinese Scholarship Council (CSC).

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Acknowledgements

Doing a PhD without supportive colleagues, friends and family around is hardly possible. Looking back on the last four years, I would like to, first of all, thank my most respectful superior, Prof. Robert Hassink. Robert is a person who is supportive, passionate, humorous, and inspiring. He spared no effort to support every single step I took during my PhD study. He has supported me in all sorts of academic activities, such as conferences, summer institute, winter schools, workshops, and fieldworks. Without his generous support, I would not have had the opportunity to meet many excellent scholars in economic geography, and to build up high quality social networks and contacts. He passes on to me all his knowledge and experience of living academic life without reservation. He is always in my shoes when I ask him for suggestions. Every time I was frustrated by my research or stuck somewhere in an article, I knocked on his door and he was always ready to listen, to explain, and to comfort. I especially appreciate his tolerance for my sometimes very emotional and tough personality. It is he who has led me step by step into the exciting academic world of economic geography; it is he who has trained me to be a young scholar with international visions and critical thinking; it is he who has taught me to strike a balance between work and life. I could hardly say anything other than grateful for his enormous support over the last years. Robert is not only a supervisor for me, but also a great friend, and a life mentor.

I would also like to thank my second supervisor Dr. Markus Grillitsch from Lund University. Thanks a lot for taking your time in reading and commenting on my thesis. The same gratitude goes to the other three members of my PhD examination committee (Prof. Holger Kersten (chairman), Prof. Ivo Mossig and Prof. Silja Klepp).

Colleagues here at the Department of Geography also helped me a lot during my studies. I would like to thank Sakura Yamamura and Florian Dünckmann for discussing the methodology with me at the beginning of my research, as well as people who gave me feedback in the Human Geography Colloquium when I presented my research there. The same thanks go to my colleagues Fabian Faller, Yijia Chen, Aljosa Isakovic, Sinje Grenzdörffer, Gerlind Wagner-Vogel, Sebastian Ehret, Christina Nikolic and Heidi Seeliger (former secretary) as well as to our student assistants. They have indeed made my past four years more colorful. Special acknowledgement goes to Lucas Breuer, Johanna O'Brien, and Klaas Fröhlich, who helped me either with the data collection or with making appointment while I was doing the fieldwork in Hamburg.

The China Scholarship Council has been financially supporting my research (since December 2016). In addition, the German Academic Exchange Service (DAAD) has also supported my fieldwork to Shenzhen and Shanghai in 2018. Special gratitude goes to these funding bodies.

In January 2019, I was invited by Dr. Christian Binz to spend three months at the Cirus working group, Eawag, in Switzerland. I benefited enormously from participating in all kinds of academic activities there. Particularly, I received a lot of useful feedback from the group on the final results of my research. Many thanks to those who attended my presentation at the Cirus seminar. I would like to express my special gratitude to Prof. Bernhard Truffer and Dr. Christian Binz, who were very kind and friendly to me, and helped me a lot in sharpening my arguments again and again. Xiexie! I would also like to thank Prof. Michaela Trippl from the University of Vienna for inviting me to a workshop on regional path development early this year. I could rethink and reorganize my arguments in a much clearer way after listening to all the high-level presentations and discussions in the workshop. Prof. Chun Yang at Hong Kong Baptist University, as well as David Chan and Tianlan Fu, also deserve my acknowledgement for our joint DAAD project.

I would also like to thank all the interviewees for taking their time to answer my questions. Without their support, I would not have been able to collect a large amount of solid and reliable data and to write papers. Associate Prof. De Hu from East China Normal University, who joined me for some interviews in Shanghai and gave feedback on the structure of the Shanghai empirical paper, deserves my special acknowledgement. And I thank Zhen Yu, Johan Miörner, Jinliao He, Luis Carvalho, Emil Evenhuis etc., for commenting on the various versions of my papers. The same acknowledgements go to the journal reviewers, who took their time in reviewing the published papers.

Finally, my deepest thanks go to my parents and sister who love me and support me since I was born. Last but not least, I would like to end by expressing my deepest gratitude and love to Qingyuan, who has been sharing my happiness and sadness over the last years and who supports every single decision I have made so far. Thank you for sharing your life with me in our long-distance relationship!

Kiel, June 2019

Extended Abstract

The question of how industry develops differently in different regions is an interesting topic in economic geography. Scholars have contributed enormous knowledge concerning various relatedness, the role of multiple actors and their agencies, and regional industrial preconditions, in contributing to local industrial path development. However, our knowledge on the agency-structure relations present in local industrial development is limited, if not totally lacking, not mentioning how such relations influence the industrial development trajectories and ultimately the overall competitiveness of the local industry. Based on such reflections, this thesis aims to fill such an 'agency-structure' gap in local industrial development by looking at the developmental trajectories of one creative industry—online games industry, in two regions that belong to different countries (Shanghai in China and Hamburg in Germany). In both cases, all sorts of misalignments between the focal industry and the institutional frameworks (including both formal and informal institutional elements) could be observed during the industrial development processes. It is under such industry-institution misalignments that the agency and activities of multiple actors have been analyzed. By comparing the two trajectories in different institutional contexts, the research contributes to the literature in the following ways. First, this research gives due attention to the structural forces, such as the formal and informal institutional structures, that affect local industrial development. Secondly, it contributes to a nuanced analysis of agency in local industrial development, including innovative entrepreneurship, institutional entrepreneurship and place leadership. Finally, it reveals the dynamic agency-structure relations, which serve as the causal mechanisms leading to different developmental outcomes in the games industry in the two selected cities.

Erweiterte Zusammenfassung

Die Frage, wie sich eine Branche in verschiedenen Regionen unterschiedlich entwickelt, ist aus wirtschaftsgeographischer Sicht interessant. Im Kontext der Diskussion um die Dynamik neuer industrieller Entwicklungspfade haben Wirtschaftsgeographinnen bisher enormes Wissen über die verschiedenen Zusammenhänge, wie etwa die Rolle mehrerer Akteure und ihrer Handlungsmacht und dem dynamischen Prozess der industriellen Evolution beigetragen. Unser Wissen über die Beziehungen zwischen Handlungsmacht und strukturellen Gegebenheiten, die in lokalen industriellen Entwicklungsdynamiken vorhanden sind, ist jedoch begrenzt, wenn nicht gar völlig unzureichend. Unklar ist insbesondere die Frage, wie diese Beziehungen die industriellen Entwicklungspfade und letztlich die allgemeine Wettbewerbsfähigkeit der lokalen Ökonomie im Vergleich zu anderen Regionen beeinflussen. Basierend auf solchen Überlegungen, zielt diese Arbeit darauf ab, eine solche "Handlungsmacht-Struktur"-Lücke in der lokalen Wirtschaftsentwicklung zu schließen, indem sie die Entwicklungstrajektorien der Online-Spieleindustrie in zwei Regionen unterschiedlicher Nationalität (Shanghai in China und Hamburg in Deutschland) untersucht. Die Arbeit setzt mit der Entwicklung dieser Kreativ-Branche Anfang der 2000er Jahre an und besteht aus fünf einzelnen Artikeln, sowie fünf zusätzlichen Kapiteln. In beiden Fällen waren während der industriellen Entwicklungsprozesse alle möglichen Fehlausrichtungen und Divergenzen zwischen der untersuchten Branche und dem gesamten institutionellen Rahmen (einschließlich formell und informeller institutioneller Elemente) zu beobachten. Unter solchen Divergenzen zwischen Wirtschaft und Institutionen wurden die Handlungsmuster und Strategien mehrerer Akteure analysiert. Durch den Vergleich der beiden Entwicklungspfade in verschiedenen institutionellen Kontexten trägt die Forschung auf folgende Weise zum Erkenntnisgewinn bei: Erstens widmet sich diese Forschung den strukturellen Kräften, wie den formell und informellen institutionellen Strukturen, die die lokale industrielle Entwicklung beeinflussen. Zweitens unternimmt sie eine differenzierte Analyse der Aktivitäten und Praktiken von Multiakteuren in lokalen industriellen Entwicklungsprozessen. Zu diesen Aktivitäten gehören die Veränderung institutioneller Kontexte, die Mobilisierung und Schaffung wichtiger Ressourcen, die Bildung von Innovationsfähigkeiten und weitere. Schließlich zeigt sie die dynamischen „Handlungsmacht-Struktur-Beziehungen“, die die lokalen industriellen Entwicklungen in Shanghai und

Hamburg unterstützen. Solche „Handlungsmacht-Struktur-Beziehungen“ dienen als Kausalmechanismus, der zu unterschiedlichen Entwicklungsergebnissen in der Spieleindustrie in den beiden ausgewählten Stadtregionen führt.

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Part 1

1 Introduction

During the last decades, the question of how regions manage to develop new industries, no matter new-to-the-world, or new-to-the-region, has attracted burgeoning scholarly interest (e.g., Scott, 1992; Scott and Storper, 1986). In addition to such academic interest, politicians and policymakers, based in central, peripheral or old industrial regions, all have strong motivations to develop new industries in their regions (Tödtling and Trippl, 2005). For highly developed regions (e.g., global innovative hubs), the development of new industries (particularly those new-to-the-world ones) may help them to maintain their leading positions in global value chains or in the global knowledge space, and thus consolidating their central positions in the global political arena in the long run. For peripheral and structurally weak areas, the motivations of developing new industries in the region mainly stem from a fear of various lock-ins and economic peripheralization (Hassink, 2010). As a result, regional industrial development has always been central to regional economic growth for different types of regions, regardless of where they are located in the world and whether they are central or peripheral to the global economy.

While developing new local industries is exciting, it is, however, the local capabilities present in the region as well as its external linkages and connections that ultimately determine whether a new industry can be successfully developed locally or not (Boschma, 2017; Grillitsch et al., 2018; Maskell and Malmberg, 1999; Trippl et al., 2017). Such differences in local capabilities and non-local connections shape various aspects of agency that is related to local industrial development, such as resource mobilization, asset modification, network construction, etc. (Binz et al., 2016b; Dawley et al., 2019). On the other hand, the broader institutional structures in which such activities are embedded also have a strong role in influencing the activities of multiple actors ranging from entrepreneurs, to policymakers, and scientists (Martin, 2000; Gertler, 2010; Dawley 2014; Steen, 2016). Because of such regional variations both in the agency and the structural aspects, often, different fates of the same industry could be observed in different regions (e.g., Garud and Karnøe, 2003; MacKinnon et al., 2018).

Although this phenomenon is interesting (i.e. the same industry shows different fates in different regions), within economic geography, there is no systemic theory yet to understand this phenomenon satisfactorily. While economic geography has moved beyond the regionalism kind of thinking prevailing in the 1990s, the single-case, single-location tradition of investigating regional industrial development tends to remain strong (Barnes et al., 2007). Such studies have argued that it is too limited to focus on the local preconditions when examining industrial development in regions. Alternatively, a multi-scalar, multiactor lens has been suggested as a useful one in understanding complex phenomena such as local industrial path developments (e.g, Binz et al., 2016b; Hassink et al., 2019; MacKinnon et al., 2019). These studies have also given increasing account to the various activities of actors, and their capabilities in making changes (Grillitsch and Sotarauta, 2018; Miörner and Trippl, 2017; Strambach, 2017; Trippl et al., 2017). Such an 'agency turn' could be observed in much of the empirical work in the last couple of years, ranging from resource formation (Binz et al., 2016b) and asset modification (MacKinnon et al., 2018), to strategic coupling (Coe and Yeung, 2015; Dawley et al., 2019), institutional entrepreneurship (Battilana et al., 2009; Sotarauta and Mustikkamäki, 2015), place leadership (Hu and Hassink, 2017; Sotarauta and Beer, 2017), etc. While insightful, these studies tend to risk neglecting the role of the big structures, or in Jamie Peck's (2017) term, they tend to miss the 'macro geographies' in which the economic activities are embedded. In Ron Martin's (2018) words, such studies fail to take into account the 'big pictures' of local economic development.

In contrast to such a strong agency-focused research, some studies (mostly based in the UK), informed by geographical political economy (GPE), have called for more attention to the macro geographical political systems (e.g., MacKinnon et al., 2019; Martin and Sunley, 2015; Peck, 2017) in exploring regional industrial/economic development. While such calls are inspiring, so far, however, it still remains controversial regarding what kind of institutional elements that belong to the geographical political systems should be taken care of, and how such structural factors and forces affect the concrete practices and actions of individuals, and thus lead to different developmental outcomes. Of course, there are also examples of studies that contribute to a better understanding of the role of institutional structures in regional industrial and economic development (for early work see Hassink, 2010; Saxenian, 1996; Gertler, 2004; for more recent work see Evenhuis, 2016, 2017; MacKinnon et al.,

2018). With a comparative perspective in mind, these studies have investigated the various role of institutions that belond to different regions or countries in local industrial path development.However, compared to the individual empirical cases conducted in one place, such comparative studies are quite limited, at best.

A further observation of central importance for this research project is that economic geography work in recent decades has increasingly emphasized the value of a dynamic and process-oriented perspective. Such a move from static descriptions prevalent in the 1980s and 1990s to more dynamic exploration is of course a big advancement of the sub-discipline. However, this process-based investigation is only a half-way-theorizing, or mid-range conceptualization, since the true *causal mechanism* that underpins this dynamism is either not captured or conflated with the term *process* (Yeung, 2019). Therefore, in order to explain the phenomena of interest in a scientifically rigorous way, such process-based thinking needs to be turned into mechanism-oriented thinking, and hence great attention should be paid to identifying causal mechanisms linking the concrete causes with the concrete effects.

Against this background, this thesis aims to incorporate both the agency and the structural sides in investigating regional industrial development. Specifically, I explored the development trajectories of one industry—the online games industry, in two city regions that are located in different countries—Shanghai, China and Hamburg, Germany. These two local industries are interesting because they started from similar industrial preconditions (e.g., poor game development capabilities, strong dominance of foreign games in the market, low value capture in the global value chain), but they managed to climb to different positions in the global value chain after more than a decade of development. In this thesis, special attention will be paid to both the agencies of actors and the multi-scalar structural factors that have facilitated or hindered the development of the focal industry in the two city regions, and more importantly, I will also show how such agency-structure relations (causal mechanisms) affect the overall competitiveness of the two local industries over time. In the rest of the chapter, I will briefly introduce my motivation in doing this research, the research objectives, as well as the structure of the thesis.

1.1 Background and motivation

When I started my PhD in September 2015, my motivation for doing such a research mainly came from my concern about regional economic development, as well as my overall interest in innovation/development policies. Concerning regional economic development, I was particularly fascinated by the question dealt in Garud and Karnøe's (2003) research on the wind turbine industry in Denmark and the US. In this seminal work, the authors asked why the wind turbines designed in the US began failing in large numbers while the Danish turbines industry started to grow strongly in the late 1990s to early 2000s. In reality, such 'success' versus 'failure' stories occur in various industries around the world, but as an economic geographer, what was (and still is) more interesting for me is the regional variations of such industrial path developments (and ultimately, regional differences in economic development), particularly in locations that belong to different geographical political and institutional systems. Among all industries and sectors, I was very much interested in the spatial patterns of the creative industries, as they have increasingly penetrated our daily lives and fundamentally changed our lifestyles. Moreover, in many countries of the world, creative industries have increasingly been seen as an important driver of economic growth (Lhermitte et al., 2015). Of all the creative industries, online gaming is very fascinating in my view because it is a fast-growing industry and its global turnover has surpassed that of the film and music industry for years (Teipen, 2008).

When I decided to research this industry, I noticed that so many people around me were playing (and still are playing) online games, ranging from massively multiplayer online role-playing games (MMORPG) to casual, simulation and many other genres. For many young people, gaming has become an indispensable part of their daily lives. So my motivation was to find out where were these popular games produced? Were they developed at home or imported from abroad? What conditions are essential and/or favorable for developing such a creative industry locally? Since I am a Chinese based in Germany, a comparative study of the online game industry in certain regions of China and Germany would be realistic and interesting for me. With such a comparative mindset, I started to conduct desktop research and literature reviewing. My questions included, where are the hotspots of online game production in China and Germany? How does the industry look like in these regions (or cities)? And to what extent are they comparable?

Based on the collection of a large amount of secondary data from media reports and academic publications, I finally decided on Shanghai and Hamburg as the comparative locations. Both city-regions have a lot in common in the development of the industry of interest. To begin with, Shanghai and Hamburg enjoy the same administrative level in the respective countries. Concretely, Shanghai is one of the four municipalities under the direct administration of China's central government, and is therefore equivalent in administrative terms to a province in China. Similarly, Hamburg is one of Germany's sixteen federal states, and it enjoys the adimistrative power of a federal state in Germany. Second, both Shanghai and Hamburg are latecomers in terms of developing the online game industry. In contrast to the global pioneers in the USA or Japan, who began to develop games in the 1970s and 1980s, both city-regions only had a games industry in the early to mid 2000s. Technologically, both cities lacked the necessary skills to develop sophisticated games. Therefore, they were starting from relatively low positions in the global value chain almost at the same time. However, after fifteen years of development, the two local industries differ significantly in their competitiveness, with Shanghai occupying a higher position in the global value chain than its counterpart in Hamburg. Thirdly, the distinct German coordinated market economy and the Sino-market-economy (market economy with Chinese charactristics), as well as the different geographical political structures in Shanghai and Hamburg are of relevance in explaining the different performance of the two local industries. All this will be elaborated in detail in the later parts of the thesis.

On the other hand, I was (still am) very much interested in regional policy debates, and I also care a lot about how my research could inform policymaking at the regional level. Throughout the history of regional policies, it is not difficult to find that different paradigmatic thinking has dominated this policy domain during different time periods. From the 1950s until the early 2000s, space-neutral kind of mentality was very popular among policymakers in Europe. Based upon the modern growth and economic development theories, such regional policies were characterized by their top-down, supply-side and one-size-fit-all nature (for elaboration, see Barca et al., 2012). It was only by the end of the 2000s and the early 2010s that the idea of place-based policy has increasingly been taken seriously. Such a turn from space-neutral to place-based policy, was largely facilitated by a series of influential reports by international organizations, such as the World Bank (2009),

the European Union (Barca, 2009), and the OECD (2009). Among all those place-based regional policies, it is the 'Smart Specialization Strategies' (S3) that has recently become one of the most popular policy instruments in Europe and many OECD countries (Foray et al., 2009; Foray, 2015).

As a geography student, I am very much sympathetic to this place-sensitive thinking, but one of my main concerns was, how, then, could 'smart' policies be designed to promote regional development while at the same time reduce regional inequality, which tended to increase sharply in the last decades? With this concern in mind, throughout my doctoral study, I was very sensitive to conditions and factors that might contribute to different developmental outcomes. The research question of how and why one industry (e.g., the online games industry) develops differently in two city-regions (Shanghai and Hamburg) is actually very much relevant to the issue of unequal regional development—regions that show better capabilities in developing many industries usually tend to outperform those places that are incapable of developing relevant sectors. Therefore, such differences in capabilities might potentially lead to different employment opportunities, salary standards, consumer behaviors, etc., and ultimately result in regional inequality. In this regard, one crucial question that one should ask is what exactly contributes to the presence of different capabilities in regions? I believe two aspects are key to this issue. The first one is related to what actors in the region have been (or are) doing in order to facilitate the development of certain industries; the second aspect is related to what structures are there in the region that enable or constrain the activities and practices of the relevant actors. Any policy initiatives that aim to facilitate regional development should pay equal attention to both the agency of actors and the geographical political and institutional structures in which such activities are embedded.

1.2 Research objectives

Drawing on the reflections discussed above, this thesis aims to marry the structure and the agency aspects of local industrial development, and apply them in the study of the development processes of one industry—the online games industry, in two regions that belong to different countries—Shanghai in China and Hamburg in Germany. Overall, this

research will contribute to the answering of a key question that has not been dealt with much in the extant literature. That is, how and why regions with similar industrial preconditions differ substantially in developing certain industries. By embedding the activities of multiple actors in the broader institutional structure, I argue that the agency-structure relations present in the region, as well as the overall fit between the industrial needs and the preexisting institutional frameworks determine, to a large extent, the competitiveness of the local industry.

I also aim to contribute to policy recommendations on regional innovation and regional development. By comparing the two local industries in Shanghai and Hamburg, the value of place-based policy instruments become evident. In particular, I will show in chapter 5 how my comparative study supports and complements to the arguments of one of the most popular regional policies in the EU and many OECD countries at the moment—the smart specialization strategies (OECD, 2013).

1.3 Structure of the thesis

The thesis is comprised of two parts. Part 1 consists of four chapters. In chapter 1 (including this introduction), I introduce the background information concerning my motivation, research objectives, and the overall structure of the thesis. Chapter 2 to 4 elaborate on the empirical (Chapter 2) and theoretical background (Chapter 3), and on methodological considerations (Chapter 4). In the second part, five papers that are relevant to the topic of interest will be incorporated. Table 1.1 introduces the details about the papers that are included in this thesis, as well as my contributions to individual papers.

Paper 1 sets the scene of the research in the broader creative industries literature. In that paper, we review the literature on creative industry clusters in economic geography. Three main drivers that may potentially contribute to the clustering of creative industries are identified. They are agglomeration economies (including both localization and urbanization economies), spinoff activities (university and corporate spinoffs), and institutional factors (formal and informal institutions). Based on the three main drivers, we will develop a comprehensive framework for analyzing the clustering of creative industries, and several avenues will be suggested for doing research on the geographies of creative industries.

Paper 2 theoretically examines a key concept in evolutionary economic geography—that is, co-evolution. Inspired by Martin and Sunley (2006) on path dependence, we try to trace the origin of co-evolution in ecology and examine its applications in economic geography. A definition based on both pair-wise and systemic understandings of co-evolution will be developed. Specifically, we see institution and industry as two populations where co-evolutionary relationships exist. A theoretical framework on the co-evolution of industries and institutions will be suggested. Two fundamental issues related to such co-evolutionary relationships are highlighted in the paper, namely, the geographical (multi-scalarity of industries and institutions), as well as the historical (nature of change) dimensions of both populations. The overall discussions on structure-agency in local industrial development can be related to the different aspects of co-evolution mentioned in the paper.

Paper 3 and paper 4 present the outcomes of the Shanghai and Hamburg single-case studies, respectively. The third paper stresses the industrial specificity of the online games industry and how it was shaping and shaped by the formal institutions (regulations, national and regional policies) at multiple spatial scales in Shanghai. Drawing insights from evolutionary economic geography and institutional economic geography, that paper explores two aspects, namely, how multi-scalar institutions influence the development of the online games industry in Shanghai, and second, how local firms and entrepreneurs affectlocal and national formal institutions that are related to the industry. It shows that the specific characteristics of the creative industry matter much as they have resulted in diverse industry-relevant policies and regulations devised by local and national states. Moreover, local firms and entrepreneurs with different capacities and characteristics also differ much in influencing the design of the industry-specific institutions in the face of institutional voids.

Paper 4 presents the results of the Hamburg online games industry. In contrast to the Shanghai case study, where the analytical focus is put on the formal institutions and the industrial specificity of the games industry, this paper emphasizes both formal and informal institutions (e.g., norms, values, and cultures shared by people) and particularly how those ‘soft forces’ shape and were shaped by the development of the games industry in Hamburg. Specifically, the Hamburg games industry has suffered from social stigmatization (e.g., children’s entertainment, glorifying violence, instable business) since the beginning of its emergence. The aim of that paper is therefore to investigate the process of how actors

legitimized such a contested creative industry in Hamburg. Drawing insights from transition studies, the article investigates the role of multi-scalar actors in building innovation systems and in legitimizing the industry at different phases of development. It shows that theories from transition studies are useful in explaining the development of the contested games industry in Hamburg. However, differences between the cleantech sectors (the empirical base of transition theories) and the focal contested games industry need to be carefully investigated, as several issues seem to differ substantially, namely 1) the legitimacy challenges that need to be solved, 2) the target object of institutional work, and 3) the multi-scalar resource formation and system building processes.

Paper 5 embeds the two cases into a broader topic of interest, that is, the structure-agency relations in local industrial development. Moreover, it also tries to answer the research question why regions with similar preconditions differ greatly in the development of certain industries. Shanghai and Hamburg started with similar industrial preconditions in developing the online games industry—both of them were characterized by strong foreign game domination in the domestic market, and very weak indigenous developmental capabilities. However, after 15 years of development, the two local industries show very different degrees of competitiveness, with Shanghai companies outcompeting Hamburg firms in various aspects. Taking these interesting differences as a starting point, I will examine the four key resource formation processes that are crucial for local industrial development, namely knowledge production, investment attraction, market formation, and legitimation. Special attention will be paid to the multi-scalar institutional structures that shape scarce asset formation processes at different scales. I argue that the geographical reach of activities that multiple actors take in developing a local industry is contingent on what the regional and national institutions have to offer, as well as the alignment between the focal industry and the broader institutional structures. Such agency-structure relations determine largely the overall competitiveness of the local industry.

Chapter 5 concludes the thesis by summarizing the main findings and the theoretical and practical contributions of the research. It also points to directions for future research.

Table 1.1. Papers incorporated and own contributions.

No.	Title	Journal	Status	Sequence of authorship	Own contribution
1	Exploring the clustering of creative industries	European Planning Studies	Published in 2017. Vol 25, issue 4, page 583-600.	Co-authored, First author	85%
2	Co-evolution in contemporary economic geography: towards a theoretical framework	Regional Studies	Published in 2018	Co-authored, First author	70%
3	Developing the Shanghai online games industry: A multi-scalar institutional perspective	Growth and Change	Accepted	Co-authored, First author	90%
4	Clearing the hurdles for industry emergence: the role of intermediary organizations in the Hamburg video games industry	European urban and regional studies	Under review	Single-authored	100%
5	Resource formation and multi-scalar institutional structures: a comparative study of the online games industry in Shanghai and Hamburg	Economic Geography	Submitted	Single-authored	100%

2 Empirical background

2.1 Setting the scene: creative industries in economic geography

Creative industries have been increasingly seen as an important economic growth engine in both industrialized and developing countries (Lhermitte et al., 2015; Jones et al., 2015; Yusuf and Nabeshima, 2005). According to Lhermitte et al. (2015), cultural and creative industry revenues worldwide have exceeded those of telecom services, and surpassed India's GDP in 2015. With 29.5 million jobs, creative industries employ 1% of the world's active population in the same year. Especially, creative industries are a locomotive of the online economy, contributing $ 200b to global digital sales in 2013 (Lhermitte et al. 2015). Creative content also powers sales of digital devices, and digital cultural goods are, by far, the biggest revenue source for the digital economy. Furthermore, creative activities also contribute significantly to youth employment and careers in creative sector are also more open to people with all kinds of backgrounds (specially women) than many of the conventional manufacturing industries. Finally, small companies or individuals, giving rise to agile and innovative employers, often run creative businesses.

At the regional level, creative industries have also contributed substantially to the regional economic and employment growth (Lee and Drever, 2012). One of the key characteristics of the creative industries and creative occupations is their strong integration into the production processes of other industries present in regions. More specifically, although many creative industries can stand on their own, most of the time, they depend on the activities and innovations of other sectors (e.g., IT industry), and reversely, they also contribute to the development of those industries, by adding creative components or cultural contents to the production procedures (Plum and Hassink, 2014).

Creative industries have often been seen as an urban phenomenon, which means that creative industries are more likely to exist and prosper in big cities than in peripheral and rural areas (Florida, 2002; Pratt, 2008). Such an urban concentration of creative activities and creative occupations have been studied by geographers. One literature that has provided answers to this is the 'creative class' explanations suggested by Richard Florida (2002, 2005). Another explanation provided in the literature is the effects of agglomeration

economies for creative cluster concentrations, including both localization and urbanization economies (Lazzeretti et al., 2016; Lorenzen and Frederiksen, 2008). These factors have been further investigated in Paper 1 included in this thesis.

While the development of creative industries is largely an urban phenomenon, recent studies have also shown that they could also be developed in peripheral regions (Gibson and Connell, 2004; Grabher, 2018). Studies have also found out that learning networking in creative industries can happen across large distances, therefore, creativity might not necessarily be the outcome of the interaction of local actors in cities. Instead, studies have considered the impact of the increasing mobility of knowledge and human capital, the division of knowing in the economy, the influence of ICT technologies, as well as the external linkages of organizations for creative firms (e.g., Grabher, 2004; Vallance, 2014).

In addition to such a focus on the territorial aspects of creativity, there are also studies concentrating on the temporary organizing of knowledge creation in creative industries. Two types of temporary knowledge creation could be identified in the literature, namely project-based learning (DeFillippi, 2015; Grabher, 2002, 2004; Grabher and Ibert, 2006), and learning through temporary events (Comunian, 2017; Richardson, 2016). Economic geographers have been concerned with positioning individual temporary projects in the wider settings of the different firms and networks that make up 'project ecologies' at the cluster level (Grabher, 2002, 2004). Parallel to the focus on projects and project ecologies, some scholars have investigated the knowledge creation modes in 'temporary clusters' such as conferences, trade fairs, festivals, etc., for creative firms (Comunian, 2017; Klein, 2011).

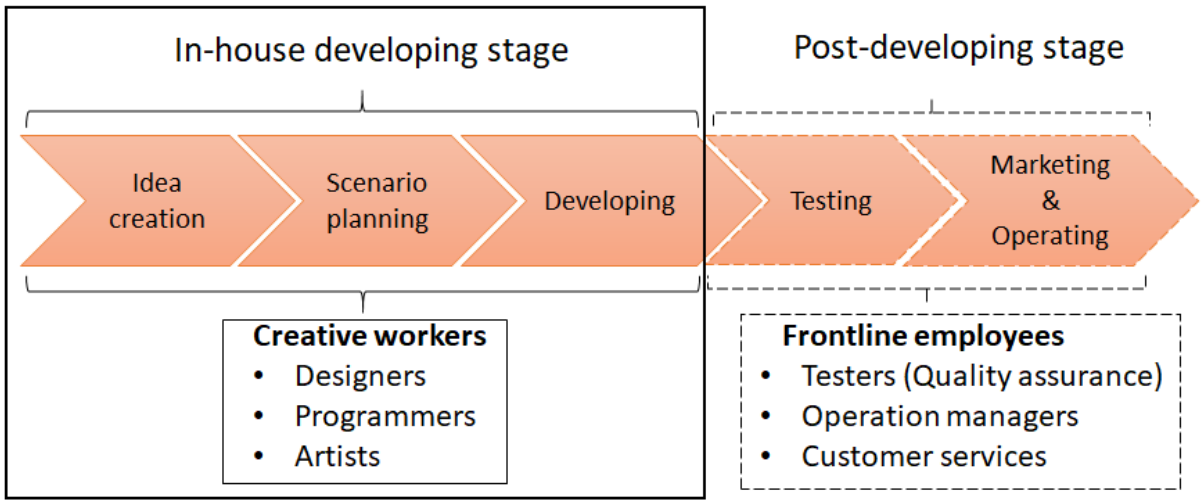
Some studies in economic geography have also investigated the development trajectories of specific creative industries at multiple scales, ranging from the local, to the national, and ultimately to the global (Coe, 2001; Florida and Jackson, 2010; Klement and Strambach, 2019; Kong, 2007; Leslie and Brail, 2011; Watson, 2008). Inspired by different approaches in economic geography (e.g. evolutionary economic geography, relational economic geography, institutional economic geography, etc.), these studies have highlighted different aspects of the development of creative industries. However, little emphasis has been placed on the similarities and differences in the development of creative industries compared to other sectors such as manufacturing, services, etc.

2.2 Online gaming as a creative industry

Games industry has been incorporated in various kinds of creative industry standards worldwide (Cunningham, 2002; Garnham, 2005). From any perspective, the development of online games is creative work (Cohendet and Simon, 2007; Johns, 2006). Based on digital devices (e.g., consoles, computers, mobile devices) and creative content (storylines, gameplay, etc.), the production of digital games requires both technical and creative inputs (Cohendet and Simon, 2007; Cohendet et al., 2018; Grandadam et al., 2013; Tschang, 20005). Tschang (2007), for instance, manifests that video games[1] are sophisticated products that combine programming technology with artistic content and interactive qualities. The online games industry is similar to other creative industries in many ways, as games require workers to perform a substantial amount of creative thinking. However, the process of game development differs from the development of other creative industries in that it is not a one-off production but needs iterative programming, and a large amount of testing (Tschang, 2007). A game is usually developed through the processes of idea creation, scenario planning, developing, testing, and marketing through continuous interactions with the users (Figure 2.1).

Figure 2.1. Process of online games production and primary workers.

[1] "Video games" is a general term for online games, PC games, console games, etc.



Adapted from Tencent (2006)

The production of online games usually involves several diverse "communities of specialists" (Cohendet and Simon, 2007), such as communities of programmers, communities of designers, artists communities, communities of testers. High levels of creativity are required particularly at the in-house developing stage, where ideas are put into practice, and a new game is developed by the collaboration of several communities of creative workers (Tschang, 2007; Cohendet et al., 2018). Because of all these reasons, it may seem logical that most of the game businesses are located in global metropolises where relevant creative sectors such as media, advertising, music, film-making, etc., coexist (Cohendet et al., 2018; Johns, 2005). As an essential part of the broader creative and cultural economy, the development of games industry resembles many other creative industries such as film production, and cartoon design, and in order to successfully develop a local online games industry, several key resources (assets) are indispensable. These include the creative input of creative workers, a sufficient amount of investment from investors, good knowledge sourcing channels, and a high level of social acceptance. All these elements will be elaborated and explained in the empirical papers incorporated in the thesis.

2.3 Reflections

While insightful, the aforementioned studies on creative industries in general and on games industry in particular have been focusing on topics such as the organizational aspect of creative production, the creativity related to certain professions, and the network-based

learning processes within epistemic communities. However, there is not much research so far examining the creative industries from a local industrial path development perspective. Exceptions include Miörner and Trippl's (2017) study of games industry in Scania, and Grandadam et al.'s (2013) research on the video game industry in Montreal, and De Vaan et al.'s (2019) study on the video game industry in the US. While these studies are useful in contributing to understanding the development of games industry in the specific local contexts, they fail to provide the overall 'big pictures' in which such local industrial development is embedded. More specifically, such research has not looked much at the broader institutional structures (e.g., capitalism, labor relations, financial and educational systems) in which such local industries developed. Therefore, the question how could one combine insights from such individual case studies, and thus contribute to overall theoretical progress concerning the industrial development processes of creative industries in different regions remains ambiguous. Furthermore, such single-case studies also prevent the establishment of a systemic framework for comparing local industrial development across countries and political-economic contexts (Barnes et al., 2007).

Based on such considerations, I believe that more comparative studies are needed in order to improve theories on local creative industry development. In the first paper incorporated in this thesis, we argue that such comparative studies could be based on the same creative industry in different regions, or different industries in one region, or different industries in different regions (Gong and Hassink, 2017). In response to such suggestions, this thesis will focus on a creative industry (i.e. online games) in different city regions belonging to different countries (Shanghai in China and Hamburg in Germany).

In the next section, I will elaborate on theories that are relevant for my specific comparative case study.

3 Theoretical background

To investigate the topic of interest, literature that deals with both agency and structure aspects of regional industrial development should be carefully reviewed. In this section, I will first of all elaborate on the research in economic geography on local industrial development which increasingly emphasized the role of agencies and activities of actors in local industrial development (section 3.1). Then consideration will be given to those studies that highlighted the structural aspects of institutions, with a special focus on the 'varieties of institutional framework' literature (Fainshmidt et al., 2018) (section 3.2). Moreover, since the structuration theory (Giddens, 1986) provides the foundation where both agency and structure are taken into account in explaining social systems, it is also included in section 3.3. And finally, I will draw inspirations from these literature strands and position my research in broader theories in section 3.4.

3.1 Industrial emergence in economic geographical literature

The emergence and development of new industries is a key topic in economic geography. Since the 1990s, scholars in economic geography have contributed substantial knowledge to understanding it (e.g., Scott, 1992). Multiple key concepts have been suggested to understand local industrial development processes: from windows of locational opportunity (Scott and Storper, 1986; Boschma and Van der Knaap, 1999), to so-called 'New Regionalism' (Lovering, 1999; MacLeod, 2001; Storper, 1997), to regional branching and related variety (Boschma and Frenken, 2012; Frenken et al., 2007), path dependence (Martin and Sunley, 2006; Martin, 2010), lock-in (Grabher, 1993; Hassink, 2010), to the recently more popular concepts of path creation (Martin, 2010; Binz et al., 2016; MacKinnon et al., 2019) and regional diversification (Boschma et al., 2017). In the last decade, such a resurge of interest in local industrial development was largely inspired by the 'evolutionary turn' in economic geography (Boschma and Frenken, 2006; Boschma and Martin, 2007, 2010). In this subsection, I will review four main streams of literature that have contributed most knowledge to the understanding of regional industrial path developments, namely, the evolutionary approach, regional innovation systems, geographies of transition, and geographical political economy. Of course, such literatures are not stand-alone and

independent from each other, rather, they draw insights from each other, and from neighboring disciplines such as sociology, innovation studies, institutional economics, management, transition studies, etc. However, they also differ from each other in some fundamental aspects, which I will turn to in the later parts of this section.

3.1.1 Evolutionary economic geography

The first line of exploration is driven by evolutionary economic geographers' interest in relatedness and regional branching/diversification processes (Boschma and Martin, 2010; Frenken et al., 2007; Boschma, 2017). Drawing on Evolutionary Economics, Evolutionary Economic Geography (EEG) adopts a dynamic perspective, and focuses strongly on technological relatedness across regional industries, combinatorial knowledge dynamics, and branching processes as key explanatory factors for where and how new industries develop (Frenken an Boschma, 2007; Boschma and Frenken, 2011). Regional industries are assumed to branch into technologically related fields in a path-dependent related diversification processes (Neffke et al., 2011; Boschma and Frenken, 2012). Based on such an understanding, the location of newly emerging industries is strongly contingent on the preexisting industrial structure in regions. The importance of related variety and related diversification have recently been labeled as 'the principle of relatedness' (Hidalgo et al., 2018), by aforementioned scholars.

While EEG provides novel insights on how and why history and local preconditions matter for regional industrial development, this approach has received several lines of criticism both from other scholars and among evolutionary economic geographers themselves. Binz et al. (2016b), for instance, argue that EEG bears the risk of regional fetishism (Martin and Sunley, 2006; Martin, 2010), in which strong emphasis is put on local endowment, regional industrial structures and relatedness among local industries. However, the influence of extra-regional forces and exogenous resources on local industrial dynamics are largely downplayed (Hassink et al., 2019; MacKinnon et al., 2019; Trippl et al., 2017). Such an approach thus runs the risk of 'spatial myopia' (Maskell and Malmberg, 2007, p. 607). Taking a firm-centric approach, EEG has also been criticized for overlooking the role of non-firm actors, such as policy-makers, universities and research institutes, intermediaries, etc.

(Asheim et al., 2011 Binz et al., 2016b; Dawley et al., 2014). More recently, scholars also challenged the evolutionary approach for its strong focus on related varieties and regional branching processes, which, according to Boschma et al (2017), is only half of the story of how regional industries diversify over time. The other half of the story is related to unrelated diversifications (Grillitsch et al., 2018; Neffke et al., 2018), which is important to secure long-term economic development as the process of related diversification and path-dependent development might eventually lead to all kinds of lock-ins (Hassink, 2010).

Among others, three additional literature streams have provided interesting complementary insights to the evolutionary approach—namely, regional innovation systems, the geography of transition, and geographical political economy. The next three subsections will elaborate on the main insights of these three approaches.

3.1.2 Regional innovation systems and new path development

The innovation systems approach is based on the understanding that innovation in complex contexts (such as sectors, regions or countries) depends on the interplay between different kinds of actors, networks, institutions and technologies (Weber and Truffer, 2017). Among others, regional innovation systems (RIS) have attracted most interest of economic geographers (Asheim and Isaksen, 2002; Asheim and Gertler, 2005; Cooke et al., 1997; Cooke, 2001). The RIS approach highlights the regional dimension of the generation, absorption and exploitation of new knowledge and innovation. RIS models foreground that interactive innovation often takes place at the regional level, influenced by particular socio-cultural conditions and respective policies (Cooke et al., 2004). RISs are thus shaped by existing industry structures and technological trajectories, the presence or absence of knowledge and support organizations, and the prevailing institutions and network configurations.

More recently, RIS scholars started to pay increasing attention to regional industrial development dynamics. Particularly, they were strongly inspired by the seminal work by Ron Martin and colleagues on path dependence and path creation (Martin, 2010; Martin and Sunley, 2006), who distinguished different types of regional path development strategies,

and argued for the “path as process” perspective. Based upon this basic typology and combined with previous RIS considerations of different types of regions (e.g., Tödtling and Trippl, 2005), an increasingly comprehensive typologies of regional path have been developed in this literature (e.g., Grillitsch, 2018; Trippl et al., 2017). Distinguishing organizationally thin and thick versus specialized and diversified RISs, these studies find out that regions vary in their preconditions and capabilities to develop new industrial paths due to pronounced differences in endogenous potentials and different abilities to attract and absorb exogenous resources. These studies have been further enriched by insights from the knowledge bases literature (Asheim, 2007). Integration of different knowledge bases, and stimulation of cross-overs between different industries is considered to be an important source of new path development (Grillitsch et al., 2018; Manniche et al., 2017; Strambach, 2017). Authors in this literature increasingly stress that resource mobilization and knowledge recombination which are necessary for local new path development do not merely happen at the local level, rather, multiple individual and collective actors at multiple scales need to work together to foster a facilitating environment for new path development (Trippl et al., 2017).

While the abovementioned studies on regional new path development have moved beyond the pure description methods to analytically more sophisticated modes, scholars tend to pay less attention to the role of institutional structures and how do they influence the agency of actors (Grillitsch and Sotarauta, 2018). RIS approaches too often “ have stopped short of providing descriptions of specific institutional arrangements in the science, innovation, and technology field in yet another country or region, without working out in much detail what sort of underlying factors and mechanisms could lead to better or worse performance” (Weber and Truffer, 2017, 111). Moreover, new trends of globalization, digitalization, and sustainability transitions have all necessitated a careful investigation of the interactions and relations between a broader range of actors and structures than in the past, including not only science, industry and government, but also user, civil society and intermediary organizations, etc. (Tödtling and Trippl, 2018).

3.1.3 Geographies of transition and new path creation

Another line of exploration that have substantially complemented the evolutionary and RIS research is the geographies of transition literature (Coenen et al., 2012; Hansen and Coenen, 2015; Truffer and Coenen, 2012). Focusing on sustainability transition, or, fundamental structural changes, in this approach, the analytical focus of technological innovation in the RIS approaches is broadened to include other resources, strategies and actors that get mobilized to interrelate proximate and distant knowledge stocks in the generation of novelty (Boschma et al., 2017). Topic-wise, transition studies are very much concerned about how a niche technology and/ or a related industry could be developed into a regime that lead to sustainability transitions. Similar to the RIS literature, this literature stresses the significance of both firms and non-firm actors in the emerging processes of new technologies and industries (Binz and Truffer, 2017; Steen and Hansen, 2018). In mobilizing resources both inside and outside the region, stakeholders usually do not (re)act alone, because such process is often very difficult to achieve by single groups (Musiolik et al., 2012; Binz et al., 2016b). Rather, they cooperate and interact with each other by establishing intermediary/collective organizations, such as professional associations, lobby organizations and industry networks (Binz and Truffer, 2017; Van Lent et al., 2003; Kivimaa, 2014).

Transition studies represent a scholarly field that has emphasized the role of distributed agency in the development of new industries and the crucial role of socio-technical alignment. Employing a functional and multi-scalar perspective, recent work on geographies of transition highlights a set of activities beyond knowledge re-combination and suggests a view that resource mobilization and extra-regional pipeline construction should go beyond the predefined and fixed territorial boundaries (e.g., Binz and Truffer, 2017).

In this conceptualization, an emerging industry's success in diffusing its new products depends on the emergence of a supportive innovation system (Bergek et al., 2008; Hekkert et al., 2007; Binz et al, 2016b). Innovators usually are confronted with a set of systemic innovation problems (Binz et al., 2016b). Six systemic elements and processes hence have been identified as important for the emerging sectors and technologies, including knowledge creation and diffusion, entrepreneurial experimentation, market formation, direction of the search, resource mobilization, and creation of positive externalities (Bergek

et al., 2008; Hekkert et al., 2007). Such a focus on agencies and activities beyond technological innovation and knowledge creation have been labeled as the 'valuation' of emerging technologies/industries by previous scholars (Binz and Truffer, 2017; Jeannerat and Kebir, 2016), and elaborating on such valuation process has helped scholars to move away from the techno-centric approach prevailing in the RIS and EEG studies.

While theoretical sophisticated and analytically rigorous, empirically, transition studies have a primary empirical focus on clean technologies and the radical way of local path creation (Binz and Truffer, 2017). Whether insights drawn from these sectors could be applied to the study of other industries such as the emerging creative and service-bases sectors remains unclear at best.

3.1.4 Geographical political economy approach and strategic coupling

A fourth approach that is potentially important for local industrial development is the geographical political economy (GPE) approach (MacKinnon et al., 2009; Pike et al., 2009; Sheppard, 2010). This line of scholarship has dominated so-called "Anglophone economic geography" (Sheppard, 2011) since the 1980s. As MacKinnon et al. (2009) have argued, "the evolution of the economic landscape needs to be related to processes of capital accumulation and uneven development" (p.131). In comparing the GPE approach to other approaches such as EEG, the authors mentioned that the neglect of capital-labor relations in non-GPE approaches is more than a matter of empirical focus. Rather, it reflects the bias toward the microscope organizational routines that is embedded in imported theoretical frameworks. As a result, issues such as scale and uneven development have received little explicit attention, particularly in relation to the role of broader extra-regional processes and institutions. MacKinnon et al (2009) have summarized three key features of the GPE approach. First, from a GPE perspective, the evolution of a region is conditioned by its position within wider territorial divisions of labor. Second, it also emphasizes much the role of power and politics in structuring economic adaptation. Finally, to investigate regional economic development, one needs to view local and regional adaptation in the context of *national* political economies (Dawley et al., 2019; MacKinnon et al., 2019).

In a recent article on regional path creation, MacKinnon et al. (2019) posit that GPE is a holistic and systemic approach in investigating topics of interest (Pike et al., 2016). Specifically, in the context of regional path creation, "the adoption of a GPE perspective focuses attention on diverse forms of social and economic agency and the struggles of actors to initiate and reproduce regional paths in the context of broader, spatially uneven processes of production, consumption, circulation and regulation" (MacKinnon et al., 2019, p.3).

Such a geographical political economic perspective on regional industrial development has been applied in several concrete empirical works, especially based in the UK (e.g., Dawley, 2014; Dawley et al., 2015, 2019; MacKinnon et al., 2018, 2019). Among others, the concept of 'strategic coupling' has provided an inroad in further disentangling the relationship between the state, local assets and global actors within global production networks (Yang, 2009; Coe and Yeung, 2015). Based upon the seminal work of Martin and Sunley (2006), and Martin (2010), and informed by GPE (primarily global production networks), MacKinnon et al (2019), for instance, argued that "…knowledgeable actors, operating within multi-scalar institutional environments, create paths through the strategic coupling of regional and extraregional assets to mechanisms of path creation and associated markets" (p. 1).

This line of investigation complements the aforementioned approaches in fundamental ways, as it highlights the macro political-economic structures in which actors and industries are embedded. Moreover, it is also an approach that tries to explicitly connect the 'missing links' (MacLeod, 2001) between subnational and national institutions. However, this approach is still very much concentrated on the production side, or the commodity production, rather than on market formation and exchange (Sheppard, 2011). Although recently, market creation has been seen as an essential building block for regional path creation by geographical political economic geographers (e.g., MacKinnon et al., 2019), issues related to marketization (Berndt and Boeckler, 2012), valorization and valuation (Binz and Truffer, 2017; Jeannerat and Kebir, 2016) have not yet been systematically theorized so far.

3.1.5 Interim summaries and reflections

Table 3.1 gives an overview of the four different approaches mentioned in the earlier subsections. Overall, each perspective has advantages in certain aspects, while at the same time suffers from some weaknesses in other respects. Due to the complexity of regional industrial development, none of the individual approach alone can contribute to a comprehensive understanding of the phenomena of interest. Rather, they must be used together with the aim of complementing each other. With the exception of GPE, none of the other three approaches has sufficiently taken into account the role of macro geographical political structures in influencing regional industrial path development.

Even within the GPE literature, while scholars have mentioned the value of embedding regional industrial development in the broader political systems and capitalist economies, it, however, fails to provide *concrete forms* of structural factors that could potentially be connected to different forms of agencies. Even if some studies have tried to make connections between the two (namely, agency on the one hand, and structure on the other hand) (e.g., Grilltisch and Sotarauta, 2018), the concrete *mechanisms* through which they influence each other remain largely unknown. To disentangle such agency-structure relationships, we first of all need to know what kind of theories are helpful for understanding the structural forces and their role in contributing to economic/industrial dynamics. In the next subsection, I will draw insights from the literature on 'varieties of institutional framework' (Fainshmidt et al., 2018), and elaborate on how structural forces can be introduced to regional industrial path development studies.

Table 3.1. Summary of four literatures on local industrial development.

Approach	**Merits**	**Shortcomings**
Evolutionary approach	Dynamic, evolutionary perspective; regional branching as a mechanism of regional industrial development	Firm-centric; spatial myopia; overlooking the role of agencies
RIS approach	Focusing on technologies and innovations; giving due attention to key organizations that are important for innovation and knowledge creation	Did not go much further than examining institutional arrangements that are important for science, innovation and technology; did not examine much about macro political-economic structures and how they influence actors' actions
Geographies of transition	Incorporating a much broader range of actors than RIS approach; highlighting the role of distributed agency and the valuation side concerning technological/industrial emergence and sustainability transition; multi-scalar perspective	Mainly based on green-tech sectors and radical innovations that contribute to sustainability transitions; did not examine much about macro political-economic structures and how they influence actors' actions
Geographical political economy	Focusing on the macro political-economic structures and different capitalist economies where actors and industries are embedded; paying due attention to the relationships between local actors and global lead firms, and the asymmetric power relations between them	The valuation side of developing local new industries have not been well examined

3.2 Multi-scalar institutional structures and modes of innovation

Local industrial development is shaping and shaped by multi-scalar institutional structures. The causes and consequences of significant differences in the organization of capitalist economies have been explored in the 'varieties of institutional systems' literature or 'varieties' approaches (Fainshmidt et al., 2018). Such 'varieties' approaches have been informed by two primary frameworks, namely the Varieties of Capitalism (VoC) approach (Albert, 1993; Hall and Soskice, 2001), and National Business Systems (NBS) (Whitley, 1999).

3.2.1 Varieties of capitalism approach

Born out of critiques of an one-world, highly liberalized vision of capitalism based upon the American model after the Cold War, earlier comparative institutionalists suggested that the more coordinated sort of capitalism could be seen as another type of capitalism. Moreover, the latter features the organization of socioeconomic activities in many countries, particularly in Europe (Albert, 1991; Peck and Zhang, 2013; Zhang and Peck, 2016). It was the suggestion of such an alternative model in addition to the American model that has placed the question of variety a central position into the discussion (Peck and Theodore, 2007).

According to Hall and Soskice (2001), the VoC approach draws insights from three literature strands—namely, modernization approach, neocorporatism, and social systems of production. Based upon a series of empirical studies of the historical evolution of different 'national capitalisms', it categorized some advanced economies as liberal market economies (LMEs) and coordinated market economies (CMEs), based on the typical capitalist models in the US, and Germany, respectively. The varieties approach has been associated with a number of interrelated theoretical claims. It provides new perspectives on a very broad set of topics, "ranging from issues in innovation, vocational training, and corporate strategy to those associated with legal systems, the development of social policy, and the stance nations take in international negotiations." (ibid, p.2)

The architecture of comparative advantage of the developed countries is portrayed in terms of key '*institutional complementarities'*—among various institutional spheres ranging from

national training systems, labor relations, financial systems and corporate governance, inter-firm relations, and coordination with employees (Hall and Soskice, 2001). The central argument in this regard is that, nations with a particular type of coordination in one sphere of the economy (e.g., easy firing and hiring) tend to develop complementary practices in other spheres (correspondingly, workers tend to invest more in generic and switchable assets). The presence of institutional complementarities reinforces the differences between LMEs and CMEs: whereas LMEs tend to rely on markets to coordinate endeavors in financial and industrial relations systems, CMEs tend to depend more on non-market coordination.

The relevance of such institutional complementarities present in different countries is that they may lead to different national comparative advantages in particular activities and products. For instance, radical innovations in fast-moving technology sectors, such as biotechnology, semiconductors, and software development, are much more often observed in LMEs, while incremental innovations in capital goods, such as machine tools, factory equipment, consumer durables, engines, etc., happen more frequently in CMEs (Casper and Whitley, 2004; Sorge and Streeck, 2018).

3.2.2 National business system approach

Compared to the bifurcated typology of the VoC approach, the NBS typology is much more diversified as it focuses on 'distinctive ways of structuring economic activities with different kinds of actors following contrasting priorities and logics' (Whitley, 1998, p. 449). As the empirical coverage of the 'varieties' approaches have moved away from industrialized countries to incorporating developing and emerging economies, many additional institutional domains have been added to the aforementioned five institutional spheres. These include the structure of the state and its policies, a society's idiosyncratic customs and traditions, as well as norms, values and laws and regulations, etc.(Hollingsworth and Boyer, 1997; Jessop, 2011; Witt and Redding, 2013). Major variations in these institutional dimensions have been seen as generating and reproducing particular kinds of capitalism in different countries (Whitley, 1999), such as Latin American capitalism (Schneider, 2009), Sino-capitalism (McNally, 2018; Peck and Zhang, 2013), etc.

3.2.3 Interim summaries and reflections

While both VoC and NBS literatures have provided insights in revealing the interrelationship between national institutions and actual business and economic practices, these approaches have been subject to several rounds of criticism (for a systematic critique, see, Hancké et al., 2007, Witt and Redding, 2013). Among others, economic geographers were particularly concerned about the methodological nationalism of the approach (Peck and Theodore, 2007; Zhang and Peck, 2016). To avoid such methodological nationalism, in this thesis, I argue that the institutional spheres identified at the national level by 'varieties' scholars can actually be extended to other spatial scales, and thus lead to a multi-scalar perspective. In addition to this methodological consideration, the "varieties" approaches also offer very useful insights, as they highlight the importance of institutional structures as an important factor in supporting or preventing innovation (Ćetković and Buzogány, 2016). Moreover, these approaches also describe in detail the institutional domains that can be linked to different aspects of agencies and actors' activities.

3.3 Structuration theory

After introducing the literature that are relevant to the agency and the structure aspects, one further issue that deserves attention is how one should perceive the relations between the two. Here the structuration theory by sociologist Anthony Giddens (1986) provides some fruitful inspiration. It is important to point out that Giddens views his explication of structuration as providing 'sensitizing concepts' for *informing* research, rather than a set of concepts that can be directly applied (Dyck and Kearns, 2014. Therefore, instead of directly drawing notions from the structuration theory, what is more inspiring is to be epistemologically informed about the way how structuration theorists conceptualize the relationship between agency and structure.

Interested in social relations, Giddens positions his structuration theory between two contrasting thoughts in social sciences (especially in sociology)—i.e., functionalism and structuralism on the one hand, and hermeneutics and interpretative sociology on the other. For the former type, both functionalism and structuralism express a naturalistic standpoint,

and both are inclined towards objectivism. For functionalism and structuralism, structure has primacy over action, and the constraining qualities of structure are strongly accentuated (Giddens, 1986, p.1-2). In contrast, in hermeneutic traditions of thought, the social and natural sciences are regarded as radically discrepant. According to hermeneutics, *subjectivity* is the pre-constituted center of the experience of culture and history and thus provides the basic foundation of the social or human sciences. Similarly, interpretative sociologists also accord primacy to action and meaning in the explication of human conduct, while structural concepts are seen as less important.

Building upon the debates between these two contrasting thoughts, Giddens (1986) argues that " [T]he basic domain of study of the social sciences, is neither the experience of the individual actor, nor the existence of any forms of social totality, but social practices ordered across space and time" (ibid, p.2). He intended to sensitize social analysis through "emphasizing the knowledgeability of the individual agent in the reproduction of social practice, the time-space contextuality of social life and the hermeneutic or interpretive nature of analysis" (Dyck and Kearns, 2014, p. 87). Unlike functionalists who often naively conceived structure in terms of *visual imagery*—using metaphors such as 'skeleton of an organism' or 'girders of a building' (Giddens, 1986, p.16), Giddens understands structure as 'rules and resources' referring to the "*structuring properties* allowing the 'binding' of time-space in social systems" (ibid, p. 17, my emphasis). Understood in this way, social systems actually do not have 'structures' but rather exhibit 'structural properties'.

The notion of "the duality of structure" is central to the structuration theory. The argument is that the "rules and resources drawn upon in the production and reproduction of social action are at the same time the means of system reproduction" (ibid, p.19). Interpreted in Gidden's terminology, structures, as sets of rules and resources, are both medium and outcomes of the practices of agents (agency). Therefore, structure exists through the concrete practices of human agents, recognized as competent and knowledgeable, who reproduce social life through their routinized encounters. On the other hand, such practices and actions of human agents are also subject to and shaped by the social totalities—in Gidden's term, "structural principles".

How does structural theory inform this specific research then? The discussion on methodological bracketing (Cohen, 1989; Stones, 2005; Philpps, 2001) is useful here.

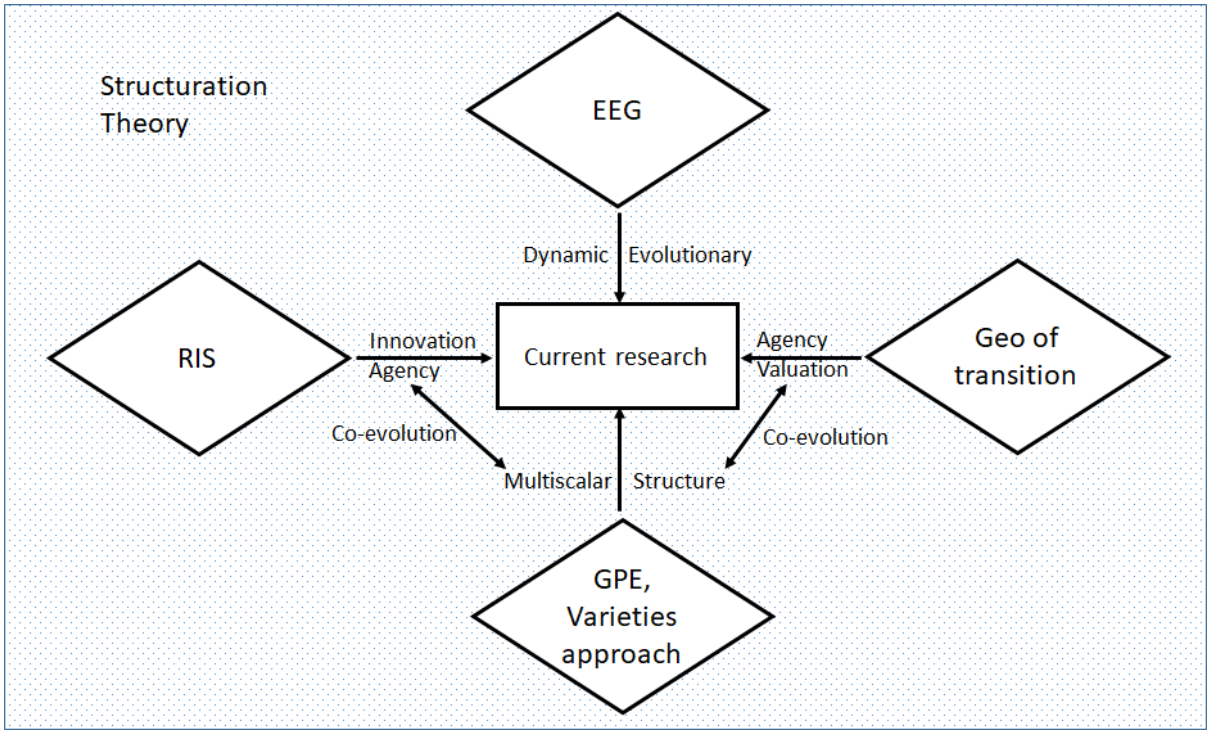
According to Cohen (1989), structuration analysis requires two methodological brackets: the first is the analysis of institutionalized properties of systems to identify *structures* that are chronically reproduced over the long run; the second bracket is the analysis of the strategic conduct of actors to identify their *agency* that regenerate or alter the institutionalized properties of systems. Here, I would add a third bracket—that is, to analyze the co-evolutionary relationships between the two and examine such dynamic relationship through time.

3.4 Positioning the research in the broader literature

As has been illustrated above, economic geographers have long shown interest in exploring regional industrial development. From regionalism in the 1990s to the evolutionary approach since the mid-2000s, and to more recent systemic thinking (RIS and geographies of transition), scholars have increasingly advanced our knowledge on regional economic and industrial development. Over time, a shift of interest from endogenous description and exploration to exploring extra-regional linkages and networks could be observed in the literature. And a multi-scalar, multi-actor, agency-based and dynamic perspective also tend to be increasingly regarded as a norm for researching the phenomena of interest. Going in a similar direction with the current economic geographical literature, this research draws ample insights from the aforementioned studies. Figure 3.1 shows the position of the current research among the different approaches. Overall, I adopt a dynamic, process-based perspective (inspired by EEG), and pay attention to the agencies of multiple actors, particularly those non-firm actors (RIS and transition studies), and try to connect such agencies to the multi-scalar geographical political and institutional structures in Shanghai (China) and Hamburg (Germany) respectively (GPE and varieties approach). Moreover, building upon the process-based perspective, and moving beyond that, I also intend to identify the causal mechanism(s) underpinning the observable phenomenon of regional industrial development (mechanism-based perspective). The GPE approach is particularly relevant here, as it has given substantial account to regional inequality and uneven regional growth. Since what I am interested in is the different fates of one industry in two different contexts, the GPE approach provides useful insights in highlighting the potential role of

geographical political and socioeconomic systems presented at both the regional and national levels in contributing to different developmental models. The varieties approaches provide additional insights in this respect, as they have a strong focus on institutional structures and the specific institutional domains. However, I depart from the varieties approaches in important ways. First, I move beyond the methodological nationalism of the literature by arguing that in order to examine resource formation at different spatial levels, a multi-scalar perspective on the institutional architectures in which actors are embedded is essential. Secondly, instead of treating agencies of actors and the multi-scalar institutional structures separately, I argue that they develop in a co-evolutionary manner (structuration theory) (see Paper 2).

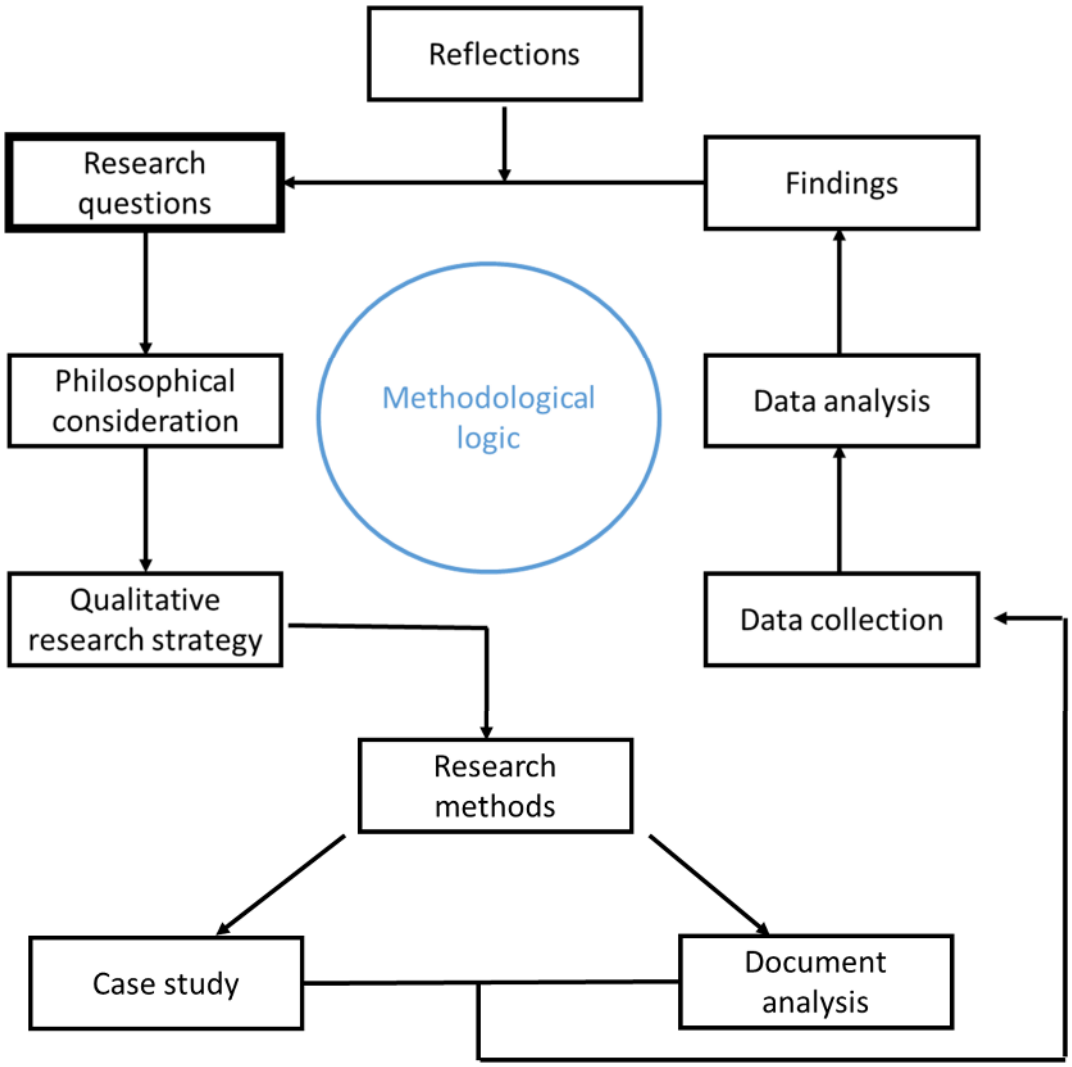
Figure 3.1. Positioning current research in different approaches.



4 Methodology

After introducing the theories that are relevant for my research, the next step is elaborate on the methodological issues that are important for a scientific research. In this section, I will elaborate on the methodological logic behind the thesis (Figure 4.1). Specifically, I will start with the philosophical consideration of the research. After that, the qualitative research strategy applied in this research will be introduced. This is followed by elaborating on the two concrete research methods that have been used in empirical studies, namely, case study method and document analysis. Based on these two methods, the procedure of data collection and data analysis will be described. Finally, I will reflect upon the influence of ethics, subjectivity, asymmetric power relations, etc., on the interpretation of the research outcomes.

Figure 4.1. Methodological logic of the research.



4.1 Philosophical considerations

The purpose of any piece of research work is to add to our stock of knowledge no matter in a small or big way. In any case, we cannot avoid making judgements about adequacy and appropriateness of the philosophical logics behind our research, because what philosophy is to research is grammar to language (Graham, 2013). In human geography, the mainstream philosophical thoughts of the discipline are not static collections of ideas but have evolved over time, often in reaction to the perceived weaknesses of other approaches (Graham, 2013). It is, however, beyond the scope of this research to discuss all the paradigms in geography (for detailed reflections, see Besetta, 1999; Johnson and Sidaway, 2015). What I aim to do specifically in this subsection is to ground the research in a critical realistic ontology and epistemology (Sayer, 1999; Yeung, 1997), which fits well with the objectives and ambitions of this doctorate project.

4.1.1 Critical realism as the underpinning philosophy

Critical Realism (CR) emerged as a philosophy in the 1970s. When first introduced by Bhaskar (1975), CR was positioned as an alternative to both objectivist (positivist, deductive, and empiricist) and subjectivist (social constructionist, inductive, and interpretive) approaches (Vincent and O'Mahoney, 2018). Unlike previous philosophies which maintained strongly that the ontology (i.e. the nature of reality) was reducible to epistemology (i.e. our knowledge of reality) (for a systemic critique, see Bhaskar, 1998), CR combines a realist ontology with a realistic epistemology (Yeung, 1997). In a nutshell, CR "…celebrates the existence of material reality independent of human consciousness (realist ontology), ascribes causal powers to properties/ potential in objects and human reasons and their activation through generative mechanisms such ad enduring social structures (realist ontology), rejects relativism in social and scientific discourses (realist epistemology), and reorientates the social sciences towards its emancipatory goal (realist epistemology)" (ibid, 52). Such a clear distinction between the existence of a reality and our knowledge of it requires a shift from purely describing the social world towards examining the fundamental

nature of social phenomena, which can be distinct from their observable characteristics and features (Hoddy, 2019; Pratt, 1995; Sayer, 1999).

CR maintains that the world consists of objects and structures with particular 'causal' or 'generative mechanisms' (Sayer, 1999; Bhaskar, 1998) that make events occur. In CR's depth ontology, reality is stratified into three levels: the real, the actual and the empirical. The level of the *'real'* is made up of causal structures and their mechanisms, it is the deepest level that researchers should reach. The middle level of the '*actual*' comprised of events, that is, what happens when mechanisms are activated. The more superficial level of the '*empirical*' refers to our perceptions and experiences of concrete events. At this level, events are always mediated through the filter of human experience and interpretation (Fletcher, 2017; Hoddy, 2019). In moving from our perception and experiences in the empirical level towards the levels of the 'actual' and ultimately 'the real', reality becomes increasingly difficult to access. It is the critical realists' task to reach deeper levels of reality, and try to understand the causal mechanisms that lead to certain observable phenomena. This stratified understanding of reality is important as it takes into account *emergent* situations. The term of 'emergence' in CR refers to the fact that one level of reality is dependent upon *but* irreducible to the level below (Vincent and O'Mahoney, 2018). Thus, when we observe the unexpected, it indicates that there are (perhaps) deficiencies in our current theorizations, which require more investigations.

Related to the specific research of this thesis, such a critical realist philosophy provides instructions on how the topic of interest could be (more) scientifically investigated. Specifically, the fact that regions with similar industrial preconditions in developing a specific industry differ much in their capabilities to do so can be seen as the empirical reality, which is observable and to certain extent measurable (e.g. by looking at annual revenues, the size of the companies, the number of employees, etc.). In order to understand such distinct social phenomena, we need to investigate the deeper causal mechanism that could potentially contribute to such differences. Such a causal mechanism should exist independent of the contexts in which observations have been made. Ultimately, in order to explain the specific cases that we are interested in, we need to bring together such causal mechanism and the concrete contexts in which the two local industries developed, because

only when mechanism is combined with context, we can expect to have concrete outcomes (Pawson and Tilly, 1997).

4.1.2 From process to mechanism

For critical realists, the identification of causal mechanism is the core of social analysis. In sociology and other social sciences, such a 'mechanism-based explanation' was quite popular in the last decades (e.g., Merton, 1968; Elster, 1989; Hedström et al., 1998; Gerring, 2010). The underpinning logic of a mechanism-based explanation is quite simple: "at its core, it implies that proper explanations should detail the cogs and wheels of the causal process through which the outcome to be explained was brought about" (Hedström and Ylikoski 2010, p. 50). In human geography, however, a 'mechanismic' worldview (Gerring, 2008) has not really been taken up empirically, although critical realists have long seen causal mechanism as one of the key strengths of the critical realism philosophy (Sayer,1999). In a recent paper, Henry Yeung (2019) tries to (re)introduce such a mechanism-based approach to economic and political geography, especially in the geographical analysis of uneven development.

In Yeung's (2019, p.13) term, "mechanism occupies an important epistemological role in its [realist] ontological conception of the world as being structured, differentiated, and changing. Realist ontology recognizes the existence of causal powers and their activation through generative mechanisms that produce differentiated social phenomena." Over the last two decades, however, geographical studies have largely failed to give account to mechanisms in the causal explanation and its relation to ontext. Rather, increasing scientific work has emphasized the relevance of a process-based perspective to the study of regional (economic) development, especially after the "evolutionary turn" (Boschma and Frenken, 2006; Boschma and Martin, 2007). Particularly, in the seminal work of Martin and Sunley (2006), the authors proposed the 'path as process' (p. 408) approach, and this was increasingly taken up as the methodological core of the recent 'new path development' literature (e.g., Binz et al., 2016b; Tödtling and Trippl, 2018; Trippl et al., 2018). The evolutionary imprint is so strong that it feels as if one is not conducting economic-geographical research if one is not concerned with the development processes of the

phenomena under investigation. Of course, such a process-based and dynamic perspective is essential for causal explanation, but it is only a half-way-theorizing since the true mechanism that caused this dynamic is often not captured under such a process-focused approach. According to Yeung (2019), the mushrooming of mid-range conceptions in economic geography, such as neoliberalization, path dependence, strategic coupling, etc., reflects the immaturity of theorizing in the sub-discipline. In essence, all these mid-range concepts are process-based rather than mechanism-based, and thus cannot meet the need for "abstract theory of the general mechanism of capitalism and other economic systems" (Sayer, 1995, p.4), no matter how nuanced and contextualized they are.

In distinguishing process from mechanism, Yeung (2019, p.1) conceives process as "a contingent change in the sequential series of entitles and their relations", and mechanism as "a necessary relation to connect an initial causal condition with its particular socio-spatial outcomes in context". In order to increase the explanatory power of mid-range process-based concepts, which were often wrongly treated as and/or conflated with the mechanism underpinning certain observable phenomena, he argues that more attention should be paid to the identification of causal mechanisms (connecting a concrete cause to a concrete effect) for the empirical phenomena under investigation.

Informed by these arguments, this research will first of all take a process-based approach in tracing the key actors and their activities in facilitating or hindering the development of the two local industries. This will be realized by a thick description of the developmental trajectories of the two industries and the practices of actors during such processes. In order to avoid 'half-way-theorizing', analytical emphasis will be placed on identifying the causal relationships or causal mechanisms after elaborating on the processes of development. I argue that the dynamic structure-agency relations serve as such the causal mechanisms that lead to distinct industrial development outcomes in the two city-regions.

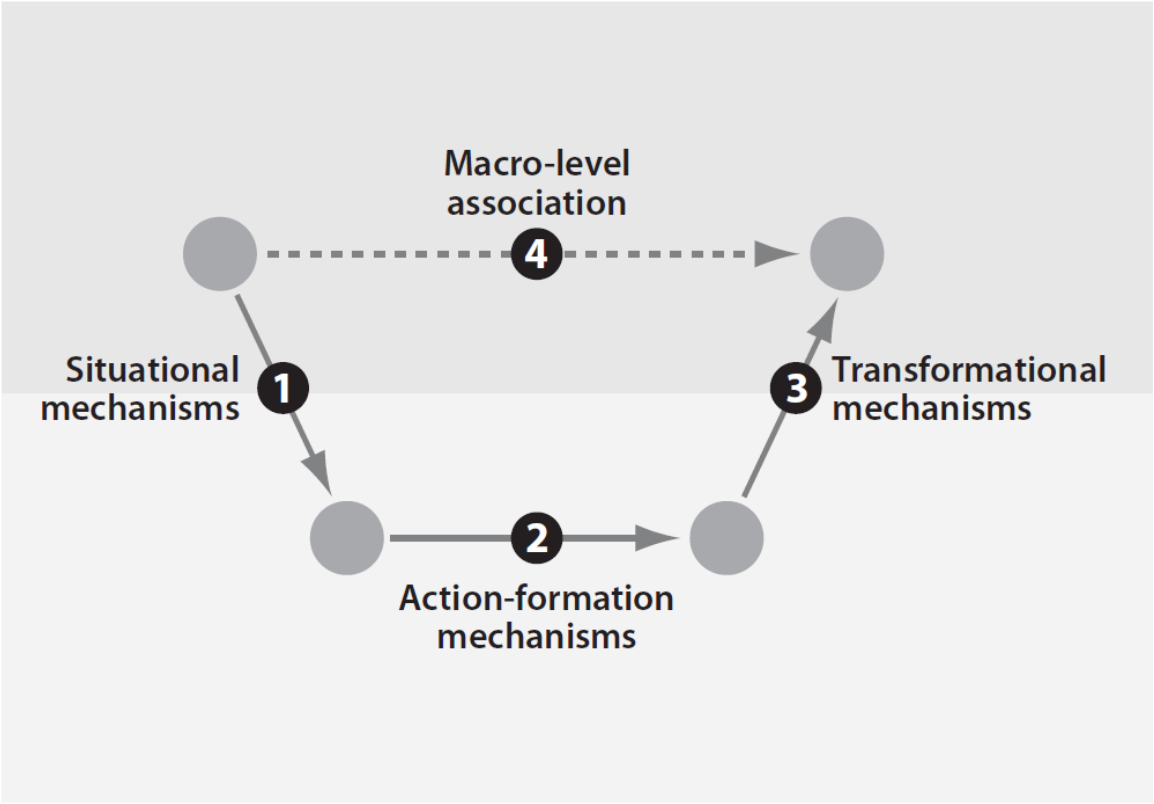
In addition to a distinction between process and mechanism, there are two other points to be mentioned here. The first is related to the *relative generality* of mechanismic explanations. Explanations can never be entirely particular or general, but there are significant differences of degree (Gerring, 2008). Informed by critical realism, my take of the generality of causal mechanism is more of a "'law' with particular contexts" one (ibid, p. 169), meaning that causal mechanisms should refer to general phenomena, but these

general phenomena take on different shapes because of the distinct local arrangements. The terminology of 'law' used here is also distinct from its conventional understanding, in physics, for example. The search for 'Law' here means that mechanism-based explanations still rely on "causal generalization about the properties, activities, and relations of underlying entities, but they do not have to satisfy the traditional criteria for laws" (Heström and Ylikoski, 2010, p. 55)

The second point concerns the *level of analysis*. For economic geography, developing better explanations of the macro structures and propensities are particularly important (e.g., Peck, 2017). A basic point of the mechanism perspective is that explanations that simply relate macro properties to each other (macro to macro) are unsatisfactory because they do not specify the mechanisms by which macro properties are related to each other (see Figure 4.2, arrow 4). For an explanation to be satisfactory, it must open up the black box and detail the mechanisms that brought about the macro-level outcomes (Heström and Ylikoski, 2010). In this regard, Hedstöm and Swedberg (1998, p. 21-23) identified three types of mechanisms that put together can explain the causal relations of interest. The *situational mechanisms* (arrow 1) identify the macro environments in which actors are embedded and how they shape actor's opportunities, goals, beliefs, etc. The *action-formation mechanisms* (arrow 2) show how these opportunities, goals, beliefs, etc., influence the actor's behavior. Finally, the *transformational mechanisms* (arrow 3) show how the behavior of many individuals jointly bring about various intended and unintended macro outcomes. Only by considering the entire chain of situational, action-formation, and transformational mechanisms, we have explained the observed macro phenomenon (e.g., industrial developments in regions). How does this typology inform my research then? I argue that these three mechanisms imply that a truly mechanismic approach on local industrial development should incorporate the micro-foundations of behaviors on the one hand, and the broader structures that effect such behaviors on the other. Such mechanism-based explanations deviate from the strong version of methodological individualism prevailing in neoclassical economics. They are based upon the so-called "structural individualism", in which relations and relational structures between individual actors and/or organizations are regarded as the core (Heström and Ylikoski, 2010). "By taking certain macro-level states as given and incorporating them into

the explanation, the realism and the precision of the proposed explanation is greatly improved." (Heström and Swedberg, 1998, p.13)

Figure 4.2. A typology of social mechanisms.



Adapted from Hedström and Swedberg (1998)

In specifying causal mechanisms in relation to the existing processes of socio-spatial change under certain context, a methodological procedure called abstraction, or retroduction, is essential. In section 4.5, I will introduce this procedure in detail.

4.2 Qualitative research strategy

After introducing the CR philosophy underpinning this research, I now introduce research strategies that fit well with such philosophical assumptions. Due to the ontological and epistemological concerns of CR (i.e., there exists a reality independent of our perception, and our knowledge on this reality can never be perfect or full-fledged, but we can definitely try various approaches in order to gain better knowledge about it), theoretically, CR researchers should embrace all sorts of research techniques in order to produce a richer

conceptualization of the mechanisms at work in the social world[2]. However, in reality, due to various constraints, such as time and budget limitations, and the incapability of researchers, critical realists usually depend on some (not all) methods.

The choice of research design depends on the position of researchers'purpose on two dimensions. The first is intensive vs. extensive, and the second is detached vs. engaged (Ackroyd and Karlsson, 2014; Yeung, 1998) (Table 4.1). For this project, I was keen to reveal the contexts as well as the mechanisms that lead to different outcomes, therefore, intensive and engaged research strategies seem to be ideal. Specifically, I adopted comparative case study and intensive document analysis as the main methods for the research. I will elaborate these two concrete methods in the next subsection.

Table 4.1. Critical realists' research design consideration.

	Intensive versus Extensive			
	What is the mechanism?	*How do context & mechanism typically interact?*	*How do context & mechanism historically interact?*	*What is the context?*
Detached	Case-study	Comparative case-study	Institutional / historical analysis	Surveys
Engaged	Action research	Intensive realist document evaluations	Barefoot research	Extensive realist evaluation

Adapted from Vincent and O'Mahoney (2018)

[2] For a comprehensive guide on how to conduct critical realism research, see Edward et al. (2014)

4.3 Concrete research methods

4.3.1 Case study

Case studies are the preferred strategy when 'how' and 'why' questions are being posed (Eisenhardt, 1989; Yin, 2003). Yin (2018) claims that, case study method is ideal particularly if scholars deliberately want to cover contextual conditions—believing that they might be highly pertinent to the phenomena under investigation. For the specific topic that I am interested in, case study is an appropriate approach for investigating complex industry formation processes, since it focuses both on the phenomenon (i.e., local industrial path development) and the relevant context conditions (i.e., multi-scalar institutional structures) (Flyvbjerg, 2006; Yin, 2018).

Specifically in this project, comparative case study is applied, as the aim of the paper is to investigate the resource formation processes as well as the influence of multi-scalar institutions on such processes for the same industry—online games industry, in two different places. According to Yin (2018), the rationale for comparative-case designs derives directly from either literal or theoretical replications. That said, each case must be carefully selected so that the individual case studies either 1) predict similar results (a literal replication) or 2) predict contrasting results but for anticipatable reasons (a theoretical replication). The logic applied in this project is a theoretical replicative one. Namely, I expected differences between the two cases, and I anticipated such differences were mainly attributed to the different agency-structure relations presented in both city regions. Concerning the relationship between the overall comparative case study and individual cases that have been selected, Yin (2018) argued that the fact that a design calls for comparative case studies does not eliminate the variation identified with single-case studies. "Each individual case study may still be holistic or contain embedded subunits. In other words, a comparative case study may consist of multiple holistic cases." (p.60). The individual papers included in this thesis give a good example of how such relationships are possible. In paper 3 and paper 4, Shanghai and Hamburg are treated as single holistic cases respectively, and only in the final paper incorporated in this package, I tried to draw on their relevant aspects and compare them under the same framework.

Since all the details of the two specific industries in Shanghai and Hamburg have been well covered in the individual papers included in the thesis, I will not repeat them. Instead, in table 4.2, I present some general information about Shanghai and Hamburg as the destinations of the comparative study.

Table 4.2. Basic information about Shanghai and Hamburg.

Basic information	**Shanghai**	**Hamburg**
Administrative level	One of the four municipalities under the direct administration of the PRC central government	One of Germany's sixteen federal states
Population (2017)	24.18 million	>1.8 million
GDP	$494 billion (2018)	€110.7 billion (2016)
GDP per capita	$20,425 (2018)	€58,300 (2016)
Important economic sectors	Financing, retail, and real estate, manufacturing, Automotive, tobacco, energy and chemical industry	Maritime industry, aviation, automotive, media and biotechnologies
Sister cities	Shanghai and Hamburg became sister cities since 1986	

The generalizability of individual cases is the last critical issue related to case studies. Previous scholars have provided responses to this question (e.g., Eisenhardt and Graebner 2007; Flyvbjerg, 2006; Yin, 2018), and these arguments also apply to this project. A key response to this challenge is to clarify that the purpose of the research is to develop theory, not to test it, and so theoretical (not statistical or random) sampling is appropriate (Patton, 1990). Theoretical sampling simply means that cases are selected because they are particularly suitable for illuminating and extending relationships and logic among constructs. In other words, cases are only sampled for theoretical reasons (Eisenhardt and Graebner, 2007). Based on such a theoretical sampling logic, the goal of case studies will be to expand and generalize theories (analytic generalization) but not to extrapolate probabilities

(statistical generalization) (Yin, 2018). Multiple-case studies (within which comparative case study is a typical one) typically provide a stronger base for theory building. Theoretical sampling for multiple case study is more complicated. The choice is based less on the uniqueness of a given case, but more on the contribution to theory development within the set of cases (Eisenhardt and Graebner, 2007). Another deeper philosophical justification on the generalizability of case study has been provided by Bengtsson and Hertting (2014). According to the authors, generalization from case study research is based on expectations about similar patterns of *thinly rational* action and interaction in similar contexts. Thin rationality here understood as the fact that actors in most cases do things for certain reasons. Assuming thin rationality, we can derive ideal-type social mechanisms from empirical observations. Based on this assumption, we can expect the same ideal-type mechanisms to be applicable also in similar actor constellations in other context.

4.3.2 Document analysis

The second method of the research is document analysis (DA). Our record-keeping society means that documentary information (whether paper or electronic) is likely to be relevant to every case study topic. This type of information should be the object of explicit data collection plans (Yin, 2018).

Generally, DA has always been seen as a complementary method to other qualitative methods, such as case studies, it can also function as a stand-alone method for specialized forms of qualitative research such as historical studies or discourse-sensitive approaches. In this project, I regarded DA as a very important complementary method to case study, because the research aimed to investigate the *histories* (or developmental trajectories) of the two local industries, which required a lot of knowledge about the past. For case study research, the most important use of documentation analysis is to corroborate and augment evidence from other sources. Documents such as reports, minutes of meetings, books, newspapers, press releases, program proposals, organizational or institutional reports, survey data, etc., can serve multiple roles in qualitative research. Bowen (2009, p.29-30) has summarized five functions of documents. First of all, documents can provide data on the context (background information and historical insight) within which research participants

operate. Secondly, documents help to generate new research questions by suggesting some issues that need to be tackled and situations that need to be observed as part of the research. Thirdly, documents provide supplementary research data. Fourthly, they also provide a means of tracking change and development. Finally, documents can be analyzed as a way to verify findings or corroborate evidence from other sources. If the documentary evidence is contradictory rather than corroboratory, the researcher is expected to investigate further.

Throughout the whole procedure of this project, the document analysis method has served all the five functions mentioned above. More importantly, document analysis turned out to be the most effective means of gathering data when events can no longer be observed or when informants have forgotten the details (Bowen, 2009).

A reservation that must be made when reviewing a document is to understand that it was written for a specific purpose and target audience that is not the case study alone (Yin, 2018). Therefore, the case study researcher needs to be cautious and reflective in applying arguments or justifications from such data sources.

4.4 Data collection

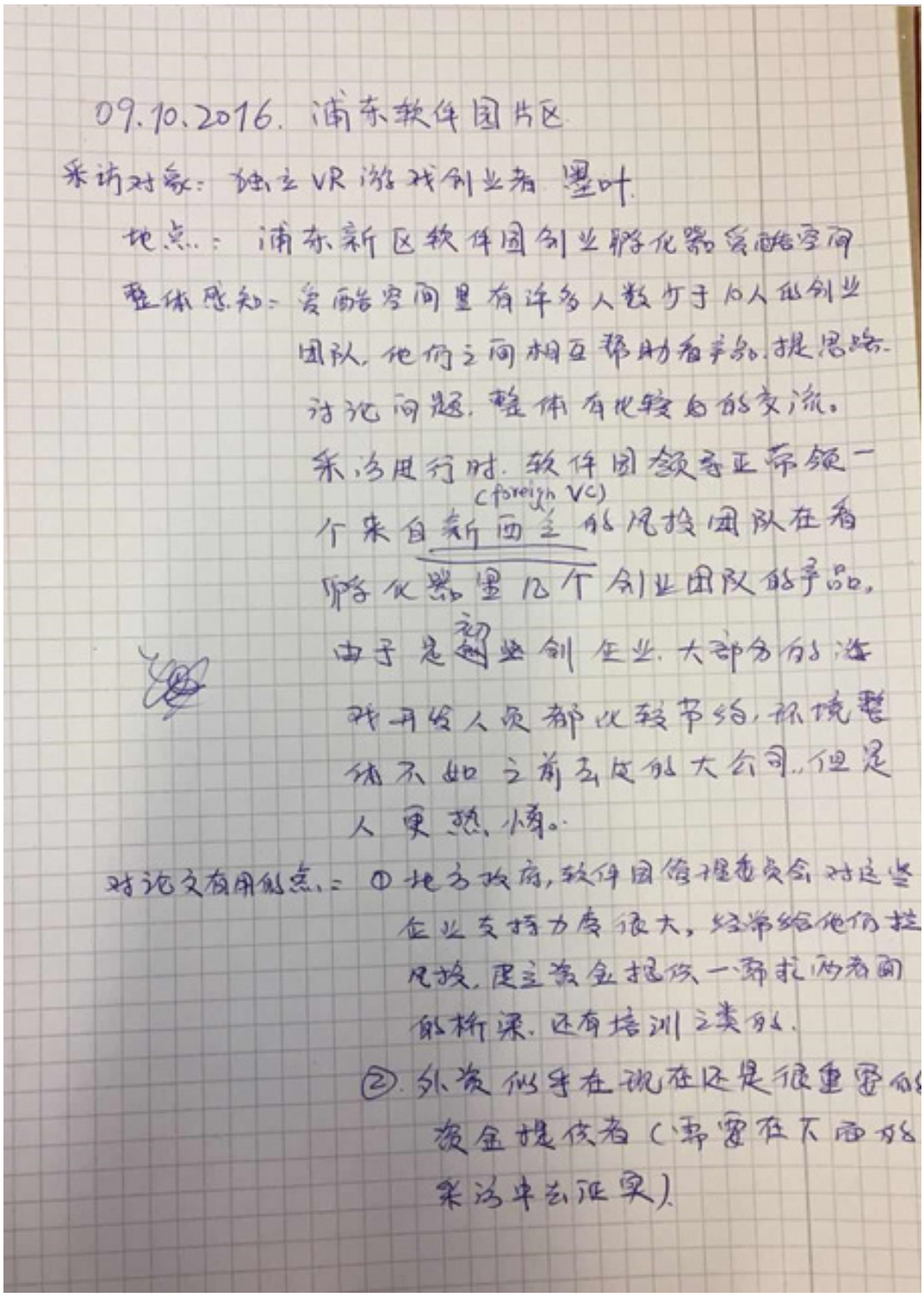
After deciding the research methods that are suitable for investigating the specific research questions, concrete data collection processes followed. This study draws upon two main data sources: 63 semi-structured interviews and a large number of secondary materials.

With some insights from the literature, a set of initial interview questions was drawn up based on themes that looked like to be relevant to the topic of interest. Semi-structured interviews were adopted as they allowed for a discussion of the questions and topics of relevant to the research as well as to pursue related and relevant lines of enquiry that might arise (Yin, 2018). The interviews were conducted over three periods: September to December 2016 (Shanghai), January to April 2018 (Hamburg), and September to October 2018 (Shanghai). 42 and 21 interviews were conducted respectively in Shanghai and Hamburg. Different interest groups including founders/ senior managers of local companies, directors of cluster organizations, officials of industrial governing authorities, managers of

industrial associations, scholars, etc., have been interviewed (Table 1). The questions asked dealt with the historical development of the games industry in both city regions. Other questions addressed the activities that various actors have taken to develop the local industries as well as the relevant institutions that have hindered or facilitated such activities. The second part of the data contains a large number of secondary data. This set of data mainly came from internal materials of the intermediary organizations, mainstream media reports, professional magazines archives and industry reports, and it was collected and compiled chronologically.

In addition to the two main data sources, I also conducted direct observations and took notes while I was visiting the sites of interest (e.g., companies, governmental offices, offices of cluster managers, etc.). I wrote down my overall perceptions about the environment of those places, the activities people were doing, and the things I was told in such visits, immediately after finishing the visits or interviews. An example of my fieldwork notes is shown in Figure 4.3.

Figure 4.3 Example of fieldwork notes after interviews in Shanghai.



4.5 Data analysis

In keeping with CR's stratified ontology on reality (i.e. the empirical, the actual, and the real), the data analysis followed three steps—identifying demi-regularities, abduction

(redescribing), and retroduction (Easton, 2010; Flecher, 2016; Vincent and O'Mahoney, 2018). It began with the search for 'demi-regularities' at the empirical level of reality. Demi-regularities refer to tendencies that something could be observed (Bhaskar, 1998). According to Lawson (1997), 'demi-regularities' are the result of contrasts between apparently similar objects—e.g., the contrasting productivity records of the British and German economies (Borwn et al., 2002). In this specific project, the distinct industrial development outcomes of the online game industry in Shanghai and Hamburg, based on similar industrial preconditions, can be seen as the social demi-regularities, the task is then to uncover the causal mechanisms that lead to such differential industrial development outcomes. These demi-regularities can be effectively identified through qualitative data coding. The software I used for coding was NVivo.

Codes were organized into two categories: empirical and theoretical. Theoretical codes were mainly derived from the literature review, theoretical framework, and key concepts, while empirical codes were mainly drawn from empirical data. These codes were changed, eliminated, and supplemented with new codes during the coding process. The large number of codes was gradually reduced during the second round of coding, many codes have been reorganized or recombined into a conceptual map informed by CR. The most dominant codes provided the key information that were important for describing the demi-regularities (e.g., the performance of the two local industries, the trajectories of industrial development in Shanghai and Hamburg).

After the main empirical findings (demi-regularities) have been identified through coding, the next step was the process of abduction—or, theoretical redescription (Hoddy, 2019). This involves re-describing of which is observed in the empirical data in terms of theory in order to describe the causal mechanism that gave rise to observed phenomena. During this process, elements that were relevant to different aspects of the agency (activities of stakeholders in facilitating or hindering local industrial development) and the structure (related to educational and financial systems, central and local governments, etc.) were categorized differently, and their relationships have been identified with the insights from previous theories.

The final stage of data analysis was retroduction, focusing on causal mechanisms and the specific conditions/contexts (Yeung, 1997). As a reasoning process that moves from

concrete to abstract and back again (Fletcher, 2016), retroduction connected the theories developed to the concrete contexts and specific cases.

4.6 Reflections on methods

For critical realists, being transparent and providing reflections to readers are considered as key to an ethical, rigorous qualitative research (Bishop and Shepherd, 2011; Finlay, 2003). Based upon this, I reflect on three issues that are prominent for the interpretation of the final research outcomes.

The first issue is related to ethics. The key principles of ethical concern in qualitative research are informing participants and avoiding any potential harm to them (Soltis, 1989). In this concrete research, I have tried to be as open as possible to my interview partners. I have informed the participants about my research purpose, methods and use of the data when contacting them. For each interview, my interviewee gave me either verbal or written permission to conduct the interview. I have also asked permission to record the interviews and informed them that they always have the right to refuse or withdraw the interviews and delete the recorded conversations if they feel insecure. I have also anonymized all respondents by grouping them into several broader categories and mentioning only their number in certain categories when citing. I sent the results to those I promised and asked for feedback, especially regarding the anonymity of their information.

The second topic relates to the power-asymmetry between me, as a doctoral student, and my interview partners, most of whom are company executives or governmental officials. In order to successfully interview such people, getting direct access to them without the intervention of the PR department, and building trust and mutual appreciation from both sides are key. In accessing such key persons, I relied strongly on the internet. In the case of Shanghai, I used *Zhihu*, the Chinese version of Quora, to find the most knowledgeable and qualified interviewees, based on their ability to answer questions on the gaming industry. I wrote private emails to those active clients who are based in Shanghai, and luckily most of them have accepted my invitation for an interview. After getting the key contacts in Shanghai, the snowball-like referencing took place automatically. As a result of that, I was able to conduct 42 high-quality interviews (10 expert interviews) with people who had very

good knowledge about the topic I was interested in. In the case of Hamburg, a German student assistant helped me in contacting key companies and persons in the city. First we received a list of companies from Gamecity Hamburg, the local game industry network, and then we tried to find the personal contact information of the founders, CEOs and senior executives of these companies in Linkedin, company websites, etc., and we contacted them directly. In the end, I managed to conduct 21 interviews in Hamburg.

In building trust and mutual appreciation between interviewer and interviewee, I stressed in the letters/emails that this research is serious one conducted in the framework of my doctoral study, and supported by both Chinese and German states (i.e. CSC and DAAD, respectively). Moreover, I also tried to increase my knowledge about the industry by reading academic publications, media news, and industry reports and so on. I familiarized myself with the terminologies used in the industry, and read the latest news of the sector in both regions, so that I could ask interesting and deeper questions that were not covered by media news or reports. Because of the efforts made, participants were in general very enthusiastic in sharing their knowledge and opinions with me.

The third issue that needs to be reflect upon is about my cultural background. As a native Chinese, I had no cultural conflicts in the Shanghai case. I understand the language, the way people think and speak. In the case of Hamburg, I suffered a little at the beginning because of cultural differences. However, it was also because of such differences between Chinese and German culture with regard to making appointment (spontaneous vs. well-planned in advance), contacting people (guanxi vs. formal and informal contacts), dress code (causal vs. formal), etc., that have made the research and comparison more interesting for me. I tried to compensate for my non-native German background by learning the language, following news, exchanging with (and asking for assistance from) my German colleagues, and talking to the locals about my research. The increasingly intelligent translation software and websites also helped me a lot with the Hamburg case study. Overall, such a comparative study and a four-year life in Germany somehow "Germanized" me in certain way and made me understand German culture much better than before. This is definitely very important for me and enabled me to interpret my research outcomes more precisely.

Part2

Paper 1. Exploring the clustering of creative industries

Published in *European Planning Studies*

Exploring the clustering of creative industries

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Abstract:

During the last decades, a large body of literature has been published on the clustering of creative industries, but it has not been reviewed in a systematic way. In this review paper we fill this gap. The review leads to the identification of several deficiencies of current research. Based on that, we distill avenues for future research on the drivers of the clustering of creative industries. In particular, we develop a comprehensive framework for analyzing the clustering of creative industries in future empirical research.

Keywords: creative industries, creative industry clusters, agglomeration economies, spin-off formation, institutional environment

1 Introduction

During the last decades we have seen an increasing importance of creative industries (CIs) in large parts of the world both concerning employment and revenues (Jones et al. 2015; EY, 2015). Moreover, creative industry policy as a policy field has been surging. It can be traced back to the establishment of the British New Department of Cultural, Media, and Sport (DCMS) in the late 1990s. Later on creative industry policies were also emerging in Continental European, North American and Asian countries. CIs also gained the attention of international organizations (e.g., UNCTAD, World Bank, and UNESCO), due to its potential role in contributing to a more balanced and even development of the world economy (Flew

& Cunning, 2010). Research-wise Lazzeretti et al. (2016) have recently shown a strong increase in the number of publications on CIs (see also Jones et al. 2015).

In economic geography, a large body of research has explored the clustering of creative industries (CIs), such as computer and video games, design, fashion, film and video, music, publishing, software, and television and radio (Hracs, 2015; De Vaan et al., 2013; Foster et al., 2015). In this literature, CIs have been defined in various ways (e.g., Caves, 2000; Potts et al., 2008; Boggs, 2009; Lange et al., 2011). In order to show the breadth of the discussion on definitions, Gibson and Kong (2005) generated four approaches of defining creative or cultural industries in the literature, namely the sectoral, the labor market, the creative index and the convergence of formats approach (such as media or digital platforms). Each of these approaches stresses certain characteristics of the industries, but each of them has thorny issues concerning the distinction between CIs and other industries. The latter issue is not static in nature but is in a constant state of flux (see for instance the increasing role of symbolic value and creativity in manufacturing industries). Some scholars contrast cultural industries with creative industries by claiming that '…the former was organized around the culturation of the economy and the second around the economization of culture' (O'Connor, 2015, p.374), while others see no difference between these two notions, or use them interchangeably (e.g., He, 2015) We leave it to others to discuss the definition issue and the distinction between creative industries and other industries. As pointed out by Gibson and Kong (2005, p. 546) "there are myriad conceptions in the literature, and the productive task ahead is not to sink into endless efforts at defining cultural economies, but acknowledge the polyvalency and address specific research agendas from there" (Gibson & Kong 2005, p. 546). The latter is what we aim for in this paper.

Creative industry clusters have long attracted the attention of economic geographers (e.g., Lorenzen & Frederiksen, 2008; Wenting, 2008a; Heebels & Boschma, 2011; De Vaan et al., 2013). Reviewing this large body of literature, at least three complementary drivers of the clustering of CIs can be identified: agglomeration economies (e.g. Florida, 2002; Lorenzen & Frederiksen, 2008;), spin-off formations (e.g. Liu, 2007; Cang & Wang, 2008; Gao et al., 2010; Wenting, 2008a; Heebels & Boschma, 2011; De Vaan et al., 2013), and the institutional environment (e.g. Chu, 2009; Turok, 2003; Foord, 2009; Darchen, 2016) (Figure 1).

Although some recent concepts in economic geography, such as cyclical clusters and trans-locality, potentially provide interesting insights into spatial patterns of CIs, what we are interested in this paper are the drivers of such spatial patterns. Moreover, one could find many additional perspectives in researching the characteristics of CIs in disciplines such as organizational or management studies (mainly stress new knowledge creation processes at micro level, project-based production, creative team/project management, etc), and even within the sub-disciplines of human geography such as cultural and social geographies (mainly focus on issues such as gender, social-cultural impacts of CIs, etc). What we want to find out in this paper, however, is what economic geographers, who 1) basically have a geographical perspective in their research, and 2) stress the economic impacts of CIs, see as significant to the development of creative industry clusters in space.

Actually, generic reviews on the literature of CIs are not lacking; scholars such as Flew and Cunningham(2010), and O'Connor(2010), have already given overviews of the industries in general. These reviews, however, pay little attention to the spatial patterns of CIs. While Berg and Hassink's (2014) work has a geographical perspective, they narrowly focus on the notions deriving from evolutionary economic geography. Recently, Branzanti (2015) systematically analyzed the extensive literature on the spatial concentration of CIs from a district economy's perspective (i.e. localization externalities). However, localization externalities are just one of the many factors contributing to the clustering of CIs.

Instead of focusing on one paradigm of economic geography, or a single driver that contributes to the spatial patterns of CIs, this paper intends to position the research on the drivers of the clustering of CIs within the different paradigms of economic geography (Hassink et al., 2014). The objective of this review is therefore twofold: First, to synthesize the theoretical and empirical insights that have been achieved in the literature on the clustering of CIs; and secondly, to reflect upon and identify some avenues that future empirical research can take on the drivers of the geographical patterns of CIs.

Considering the large number of research on CIs, it is necessary for us to briefly introduce our selection of literature. Our main concern is the clustering of CIs, and the drivers that contribute to the spatial clustering of certain CIs. Therefore, papers that have dealt with this issue are selected and analyzed. Of course, some papers have touched upon more than one driver, or two aspects of a driver (e.g., the work by Martin-Brelot et al., 2008; Chapain and

De Propris, 2009; Lazziretti et al., 2008, 2012; Heebels and Boschma, 2011; De Vaan et al., 2013), but none of them have included all the three drivers we identify in this paper. As these studies provide much knowledge on the role of different drivers, we might refer to them several times in different parts of the paper in order to confirm that we do not miss some important insights.

The remainder of this paper is structured as follows. In the following Section 2 we shortly embed our paper into broader paradigmatic discourses in economic geography. A review of the theoretical explanations as well as empirical evidence on the spatial concentration of CIs is presented in sections 3-5, in which the roles of agglomeration economies, spin-off formation, and institutional environment for creative industry clusters are elaborated. Section 6 concludes and suggests insightful avenues for future research.

2 Embedding CIs studies in economic geography

Recently, a plethora of different paradigms, such as evolutionary economic geography, institutional economic geography, and relational economic geography, have been developed in economic geography analysing and explaining geographical industrial patterns (Hassink et al., 2014). In our view, they provide relevant theoretical notions, such as routines, path dependence, power geometry etc. for analysing and explaining the geographies of CIs.

Evolutionary economic geography is currently the most influential paradigm in economic geography. It aims at explaining the emergence and changes in economic landscapes by the underlying industrial dynamics of firms at the micro-level, and of sectors and regions at the meso-level (Boschma & Frenken, 2006). The emergence and rapid theoretical development of evolutionary economic geography has introduced new notions to the spatial dynamics of CIs such as path dependence, lock-ins, related variety, spin-off formation or routine replication (Berg & Hassink, 2014).

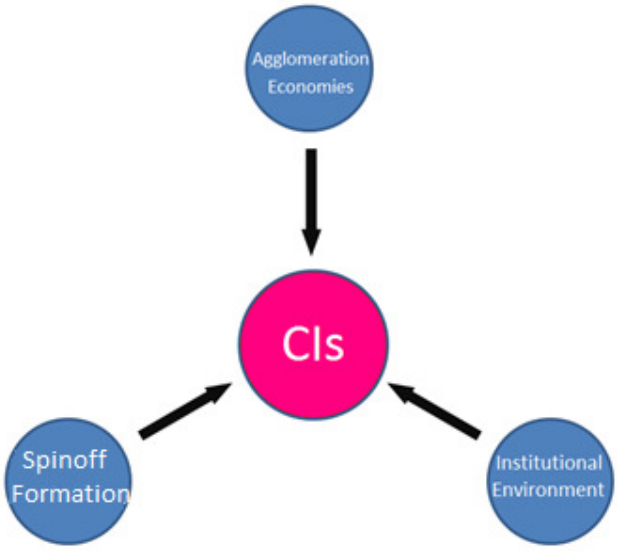
The somewhat older paradigm of institutional economic geography focuses more on formal and informal institutions at several spatial scales (Martin, 2000). Moreover, Gertler (2010) highlighted a stronger emphasis on geographical variation, namely through a better understanding of how formal and informal institutions at different scales interact to produce a specific outcome. Enlightened by this paradigm, some scholars started to combine the

research on geographies of CIs with institutional factors (e.g. Coe, 2000; Turok, 2003; Bathelt, 2004; Chapain & Comunian, 2010), and increasing attention has been paid to the importance of different spatial levels of institutions for spatial patterns of CIs.

Relational economic geography "focuses on a relational understanding of economic action which is analysed in spatial perspective" (Bathelt & Glückler, 2011, p. 6). To explain the success of firms and regions, it puts emphasis on actors' networks and interrelations, power, social agency, socio-cultural embeddedness of actors in multiple networks, and the interrelatedness between scales at individual level, rather than on firm-centred organisational routines. The idea of emphasizing the co-relations of different actors in this paradigm has influenced the CIs literature, as it increasingly focuses on the role of networks, socio-cultural embeddedness of actors, as well as the interrelations at various scales (e.g., Drake, 2003; Bathelt & Graf, 2008).

These three paradigms and their related theoretical notions are useful to position the three drivers of the geographies of CIs in the theoretical and empirical literature (Figure 1). Some might argue that spin-off formations can be seen as part of the institutional environment, because incumbent firms can actually be regarded as part of the institutional environment. But for us, these two drivers are quite different because they are related to different paradigms in economic geography. These drivers will be presented in detail in the following sections.

Figure 1. Main drivers of the clustering of CIs.



3 Agglomeration economies and creative industry clusters

CIs, and other industries, for that matter, are not evenly distributed across space but are spatially concentrated (Scott, 2005). The spatial concentration of CIs has attracted great research interest (e.g. Caves, 2000; De Vaan et al., 2013; Berg & Hassink, 2014). CIs are affected by agglomeration economies (see Table 1), a concept critically discussed in more general terms by, among others, Beaudry and Schiffauerova (2009). Agglomeration economies basically act as centripetal forces, fostering the incubation and attraction of CIs in places with specific characteristics (localization economies, Section 3.1), or in large cities and metropolises (urban economies, Section 3.2) (Lorenzen & Frederiksen, 2008; Chapain & De Propris, 2009).

Table 1. Insights into the role of agglomeration economies in the clustering of CIs.

Drivers	**Elements**	**Authors**	**Main ideas**
Agglomeration economies	Localization economies	Storper (1995);O'Connor (2004); Scott (2006a,2006b); Martin-Brelot et al. (2008); Lazzeretti et al. (2008); Lorenzen and Frederiksen (2008); Chapain and Comunian (2010); Chapain and De Propris (2009); Branzanti (2015) ;	1) concentration of production in a particular location generates external benefits for co-located creative firms; 2) local access to specialized suppliers and buyers, a large and specialized labor pool and local knowledge spillovers are the benefits that creative firms can enjoy

Urbanization economies	Glaeser et al. (2001); Florida (2002, 2005); Yusuf and Nabeshima (2005); Martin-Brelot et al. (2008); De Propris et al. (2009); Boix et al. (2015); Mateos-Garcia and Bakhshi (2016); Chapain and De Propris (2009); Wenting et al. (2011); Comunian et al. (2010); Landry (2012); Lazzeretti et al. (2012);	1) CIs tend to concentrate in cities; 2) large cities or metropolises show much attractiveness to creative individuals, since they provide urban amenities that other places cannot provide 3) the "quality-of-place", instead of the "access-to-place", has become the pivot point for the attraction of the creative class

3.1 Localization economies and clustering of CIs

Primarily based on the spatial agglomeration of manufacturing sectors, the localization economies have been applied to the study of creative industry clusters recently as well. The central idea of these studies is that the concentration of production from the same industry in a particular location generates external benefits for creative firms located in the specific location. Building on the conceptualization of the main drivers of district economies — i.e. reduction of production and transaction costs, increased efficiency of factors of production, and increased dynamic efficiency, Branzanti (2015) provides a systematic literature review on the role of localization economies in creative industry clusters. According to her, the notion 'reduction of production costs' is scarcely supported by the existing literature on creative industry clusters. However, other notions such as the reduction of transaction costs, the increased efficiency of factors of production, the increased dynamic efficiency are

vital factors contributing to the clustering of CIs. Closely related to localization externalities is the notion of 'untraded interdependencies' introduced by Storper (1995). Regions that constitute a "nexus of untraded interdependencies" can enjoy place-specific conventions, rules, norms, and practices which support the knowledge-seeking aspects of CIs. In a similar vein O'Connor (2004) argued that creative industry clusters succeed because of the development of tacit knowledge, opposed to codified knowledge. Scott (2006a, 2006b) attributed the exceptional pattern of clustering in CIs to the disproportionate advantages that creative firms experience from co-location, transforming the cluster into a "creative field". Similar in meaning, Lazzeretti et al. (2008) termed those specific places where CIs tend to cluster as "Creative Local Production Systems", which are socio-territorial entities, characterized by specific features that nourish and facilitate the concentration of CIs.

3.2 Urbanization economies and creative industry clusters in cities

CIs tend to concentrate mainly in and around large cities (Florida, 2002; De Propris et al., 2009; Boix et al., 2015; Lazzeretti et al., 2012; Mateos-Garcia & Bakhshi, 2016). An alternative explanation of spatial clustering of CIs is based on Florida (2002)'s work which argues that spatial clustering of CIs and other industries requiring creativity is primarily the result of urban amenities as well as the location decision of the creative class. Although critiques on the fuzziness of the creative class concept and indicators, the contextlessness of creative class research, as well as the ambiguity of the relation between creativity and cities have never stopped since the concept was proposed (for an overview of these critiques see Asheim & Hansen, 2009), in our view, his work provides interesting insights into the studying of creative industry clusters in cities. Studies of such urbanization economies indicate that large cities show much more attractiveness to creative individuals as they provide urban amenities (or in Landry's (2012, 133) term, 'hard' and 'soft' infrastructure) that other places cannot provide (Florida, 2002; Lorenzen & Frederiksen, 2008; Landry, 2012). In this regard, the "quality-of-place", instead of the "access-to-place", has become the pivot point of competitive advantage in cities (Florida, 2005). Landry (2012, p.133) sees a place—be it "…a cluster of building, a part of a city, a city as a whole or a region"—as a "creative milieu" as long as it contains the necessary predictions to generate a flow of ideas and inventions. Such creative milieus are usually located in cities, and they are the physical settings where "… a

critical mass of entrepreneurs, intellectuals, social activisits, artists, administrators, power brokers or students can operate in an open-minded, cosmopolitan context and where face to face interaction creates new ideas, artefacts, products, services, and institutions …" (Landry 2012, 133).Examples of urbanization externalities include the presence of various services and consumer goods, an aesthetic and physical setting, good public service and a high efficiency of city life (Glaeser et al., 2001); a nexus of buildings and institutions, systems of associate structures and social networks, connections and human interactions (Landry, 2012);tolerance, talent, and technologies (Florida, 2002, 2005); and ICT, high-quality housing and recreational amenities (Yusuf & Nabeshima, 2005), just to name a few. As consumption is an important part of city life, the future of cities increasingly depends on their attractiveness for consumers (Glaeser et al., 2001). Yusuf and Nabeshima (2005) confirmed this idea by manifesting that one of the advantages that cities might have for creative firms is the large size of markets. Based on a broader perspective, Comunian et al. (2010) even regarded markets as one of the drivers of the location patterns of CIs.

Urbanization economies do not only explain why specific CIs spatially cluster, but also why they typically cluster in large cities (Wenting et al., 2011). However, these studies mainly focus on the attraction of creative individuals (or the creative class in the labor force) in cities (Florida, 2002, 2005; Chapain & De Propris, 2009), which is only part of the successful story of creative industry clusters. To give a full picture of the success of CIs in cities, scholars need to pay more attention to other factors besides creative class. Furthermore, while the dominance of case studies on CIs in metropolitan areas provide much knowledge on the geographies of CIs in urban areas, the clustering of CIs in remote areas has only recently started to attract the attention of scholars (for instance, see Gibson and Connell (2004), and Harvey et al. (2012)).

Although astrict distinction between urbanization and localization economies is difficult and it is not always easy to operationalize these concepts in empirical research (see Beaudry & Schiffauerova, 2009), studies on agglomeration economies still provide insightful knowledge on the clustering of CIs, particularly concerning the agglomeration of small and medium-sized firms, freelance workers and grassroots start-ups in CIs (Vinodrai, 2015). These firms strongly benefit from co-locating in certain regions for several reasons, such as uncertain and unpredicatable demand for their creative products (Caves 2000).

In addition to the benefits provided by agglomeration economies, CIs also cluster thanks to the mechanisms of spin-off formation (e.g. Liu, 2007; Wu, 2005; Aoyama & Izushi, 2004; Wenting, 2008a; Heebels & Boschma, 2011) and institutional support (e.g. Turok, 2003; Foord, 2009; Wenting & Frenken, 2011; Darchen, 2016). In the next two sections, the roles of these two drivers will be elaborated.

4 Spin-off activities and the spatial concentration of CIs

Any phenomenon can be qualified as a "spin-off" as long as it simultaneously fulfils three conditions": 1) it takes place with an existing organization, generally known as the "parent organization"; 2) it involves one or several individuals, whatever their status and function within the "parent organization"; 3) these individuals leave the "parent organization" to create a new one (Pirnay & Surlemont, 2003, p. 356). Dahlstrand (1997) subdivided spin-offs into university spin-offs and corporate spin-offs. The next subsections illustrate the formation of both kinds of spin-offs and their role in creative industry cluster formation (Table 2), although we realize that creative industry clusters also consist of grassrooted small businesses which have neither connections to universities nor to incumbent corporations.

Table 2. Research on the role of spin-off activities for the clustering of CIs.

Drivers	**Elements**	**Authors**	**Main ideas**
Spin-off activities	University spin-offs	Liu (2007); Cang and Wang (2008); Chen and Li (2009); Wu (2005); and Gao et al. (2010); Rantisi and Leslie (2015)	1) Establishing spin-off companies is one of the most common approaches that universities commercialize their research; 2) University spin-offs usually tend to locate on or near to the university campuses to various benefits that are provided by universities

Corporate spin-offs	Wenting (2008a); Heebels and Boschma (2011); De Vaan et al. (2013);	1) Corporate spin-offs tend to agglomerate with their parent firms to learn from their routines, thus forming creative industry clusters 2) there is no need for agglomeration economies to make cluster happen

4.1 University spin-off formation and creative industry clusters

Recently we observed an increasing number of studies on the role of universities in cultural/artistic clusters. Based on different types of university artistic spin-offs, these studies shed some lights on how universities influence the spatial patterns of specific CIs in certain areas.

Liu (2007), for example, adopted Florida's 3T theory in analyzing the role of universities in university spin-off clusters. According to him, a university is important for this kind of creative industry clusters in three ways: first of all, it provides the state-of-art technologies and knowledge to spin-offs in the cluster; secondly, it attracts creative class (mainly teachers and students), such that the cluster can benefit from a pool of talented workers; thirdly, such university shows most of its tolerance for all kinds of people, different ways of lifestyles, etc. Based on an architecture design cluster around Tongji University in Shanghai, Cang and Wang (2008), Chen and Li (2009), Gao et al. (2010) highlighted the role of Tongji University in promoting the development of this creative industry cluster. According to these studies, 80 percent of the practitioners in this cluster are teachers, students and alumni of Tongji University. Thanks to their extensive social and international cooperation networks people in the cluster can easily get to know the most advanced theory, concepts, and the most popular design in the world. Due to various support from the university, Tongji design cluster remains to be the most successful university spin-off creative industry clusters in China. Rantisi and Leslie (2015) examined the role that École nationale de cirque (National Circus School) plays in the development of the local circus arts cluster and the circus arts conventions in Montreal, Canada. By providing training and skill development and by forging important networks, the school fosters 'know-how', 'know-who' and 'know-what'.

Wu's (2005) study on New York's fashion cluster manifested that art schools in the city serve not only as a venue for design training, but also as a conduit for establishing social networks. There are strong school-industry links, through internships or by having industry leaders serve as visiting instructors or critics.

4.2 Corporate spin-offs and the agglomeration of creative firms

In addition to the university spin-offs, another category of spin-off firms—corporate spin-offs— which can easily inherit successful routines from their parents firms, also attracted the attention of researchers recently. By exploring the spatial formation of the global fashion design industry, Wenting (2008a) found that corporate spin-offs which inherit parent success tend to outperform other firms without any experience in the industry. Based on a genealogical perspective, he concluded that the local replication of routines through spin-offs caused the clustering of fashion design in a few cities around the world.

Enlightened by Klepper (2006, 2010)'s work on the relative importance of spin-off dynamics and agglomeration economies in the clustering of manufacturing industries, recently some research also tried to find out that the relative significance of these two drivers for the formation of creative industry clusters. For instance De Vaan et al.'s (2013) research on the global video game industry demonstrated that corporate spin-offs, with pre-entry experience, can overcome entry barriers that rise over time. Apart from the importance of spin-off process, localization externalities were still very vital factors contributing to the clustering of video game industry. Heebels and Boschma (2011) found that the agglomeration economies did not increase the survival of Amsterdam's book publishing firms in general, but spin-off firms with prior experience in publishing did perform better and had higher survival rates. Industrial specificity, therefore, turns out to be a very crucial element for the different spin-off processes in CIs. We will elaborate upon this in Section 6.

The spin-off formation explanation, which emphasizes the importance of knowledge transfer between parent organizations (either universities or companies) and creative spin-off firms, provides new insights for the geographies of CIs. However, spin-off formation alone cannot fully explain the clustering of CIs. Other factors such as formal and informal

institutions should also be taken into account in order to give a full picture of the drivers that determine the clustering of CIs.

5 Institutional environments and spatial pattern of CIs

Enlightened by the "institutional turn" in economic geography in the 1990s (Martin, 2000), some scholars started to pay attention to the importance of institutions at different scales for the spatial distribution of CIs (see Table 3). Institutions are crucial to the formation and development of creative industry clusters, because they help firms to solve complex coordination problems with other economic actors in the market. At all scales, from the national to the regional and local levels, institutions are very important determinants of the spatial patterns of CIs.

Table 3. Institutional environments and their roles in the clustering of CIs.

Drivers	**Elements**	**Authors**	**Main ideas**
Institutional contexts	Formal institutions	Turok (2003); Bathelt (2004); Yusuf and Nabeshima (2005); Chu (2009); Foord (2009); Lingo and O'Mahony (2010); Manning (2010); Foster et al., (2011); Harvey et al. (2012); and Clifton et al. (2013); Jakob and van Heur (2015); Foster et al (2015); Hracs (2015); Rantisi and Leislie (2015)	1) creative industry clusters require private and public institutions to function properly 2) the institutional framework at various scales (transnational, national, and local) affects the spatial patterns of certain CIs

	Informal institutions	Florida (2002, 2005); Wenting and Frenken (2011); Landry (2012); Brinks, 2016; Darchen (2016)	1) norms and values shared by communities are vital for the formation of creative industry clusters; 2) with the development of ICT, the sharing of norms and values tend to be more decentralized.

5.1 Formal institutions and the spatial distribution of CIs

As Scott (2000) noted, the survival and growth of creative industry clusters often relies upon a mixture of institutional support, public and private partnerships and training organizations. Harvey et al. (2012)'s research on the small rural based creative cluster — Krowji, West Cornwall, UK, manifested that the cluster is very responsive, and even vulnerable to policy formulation and funding decisions because most of its funding comes from public sources. In addition to that, many public agencies also contributed greatly to the emergence and the development of a creative cluster where practitioners from different creative sectors agglomerate in a rural area. Turok's (2003) study on the film and television industries in Scotland found out that national and transnational organizations and governmental regulation are important in influencing the scale and durability of the selected industries.

Besides the transnational and national scales of institutions, regional and local intermediaries also provide a dense network of institutional support (such as special training programs, institutions of higher education, incubator organizations, etc) to CIs. A recent Special Issue in Regional Studies (Jakob and van Heur, 2015) gave full consideration to the role of various kinds of intermediaries in the clustering of CIs. It showed that creative intermediaries, be they higher education institutes (Rantisi and Leslie, 2015), freelance managers (Hracs, 2015), professional associations (Vinodrai, 2015), or creativity supporting offices (Foster et al., 2015), are significant for cluster development in CIs. They are not merely passive conduits for creative artefacts, but active agents who shape the production and consumption of creative goods. Intermediaries, defined as brokers who connect and

coordinate others (Lingo and O'Mahoney, 2010)—are very important institutional forces that contribute to the clustering of CIs in certain places. They facilitate creative projects formation and governance (Lingo and O'Mahony, 2010; Foster et al., 2011), coordinate emerging professional networks (Manning, 2010), and foster the clustering of creative class or creative production in certain regions (Hracs, 2015).

Moreover, Bathelt (2004)'s study on Leipzig's new media cluster in Germany demonstrated the importance of political decisions, namely in this case to locate the MDR (Mitteldeutscher Rundfunk - Central German Broadcasting) head office and production facilities to Leipzig. Parallel to this development, local policy initiatives were also designed to provide start-up consulting, refine training programs and create new incubator facilities for entrepreneurial activities. However, one should also note that the role of such formal institutions vary at different stages of creative industry cluster development (Foord 2009; Chu 2009).

5.2 Informal institutions and spatial patterns of CIs

Recently, some scholars try to find informal institutional explanations for the decline of certain CIs clusters. For example, Wenting and Frenken (2011) attributed the decline of Paris as a center for fashion design in the post-war period to the "institutional lock-in", which prevented a ready-to-wear cluster to emerge despite the presence of the haute couture cluster. Among all institutional constraints, particularly informal institutions played an unignorable role in Paris's lock-in to the haute couture production. Instead of welcoming the "commercialization" and "popularization" of fashion design, Parisian designers stuck to the opinion that fashion should be artistic, exclusive and tailor-made. Therefore, many designers in Paris felt reluctant to react to the growing demand for ready-to-wear fashion, resulting in the declining position of Paris as a center of the global fashion design.

In line with this, previous studies have also proved that informal institutions play a very important role in the development of many creative industry clusters. Landry (2012, 134) highlights the role of a set of networks in the forming process of a creative milieu. According to him, flexible organizations working with "…a high degree of trust, self-responsibility and strong, often unwritten, principles" are always required for a creative milieu to come into being. These include a willingness to share and to contribute to the success of the network for the greater good. Trust, and norms and values shared by community members are the

central feature of the way a successful creative milieu operates. Florida (2002, 2005)'s work on the creative class in cities also stresses that those creative professions prefer to work in places where their ways of living, tastes and values are acknowledged and shared by their peers. Thanks to the favorable informal institutional climates in certain places, many creative people are attracted to these locations, and thus form the centers for creative production.

While most of the prior research assumes that CIs are spatially concentrated, the development of ICT makes the sharing of norms and values more decentralized. This has been particularly shown in studies on so-called "communities of practices" , "communities of interests" and "networked communities", which have become increasingly popular (e.g., Brinks, 2016; Darchen, 2016).

6 Research deficiencies and avenues for future empirical research

This paper examined the extensive literature on the geographies of CIs which is embedded in the broader domain of economic geography. By embedding the research on the geographical patterns of CIs in current paradigmatic discourses of economic geography, we found that these paradigms introduce new perspectives, concepts, contents, as well as modes for the study of the spatial patterns of CIs: evolutionary economic geography introduces notions such as routine replication, spin-off formation, and lock-ins for the explanation of the location patterns of different CIs; institutional economic geography highlights the role of formal and informal institutions in the spatial distributions of CIs; relational economic geography could be potentially linked to the role of informal institutions highlighting the actor networks, or their interrelations at various scales. Looking at the research on the geographies of CIs as a whole, while this string of literature provides much knowledge on the drivers contributing to the spatial patterns of different CIs, there are still some deficiencies that need to be carefully dealt with in the future.

First of all, while broad in perspective, prior studies are mainly based on different sectors (for example, video games, fashion design, advertising, publishing, etc). As CIs differ in terms of their inputs and outputs, production and consumption, (for example, fashion design and films differ throughout the way they are produced, marketed, sold, and consumed), it

remains not clear enough whether findings from one industry can be generalized directly to other CIs (Champion, 2013). Although one might argue that many scholars implicitly know that there are differences between CIs and take them for granted, there is not much research that explicitly compares and shows differences and similarities. Another shortcoming concerning the research on the spatial patterns of CIs is that the clustering of public and not-for-profit CIs has received little attention. The replacement of the cultural industries agenda with creative industries initiatives by policy-makers has shown the governments' concern on the economization, or the 'business development' (O'Connor, 2015) of creative activities. The increasing emphasis on economically favorable CIs at the expense of some of its earlier claims to the development of not-for-profit CIs has been problematized by some scholars (for example, O'Connor (2015)). More work, therefore, needs to be done in order to shed some lights on the spatial patterns of the not-for-profit and subsided CIs. In addition to that, knowledge on the spatiality of CIs in peripheral/ rural areas is scarce (for exceptions, see Harvey et al., 2012; Gibson, 2014).

Secondly, prior studies focusing on one specific perspective usually tend to overemphasize one driver while overlooking the importance of other drivers (for example, Florida (2002) mainly focused on the role of urbanization economies while Wenting (2008a) mainly highlighted spin-off process of CIs). Even though there is some work trying to combine two or more different approaches (e.g. De Vaan et al., 2013; Heebels & Boschma, 2011; Lazzeretti et al., 2008, 2012), these studies have just dealt with two or more drivers in an additive way—that is—listing several drivers, and exploring the role of different drivers individually without looking at the interconnections between drivers. In our view, it is particularly the latter that can lead to an improved understanding of the clustering of creative industries that goes beyond the classical cluster approach.

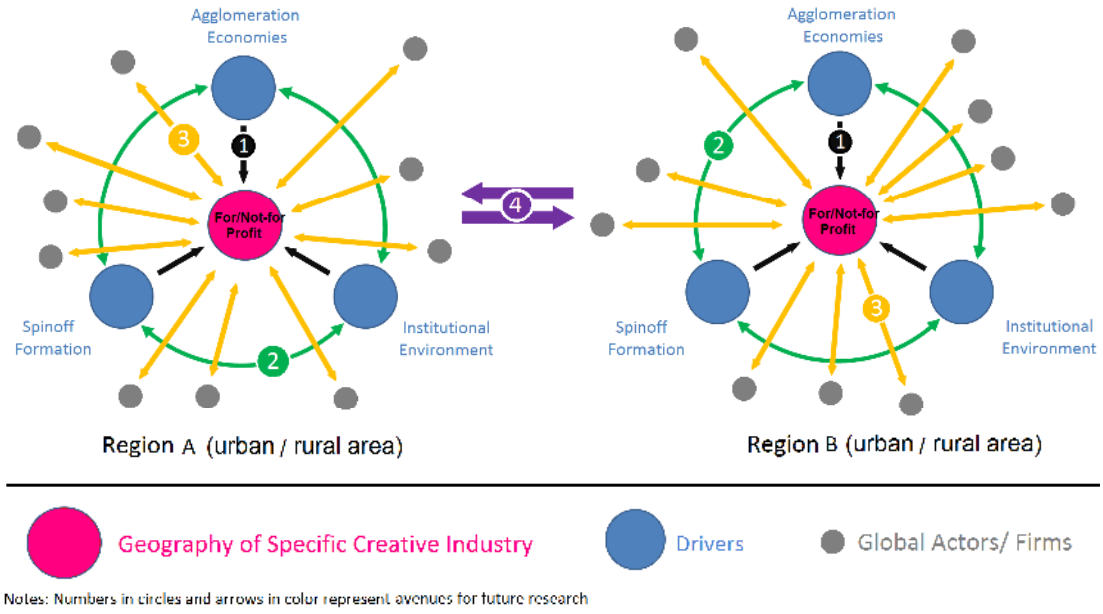
Thirdly, the majority of the reviewed literature on CIs is empirically conducted in localized centers of production, which "runs the risk of over-privileging the importance of local institutional and organizational network relations" (Johns, 2006, p. 152). As globalization is changing the way how products are produced in space, we expect that the global partners are playing an increasing role in the spatial patterns of CIs.

Finally, while places vary in terms of local conditions, entrepreneurship, institutions, external networks, etc., it is quite surprising that only a few comparative studies have been

conducted so far (e.g., Lazaretti et al., 2008; Lange & Streit, 2013). Some might argue that the latter is due to the context and place specificity of CIs. However, in our view, a well-designed comparison of the same creative industry in different locations, or different sectors in the same location will be both interesting and fruitful.

In order to explain the clustering of CIs, we need to go beyond the relatively simple drivers identified in the literature (as illustrated in Figure 1). On the basis of the deficiencies identified in the literature on CIs clusters, as well as experience of studying manufacturing industry clusters, a comprehensive framework to study the geographies of CIs is suggested in Figure 2. Arrows in color with different numbers indicate our suggestions for doing research on the clustering of CIs.

Figure 2. Comprehensive framework for analyzing the clusteringof CIs.



First of all, industry specificity should be highlighted, and more empirical work is needed to explore the spatial distribution of each specific creative industry. To examine what roles agglomeration economies, spin-off formation, and institutional conditions play in the spatial distribution of different CIs, CIs should be distinguished from one another. Comparisons between different CIs are encouraged as these will contribute to the understanding of how industrial specificity affects the geographical patterns of CIs. Moreover, given that public CIs are an indispensable part of CIs, and they also play a role in developing markets for creative

products, factors contributing to the geographies of these not-for-profit CIs should be explored as well.

Of course, in some cases, creative industry clusters connect to more than one sector, particularly in large cities (for example, 'creative hubs' in London). In these cases the spatial patterns of some creative sectors might be difficult to separate. But at least, we should scrutinize the location preferences of these different CIs in the analyses of the formation of such creative hubs.

Secondly, more explorations on the interconnection between the different drivers should be highlighted. Research on manufacturing industries has shown the potential influence these interconnections might have on each driver's performance in determining the spatial patterns of CIs:

a) Agglomeration economies and the local institutional environment potentially have great impact on each other at the initial stage of cluster development in manufacturing industries. As soon as a new industry reaches a critical mass and enjoys agglomeration economies somewhere, self-reinforcing mechanisms might come into being, and the local environment (of which local institutions are a vital part) can become a supportive one. On the other way around, specific policies, laws, regulations, rules, as well as informal conventions, norms, and values also affect agglomeration economies. This general interconnection between agglomeration economies and local institutional environment might well apply to CIs, since these two drivers also play an important role in explaining the clustering of CIs

b) Agglomeration economies and spin-off formation potentially affect each other's performance through the way in which firms interact with the local environment. With regard to many manufacturing industries, Klepper (2006) claimed that due to the successful routine replication of spin-off firms, theoretically we can expect spatial clustering of manufacturing despite the absence of agglomeration economies. However, he also admits that in practice, agglomeration economies still play a very important role in the entry and survival of spin-offs in clusters (Klepper, 2006; Boschma, 2015). Successful spin-offs improve the local environment through their interactions with other firms in the cluster. As most of the spin-offs tend to co-locate with their parent organizations, local buzz, infrastructure, networks between different actors become more favorable, thus contribute to the

improvement of the local conditions. Potentially, these interconnections between agglomeration economies and spin-off activities also suit well to CIs (Wenting, 2008b).

c) Spin-off formation and the institutional environment might also affect each other's performance in clusters. Generally, local institutions are very helpful for the spin-off activities in manufacturing sectors (Klepper, 2010). However, too much institutional thickness might, on the contrary, lead to a "political lock-in" (Hassink, 2010), thus preventing successful routine replications. Spin-off formation, on the other way around, is also important for the development of the institutional environment. As successful spin-off firms usually tend to attract the attention of policy-makers as well as citizens, the establishment of both formal and informal institutions favorable to spin-off mechanism might be encouraged. In a similar vein like the study by Wenting and Frenken (2011) on the fashion industry in Paris, we see potential in doing research on the interrelations between spin-off formation and the institutional environment in the CIs.

Thirdly, to avoid the problem of overemphasizing local conditions, more research in the future should focus on the external partners of creative firms in specific locations. Studies exploring the production of cultural and creative products and services through the lens of global production network (GPN) (see, e.g., Coe & Johns, 2004; Johns, 2006; Lim, 2006; Bathelt & Graf, 2008; Coe, 2015) provide us new insights on how external linkages of firms as well as the distribution of the GPN of CIs affect the production of creativity globally. Given that global labor divisions as well as the positions of different regions in the GPN indeed influence the spatial distribution of certain CIs (particularly technology-based CIs such as video games, animation, cartoon, film, etc), we need a much broader spatial perspective than local agglomerations of CIs. Therefore, the third avenue for future empirical research calls for more work on the interactions and connections between local conditions and external global firms. Although data on a global level is a big challenge in carrying out such research, at least more attention should be paid to actors outside the creative industry clusters.

Last but not least, in order to explore the local varieties, more comparative studies between different locations (both in urban/ central and rural/peripheral areas) on the same CI should be carried out. In the case of CIs, the main purpose of studying spatial patterns is not merely to explore what drives the clustering of CIs, but also how such patterns differ from place to

place. Therefore, more comparisons are needed between different locations for the same creative industry for a better understanding of the commonalities and differences of the specific creative industry in different contexts. Moreover, international comparative research might also point at the interesting intersection between culture and economy in research on the clustering of CIs (Gibson & Kong, 2005; Vinodrai, 2015).

Overall, based on an extensive review of the literature on the geographies of CIs, we identified several deficiencies from which we derived avenues for future empirical research. In particular, we developed a comprehensive framework that goes beyond the analysis of individual drivers of the geographies of CIs. Instead it stresses the industrial specificity, interconnections between different drivers, external linkages of creative firms, and comparisons between different locations.

Acknowledgements

We would like to thank Roberta Comunian, Fabian Faller, Harald Bathelt and anonymous reviewers for giving useful comments on earlier versions of this paper. The usual disclaimer applies.

References

Asheim, B., & Hansen, H. K. (2009). Knowledge bases, talents, and contexts: On the usefulness of the creative class approach in Sweden. Economic Geography, 85(4), 425-442. doi:10.1111/j.1944-8287.2009.01051.x

Bathelt, H. (2004). Toward a multidimensional conception of clusters: the case of the Leipzig media industry, Germany. In D. Power & A. J. Scott (Eds.), Cultural industries and the production of culture (pp. 147-168). London, New York: Routledge.

Bathelt, H., & Glückler, J. (2011). The Relational Economy: Geographies of Knowing and Learning. Oxford: Oxford University Press.

Bathelt, H., & Graf, A. (2008). Internal and external dynamics of the Munich film and TV industry cluster, and limitations to future growth. Environment and Planning A, 40(8), 1944-1965. doi:10.1068/a39391

Beaudry, C., & Schiffauerova, A. (2009). Who's right, Marshall or Jacobs? The localization versus urbanization debate. Research Policy, 38(2), 318-337. doi:10.1016/j.respol.2008.11.010

Berg, S.-H., & Hassink, R. (2014). Creative industries from an evolutionary perspective: A critical literature review. Geography Compass, 8(9), 653-664. doi:10.1111/gec3.12156

Boggs, J. (2009). Cultural Industries and the Creative Economy – Vague but Useful Concepts. Geography Compass, 3(4), 1483–1498. doi:10.1111/j.1749-8198.2009.00247.x

Boix, R., Hervás-Oliver, J. L., & Miguel-Molina, D. (2015). Micro-geographies of creative industries clusters in Europe: From hot spots to assemblages. Papers in Regional Science, 94(4), 753-772. doi:10.1111/pirs.12094

Boschma, R. (2015). Do spinoff dynamics or agglomeration externalities drive industry clustering? A reappraisal of Steven Klepper's work. Industrial and Corporate Change, 24(4), 859-873. doi:10.1093/icc/dtv024

Boschma, R., & Frenken, K. (2006). Why is economic geography not an evolutionary science? Towards an evolutionary economic geography. Journal of Economic Geography, 6(3), 273-302. doi:10.1093/jeg/lbi022

Branzanti, C. (2015). Creative clusters and district economies: Towards a taxonomy to interpret the phenomenon. European Planning Studies, 23(7), 1401-1418. doi:10.1080/09654313.2014.935930

Brinks, V. (2016). Situated affect and collective meaning: A community perspective on processes of value creation and commercialization in enthusiast-driven fields. Environment and Planning A (forthcoming). doi:10.1177/0308518X16633470

Cang, P., & Wang, S. (2008). Studies on mechanism of industrial clusters around university based on ground theory—a case study of the industrial clusters around Tongji University. Tongji University Journal Social Science Section, 19(2), 115-124 (in Chinese).

Caves, R. E. (2000). Creative industries: Contracts between art and commerce. Cambridge, Mass.: Harvard University Press.

Champion, K. (2013). Problematizing a Homogeneous Spatial Logic for the Creative Industries: The Case of the Digital Games Industry. In Changing the Rules of the Game (pp. 9-27). Palgrave Macmillan UK.

Chapain, C., & Comunian, R. (2010). Enabling and inhibiting the creative economy: The role of the local and regional dimensions in England. Regional Studies, 44(6), 717-734. doi:10.1080/00343400903107728

Chapain, C., & De Propris, L. (2009). Drivers and processes of creative industries in cities and regions. Creative Industries Journal, 2(1), 9-18. doi:10.1386/cij.2.1.9/1

Chen, S., & Li, J. (2009). External linkages and the development of knowledge-intensive service industrial clusters. Science & Technology Progress and Policy, 26(12), 62-65 (in Chinese).

Chu, J. (2009). A study on spatial difference of the creative industrial zones in Shanghai. Human Geography, 2, 23-28 (in Chinese).

doi:10.1080/00343404.2012.665991

Coe, N. M. (2000). The view from out West: embeddedness, inter-personal relations and the development of an indigenous film industry in Vancouver. Geoforum, 31(4), 391-407. doi:10.1016/S0016-7185(00)00005-1

Coe, N. M. (2015). Global Production Networks in the Creative Industries. In C. Jones, M., & J. Sapsed (Eds.), The Oxford Handbook of the Creative and Cultural Industries (pp. 486-501). Oxford: Oxford University Press.

Coe, N. M., & Johns, J. (2004). Beyond production clusters: towards a critical political economy of networks in the film and television industries. In D. Power & A. J. and Scott (Eds.), Cultural industries and the production of culture (pp. 188-204). London, New York: Routledge.

Comunian, R., Chapain, C., & Clifton, N. (2010). Location, location, location: exploring the complex relationship between creative industries and place. Creative Industries Journal, 3(1), 5-10. doi:10.1386/cij.3.1.5_2

Dahlstrand, Å. L. (1997). Growth and inventiveness in technology-based spin-off firms. Research Policy, 26(3), 331-344.

Darchen, S. (2016). “Clusters” or “communities”? Analysing the spatial agglomeration of video game companies in Australia. Urban Geography, 37(2), 202-222. doi:10.1016/S0048-7333(97)00016-4

De Propris, L., Chapain, C., Cooke, P., MacNeill, S., & Mateos-Garcia, J. (2009). The geography of creativity. London: Nesta.

De Vaan, M., Boschma, R., & Frenken, K. (2013). Clustering and firm performance in project-based industries: the case of the global video game industry, 1972–2007. Journal of Economic Geography, 13(6), 965-991. doi: 10.1093/jeg/lbs038

Drake, G. (2003). ‘This place gives me space’: Place and Creativity in the Creative Industries. Geoforum, 34(4), 511-524. doi:10.1016/S0016-7185(03)00029-0

EY (2015) Cultural times – The first global map of cultural and creative industries. UK: Ernst & Young Global Limited.

Flew, T., & Cunningham, S. (2010). Creative industries after the first decade of debate. The Information Society, 26(2), 113-123. doi:10.1080/01972240903562753

Florida, R. L. (2002). The rise of the creative class: and how it's transforming work, leisure, community and everyday life. New York: Basic books.

Florida, R. (2005). Cities and the creative class. London, New York: Routledge.

Foord, J. (2009). Strategies for creative industries: an international review. Creative Industries Journal, 1(2), 91-113. doi:10.1386/cij.1.2.91/1

Foster, P., Borgatti, S. P., & Jones, C. (2011). Gatekeeper search and selection strategies: Relational and network governance in a cultural market. Poetics, 39(4), 247-265.

Foster, P., Manning, S., & Terkla, D. (2015). The rise of Hollywood East: regional film offices as intermediaries in film and television production clusters. Regional studies, 49(3), 433-450.

Gao, G., Chen, Q., Duan, C., & and Wang, L. (2010). University-industry interaction modes in the Tongji architecture design cluster. Chinese University Technology Transfer, 9, 50-51 (in Chinese).

Gertler, M. S. (2010). Rules of the Game: The Place of Institutions in Regional Economic Change. Regional Studies, 44(1), 1-15.

Gibson, C., & Connell, J. (2004). Cultural industry production in remote places: indigenous popular music in Australia. In D. Power & A. J. Scott (Eds.), The cultural industries and the production of culture (pp. 243-258). London, New York: Routledge.

Gibson, C., & Kong, L. (2005). Cultural economy: a critical review. Progress in Human Geography, 29(5), 541-561. doi:10.1191/0309132505ph567o

Gibson, C. (Ed.). (2014). Creativity in peripheral places: redefining the creative industries. Routledge.

Glaeser, E. L., Kolko, J., & Saiz, A. (2001). Consumer city. Journal of Economic Geography, 1(1), 27-50. doi: 10.1093/jeg/1.1.27

Hassink, R. (2010). Locked in decline? On the role of regional lock-ins in old industrial areas. In R. Boschma & R. Martin (Eds.), The Handbook of Evolutionary Economic Geography (pp. 450-468). Cheltenham: Edward Elgar.

Hassink, R., Klaerding, C., & Marques, P. (2014). Advancing evolutionary economic geography by engaged pluralism. Regional Studies, 48(7), 1295-1307. doi:10.1080/00343404.2014.889815

Harvey, D.C., Hawkins, H., & Thomas, N. J. (2012). Thinking creative clusters beyond the city: People, places and networks. Geoforum, 43(3), 529-539. doi:10.1016/j.geoforum.2011.11.010

He, J.(2015). Creative Industry Districts. Springer International Publishing.

doi:10.1080/0810902042000218364

Heebels, B., & Boschma, R. (2011). Performing in Dutch book publishing 1880–2008: the importance of entrepreneurial experience and the Amsterdam cluster. Journal of Economic Geography, 11(6), 1007-1029. doi: 10.1093/jeg/lbq048

Hracs, B.J., 2015. Cultural intermediaries in the digital age: The case of independent musicians and managers in Toronto. Regional Studies, 49(3), pp.461-475.

Jakob, D., & van Heur, B. (2015). Editorial: Taking matters into third hands: intermediaries and the organization of the creative economy. Regional studies, 49(3), 357-361.

Johns, J. (2006). Video games production networks: value capture, power relations and embeddedness. Journal of Economic Geography, 6(2), 151-180. doi: 10.1093/jeg/lbi001

Jones, C., Lorenzen, M. and Sapsed, J., 2015. Creative industries: A typology of change. In C. Jones, M., & J. Sapsed (Eds.), The Oxford Handbook of the Creative and Cultural Industries (pp. 1-51). Oxford: Oxford University Press. Klepper, S. (2006). The evolution of geographic structure in new industries. Revue de l'OFCE, 5, 135-158. doi:10.3917/reof.073.0135

Klepper, S. (2006) The evolution of geographic structure in new industries. Revue de l'OFCE 5: 135-158.

Klepper, S. (2010). The origin and growth of industry clusters: The making of Silicon Valley and Detroit. Journal of Urban Economics, 67(1), 15-32. doi:10.1016/j.jue.2009.09.004

Landry, C. (2012). The creative city: A toolkit for urban innovators (Second edition). Earthscan.

Lange, B., & von Streit, A. (2013). Governance of creative industries. Zeitschrift für Wirtschaftsgeographie, 57 (1-2), 122-138.

Lange, B., von Streit, A., & Hesse, M. (2011). Kultur-und Kreativwirtschaft in Stadt und Region. Bonn: Heft des Bundesinstituts für Bau-, Stadt-und Raumforschung.

Lazzeretti, L., Boix, R., & Capone, F. (2008). Do creative industries cluster? Mapping creative local production systems in Italy and Spain. Industry and Innovation, 15(5), 549-567. doi:10.1080/13662710802374161

Lazzeretti, L., Capone, F., & and Boix, R. (2012). Reasons for clustering of creative industries in Italy and Spain. European Planning Studies, 20(8), 1243-1262. doi:10.1080/09654313.2012.680585

Lazzeretti, L., Capone, F., Innocenti, N. (2016) The evolution of 'creative economy' research. Università degli Studi di Firenze, Working Paper N. 1/2016.

Lim, K. F. (2006). Transnational collaborations, local competitiveness: mapping the geographies of filmmaking in/through Hong Kong. Geografiska Annaler B, 88(3), 337-357. doi:10.1111/j.1468-0459.2006.00226.x

Lingo, E. L., & O'Mahony, S. (2010). Nexus work: Brokerage on creative projects. Administrative Science Quarterly, 55(1), 47-81.

Liu, Q. (2007). The Research on the creative cluster development surrounding university with city renew — the case for the creative cluster surrounding Tongji University (doctoral dissertation). Tongji University, Shanghai (in Chinese).

Lorenzen, M., & Frederiksen, L. (2008). Why do cultural industries cluster? Localization, urbanization, products and projects. In P. N. Cooke & L. Lazzeretti (Eds.), Creative cities, cultural clusters and local economic development (pp. 155-179). Cheltenham: Edward Elgar.

Manning, S. (2010). The strategic formation of project networks: A relational practice perspective. Human Relations 63(4), pp.551-573.

Martin, R. (2000). Institutional approaches in economic geography. In T. Barnes & E. Sheppard (Eds.), A Companion to Economic Geography (pp. 77-94). Oxford: Blackwell.

Martin-Brelot, H., Grossetti, M., Eckert, D., & Thouzellier, C. (2008). Main drivers for the settlement of creative industries in Toulouse. The managers' view. Amsterdam: ACRE report 6.11.

Mateos-Garcia, J., & Bakhshi, H. (2016). The Geography of Creativity in the UK; Creative clusters, creative people and creative networks. London: Nesta.

O'Connor, J. (2004). 'A special kind of city knowledge': innovative clusters, tacit knowledge and the 'Creative City'. Media International Australia, 112(1), 131-149. doi:10.1177/1329878X0411200111

O'Connor, J. (2010). The cultural and creative industries: a literature review. Newcastle: Creativity, Culture and Education.

O'Connor, J. (2015). Intermediaries and imaginaries in the cultural and creative industries. Regional Studies, 49(3), 374-387.

Pilon, S., & Tremblay, D.-G. (2013). The geography of clusters: the case of the video games clusters in Montreal and in Los Angeles. Urban Studies Research. doi:10.1155/2013/957630

Pirnay, F., & Surlemontl, B. (2003). Toward a typology of university spin-offs. Small Business Economics, 21(4), 355-369. doi:10.1023/A:1026167105153

Potts, J., Cunningham, S., Hartley, J., & Ormerod, P. (2008). Social network markets: a new definition of the creative industries. Journal of Cultural Economics, 32(3), 167-185. doi:10.1007/s10824-008-9066-y

Rantisi, N. M., & Leslie, D. (2015). Significance of higher educational institutions as cultural intermediaries: the case of the École nationale de cirque in Montreal, Canada. Regional Studies, 49(3), 404-417.

Scott, A. J. (2000). The cultural economy of cities: essays on the geography of image-producing industries. London: Sage.

Scott, A. J. (2005). On Hollywood: The place, the industry. Princeton, Oxford: Princeton University Press.

Scott, A. J. (2006a). Entrepreneurship, innovation and industrial development: geography and the creative field revisited. Small Business Economics, 26(1), 1-24. doi:10.1007/s11187-004-6493-9

Scott, A. J. (2006b), Creative cities: conceptual issues and policy questions. Journal of Urban Affairs, 28(1), 1-17. doi:10.1111/j.0735-2166.2006.00256.x

Storper, M. (1995). The resurgence of regional economies, ten years later the region as a nexus of untraded interdependencies. European Urban and Regional Studies, 2(3), 191-221. doi: 10.1177/096977649500200301

Turok, I. (2003). Cities, clusters and creative industries: the case of film and television in Scotland. European Planning Studies, 11(5), 549-565. doi:10.1080/09654310303652

Vinodrai, T. (2015). Constructing the creative economy: design, intermediaries and institutions in Toronto and Copenhagen. Regional Studies, 49(3), 418-432.

Wenting, R. (2008a). Spinoff dynamics and the spatial formation of the fashion design industry, 1858–2005. Journal of Economic Geography, 8(5), 593-614. doi: 10.1093/jeg/lbn030

Wenting, R. (2008b). The Evolution of a Creative Industry: The industrial dynamics and spatial evolution of the global fashion design industry (doctoral dissertations). Utrecht University, Utrecht.

Wenting, R., Atzema, O., & Frenken, K. (2011). Urban Amenities and Agglomeration Economies? The Locational Behaviour and Economic Success of Dutch Fashion Design Entrepreneurs. Urban Studies, 48(7), 1333-1352. doi:10.1177/0042098010375992

Wenting, R., & Frenken, K. (2011). Firm entry and institutional lock-in: an organizational ecology analysis of the global fashion design industry. Industrial and Corporate Change, 20(4), 1031-1048. doi:10.1093/icc/dtr032

Wu, W. (2005). Dynamic cities and creative clusters (Vol. 3509). World Bank Publications.

Yusuf, S., & Nabeshima, K. (2005). Creative industries in east Asia. Cities, 22(2), 109-122. doi:10.1016/j.cities.2005.01.001

Paper 2. Co-evolution in contemporary economic geography: towards a theoretical framework

Published in *Regional Studies*

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Co-evolution in contemporary economic geography: towards a theoretical framework

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Keywords: co-evolution, economic geography, theoretical framework, multi-scalarity, nature of change

Abstract

Although co-evolution is a key concept in contemporary economic geography because of its relevance for achieving deep contextualization and sound policy recommendations, it has not been taken up in recent empirical work largely. This is partly due to the lacking of a comprehensive theoretical framework. In this paper, we therefore develop such a framework in which we stress two key issues, namely the multi-scalarity of co-evolving populations and the nature of change. Moreover, we set an agenda for more theoretically informed future research on co-evolution.

1. Introduction

Over the past decades or so, the evolutionary program has been proved to be not only influential in evolutionary economics, but also in other research fields, including strategic management, technology studies, organization theory, etc. (Winter, 2017). Economic geography is without exception, as it started to notice the significance of evolutionary theories in explaining economic geographical phenomena (e.g., Boschma & Frenken, 2006; Martin & Sunley, 2015a).

Co-evolution is one of the several evolutionary theoretical concepts used in evolutionary economic geography (EEG). However, compared with research on other concepts such as path-dependence and lock-in (Martin & Sunley, 2006; Hassink, 2010), related/unrelated

variety (Boschma, 2017), and resilience (Martin and Sunley, 2015b; Gong & Hassink, 2017), a co-evolutionary research agenda has not taken off in economic geography. Although a few articles have explored some theoretical issues of the co-evolution notion (e.g., Schamp, 2010; Ter Wal & Boschma, 2011), little theoretically informed empirical work on co-evolution has been conducted so far. One reason for the lack of sound empirical research on co-evolution in economic geography might be that it is ill defined. So far, the proper units of analyzing co-evolution, as well as its kind of causal relationships and dynamics remain unclear (Schamp, 2010; Murmann, 2013), or as Schamp (2017, 4) stated: '… there is often fuzzy use of the concept, despite the quest for a clear definition …'. Another reason is of methodological nature. In order to do theoretically- and methodologically-informed (either qualitative or quantitative) research on co-evolution, one needs to not only trace the developmental histories of relevant populations, but also disentangle the reciprocal relationships among them, which requires much labor-intensive and time-consuming work (Abatecola, Belussi, Breslin, & Filatotchev, 2016).

However, the lack of a clear and commonly accepted definition, as well as the scarcity of well-conducted empirical work should not veil the significance of co-evolution as a key concept in economic geography for three reasons.

First, co-evolution stresses the importance of studying non-economic factors, such as institutions, that is organizations and formal and informal rules, from an evolutionary perspective. They have been threatened to be relegated in the EEG literature (Schamp, 2010; Ter Wal & Boschma, 2011), although their relevance has been stressed (for example, MacKinnon, Cumbers, Pike, Birch, & McMaster, 2009; Rodríguez-Pose, 2013; Grillitsch, 2015; Zukauskaite, Trippl, & Plechero, 2017). Economic activities are not happening in a vacuum, but are embedded in specific socio-economic contexts, which require '… analysis both 'downwards' (the role of agency and purposive behaviour) as well as 'upwards' and 'outwards' (the influence of socio-institutional structures and regulatory conditions impinging on the system under study)' (Martin & Sunley, 2015a, p. 721).

Secondly, exploring and understanding co-evolution is a key precondition for achieving the badly needed deep contextualization in economic geography (Martin & Sunley, 2015a). As has been stated by Martin & Sunley (2015a, p. 720) '… one needs to move to a *more systemic and holistic understanding* of spatial economic evolution, one that considers not

just industrial evolutionary dynamics but also the wider economic, institutional, and sociopolitical structures …' (italics in original). We consider co-evolution as the key concept in achieving such deep contextualization, not just for the sake of describing the evolution of economic developmental systems, but also for the sake of developing deep knowledge of regional economic development, inequalities and policy prescriptions.

Finally and strongly related to the previous reason, co-evolution and the related deep contextualization are essential for being able to develop tailor-made policy recommendations. With a sophisticated co-evolutionary theoretical framework working with a broad group of populations such as industries, institutions, technologies and platforms, civil societies, markets and consumers, NGOs and intermediary organizations, such policy recommendations can go beyond the goal of making industry more competitive, the main goal often supported by many other EEG concepts. Such a framework would also be able to contribute to policies aiming at alternative goals such as de-growth, social innovation, sustainability, inclusive and cohesive growth and social equality (e.g., Hansen & Coenen, 2015; Faller, 2016; Krueger et al., 2017; Phelps et al., 2018; Storper, 2018).

We are convinced that only if we understand co-evolution better, if we have a deeper knowledge of the mechanisms of co-evolution in a regional socio-economic development context, we will be able to better analyze and understand regional socio-economic evolution, on the one hand, and to draw sound and tailor-made policy recommendations, on the other hand. However, as has been stated above, although economic geographers have increasingly noticed the significance of co-evolution as a core concept, so far, little has been done to construct a sound theoretical framework. The aim of this paper, therefore, is to develop such a theoretical framework on co-evolution —based on a multi-scalar and historical perspective—which provides explanations and explorations of the interrelations of co-evolving populations, as well as their impact on the dynamics of both sides. For the sake of simplifying, as it is barely possible to include all relevant populations within the limited space of one paper, and for making the core of our theoretical framework—namely, the multi-scalarity of co-evolving populations and the nature of change, clearer, we decide to focus on two relevant populations, i.e. industries and institutions. Moreover, most of the (economic geography) literature we draw on has been focusing on the dynamics of these populations. Although we are only focusing on two populations, we believe our theoretical

framework is relevant for other co-evolving populations as well as, because of the similarities of the mechanisms of how co-evolution actually happens.

The paper is organized as follows: in Section 2, an overview of the literature on co-evolution of industries and institutions in economic geography and other disciplines will be provided in order to define co-evolution and to identify units of analysis, which will then be done in Section 3. Following that, a multi-scalar and historical-dependent framework on co-evolution will be developed in Section 4, which will be based on several theories and perspectives. The final section (5) will draw conclusions and will formulate a research agenda.

The article contributes to the co-evolution literature in the following aspects. First, it highlights the multi-scalar nature of both industries and institutions, and argues that a co-evolutionary perspective should consider the influence of the dynamics of one population on the evolution of the other population at multiple levels, and vice versa. Second, it pays special attention to the nature of changes, where both the role of incremental and radical changes on co-evolution and combinations of changes and their potential impact on co-evolution are provided. Third, it contributes to clearly defining the concept and in doing that, it stresses the complementarity between a pair-wise and systemic understanding of co-evolution.

2. Co-evolution in economic geography and beyond

2.1 Co-evolution in economic geography

Recently, in economic geography, particularly in EEG, scholars have adopted the concept of co-evolution, both implicitly and explicitly, to explore the causal relationship between different actors and populations. Topics of relevance range from the co-evolution of various types of proximity (Broekel, 2015), to the co-evolution of firms, industries and networks (Ter Wal & Boschma, 2011), and the reciprocal influence of different groups of firms within a specific industrial district (Lazzeretti & Capone, 2017). These efforts have paid adequate attention to the interrelation and causal mechanisms between different economic entities.

Moreover, the relation between the evolution of industries and institutions has increasingly caught the interest of economic geographers and some have suggested that the co-evolution of economic entities and institutions at multiple spatial scales should be at the center of economic geography (e.g., Schamp, 2010; Essletzbichler, 2012a, 2012b). The recent work by Berg (2015) and Xin & Mossig (2017) on the co-evolving of creative industries and the supporting institutions has taken seriously the role of institutions on the development of film industry in Seoul and Shanghai. However, just like what most evolutionary economic geographers, taking a Generalized Darwinism approach, are looking at, both of these two studies stressed primarily the *unidirectional* impact of institutions on the development of the creative industry, whereas the agency of collective organizations and individuals, as well as their impact on the institutional contexts have largely been overlooked.

Recently, this situation has improved as some attention has been paid to institutional changes (Gertler, 2018), inspired by seminal work on this topic by historical institutionalists such as Hall & Thelen (2009) and Mahoney & Thelen (2010). Among these efforts, it is particularly the literature on institutional entrepreneurship that is of great relevance to co-evolution (see, for example, Bathelt & Glückler, 2014; Sotarauta & Mustikkamäki, 2015). Recently, Grillitsch & Sotarauta (2018) have suggested in addition to institutional entrepreneurship, Schumpeterian innovative entrepreneurship, and place leadership as a broader "trinity of change agency". Although helpful for understanding the human agency of collective and individual actors and their role in individual and co-evolving populations, these efforts are still in a very embryonic stage, when compared with the large number of studies stressing the unidirectional relationship between institutions and economies.

The nature of economic and institutional change is another co-evolutionary issue, which raised some interest in economic geography. So far, most of its research emphasizes slow and cumulative changes, related to concepts such as regional branching, spin-off mechanism, and path dependence (e.g., Martin & Sunley, 2006; Boschma, 2017). However, in reality, as claimed by Martin & Sunley (2015b, p. 2), '… Economies have always been prone to major perturbations and shocks….'. The same counts for institutional dynamics. Institutions do not come into existence once and forever, but undergo continuous modifications to adjust themselves to changing circumstances (Maskell & Malmberg, 2007;

Mahoney & Thelen, 2010). Therefore, institutional changes are also subject to the frequencies as well as the power of both internal and external events, such as major shifts in technologies, market demand, regime iteration and so on, as has also been pointed out in the sustainability transition studies literature (Hansen & Coenen, 2015; Faller, 2016). Berg (2015) recently observed that, the co-evolution-related literature in economic geography has largely neglected the role that critical events play in shaping the relations between industry/ firms and the institutional environment at several spatial scales. Moreover, due to mutual interdependence between industries and institutions radical change happening in one of the populations will have a strong impact on the dynamics of the other (e.g., a radical institutional change might create space for new industry development, or radical technological breakthroughs in certain industries might lead to great institutional changes). So far, this issue has not received adequate attention yet.

In short, although the potential of co-evolution and institutional dynamics has been increasingly noted in economic geography, there are still issues surrounding the definition and conceptualization of co-evolution that need to be dealt with more carefully. Since the concept of co-evolution has been used broadly in other social sciences, it is worthwhile to try to draw insights from them.

2.2 Co-evolution beyond economic geography

Co-evolutionary narratives have flourished in disciplines such as management, organization theories, and innovation studies (e.g., Murmann, 2013; Blankenberg & Buenstorf, 2016). The central idea of these co-evolutionary studies is that most of the challenges faced by social organizations and economies, cannot be properly accounted for through '…focusing on organizations, or their environments, as stand-alone, single and static units of investigation' (Abatecola et al., 2016, p. 3). Therefore, co-evolutionary and dialectical narratives should be used more often than before in explaining the complex relationships between different socio-economic organizations.

Scholars have considered various co-evolutionary phenomena, such as the co-evolutionary development of organizations/ firms and supporting institutions (Cantwell, Dunning, & Lundan, 2010), of technology, industry structure and institutions (Nelson, 1995; Blankenberg

& Buenstorf, 2016), of socio-technical transitions (Geels, 2014), and of social and ecological systems (Kallis & Norgaard, 2010). Recently, some efforts have also been made to embed co-evolution in the broader evolutionary theoretical framework and conceptually combine mechanisms of co-evolution with the Darwinian principle of VSR (Murmann, 2013; Geels, 2014).

While such theoretical and empirical explorations provide insights in the co-evolutionary mechanism of the economy and the institutions, from an economic geographical perspective, the weakness of these studies is conspicuous—namely their neglect of the embeddedness of firms/industries in space, places and scales, key analytical categories in economic geography. An exception to this neglect is the work done by ecological economists and transition theorists (e.g, Geels, 2014; Kallis & Norgaard, 2010), but these studies focus mainly on either socio-ecological types of co-evolution, or socio-technical transition, rather than social co-evolution (Kallis & Norgaard, 2010).

To sum up, although co-evolution has been used in economic geography and other social sciences the weaknesses of these studies are apparent: for economic geography, they include the lack of a theoretical-informed definition, the overemphasis of the unidirectional influence of institutions over industries, and the poor exploration of the nature of changes. Research in broader social sciences often neglects geographical aspects, such as places, space and scales. The task confronting economic geographers wishing to utilize the idea of co-evolution is therefore twofold: to confront the unresolved issues that surround the conceptualization of co-evolution, and to move beyond the basic notion of co-evolution *per se* by including space, places and scales and historical trajectories of development. Building on these insights, the next section will define co-evolution and distinguish co-evolving populations.

3. Conceptualizing the co-evolution of the economy and institutions

3.1 Defining co-evolution

Co-evolution remains largely a 'black box' not only in economic geography but also in other social sciences (Schamp, 2010; Murmann, 2013). This is not surprising if one looks at the

definitions of co-evolution in biology and ecology where the notion originated. Reviewing the development of co-evolution conceptualization in biology during the last fifty years, Carmona, Fitzpatrick & Johnson (2015, p. 5315-5318) claim that there are different groups of research stressing different aspects of co-evolution in biology: Ehrlich & Raven's (1964) version of coadaptation; Janzen's (1980) distinction of pair-wise and diffuse co-evolution; and Thompson's (2005) 'geographic mosaic of co-evolution' (GMC). Similar conceptualizations can also be found in co-evolutionary research in social sciences. Overall, there are, basically, two perspectives on co-evolution (Schamp, 2010). The first perspective calls for an exact delineation of what is co-evolving with what (similar to Carmona et al.'s (2015) category of pair-wise co-evolution). The second perspective views co-evolution as embedded in an overall system, which makes it difficult to separate particular dimensions of co-evolution (close to Carmona et al.'s (2015) summarization of diffuse co-evolution).

Recently, social scientists intend to favor the pair-wise understanding of co-evolution. Schamp (2010), for instance, proposes that co-evolution only exists under three conditions: (i) it must be possible to differentiate two populations that (ii) more or less simultaneously (iii) have a reciprocal causality. In a similar vein, Murmann (2003) argues that 'two evolving populations coevolve if and only if they both have a significant causal impact on each other's ability to persist' (p. 22). Malerba (2006, p. 18) remarks that '…the challenge for [co-evolutionary research] is to… move from the statement that everything is coevolving with everything else to the identification of what is coevolving with what'. Recently, relating co-evolution to the Darwinian principle of VSR, Murmann (2013) claims that to use the concept of co-evolution in explaining the evolution of an industry and its (institutional) environments involves two steps. First, the industry under observation and the important feature of the institutional environment should both be conceptualized as populations that undergo change through VSR processes. Second, the analysis needs to show the reciprocal and bi-directional relationships that link the evolutionary trajectory of the two populations by causally affecting at least one of the three component VSR processes.

In addition to the pair-wise co-evolution, the GMC model could also contribute to a better conceptualization of co-evolution as it stresses much the influence of local conditions and geographic variations. Furthermore, when applied to a specific context, geographical issues, as well as the historical trajectories of co-evolving populations, are all taken into account.

Both the pair-wise understanding of co-evolution and the GMC model, however, ignore to a certain extent that co-evolving populations are embedded in and often affected by higher level systems (the second perspective), such as a variety of capitalism (Hall & Thelen, 2009), which are increasingly stressed in contemporary economic geography (Schröder & Voelzkow, 2016; Martin & Sunley, 2015a; Evenhuis, 2017). Therefore, in our view the system dimension of co-evolution is a key dimension complementing pair-wise co-evolution and the GMC model. Informed by the above-discussed pair-wise understanding of co-evolution, the GMC model, as well as the system dimension of co-evolution, this paper adopts a geographical-historical definition of co-evolution, which involves

> the reciprocal, causal relationships between two or more populations (*distinguishable populations*). Such reciprocal relationships are embedded in a multi-scalar context (regional, national, global scales) where dynamics of relevant populations (e.g., industries, institutions) at one scale influence and are influenced by interactions of populations at other levels *(multi-scalar).* Moreover, they are embedded in higher level systems (*system dimension*). The evolutionary trajectories are subject to the histories of respective populations *(historical)*.

As economic geographers, we take the regional economy, in general, or some agglomerations with in a regional economy, such as clusters, as a starting point of analysis in a multi-scalar context. The central issue remains how to identify the distinguishable populations of co-evolution, to which we turn now.

3.2 Units of analysis: Populations of co-evolution

As mentioned in the introduction, many populations can be co-evolving at the same time. To make things simple and understandable, the units of analysis adopted here is the population of economic organizations on the one hand, and the population of institutions on the other. Unlike many studies, which view institutions as a background for economic evolution exerting unidirectional impact on the economy, we regard institutions as an evolving population that is also influenced by economic organizations. This is consistent with Hodgson & Knudsen (2006)'s argument that populations in complex systems not merely

include economic organizations, but also human institutions, as long as they could be regarded as cohesive entities having some capacity for the retention and replication of problem solutions.

The population of economic organizations refers to firms that form an industry. On the one hand, these firms share similarities because they belong to the same or a similar industry. On the other hand, however, they are the concrete actors doing the action, consequently divergence and variation are the results of such individual agency. Such a duality is important for understanding the evolution of an industry, because on the one hand, an industry would not be evolving if no common changes would take place within the corporate entities. On the other hand, such changes are often the initiative by one or a few firms, and then spread to the rest of the population (Geels, 2014). Such a population of firms is embedded in multiple locations and influenced by the dynamics of institutions at different scales.

The other population of relevance is institutions. We find Scott's (1995) distinction of three types of institutional pillars useful, as this distinction does not only pay attention to formal industry- and territory-specific regulations and organizations, but more importantly, stresses the cultural aspects (i.e., cognitive and normative) of institutions. The regulatory pillar of an institutional system includes laws and regulations generated by the government or other authoritative bodies that regulate individual and organizational action. The normative pillar represents actions that organizations and individuals ought to take (values, norms, role expectations, duties), irrespective of economic rationality. Their ability to guide organizational action stems largely from social obligation. The cognitive institutional pillar argues that organizations and individuals act because of ideational structures rather than consciously following rules or norms—i.e., organizations will abide by rules without conscious thought. Scott (1995) depicts the three institutional pillars as analytically independent and self-contained, which means interaction between the three pillars would not be expected (Hoffman, 1999). However, Zukauskaite et al. (2017) recently identify three types of relations between institutions influencing change processes—contradicting, reinforcing and complementary. In consistent with this, we see the intra-population dynamics of industries and institutions as an essential part of the co-evolutionary research.

A geographical perspective will be added to Scott's institutional pillars, to which we will come back in Section 4.2.

4. A theoretical framework on co-evolution of industries and institutions

As state above, co-evolution does have some key characteristics, namely distinguishable populations, multi-scalarity, as well as a system and historical dimension. This section suggests a theoretical framework on co-evolution, which deals with these key characteristics. Section 4.1 elaborates on the theoretical foundation of the framework, while section 4.2 and 4.3 explain the geographical and historical dimensions of the framework.

4.1 Theoretical foundation

Enlightened by research on co-evolution within and beyond economic geography, our framework is based on the following theories and approaches: Generalized Darwinism, complexity approach and developmental evolutionary theory, and relational thinking.

Generalized Darwinism

The generalizing of Darwinian biological principles into, among others, social sciences, also called Generalized Darwinism (GD), has informed and motivated evolutionary economics and EEG (Hodgson & Knudsen, 2006; Breslin, 2011; Essletzbichler, 2012b). Although it has been criticized by some scholars (for example, MacKinnon et al., 2009), GD remains the central theory of EEG (Hodgson & Knudsen, 2006; Martin & Sunley, 2015a). Stressing a linear thinking, GD is particularly preferable during periods when systems are adapting toward relatively stable status (Meyer, Gaba, & Colwell, 2005). Informed by GD, the EEG literature often tends to highlight the role of experience and history of economic agents. Here, insights from historical institutionalists (e.g., Thelen, 1999; Mahoney & Thelen, 2010) have been well incorporated. Similar in vein, we stress that histories of both the industry and the institutions should be taken into account when exploring the co-evolution of these two relevant populations. In our theoretical framework of co-evolution, GD is acting as one of the foundations where co-evolutionary mechanism could be based upon.

Moreover, the Darwinian principle of VSR is useful for analyzing the basic forms of pair-wise co-evolution (Schamp, 2010). Variety in and between industrial populations is a starting point for evolution, whereas selection mechanisms and the selection environment are in favor of some and not of others. Finally, other mechanisms lead to the survival of variants in the long run (retention) (Figure 20.1 in Schamp, 2010, p. 435). Schamp (2010, p. 435) further states that '… the emergence of a co-evolving (institutional), 'second', population can function as a selection and retention mechanism for the primary evolving population …'.

However, although GD is helpful in analyzing co-evolution in a first, pair-wise analytical step, it is relatively abstract, too much micro- and routines-oriented, and does not pay enough attention to several phenomena important in contemporary economic geography, such as higher level systems of capitalism, human agency, learning, intentionality and power (MacKinnon et al., 2009; Martin & Sunley, 2015a). Therefore, GD is never sufficient on its own (Hodgson & Knudsen, 2006). Additional theories and approaches are required, in exploring the co-evolving relationships between different populations that are embedded in systems. We consider the complexity approach, developmental evolutionary theory and relational thinking as these required additional theories and approaches.

Complexity thinking and developmental evolutionary theory

Complexity theory is still under developed, yet, it seems to resonate with some of the central concerns of EEG (Martin & Sunley, 2007; Weig, 2016). Complexity approaches relieve entities in a complex system from restrictive natural analogies and metaphors, and allow them to tell stories about their own subject matter. Similar to the multi-scalar thinking of the co-evolutionary theoretical framework, a defining feature of a complex system is that it is composed of interacting subsystems and hierarchical levels (Anderson, 1999; Martin & Sunley, 2007). On this basis, we might argue that both industries and institutions could be divided into smaller subsystems and finer units of analysis. Human agency and intentionality, issues lacking in GD, are stressed in the complexity theory, because micro behavior and interactions are seen as the source of emergent pattern and order at the macro level (Beinhocker, 2006). Highlighting nonlinear thinking, the complexity approach is preferable when systems are in flux, or experiencing upheavals and emergences (Meyer et al., 2005).

Developmental evolutionary theory provides another complementary theory to GD. Its most prominent advantage exists in allowing environmental and contextual resources to have a formative role in how development and evolution co-interact (Martin & Sunley, 2015a). Such a systemic understanding of spatial economic evolution is particularly important for our co-evolutionary theoretical framework as it does not solely focus on industrial evolutionary dynamics alone, but also pays adequate attention to the wider institutional and socio-political structures produced by and constitutive of uneven geographical development, or what Martin & Sunley (2015a) refer to as 'deep contextualization'. A developmental evolutionary theory would view institutions at all scales as both the context and consequence of economic evolution. On the one hand, institutions of all kinds and at all scales condition, constrain and enable the operation of evolutionary mechanisms in the economy; on the other hand, economic actors also exert strong influence on the institutional dynamics, and therefore make the external conditions favorable for their survival and development.

Relational thinking

The last theoretical foundation of the framework is related to relational thinking. As argued by Yeung (2005), relational thinking in economic geography originated in two different schools of research: networks and connections of certain types developed in economic sociology, and the poststructuralist approach on all forms of networks and linkages between entities. For our co-evolutionary framework, we view economic organizations (firms) as both embedded in local contexts (built upon kinship, friendship, sustained economic relations and institutions, etc.), and linked to the external organizations and entities in various forms (e.g., global pipelines). These two aspects are indispensable for understanding the evolution of the economy and institutions at multiple scales, as well as their mutually causal relations.

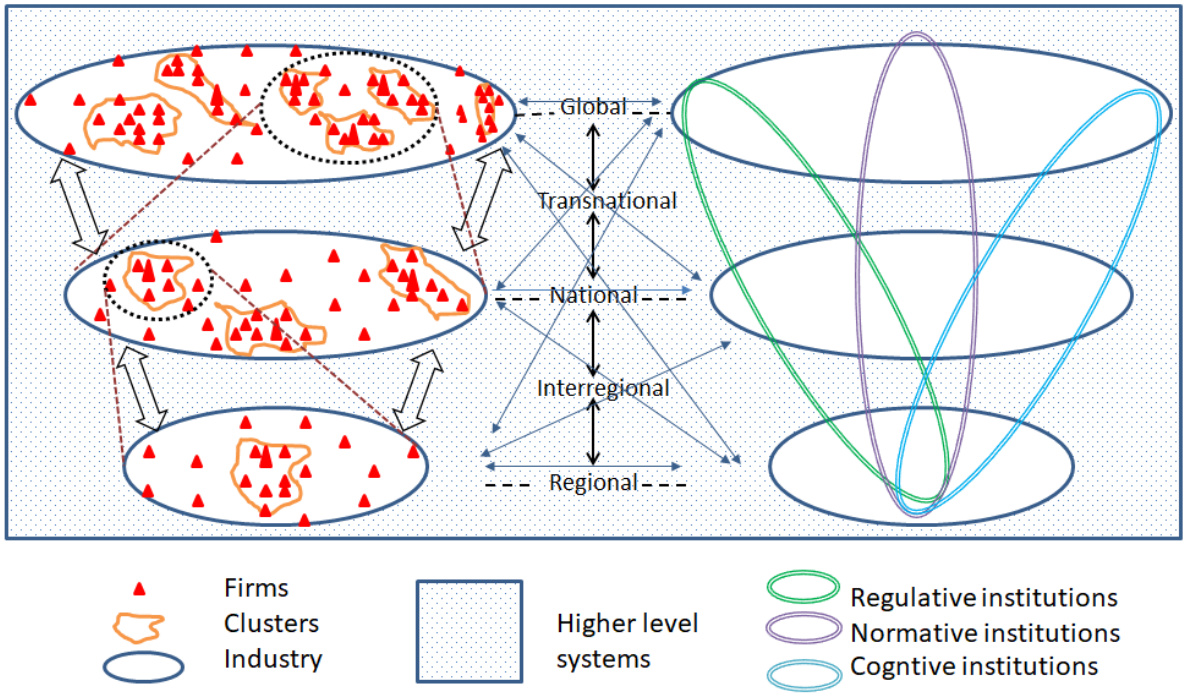
4.2 The geographical dimension of the framework—the multi-scalarity of populations

Before dealing with the multi-scalarity of relevant populations, it is important to restate here that all co-evolving populations are embedded in higher level systems, such as a variety of capitalism. This embeddedness definitely influences how two populations are interacting

and thus influencing each other's evolutionary trajectories. For example, the co-evolution of a certain industry and institutions in a liberal market economy (LME) might be very different from that in a coordinated market economy (CME), because of the diverse conditions related to industrial structure, inter-firm relations, financial systems, education and training, etc. How such embeddedness exactly affects co-evolution is a matter of empirical exploration. In the next paragraphs, we cannot discuss the potential influence of all the higher level systems in detail because of space constraints. Yet, what we want to stress here is that the influence of the systems should definitely be taken seriously in empirical studies.

The multi-scalarity of institutions and economy have been well documented in the literature (e.g., Coe et al., 2004; Gertler, 2010; Essletzbichler, 2012a; Grillitsch, 2015; Grillitsch & Rekers, 2016; Schröder & Voelzkow, 2016; Evenhuis, 2017; Gertler, 2018; Zukauskaite et al., 2017). Co-evolutionary studies are increasingly concerned with the interrelationship of processes at different scales. Space, places and scales are, therefore, one of the most central issues in our co-evolutionary theoretical framework (see Figure 1).

Figure 1. Multi-scalar nature of co-evolving populations.



A local industry can be related to the industry at other geographical scales either through building non-production connections to incumbent firms acting as knowledge transfer channels linking the local to the national or global, or through the establishment of vertical networks based upon production relationships. Global production networks thus offer the opportunity for economic actors to establish multi-scalar relationships. At the local level, related firms usually tend to co-locate in certain locations and thus form clusters. In addition to such agglomerations, there are also firms that are located dispersedly. These clusters and geographically dispersed individual firms together form the basis of a local industry. Such a local industry, however, is hardly formed and shaped by local forces (local social, cultural, institutional and economic conditions) solely. It is subject to all sorts of influence from other geographical scales (Grillitsch & Rekers, 2016): institutions and related organizations at the upper level might influence it, and if a local industry is strongly embedded in a global production network, decisions made in multinational headquarters located in other parts of the world certainly influence it. If the headquarters, for whatever reason, decide to shut down its branch in the region, the whole local industry might run the risk of closing down due to its strong connections with and reliance upon the multinational.

Because a local industry is embedded in broader geographical contexts, it could also influence industries and institutions at upper levels as long as it is strong enough to trigger institutional and economic changes beyond the local level. Such a nested understanding of an industry embedded in multiple scales is necessary for figuring out the dynamics of an industry at different levels.

Similar to the populations of an industry, we also see the three pillars of institutions embedded in multi-scalar space. Socio-economic specificity of different locations might contribute to different norms, values, understandings, as well as regulatory institutional environments. Thus, conflicts, consistency or complementarities of institutions at different spatial scales should be seen as normal. As rightly stated by Gertler (2010, p. 6) ‘institutional forms and the incentives they create at any one particular scale influence, are influenced by, and interacted with, the institutional architectures that are erected at other geographical scales’. In terms of their relationships with a multi-scalar industry, it is clear that both camps affect each other at different scales. The exploration of the co-evolution of an industry and institutions, thereby involves the following processes: (i) the identification of the evolution

trajectories of both industrial and institutional populations at multiple scales through time; (ii) the impact of the evolution of industrial population on the dynamics of institutional population at different scales, and (iii) vice versa.

4.3 The time-historical dimension of the framework—the nature of change

Time is a very prominent element of co-evolutionary development (Schamp, 2010). As Martin (2012, p. 183) has rightly observed, whilst economic geographers have increasingly taken notice of the dynamic processes of production, 'much less attention has been accorded to the types, forms and patterns of evolutionary trajectory observable in the economic landscape'. We are taking issue with it in this part.

Similar to the argument in the previous part, we argue that the embeddedness of the co-evolving populations in systems strongly influences how the two relevant populations interact when incremental and radical changes happen. However, to make our argument concerning the nature of change more conspicuous, we only focus on the pair-wise co-evolutionary relationships between the two populations. In addition, we emphasize here that co-evolutionary empirical research needs to take the systemic part of the co-evolution concept seriously in order to draw a full picture of the co-evolutionary dynamics of the relevant populations.

Our discussion on the dynamics of the co-evolving populations is partly inspired by the debate on institutional change in historical institutionalism (Thelen, 1999; Hall & Thelen, 2009; Mahoney & Thelen, 2010), as well as more recent work on institutional dynamics in economic geography and regional studies (e.g. Bathelt & Glückler, 2014; Dawley, 2014; Grillitsch, 2015; Schröder & Voelzkow, 2016; Evenhuis, 2017). According to this strand of research, economic and institutional evolution is the product of a constant tension between change and continuity, between stability and flux, between innovation and reinforcement (Martin, 2012, p. 184). Informed by this idea, we pay particular attention to the nature of changes concerning the co-evolving populations. For the sake of analytical clarity, two types of change—incremental and radical, are highlighted, although we are fully aware that there is, in reality, a continuum between these two extremes. Moreover, there is also a large

variety of moments, triggering events, critical events or shocks leading to changes (Dawley, 2014; Sanz-Ibáñez, Wilson, & Clavé, 2017; Steen & Hansen, 2018).

Concerning incremental changes, be they institutional or economic, the impact of such changes on the evolutionary development of a specific industry or institutions is mostly minor and cumulative. Concepts in EEG, such as regional branching, spin-off mechanism, path dependence, etc., as well as some of the above-mentioned notions related to institutional change (defection, reinterpretation, displacement, layering, drift and conversion, and bricolage and translation) are relevant to this type of change. Incremental changes often result in the continuity of the status quo, or the slow growth (or decline) of the industry, and/ or the minor adaptation of the institutions. General Darwinism and VSR mechanism can be applied in this situation. However, those incremental changes sometimes can also lead to fundamental or radical changes, when the precipitated changes reach a tipping point (Strambach & Pflitsch, 2018). In this context, other theories such as complexity theory should be included.

For radical changes, situations are much more complicated. The first issue here is that such changes not only exist in the form of crises, disruptions and problems (negative), but can also present new opportunities (positive) (Hoffman, 1999). Another issue related to co-evolution is that radical changes can happen to both the populations of economic organizations and institutions, thus potentially leading to a mismatch between the developmental paths of these two populations. This is, indeed, where co-evolutionary mechanism plays an important role—industrial and institutional trajectory activities affect each other, and thereby alter the developmental path of each other. Finally, depending on the timing and the stage of development of the industry, radical change can create a window of opportunity for the industry or not (Geels & Schot, 2007).

Furthermore, it is not only the speed of change (incremental vs. radical) that is of interest in this context, but certainly also the question whether interactions between institutions and industries support or hinder change. There is a rich plethora of options of contradicting, reinforcing, complementary, colliding and non-colliding interactions (confined to institutional change, see for Grillitsch (2015) and Zukauskaite et al. (2017)). In Table 1, we summarize eight potential combinations of changes in the evolutionary process of regional industries and institutions, as well as how such combinations lead to different types of co-

evolutionary outcomes. The list only contains some typical and simplified combinations and is hence non-exhaustive, as there are many other combinations possible. Moreover, it does not represent the share of possible cases in reality, as incremental changes in industry and institutions do happen much more often than radical changes.

Table 1. Combinations of changes and potential co-evolutionary outcomes.

Changes[3]		Examples	Potential reaction and co-evolution outcome
Industrial dynamics	Institutional dynamics		
Incremental	Incremental	Minor and incremental innovations lead to slow growth of certain industry; Formal laws, regulations, and governmental structures, as well as informal practices, norms, conventions, values and networks experience incremental changes	Mutual reinforcement
Incremental	Radical (+)	Policy-makers design new policies that potentially have positive impact on certain industry; The industry is still undergoing incremental changes	Industry associations realize opportunity and inform companies (coincidental dynamics); Feedback from the industry side helps to revise the actions from the institutional side (e.g., whether it is too ambitious or not) (delayed revision)
Incremental	Radical (-)	Policy-makers design new policies that potentially have negative impact on certain industry; The industry is still undergoing slow growth	Industry associations realize threat and advise companies (coincidental dynamics); Feedback from the industry side helps to revise the actions from the institutional side (delayed revision)

[3] The mentioning of industrial dynamics first and institutional dynamics second does not mean that institutional dynamics always follow industrial dynamics; it can also be the other way around.

Radical (+)	Incremental	Regional industry strongly grows through f.e. radical innovation; Formal and informal institutions do not change much	Through industry lobby initiation of institutional entrepreneurship; new institutions are expected to favor the radical industrial growth, though in a delayed manner
Radical (-)	Incremental	Strong decline of regional industry through f.e. plummeting of world market price; Formal and informal institutions remain relatively unchanged	Through industry lobby initiation of protective measures; new institutions are expected to stop the industrial decline or even recover the industry, though in a delayed manner
Radical (+)	Radical (+)	Policy-makers design new policies that strongly support a certain regional industry; The industry experiences strong growth due to f.e. radical innovation	Mutual and intended enforcement
Radical (-)	Radical (+)	Policy-makers design new policies that strongly support a certain regional industry; The specific industry, however, experiences strong decline due to f.e. plummeting of world market price	Depending on the relative strength of the two populations: recovery of the industry (institutional support compensates for the negative effect of market price); decline of the industry though in a slower speed (negative effect of market price is too big to be compensated by institutions)
Radical (+)	Radical (-)	Strong growth of regional industry through f.e. radical innovation; Strong formal institutions dynamics in the direction of destroying the industry	Depending on the relative strength of the two populations: adjustment of institutions (lobby to govt.) which leads to a new match between industry and institutional conditions; decline of the industry (when lobby does not work)

Radical (-)	Radical (-)	Strong decline of regional industry through f.e. increasing competition from low-cost countries; strong policy change towards laissez-faire strategy	Mutual weakening

Note: + / - refers to a positive or negative effect on the development of relevant populations

Below we will present some empirical illustrations of different combinations of changes and potential co-evolutionary outcomes based on the literature, although only in few cases co-evolution has been explicitly used.

In a recent paper on regional economic polarization, Storper (2018) highlights the mutual-reinforcing mechanism of formal and informal institutions and local industries. Based on numerous studies, he argues that the success of many leading regions, such as Silicon Valley and London today, might be attributed to the endogenous co-evolution of agglomeration of industries and local formal (laws, governmental structures, rules, organizations, etc.) and informal institutions (practices, norms, beliefs, networks, etc.), that are specific to certain industries and places. He states that: '…the places that develop the institutions … in tandem with the location of firms that have leading-edge technology or knowledge endowments, develop double monopolistic advantages, from hard economies of scale to informal institutions that are difficult-to-imitate or transfer' (Storper, 2018, p. 261). In such a context, when radical industrial growth happens, local institutions will change or adapt accordingly (either radically or incrementally), in order to reach a new balance between the two dynamics. Reversely, when radical institutional changes happen in the region, local industries in these leading regions also have the capabilities to react and adjust appropriately. Miörner & Trippl (2017) provide an example of the combination of a radical industrial an incremental institutional change in their study on Scania's gaming industry. Actors in the industry sniffed the great economic potential of the new technology, while regulative, normative and cognitive institutions are less sensitive to it. Under this context, key firms, or adventurous entrepreneurs, individually or collectively, will try their best to change the existing institutional environment (institutional entrepreneurship or

'environment shaping' (Martin & Sunley, 2015a, p. 727)) into a favorable one supporting the application of the new technology in a certain industry.

Legions of studies on the restructuring of old industrial areas have shown that radical industrial dynamics in a negative sense might often not lead to strong institutional reaction, as the rigidities of the so-called institutional hysteresis (Setterfield, 1993) can potentially lead to highly contingent local political and institutional lock-ins. They hinder the flexibility and adaptability of key economic actors (Hassink, 2010).

If an industry is growing strongly due to radical industrial dynamics, and radical institutional dynamics go in a supportive direction for industrial growth, the potential outcome of co-evolution might result in a strong mutual reinforcement. The Korean Wave (Hallyu) in the 2000s, leading to strong growth of creative industries in the Capital Region of South Korea (Berg, 2015, 2018) is a good illustration of this combination. Another one is the radical institutional change due to Renewable Energy Sources Act in Germany positively affecting radical regional industrial dynamics in renewable energy industries, such as offshore wind energy in Northern Germany (Fornahl, Hassink, Klaerding, Mossig, & Schröder, 2012).

As the afore-mentioned examples indicate, radical changes could happen at any spatial scale (local, national, global), and can be related to specific cultural, economic, institutional and social events. Moreover, the influences of such changes vary: some cause local changes (see the games industry in Scania), while others cause national or international changes (such as Hallyu, Berg, 2018).

5. Conclusions and Research Agenda

Co-evolution, as we have argued in this paper, should gain an equal position as other key concepts such as path dependence, resilience, lock-ins in economic geography because it is essential for understanding the mutual reciprocal relationships between related populations in complex socio-economic systems. Moreover, we see co-evolution as a highly relevant concept for exploring and understanding non-economic organizational changes and for achieving deep contextualization and sound policy recommendations.

Based on the literature both within and outside economic geography, we have therefore developed a co-evolutionary theoretical framework in which the units of analysis are distinguishable populations of economic organizations and institutions. In our view, a co-evolutionary analysis in contemporary economic geography should contain both a pair-wise examination of these distinguishable populations, as well as an analysis of their embedding in higher level systems. The theoretical framework builds upon Generalized Darwinism, the complexity approach and developmental evolutionary theory, and relational thinking. Two dimensions—geographical (multi-scalarity) and historical (nature of change), are crucial for understanding the mutual influences and reciprocal relationships between the evolution of industries and institutions.

In the future, more empirical and theoretical research on the co-evolution concept should be conducted along the lines of our theoretical framework in order to realize its potential. We see room in six areas.

To begin with, as stated in the introduction we took industries and institutions as the main populations in this paper, whereas in fact there are more populations of interest in contemporary economic geography that could be analyzed with the help of the co-evolutionary theoretical framework in future research. Examples include consumers and markets, platforms, networks, new practices, civil societies, etc.

The second area is closely related to the first one. Since there are more co-evolving populations that are relevant for local and regional socio-economic development, we need to be cautious of the policy implications of such co-evolutionary developments. Although most of the policy recommendations derived from co-evolutionary studies are based on an implicit normative premise that the maintenance of co-evolution itself is a desirable state of affairs, in reality, co-evolutionary outcomes are not necessarily beneficial to all populations. The synergetic development of economy and institutions might namely come at the expense of other social, cultural, and ecological goals (see the research of Norgaard (1994) on ‘Development Betrayal’). Therefore, we should be cautious about certain normative assumptions and carefully analyze the positive and negative impacts of co-evolution outcomes for different interest groups.

Third, more attention should be paid to the multi-scalarity of co-evolving populations. This multi-scalarity, as argued previously, does not only relate to institutional, but also to industrial populations. Complexity increases much if the evolution of specific, individual populations (industrial or institutional populations) is combined with the co-evolution between different populations. This issue has not been taken up much in economic geography, neither in theoretical nor in empirical endeavors. The conceptual challenge is to explain the different levels of evolution in relevant populations and their internal and external conflicts, interactions and complementarities. Future co-evolutionary models and empirical analyses should take this complexity into account and specify more precisely the different levels of (co)evolution, within and between scales, their weights, and the nature of their interaction (Kallis & Norgaard, 2010).

Fourth, since co-evolving populations are embedded in higher level systems such as a variety of capitalism, and different co-evolutionary phenomena can be found under similar conditions, or similar co-evolutionary developments within different contexts, it, therefore, would be important for future empirical work to look specifically how such embeddedness influence the co-evolutionary development of relevant populations. Moreover, it would also be interesting to compare co-evolutionary interactions. Comparative studies can be conducted either on different industries within the same geographical setting, or on the same industry in different locations. Although, co-evolution is usually time and space contingent (Schamp, 2010), comparative studies on co-evolution are useful in achieving de-contextualization, which is '… a methodology to identify trans-contextual, more-or-less necessary circumstances and structures from contextualized events' (Bathelt & Glückler, 2003, p. 128).

Fifth, in future research the nature of changes should be emphasized more. Although this has been argued for in several theoretical and conceptual papers in economic geography (e.g, Martin & Sunley, 2006; Martin, 2012), it has not been taken up much in empirical work. Different institutions and different industries evolve at different rates and with different temporalities. Although incremental and radical changes might seem to be a dual and exclusive typology of evolutionary possibilities (Table 1), in reality there are many varieties between these two patterns (Sanz-Ibáñez et al., 2017). The work on layering, developmental

change, and so on has provided fruitful insights in how to fill the spectrum between incremental and radical change in future research.

Finally, microevolution phenomena (within individual populations) have not been discussed much (McKelvey, 1999). Issues such as agency (agents with schemata), self-organizing networks, dissipative systems, edge of chaos, are very much relevant for such microevolution, and this is actually a field where theories of human agency (e.g., the suggestions by Grillitsch and Sotarauta, 2018) and theories of complex adaptive systems (Anderson, 1999; Martin and Sunley, 2007) could provide insights. Moreover, such microevolution is not irrelevant for macroevolution (between populations), as the former is the foundation of the latter (Anderson, 1999). Therefore, it would be worthwhile to make more efforts in exploring the co-evolutionary phenomena within individual populations.

Acknowledgements

An earlier version of this paper was presented at the Workshop on „Evolution, Co-Evolution and Regional Innovation Processes“, Heilbronn, Germany, on June 29 2017. We are grateful to Michaela Trippl, Camilla Chlebna, Alexandra Frangenheim and Fabian Faller for giving useful comments on an earlier version of this paper. The usual disclaimer, however, applies.

References

Abatecola, G., Belussi, F., Breslin, D., & Filatotchev, I. (2016). Darwinism, organizational evolution and survival: key challenges for future research. *Journal of Management & Governance, 20*, 1-17.

Anderson, P. (1999). Perspective: Complexity theory and organization science. *Organization Science, 10*, 216-232.

Bathelt, H., & Glückler, J. (2003). Toward a relational economic geography, *Journal of Economic Geography, 3*, 117-144.

Bathelt, H., & Glückler, J. (2014). Institutional change in economic geography. *Progress in Human Geography, 38*, 340-363.

Beinhocker, E. D. (2006). *The Origin of Wealth: Evolution, Complexity, and the Radical Remaking of Economics*. Boston: Harvard Business Press.

Berg, S. H. (2015). Creative cluster evolution: The case of the film and TV industries in Seoul, South Korea. *European Planning Studies, 23*, 1993-2008.

Berg, S. H. (2018). Local Buzz, Global Pipelines and Hallyu: The Case of the Film and TV Industry in South Korea. *Journal of Entrepreneurship and Innovation in Emerging Economies, 4*, 33-52.

Blankenberg, A. K., & Buenstorf, G. (2016). Regional co-evolution of firm population, innovation and public research? Evidence from the West German laser industry. *Research Policy, 45*, 857-868.

Boschma, R. (2017). Relatedness as driver of regional diversification: A research agenda. *Regional Studies, 51*, 351-364.

Boschma, R. A., & Frenken, K. (2006). Why is economic geography not an evolutionary science? Towards an evolutionary economic geography. *Journal of Economic Geography, 6*, 273-302.

Breslin, D. (2011). Reviewing a Generalized Darwinist Approach to Studying Socio-economic Change. *International Journal of Management Reviews*, *13*, 218-235.

Broekel, T. (2015). The co-evolution of proximities–a network level study. *Regional Studies, 49*, 921-935.

Cantwell, J., Dunning, J. H., & Lundan, S. M. (2010). An evolutionary approach to understanding international business activity: The co-evolution of MNEs and the institutional environment. *Journal of International Business Studies, 41*, 567-586.

Carmona, D., Fitzpatrick, C. R., & Johnson, M. T. (2015). Fifty years of co-evolution and beyond: integrating co-evolution from molecules to species. *Molecular Ecology, 24*, 5315-5329.

Coe, N. M., Hess, M., Yeung, H. W. C., Dicken, P., & Henderson, J. (2004). 'Globalizing' regional development: a global production networks perspective. *Transactions of the Institute of British Geographers, 29*, 468-484.

Cooke, P. (2004). Regional innovation systems: an evolutionary approach. In P. Cooke, M. Heidenreich, & H-J. Braczyk (Eds.), *Regional Innovation Systems: The Role of Governance in a Globalized World* (2nd edition) (pp. 1-20). London, New York: Routledge.

Dawley, S. (2014). Creating new paths? Offshore wind, policy activism, and peripheral region development. *Economic Geography*, *90*, 91-112.

Ehrlich, P. R., & Raven, P. H. (1964). Butterflies and plants: a study in coevolution. *Evolution, 18*, 586-608.

Essletzbichler, J. (2012a). Evolutionary economic geographies. In T. Barnes, J. Peck, & E. Sheppard (Eds.), *The Wiley-Blackwell Companion to Economic Geography* (pp. 183-198). Chichester: Wiley-Blackwell.

Essletzbichler, J. (2012b). Generalized Darwinism, group selection and evolutionary economic geography. *Zeitschrift für Wirtschaftsgeographie*, *56*, 129-146.

Evenhuis, E. (2017). Institutional change in cities and regions: a path dependency approach. *Cambridge Journal of Regions, Economy and Society*, *10*, 509-526.

Faller, F. (2016). *Energetisches Regionalisieren. Transformationspraktiken der Energiewende am Beispiel der Biogaserzeugung*. Frankfurt/Main: Peter Lang.

Fornahl, D., Hassink, R., Klaerding, C., Mossig, I., & Schröder, H. (2012). From the old path of shipbuilding onto the new path of offshore wind energy? The case of northern Germany. *European Planning Studies, 20*, 835-855.

Geels, F. W. (2014). Reconceptualising the co-evolution of firms-in-industries and their environments: Developing an inter-disciplinary Triple Embeddedness Framework. *Research Policy, 43*, 261-277.

Geels, F. W., & Schot, J. (2007). Typology of sociotechnical transition pathways. *Research Policy, 36*, 399-417.

Gertler, M. S. (2010). Rules of the game: the place of institutions in regional economic change. *Regional Studies, 44,* 1-15.

Gertler M. S. (2018). Institutions, Geography and Economic Life. In G. Clark, M. Gertler, M. P. Feldman, & D. Wójcik (Eds.), *The New Oxford Handbook of Economic Geography* (pp. 230-242). Oxford: Oxford University Press.

Gong, H., & Hassink, R. (2017). Regional Resilience: the Critique Revisited. In N. Williams & T. Vorley (Eds.), *Creating Resilient Economies: Entrepreneurship, Growth and Development in Uncertain Times* (pp. 206-216). Cheltenham: Edward Elgar.

Grillitsch, M. (2015). Institutional layers, connectedness and change: Implications for economic evolution in regions. *European Planning Studies, 23*, 2099-2124.

Grillitsch, M., & Rekers, J. V. (2016). How does multi-scalar institutional change affect localized learning processes? A case study of the med-tech sector in Southern Sweden. *Environment and Planning A, 48*, 154-171.

Grillitsch, M., & Sotarauta, M. (2018). Regional Growth Paths: From Structure to Agency and Back (No. 2018/1). Lund University, CIRCLE-Center for Innovation, Research and Competences in the Learning Economy.

Hall, P. A., & Thelen, K. (2009). Institutional change in varieties of capitalism. *Socio-Economic Review, 7*, 7-34.

Hansen, T., & Coenen, L. (2015). The geography of sustainability transitions: Review, synthesis and reflections on an emergent research field. *Environmental Innovation and Societal Transitions, 17*, 92-109.

Hassink, R. (2010). Locked in decline? On the role of regional lock-ins in old industrial areas. In R. Boschma & R. Martin (Eds.), *Handbook of Evolutionary Economic Geography* (pp. 450-468). Cheltenham: Edward Elgar.

Hodgson, G. M., & Knudsen, T. (2006). Why we need a generalized Darwinism: and why generalized Darwinism is not enough. *Journal of Economic Behavior and Organization, 61*, 1-19.

Hoffman A. J. (1999). Institutional evolution and change: Environmentalism and the US chemical industry. *Academy of Management Journal, 42*, 351-371.

Janzen, D. H. (1980). When is it coevolution? *Evolution, 34*, 611–612.

Kallis, G., & Norgaard, R. B. (2010). Coevolutionary ecological economics. *Ecological Economics, 69*, 690-699.

Krueger, R., Schulz, C., & Gibbs, D. C. (2017). Institutionalizing alternative economic spaces? An interpretivist perspective on diverse economies. *Progress in Human Geography*, 0309132517694530.

Lazzeretti, L., & Capone, F. (2017). The transformation of the Prato industrial district: an organisational ecology analysis of the co-evolution of Italian and Chinese firms. *The Annals of Regional Science, 58*, 135-158.

MacKinnon, D., Cumbers, A., Pike, A., Birch, K., & McMaster, R. (2009). Evolution in economic geography: institutions, political economy, and adaptation. *Economic Geography, 85*, 129-150.

Mahoney, J., & Thelen, K. (Eds.) (2010). *Explaining Institutional Change: Ambiguity, Agency, and Power*. Cambridge: Cambridge University Press.

Malerba, F. (2006). Innovation and the evolution of industries. *Journal of Evolutionary Economics, 16*, 3-23.

Martin, R. (2012). (Re) Placing path dependence: a response to the debate. *International Journal of Urban and Regional Research, 36*, 179-192.

Martin, R., & Sunley, P. (2006). Path dependence and regional economic evolution. *Journal of Economic Geography, 6*, 395-437.

Martin, R., & Sunley, P. (2007). Complexity thinking and evolutionary economic geography. *Journal of Economic Geography, 7*, 573-601.

Martin, R., & Sunley, P. (2015a). Towards a developmental turn in evolutionary economic geography? *Regional Studies, 49*, 712-732.

Martin, R., & Sunley, P. (2015b). On the notion of regional economic resilience: conceptualization and explanation. *Journal of Economic Geography, 15*, 1-42.

Maskell, P., & Malmberg, A. (2007). Myopia, knowledge development and cluster evolution. *Journal of Economic Geography, 7*, 603-618.

McKelvey, B. (1999). Avoiding complexity catastrophe in coevolutionary pockets: Strategies for rugged landscapes. *Organization Science, 10*, 294-321.

Meyer, A. D., Gaba, V., & Colwell, K. A. (2005). Organizing far from equilibrium: Nonlinear change in organizational fields. *Organization Science, 16*, 456-473.

Miörner, J., & Trippl, M. (2017). Paving the way for new regional industrial paths: actors and modes of change in Scania's games industry. *European Planning Studies, 25*, 481-497.

Moulaert, F., & Sekia, F. (2003). Territorial innovation models: a critical survey. *Regional Studies, 37*, 289-302.

Murmann, J. P. (2003). *Knowledge and Competitive Advantage: The Coevolution of Firms, Technology, and National Institutions*. Cambridge: Cambridge University Press.

Murmann, J. P. (2013). The coevolution of industries and important features of their environments. *Organization Science, 24*, 58-78.

Nelson, R. R. (1995). Co–evolution of industry structure, technology and supporting institutions, and the making of comparative advantage. *International Journal of the Economics of Business, 2*, 171-184.

Norgaard, R. B. (1994). *Development betrayed: The end of progress and a coevolutionary revisioning of the future.* London: Routledge.

Phelps, N. A., Atienza, M., & Arias, M. (2018). An invitation to the dark side of economic geography. *Environment and Planning A*, 0308518X17739007.

Rodríguez-Pose, A. (2013). Do institutions matter for regional development? *Regional Studies, 47*, 1034-1047.

Sanz-Ibáñez, C., Wilson, J., & Clavé, S. A. (2017). Moments as catalysts for change in the evolutionary paths of tourism destinations. In P. Brouder, S. A. Clavé, A. Gill, & D. Ioannides (Eds.), *Tourism destination evolution* (pp. 81-102). London: Routledge.

Schamp, E. W. (2010). On the notion of co-evolution in economic geography. In R. Boschma & R. Martin (Eds.), *Handbook of Evolutionary Economic Geography* (pp. 432-449). Cheltenham: Edward Elgar.

Schamp, E. W. (2017). Evolutionary Economic Geography. In D. Richardson, N. Castree, M. F. Goodchild, A. Kobayashi, W. Liu, & R. A. Marston (Eds.), *The International Encyclopedia of Geography* (pp. 1-11). London: Wiley.

Schröder, M., & Voelzkow, H. (2016). Varieties of regulation: how to combine sectoral, regional and national levels. *Regional Studies, 50*, 7-19.

Scott, W. R. (1995). *Institutions and organizations* (Vol. 2). Thousand Oaks, CA: Sage.

Setterfield, M. (1993). A model of institutional hysteresis. *Journal of Economic Issues*, *27*, 755-774.

Sotarauta, M., & Mustikkamäki, N. (2015). Institutional entrepreneurship, power, and knowledge in innovation systems: institutionalization of regenerative medicine in Tampere, Finland. *Environment and Planning C, 33*, 342-357.

Steen, M., & Hansen, G. H. (2018). Barriers to Path Creation: The Case of Offshore Wind Power in Norway. *Economic Geography, 94*, 188-210.

Storper, M. (2018). Separate Worlds? Explaining the current wave of regional economic polarization. *Journal of Economic Geography*, 18(2), 247-270.

Strambach, S., & Pflitsch, G. (2018). Micro-dynamics in regional transition paths to sustainability-Insights from the Augsburg region. *Applied Geography, 90*, 296-307.

Ter Wal, A. L., & Boschma, R. (2011). Co-evolution of firms, industries and networks in space. *Regional Studies, 45*, 919-933.

Thelen, K. (1999). Historical institutionalism in comparative politics. *Annual Review of Political Science, 2*, 369-404.

Thompson, J. N. (2005). *The Geographic Mosaic of Coevolution*. Chicago: University of Chicago Press.

Weig, B. (2016). *Resilienz komplexer Regionalsysteme: Brunsbüttel zwischen Lock-in und Lernprozessen*. Wiesbaden: Springer-Verlag.

Winter, S. G. (2017). Pursuing the Evolutionary Agenda in Economics and Management Research. *Cambridge Journal of Economics, 41*, 721-747.

Xin, X. R., & Mossig, I. (2017). Co-evolution of institutions, culture and industrial organization in the film industry: the case of Shanghai in China. *European Planning Studies, 25*, 923-940.

Yeung, H. W. C. (2005). Rethinking relational economic geography. *Transactions of the Institute of British Geographers, 30,* 37-51.

Zukauskaite, E., Trippl, M., & Plechero, M. (2017). Institutional thickness revisited. *Economic Geography, 93*, 325-345.

Paper 3. Developing Shanghai online games industry: a multi-scalar institutional perspective

Accepted in *Growth and Change: A Journal of Urban and Regional Policy*

Developing the Shanghai online games industry: a multi-scalar institutional perspective

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Abstract: In recent decades, while place-based policies and local development have attracted the interest of institutional economic geography, the issue of features of certain industries and how they are shaping and shaped by institutions at multiple spatial scales, has not been taken up sufficiently. This article, based on a local creative industry—the Shanghai online games industry, which is an essential part of the new media sector, takes issue with it. It explores two aspects, namely, how multi-scalar institutions relate and influence the development of the online games industry in Shanghai, and second, how local firms and entrepreneurs affect local and national institutions. It shows that the three aspects that are related to media sector in general and games industry in particular (i.e., cultural influence, technological significance and economic value) matter much as they have resulted in diverse industry-relevant policies and regulations devised by local and national states. Moreover, local firms and entrepreneurs with different capacities and characteristics also differ much in influencing the design of the industry-specific institutions in the face of institutional voids.

Keywords: Multi-scalar institutions, industry specificity; downward and upward causations; online games industry, Shanghai

1. Introduction

The idea that institutions, which "are the humanly devised constraints that structure political, economic and social interaction" (North, 1991, p. 97), or 'rules of the game', play a major role in shaping economic growth has been widely shared in social sciences (North, 1990; Amin & Thrift, 1995; Jessop, 2001; Rodríguez-Pose and Storper, 2006; Farole et al., 2011; Hayter & Patchell, 2011; Rodríguez-Pose, 2013; Scott, 2013; Gertler, 2018; Zukauskaite et al., 2017; Storper, 2018). While much previous research in institutional economics and political science has focused on national institutions (e.g., Hall & Soskice, 2001; Hall & Thelen, 2009), economic geographers show more interest in the role of regional institutions (e.g., Amin & Thrift, 1995; Storper, 1995; Tödtling & Trippl, 2005; Farole et al., 2011; Rodríguez-Pose, 2013; Zukauskaite et al., 2017). Recently, some theoretical work in economic geography has advocated for a better understanding of institutions at different spatial scales, as well as the downward and upward causations of institutional dynamics (Gertler, 2010, 2018; Schröder & Voelzkow, 2016). However, such a perspective has not been taken up much in empirical studies in economic geography.

Against this background, this paper aims to contribute to the literature in economic geography on how downward and upward causations of institutional dynamics are shaping and shaped by the specific features of a local industry[4]. It does so by zooming in on the interrelationships between institutions and the development of a local creative industry—the Shanghai online games industry. Online games industry can be seen as a typical case of the creative industries/ the new media industries, as it shares some key features with other creative industries (Cohendet et al., 2018; Tsang, 2007). Such features might contribute to diverse causal mechanisms between industrial and institutional dynamics in a co-evolutionary manner—that is, the dynamics of relevant populations (e.g., industries, institutions) at one scale influence and are influenced by the activities taken by populations at other levels (Gong & Hassink, 2018). From an institutional perspective, China is an interesting country to investigate top-down and bottom-up initiatives, as its central government remains powerful in regulating many of the creative industries which are deemed important from a cultural/ideological perspective (Shan, 2014). In contrast, local

[4] In this paper, we are mostly interesting in the role of formal institutions (e.g., formal laws, regulations, guidelines), as well as the dynamics of such formal institutions.

governments only have limited power in designing and implementing policies dealing with the trivial aspects of such creative industries. This will be demonstrated in the empirical parts. Shanghai is an ideal location for conducting such a research, because it was the first city in China to include the online games industry as a significant constituent of the broader creative economy (CNG, 2015), and today it still remains one of the most important locations for game development in China. By tracing the co-evolutionary locus of the local games industry and relevant local and national institutional arrangements, more knowledge can be generated on how multi-scalar institutions influence the development of a local creative industry and vice versa, in China[5], in general, and in Shanghai, in particular.

We explore this topic from a local industry perspective—that is, looking at the impact of both national and regional institutions on Shanghai games industry development on the one hand, and exploring the ways of how local firms and entrepreneurs influence national and regional institutions on the other[6]. Instead of treating the industry as a homogeneous entity, we pay particular attention to different features of the sector—namely, its social and cultural influence, technological significance and economic potential. We focus specifically on how institutions at national and regional levels are related to the different characteristics of the industry, and thus influence the local industry development, and vice versa.

The paper contributes to the economic geographical literature in two aspects. First, it manages to show how industry specificity matters concerning institutional multi-scalarity. Secondly, it exhibits the importance of combining upward and downward perspectives systematically in studying institutional dynamics. The article is structured as follows: in Section 2, the general theoretical relationships between institutions and local industrial development are explored. Section 3 introduces the case study as well as the research methods adopted. Empirical evidence is provided from Section 4 to 6. And the final section discusses and concludes the paper.

[5] There is an abundant literature on multi-scalar institutions in China from several disciplinary perspectives, such as urban studies (see for instance Zhang & Li, 2016; Shin, 2014), which we do not further introduce, since the focus of our paper is solely on institutional multi-scalarity from an economic geography perspective.

[6] The focus will, however, not be on local-national institutional interactions and conflicts, which have been researched in the Chinese context in other disciplines, such as urban studies and political science.

2. Institutions and local economic development

Institutions have long been argued to be crucial for economic growth at multiple scales (Gertler, 2010). Here, we mainly review two strands of literature that are relevant to our study — namely, the spatiality of institutions and institutional change.

2.1 The spatiality of institutions

Much research in institutional economics, such as the work on national innovation systems (Lundvall, 2010), and varieties of capitalism (Hall & Soskice, 2001; Hall & Thelen, 2009), shows that the emergence and evolution of certain industries in space depend on the configuration of the national institutional framework (Grillitsch & Rekers, 2016). Economic geographers, on the other hand, have developed a considerable body of work looking at the impact of local and regional institutions on regional development (e.g., Amin & Thrift, 1995; Storper, 1995; Tödtling & Trippl, 2005; Farole et al., 2011; Rodríguez-Pose, 2013; Zukauskaite et al., 2017), including foci on regional innovation systems (Cooke et al., 2004; Asheim & Coenen, 2006; Isaksen et al., 2018), regional clusters (Saxenian, 1990; Maskell & Malmberg, 2007), and regional competitiveness (Beer & Lester, 2015). Previous work has highlighted that institutions condition, enable, and constrain the economic vitality and innovation capacity of regional economies, providing legal frameworks for actions, defining communication patterns, and affecting learning possibilities (Gertler, 2010).

While the above-mentioned literature is insightful, there is an increasing awareness that more attention needs to be paid to a better understanding of the inter-relationships between institutions at different spatial scales (Essletzbichler, 2012; Gertler, 2010, 2018; Grillitsch & Rekers, 2016; Schröder & Voelzkow, 2016; Hu & Hassink, 2017). Both “downward causation” (top-down processes of policy implementation) and “upward causation” (industrial actors influence and alter institutions through a bottom-up way) have been increasingly argued to be fundamental mechanisms through which institutions and economies interact (e.g., Martin & Sunley, 2011).

While theoretical efforts have been made to depict the role of multi-scalar institutions on local economic development, the empirical analyses remain preliminary and tentative at best (Fornahl et al., 2015; Trippl et al., 2015; Gertler, 2018).

2.2 Institutional change and institutional entrepreneurship

Since the early 2000s, increasing attention has been paid to the dynamics and changes of institutions and how that relates to regional economic development and change (Jessop, 2001; Sotarauta & Pulkkinen, 2011; Bathelt & Glückler, 2014; Grillitsch, 2015; Uyarra et al., 2017; Gertler, 2010, 2018; Glückler et al., 2018). Regarding the specific mechanisms that contribute to institutional change, studies on institutional entrepreneurship (e.g., Garud et al., 2007; Sotarauta & Pulkkinen, 2011; Grillitsch & Sotarauta, 2018), and institutional work (Binz et al., 2016; Fuenfschiling & Truffer, 2016; Lawrence & Suddaby, 2006) have provided interesting insights. The notion of institutional entrepreneurship was firstly introduced by DiMaggio (1988) in an effort to explain how actors can contribute to changing institutions despite pressures towards stasis. Battilana et al. (2009) suggest that institutional entrepreneurs are change agents who initiate divergent institutional changes and who actively participate in the implementation of these. They consist of multiple actors ranging from inventors and innovators to policy-makers. Some actors engage in the exploration and exploitation of opportunities for new path development whilst others work to facilitate such processes. The more recent literature on institutional work has further extended the research on institutional entrepreneurship as it investigates “the purposive action of individuals and organizations aimed at creating, maintaining and disrupting institutions” (Lawrence & Suddaby, 2006, p. 215). Specifically, researchers have categorized multiple forms of institutional work that can be taken by individual and collective actors. Particularly in creating new institutions, Lawrence & Suddaby (2006) observed that the kind of institutional work used to create institutions reflect three broader categories of activities—namely, political work, reconfiguring belief systems, and altering meaning systems.

The work on institutional dynamics and institutionalism in local economic development (Wood & Valler, 2001; Cumbers et al., 2003; Hayter, 2004) have contributed to the longstanding ‘structure-agency’ debate in institutional studies. While the research of ‘old’

institutional theories tend to stress a top-down way of institutional implementation (highlighting the influence of big 'structures'), the work on institutional change highlights the agency of individuals and organizations in altering the evolution of institutions at multiple levels (highlighting the role of agencies). Moreover, in the context of developing and emerging economies, where market economies are not sophisticatedly developed (Mair et al., 2012; Schrammel, 2014), institutional entrepreneurship and institutional work can also be considered as a reaction to "institutional voids", which are situations where institutional arrangements that support markets are either absent, weak, or fail to accomplish the role expected of them (Liu, 2011; Mair & Marti, 2009).

While literature in economic geography and the broader social sciences has contributed much to the knowledge of the co-relationship between institutions and local economic development, some deficiencies can be identified. First of all, while existing economic geographical literature focuses on territorial institutions and policies (i.e., region- or nation-specific institutions), industry-relevant policies that are geared towards the specific characteristics of certain industries have not drawn equivalent attention: "…The discussions about customization [of regional policy] due to different innovation practices within different industries and firms are not explicitly elaborated" (Moodysson & Zukauskaite, 2014, p. 130; see also Asheim & Coenen, 2006, p. 163). In this context we stress that it would be fruitful to contextualize the different characteristics of the focal industry under investigation when analyzing its co-relationship with the regional and national institutional frameworks.

Secondly, while various forms of institutional work taken by industry promoters in a bottom-up way have been noted as significant for institutional dynamics, the mechanisms of how local firms and entrepreneurs try to influence the industry-specific institutional framework remain understudied. Questions such as "do firms and entrepreneurs with different capabilities and characteristics differ in their strategies in influencing the institutional setup?", and "what will they do when facing institutional voids?" remain poorly explored.

The case study on online games industry in Shanghai, which will be presented in the rest of the paper, will deal with both of these issues.

3. Case study and research methods

3.1 Research context

Previous research on the creative industries in China has provide novel insights on the spatiality and modes of development of creative clusters from urban planning and land use perspectives (Keane, 2009; Gu, 2014; O'Connor & Liu, 2014; He & Huang, 2018; He, 2017), the history of cultural and creative industry policies, and the political-economy of China's creative economy (O'Connor & Gu, 2006; O'Connor & Liu, 2014; Keane, 2013b; Shan, 2014; Zhang, 2017; Zheng, 2010, 2011). Among all these studies, an unavoidable question that scholars must explore is the role of states in developing those creative industries. There is a common sense that in general, the central government has a decisive power in developing creative industries. It does so by putting forward the goals of all major policies for creative industries. Then there is a top-down formulation and circulation of policy through national administrative departments, and further specification by local governments (Shan, 2014). Although, there is literature on the role of local states in designing, fostering and controlling creative industry clusters in general (Keane 2013a; O'Connor & Gu 2014; Ren & Sun, 2012; He, 2017; Zheng, 2010, 2011), hardly any research has zoomed in on the characteristics of certain creative industries, and explored how such characteristics are related to the regulations and policies at different levels.

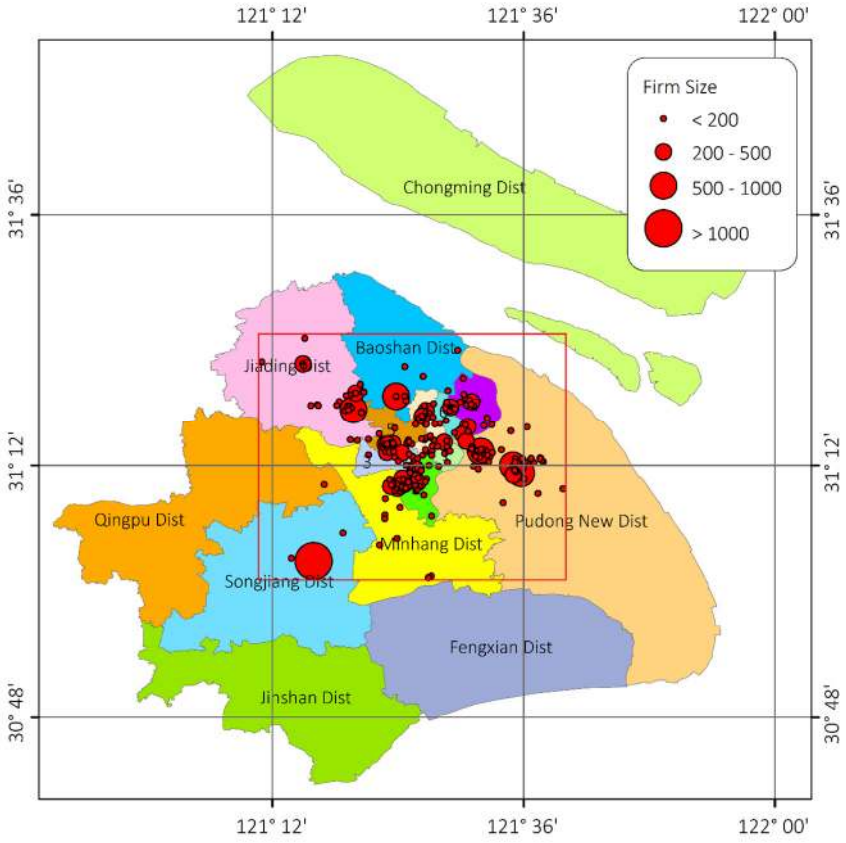
Concerning the industrial context, online games industry is a creative industry (Cohendet & Simon, 2007; Cao & Downing, 2008; Ernkvist & Ström, 2008; Tsang & Tschang, 2012; Cheung & Fung, 2016; Chew, 2016; Gong & Hassink, 2017; Cohendet et al., 2018), and it is also an essential part of the new media sector (Dovey and Kennedy, 2006). Tschang (2007), for instance, manifests that online games are sophisticated products that combine programming technology with artistic content and interactive qualities, and Cohendet et al. (2018), largely in consensus with this, argue that video game activities are those for which the coupling between the arts and science or technology is the strongest among all creative industries. While unique in many ways, the games industry shares similarities with other new media industries such as cartoon and broadcasting, in which the cultural influence, the reliance on information and communication technologies, and the strong economic

contribution of such industries have drawn the attention of both scholars and politicians (we will elaborate such characteristics in the later part of the paper). Because of such similarities shared among different creative industries, it is natural to assume that the insights drawn from this specific case study could potentially contribute to a better understanding of the relationship between industrial evolution and institutional dynamics in the creative industry sectors in China.

As one of the first cities in China to support the video games industry as an essential part of the creative economy, the development of a commercially successful online games industry in Shanghai can be traced back to the early 2000s when Shanda Games published a Korean game—*Legend of Mir II* in China. After more than 15 years of development, the industry has achieved great success in Shanghai. The Shanghai Games Industry Report 2015 (CNG, 2015) showed that Shanghai online games sales revenue reached 49.93 billion RMB yuan, accounting for 35.5% of the total revenue of game sales in the country. The overseas online game sales revenue experienced an annual increase of 31.6%, and reached $ 694,800,000.

Based on the data from CGIGC—the official website of China´s Games Industry, the distribution pattern of Shanghai online game firms is illustrated in Figure 1. Geographically, most of the online games companies are located in governmental-planned high-tech or software parks.

Figure 1. Geographical Pattern of Shanghai Online Games Industry.



3.2 Research methods

Since our interest in this paper lies in answering the 'how' questions (namely, how do multi-scalar institutions influence the development of a local creative industry? how do local entrepreneurs and firms from the industry try to alter the institutional environments at the local and national levels?), a single case study approach seems appropriate (Yin, 2018). Such a single case study allows us to collect concrete, context-dependent knowledge related to the specific case (Flyvbjerg, 2006). Our research relies on 'theoretical sampling', namely, the Shanghai case is chosen for the theoretical insights it has to offer (i.e. analytic generalizability) (Eisenhardt, 1989; Eisenhardt and Graebner, 2007). As a representative case, the development of the online games industry in Shanghai as well as the downward and upward mechanisms observed in institutional dynamics could potentially provide some lessons for other regions where similar creative industries have been developed locally. In other words, the insights generated from the Shanghai online games industry could provide an entry point for industry promoters in other regions aiming to influence the local and national institutional environments specific to the focal industries.

Purposeful sampling is applied in the fieldwork, based on the understanding that "the logic and power of purposeful sampling lies in selecting information-rich cases for study in depth … [which] are those from which one can learn a great deal about issues of central importance to the purpose of the research …" (Patton, 1990, p. 169). Our purpose sampling results in 32 in-depth semi-structured interviews lasting between one and a half to two hours. As Ernkvist & Ström (2008) assert in their own experience, researching on the Chinese online game industry poses many problems, as the Chinese government's control over a number of information sources. Concerning our own experience, since governing bodies of online games industry at Shanghai city level have not provided all their documents openly, a comprehensive research based on documentary and archival work would be impossible. Our interviews as well as visits to local officers and industrial parks, therefore, provide invaluable complementarities to the documents we collected both openly and privately. This part of data not only enables us to get the information that could not be readily accessed otherwise, but also provides insightful knowledge on the logics behind the decisions of local authorities when implementing policies from senior levels of government. Moreover, such interviews and visits to the site, as well as informal and casual conversations with local people also allow us to read between the lines in the specific political context.

We interviewed different groups of people including founders/ senior managers of local companies, directors of cluster organizations, officials of industrial governing authorities, etc. (Table 1). All interviews were digitally recorded and transcribed, and were analyzed with a combined method of thematic and discourse analyses. Interviews are not only internally triangulated, but also triangulated with the large number of documents we collected from various sources (e.g., internal materials from interviewees, and open materials from the official websites of the relevant governing authorities) (Eisenhardt, 1989; Eisenhardt and Graebner, 2007).

The next three sections will present the empirical results of the study. Based on documents, reports, scientific publications we have collected, Section 4 and 5 explore the relevant regulating bodies of the online games industry at national and local levels, as well as the specific policies and announcements that have been designed by these organizations. Particular attention has been paid to the industry specificity of the online games industry, and how such specificity influences what have been designed by regulators. Section 6

investigates the bottom-up way of institutional entrepreneurship, initiated by local firms and entrepreneurs, in influencing the institutional arrangements at local and national levels. We examine closely, as well, how industry specificity influences the motivation of local enterprises to bargain and lobby.

Table 1. Target groups and purposes of interviews.

Interview groups	No. of interviewees	Purposes of interviews
Founders/managers of local companies	23	Understanding 1) the history of local industry development; 2) challenges and difficulties they had to conquer in developing their business; 3) industry governing bodies at local and national levels and their influence on the development of the local industry; 4) laws, regulations and policies that are relevant for their businesses
Directors of cluster organizations[7]	5	Understanding 1) the history and milestones of the organizations; 2) initiatives and key events that have been taken by the organizations; 3) interactions and relationships with local and national authorities
Officials	4	Understanding 1) the formal institutional context of the industry; 2) the logics behind supporting/deterring the industry; 3) the mechanism of multi-scalar relations in the specific sector
Total	32	Co-evolution of the local games industry and multi-scalar institutions

[7] All of the clusters we visited are fully-funded, either by central or local governments, and the managers of such cluster organizations (e.g., High-tech Park Management Committee) are all paid out of public money.

4. National regulators and industry-relevant institutions

4.1 Labor division of national authorities: how do industrial characteristics matter?

In general, the national government is the most influential political institution as it oversees local and regional authorities (Hayter & Patchell, 2011). Due to the centralized governance of the Chinese Communist Party (CCP), administrative measures and interventions at central state level have a strong impact on the development of local creative industries (Murphy, 2012). Since its emergence in China, the online games industry has received much but varied attention. Here, we focus on policies and regulations that relate to the three characteristics of the online games industry—namely, its cultural influence, technological significance and economic value[8].

Online games are cultural products (Cheung & Fung, 2016). With regard to their cultural influence, the central state concerns two aspects in particular. On the one hand, online games industry is a sector that has strong cultural and ideological influence on Chinese citizens. On the other, the development of the industry was seen as an instrument of the state to strengthen its soft power (Ernkvist & Ström, 2008). In respect to the first concern, the central government has adopted strict regulatory measures to ensure that the development of the industry is in line with the political agenda of the Communist Party—namely, it promotes Chinese citizens´ socialist core values (shehuizhuyi hexinjiazhiguan, 社会主义核心价值观), on the one hand, and that the influx of foreign games exerts no threat to the Chinese national identity, on the other (Cao & Downing, 2008). In order to strengthen China's soft power, national authorities had supported the development of online games with Chinese features through subsidies and favorable tax treatments (Ernkvist & Ström, 2008). These guidelines and regulations were mainly issued by Chinese national ministries and state-run industrial committees and associations. Among others, the Ministry of Culture (MOC, 文化部), the General Administration of Press and Publications (GAPP, 新闻出版总署) [it has been merged with the State Administration of Radio, Film, and TV (SARFT, 广播电影

[8] As mentioned earlier, these characteristics are, in general, applicable to the new media sector. But so far, according to our knowledge, no research has tried to connect such industrial characteristics to the concrete industrial policies and institutional dynamics. This is where we aim to contribute to.

电视总局) into the State Administration of Press, Publication, Radio, Film and TV (SAPPRFT, 新闻出版广播电影电视总局) since 2013], and its affiliated industrial committee— Game Publishing Committee (GPC, 游戏工委), and the Ministry of Industry and Information Technology (MOIIT, 工业和信息化部) are the most relevant authorities.

The second characteristic of the online games industry is that it is an IT-based high-technology industry. Therefore, it is the Ministry of Science and Technology (MOST, 科技部) that is the main national authority targeting at improving the innovative capacity and technological progress of domestic online games companies by, among others, providing financial incentives for game development projects and preferential tax treatments, and incorporating them into the State High-Tech Development Plan (Ernkvist & Ström, 2008).

Thirdly, the online games industry in China is a billion-dollar business (Cao & Downing, 2008). The fact that in 2004 Shanda Games (the leading publisher of online games in China back then) was listed in NASDAQ and four out of the top ten wealthiest individuals in the Chinese Forbes ranking were based in the online games industry caught the interest of both businessmen and policy-makers (Chew, 2016). In the interest of promoting the industry, the central government has announced several industry-specific supporting incentives through its ministries. Among others, GAPP and the affiliated GPC are, among others, the organizations that have taken due account of the lucrative potential of the industry.

4.2 Industry-relevant policies and regulations at national level

Based on the three characteristics of online games industry, we have collected and compiled the regulations, announcements, and measures that were related to the online games industry since 2000. Cultural influence remains the main concern of the central government. Particularly, the social and cultural influence of online games on its citizens has resulted in most political attention from the Party. MOC, GAPP and MOIIT, among others, contributed most to the online games cultural regulations, though with different priorities. Guidelines and measures related to online games' social and cultural influence mainly focused on game operations regulations, content censorship, Internet cafés management, game firms' self-censorship, etc. Regulatory policies were quite intensive in the early phase of industrial

development (before 2005), and were lightened in the early 2010s, but became intensive again recently.. Games' influence on youth health (both mental and physical) also received adequate policy attention. GAPP, MOE, MOC, the Communist Youth League of China (CYL, 共青团), among others, are the main regulating bodies. Policies concerning youth protection include installing anti-addiction systems in online games, limiting gaming times, real-name authentication, etc.

In parallel to the strict cultural regulative policies, aiming at ensuring that the industry meets the Party's political agenda, the national authorities also aim to manipulate the industry as an instrument to strengthen China's soft power. Considering that games are cultural products that are not only consumed by Chinese citizens but can also be exported as carriers of Chinese culture, Ministry of Finance, General Administration of Customs, GAPP, etc., announced strong incentives in the second half of 2000s and early 2010s to facilitate the export of Chinese games. The state's support for the indigenous games industry is not an isolated effort but a part of an ongoing state-initiated reform to build strong cultural industries (Cao & Downing, 2008).

Technologically relevant incentives relate to two main concerns: improving domestic innovation capacity and restricting foreign competitors on the domestic market. To achieve the first goal, online games engine research was for the first time included in the State High-Tech Development Plan (863 Program) by MOST in 2003. The aim of this plan was to improve the self-development capabilities of domestic game companies in the key technology of online games-- game engines. Furthermore, two specific projects—the Chinese Ethnic Online Games Publishing Project (Zhongguo minzu wangluoyouxi chuban gongcheng, 中国民族网络游戏出版工程), initiated in 2004, and the Chinese Self-Developed Boutique Online Games Publishing Project (zhongguo yuanchuang youxi jingpin chuban gongcheng, 中国原创游戏精品出版工程), which started in 2016, have been established by GAPP aiming at encouraging self-developing games with Chinese cultural elements. In addition to encouraging domestic innovation, the central government also sought to limit competition from foreign companies in the domestic market. MOC and GAPP have done this by developing several measures throughout the industry's history to strengthen foreign game censorship, ban foreign direct investment and promote joint

ventures. These two aspects combined, contribute to an unbalanced competitive situation clearly favors domestic, such as Shanghai, firms.

The third aspect of policy interest relates to the lucrative nature of the industry. In addition to the broader support incentives for cultural exportat and technological progress, the GAPP supported two annual industry events, namely, the annual video games exhibition—Chinajoy, and the Annual Conference of Games Industry, both of which were initiated in 2004. The former deputy director of the Electronic Audio and Video Division (中国音像出版司), Kou Xiaowei, who has worked for the industry since its emergence, suggested and supported these events. He mentioned in many public speeches that the motivation for GAPP to initiate these events was the industry's great economic contribution as well as its strong growth. While Chinajoy provides producers opportunities to meet both domestic and global players, the Annual Conference is the occasion where industrial practitioners and government officers meet.

5. Local and regional institutional actors and local online games industry development

5.1 Shanghai regulating bodies

Several authorities in Shanghai implement the policies and regulations introduced by the central government and national ministries (Table 2). These local departments primarily perform two functions: namely, implementing policies, measures, and announcements of higher governmental organizations, and promoting, regulating and managing local industries and economies.

Concerning social and cultural administration of the industry in Shanghai, the Shanghai Administration of Press and Publication (SAPP,上海市新闻出版局) and the Shanghai Administration of Culture, Radio, Film &TV (SACRFT, 上海市文化广播影视管理局) are the local organizations that carry out policies devised by GAPP and MOC. The Shanghai Commission of Economy and Informatization (SCEI, 上海经济信息委员会) is the local

department that implements regulations and policies from MIIT. Regarding technological development, the Shanghai Commission of Science and Technology (SCST, 上海科学技术委员会) is the organization that promotes local technological innovation and it is correspondent to MOST at the national level.

In addition to industrial governance, local officers are also highly motivated to promote the development of a local games industry. Among others, Shanghai city government, Shanghai district governments, and Shanghai cluster-facilitating organizations (e.g., Offices of High-tech Parks, Software Parks, Creative Clusters, etc.) have developed various favorable strategies to both attract high potential game enterprises as well as support the development of existing companies. The Shanghai Game Incubator in Jiading District (Shanghai Game Industry Incubator), is a representative example as such, as that the district government provides free or lower-priced offices, financial, administrative, and training services, as well as personal income tax refund for higher managers of games companies to attract firms with the aim of generating more local tax revenues (Official 1; CEO, Company 19; Cluster manager, cluster 1; Official 2).

Table 2. Local and national authorities and their responsibilities.

Characteristics of online games industry	**State authorities and responsibilities**	**Local authorities and responsibilities**
Cultural influence	MoC— regulates and censors cultural content of online games. GAPP and GPC—regulates, licenses, or censors video games before going online. MIIT—regulates and licenses Internet content providers, telecommunications, and software.	SAPP—executes power delegated by Shanghai government, implements regulations from GAPP and regulates local publishing industry. SACRFT–executes power delegated by Shanghai government, implements regulations from MOC and regulated local cultural industries.

		SCEI—implements rules from MIIT, and promotes Shanghai industrialization and informatization.
Technological significance	MOST—improve the technological innovation capability of domestic game developing firms.	SCST—improve innovation of online games firms located in Shanghai.
Economic Potential	GAPP and GPC—support or organize industry-specific events including Chinajoy, and Annual Conference of Games Industry.	Shanghai city government—hosts Chinajoy annually. District governments, cluster-facilitating organizations—form clusters and attract high potential companies.

5.2 Different role of Shanghai authorities: how do industry characteristics matter?

As illustrated above, the online games industry is a complex web of activities, where the diverse aspects of the industry has been subject to the supervision of different departments. Therefore, the nature and potential of top-down governmental power varies considerably. The three characteristics of the online games industry are relevant in this respect, as they largely influence how much discretion local authorities have in the exercise of power locally.

As analyzed above, the cultural and social influence of the industry have resulted in highly intense political attention at the national level. Therefore, the central government and national ministries leave little room for local authorities to negotiate the censorship of game content and the rules and regulations of the games industry. In this respect, Shanghai city simply forwarded documents from central government instead of adopting localized regulatory measures. Similar to the argument of Cao & Downing (2008) that video games are seen as central to its priorities by the party-state´s ideological apparatus, a senior officer in SACRCT claimed that the lack of autonomy in localities in this respect is mainly due to the fact that the industry has extensive influence on the whole society. Although games are produced locally, they are consumed nationally, or even globally. Therefore, " …instead of transferring powers to the localities, the central government wants to keep the industry

under its direct control, because it is an Internet-based industry, which, unlike traditional cultural industries, is much more difficult to regulate and supervise without a strong centralized force." (CEO, company 20). That said, the central government regards the monitoring of the cultural influence of industry as its own administrative power. (shiquan, 事权).

In terms of financial support, local and central governments share the administrative responsibility for financing the development of the local games industry. Theoretically, the online games industry is relevant to two broader sets of financial support from the central government: as a significant composition of the cultural and creative sector, it receives the subsidies that MOC has granted for prospering national cultural and creative industries; as an IT-based technological industry, it is also within the scope of financial support provided by MOST. At Shanghai city level, local departments also allocate a considerable share of their budgets to the provision of local matching funds under these national grants. The online games industry is part of the following local matching funds and projects: the SCE´s Software and Integrated Circuit Industry Development Special Funds, the SCST´s Science and Technology Little Giant Project, the Shanghai Torch Program, and the Shanghai Cultural and Creative Industry Promotion Leading Group's Cultural and Creative Industries Development Special Funds. However, as many interviewees claimed, online games are only a very small part within the high-tech sector, and these funds are made available to all relevant high-tech industries, therefore, not all companies could benefit from these incentives due to the 'picking winners' strategies of the state and local authorities (CEO, company 2; Producer, Company 5; CEO, Company 11; Developer, company 22). More industry-specialized support funds, therefore, need to be provided at local level (Content Director, Company 3; CEO, Company 18). Among others, SACRF´s Animation and Game Industry Development Support Fund is the special fund targeting at prospering Shanghai online games industry. Initiated in 2011, this incentive has been implemented annually by Shanghai city and its subordinate departments, and has benefited many game enterprises.

In addition to administrative responsibilities for sponsoring local game companies, the central and Shanghai governments also share the financial power (caiquan, 财权) —tax incomes, generated by the local online games industry. In this regard, localities are strongly motivated to attract and maintain high potential creative enterprises in the region due to

the cadres' promotion systems in China (Designer, Company 7). A head of a cluster-facilitating organization based in Jiading district mentioned that they had made quite some efforts to foster a local games industry cluster (Cluster manager, cluster 2). These include personal income tax refund for senior executives, preferential tax treatment for game companies, free or low-rent office provision, subsidies, administrative services, as well as public procurement of hardware that were too expensive for individual SMEs (such as game rendering machines, 3d scanners, motion capture machines, etc.). Another officer based in Putuo district also recalled how the district government and cluster-facilitating office tried to attract Unity Technologies, an American company which is best known for the development of Unity— a licensed game engine. In that way, it developed the local Software Park into a game cluster: "We offered 3-year free office to Unity [Technologies], which was impossible for other districts. … in addition to that, district government and relevant departments also provided special funds and subsidies in order to attract it. …Since Unity [Technologies] produces game engine, most of its customers are game developing companies, our aim of attracting it in our Park was mainly to form an industrial cluster with upstream and downstream enterprises in the game production value chain." (Cluster manager, cluster 3). These kinds of stories also exist in other clusters. Although the aim of such strategies is to attract high-potential firms, the specific policies of each cluster and district vary considerably, and local authorities have autonomy in designing this type of incentive.

6. Agency of local firms and entrepreneurs: institutional work in the face of institutional voids

The above sections mainly dealt with the issue of how policies designed at the local and national level have been implemented locally. This section will explore how local firms and entrepreneurs try to change regional and national institutional setups, where voids exist. By institutional voids, we mainly refer to Mair & Marti's (2009) understanding, in which not only institutional insufficiencies are regarded as voids, but also situations in which the institutions are established but in which they either not properly function or are beneficiary to one group but hampering another one.

At *national* level, of the three broader domains of cultural, technological and economic policies and regulations, local firms have the greatest interest in influencing the national *cultural regulatory policies,* as these regulations have a high direct impact on the survival of game companies. Concerning local companies' capability in influencing national institutions, the situation varies from enterprise to enterprise. Whereas some big companies have the resources to influence the design of industrial policies and standards, many small entrepreneurial teams or startups appear to be less powerful in this respect (institutional voids for SMEs). Those powerful local firms are mostly industrial representatives, members of national industrial associations, and large taxpayers. They challenge and influence national administrative measures and policies either through informal channels such as personal guanxi (social connections) with national officials, or through formal channels such as lobbying for favorable policies at events such as industrial conferences, state-support exhibitions, and so on. Several senior managers of medium-sized and large companies claimed that their firms had set up offices in Beijing to communicate directly with central authorities in censoring their games[9], and such communication was essential to speed up the censoring process of their own games (Content director, company 3; COO, company 6; Officer 1; CEO, company 11). Others have also mentioned that national officials also like to discuss with them what kind of measures and regulations should be developed in order to promote healthy and sustainable industrial development (CEO, company 2; CEO, company 14; Officer 3).

In contrast to this, a considerable number of SMEs might not have the type of guanxi to alter national cultural regulations, but they also try to change unfavorable institutional conditions through other channels, among which the Internet is the most powerful one (CEO, company 1; IP director, company 4; Producer, company 4; CEO, company 18). For example, the announcement concerning mobile games censorship, issued by SAPPRFT in 2016, has put SMEs in a disadvantageous position (Content director, company 3; Developer, company 22). According to the new regulation, mobile game publishers must obtain three licenses issued by different governing bodies before their games can go online. The obtaining of these licenses is not only costly, but above all time-consuming, which, according to many interviewees, is catastrophic for SMEs in the face of fierce market competition (Content

[9] Instead of delegating power to local authorities, online games in China are directly censored by SAPPRFT.

director, company 3; Producer, company 4; CEO, company 18; Developer, company 22). One Shanghai game producer, Chen Yu, expressed his dissatisfaction in *Zhihu*, a Chinese version of Quora, and announced that he would sue the SAPPRFT through crowdfunding. Within about 11 hours, he collected 50000 RMB, which he saw as the common will of a large number of SMEs. One of the interviewees who has supported Chen's action, claimed that "…we are dissatisfied with it [the new regulation], but there is no other appropriate channel to discuss it with regulators. All we can do is complain online, and support him [Chen Yu] in the hope that SAPPRFT can at least speed up the censorship process." (CEO, company 11).The series of actions happened online, actually worked well, as SAPPRFT has responded quickly and promised to speed up the censorship of mobile games in a later document.

While national game-related cultural regulations have led to intense reactions from both large firms and SMEs, local companies have less motivation to influence technological- and economic- relevant policies and regulations. One of the reasons, as argued by entrepreneurs, is that they can easily obtain venture capitals from investors (Producer, company 4; CEO, company 11; CEO, company 14; Developer, company 22)[10]. In other words, unlike many manufacturing sectors that are heavily subsidized by the central government (e.g., the automotive industry), the Shanghai online games industry is primarily operated under market mechanisms and driven by market forces (Zhang and Fung, 2014). "The development of Shanghai's online games industry is by no chance the sole outcome of national financial support" (Producer, company 13.

In terms of their strategies to address *local* institutional voids, firms mainly affect the policies and regulations that district governments and cluster facilitators have made. In contrast to national authorities, local governments are much more responsive to the needs of local businesses, and thus are much more flexible and leave more room for negotiation. Large enterprises and SMEs also influence local institutional environment in different ways. Large companies, due to their higher profits capabilities, have greater bargaining power. "We maintain good guanxi with the officials of this cluster … Because we are a big taxpayer, they pay a lot of attention to our business. The Management Committee of the Park has

[10] Due to the high profitability of the games industry, investors and speculators, both from high-tech sectors as well as traditional industries such as coal mining and manufacturing have rushed into the industry due to the overcapacity of those sectors.

provided preferential treatment to keep us in this Park, because they fear that we would move to another location, which would mean a loss of tax revenues in this region…." (Senior designer, company 7). Another COO of a commercial games incubator based in the same district, who maintains close relations with the local district government openly stated "as long as a local company grows to a certain size, managers can ´talk´ with the [local] government directly. Things like tax reduction, free-office supply are not a big issue, and local leaders will try their best to do it for those big companies." (COO, company 9)

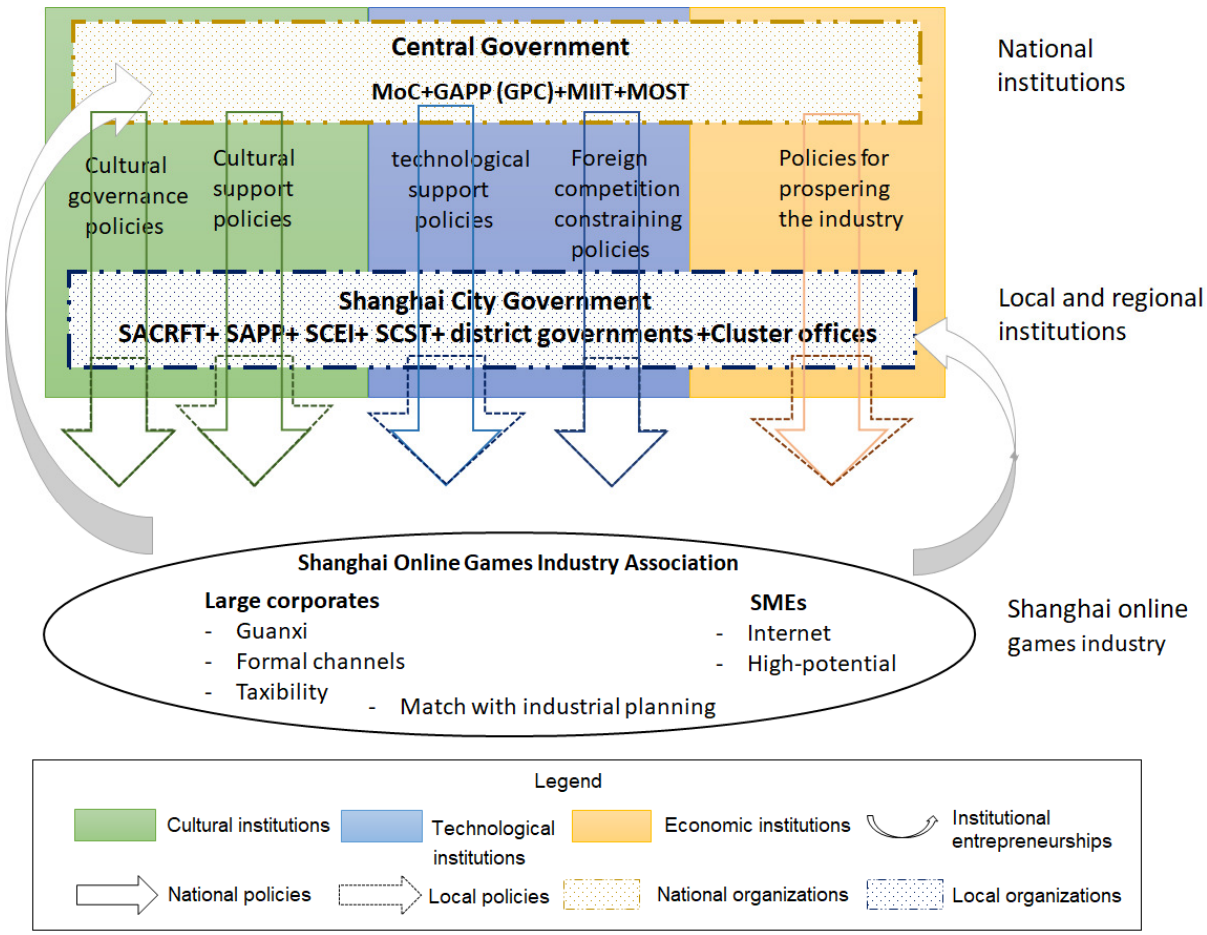
In contrast to commercially successful firms, small teams and startups generally have less bargaining power, but the situation also varies depending on local officials perceive the potential of firms. A CEO of a startup company based in Shanghai Pudong Software Park claimes that, "…we are an entrepreneurial team with an average working experience of 10 years in the online games industry, and all of us had been working in large companies before… When we decided to open our office in this Park, the manager responsible for the IT sector in this Park came to us immediately and asked what he could do for us …. The reasons for showing great enthusiasm to us, I think, was because they [officers] believe that our experience and training in large companies would lead to a higher chance of success than others." (CEO, company 1). A cluster manager from Caohejing High-tech Park confirms this by stating that other conditions remain the same, the following three criteria could be used to check whether firms have 'high potential': "first, whether entrepreneurs have previously worked in large companies; Second, whether new startups receive venture capital from professional investment organizations; And finally, whether entrepreneurial ideas are developing in the same direction of the market trend." (Cluster manager, cluster 3)

In addition to the size of the company, the alignment between the games industry and the overall local industrial planning also determines to a certain extent the company's bargaining power with local authorities,. A producer confirms this by claiming: "…our company is located in Putuo district, where the cultural and Creative industries are less developed than in other parts of the city. The leaders of the Putuo district have developed a series of instructions with an aim of prospering local Creative industries in recent years…. When we received a large amount of venture capital in 2014, the local government immediately noticed that the online games industry could be transformed into a representative creative industry of the district…. Since we are considered a major company

in this region, the bargaining power of our company was undoubtedly stronger than that of companies of similar size." (Producer, company 13). Similarly, a local officer also stated that, other conditions remain the same, industries in line with the government's industrial planning could benefit from more favorable treatments (Cluster manager, cluster 2).

Although industrial actors, large and small, have so far individually negotiated and solicited support from central and local states (e.g., more favorable policies, acceleration of the game censorship process, etc.), the establishment of the Shanghai Online Games Industry Association at the end of 2016, an alleged intermediary between the local industry and institutional organizations, could contribute to more joint actions and interactions between large companies and SMEs in the future. The pattern of how industry actors and institutions are related and how they influence each other is illustrated in Figure 2.

Figure 2. Relations of institutions and Shanghai online games industry[11].



7. Conclusions

The relationship between institutional dynamics and local industrial development have increasingly become an interesting topic in economic geography. However, in our view, at least two weaknesses could be identified in the literature, namely, the lack of attention paid to industrial specificities in studying multi-scalar institutional dynamics (top-down and bottom-up); and the lack of study on the mechanisms of how local firms and entrepreneurs influence the industry-specific institutional environment. By empirically investigating the

[11] This Figure needs to be read by referring to Table 2. The backgrounded big solid rectangles with solid fills in three colors—green, purple and orange, represent the institutions that are related to the three characteristics of the industry. The dash rectangles (from top-down) with pattern fills represent institutional organizations at national and local levels. The solid and dash arrows represent the ways how national and local policies have been designed and implemented. The size of the dash arrows indicates how much discretion that local and regional authorities have in designing locally-tailed policies. The bigger the dash arrows are, the more flexibility the local government has in designing local policies and implementing nationally-made policies.

Shanghai online games industry, we are able to fill these gaps and hence contribute to a recently surging literature in economic geography on institutional dynamics and local industrial development. Overall, this article supports the statement of Moodysson & Zukauskaite (2014), in which they argue that policies designed at national and regional levels should pay more attention to the different characteristics of certain industries. By zooming in on the role of local-national institutions in local industrial development we have been able to demonstrate how industry characteristics matter for the relationship between multi-scalar institutional dynamics and local industrial development. Such characteristics influence both the downward and upward causations of industry-specific institutional dynamics. In the specific case of Shanghai online games industry, the cultural influence of games has been the major concern of the central government, which is why over time this has led to various policy actions by the national government and ministries. Local governments could only play the role of policy implementers in this respect, and therefore had little power in developing local specific policies to regulate game content and influence censorship procedures. The technological relevance and economic value of the online games industry have been the interest of other national ministries such as the MOST, and GAPP. Since these aspects are not the main concern of central government, more place-based and place-varied policies and actions could be designed by local authorities in Shanghai. Similarly, in changing the local and national institutional environment, local entrepreneurs and firms also have stronger motivation in altering the unfavorable cultural policies than in changing technological and economic policies, as the former have much stronger influence on the survival space of the companies.

Moreover, instead of favoring either the top-down or the bottom-up approach, this paper displays how these two perspectives can be well combined in the development of a local industry and in the design of regional innovation policies. While we are focusing on the specific games industry, the three features identified in this paper—namely, cultural influence, technological significance and economic value, are shared by the broader new media sector (e.g., cartoon, media, broadcasting, etc.). Therefore, insights drawn from this case are also valuable for understanding the political and institutional concerns of developing new media industries in China.In addition to exploring the influence of multi-scalar industry-relevant institutions on local industry development, this paper also examines

the way through which local industrial actors change the institutional structure at both local and national levels. We argue that entrepreneurs and individual firm´s capacities and characteristics (e.g., size, profitability, guanxi, fit with industrial planning, etc.) are of great importance for their lobbying and negotiation activities. This could have implications for enterprises and entrepreneurs in other developing and emerging economies where the relevant institutions are underdeveloped, and thus institutional voids exist (e.g., Mair & Marti, 2009; De Lange, 2016). Industrial promoters could either compensate for the existence of institutional voids with alterative solutions or influence the design of sector-specific institutions through institutional work of all kinds.

Finally, there remain some interesting issues that require future research. The first one is whether local authorities contradict, conflict and challenge national organizations. Although this topic has not been the main focus of this paper, we see a value in investigating it in more detail in the future. Secondly, while the single Shanghai case provides some insight into the co-evolutionary relationship between the focal games industry and multi-scalar institutions, more comparative studies should be conducted if one aims to develop a generic theory of the co-relationship of industry and institutions. However, this should not discount the value of a representative case study, as the knowledge generated from this case study could enter the collective process of knowledge accumulation in understanding the co-evolution of industries and institutions, and helped path the way for a theoretical breakthrough (Flyvbjerg, 2006).

References

Amin, A., & Thrift, N. (1995). Globalisation, institutional 'thickness' and the local economy. *Managing cities: The new urban context*, *12*, 91-108.

Asheim, B. T., & Coenen, L. (2006). Contextualising regional innovation systems in a globalising learning economy: On knowledge bases and institutional frameworks. *The Journal of Technology Transfer*, *31*(1), 163-173.

Bathelt, H., & Glückler, J. (2014). Institutional change in economic geography. *Progress in Human Geography*, *38*(3), 340-363.

Battilana J, Leca B, & Boxenbaum, E. (2009). 2 how actors change institutions: towards a theory of institutional entrepreneurship. *Academy of Management Annals*, 3(1), 65-107.

Beer, A., & Lester, L. (2015). Institutional thickness and institutional effectiveness: developing regional indices for policy and practice in Australia. *Regional Studies, Regional Science*, *2*(1), 205-228.

Binz, C., Harris-Lovett, S., Kiparsky, M., Sedlak, D. L., & Truffer, B. (2016). The thorny road to technology legitimation—Institutional work for potable water reuse in California. *Technological Forecasting and Social Change*, *103*, 249-263.

Cao, Y., & Downing, J. D. (2008). The realities of virtual play: video games and their industry in China. *Media, Culture & Society*, *30*(4), 515-529.

Cheung, C. K., & Fung, A. (2016). Globalizing the Chinese Online Game Industry: From Incubation and Hybridization to Structural Expansion in the Past Two Decades. In *Global Game Industries and Cultural Policy* (pp. 71-90). Palgrave Macmillan, Cham.

Chew, M. M. (2016). A Critical Cultural History of Online Games in China, 1995–2015. *Games and Culture* (forthcoming).

CNG (2015). *Shanghai Games Industry Report 2015*, Shanghai. [Jiama Data, 伽马数据].

Cohendet, P., & Simon, L. (2007). Playing across the playground: paradoxes of knowledge creation in the videogame firm. *Journal of Organizational Behavior*, *28*(5), 587-605.

Cohendet, P., Grandadam, D., Mehouachi, C., & Simon, L. (2018). The local, the global and the industry common: the case of the video game industry. *Journal of Economic Geography*, *18*(5), 1045-1068.

Cooke, P. N. C., Heidenreich, M., & Braczyk, H. J. (Eds.). (2004). *Regional innovation systems*. London: Routledge.

Cumbers, A., MacKinnon, D., & McMaster, R. (2003). Institutions, power and space: assessing the limits to institutionalism in economic geography. *European Urban and Regional Studies*, *10*(4), 325-342.

De Lange, D. E. (2016). Legitimation strategies for clean technology entrepreneurs facing institutional voids in emerging economies. *Journal of International Management*, *22*(4), 403-415.

DiMaggio, P. (1988). Interest and agency in institutional theory. *Institutional patterns and organizations culture and environment*, Cambridge; Ballinger, 3-22.

Dovey, J., & Kennedy, H. W. (2006). *Game cultures: Computer games as new media: computer games as new media*. McGraw-Hill Education (UK).

Eisenhardt, K. M. (1989). Building theories from case study research. *Academy of management review*, 14(4), 532-550.

Eisenhardt, K. M., & Graebner, M. E. (2007). Theory building from cases: Opportunities and challenges. *Academy of management journal*, 50(1), 25-32.

Ernkvist, M., & Ström, P. (2008). Enmeshed in games with the government: Governmental policies and the development of the Chinese online game industry. *Games and Culture*, *3*(1), 98-126.

Essletzbichler, J. (2012). Evolutionary economic geographies. *The Wiley-Blackwell Companion to Economic Geography*, 183-198.

Farole, T., Rodríguez-Pose, A., & Storper, M. (2011). Human geography and the institutions that underlie economic growth. *Progress in Human Geography*, *35*(1), 58-80.

Flyvbjerg, B. (2006). Five misunderstandings about case-study research. *Qualitative Inquiry*, *12*(2), 219-245.

Fornahl, D., Hassink, R., & Menzel, M. P. (2015). Broadening our knowledge on cluster evolution. *European Planning Studies* 23(10): 1921-1931.

Fuenfschilling, L., & Truffer, B. (2016). The interplay of institutions, actors and technologies in socio-technical systems—An analysis of transformations in the Australian urban water sector. *Technological Forecasting and Social Change*, *103*, 298-312.

Garud, R., Hardy, C., & Maguire, S. (2007). Institutional entrepreneurship as embedded agency: An introduction to the special issue. *Organization Studies* 28: 957-969.

Gertler, M. S. (2010). Rules of the game: The place of institutions in regional economic change. *Regional Studies*, *44*(1), 1-15.

Gertler, M. S. (2018). Institutions, Geography, and Economic Life. *The New Oxford Handbook of Economic Geography*, 230-242.

Glückler, J., Suddaby, R., & Lenz, R. (Eds.). (2018). *Knowledge and Institutions*. Springer International Publishing.

Gong, H., & Hassink, R. (2017). Exploring the clustering of creative industries. *European Planning Studies*, *25*(4), 583-600.

Gong, H., & Hassink, R. (2018). Co-evolution in contemporary economic geography: towards a theoretical framework. *Regional Studies* (forthcoming).

Grillitsch, M. (2015). Institutional layers, connectedness and change: Implications for economic evolution in regions. *European Planning Studies*, *23*(10), 2099-2124.

Grillitsch, M., & Rekers, J. V. (2016). How does multi-scalar institutional change affect localized learning processes? A case study of the med-tech sector in Southern Sweden. *Environment and Planning A*, *48*(1), 154-171.

Grillitsch, M., & Sotarauta, M. (2018). Regional Growth Paths: From Structure to Agency and Back (No. 2018/1). Lund University, CIRCLE-Center for Innovation, Research and Competences in the Learning Economy.

Gu, X. (2014). Cultural industries and creative clusters in Shanghai. *City, Culture and Society*, *5*(3), 123-130.

Hall, P. A., & Soskice, D. W. (2001). *Varieties of capitalism: The institutional foundations of comparative advantage*. Oxford: Oxford University Press.

Hall, P. A., & Thelen, K. (2009). Institutional change in varieties of capitalism. *Socio-economic review*, *7*(1), 7-34.

Hayter, R. (2004). Economic geography as dissenting institutionalism: the embeddedness, evolution and differentiation of regions. *Geografiska Annaler: Series B, Human Geography*, *86*(2), 95-115.

Hayter, R., & Patchell, J. (2011). *Economic geography: An institutional approach*. Oxford: Oxford University Press.

He, J., & Huang, X. (2018). Agglomeration, Differentiation and Creative Milieux: A Socioeconomic Analysis of Location Behaviour of Creative Enterprises in Shanghai. *Urban Policy and Research*, *36*(1), 79-96.

He, S. (2017). The creative spatio-temporal fix: Creative and cultural industries development in Shanghai, China. *Geoforum* (forthcoming).

Hu, X., & Hassink, R. (2017). Exploring adaptation and adaptability in uneven economic resilience: a tale of two Chinese mining regions. *Cambridge Journal of Regions, Economy and Society*, *10*(3), 527-541.

Isaksen, A., Martin, R., & Trippl, M. (Eds.). (2018). *New Avenues for Regional Innovation Systems: Theoretical Advances, Empirical Cases and Policy Lessons*. Springer International Publishing.

Jessop, B. (2001). Institutional re (turns) and the strategic–relational approach. *Environment and planning A*, *33*(7), 1213-1235.

Keane, M. (2009). Great adaptations: China's creative clusters and the new social contract. *Continuum*, *23*(2), 221-230.

Keane, M. (2013a). *China's new creative clusters: Governance, human capital and investment*. London: Routledge.

Keane, M. (2013b). *Creative industries in China: Art, design and media.* Chichester: John Wiley & Sons.

Lawrence, T. B., & Suddaby, R. (2006). Institutions and institutional work. In Clegg, S., Hardy, C., Lawrence, B., & Nord, W. (Eds.). *Sage Handbook of Organization Studies*, 2nd Edition: 215-254. London: Sage.

Liu, Y. (2011). High-tech ventures' innovation and influences of institutional voids: A comparative study of two high-tech parks in China. *Journal of Chinese Entrepreneurship*, *3*(2), 112-133.

Lundvall, B. Å. (Ed.) (2010). *National systems of innovation: Toward a theory of innovation and interactive learning*. London, New York: Anthem Press.

Mair, J., & Marti, I. (2009). Entrepreneurship in and around institutional voids: A case study from Bangladesh. *Journal of Business Venturing*, *24*(5), 419-435.

Mair, J., Marti, I., & Ventresca, M. J. (2012). Building inclusive markets in rural Bangladesh: How intermediaries work institutional voids. *Academy of Management Journal*, *55*(4), 819-850.

Martin, R., & Sunley, P. (2011). Conceptualizing cluster evolution: beyond the life cycle model?. *Regional Studies*, *45*(10), 1299-1318.

Maskell, P., & Malmberg, A. (2007). Myopia, knowledge development and cluster evolution. *Journal of Economic Geography*, *7*(5), 603-618.

Moodysson, J., & Zukauskaite, E. (2014). Institutional conditions and innovation systems: On the impact of regional policy on firms in different sectors. *Regional Studies*, *48*(1), 127-138.

Murphy, A. B. (2012). China's Cultural and Creative Economy: An Introduction. *Eurasian Geography and Economics*, *53*(2), 179-181.

North, D. C. (1990). *Institutions, institutional change and economic performance*. Cambridge: Cambridge University Press.

North, D. C. (1991). Institutions. *Journal of Economic Perspectives, 5*(1), 97-112.

O'Connor, J., & Xin, G. (2006). A new modernity? The arrival of 'creative industries' in China. *International Journal of Cultural Studies*, *9*(3), 271-283.

O'Connor, J., & Gu, X. (2014). Creative industry clusters in Shanghai: a success story? *International Journal of Cultural Policy*, *20*(1), 1-20.

O'Connor, J., & Liu, L. (2014). Shenzhen's OCT-LOFT: Creative space in the City of Design. *City, Culture and Society, 5*(3), 131-138.

Patton, M. Q. (1990). *Qualitative evaluation and research methods*. Thousand Oaks: SAGE.

Ren, X., & Sun, M. (2012). Artistic urbanization: creative industries and creative control in Beijing. *International Journal of Urban and Regional Research*, *36*(3), 504-521.

Rodríguez-Pose, A. (2013). Do institutions matter for regional development? *Regional Studies*, *47*(7), 1034-1047.

Rodríguez-Pose, A., & Storper, M. (2006). Better rules or stronger communities? On the social foundations of institutional change and its economic effects. *Economic geography*, *82*(1), 1-25.

Saxenian, A. (1990). Regional networks and the resurgence of Silicon Valley. *California management review*, *33*(1), 89-112.

Schrammel, T. (2014). *Clusters as an instrument to bridge institutional voids in transition economies: Lessons learned from Southeast Europe*. Springer Science & Business.

Schröder, M., & Voelzkow, H. (2016). Varieties of regulation: how to combine sectoral, regional and national levels. *Regional Studies*, *50*(1), 7-19.

Scott, W. R. (2013). *Institutions and organizations: Ideas, interests, and identities*. Thousand Oaks: SAGE.

Shan, S. L. (2014). Chinese cultural policy and the cultural industries. *City, Culture and Society*, *5*(3), 115-121.

Shin, H. B. (2014). Urban spatial restructuring, event-led development and scalar politics. *Urban Studies*, *51*(14), 2961-2978.

Sotarauta, M., & Pulkkinen, R. (2011). Institutional entrepreneurship for knowledge regions: In search of a fresh set of questions for regional innovation studies. *Environment and Planning C: Government and Policy*, *29*(1), 96-112.

Storper, M. (1995). The resurgence of regional economies, ten years later: the region as a nexus of untraded interdependencies. *European Urban and Regional Studies*, *2*(3), 191-221.

Storper, M. (2018). Separate Worlds? Explaining the current wave of regional economic polarization. *Journal of Economic Geography*, *18*(2), 247-270.

Tsang, S. S., & Tschang, T. (2012). Combinations and cultural content: Catch-up in the Chinese gaming industry. DRUID Conference 2012.

Tschang F. T. (2007). Balancing the tensions between rationalization and creativity in the video games industry. *Organization Science* 18(6): 989-1005.

Tödtling, F., & Trippl, M. (2005). One size fits all?: Towards a differentiated regional innovation policy approach. *Research policy*, *34*(8), 1203-1219.

Trippl, M., Grillitsch, M., Isaksen, A., & Sinozic, T. (2015). Perspectives on cluster evolution: critical review and future research issues. *European Planning Studies*, *23*(10), 2028-2044.

Uyarra, E., Flanagan, K., Magro, E., Wilson, J. R., & Sotarauta, M. (2017). Understanding regional innovation policy dynamics: Actors, agency and learning. *Environment and Planning C, 35*(4), 559-568.

Wood, A., & Valler, D. (2001). Turn again? Rethinking institutions and the governance of local and regional economies. *Environment and Planning A, 33*(7),1139-1144.

Yin, R. K. (2018). *Case Study Research and Applications (6th Edition)*. Thousand Oaks: SAGE.

Zhang, J. (2017). The geographic political economy of art district formation in China: The case of Songzhuang. *Geoforum* (forthcoming).

Zhang, C., & Li, X. (2016). Urban redevelopment as multi-scalar planning and contestation: The case of Enning Road project in Guangzhou, China. *Habitat International*, *56*, 157-165.

Zhang, L., & Fung, A. Y. (2014). Working as playing? Consumer labor, guild and the secondary industry of online gaming in China. *New media & society*, 16(1), 38-54.

Zheng, J. (2010). The “entrepreneurial state” in “creative industry cluster” development in Shanghai. *Journal of Urban Affairs*, *32*(2), 143-170.

Zheng, J. (2011). ‘Creative industry clusters’ and the ‘entrepreneurial city’of Shanghai. *Urban Studies*, *48*(16), 3561-3582.

Zukauskaite, E. (2015). Organizational change within medical research in Sweden: on the role of the individuals and institutions. *Environment and Planning C: Government and Policy*, *33*(5), 1190-1206.

Zukauskaite, E., Trippl, M., & Plechero, M. (2017). Institutional thickness revisited. *Economic Geography*, *93*(4), 325-345.

Paper 4. Overcoming hurdles in developing a local contested industry: a case study of the Hamburg online games industry

Submitted to *European Urban and Regional Studies*

This is the author‘s original manuscript of the submitted article

Overcoming hurdles in developing a local contested industry: a case study of the Hamburg online games industry

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Abstract: While extant literature in economic geography has provided insights on how regions develop new industries, our knowledge is limited concerning how actors in a contested industry legitimize the industry and thus contribute to the system building for the focal industry. The aim of this paper is therefore to investigate the process of how actors affect the development of a contested creative industry in Hamburg—the online games industry. Drawing insights from transition studies, this paper investigates the role of multi-scalar actors in building innovation systems and in legitimizing the industry at different phases of development. It shows that theories from transition studies are useful in explaining the development of the contested games industry in Hamburg. However, industrial differences still need to be carefully examined.

Key words: legitimacy; system building; contested industry; online games industry; Hamburg

1. Introduction

The question of how new industries emerged and developed in regions has gained enormous interest in the fields of economic geography and innovation studies, primarily due to the potential of new industries in contributing to regional de-locking from negative path dependence and stronger regional economic growth (e.g., Boschma et al., 2017; Martin and Sunley, 2006).Drawing on Evolutionary Economics, Evolutionary Economic Geography (EEG) adopts a dynamic perspective, and focuses strongly on technological relatedness across regional industries, combinatorial knowledge dynamics, and branching processes as key

explanatory factors for where and how new industries develop (Frenken an Boschma, 2007; Boschma and Frenken, 2011). After more than a decade of development, such an endogenous-looking and technology-oriented perspective is increasingly called into question (e.g., Binz et al., 2016b). More recent studies have instead adopted a more comprehensive perspective that takes into account both endogenous and exogenous factors and highlights the role of the various actors, including both firms and non-firm actors, in contributing to regional new industrial development (e.g., Binz et al., 2016b; MacKinnon et al., 2018; Tödtling and Trippl, 2018; Trippl et al., 2017). A multi-scalar perspective have thus been suggested as a useful lens in studying such phenomena (Binz and Truffer, 2017; Hassink et al., 2019; Trippl et al., 2017).

While insightful, the extant literature seems to offer little knowledge on the development of contested industries in regions. By 'contested industries', we mean sectors that suffer from "public challenges to the nature and accountability of corporation and industries…. typically take the form of contests over the societal appropriateness and evaluation of industry practices, strategies, and forms" (Galvin, et al., 2004, p.57). Typical examples of contested industries include arms industry (Vergne, 2012), tobacco and gambling industries (Galvin et al., 2004), nuclear power (Arentsen, 2006), psychotropic drugs (Geels et al., 2007), videogaming (Yousafzai et al., 2014), etc. What distinguishes a contested industry from a 'normal' industry is that the former suffers more from legitimacy deficits. Therefore, much more legitimation effort is needed if promoters want to develop such sectors.

The aim of the paper is thus to investigate the process of how relevant actors affect the development of an emerging, contested creative industry in Hamburg—the online games industry. Recent studies in transition studies have provided some novel insights on how emerging industries build up their legitimacy and what sorts of legitimation strategies and institutional works are essential in this process (Bergek et al., 2008; Binz et al., 2016a; Fuenfschilling and Truffer, 2016; Hekkert et al., 2007; Markard et al., 2016). Such research, however, is mainly based on global emerging sectors that are dependent on technological breakthroughs that lead to sustainability transitions. So far, little attention has been paid to globally established but nationally/regionally contested sectors. Are insights from transition studies also applicable to those nationally/regionally contested sectors? This is the question we aim to provide answer to.

The online games industry is relevant in two respects. On the one hand, it is a globally operating business (Cohendet et al., 2018; Johns, 2005), which means that from the beginning, the development of the industry did not rely solely on local assets, rather extra-regional knowledge recombination and resource mobilization is essential for the development of the local new industry. On the other hand, there are interesting geographical differences concerning how well the industry is socially accepted as a "harmless" creative industry between countries and regions, which make it worthwhile to look at this industry.

This paper proceeds as follows. Section 2 presents the literature on local industrial development in economic geography. Section 3 introduces the case selection and the research methods. Empirical results are presented in the next three sections, where we identify three phases of development of the local industry, and explore the innovation system construction and the legitimation processes carried out by multi-actors ranging from the local to the global. Section 7 discusses some of the findings, and the final section concludes the paper.

2. Overview of the literature

Among all the literature that has contributed to a more comprehensive understanding of regional industrial pathway development in economic geography, two lines of inquiry are particularly relevant, namely the approach of regional innovation systems (RIS) and transitional studies. Although the interest in the types of regional new path development varies greatly between RIS and transition studies, scholars from these two strands of literature increasingly agree that the mobilisation of resources and the creation of knowledge are indispensable processes for regional new path development. Such processes usually involve various actors and happen across multiple scales. Thus, a multi-scalar, multi-actor and multi-resource approach is essential for exploring regional path developments (Binz and Truffer, 2017; Hassink et al., 2019; MacKinnon et al., 2018).

RIS studies show much interest in the interplay between different kinds of actors, networks, and institutions, in exploring regional industrial development (Tödting and Trippl, 2018). More recently, this approach has evolved from a mere description of territorial assets

(Weber and Truffer, 2015) to one that highlights the processes of resource mobilisation and knowledge recombination contributing to the emergence of industries in regions (Asheim et al., 2017; Isaksen and Trippl, 2017; Strambach, 2017). However, institutions are often seen as a stable structure within which new industries develop. Consequently, not much attention has been paid to actors that have made changes to the institutional structure in which they are embedded (recent exceptions are Dawley, 2014; Grillitsch and Sotarauta, 2018; Sotarauta, 2017).

Transition studies, in contrast, take account of transitions towards more sustainable modes of production and consumption (e.g., Coenen et al., 2012; Markard et al., 2012). Due attention is paid to the regional emerging sectors that suffer from the 'liability of newness' (Freeman et al., 1983). Hence this literature stresses much the process of how such emerging sectors gain legitimacy and social acceptance, on the one side (Binz et al., 2016a; Fuenfschilling and Truffer, 2016; Geels and Verhees, 2011). On the other side, it emphasizes how actors, ranging from local to global, collaborate to construct other elements of the innovation systems (Bergek et al., 2008; Hekkert et al., 2007; Binz et al., 2017b). Such core system building processes are termed 'functions' of innovation systems (Hekkert et al., 2007; Bergek et al., 2008). Binz et al. (2016b) identified four key resource formation processes that are important for innovation system building, including knowledge production and diffusion, market formation, finance investment, and technology legitimation.

Among these system building processes, legitimacy has been argued to be one of the most vital aspects of system building for emerging technologies and related industries (e.g., Binz et al., 2016a, 2016b; Carvalho and Vale, 2018). It is defined as "a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions" (Suchman, 1995, p.574). It is not only a prerequisite for the mobilization and formation of other types of resources, especially scarce ones such as finance and market, but also a result of the very same processes (Bergek et al., 2008). At the industry or technology level, the creation of legitimacy is often the outcome of collective lobbying, coalition building, negotiation, compromising seeking, framing or categorization (Rao, 2004).

Acquiring legitimacy is particularly important for many of the cleantech industries, where incumbent technologies, actors and institutions have been well legitimized and taken for granted for a long time (Bergek et al., 2008). Therefore, incumbents may act as the opponents of the new technologies, and deliberately attempt to block the development of related new industries. In order to create legitimacy for the new technology and related industry, several forms of institutional work (Lawrence and Suddaby, 2006) have been introduced to transition studies. Institutional work such as political work, changing or constructing normative associations, theorizing, educating, valorizing and demonizing, have been argued to be essential for the legitimation process of emerging cleantech industries (Binz et al., 2016a; Fuenfschilling and Truffer, 2016).

While interesting, the extant literature does not seem to provide explanations for the development of contested industries in regions. For RIS studies, the focus is on knowledge bases and capability building (production side), while the 'valuation process' (Jeannerat and Kebir, 2016) relating to the focal industry only started to attract the attention of scholars very recently (e.g., Isaksen et al., 2018). By 'valuation', it refers to a process by which a new technology becomes a value product for a specific customer segment (Jeannerat and Hebir, 2016). Recent transition theorists have increasingly paid attention to the valuation side of emerging technologies and related industries (e.g., Binz et al., 2016a, 2016b). Binz and Truffer (2017), for instance, argue that a valuation process usually consists of three resource formation processes—market formation, financial investment, and technology legitimation. While insightful, the question of whether legitimation strategies and valuation processes developed in such cleantech sectors are applicable to other industries, particularly those suffering from legitimacy deficits, remains largely unexplored[12]. Moreover, geographical differences of legitimacy confer to the same industry (namely that certain industry is better accepted socially in some countries than in others) have been mentioned by the authors, but these have not yet been taken up in empirical studies. These are the gaps we aim to fill in the rest of the paper. One issue that must be kept in mind is that legitimation is never a single process in itself, but is intertwined with other processes of innovation system building

[12] Here, we do not argue in favour of developing contested industries in regions. Our interest confines to academic questions, such as: how do (did) contested industries manage to reduce social and cultural criticisms and do they differ geographically? Do relevant actors adopt similar legitimation strategies as we have observed in the cleantech sectors?

such as knowledge creation, investment attraction and market formation, etc. Therefore, they develop in a co-evolutionary manner.

3. Case selection and research methods

3.1 Overview of the Hamburg online games industry

Although digital games have existed for more than four decades, the social acceptance of the industry varies from culture to culture. In Germany, the games industry used to be stigmatised as glorifying violence (Sørensen, 2013). It was under such context, the Hamburg online games industry started to emerge in the early to mid-2000s (Quinke, 2004). Hamburg's online games industry is relatively small in terms of labour share and business revenue (Plum and Hassink, 2014). Nevertheless, as the first German state directly supporting the emerging games industry, Hamburg gained the first-mover advantages in this emerging sector. According to Castendyk and Müller-Lietzkow (2017), in 2015, there were 87 companies located in Hamburg, and Hamburg was only second to the state of Hessen in terms of game turnover. Concerning the sales excluding German branches of foreign firms, Hamburg outcompeted all other states.

Due to historical reasons, Germans are very cautious regarding products that are glorifying violence (Quinke, 2004). The development of the games industry has thus always been debated, particularly violent games, because of the fear of potential 'media panic'[13] caused by playing games (Karlsen, 2015; Sørensen, 2013). Moreover, game addictions and associated social problems are another major concern of the German society. Especially in the age of online gaming, access to digital games is so easy that this fear is growing strongly (Karlsen, 2015).

Although the industry was not well accepted by certain social groups (e.g., parents and educators), it had a strong supporting group—that is, players. Controversial opinions about

[13] Karlsen (2015, 1): "media panic is often invoked when public controversies arise around digital games…. Concern is usually expressed on behalf of children or youth, and the medium is described as seductive, psychologically harmful, or immoral."

gaming have thus been caused by distinct experiences and knowledge of different social groups. Such a 'contested embedding' (Geels et al., 2007) was important for the legitimacy dynamics of the industry through time.

3.2 Data collection and analysis

This study draws upon two main data sources: 21 semi-structured interviews and a large number of secondary materials. The data was collected in 2017 and early 2018. The interviewees included officials, former and existing managers of local industry networks and national associations, founders and executives of firms, scholars, etc. (Table 1)[14]. The questions asked dealt with the historical development of the games industry in Germany in general, and in Hamburg in particular. Other questions addressed the legitimation challenges and innovation system building obstacles that practitioners in the industry have confronted through time. The relevant actors and their role in shaping the developmental trajectory of the industry has been asked as well. Purposeful and theoretical sampling is applied (Coyne, 1997), with the aim of gaining insights from multiple sources. The interview data was complemented with a large number of secondary data from various sources, including internal materials from industry associations, mainstream media reports, professional magazines archives and industry reports (Prior, 2003).

Table 1. Basic Information of interviewees.

Interview groups	**No. of interviewees**	**Topics**
Founders/managers of local firms (industry representatives) (IR)	10	1) history of local industry development; 2) legitimacy challenges and innovation system building obstacles had to be conquered; 3) relevant actors that have helped solving the problems and facilitating the development of the industry

[14] Interviewees will be cited in the empirical part according to the abbreviations in this table.

Directors of intermediary organizations (IO)	4	1)history and milestones of organizations; 2) initiatives and key events that are important for legitimacy creation and innovation system building; 3) interactions and relationships with the games industry
Scholars (SC)	5	1) history of German online games industry; 2) legitimacy dynamics of the industry 3) relevant actors and their roles in developing the industry
Governmental officials (GO)	2	1) formal institutional context of industry; 2) mechanism of public-private interactions in the sector; 3) logics behind supporting industry
Total	21	/

The data analysis proceeded as follows (Miles and Huberman, 1994). The first step consisted of reading the interviews to develop an understanding of the main development in the field. A thematic analysis was adopted to develop a codebook based on the interpretation of emerging themes. The second stage consisted of analysing the secondary data collected from various sources. The final round of analysis aimed at developing a more nuanced understanding and interpretation of the findings by triangulating the two sets of data. As a result, topics on the phases of local industry development, barriers emerging during the process, main facilitators, spatial logics and the main functions of relevant facilitators were developed.

Although legitimation has so far been seen as an essential part of the overall innovation system building processes, in the empirical part, we decided to separate the legitimation process from other system building processes (i.e., knowledge creation, finance attraction, and market formation), as legitimation is a particularly important process in developing a contested industry, such as the online games industry.

4. Emergence of the local games industry: seeding the success in an infertile land? (before 2005)

4.1 Innovation systems building processes: pioneers in facilitating the emerging industry

The German games market was dominated by imported games from the US and Japan since the 1970s (Castendyk and Müller-Lietzkow, 2017). An endogenously-developed online games industry did not emerge in Hamburg until the first half of the 2000s when websites became a feasible platform for gaming (Müller-Lietzkow et al., 2006). The Hamburg games industry started as a hobby business of early entrepreneurs (IO1). In this phase, two groups of entrepreneurs became visible in our interviews. The first group is related to Bigpoint Studio, who started the company with sport management simulation games in 2002 (IR2). The second group is related to Innogames Studio. In 2003, the three founders developed the game *Tribal Wars* for themselves and their friends. Later they turned this hobby into a serious business because more and more people were taking part in their game (IO3). It is these young entrepreneurs and autodidacts who founded the online games industry in Hamburg.

During this embryonic period, the essential innovation systems and the necessary legitimacy for the development of a new games business were largely lacking. It was not until the establishment of the local industry network Gamecity Hamburg in 2003 that the industry has slowly attracted the attention of local government and Chamber of Commerce (IO1). In collaboration with local policy-makers and game studios, a series of projects have been initiated by Gamecity Hamburg in order to facilitate the emergence of the new sector. Among others, the joint stand booths organized at international games fairs since 2004 has been identified as very prominent for *global knowledge spillovers*. At the national level, to justify the German market position, in 2002, the former German Association of Entertainment Software (VUD) established the games annual event—Games Convention, as a platform for German and international game studios to exchange ideas and exhibit their products (*knowledge diffusion*).

4.2 Legitimizing the emerging sector: raising the visibility and mitigating the 'killer games' panic

In the early 2000s, the local online gaming industry was largely unnoticed. Neither did policymakers sufficiently recognise the economic value of the industry, nor was it the focus of interest for local business agencies. In order to increasing its visibility, in 2003, a working group called 'Arbeitskreis Games' (AK Games) was established to investigate the economic value of the industry in Hamburg. Systematic reports concerning the economic and employment benefits of the emerging sector have been produced for the first time. Such reports triggered the interest of local politicians. As a result, the Hamburg Chamber of Commerce explicitly highlighted the games industry in its "Industry Portrait of IT Metropolis Hamburg" published in May 2004 (Handelskammer Hamburg, 2004). After local politicians were convinced of the importance of the new sector, organizations such as the Hamburg Society for Economic Development and the Chamber of Commerce started to support the activities of local intermediary organizations such as Gamecity Hamburg and Hamburg@work[15]. These include further informing the public of the socio-economic value of the industry, on the one side, and promoting Hamburg as a unique game city in Germany, on the other.

Nationwide, while some of the Hamburg-based developers started to develop browser games as a hobby, elsewhere, in Germany, people were getting het up about the dangers of alleged 'killer games'. Shooting games were stigmatized as glorifying violence. "In particular, the 2002 Erfurt school massacre, has arose the general public's hatred towards violence in games" (SC4). The Entertainment Software Self-control (USK), the industry self-regulation body, was heavily criticized (IR1). Politicians were quickly calling for a ban on so-called "killer games". While such a proposal has been celebrated by parents, developers and players have argued that such an aggressive action was not really fruitful. One senior game designer recalls, "even if the scientific findings about whether playing shooting games can lead to violence remained controversial, many critics in the media began to make linkages between playing shooting games with committing violent behaviors, which was of course a catastrophe for the young industry" (IR8). Gamers have also strongly rebelled against this

[15] Hamburg@work is a cluster initiative for the MITT economy (mass media, IT, telecommunications) based in Hamburg.

stigma. “At that time there were some reports in the German mainstream media linking games to potentially aggressive behavior, … the general attitude of society towards gaming was negative.... but many players have resisted such stigmatization. ...they argued that a more comprehensive picture of the pros and cons of games should be based on scientific evidence” (IR5). Voices from players and developers had some effects. The then chancellor Schröder thus invited a group of experts as well as industry representatives to a roundtable discussion on the appropriate way of dealing with the problem. “…the early proposal to ban violent games was abolished due to the discussions [of pros and cons of the industry] in this session, but the federal government urged the industry representatives to transform the age-rating work of the USK into a legally binding age signs” (IR2).

5. Browser game booming: Hamburg as the browser game capital of Germany (2006-2012)

5.1 Innovation systems building: meeting the needs of an expanding new industry

After some years of development, the early hobby business of the Hamburg-based studios started to take off in the age of browser games. Bigpoint Studio, for instance, broke the one-million-user barrier in its own game portal in 2006. The success of the real-time strategy, massively multiplayer online game *Tribal Wars* led to the setting up of the Innogames studio in 2007. And in 2009, one of the biggest German games companies, Goodgame Studio, was established focusing on casual and social games (IO2). It was only with this boom that the companies in Hamburg significantly increased their staffing and established their own reputation (Castendyk and Müller-Lietzkow, 2017).

To meet the needs of the expanding sector, local actors have worked together on several aspects to create a better innovation environment for the new business. First of all, in 2007, a former industrial site in the district of St. Pauli was transformed into a theme property ‘GamecityPort’ for start-ups. Secondly, an educational project called ‘GamecityLab’ was established in 2007 (IO3), and, this was changed into the Games Master study at the Hamburg University of Applied Sciences (HAW) in 2009 (SC1) (*knowledge creation*).

Moreover, local organizations and actors have also made great efforts to solve the urgent labor shortage problem due to industrial expansion. Several recruiting tours have been organized by Gamecity Hamburg in Eastern Germany and neighbouring countries, in order to convince creative people to move to Hamburg (IO3). Moreover, local government was also actively involved in creating an open atmosphere and attracting international talent, particularly IT workers from Eastern Europe, Asia and America (GO1) (*global knowledge transfer*). In order to meet the increasingly globalizing need of the local firms, local intermediary organizations have arranged several business meetings and networking events with international media conglomerates, such as Apple, Tencent, Google, etc. (IR3) (*market extension*). In parallel to supporting the large players in the market, the local government also launched the first game prototype funding program in 2006, aiming at supporting start-ups (SC3) (*financial investment*).

National industry associations such as BIU and G.A.M.E. have also organized various annual conferences, forums, and workshops, to encourage the exchange within the industry itself as well as with other social groups. Activities such as Game Focus Germany, Game Forum Germany, GAMEplaces International, contributed to an increasingly recognizable identity of the industry (SC1). Various significant issues ranging from new technologies, business models, were intensively discussed in these meetings (IO4). Such national support programs were undoubtedly essential to the prosperity of the local industry.

5.2 Legitimation work: game as a serious business, and as an indispensable part of the creative economy

While the industry has been developing for a number of years, many early workers in the industry expressed a sense of discrimination when people talked about their careers. One early founder recalls: “when we started the gaming business, my parents were a bit skeptical about whether it would be a stable business ... they said I should focus more on serious jobs...” (IR5). Similarly, another early employee claimed that his family also wanted him to work in sectors such as manufacturing or mechanical engineering (IR4).

In order to give workers in the new sector their own identity and to strengthen their sense of pride in working in this business, numerous collective actions have been taken by

companies, local intermediaries and politicians. The diverse creative industries presented locally helped much in this respect. One of the most prominent efforts taken by the local facilitators was to converge the games industry with other established media sectors. With the support of the local government, local intermediaries have begun to initiate and catalyse cooperation between game companies and the local media industry through workshops, informal meetings, networking and projects (IR6, IO1)". "Our goal [of organizing such events] wasn't only to show the public that gaming is a serious business, but above all to show that it is an indispensable part of Hamburg's creative economy, where high creativity and innovation are presented"(IO3).

In addition to making connections to established local media industries, managers of local industry networks, founders of successful companies and politicians also held lectures, interviews and exposures to mainstream media platforms in order to ensure greater visibility of the new industry as a promising business (SC2). According to internal material from Gamecity, there were approximately 500 publications on the games industry in Hamburg in the daily and specialized online press and TV between 2006 and 2011. Moreover, the Hamburg Chamber of Commerce repeatedly reported on the increased number of jobs created by the new industry. The local media also reported positive news on this growing local business as it created job opportunities and recorded high sales.

At the national level, the discussions on killer games and violent behavior continued during this phase, due to two serious school shooting accidents in Germany: in Emsdetten in 2006 and in Winnenden in 2009. Through discussions in the media, games became a political issue (Sørensen, 2013). After the Emsdetten accident, for instance, the Bavarian government proposed to extend the penal code by a new paragraph for "killer games" in early 2007. That proposal was strongly rejected by industry experts and players (IO4). Whereas the federal government admitted that violent games should be strictly controlled, they proposed in the motion "Promoting Valuable Computer Games, Strengthening Media Literacy" to the Bundestag in 2007, that the protection of minors should not be the sole responsibility of the industry. Rather, parents, educators and the public should also increase their media competence and take responsibility in order to avoid similar tragedies (SC5). The BIU, together with other federal authorities (e.g., Youth Protection League) organized a series of

media courses for parents and educators. Through a series of campaigns, national actors aim to reduce prejudice and increase parents' and educators' knowledge about games (IO4).

Parallel to the discussions about the ban on violent games, the Federal Government increasingly perceived the cultural and economic value of the industry. The German Games Awards (GCP), for instance, were launched to promote creative and culturally-rich, domestically produced games. Moreover, G.A.M.E. and the BIU were also accepted as members of the German Cultural Council, which has strengthened the image of games as an essential part of the country‘s cultural economy (IO3). Furthermore, industry associations have also actively promoted the positive aspects of online games. Among others, serious games were strongly highlighted by BIU and GAME. The Serious Games Conference, and the Serious Games Award, for instance, have been supported by BIU since 2007 (IO4). Emphasizing the practical functions of games on serious occasions, the facilitators sought to convey the message that games are not only served for entertainment purposes, but may also have educational and industrial values.

Moreover, national industry associations have also organised a number of events with politicians. In return, they were also invited by federal officials to participate in discussions on relevant topics (SC5, GO2). By actively promoting communication between business and politics, a more comprehensive understanding of the industry was achieved. “The efforts of the national associations were very important for our business. Of course, such legitimizing work would not bring us direct financial benefits, but it would definitely increase the social acceptance of the industry.”(IR10)

6. Transforming to the mobile era: pains and gains (since 2013)

6.1 Innovation systems building: meeting the needs of the new indie scene

When mobile devices such as smart phones and tablets became the mainstream platforms for gaming in the early 2010s, the earlier browser-game-based Hamburg companies were forced to transform to the mobile game business mode. Several of the previous successful Hamburg browser games companies suffered a lot during this process and foreign firms

acquired the three biggest studios in Hamburg (IO3). Such a restructuring process has gone hand in hand with the increasing globalization of the local industry: many of the local studios have gone abroad by opening offices in foreign markets, particularly in Asian countries such as South Korea, Japan and China (IO2, IO3, IR4) (*global market formation*). In the last five years, a considerable number of indie-game start-ups have emerged locally, and thus created a varied games landscape in Hamburg (IR9).

While industrial practitioners appreciated the work of intermediary organizations in the browser games period, many of them started to complain recently, as the networks organized were too general and young start-ups could not benefit much (IR10). In reacting to this criticism, new network meetings such as 'Hamburg Indie Treff' were organized with the support of Gamecity Hamburg (IR9). Moreover, inexpensive office space for independent game teams—"Games Kontor" — was organized by the indie studio *Threaks* (IR10). Recently, some large studios wanting to give something back to the local industry have also started to organize specific indie game meetings. One of the most praised efforts was Innogame's initiative of the Innogames Jam (IR4). As a result, local industry has shifted in recent years from a strong dependence on local intermediary support to one that is more supported by the industry itself.

At the national level, the lack of a nationwide fund for the games sector was regarded as one of the biggest disadvantages of the German game companies when compared with many other countries (Castendyk and Müller-Lietzkow, 2017). To solve this problem, national industry associations drew heavily on successful experience in developing the games industry in other countries, such as France, the UK, and Canada, in justifying the essentiality of nationwide financial support. Early last year, the newly merged industry association GAME has finally managed to convince the new CDU, CSU and SPD parties' coalition of the necessity of such a national fund (*financial investment*). The national fund has finally come into shape thanks to the efforts of various actors including national associations, numerous game studios, scientists and politicians (IR6, IO2, SC4).

6.2 Legitimation: Stable business and more comprehensive understanding of the positive sides of the new business

As the restructuring process of the local industry led to the dismissal of several hundred employees, there were concerns on whether the games industry is a stable one. As local newspapers and media started to question the stability of the local game companies (Hamburger Abendblatt, 2016, 2017), a new round of legitimizing work had to be launched by promotors to convince the public that fluctuation is just a temporary phenomenon. “The reports of job losses [in games industry] were alarming … But we need to find out whether it was an industry-wide problem or a problem that was only relevant to a few companies,” argued one interviewee (IO3). “Based on our intensive discussions with several industry representatives, we believe this problem has more to do with the strategies and plans of certain companies than with a general slowdown of the industry as a whole.” In this context, Innogames, which experienced growth during this fluctuation, was used as a counterexample to illustrate the vibrancy of the industry (IO3). While there have been oscillations in some of the big studios, increasing number of start-ups and independent developers have entered the Hamburg gaming industry. Therefore, the local industry has been quite stable during the past two years.

At the national level, as people's understanding of the creative industry increases as a result of the sector's increasing economic and cultural visibility, as well as the continuing age labeling work of USK, discussions of games have been reduced. Since a large number of opinion leaders and decision makers (e.g. journalists, politicians) have grown up with such games as children, an increasingly neutral perspective on the industry started to prevail. Even when the Munich school massacre took place in 2016, the discussion in the mainstream media was rather neutral, without blaming video games (SC5). As already mentioned, the CDU/CSU also referred to games and eSport in its 2017 Bundestag election campaign. The previously stigmatized industry has finally gained a better image thanks to the continuous efforts of multiple actors working on different aspects of games.

7. Discussion

Table 2 summarizes the work of key facilitators in promoting the local new sector in the three phases of development. Various actors ranging from entrepreneurs and firms to non-firm actors such as governments and politicians, civil society, game players, and media and journalists, etc., jointly shaped the trajectory of the local games industry. Two prominent groups of actors deserve more elaboration here: Intermediary organizations and game players. Acting as the bridging and connecting organizations of multiple actors, intermediary organizations, including local industry networks, local business development agencies, and national industry associations have played a great role in the whole process. They work on overcoming barriers emerging in the developing process of the local (national) industry. Their efforts are undoubtedly essential, both in building innovation systems for the emerging business, and in improving the image of the specific contested industry.

The second group of actors worth mentioning in this case study is game players. The games industry in Hamburg mostly resembles the ‘contested embedding’ of social embedding (Geels et al., 2007). In this pattern, some societal groups, often lead-users (gamers in this context), react enthusiastically to the new sector, while other social groups, who experience immediate negative effects (e.g., parents and educators) react negatively. Similar to the observation made by Jeannerat and Kebir (2016), gamers, as the end users, play a crucial role in the economic valuation process of the industry. In contrast to the literature in transition studies, in which the "liability of novelty" of emerging technologies as well as the protection of incumbent actors on established technologies tends to make users one of the target of institutional work (Markard et al., 2012), the Hamburg games industry shows the opposite. Players turn out to be significant promotors of the local creative industry who argued strongly in favour of a netural treatment of the industry. This difference between the game and the cleantech sectors might be due to the question of to whom is the business exotic to. Whereas cleantechs are largely ‘new’ to its users (because users have been used to the established incumbent technologies, practices and institutions for decades, and thus feel unfamiliar with the new clean technologies), gaming has been well accepted by players when the local industry started. Therefore, while in principle we agree that different actors must be involved in the legitimation process of the new industries, we argue that two factors need to be taken into account in deciding who should be the object of the

institutional work. The first factor is the degree of novelty of the new industry, and the second factor is the relative power of incumbent actors in deterring the development of the focal industry.

More importantly, the transition literature, so far, has not discussed much about the social responsibility of actors engaged in the global emerging cleantech sectors. It is namely presumed that the need/desire for developing clean technologies is self-evident from a societal perspective, and the valuation process is thus mainly related to the establishment of protected space where such technologies could be developed and upscaled, so as to replace parts or the whole of the more traditional, unsustainable technologies. The issue of social responsibility, however, is prominent to the legitimation strategy of contested industries such as the online games industry (Lindorff et al., 2012; Yousafzai et al., 2014). In contrast to the cleantech sector, online games industry is a market-driven industry in which the market has existed for decades (market formation is not an issue), the main legitimacy concern then becomes how relevant actors could minimize the harm caused by consuming games. In this respect, industrial self-regulation (e.g., the work of USK), and corporate social responsibility (e.g., promotion of serious games), are important issues that actors in this industry need to pay special attention to.

Table 2. System building and legitimation processes of Hamburg online games industry.

Phase of development		Innovation systems building	Institutional work and legitimacy	
			Forms	Aim(s)
Emergence <2005	Local	*** Establishing intermediaries; Networking;	** Establishing AK Games working group to investigate the emerging industry	Increasing the general public's knowledge on the emerging sector
	National	* Organizing events;	*** Roundtable discussion with parliamentary politicians; Strengthening industry self-regulation	Mitigating negative images relating to violence
	Global	** Learning through participating in temporary global events through joint booths (e.g., the latest technologies, changes of gamer tastes, etc.); Promoting Hamburg as a game city	/	/
Browser games booming 2006-2012	Local	*** Office provision; Training and education; Events and networking; Recruiting tours; Free-interest loan;	** Multimedia convergence; increasing media exposures; keeping reporting the job opportunities and economic values created by game firms	Justifying game as serious business;
	National	* German Games Awards; Organizing annual games events; Various forms of activities;	*** Dialogues with politicians; Awarding games meet certain cultural criteria; Certification from German Cultural Council; Educating parents and educators	Promoting game as a significant part of the creative economy
	Global	** Attracting international talents; Meeting global media conglomerates for collaborative opportunities	/	/
Mobile games era > 2013	Local	*** GAMES KONTOR hub; Indie Treff; Innogames Jam;	** Media justification	Game as a stable and sustainable business
	National	** Funding	*** Gaming and eSport have been embraced by CDU/CSU in their electoral campaign 2017	Promoting a more comprehensive understanding of the games business
	Global	**	/	/

Notes: * weak; **medium; ***strong

Moreover, actors at different spatial levels have played complementary roles during the whole process of development. While local actors mainly worked on solving local problems that arose in the three developmental phases, national actors contributed significantly to the increasing social acceptance and cognitive legitimacy of the new industry in the broader society. In other words, the efforts made by national facilitators have largely complemented the work of local actors, and thus are essential for local industry development. As a globally operating business, international actors also had a prominent role for the local emerging industry throughout the three phases. In comparing to the efforts of national actors which are essential for the legitimation process of the local industry, the construction of global pipelines seem to matter more for other parts of innovation system building, such as knowledge formation, finance attraction, and market formation. This might be because stigmatization is a German specific phenomenon, and thus to legitimize the industry, the primary institutional work should be conducted within the boundary of the country. On the other hand, however, other resources such as knowledge, investment and markets can come from multiple scales. Therefore, building global pipelines is necessary for mobilizing these crucial resources beyond the national boundary.

The challenges for the new sector as well as the focus of the work of the different facilitators also differ considerably in the three development phases. In the emerging phase, when the new business came into being as a 'hobby business', infrastructure and facilitators that are essential for changing such a hobby into a new economic sector were missing. Therefore, both the innovation systems building work and the institutional work that have been taken were limited, as the new industry has not really come into shape yet. In the browser game booming phase, the local industry started to take off. The supportive schemes designed by local actors were intensive in this period. In addition, nationwide institutional work to increase the legitimacy of the industry was also important in stage as shooting accidents happened meanwhile. When the industry entered the age of mobile games, the question of how to compete with global competitors in the domestic and international markets has become the biggest challenge for the local industry. As a result, establishing global linkages has become one of the most important tasks for building innovation systems. In contrast, institutional work tended to be less important compared with the previous stages, as the cultural values and economic potential of the sector have been increasingly acknowledged.

8. Conclusions

Economic geographers have long shown an interest in researching how new industries emerge and develop in regions. So far, however, our knowledge of how a contested industry is legitimized and thus developed in a region is limited. Based on the knowledge of regional industrial development in economic geography and transition studies, this paper explored the thorny pathway of developing a contested creative industry—the online games industry, in Hamburg. It thus makes two contributions to the literature. First of all, by focusing on the development of the Hamburg online games industry, it deals with a topic so far has not been taken up much in economic geography—the controversial nature of certain industries such as the online games industry, and how such contested feature influence the development of the local industry. Secondly, by applying theories from transition studies to the legitimation process of the local online games industry, we argue that insights from geography of transition could be used in exploring the developmental trajectories of other industries beyond the 'cleantech' sectors that this literature has so far been focusing on. Insights from transition studies are useful in explaining the emergence and development of the specific contested industry in Hamburg. However, differences between the cleantech sectors (the empirical base of transition theories) and the focal contested games industry need to be carefully investigated, as 1) the legitimacy challenges that need to be solved, 2) the target object of institutional work, and 3) the multi-scalar resource formation and system building processes, seem to differ substantially.

Particularly, contested industries are typically characterised by social taboos, moral debates, ethnic concerns and social panic, etc. Therefore, issues such as 1) how industry practitioners could behave in a social responsible way (e.g., minimize the side effects caused and contribute to other aspects of society building); and 2) how should regulators and the generic public react towards such contested industries in regions, particularly when they grow into million or billion businesses, are issues that need to be further investigated.

References

Arentsen, M. J. (2006). Contested technology: Nuclear power in the Netherlands. *Energy & Environment*, 17(3), 373-382.

Asheim, B., Grillitsch, M., & Trippl, M. (2017). Introduction: combinatorial knowledge bases, regional innovation, and development dynamics. Economic Geography, 93(5), 429-435.

Bergek, A., Jacobsson, S., & Sandén, B. A. (2008). 'Legitimation' and 'development of positive externalities': two key processes in the formation phase of technological innovation systems. *Technology Analysis & Strategic Management*, 20(5), 575-592.

Binz, C., Harris-Lovett, S., Kiparsky, M., Sedlak, D. L., & Truffer, B. (2016a). The thorny road to technology legitimation—Institutional work for potable water reuse in California. *Technological Forecasting and Social Change*, *103*, 249-263.

Binz, C., Truffer, B., & Coenen, L. (2016b). Path creation as a process of resource alignment and anchoring: Industry formation for on-site water recycling in Beijing. *Economic Geography*, 92(2), 172-200.

Binz, C., & Truffer, B. (2017). Global Innovation Systems—A conceptual framework for innovation dynamics in transnational contexts. *Research Policy*, 46(7), 1284-1298.

Boschma, R., Coenen, L., Frenken, K., & Truffer, B. (2017). Towards a theory of regional diversification: combining insights from Evolutionary Economic Geography and Transition Studies. *Regional Studies*, 51(1), 31-45.

Boschma, R., & Frenken, K. (2011). The emerging empirics of evolutionary economic geography. *Journal of economic geography*, 11(2), 295-307.

Carvalho, L., & Vale, M. (2018). Biotech by Bricolage? Agency, institutional relatedness and new path development in peripheral regions. *Cambridge Journal of Regions, Economy and Society*, *11*(2), 275-295.

Castendyk, O. & Müller-Lietzkow, J. 2017. Die Computer- und Videospielindustrie in Deutschland: Daten, Fakten, Analysen. Hamburg Media School.

Coenen, L., Benneworth, P., & Truffer, B. (2012). Toward a spatial perspective on sustainability transitions. *Research Policy*, 41(6), 968-979.

Cohendet, P., Grandadam, D., Mehouachi, C., & Simon, L. (2018). The local, the global and the industry common: the case of the video game industry. *Journal of Economic Geography*.1-24.

Coyne, I. T. (1997). Sampling in qualitative research. Purposeful and theoretical sampling; merging or clear boundaries?. *Journal of advanced nursing*, 26(3), 623-630.

Dawley, S. (2014). Creating new paths? Offshore wind, policy activism, and peripheral region development. *Economic Geography*, 90(1), 91-112.

Freeman, J., Carroll, G. R., & Hannan, M. T. (1983). The liability of newness: Age dependence in organizational death rates. *American Sociological Review*, 692-710.

Frenken, K., & Boschma, R. A. (2007). A theoretical framework for evolutionary economic geography: industrial dynamics and urban growth as a branching process. *Journal of Economic Geography*, 7(5), 635-649.

Fuenfschilling, L., & Truffer, B. (2016). The interplay of institutions, actors and technologies in socio-technical systems—An analysis of transformations in the Australian urban water sector. *Technological Forecasting and Social Change*, 103, 298-312.

Galvin, T. L., Ventresca, M. J., & Hudson, B. A. (2004). Contested industry dynamics. *International Studies of Management & Organization*, 34(4), 56-82.

GAME. (2018). DEUTSCHER GAMES-FONDS: Modell für eine Games-Förderung des Bundes

GamesMarkt. (2000). VUD: Game.On! in Leipzig.

Geels, F. W., Pieters, T., & Snelders, S. (2007). Cultural enthusiasm, resistance and the societal embedding of new technologies: psychotropic drugs in the 20th century. *Technology Analysis & Strategic Management*, 19(2), 145-165.

Geels, F. W., & Verhees, B. (2011). Cultural legitimacy and framing struggles in innovation journeys: a cultural-performative perspective and a case study of Dutch nuclear energy (1945–1986). *Technological Forecasting and Social Change*, 78(6), 910-930.

Grillitsch, M., & Sotarauta, M. (2018). Regional Growth Paths: From Structure to Agency and Back. Papers in Innovation Studies (No. 2018/1), Lund University.

Hamburger Abendblatt. (2008). Hamburg—Hochburg für Computerspiele

Hamburger Abendblatt. (2017). Hat die Games-Hauptstadt Hamburg ausgespielt?

Handelskammer Hamburg. (2004). Branchenportrait IT-Metropole Hamburg 2004.

Hassink, R., Isaksen, A., & Trippl, M. (2019). Towards a comprehensive understanding of new regional industrial path development. *Regional Studies*, 1-10.

Hekkert, M. P., Suurs, R. A., Negro, S. O., Kuhlmann, S., & Smits, R. E. (2007). Functions of innovation systems: A new approach for analysing technological change. *Technological forecasting and social change*, 74(4), 413-432.

Isaksen, A., Martin, R., & Trippl, M. (Eds.). (2018). *New Avenues for Regional Innovation Systems: Theoretical Advances, Empirical Cases and Policy Lessons*. Cham, Switzerland: Springer.

Isaksen, A., & Trippl, M. (2017). Exogenously led and policy-supported new path development in peripheral regions: Analytical and synthetic routes. *Economic Geography*, 93(5), 436-457.

Jeannerat, H., & Kebir, L. (2016). Knowledge, resources and markets: what economic system of valuation?. *Regional Studies*, 50(2), 274-288.

Johns, J. (2005). Video games production networks: value capture, power relations and embeddedness. *Journal of economic geography*, 6(2), 151-180.

Karlsen, F. (2015). *Analyzing game controversies: A historical approach to moral panics and digital games. The Dark Side of Game Play: Controversial Issues in Playful Environments*. New York and London: Routledge, 15-32.

Lawrence, T., and Suddaby, R. (2006). Institutions and institutional work. In S. R. Clegg, C. Hardy, T. B. Lawrence, and W. R. Nord (Eds.), *Handbook of organization studies* (2nd ed., pp. 215–254). London: Sage.

Lindorff, M., Jonson, E. P., & McGuire, L. (2012). Strategic corporate social responsibility in controversial industry sectors: The social value of harm minimisation. *Journal of Business Ethics*, 110(4), 457-467.

MacKinnon, D., Dawley, S., Pike, A., & Cumbers, A. (2018). Rethinking Path Creation: A Geographical Political Economy Approach. *Economic Geography* (forthcoming).

Markard, J., Raven, R., & Truffer, B. (2012). Sustainability transitions: An emerging field of research and its prospects. *Research Policy*, 41(6), 955-967.

Markard, J., Wirth, S., & Truffer, B. (2016). Institutional dynamics and technology legitimacy–A framework and a case study on biogas technology. *Research Policy*, 45(1), 330-344.

Martin, R., & Sunley, P. (2006). Path dependence and regional economic evolution. *Journal of economic geography*, 6(4), 395-437.

Miles, M. B., Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook*. Sage.

Müller-Lietzkow, J., Bouncken, R. B., & Seufert, W. (2006). *Gegenwart und Zukunft der Computer- und Videospielindustrie in Deutschland*. Dornach: Entertainment Media Verlag.

Plum, O., & Hassink, R. (2014). Knowledge bases, innovativeness and competitiveness in creative industries: the case of Hamburg's video game developers. *Regional Studies, Regional Science*, 1(1), 248-268.

Prior, L. (2003). *Using documents in social research*. London: Sage.

Quinke, A. 2004. GameCity Hamburg: Konzept zur Förderung der Computerspiele-Wirtschaft in Hamburg. Diploma thesis, TU-Hamburg Harburg.

Rao, H. (2004). Institutional activism in the early American automobile industry. *Journal of Business Venturing*, 19(3), 359-384.

Sørensen, E. (2013). Violent computer games in the German press. *New media & society*, 15(6), 963-981.

Sotarauta, M. (2017). An actor-centric bottom-up view of institutions: Combinatorial knowledge dynamics through the eyes of institutional entrepreneurs and institutional navigators. *Environment and Planning C: Politics and Space*, 35(4), 584-599.

Strambach, S. (2017). Combining Knowledge Bases in Transnational Sustainability Innovation: Microdynamics and Institutional Change. *Economic Geography*, 93(5), 500-526.

Tödtling, F., & Trippl, M. (2018). Regional innovation policies for new path development–beyond neo-liberal and traditional systemic views. *European Planning Studies*, 1-17.

Trippl, M., Grillitsch, M., & Isaksen, A. (2017). Exogenous sources of regional industrial change: Attraction and absorption of non-local knowledge for new path development. *Progress in Human Geography*, 1-19.

Vergne, J. P. (2012). Stigmatized categories and public disapproval of organizations: A mixed-methods study of the global arms industry, 1996–2007. *Academy of Management Journal*, 55(5), 1027-1052.

Weber, K. M., & Truffer, B. (2017). Moving innovation systems research to the next level: towards an integrative agenda. *Oxford Review of Economic Policy*, 33(1), 101-121.

Yousafzai, S., Hussain, Z., & Griffiths, M. (2014). Social responsibility in online videogaming: What should the videogame industry do?. *Addiction Research & Theory*, 22 (3): 181-185.

Paper 5. Resource formation and multi-scalar institutional structures: a comparative study of the online games industry in Shanghai and Hamburg

Sumbitted to *Economic Geography*

This is the author‘s original manuscript of the submitted article

Resource formation and multi-scalar institutional structures in local industrial development: the online game industry in Shanghai and Hamburg

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Abstract: The question why the same industry shows distinct fates in different regions is interesting from an economic-geographical point of view. So far, the mechanism through which such different developmental trajectories occur has not been explored satisfactorily. Based on the development paths of one industry—the online game industry, in two city-regions—Shanghai and Hamburg, this paper fills this gap. It contributes to the recent industrial path development literature by linking resource mobilization processes to the multi-scalar institutional structures. The central argument is that the dynamic agency-structure relations serve as the causal mechanism that leads to different local industrial development outcomes. Furthermore, it also brings the 'national' back into the existing 'multi-scalar' views on regional path development.

Keywords: agency; structure; causal mechanism; local industrial development; online game industry

1. Introduction

The fundamental question of where and how industries emerge and develop has regained popularity in economic geography literature (Martin, 2010; Martin and Sunley, 2006). So far, however, no satisfactory theory has yet been proposed to answer the question why one industry shows distinct fates in different regions. In our view, to answer this question, two crucial aspects need to be cautiously worked out, namely, 1) the relevant actors and their agencies in contributing to local industrial development; and 2) the institutional structures that enable or constrain actors' actions. While the recent 'new path' literature has highlighted the role of multi-actors and their agencies (e.g., Binz et al., 2016b; Grillitsch and Sotarauta, 2019), the *structural* side of local path development (i.e. how the multi-scalar institutional architectures enable or present the activities of actors and thus influence local industrial development) has resulted in much less discussion.

To answer the question of interest, we try to embed the agencies of various actors in developing an industry into the broader institutional structures present at the local and national levels. We do so by examining the development of the online game industry in Shanghai and Hamburg. These two local industries had a similar starting point— both had a low position in the global value chain, and possessed weak capabilities in developing complex video games. However, they differed substantially in their competitiveness after 15 years of development. The different political and institutional structures present in Shanghai (China) and Hamburg (Germany) thus provide a valuable setting for investigating the topic of interest.

The paper is structured as follows. Section 2 reviews the recent work on local industrial development and identifies deficiencies that are relevant to our study. In Section 3, a multi-

scalar analytical framework is developed, incorporating the agency and the structural that are relevant for local industrial development. The next section then introduces the cases and research methods. Section 5 presents the processes through which actors mobilize and create key resources at different spatial levels in Shanghai and Hamburg. In Section 6, we investigate the role of the multi-scalar institutional structures that shape such processes. Section 7 discusses three key aspects that relate to our research question, namely, the multi-scalar nature of resource formation, the role of the institutional structures, and the relationships between the two. The final section concludes.

2. Overview of the literature: local industrial development

Although local industrial development is a classic topic in economic geography (Scott, 1992), it is particularly during the last decade or so, that we observe an increasing interest in systematically exploring such phenomena (Binz et al., 2016b). Drawing on evolutionary concepts, studies from evolutionary economic geography (EEG) have contributed a significant amount of knowledge to local industrial development, with a special focus on the 'principle of relatedness' (Hidalgo et al., 2018)—that is, the probability of an economic activity entering or exiting a region is a function of the number of related activities present in that region. While insightful, such an evolutionary approach has been recently criticized as spatially myopic and firm-centric by many scholars (for a systemic criticism, see Binz et al., 2016b; Hassink et al., 2019).

To compensate for the deficiencies of EEG studies, the 'new path development' literature (e.g., Martin 2010; MacKinnon et al., 2019) has increasingly stressed the significance of actors and their agencies in developing local industries (Grillitsch and Sataurata, 2019).

Actors that have been highlighted in such studies include entrepreneurs and firms, policy-makers, universities and research institutes, intermediaries, etc. (Dawley, 2014; Binz et al., 2016b). Agencies that are important for local industrial development include innovative entrepreneurship (Asheim et al., 2011), institutional entrepreneurships (Sotarauta and Mustikkamäki, 2015), and place leadership (Sotarauta et al., 2017), etc. The emphasis on institutional elements in local industrial development has been claimed to be the merits of the recent 'path' literature by some authors (e.g., Sotarauta and Mustikkamäki, 2015). So far, however, this approach has focused either on how actors manage to change such institutional frameworks, or on providing descriptions of specific institutional arrangements in the science, innovation and technology field in a country or a region (for a systemic critique see Weber and Truffer, 2017). It has not really provided a very systematic articulation about "the underlying factors and mechanisms that could lead to better or worse [industrial] performance." (ibid, 111).

Spatially, the literature on local industrial development has moved away from an endogenous perspective (local-based) to a perspective that highlights the extra-regional linkages of multiple actors in certain regions (e.g., Binz et al., 2016b; Trippl et al., 2018). A multi-scalar perspective have thus been suggested as a useful lens in studying such phenomena (e.g., Hassink et al., 2019). While such a move is indeed helpful in understanding the different forces contributing to local industrial dynamics, most of the time such exogenous factors only refer to *global* actors and assets (typical examples are Binz et al., 2016b; Trippl et al., 2018). As such, the so-called 'multi-scalar' perspective is often used interchangeably with terms such as 'global-local' interactions, 'regional-extraregional' relations, and an 'endogenous-exogenous' approach. Furthermore, as argued by Dawley et al (2019), in many of the studies that investigate local path development, regional

institutions have often been understood as an overarching category incorporating not only regional institutions, but also national institutions and actors. Such a too generic understanding of 'regional' institutions, as well as the strong interest in global networks have resulted in an ignorance of activities happening on the national level. Consequently, national institutions have often drifted backward, and being seen as background information for specific case studies (for critique, see Dawley et al., 2019). Although some work have explicitly mentioned the relevance of national actors for industrial development, these studies focused either on relatedness (Boschma and Capone, 2015; Hidalgo et al., 2007), or on the policies designed by the national government (Dawley 2014; MacKinnon et al., 2018). Yet, there have been few attempts to relate local industrial development to broader institutional settings in different countries and explain how specific multi-scalar institutional architectures constrain or facilitate the emergence of local industries (for similar observations, see Ćetković and Buzogány, 2016; Smith, 2015). This has prevented the establishment of a systemic framework for comparing local industrial development across countries, and therefore many empirical blind spots exist in the current 'path' literature. In order to tackle such a gap, we aim to bring the 'national' back into the existing 'multi-scalar' views on regional industrial path development, we will show how this national level matter for the development of the two local industries in the later part.

3. Local industrial development and multi-scalar institutions: an analytical framework

Following the discussion on agency vs. structure mentioned above, in order to construct an analytical framework for local industrial development, three steps are essential. The first

step is to examine the activities of actors in developing a local industry (agency side), and the second step is to investigate the multi-scalar institutional structures that are crucial for such activities (structural side). The third step, then, is to investigate such agency-structure relations and look at how they influence the developmental trajectories and ultimately the competitiveness of certain industries in regions.

In investigating the agency side, Binz et al (2016b)'s four key resources mobilization processes, namely *knowledge creation*, *market formation*, *investment attraction* and *technology legitimization*, are helpful. The four resources that have been argued to be crucial for developing China's emerging on-site water recycling industry include knowledge, finance, market and legitimacy. We also see these four resources essential for developing the online game industry, and the analysis of the processes of how relevant actors anchor and mobilize resources at different spatial scales is key for understanding the research question posed in the Introduction.

In terms of institutional structures, we draw inspirations from the comparative capitalism literature, especially the 'varieties of institutional systems' studies (Fainshmidt et al., 2018). The 'varieties' approach has been informed primarily by two frameworks, namely Varieties of Capitalism (VoC)(Hall and Soskice, 2001), and National Business Systems (NBS) (Whitley, 1999). According to the VoC literature, the architecture of 'comparative advantage' of the developed countries is portrayed in terms of key institutional complementarities—among various institutional spheres ranging from national training systems, labor relations, financial systems and corporate governance, inter-firm relations, and coordination with employees. NBS studies have added some additional institutional domains to these five institutional spheres, including the structure of the state and its policies, a society's idiosyncratic customs

and traditions, as well as norms, values and laws and regulations, etc.(Hollingsworth and Boyer, 1997; Whitley, 1999). While the 'varieties' approach has been subject to several rounds of criticism (for a systematic critique, see, Hancké et al., 2007; Peck and Theodore, 2007), for certain specific studies like this paper, this approach offers very useful insights as it highlights the relevance of institutional structures as an important factor in supporting or preventing innovation (Ćetković and Buzogány, 2016). We thus borrow insights from the 'varieties' literature by focus on macro institutional structures and the specific institutional domains, but we also depart from the approach by going beyond the methodological nationalism of the literature to incorporate a multi-scalar view on institutional architectures in which actors and their activities are embedded.

The final step of constructing the analytical framework is to investigate the relationships between the aforementioned two aspects. Since the relationships between structure and agency can be very complicated and can therefore lead to an almost impossible unbundling of such relationships, in this part we try to simplify this complexity by linking the most relevant institutional domains with the concrete resource formation processes mentioned in the prior studies.

Knowledge creation

Knowledge lies at the heart of all local industrial development processes (Asheim et al., 2011). In terms of knowledge creation, educational and vocational training systems determine largely what kinds of knowledge are more readily available for local industrial development. The differences in the educational systems have a big role in shaping the most commonly adopted knowledge seeking strategies taken by firms within national boundaries (e.g., relying on university and college education or depending more on the on-the-job

training). Moreover, in addition to the public schools, private training organizations might add to the diversity of knowledge acquisition channels for firms. Beyond the boundary of a country, collaboration with foreign universities, international high-skill labor mobility, etc., can also contribute to the knowledge creation in the region (Trippl et al., 2018).

Investment accessing

Financial investment is another key and often scarce resource for actors in a new industry (Fritsch and Schilder, 2012). How can industry practitioners mobilize and attract investments from various sources is one of the decisive factors on whether a local industry will take off or not. The multi-scalar financial system determines both the availability of finance for particular types of projects and the terms on which firms can secure funds (Binz et al., 2016b). Theoretically, there are multiple financial sources that local firms could depend on, such as angel investments, venture capitals, commercial and investment banks, family investment, public funds and investment, etc. (Fainshmidt et al., 2018). In reality, however, many of such options are not available in certain countries or regions due to the different characteristics of the financial systems (Hall and Soskice, 2001). In countries where shareholder-based systems are preferred, equity-based stock exchange provides the main source of finance for firms. On the contrary, in societies that are in favor of stakeholder-based system, credit-based bank investments will be the dominant financial source (Whitley, 1999). Such national financial systems also exhibit regional variations (e.g., Klagge and Martin, 2005). For those firms that derive no or very few benefits from domestic financial systems, foreign venture capital and other global financial channels may benefit them (Allen and Whitley 2012). Of course, such cross-border capital flow is often regulated and influenced by the national political and institutional forces (Wójcik and Burger, 2010).

Market formation

Market formation is a key process for industry developments (Dewald and Truffer, 2011). Without a demand in the market, the local industries would not come into shape. Previously in the innovation systems literature, market formation is typically understood as a linear process passing through steps from a nursing over a bridging to a mass market. Recently, scholars increasingly aware of the pivotal role of the government and other interest groups (Dawley, 2014). In this respect, the states might have a big role on who gets access to which market and under what conditions (Dicken, 2015). National and regional governments for instance possess an extensive kit of regulatory tools with which to control and to stimulate economic activity in certain markets. Such state support is not only important for domestic market formation, but also can facilitate local firms' foreign market penetration by improving the overall competitiveness of these firms in global competitions (Smith, 2015). In addition to the role of the state, the cultural proximity (e.g., consumption preferences, cultural tastes, language, etc.) between home-host countries plays an important role for the international market expansion of the domestic industries (Du et al., 2012).

Legitimation

Legitimacy depends on aligning the new industry and its products with the relevant institutional contexts (Aldrich and Fiol, 1994; Binz et al., 2016a). New products and processes that are not aligned with the multi-scalar institutions will suffer from skepticism and social defenses (Markard et al., 2016). Legitimation is a dynamic process that requires the efforts of vested interest groups, including entrepreneurs, policymakers, intermediaries, users, and other social groups (Binz et al., 2016a). When the economic and social value of the new industry increases as the industry grows, and people's knowledge about certain

industry accumulates, the liability of the new industry might be slowly mitigated. Regionally or nationally shared norms, values, and conventions thus have a great impact on the acceptance of the local new industry as a 'normal' business (Hollingsworth and Boyer, 1997).

Table 1 shows how the resource formation processes can be linked to the multi-scalar institutional structures[16]. The central argument here is that with respect to each type of resource formation, the agency of relevant actors is strongly mediated by certain institutional domains presented at multiple scales. And such dynamic agency-structure relations, which exist in different regions, can potentially serve as the *causal mechanism* leading to disparate outcomes of industrial development.

Table 1. Resource formation processes and multi-scalar institutional structures.

Key resource	**Formation process (agency)**	**Multi-scalar institutional domains* (structure)**
Knowledge	Knowledge creation	Educational system
Finance	Investment accessing	Financial system
Market	Market formation (expansion)	The role of the state Cultural proximity
Legitimacy	Industry legitimation	Informal institutions Formal institutions

*Note: although most of the time one could argue that such institutional domains are stable, they are also subject to changes, and as long as such changes have impact on the resource formation processes (and vice versa), analytical attention will need to be paid to such dynamics.

All in all, by analyzing 1) the resource formation processes of relevant actors, 2) the multi-scalar institutional structures in which such activities and processes are embedded, and 3) the dynamic agency-structure relations present in regions, we can investigate local industrial development without ignoring the agency and the structure. In addition to this, we are also interested in the *geographical reach* of actor's activities, and how they are shaped by the

[16] The real situation can be much more complicated than this. Each resource formation process can potentially be related to several institutional domains. Here, we only focus on the simplest and directly observable relations between the two aspects.

institutional structures. Our proposition is that the geographical reach of actors' activities is strongly contingent on what the regional and national institutions have to offer. Where the domestic institutional regime structure is seen as being deficient in some way, actors may draw on resources that are derived from abroad to counter for those shortcomings (Allen and Whitley, 2012). This will be examined in our empirical investigation.

4. Case selection and research methods

4.1 Case selection

To answer the 'how and why' research questions posed earlier, we adopt case study method (Eisenhardt, 1989). Case study is an appropriate approach for investigating complex industry formation processes, since it focuses both on the phenomenon (i.e., industrial path development) and the relevant context conditions (i.e., multi-scalar institutional structures) (Yin, 2018). Specifically in this paper, comparative case study is applied, as the aim of the paper is to investigate why the development of the same industry—online game industry, differ substantially in two city-regions.

The different political economic structures of China and Germany provide a fertile ground for investigating and comparing the role of institutional structures on resource formation processes, and ultimately on local industrial development in two regions of two countries. Table 2 summarizes the main characteristics of the typical German and Chinese institutional structures.

Table 2. Characterization of German and Chinese institutional structures.

Institutional spheres	German institutional structures	Chinese institutional structures
Educational and skills formation	Apprenticeship imparting industry-specific skills	Emphasis on general skills, weak vocational training; Skills mismatches Superiority in labor-intensive sectors; Limited innovation capabilities
Financial system	Credit-based patient capital based on banking system; Limited venture capital	State-led banks; Financially starved private firms coexist with spoiled state-owned enterprises; Soaring overseas stock market listing of domestic firms; Large-scale foreign direct investment in technologically advanced sectors
State investment	Investment in strategically important sectors	Heavy investment in public service and national 'pillar' industries; Little investment in private businesses
State role in market	Coordination but not direct intervention	Domestic market protection by creating favorable conditions for indigenous firms; Strong intervention in certain markets; Encouraging exportation

Source: adapted from Hall and Soskice (2001), Peck and Zhang (2013)

In terms of the specific contexts of Shanghai and Hamburg, both cities are important locations for the game industry in respective countries. Table 3 compares the initial conditions and the status quo of the two local industries. Shanghai and Hamburg shared similar industrial preconditions—the domestic market was dominated by foreign games, and the self-development capabilities of local firms were rather weak in comparison to the global forerunners from the US, Japan, and South Korea. However, the local industry has developed differently during the last fifteen years or so. The turnover of Shanghai-based companies reached $9,889 million in 2017 (CNG, 2018). There were around 1670 game firms in Shanghai, and the oversea game revenue of Shanghai reached $1345 million in 2017 (CNG, 2018). In contrast, Hamburg's industry is much smaller in every aspect. In 2015, there

were 200 game-related companies located in Hamburg (Gamecity Hamburg, 2015), and game turnover in Hamburg was around 500 million euros (Castendyk and Müller-Lietzkow, 2017). Compared to the Shanghai games sector, the local industry was dominated by small studios normally with less than 10 employees (Gamecity Hamburg, 2015). Moreover, Hamburg-based companies are hardly visible in the global market. In sum, after more than a decade development, Shanghai game firms tends to outcompete their Hamburg counterparts in all of the abovementioned dimensions.

Table 3. Shanghai and Hamburg game industry in comparison

		Shanghai	**Hamburg**
Initial conditions	Time of entry	Early 2000s	Early-mid 2000s
	Related industries	Some related creative and IT industries were present	Some related creative and IT industries were present
	Self-developing capabilities	Weak	Weak
	Market characteristics	Strong dominance of foreign games	Strong dominance of foreign games
	Position in global value chain	Latecomer; engaging in downstream, low-value-added activities	Latecomer; little engagement with global lead firms
Status quo	Turnover	$9,889 million (2017)	€500 million euros (2017)
	Foreign revenue	$1345 million (2017)	NA
	No. of firms	Circa 1670 (2017)	Circa 200 (2015)
	Industry structure	A good mixture of big, medium-, and small-sized firms	SMEs dominate
	Global competitiveness	Market is huge, while still lacking blockbuster	Market is small, visibility is low
	Overall assessment	A big industry serving both domestic and global markets with diverse firms from the whole value chain; relatively strong R&D, publishing and marketing capabilities	A small industry with relatively weak position in both domestic and global markets; strong focusing on game development, while publishing and marketing capabilities are weak

4.2 Methods

This study draws upon two main data sources: 63 semi-structured interviews and a large number of secondary materials. The interviews were conducted over three periods: September to December 2016 (Shanghai), January to April 2018 (Hamburg), and September to October 2018 (Shanghai and Shenzhen). On average, each interview lasted for one and a half hours. Interviewees included founders and managers of local companies, officials, managers of industry associations, industry experts, scholars, etc. Detailed information about the interviewees is presented in Table 4. The second part of the data contains a large number of secondary data. This set of data mainly came from internal materials of the intermediary organizations, mainstream media reports, professional magazines archives and industry reports, and it was collected and compiled chronologically. Thematic analysis was applied in analyzing the data. A codebook was developed based on the interpretation of emerging themes. And the two sets of data have been compared and triangulated with each other.

Table 4. Interview groups and number of interviewees.

Interview groups	**No. of interviewees**
Shanghai	
Experts with >10 years working experience in the industry (SHEX)	10
Founders/managers of local firms (industry representatives) (SHIR)	23
Directors of cluster organizations (SHCO)	5
Government officials (SHGO)	4
Total	42
Hamburg	
Founders/managers of local firms (industry representatives) (HAMIR)	10
Directors of intermediary organizations (HAMIO)	4
Scholars (HAMSC)	5
Governmental officials (HAMGO)	2
Total	21

5. Resource formation and local industrial development

5.1 Resource formation in the online game industry in Shanghai

The Shanghai online game industry has gone through three phases of development within its relatively short history. Before 2005, the capabilities of local studios to develop games were weak. The domestic market was dominated by foreign games. From 2006 to 2011, derived from their previous experience of collaborating with global leading studios in the US and South Korea, game companies in Shanghai started to develop their own games. Game players have significantly expanded from previous hardcore gamers to include various non-hardcore gamers. Since 2012, the market share of the mobile games started to grow rapidly. The portfolio of game companies became diversified, and firms with divergent sizes occupied the whole value chain from game developing to publishing, maintaining and operating (CNG, 2015). During the whole process of development, actors in the local industry had to mobilize key resources from different scales, ranging from the local to the global. The following subsections will present how the four key resources have been formed in the efforts of multiple stakeholders.

5.1.1 Knowledge creation

When Shanghai started to develop the online game industry in the early 2000s, local companies such as Shanda Games and Giant were mainly acting as the domestic publishers of foreign games. The experience of being the Chinese publishers of foreign games has contributed enormously not only to the economic success of the selected companies, but also to the knowledge transfer from global leaders to the local industry. Moreover, the

industry also benefitted substantially from the knowledge spillover of the Shanghai branches of global game companies, such as Ubisoft, TOSE, Konami, Activision Blizzard, Neowiz, etc. (SHEX3). These foreign firms also later became the seedbeds for the subsequent formation of game startups (SHIR3). While global knowledge spillover through multinationals was important for the local industry, such knowledge has to be absorbed by the indigenous firms. This local absorptive capacity has been significantly improved by the influx of large numbers of graduates from universities. “Our employees came from different parts of China. We recruited a lot of graduates from Shanghai local universities, but in addition to that, we also hired students from other provinces such as Zhejiang, Jiangsu, Hubei, Sichuan, and so on” (SHIR10). While young employees in general were well-educated, however, what they learnt at universities were too general to fit the need of the games business. “Basically, we had to spend half a year to a year in training new graduates to fit into their jobs, the situation varied from job to job, but overall the mismatch between university education and industrial needs was quite big” (SHIR19).

Entering the second phase of development, local studios started to make efforts in improving their self-developing capabilities. However, the misalignment between the general school education and the needs of the industry became a prominent problem, as a result, a large number of private training organizations started to emerge in Shanghai. “These organizations mainly offered intensive short-term courses for those wishing to enter the industry. The courses offered ranged from basic programming to 3D design to game marketing and operations, but the quality of such courses varied greatly as many of the trainers themselves were not so experienced with game development” (SHEX5). At the same time, some universities and colleges started to provide game specific programs (SHCO3). These efforts have reduced the gap between higher education and industrial demand to

some extent, but the mismatch persisted as the number of universities and colleges that had game-specific courses was quite small and many courses were criticized as "far from reality, obsolete and without operationalization" (SHIR3, 20). In this context, the internal training of game companies and online learning have fulfilled a complementary function to the formal higher education (SHIR3, 16).

Knowledge creation in the third phase of development was characterized by an enriched knowledge sourcing portfolio of companies. By the year 2018, the number of higher educational organizations that opened courses that are strongly related to game development has reached 500. Within Shanghai, there were approximately 40 universities and colleges offering such courses (CNG, 2018). In addition to that, industry-university collaboration has strengthened in the recent years. Shanda, for instance, has collaborated with the China Academy of Art (Hangzhou) in “putting students in the driver’s seat” (SHIR3) in providing real game-design experience instead of abstract and obsolete knowledge. In addition, many of the Shanghai-based companies (e.g. YooZoo, Shanda, Giant) also draw on most-advanced knowledge on a global scale by directly opening offices in developed countries (SHEX5, 6, SHGO1).

5.1.2 Investment accessing

Investment is one of the key drivers of industrial development. As one of the financial centers of China, multiple financial sources including equity, business angel, venture capital, could be found in the local game industry since its emergence (SHIR17, 6, SHEX20).

In the early 2000s, foreign capital dominated the Shanghai online game industry (SHIR1). For instance, Shanda, the then biggest game company in China, went IPO at Nasdaq in 2004

(SHGO2). Another two Shanghai-based firms The9 and Giant also went public in America shortly after Shanda's IPO (SHEX4). The early companies' success has thus triggered a local e-game boom. Local governments have reserved certain areas of their high-tech zones for game start-ups and provided them with public funding (SHGO3, SHIR13). In addition, the Shanghai High-Tech Park Management Committees also organized various "investment and financing matchmakings" to solve the financing problem of firms in their clusters (SHCO5). This proactive participation of entrepreneurs, investors and the local government has contributed to the enormous success of the Shanghai online gaming industry in the first phase.

With the start of the second development phase, this new and highly profitable industry has caught the eye of investors from traditional manufacturing, as they expected a much higher return in this emerging industry than in many of the conventional sectors (SHEX8). In addition to investments from traditional sectors, professional venture capital companies were also very active during this period. They provided money and management expertise for many of the start-ups (SHEX7, SHIR11). Moreover, the former successful local companies (e.g. Shanda, Giant) also began to invest in top-class start-up teams (SHIR2). The last two types of investors usually had higher requirements than the first type, and they usually required start-ups to deliver a demo before they started investing money (SHIR20).

Entering the third phase of mobile gaming, the barriers of attracting investments became higher as the competition within the industry became fierce. "...The increasing homogeneity of the games offered on the market made investing in games less profitable for most investors." (SHIR3). Therefore, many of the previous investors from traditional sectors started to withdraw from further investment (SHIR9). Venture capital and intra-industry

investments dominated the market in this period. In contrast to the previous phase where developers could easily found investors, entrepreneurs found it harder to fund their projects, as venture capital companies and large game firms had a good knowledge about game markets and technologies and they were much more selective than previous investors such as bosses from conventional manufacturing (SHEX5). Fund provided by the local government was important in this regard, and game incubators located in the high-tech park zones in Shanghai also provided money and expertise for developing such demos (SHGO2). In contrast to SMEs, Shanghai-based companies that have previously been listed on American stock exchanges (Shanda, Giant, The9) withdrew from abroad because their share price had long been undervalued on the foreign market (SHIR16). Alternatively, the two domestic stock exchanges based in Shanghai and Shenzhen and the Hong Kong stock exchange have become the main sales markets for IPOs for many of the Shanghai-based medium-sized companies (SHIR16, 23).

5.1.3 Market formation

In the early years, the Chinese market was dominated by foreign games, particularly those fantasy and massively multiplayer online role-playing games from South Korea and the US (SHEX8). This asymmetric position between foreign and domestic games changed in the second phase of development. Since then, indigenously developed games have dominated the domestic market, and this trend has intensified in recent years.

In terms of Shanghai, it accounted for around 30% of the total revenue generated in the domestic market since 2009 (CNG, 2015). More prominently, the share of sales accounted by the self-developed games in Shanghai rose to more than 60% in the 2010s. Parallel to

the expanding domestic market, Shanghai-based companies also began to export games to culturally proximate countries since the second half of the 2000s. This game export trend was intensified in the third development phase, in which the share of export games in the total game sales of Shanghai-based companies rose to around 10 percent in 2016. (CNG, 2016). Such an expansion of both domestic and international markets has been realized by various facilitating factors including the supportive role of the state, the formal and information institutions, which we will elaborate on later in the paper.

5.1.4 Legitimation

Digital games have been stigmatized as 'Electronic Heroin' in the 1990s and early 2000s (SHIR18). Problems of game addictions, poor school performance, physical unfitness, behavioral aggression as a result of playing violent games, have raised social concerns about the dark side of gaming (SHIR15). Consequently, intensive regulations and policy documents have been produced in reducing the side effects of the industry (SHEX6). However, such a negative view began to change slowly when the industry surprised the country by showing how profitable it could be. What was intensively discussed at the time of the game boom was mainly the economic benefits, the employment opportunities that the industry could offer, the cultural value of such digital games and the added value of exporting games to other countries in increasing the cultural influence of the country, etc. The pervasive (negative) social and cultural influence of gaming was still one of the main concerns of the central government and the public, but state's attitude towards the industry has become more and more complex (SHIR 8). National and local governments have tried various measures to reduce the negative effects of the industry while maximizing the economic

benefits it brought (SHIR21). In recent years, critical voices increased again, as game addictions of rural youths became alarming (SHIR23). The negative effects of the industry have once again become a main concern of the state, particularly regarding problems with 'left-behind' rural children (SHEX7). Series of policy interventions have been announced by the central government. One of these measures which had a devastating impact on the industry, was the suspension of the release of new games since March 2018 (SHIR18, 20). The central government did not license any new games till the end of the year (SHIR20). Such a tightening of policy at the national level has led to a sharp decline in game stocks, and most of the game companies in Shanghai have been affected to varying degrees (SHIR18).

5.2 Resource formation in the online game industry in Hamburg

Hamburg is Germany's leader in free-to-play and browser game development. The local game industry employed close to 5,000 people in 2015, with the three biggest companies, Bigpoint, Goodgames and Innogames hired hundreds of workers respectively (Gamecity Hamburg, 2015). Similar to the Shanghai game industry, the Hamburg online game industry has also gone through three phases of development: Before 2005, the industry was in an emerging period, and founders of earlier studios, or, autodidacts, began to develop simple games either as a hobby or as a small business (Hamburger Abendblatt, 2008). The browser games boom started when local studios experienced mass market explosion between 2006 and 2012. It was only with this boom that the companies in Hamburg significantly increased their staffing and established their own reputation as the browser game capital of Germany (Castendyk and Müller-Lietzkow, 2017). The mobile games phase started in 2013 when

devices such as smart phones and tablets became the mainstream platforms for gaming. The earlier browser game companies were forced to substantially restructure their organizational structures in order to switch to the mobile game business. Meanwhile, a large number of indie game start-ups and studios have been emerging. Focusing on creative gameplays, such indie groups have added diversity to Hamburg's game landscape.

5.2.1 Knowledge creation

The game industry began in Hamburg as the "hobby" of some early autodidacts and amateurs (HAMIR3). Typical hobby game projects at that time started with imitating the idols whose games the developers adored. Based on that, the autodidacts added some features, ideas and stories to the perfect copies (HAMIR2). For most of those autodidacts, the most important channel for acquiring knowledge was self-learning via German online forums such as ZFX, Developia, etc. (HAMIR3).

After a few years of development, the early hobby business started to take off in the age of browser games. In order to meet the burgeoning demand for highly qualified workers of the local industry, an educational project "GamecityLab" (HAMIO3) was launched in 2007, which was converted into the Games Master's course at the Hamburg University of Applied Sciences (HAW) in 2009 (HAMSC1). Since its establishment, this master's program has provided the local gaming community with highly qualified programmers and artists (HAMGO1). While this educational program was important in closing the gap between formal education and actual industrial needs, the number of students trained there was limited (HAMSC3). Therefore, national and global talent recruiting became important. Gamecity Hamburg, the local industry network, together with local lead firms, have

organized several recruiting tours in Eastern Germany and neighboring countries to attract creative people to move to Hamburg (HAMIO3). In addition, the local government was also actively involved in creating an open atmosphere in welcoming international workers, particularly IT engineers from Eastern Europe, Asia and America (HAMGO1). It was the influx of talented workers from the whole Germany and other countries that contributed much to the continued upswing of local industry before its decline began in the third phase. At the national level, more universities began offering game-related courses, and some private schools with a strong focus on game design (e.g. 3D modeling, character art design, animation) began to emerge (HAMSC5).

When mobile devices such as smart phones and tablets became the mainstream gaming platforms in the early 2010s, the former browser-game-based Hamburg companies were forced to switch to the mobile game business model. In this period, the knowledge sourcing channels of the local industry started to diversify much. Online learning via epistemic communities, and knowledge exchange with co-located firms (intra-industry collaboration between local small and big game companies) are important channels for knowledge generation and spillover (HAMIR6). In addition, the number of schools and universities where designers, programmers and artists can receive education and training is growing. However, schools can only do educational work to a certain extent, such as sharing the technologies needed to develop games. Many of the techniques and skills that are important for running a business, such as commercializing games, planning budgets, and finding teammates and founding studios must be learnt via the community (HAMSC2). This type of learning only started to emerge very recently (HAMIR3, 6, 8).

5.2.2 Investment accessing

Fundraising is the most challenging work for game developers in Germany (HAMSC3, HAMIR5). In the specific case of Hamburg, the early game developers had to invest their own money (which they had earned in the last years, or were supported by the family) to start the business (HAMIR2). There was no public funding available until 2006 (HAMIR7). Thanks to the effort of Gamecity in applying for an EU fund, from 2006 to 2012, a public initiation encompassed 100,000 € as a free-interest loan could be provide to Hamburg-based developers who were developing promising game prototypes. Several local companies, such as Daedalic and Xyrality, have benefited from this fund (HAMSC3). Unlike the conventional mode of the German financial system where enterprises obtain loans from banks, Hamburg game industry hardly received any debts from banks (HAMIR10). The only exception in our study was Goodgames, which borrowed €500,000 from a bank (HAMIR4). For Hamburg-based game companies, the most common financial channel was to look for a publisher or investor to fund their projects. However, this funding model was also difficult, as “venture capitalists and publishers usually would not give money without reference projects or prototypes” (HAMIR6). As such, self-investment dominated the early prototype phase, and only after a demo had been developed, could the developers asked for further investment from publishers or inventors to complete the game.

Contrasting to the situation in Shanghai, where global capitalists started to invest in game business since the beginning of the industry, such global investments only started in the third phase of development, when the three largest studios in Hamburg were acquired by foreign media conglomerates[17]. Such international mergers and acquisitions are important

[17] Bigpoint was acquired by the Chinese games company Youzoo in 2016, Goodgames by the Swedish company Stillfront in 2018 and Innogames by the Swedish Modern Times Group in 2017.

for sustaining the development of the local industry, as more stable sources of money will be provided by international firms (HAMIO3, HAMIR6, 7). Aside from big studios, the city is populated by independent studios. Such start-ups had to depend on local networks to find investors. Many of the founders regularly took part in such networking events organized by Gamecity Hamburg where venture capitalists also participated, with the hope that some business partnerships could be developed there (HAMIR8, 10). In the same time, intra-industry partnership between big and small companies became more important, and the former successful companies such as Innogames and Daedalic, have collaborated with indie groups to support those young developers. It was also in the third phase that the essentiality of a nationwide support funding became the main concern of game developers based in Hamburg and the whole Germany. "So far, the industry was mainly supported by limited regional funding, and the German government is clearly not doing enough to support our industry" (HAMIR6). This situation has changed slightly in the last two years, thanks to the long-term lobbying of national game associations BIU and GAME, in which they criticized the poor funding situation in Germany comparing to other countries such as France, the UK and Canada (Castendyk and Müller-Lietzkow, 2017). Last year, the central government finally agreed to launch a German Games Fund (HAMSC5).

5.2.3 Market formation

Since the 1970s, the German games market has been dominated by imported games from the USA and Japan (Castendyk and Müller-Lietzkow, 2017). This situation did not change much until the German browser game boom in the mid-2000s and early-2010s, led by Hamburg-based companies. During this time, several browser games from Hamburg have

reached the global players in many countries (HAMIR3). And the revenue generated by companies based in Hamburg increased strongly in the national and global markets. However, this situation did not last long. Entering the age of mobile gaming, Hamburg-based companies were under strong pressure to compete with global competitors, particularly from East Asia and North America, both in the national and global markets (HAMIR9). Hamburg companies have also tried to enter the foreign market by opening offices in countries such as Korea, Japan and China (HAMIO2, 3, HAMIR4), but competition there is even more fierce. In contrast to Shanghai case, the states, both at the regional and national levels, have not done much in supporting game exports, leading to competitive disadvantages in the global market.

5.2.4 Legitimation

Similar to China, the game industry in Germany also suffered from social stigmatization. In Germany, the prevailing view is that gaming is a less serious industry that aims to provide entertainment for children (HAMIR3). The German Computer Game Awards have never been awarded to games whose target players are adults. “Whenever the jury nominated action titles, they were either rejected by strange veto rights or heavily criticized by the responsible Minister of Culture” (HAMSC4). Such a strong attachment of games to children entertainment has hindered the development of internationally attractive titles in Germany. A second legitimacy issue concerned the stability of the industry. When young people have decided to choose games as their permanent career, their families and friends would always doubt whether this was a stable career to pursue (HAMIR4, 5). Also, the concern for violence was very strong in the society, due to its specific history of Nazi Germany (HAMIR7,

HAMIO4). German authorities had notoriously banned violent games in the country (HAMIO4). This situation has changed slowly with the long-term institutional work of industrial practitioners, some politicians and political parties, industry associations, scientists, etc. (HAMSC2). And there has been less and less discussion about banning violent games in both the media and political campaigns, and the previously stigmatized industry has finally gained a better image. But such an accumulation of legitimacy is not stable, as long as shooting accident happens, it will be brought back to the table of discussion, although the industry is no longer seen as completely negative (HAMIO3).

6. Multi-scalar institutions in resource formation processes

We now examine the relevant institutional domains that are crucial for the activities of industry proponents. In terms of educational and vocational training systems, strong mismatches between the local and national education systems and the industrial need could be observed, particularly in the early emergence phase. In the case of Shanghai, the emphasize on generic skills and knowledge, and the ignorance of vocational training of the Chinese educational system (Peck and Zhang, 2013) did not fit well with the requirements of highly-skilled and well-trained labors of the game industry. In Hamburg, the situation was not better. Starting from the hobby business of autodidacts, professional education and training did not exist in the beginning. Even though vocational training has long been regarded as one of the advantages of the German educational system, in the specific game industry, this seems to play a minor role. Instead of working as an intern or trainee in a company, many of the students and graduates from universities of applied sciences would choose to start their own business and develop their own games with fellow students or friends. But the situation in both cases has improved over the last decade, and both local

and national public and private schools have tried to close such gap by innovating the industry' educational and training systems. Domestically, many private training organizations and online courses have been established to overcome the weaknesses of formal educating. More importantly, many companies have chosen to globalize their knowledge sourcing channels as the frontier knowledge cannot readily be obtained domestically.

The second institutional domain that is important for local industrial development is the financial system. In this respect, we observed a huge discrepancy between the German financial system and the industrial need. While the German financial system is characterized by bank-based credit financing (Bathelt and Gertler, 2005; Hall and Soskice, 2001), banks do not provide much money to game companies. Moreover, at least in the game industry in Hamburg and probably also in Germany in general, no venture capital market has yet developed. As a result, entrepreneurs had to bear most of the risks. The stock market has not yet formed in the industry either, as so far there is no Hamburg-based game company that has been publically listed. Such a strong discrepancy between the financial system and the focal industry has made it difficult to expand the games business in Hamburg. This may explain why small studios dominate the Hamburg games industry - the lack of sufficient financing and the inactivity of the capital market have severely impaired the growth potential of start-ups. In order to compensate for such weaknesses in the financial system, other alternatives, such as a national gaming fund, were urgently needed. In addition, the latest international M&As in Hamburg also contributed to the diversifying sources of finance.

In contrast, while the Chinese financial system largely discriminates against the private sectors (Peck and Zhang, 2013), global capital and foreign equity markets have begun to compensate for such weakness since the beginning of the industry. To some extent, foreign capital has largely facilitated the emergence of the local game business. Moreover, in order to overcome the bias of the state-owned banking system towards state-owned enterprises, dynamic venture capital and equity markets have been successfully developed in many of the high-tech and competitive private sectors, such as the IT sector, in China's first-tier cities such as Shanghai, Beijing, and Shenzhen. Game industry in Shanghai was (still is) highly capitalized, and as one of the financial centers of mainland China, Shanghai offered various financial channels for local firms.

The third broader institutional dimension relevant to market creation consists of sub-dimensions, such as the multiple roles of the states, and the cultural proximity between home-host markets. In Shanghai, national and local governments have played roles such as market regulators, strategic market actors, and service providers (Dicken, 2015). In particular, the central state has protected indigenous companies by creating favorable competitive conditions for indigenous companies on the domestic market. Moreover, it also discouraged the import of foreign games by creating barriers for foreign companies to obtain publication licenses from the relevant ministries, by introducing stricter censorship and by setting an annual import quota for foreign games. Moreover, the central and local governments also actively involved themselves in facilitating the export of Chinese titles (e.g. through financial and regulatory support) to foreign countries. In addition to such active roles of the states, the cultural proximity between China and neighbor countries, has also contributed substantially to the international market expansion of the local industry.

In Hamburg, the states in general played a minor role. Although the local state was very active in promoting its game scene, they could not offer the resources that the local industry needed most (e.g., sufficient money, favorable policy in the market). The national state was even worse, they reacted passively and slowly to the requests of the industry both in providing public fund and in supporting indigenous firms in the market. This has been cited as the main reason why the market share of German-developed games has continued to decline in recent years (GAME, 2018). In terms of its international market expansion, the German language has been argued by some respondents as to why it is difficult for some German games to be reached by global players.

Finally, the laws and regulations, norms, values and beliefs shared within a country strongly influence the legitimacy that people attribute to an industry. In the specific game industry, we observe a strong disparity between the industry and the nationally-shared formal and informal institutions in both countries. As such, nationwide institutional work and legitimation activities are essential to eliminate the social stigma associated with games and gaming. Although the legitimacy of industry has improved in both countries, especially in China, it is still an inhibiting factor that could negatively affect the development of the industry.

7. Discussion

After exploring the resource formation processes as well as the relevant institutional domains that either hindered or facilitated such activities, we now turn to discuss the relations between agency and structure in local industrial development, and how they contribute to the answer of the research question we posed earlier.

The first aspect concerns the multi-scalar resource formation activities of actors. Table 5 summarizes such resource formation processes during the industrial development trajectories. While the extant literature stresses much the significance of local assets reconfiguration and global resource mobilization in developing a local industry (e.g., Binz et al 2016; MacKinnon et al., 2019), in both cases, it is not difficult to find that mobilizing assets at the national level also plays an indispensable role for local industrial development. Similar to those studies arguing for the need of a more nuanced understanding of the state as a critical multi-scalar actor (Smith, 2015), we claim that a truly multi-scalar resource formation should take appropriate account of activities happening on the national level.

Table 5. Multi-scalar resource formation during difference phases.

SH	**Knowledge**		**Finance**		**Market**		**Legitimacy**	
	Resource formation	Scales	Resource formation	Scales	Resource formation	Scales	Resource formation	Scales
P 1	Lacking specific knowledge; Spillovers from MNEs; large number of well-educated workers from domestic universities	Local, national, global	Domestic vc; Foreign investment; IPO/listed in foreign stock exchanges	Local, national, global	foreign games dominated the market	/	Stigmatized as "Electronic heroin"	/
P2	In-house knowledge accumulation; private training organizations;	Local, national, global	investment from traditional sectors within China; domestic VC and local big game companies; foreign vc	Local, national, global	Domestic market developed; exporting to culturally-proximate countries	Local, national, global	Criticisms have been mitigated slightly; state started to support the industry	National
P3	Internal training; Industry-university collaborations; industry-specific private training schools; online channels; global knowledge sourcing	Local, national, global	Professional venture capitalists and big game companies; IPO/listed in domestic stock exchanges	Local, national, global	Domestic and global markets continued to grow; national regulations both support and hinter domestic market expansion	Local, national, global	Criticisms raised strongly due to the severe problem of game additions among rural left-behind children.	National
HAM	**Knowledge**		**Finance**		**Market**		**Legitimacy**	
	Resource formation	Scales	Resource formation	Scales	Resource formation	Scales	Resource formation	Scales
P 1	Lacking specific knowledge; autodidacts' self learning	/	Difficulty in getting venture capital; banks did not play a role; entrepreneurs' self-investment	Local	Market dominated by imported games; state did not take any interventions	/	Skepticism about violent games; doubt as a 'serious' business	/
P2	International and national labor inflow; internal training, online channels	Local, national, global	Free-interest loans from local state; self-dependent financing; domestic publishers	Local, national	Domestic market share grew though the market was strongly occupied by foreign games; revenue from foreign markets grew	Local, national, global	Legitimacy increased slowly due to the lobby of national industry associations	National regional
P3	Internal training; public and private schools; Internship and vocational training	Local, national, global	International M&A; local intra-industry support; national industry-specific funding; crowdfunding	Local, national, global	Competition from global competitors in the domestic market; poor performance in domestic and global markets	Local, national, global	Further legitimated	National regional

Source: own summary

Secondly, relating to the structural side, the results have supported the proposition we developed earlier. Specifically, we find that the institutional framework *within* a country strongly influences the availability of key assets in the domestic market. If national and

regional institutional structures enable the creation of important resources within the country, access to global resources is not so important. However, if the domestic institutional system is seen as restrictive and companies see their industry as relatively disadvantaged by the broader institutions, they intend to take advantage of global opportunities (e.g. international M&As, global financing), access assets abroad (e.g. advanced knowledge) and use external pressure to change domestic arrangements (e.g. the German Games Fund). This kind of global resource anchoring and mobilization occurred in both cases, and part of the reason of globalizing the two local industries was indeed to look for resources that were either non-existing or scarce under the preexisting institutional structures (Allen and Whitley, 2012).

Thirdly, the relationships between the agency (resource formation) and the broader institutional structure have strongly influenced the overall competitiveness of the local industry. Table 6 summarizes the alignment/misalignment between the activities of actors and the multi-scalar institutional structures in both cases. In Hamburg, the industry exhibits discrepancies with the institutional structure in all of the four key resource formation processes. It was above all the risk-averse German banking system and the lack of national state support that have hindered the development of the local industry most. In Shanghai, although actors were better at adjusting and seeking alternatives under its institutional structure (particularly in educating and financing), the close ties to the states could potentially lead to industrial downturn, as recent evidence has clearly shown. Moreover, the negative social influence of gaming will definitely be an obstructive factor for further developing the industry in the long run. Of course, such agency-structure relations are always in a dynamic status. Thus, resource formation processes and their relationships to broader institutional structures cannot be considered ideal or fixed over time.

Table 6. The relationship between agency and the structures.

Resource	Multiscalar instit. dimensions	Hamburg	Shanghai
Knowledge	Education and vocational training	From autodidacts to enriched knowledge acquisition channels; Vocational education and training started to grow; discrepancy between formal education and business requirements (-)	Generic educational system provides large number of skilled workers, while there is still a education-real production mismatch (-)
Finance	Financial system	Venture capital and banking barely play a role; Entrepreneurs bore various risks (- - -)	Vibrant vc and equity markets, though the typical national financial system discriminates against the private sectors (+ + +)
Market	State's roles Formal/informal instit.	Local government has supported the industry; National state was largely inactive; German language as a barrier for global players (- -)	State played both supportive and obstructive roles; cultural proximity between China and targeted export countries (+ +/- -)
Legitimacy	Formal/ informal instit.	social stigmatization (-)	Social stigmatization (- -)

Note: - mismatch, + match; number of symbols represents the degree of match/mismatch

8. Conclusion

The question why one industry presents divergent fates in different regions is an interesting but poorly explored topic in economic geography. Focusing on the online game industry in Shanghai and Hamburg, this paper gives a possible answer to this question. We argue that such a difference in local industrial competitiveness has much to do with the agency and the structural aspects in developing the industry. While the current industrial path development literature has highlighted the agencies of multiple actors in contributing to developing the local industrial development, the institutional structures within which actors mobilize and create resources for local industry are less studied. Spatially, activities and institutions at the national level have largely been overlooked or taken for granted in these studies. Based on the development of the online game industry in Shanghai and Hamburg, we developed an analytical framework that takes into account both agency-structure relations and the multi-scalarity of such relations.

The detailed analysis of the activities of stakeholders at all levels shows that in both cases stakeholders have invested heavily in mobilizing and anchoring the key resources and assets needed. Even so, there are still huge differences in the outcomes. These differentiated results could be explained by the institutional structures, as well as the way they mediated the resource formation processes. In the concrete game industry, it is not difficult to find that the globally-anchored Sino-capitalist model in China/Shanghai was much faster and more flexible in either adapting the impeding institutional structures, or in finding alternative solutions, in meeting the industry's need, while the coordinated German institutional system remained less flexible both in changing their structures and in providing alternatives.

This study contributes to the recent industrial path development literature by linking resource mobilization (agency) to the multi-scalar institutional frameworks (structure). The central argument is that the dynamic agency-structure relations serve as the causal mechanism that leads to different local industrial development outcomes. Furthermore, by carefully examining the national institutions and activities, we were able to bring the 'national' back into the existing 'multi-scalar' views on regional path development, which have so far been applied in a simplistic local-global logic.

Our research also suffers from two weaknesses. First, for the sake of simplifying, the framework we propose in connecting agency and structure only look at the most relevant institutional domains. In reality, situations are much more complex than this, therefore, in the future, more attention needs be paid to the many-to-many relationships between the concrete activities of actors and the institutional domains. Secondly, since digital games are cultural products that could potentially influence the well-being of players, legitimacy has

been regarded as a crucial resource for local industrial development. However, for developing other 'normal' industries, such a legitimacy consideration might be less relevant as they will not lead to negative user behavior. Therefore, whether and how findings from this research could be applied to understanding the developments of other sectors needs to be carefully examined. At the very least, however, our research could have implications for understanding the development of some contested industries, and many emerging industries that suffer from the liability of newness.

References

Aldrich, H. E., & Fiol, C. M. (1994). Fools rush in? The institutional context of industry creation. *Academy of management review*, 19(4), 645-670.

Allen, M. M. C., & Whitley, R. (2012). Internationalization and Sectoral Diversity: The Roles of Organizational Capabilities and Dominant Institutions in Structuring Firms. In Wood, G., & Lane, C. (Eds.). (2012). *Capitalist diversity and diversity within capitalism*, Routledge, 97-120.

Asheim, B. T., Boschma, R., & Cooke, P. (2011). Constructing regional advantage: Platform policies based on related variety and differentiated knowledge bases. *Regional studies*, 45(7), 893-904.

Bathelt, H., & Gertler, M. S. (2005). The German variety of capitalism: forces and dynamics of evolutionary change. *Economic Geography*, 81(1), 1-9.

Binz, C., Harris-Lovett, S., Kiparsky, M., Sedlak, D. L., & Truffer, B. (2016a). The thorny road to technology legitimation—Institutional work for potable water reuse in California. *Technological Forecasting and Social Change*, 103, 249-263.

Binz, C., Truffer, B., & Coenen, L. (2016b). Path creation as a process of resource alignment and anchoring: Industry formation for on-site water recycling in Beijing. *Economic Geography*, 92(2), 172-200.Boschma, R., & Capone, G. (2015). Institutions and diversification: Related versus unrelated diversification in a varieties of capitalism framework. *Research Policy*, 44(10), 1902-1914.

Castendyk, O.& Müller-Lietzkow, J. 2017. *Die Computer- und Videospielindustrie in Deutschland: Daten, Fakten, Analysen*. Hamburg Media School.

Ćetković, S., & Buzogány, A. (2016). Varieties of capitalism and clean energy transitions in the European Union: When renewable energy hits different economic logics. *Climate Policy*, 16(5), 642-657.

CNG. (2015). *Shanghai Gaming Industry Report 2015*, Shanghai.

CNG. (2016). *Shanghai Gaming Industry Report 2016*, Shanghai.

CNG (2018). *Game Industry Development and Talent Demand Analysis Report of 2018*. Shanghai.

Dawley, S. (2014). Creating new paths? Offshore wind, policy activism, and peripheral region development. *Economic Geography*, 90(1), 91-112.

Dawley, S., MacKinnon, D., & Pollock, R. (2019). Creating strategic couplings in global production networks: regional institutions and lead firm investment in the Humber region, UK. *Journal of Economic Geography*.1-20

Dewald, U., & Truffer, B. (2011). Market formation in technological innovation systems—diffusion of photovoltaic applications in Germany. *Industry and Innovation*, 18(03), 285-300.

Dicken, P. (2015). *Global shift: Mapping the changing contours of the world economy* (Seventh edition). SAGE Publications Ltd.

Du, J., Lu, Y., & Tao, Z. (2012). Institutions and FDI location choice: The role of cultural distances. *Journal of Asian Economics*, 23(3), 210-223.

Eisenhardt, K. M. (1989). Building theories from case study research. *Academy of management review*, 14(4), 532-550.

Fainshmidt, S., Judge, W. Q., Aguilera, R. V., & Smith, A. (2018). Varieties of institutional systems: A contextual taxonomy of understudied countries. *Journal of World Business*, 53(3), 307-322.

Fritsch, M., & Schilder, D. (2012). The regional supply of venture capital: Can syndication overcome bottlenecks?. *Economic Geography*, 88(1), 59-76.

Gamecity Hamburg. (2015). *The Guide to Gamecity: Hamburg*. https://www.gamecity-hamburg.de/

Grillitsch, M., & Sotarauta, M. (2018). Regional growth paths: From structure to agency and back (No. 2018/1). Lund University, CIRCLE-Center for Innovation, Research and Competences in the Learning Economy.

Hall P and Soskice D (eds) (2001) *Varieties of Capitalism: The Institutional Foundations of Competitive Advantage*. New York: Oxford University Press.

Hamburger Abendblatt. (2008). Hamburg—Hochburg für Computerspiele

Hancké, B., Rhodes, M., & Thatcher, M. (Eds.). (2007). *Beyond varieties of capitalism: Conflict, contradictions, and complementarities in the European economy*. Oxford: Oxford University Press.

Hassink, R., Isaksen, A., & Trippl, M. (2019). Towards a comprehensive understanding of new regional industrial path development. *Regional Studies*, 1-10.

Hidalgo, C. A., Klinger, B., Barabási, A. L., & Hausmann, R. (2007). The product space conditions the development of nations. *Science*, 317(5837), 482-487.

Hollingsworth, J. R., & Boyer, R. (Eds.). (1997). *Contemporary capitalism: The embeddedness of institutions*. Cambridge University Press.

Klagge, B., & Martin, R. (2005). Decentralized versus centralized financial systems: is there a case for local capital markets?. *Journal of Economic Geography*, 5(4), 387-421.

MacKinnon, D., Dawley, S., Pike, A., & Cumbers, A. (2019). Rethinking path creation: A geographical political economy approach. *Economic Geography*, 1-23.

MacKinnon, D., Dawley, S., Steen, M., Menzel, M. P., Karlsen, A., Sommer, P., Hansen, G. H. & Normann, H. E. (2018). Path creation, global production networks and regional development: a comparative international analysis of the offshore wind sector. *Progress in Planning*.

Markard, J., Wirth, S., & Truffer, B. (2016). Institutional dynamics and technology legitimacy–A framework and a case study on biogas technology. *Research Policy*, 45(1), 330-344.

Martin, R. (2010). Roepke Lecture in Economic Geography—Rethinking regional path dependence: beyond lock-in to evolution. *Economic geography*, 86(1), 1-27.

Martin, R., & Sunley, P. (2006). Path dependence and regional economic evolution. *Journal of economic geography*, 6(4), 395-437.

Peck, J., & Zhang, J. (2013). A variety of capitalism… with Chinese characteristics?. *Journal of Economic Geography*, *13*(3), 357-396.

Peck J and Theodore N (2007) Variegated capitalism. *Progress in Human Geography* 31(6): 731-772.

Scott, A. J. (1992). The Roepke lecture in economic geography the collective order of flexible production agglomerations: Lessons for local economic development policy and strategic choice. *Economic Geography*, 68(3), 219-233.

Smith, A. (2015). The state, institutional frameworks and the dynamics of capital in global production networks. *Progress in Human Geography*, 39(3), 290-315.

Sotarauta, M., Beer, A., & Gibney, J. (2017). Making sense of leadership in urban and regional development. *Regional Studies*, 51:187-193.

Sotarauta, M., & Mustikkamäki, N. (2015). Institutional entrepreneurship, power, and knowledge in innovation systems: institutionalization of regenerative medicine in Tampere, Finland. *Environment and Planning C: Government and Policy*, 33(2), 342-357.

Trippl, M., Grillitsch, M., & Isaksen, A. (2018). Exogenous sources of regional industrial change: Attraction and absorption of non-local knowledge for new path development. *Progress in Human Geography*, 42(5), 687-705.

Weber, K. M., & Truffer, B. (2017). Moving innovation systems research to the next level: towards an integrative agenda. *Oxford Review of Economic Policy*, 33(1), 101-121.

Whitley, R. (1999). *Divergent capitalisms: The social structuring and change of business systems*. Oxford: Oxford University Press.

Wójcik, D., & Burger, C. (2010). Listing BRICs: Stock Issuers from Brazil, Russia, India, and China in New York, London, and Luxembourg. *Economic Geography*, 86(3), 275-296.

Yin, R. K. (2018). *Case study research and applications: Design and methods* (6th edition). Sage publications.

5 Conclusions and outlook

5.1 Summary of the main findings and contributions of the research

Table 5.1. Summary of the contributions of individual papers.

Paper	Contributions
Paper 1	Identifying three forces that drive the clustering of creative industries
Paper 2	Teasing out one of the key concepts in EEG—co-evolution, and thus providing a conceptual foundation for the whole research project; The key concept of co-evolution reveals the dynamic, and reciprocal relationship between industrial development and institutional evolution
Paper 3	Highlighting the downward and upward causal mechanism in institutional dynamics; examining the importance of industry specificity in influencing formal institutional structures; revealing the different strategies of SMEs and big firms in changing unfavorable institutional conditions
Paper 4	Investigating the legitimation process of a stigmatized industry, which has not been explored much so far in economic geography; highlighting changes in formal and informal institutions and how did they affect the social acceptance of the games industry
Paper 5	Building a bridge between agency and the multi-scalar institutional structures; connecting concrete forms of agency (key resource formation processes) to concrete institutional domains/spheres (education system, financial system, labor relations, the role of state, etc.); exploring how agency-structure relations and the alignment between industrial needs and institutional structures shape local industrial competitiveness
Overall contributions	Incorporating both agency and structure sides in explaining the question of why the development of an industry and its competitiveness differs substantially in different regions, despite similar industrial preconditions; moving beyond the process-oriented approach by exploring the underpinning causal mechanisms that contribute to differentiated industrial developmental models in the two city-regions

Table 5.1 gives an overview of the main contributions of the five individual papers and the overall theoretical contributions of the research. Paper 1 gave an overview of the creative industry clusters literature, and paper 2 built the theoretical foundation (co-evolution) for the three empirical papers. Specifically, co-evolution can be used as a key notion in analyzing the reciprocal relationship between an industrial evolution and institutional dynamics at multiple scales. Such institutional dynamics consist of both formal and informal institutional changes, and involves multiple actors located at different scales. Paper 3 dealt with the co-evolution of the focal industry and formal institutions in Shanghai, with a focus on the impact of industrial specificities (cultural influence, technological significance and economic potential) on such relationships. Paper 4 elaborated on the process of regional and national actors in legitimizing the online games industry in Hamburg, which has been subject to all sorts of stigmatization throughout its relatively short developmental history. Insights from transition studies and organizational institutionalism have been drawn in revealing the thorny road of legitimizing such an industry at the regional and national level. The final, comparative paper that has been incorporated in the thesis dealt with the agency-structure relations in explaining the different performance of the two local industries over time. In particular, substantial attention has been paid to bridging the agency and the structural sides of concern. In so doing, I was able to connect concrete forms of practices of actors (agency side) to concrete forms of institutional structures (structure side).

The five papers presented in this thesis are coherent and complementary to each other in multiple aspects. Overall, they contributed to answering the research question raised in the Introduction, namely how and why, starting from a similar industrial condition, the development of an industry and its competitiveness differ significantly in different regions. By examining the activities and practices of actors in mobilizing and accessing key resources for industrial development, as well as the broader institutional structures influencing the geographical search for such resources, these papers drew attention to several issues and concepts. These include co-evolutionary relationship between industry and institutions (paper 2), industrial specificities (paper 3), downward and upward causations (paper 3), social stigmatization and institutional work (paper 4), agency-structure relations (paper 5), and causal mechanisms (paper 5), in explaining the divergent regional industrial developments in different regions.

In addition to the agency- and process-based approaches commonly taken in the current industrial path development literature (see paper 3 & 4), this research also identified the causal mechanisms that could explain the differentiated developmental fates of the same industry in different contexts (paper 5). Informed by critical realist thinking, such a move from pure process tracking to causal mechanism identification could potentially contribute to a more comprehensive understanding of regional industrial development, and thus lead to better policy prescriptions for regional economic problems. Specifically in the online games industry in Shanghai and Hamburg, the process tracing of actors's activities (agency side) could not provide a comprehensive explanation for the different development modes of the focal industry in the selected city-regions (half-way-theorizing), as the exploration of the institutional structures in which such activities are embedded also matters equally in explaining the phenomenon of interest (i.e., an industry shows two fates in two locations). By disentangling the dynamic relationships between the structure and the agency, the underlying forces leading to divergent activities of actors along the whole development processes of the local industries become understandable. In sum, such agency-structure relations serve as the causal mechanisms that lead to different development outcomes in the game industry in the two locations.

5.2 Policy implications

When developing a new industry in a region, the following two fundamental questions need to be taken into account: 1) how well does the new industry fit into the general institutional structures?; and 2) what kinds of alternative solutions are available, if misalignments between industry and institutions occur? Concerning the first question, the general policy implication we could draw from this research is that, instead of investing heavily in industries that show big misalignments with the institutional structures (e.g., the online games industry in Hamburg), it would be smarter to invest in sectors that the overall institutional architecture supports. This argument is very much in line with the central idea of the smart specialization strategies (Foray, 2015). Instead of each region investing all its resources in pursuing a high-road developmental model (i.e., all regions focus on high-tech sectors), policymakers should be more sensitive to the comparative advantages present in

their region. One central consideration to such policy initiatives is to what extent is the new industry supported by the preexisting institutional structures. In the case of the online games industry, we observe misalignments between the industrial needs and the institutional architectures in Shanghai and Hamburg. Therefore, neither of them have managed to achieve a leading position in the global production network, and thus captured less added-value in the global value chain when compared to global leaders based in the US, Japan and South Korea. Hence, the overall fit between the new industries that a region intends to develop and its preexisting institutional structure needs to be carefully examined before any policy initiative is launched.

However, even though both the institutional structures in Shanghai and Hamburg showed mismatching elements with the concrete needs of the games industry, because of the different flexibility and adaptability of the relevant institutional structures as well as agents' power in making changes, the Shanghai online games industry tends to show greater competitive advantages than its counterpart in Hamburg after more than ten years' development. In this context, the second consideration mentioned above (i.e. what kinds of alternative solutions are available, if misalignments between industry and institutions occur?) matters. This is the place where I see added value of this project to the smart specialization strategies (S3). In S3, the identification of comparative advantage via entrepreneurial discovery processes has been seen as the first (and central) step for prioritizing and strengthening certain transformation activities that are relevant to certain sectors in the regional economy (Foray et al., 2009). However, this policy instrument has paid little attention to the flexibility of actors in seeking alternatives, and the adaptability of the institutional structures in which the industries/ sectors are embedded, as well as the alternative solutions that are available beyond the regional context (Uyarra et al., 2018). In the online games industry, both city regions showed disadvantages in key institutional domains such as the educational and financial system in the beginning, however, both regions have managed to complement these disadvantages to some extent. Specifically, both regions have developed alternative training and knowledge sourcing channels by depending more on extra-regional knowledge spillovers and international labor mobilization via both virtual and real channels. However, in terms of financing the new local industries, the two cities differed substantially in their capabilities in providing alternative financial

sources. In Shanghai, multiple funding sources ranging from foreign venture capital, to business angles from conventional manufacturing sectors, intra-industry investments, and equity financing, etc., have emerged during the last fifteen years in order to complement for the state-led banking system present in the country. In contrast, although the German financial system was (still is) also strongly dominated by banks, not many alternative funding opportunities are available for game studios in Hamburg. It was because of such a difference in offering alternative solutions in complementing to the weaknesses of the conservative financial systems of the two countries that the developments of the two local industries differed greatly from each other.

All in all, it is believed that both the agency and the structural concerns are important for regional policymaking. Furthermore, in addition to paying attention to these two aspects, we also need to know how well the new industry fits into the general institutional structures and whether or not alternative solutions are available when there are mismatches between industry and institutions. Particularly in the implementation of the Smart Specialization Policy, since not all regions are able to develop industries that fit very well into the existing local institutional structures, the extent to which regional actors are flexible in the search for alternatives and the adaptability of institutional structures to the needs of new industries are key issues that need to be considered more carefully.

5.3 Limitations of the research and directions for future research

This project also bears some limitations, and there are several interesting aspects that deserve more attention in the future. At this point, I would like to point to five promising avenues for future research in combination with reflecting on the limitations of the research.

The first concerns the industrial specificity of the online games industry, or more general, the nature of creative industries. Since digital games are cultural products, which could potentially influence players' way of thinking, habits, and even modes of behavior (e.g., committing violence or suicide), etc., its cultural influences and the normative considerations behind developing the industry were (still are) the main concern of the Chinese and German societies. Gaming can be used for good and bad purposes, this is

exactly what makes the investigation of the industry interesting from my point of view. However, for developing other 'normal' industries (e.g., manufacturing, high-tech), such a cultural influence might not be the main concern of stakeholders because they will not result in negative behaviors of the users. In this context, the question of whether and how findings from this research could be applied to the developmental trajectories of other industries or sectors needs to be examined carefully.

Secondly, due to time and resource constraints, I could only investigate 'second best practices' in the online games industry (namely in Shanghai and Hamburg). In the future, more empirical research should be carried out in those 'best-practice' regions in countries such as the USA, Canada, Japan, South Korea, etc. (for previous studies see Cohendet et al., 2018; Grandadam et al., 2013; Johns, 2005; Storz, 2008). As mentioned earlier, neither Shanghai/China nor Hamburg/Germany is the most ideal location for developing the online games industry as various discrepancies between the industry and the institutions structure could be identified. In order to provide a more comprehensive picture of the co-evolutional relationship between industry and institutions, the inclusion of additional case studies from other countries would be interesting. In particular, one could distinguish the degree of alignment between industry and institutions in different countries and examine in detail how such alignment or discrepancies affect the practices of actors in mobilizing key resources. In this way, a more general theory could be developed on the relationship between the spectrum of industry-institution alignment (e.g., high match, mid match, low match) and the ease of mobilizing crucial assets.

Thirdly, more comparative studies based on regions in different countries should be carried out in other sectors or industries (e.g., other creative industries, manufacturing industries, green-tech sectors, service industries, etc.) if one aims to develop a more comprehensive understanding of agency-structure relations in influencing regional/ local industrial development. As correctly argued by Barnes et al. (2007, p.32), "…sustained theoretical development by way of case-study research is hampered by an apparent disinclination across the field to invest in corroboration, triangulation, and interrogation across comparative sites." Recently, Evenhuis (2017) also argues that a comparative case study design would be the most appropriate for incorporating both the agency and the structural, as it would involve the comparison between different institutional structures and activities.

Moreover, it will also offer greater scope to pay much more attention to how decisions, relations and structures at various levels impinge on the mechanisms of local industrial development in regions.

The fourth promising avenue for future research, which has been touched upon but not dealt in a systematic way in the empirical papers, is to investigate the converging and/or diverging trends both in the practices and actions of actors (e.g., increasing globalized resource sourcing), as well as in the institutional structures (e.g., convergence in labor relations, financial systems, etc.) that are relevant for the development of local industries. Such a discussion on convergence versus divergence is particularly prominent in the context of globalization. Relevant questions include: under the influence of globalization, which institutional elements (or actor practices) are becoming more and more similar, and which are not? And why? How does such institutional/ practice convergence and divergence affect the development of industries in a particular regional context?

The final avenue is related to the uneven economic growth in general and the dark side of regional industrial path development in particular (Phelps et al., 2018). Just like many studies on regional industrial development, in which much analytical focus has been placed on the 'bright' side of development, and empirical emphases have been put on phenomena such as innovation, knowledge spillovers, technological breakthroughs, etc., this research has also paid little attention to the 'dark side' of regional industrial development. As Phelps et al. (2018) maintain, such dark sides of economic geography not only refer to those peripheral and structurally weak regions, but is also associated with "deep social unrest among the people left in the shadows of economic, [and] is a fertile breeding ground for political turmoil, repeated economic crises and eruptions of violence" (p.2). Thus, in arguing for more research on such potential dark side of regional growth, what I am arguing is that regional industrial development cannot be interpreted in isolation from the broader context in which it is embedded. Specifically, we should avoid any generic assumption about what is good for a region, because a region is constituted by multiple actors and vested interest groups. Instead of biasing towards the brighter side of regional development, equal analytical attention should be given to the potential vulnerabilities of such industrial developments, and what relevant actors should do in order to minimize harms and damages that could occur to those vulnerable groups.

All in all, by comparing the development of the online games industry in different institutional contexts, the research contributes to the literature in the following ways. First, it gives due attention to the structural forces, such as the formal and informal institutional structures that affect local industrial development. Secondly, it contributes to a nuanced analysis of the activities and practices of multi-actors in local industrial development. Such activities include altering institutional contexts, mobilizing and creating key resources, and forming innovative capabilities. Finally, it reveals the dynamic agency-structure relations that lead to different development outcomes in the games industry in the two selected city-regions. Such a detailed investigation on one industry in two locations has complemented to the previous studies in important ways, but regional indusrial development should not be considered in isolation with big-picture issues such as capitalism and globalization if one wants to develop better understanding of regional uneven development.

References (for Chapter 1, 2, 3, 4, and 5)

Ackroyd, S., & Karlsson, J. C. (2014). Critical realism, research techniques, and research designs. In Edwards, P. K., O'Mahoney, J., & Vincent, S. (Eds.). (2014). *Studying organizations using critical realism: A practical guide,* 21-45. Oxford: Oxford University Press.

Albert, M. (1991). *Capitalisme contre capitalisme* (Vol. 11). Paris: Seuil.

Asheim, B. (2007). Differentiated knowledge bases and varieties of regional innovation systems. *Innovation*, 20(3), 223-241.

Asheim, B. T., Boschma, R., & Cooke, P. (2011). Constructing regional advantage: Platform policies based on related variety and differentiated knowledge bases. *Regional studies*, 45(7), 893-904.

Asheim, B. T., & Gertler, M. S. (2005). The geography of innovation: regional innovation systems. In Fagerberg, J., Mowery, D. C., & Nelson, R. R. (Eds.). (2005). *The Oxford handbook of innovation*. 291-317. Oxford: Oxford University Press.

Asheim, B. T., & Isaksen, A. (2002). Regional innovation systems: the integration of local 'sticky'and global 'ubiquitous' knowledge. *The Journal of Technology Transfer*, 27(1), 77-86.

Barca, F. (2009). *Agenda for a reformed cohesion policy: a place-based approach to meeting European Union challenges and expectations*. European Communities.

Barca, F., McCann, P., & Rodríguez-Pose, A. (2012). The case for regional development intervention: place-based versus place-neutral approaches. *Journal of regional science*, 52(1), 134-152.

Barnes, T., Peck, J., Sheppard, E., & Tickell, A. (2007). Methods matter: transformations in economic geography. In Tickell, A., Sheppard, E., Peck, J., & Barnes, T. J. (Eds.). (2007). *Politics and practice in economic geography*. 1-24. London: SAGE.

Bassett, K. (1999). Is there progress in human geography? The problem of progress in the light of recent work in the philosophy and sociology of science. *Progress in Human geography*, 23(1), 27-47.

Bathelt, H., Malmberg, A., & Maskell, P. (2004). Clusters and knowledge: local buzz, global pipelines and the process of knowledge creation. *Progress in human geography*, 28(1), 31-56.

Battilana, J., Leca, B., & Boxenbaum, E. (2009). How actors change institutions: towards a theory of institutional entrepreneurship. *Academy of Management annals*, 3(1), 65-107.

Bengtsson, B., & Hertting, N. (2014). Generalization by mechanism: Thin rationality and ideal-type analysis in case study research. *Philosophy of the social sciences*, 44(6), 707-732.

Bergek, A., Jacobsson, S., Carlsson, B., Lindmark, S., & Rickne, A. (2008). Analyzing the functional dynamics of technological innovation systems: A scheme of analysis. *Research policy*, 37(3), 407-429.

Berndt, C., & Boeckler, M. (2012). Geographies of marketization. In Sheppard, E.S., & Barnes, T.J. (Eds.). (2012). *The Wiley-Blackwell Companion to Economic Geography new companion to economic geography*, 199-212. Malden, MA, Oxford, and Chichester: Wiley-Blackwell.

Bhaskar, R. (1975). *A realist theory of science*. Leeds: Leeds Books.

Bhaskar, R. (1998). Philosophy and scientific realism. In M.Archer, R. Bhaskar, A. Collier, T. Lawson, & A. Norrie. (Eds.). (1998). *Critical realism: Essential readings*, 16-47. London; New York: Routledge.

Binz, C., Harris-Lovett, S., Kiparsky, M., Sedlak, D. L., & Truffer, B. (2016a). The thorny road to technology legitimation—Institutional work for potable water reuse in California. *Technological Forecasting and Social Change*, 103, 249-263.

Binz, C., Truffer, B., & Coenen, L. (2016b) Path creation as a process of resource alignment

and anchoring: Industry formation for on-site water recycling in Beijing. *Economic Geography*, 92(2), 172-200.

Binz, C., & Truffer, B. (2017). Global Innovation Systems—A conceptual framework for innovation dynamics in transnational contexts. *Research Policy*, 46(7), 1284-1298.

Bishop, E. C., & Shepherd, M. L. (2011). Ethical reflections: Examining reflexivity through the narrative paradigm. *Qualitative health research*, 21(9), 1283-1294.

Boschma, R. (2017). Relatedness as driver of regional diversification: A research agenda. *Regional Studies*, 51(3), 351-364.

Boschma, R., & Capone, G. (2015). Institutions and diversification: Related versus unrelated diversification in a varieties of capitalism framework. *Research Policy*, 44(10), 1902-1914.

Boschma, R., Coenen, L., Frenken, K., & Truffer, B. (2017). Towards a theory of regional diversification: combining insights from Evolutionary Economic Geography and Transition Studies. *Regional Studies*, 51(1), 31-45.

Boschma, R., & Frenken, K. (2006). Why is economic geography not an evolutionary science? Towards an evolutionary economic geography. *Journal of Economic Geography*, 6(3): 273-302.

Boschma, R., & Frenken, K. (2012). Technological relatedness and regional branching. In Bathelt, H., Feldman, M., & Kogler, D.F. (Eds.). (2012). *Beyond territory. Dynamic geographies of knowledge creation, diffusion and innovation*, 64-68. London; New York: Routledge.

Boschma, R., & Martin, R. (2007). Constructing an evolutionary economic geography. *Journal of Economic Geography*, 7(5), 537-548.

Boschma, R., & Martin, R. (2010). *The Handbook of Evolutionary Economic Geography*. Cheltenham: Edward Elgar.

Boschma, R. A., & Van der Knaap, G. A. (1999). New high-tech industries and windows of locational opportunity: the role oflabour markets and knowledge institutions during the industrial era. *Geografiska Annaler: Series B, Human Geography*, 81(2), 73-89.

Bowen, G. A. (2009). Document analysis as a qualitative research method. *Qualitative research journal*, 9(2), 27-40.

Brown, A., Slater, G., & Spencer, D. A. (2002). Driven to abstraction? Critical realism and the search for the 'inner connection'of social phenomena. *Cambridge Journal of Economics*, 26(6), 773-788.

Casper, S., & Whitley, R. (2004). Managing competences in entrepreneurial technology firms: a comparative institutional analysis of Germany, Sweden and the UK. *Research Policy*, 33(1), 89-106.

Ćetković, S., & Buzogány, A. (2016). Varieties of capitalism and clean energy transitions in the European Union: When renewable energy hits different economic logics. *Climate Policy*, 16(5), 642-657.

Coe, N. M. (2001). A hybrid agglomeration? The development of a satellite-Marshallian industrial district in Vancouver's film industry. *Urban studies*, 38(10), 1753-1775.

Coe, N. M., Dicken, P., & Hess, M. (2008). Global production networks: realizing the potential. *Journal of economic geography*, 8(3), 271-295.

Coe, N. M., & Yeung, H. W. C. (2015). *Global production networks: Theorizing economic development in an interconnected world*. Oxford: Oxford University Press.

Coenen, L., Benneworth, P., & Truffer, B. (2012). Toward a spatial perspective on sustainability transitions. *Research policy*, 41(6), 968-979.

Cohen, I. J. (1989). *Structuration theory: Anthony Giddens and the constitution of social life*. New York: St Martin's Press.

Cohendet, P., & Simon, L. (2007). Playing across the playground: paradoxes of knowledge creation in the videogame firm. *Journal of Organizational Behavior*, 28(5), 587-605.

Cohendet, P., Grandadam, D., Mehouachi, C., & Simon, L. (2018). The local, the global and the industry common: the case of the video game industry. *Journal of Economic Geography*, 18(5), 1045-1068.

Comunian, R. (2017). Temporary clusters and communities of practice in the creative economy: Festivals as temporary knowledge networks. *Space and Culture*, 20(3), 329-343.

Cooke, P. (2001). Regional innovation systems, clusters, and the knowledge economy. *Industrial and corporate change*, 10(4), 945-974.

Cooke, P., Uranga, M. G., & Etxebarria, G. (1997). Regional innovation systems: Institutional and organisational dimensions. *Research policy*, 26(4-5), 475-491.

Cunningham, S. (2002). From cultural to creative industries: theory, industry and policy implications. *Media International Australia incorporating Culture and Policy*, 102(1), 54-65.

Easton, G. (2010). Critical realism in case study research. *Industrial marketing management*, 39(1), 118-128.

Dawley, S. (2014). Creating new paths? Offshore wind, policy activism, and peripheral region development. *Economic Geography*, 90(1), 91-112.

Dawley, S., MacKinnon, D., Cumbers, A., & Pike, A. (2015). Policy activism and regional path creation: the promotion of offshore wind in North East England and Scotland. *Cambridge Journal of Regions, Economy and Society*, 8(2), 257-272.

Dawley, S., Mackinnon, D., & Pollock, R. (2019). Creating strategic couplings in global production networks: regional institutions and lead firm investment in the Humber region, UK. *Journal of Economic Geography*,1-20.

DeFillippi, R. (2015). Managing project-based organization in creative industries. In Jones, C., Lorenzen, M., & Sapsed, J. (Eds.). (2015). The *Oxford handbook of creative industries*. 268-283. Oxford: Oxford University Press.

De Vaan, M., Frenken, K., & Boschma, R. (2019). The downside of social capital in new industry creation. *Economic Geography*, forthcoming

Dicken, P. (2015). *Global shift: Mapping the changing contours of the world economy* (Seventh edition). London: SAGE.

Dyck, I., & Kearns, R. A. (2014). Structuration theory: agency, structure and everyday life. In Aitken, S. C., & Valentine, G. (Eds.). (2014). *Approaches to human geography: Philosophies, theories, people and practices*. 86-97. London: SAGE.

Edwards, P. K., O'Mahoney, J., & Vincent, S. (Eds.). (2014). *Studying organizations using critical realism: A practical guide* (Vol. 17).Oxford: Oxford University Press.

Eisenhardt, K. M. (1989). Building theories from case study research. *Academy of management review*, 14(4), 532-550.

Elster, J. (1989). *Nuts and bolts for the social sciences*. Cambridge: Cambridge University Press.

Evenhuis, E. (2016). *The political economy of adaptation and resilience in old industrial regions: A comparative study of South Saarland and Teesside* (Doctoral dissertation, Newcastle University).

Evenhuis, E. (2017). New directions in researching regional economic resilience and adaptation. *Geography Compass*, 11(11), e12333.

Fainshmidt, S., Judge, W. Q., Aguilera, R. V., & Smith, A. (2018). Varieties of institutional systems: A contextual taxonomy of understudied countries. *Journal of World Business*, 53(3), 307-322.

Finlay, L. (2003). The reflexive journey: mapping multiple routes. *Reflexivity: A practical guide for researchers in health and social sciences*, 3-20.

Fletcher, A. J. (2017). Applying critical realism in qualitative research: methodology meets method. International Journal of Social Research Methodology, 20(2), 181-194.

Flyvbjerg, B. (2006). Five misunderstandings about case-study research. *Qualitative inquiry*, 12(2), 219-245.

Florida, R. (2002). *The rise of the creative class* (Vol. 9). New York: Basic books.

Florida, R. (2005). *Cities and the creative class*. New York: Routledge.

Florida, R., & Jackson, S. (2010). Sonic city: The evolving economic geography of the music industry. *Journal of Planning Education and Research*, 29(3), 310-321.

Foray, D. (2015). *Smart Specialisation: Opportunities and Challenges for Regional Innovation Policy*. Abingdon: Routledge/ Regional Studies Association.

Foray, D., David, P. A., & Hall, B. (2009). Smart specialisation–the concept. *Knowledge economists policy brief*, 9(85), 100.

Frenken, K., & Boschma, R. A. (2007). A theoretical framework for evolutionary economic geography: industrial dynamics and urban growth as a branching process. *Journal of economic geography*, 7(5), 635-649.

Frenken, K., Van Oort, F., & Verburg, T. (2007). Related variety, unrelated variety and regional economic growth. *Regional studies*, 41(5), 685-697.

Garud, R., & Karnøe, P. (2003). Bricolage versus breakthrough: distributed and embedded agency in technology entrepreneurship. *Research policy*, 32(2), 277-300.

Gereffi, G., Humphrey, J., & Sturgeon, T. (2005). The governance of global value chains. *Review of international political economy*, 12(1), 78-104.

Gerring, J. (2008). The mechanismic worldview: Thinking inside the box. *British journal of political science*, 38(1), 161-179.

Gerring, J. (2010). Causal mechanisms: Yes, but…. *Comparative political studies*, 43(11), 1499-1526.

Gertler, M. S. (2004). *Manufacturing culture: The institutional geography of industrial practice*. Oxford: Oxford University Press.

Gertler, M. S. (2010). Rules of the game: The place of institutions in regional economic change. *Regional Studies*, 44(1), 1-15.

Gibson, C., & Connell, J. (2004). Cultural industry production in remote places: Indigenous popular music in Australia. In D. Power, & A. J. Scott (Eds.). (2004). *Cultural industries and the production of culture* (pp. 243–258). London; New York: Routledge.

Giddens, A. (1986). *The constitution of society: Outline of the theory of structuration* (Vol. 349). California: Univ of California Press.

Gong, H., & Hassink, R. (2017). Exploring the clustering of creative industries. *European Planning Studies*, 25(4), 583-600.

Gong, H., & Hassink, R. (2018). Co-evolution in contemporary economic geography: towards a theoretical framework. *Regional Studies*, 1-12.

Grabher, G. (1993). The weakness of strong ties; the lock-in of regional development in Ruhr area. In: *The embedded firm; on the socioeconomics of industrial networks*, 255-277.

Grabher, G. (2002). The project ecology of advertising: tasks, talents and teams. *Regional studies*, 36(3), 245-262.

Grabher, G. (2004). Temporary architectures of learning: Knowledge governance in project ecologies. *Organization studies*, 25(9), 1491-1514.

Grabher, G. (2018). Marginality as strategy: Leveraging peripherality for creativity. *Environment and Planning A: Economy and Space*, 50(8), 1785-1794.

Grabher, G., & Ibert, O. (2006). Bad company? The ambiguity of personal knowledge networks. *Journal of Economic Geography*, 6(3), 251-271.

Graham, E. (2013). Philosophies underlying human geography research. In Flowerdew, R., & Martin, D. (Eds.). (2013). *Methods in Human Geography: A guide for students doing a research project*, 8. Essex: Pearson Education.

Grandadam, D., Cohendet, P., & Simon, L. (2013). Places, spaces and the dynamics of creativity: The video game industry in Montreal. *Regional studies*, 47(10), 1701-1714.

Garnham, N. (2005). From cultural to creative industries: An analysis of the implications of the "creative industries" approach to arts and media policy making in the United Kingdom. *International journal of cultural policy*, 11(1), 15-29.

Grillitsch, M. (2018). Place-based entrepreneurship and innovation policy for industrial diversification (No. 2018/3). Lund University, CIRCLE-Center for Innovation, Research and Competences in the Learning Economy.

Grillitsch, M., Asheim, B., & Trippl, M. (2018). Unrelated knowledge combinations: the unexplored potential for regional industrial path development. *Cambridge Journal of Regions, Economy and Society*, 11(2), 257-274.

Grillitsch, M., & Sotarauta, M. (2018). Regional growth paths: From structure to agency and back (No. 2018/1). Lund University, CIRCLE-Center for Innovation, Research and Competences in the Learning Economy.

Hall, P., & Soskice, D. (2001). Varieties of capitalism: The institutional foundations of comparative advantage. Oxford: Oxford University Press.

Hancké, B., Rhodes, M., & Thatcher, M. (2007). *Beyond varieties of capitalism: Conflict, contradictions, and complementarities in the European economy*. Oxford: Oxford University Press.

Hansen, T., & Coenen, L. (2015). The geography of sustainability transitions: Review, synthesis and reflections on an emergent research field. *Environmental innovation and societal transitions*, 17, 92-109.

Hassink, R. (2010). Locked in decline? On the role of regional lock-ins in old industrial areas. In Boschma, R., & Martin, R. (Eds.). (2010). *The handbook of evolutionary economic geography*, 450. Chichester: Edward Elgar.

Hassink, R., Isaksen, A., & Trippl, M. (2019). Towards a comprehensive understanding of new regional industrial path development. *Regional Studies*, 1-10.

Hedström, P., Swedberg, R., & Hernes, G. (1998). *Social mechanisms: An analytical approach to social theory*. Cambridge: Cambridge University Press.

Hedström, P., & Ylikoski, P. (2010). Causal mechanisms in the social sciences. *Annual review of sociology*, 36, 49-67.

Hekkert, M. P., Suurs, R. A., Negro, S. O., Kuhlmann, S., & Smits, R. E. (2007). Functions of innovation systems: A new approach for analysing technological change. *Technological forecasting and social change*, 74(4), 413-432.

Hidalgo, C. A., Klinger, B., Barabási, A. L., & Hausmann, R. (2007). The product space conditions the development of nations. *Science*, 317(5837), 482-487.

Hidalgo, C. A., Balland, P. A., Boschma, R., Delgado, M., Feldman, M., Frenken, K., & Neffke, F. (2018). The principle of relatedness. In International Conference on Complex Systems, 451-457. Cambridge, MA, USA.

Hoddy, E. T. (2019). Critical realism in empirical research: employing techniques from grounded theory methodology. *International Journal of Social Research Methodology*, 22(1), 111-124.

Hollingsworth, J. R., & Boyer, R. (1997). *Contemporary capitalism: The embeddedness of institutions*. Cambridge: Cambridge University Press.

Hu, X., & Hassink, R. (2017). Place leadership with Chinese characteristics? A case study of the Zaozhuang coal-mining region in transition. *Regional studies*, 51(2), 224-234.

Isaksen, A., & Trippl, M. (2017). Exogenously led and policy-supported new path development in peripheral regions: Analytical and synthetic routes. *Economic Geography,* 93(5), 436-457.

Jeannerat, H., & Kebir, L. (2016). Knowledge, resources and markets: what economic system of valuation? *Regional Studies*, 50(2), 274-288.

Jessop, B. (2011) Rethinking the Diversity and Varieties of Capitalism: on Variegated Capitalism in the World Market. In *Capitalist diversity and diversity within capitalism*, edited by Wood, G., and Lane, C, 209-237. London: Routledge.

Johns, J. (2005). Video games production networks: value capture, power relations and embeddedness. *Journal of Economic Geography*, 6(2), 151-180.

Johnston, R., & Sidaway, J. D. (2015). *Geography and geographers: Anglo-American human geography since 1945*. London: Routledge.

Jones, C., Lorenzen, M., & Sapsed, J. (2015). The Oxford handbook *of creative industries*. Oxford: Oxford University Press.

Kivimaa, P. (2014). Government-affiliated intermediary organisations as actors in system-level transitions. *Research policy*, 43(8), 1370-1380.

Klein, R. R. (2011). Where music and knowledge meet: a comparison of temporary events in Los Angeles and Columbus, Ohio. *Area*, 43(3), 320-326.

Klement, B., & Strambach, S. (2019). Innovation in Creative Industries: Does (Related) Variety Matter for the Creativity of Urban Music Scenes*? Economic Geography*, 1-33.

Kong, L. (2005). The sociality of cultural industries: Hong Kong's cultural policy and film industry. *International Journal of Cultural Policy*, 11(1), 61-76.

Lawson, T. (1997). *Economics and reality*. London: Routledge.

Lazzeretti, L., Capone, F., & Boix, R. (2012). Reasons for clustering of creative industries in Italy and Spain. *European Planning Studies,* 20(8), 1243–1262.

Lee, N., & Drever, E. (2013). The creative industries, creative occupations and innovation in London. *European planning studies*, 21(12), 1977-1997.

Leslie, D., & Brail, S. (2011). The productive role of 'quality of place': A case study of fashion designers in Toronto. *Environment and Planning A,* 43(12), 2900-2917.

Lhermitte, B., Perrin, B., & Blanc, S. (2015). Cultural Times: The First Global Map of Cultural and Creative Industries. London: Erst & Young.

Lorenzen, M., & Frederiksen, L. (2008). Why do cultural industries cluster? Localization, urbanization, products and projects. In P. N. Cooke & L. Lazzeretti (Eds.). (2008). *Creative cities, cultural clusters and local economic development*, 155–179. Cheltenham: Edward Elgar.

Lovering, J. (1999). Theory led by policy: the inadequacies of the 'new regionalism' (illustrated from the case of Wales). *International journal of urban and regional research*, 23(2), 379-395.

MacKinnon, D., Cumbers, A., Pike, A., Birch, K., & McMaster, R. (2009). Evolution in economic geography: institutions, political economy, and adaptation. *Economic geography*, 85(2), 129-150.

MacKinnon, D., Dawley, S., Steen, M., Menzel, M. P., Karlsen, A., Sommer, P., Hansen, G. H. & Normann, H. E. (2018). Path creation, global production networks and regional development: a comparative international analysis of the offshore wind sector. *Progress in Planning*.

MacKinnon, D., Dawley, S., Pike, A., & Cumbers, A. (2019). Rethinking path creation: A geographical political economy approach. *Economic Geography*, 1-23.

MacLeod, G. (2001). New regionalism reconsidered: globalization and the remaking of political economic space. *International journal of urban and regional research*, 25(4), 804-829.

Manniche, J., Moodysson, J., & Testa, S. (2017). Combinatorial knowledge bases: An integrative and dynamic approach to innovation studies. *Economic Geography*, 93(5), 480-499.

Martin, R. (2000). Institutional approaches in economic geography. In Sheppard, E. S., & Barnes, T. J. (Eds.). (2000). *A companion to economic geography* (pp. 77-89). Oxford: Blackwell.

Martin R, (2010). Roepke lecture in economic geography – Rethinking regional path dependence: beyond lock-in to evolution. *Economic Geography*, 86(1), 1–27.

Martin, R. (2018). Is British economic geography in decline? *Environment and Planning A: Economy and Space*, 50(7), 1503-1509.

Martin, R., & Sunley, P. (2006). Path dependence and regional economic evolution. *Journal of economic geography*, 6(4), 395-437.

Martin, R., & Sunley, P. (2015). Towards a developmental turn in evolutionary economic geography? *Regional Studies*, 49(5), 712-732.

Maskell, P., & Malmberg, A. (1999). Localised learning and industrial competitiveness. *Cambridge journal of economics*, 23(2), 167-185.

Maskell, P., & Malmberg, A. (2007). Myopia, knowledge development and cluster evolution. *Journal of Economic Geography*, 7(5), 603-618.

McNally, C. A. (2018). Theorizing Sino-capitalism: implications for the study of comparative capitalisms. *Contemporary Politics*, 1-21.

Merton, R. K., & Merton, R. C. (1968). *Social theory and social structure*. New York: The FREE Press, Simon and Schuster.

Miörner, J., & Trippl, M. (2017). Paving the way for new regional industrial paths: actors and modes of change in Scania's games industry. *European Planning Studies*, 25(3), 481-497.

Musiolik, J., Markard, J., & Hekkert, M. (2012). Networks and network resources in technological innovation systems: Towards a conceptual framework for system building. *Technological Forecasting and Social Change*, 79(6), 1032-1048.

Næss, P. (2015). Critical realism, urban planning and urban research. *European Planning Studies*, 23(6), 1228-1244.

Neffke, F., Hartog, M., Boschma, R., & Henning, M. (2018). Agents of structural change: the role of firms and entrepreneurs in regional diversification. *Economic Geography*, 94(1), 23-48.

OECD. (2009). *Regions Matter: Economic Recovery, Innovation and Sustainable Growth*. Paris: Organization for Economic Growth and Development.

OECD. (2013). *Innovation-driven growth in Regions: The role of Smart Specialisation*.

Patton, M, Q. (1990) *Qualitative evaluation and research methods*. London: SAGE.

Pawson, R. & Tilley, N. (1997). *Realistic Evaluation*. London: SAGE.

Peck, J. (2016). Macroeconomic geographies. *Area Development and Policy*, 1(3), 305-322.

Peck, J., & Theodore, N. (2007). Variegated capitalism. *Progress in human geography*, 31(6), 731-772.

Peck, J., & Zhang, J. (2013). A variety of capitalism… with Chinese characteristics? *Journal of Economic Geography*, 13(3), 357-396.

Phelps, N. A., Atienza, M., & Arias, M. (2018). An invitation to the dark side of economic geography. *Environment and Planning A: Economy and Space*, 50(1), 236-244.

Phipps, A. G. (2001). Empirical applications of structuration theory. *Geografiska Annaler: Series B, Human Geography*, 83(4), 189-204.

Pike, A., Birch, K., Cumbers, A., MacKinnon, D., & McMaster, R. (2009). A geographical political economy of evolution in economic geography. *Economic Geography*, 85(2), 175-182.

Pike, A., MacKinnon, D., Cumbers, A., Dawley, S., & McMaster, R. (2016). Doing evolution in economic geography. *Economic Geography*, 92(2), 123-144.

Plum, O., & Hassink, R. (2014). Knowledge bases, innovativeness and competitiveness in creative industries: the case of Hamburg's video game developers. *Regional Studies, Regional Science*, 1(1), 248-268.

Pratt, A. C. (1995). Putting critical realism to work: the practical implications for geographical research. *Progress in Human Geography*, 19(1), 61-74.

Pratt, A. C. (2008). Creative cities: the cultural industries and the creative class. *Geografiska annaler: series B, human geography*, 90(2), 107-117.

Richardson, L. (2016). Sharing knowledge: Performing co-production in collaborative artistic work. *Environment and Planning A: Economy and Space*, 48(11), 2256-2271.

Saxenian, A. (1996). *Regional advantage*. Cambridge: Harvard University Press.

Sayer, R. A. (1995). *Radical political economy: Critique and reformulation*. Oxford: Blackwell.

Sayer, A. (1997). Critical realism and the limits to critical social science. *Journal for the theory of social behaviour*, 27(4), 473-488.

Sayer, A. (1999). *Realism and social science*. London: SAGE.

Schneider, B. R. (2009). Hierarchical market economies and varieties of capitalism in Latin America. *Journal of Latin American Studies*, 41(3), 553-575.

Scott, A. J. (1992). The Roepke lecture in economic geography the collective order of flexible production agglomerations: Lessons for local economic development policy and strategic choice. Economic Geography, 68(3), 219-233.

Scott, A. J., & Storper, M. (1986). High technology industry and regional development: A theoretical critique and reconstruction. *International Social Science Journal*, 112, 215-232.

Sheppard, E. (2010). Geographical political economy. *Journal of Economic Geography*, 11(2), 319-331.

Soltis, J. F. (1989). The ethics of qualitative research. *Internation Journal of Qualitative Studies in Education*, 2(2), 123-130.

Sorge, A., & Streeck, W. (2018). Diversified quality production revisited: its contribution to German socio-economic performance over time. *Socio-Economic Review*, 16(3), 587-612.

Sotarauta, M., & Beer, A. (2017). Governance, agency and place leadership: Lessons from a cross-national analysis. *Regional Studies*, 51(2), 210-223.

Sotarauta, M., & Mustikkamäki, N. (2015). Institutional entrepreneurship, power, and knowledge in innovation systems: institutionalization of regenerative medicine in Tampere, Finland. *Environment and Planning C: Government and Policy*, 33(2), 342-357.

Steen, M. (2016). Reconsidering path creation in economic geography: aspects of agency, temporality and methods. *European Planning Studies*, 24(9), 1605-1622.

Steen, M., & Hansen, G. H. (2018). Barriers to path creation: The case of offshore wind power in Norway. *Economic Geography*, 94(2), 188-210.

Stones, R. (2005). *Structuration theory*. Basingstoke: Palgrave Macmillan.

Storper, M. (1997). *The regional world: territorial development in a global economy*. New York: Guilford Press.

Storz, C. (2008). Dynamics in innovation systems: Evidence from Japan's game software industry. *Research policy*, 37(9), 1480-1491.

Strambach, S. (2017). Combining Knowledge Bases in Transnational Sustainability Innovation: Microdynamics and Institutional Change. *Economic Geography*, 93(5), 500-526.

Teipen, C. (2008). Work and employment in creative industries: The video game industry in Germany, Sweden and Poland. Economic and Industrial Democracy, 29(3), 309-335.

Tödtling, F., & Trippl, M. (2005). One size fits all? Towards a differentiated regional innovation policy approach. *Research policy*, 34(8), 1203-1219.

Tödtling, F., & Trippl, M. (2018). Regional innovation policies for new path development–beyond neo-liberal and traditional systemic views. *European Planning Studies*, 26(9), 1779-1795.

Trippl, M., Grillitsch, M., & Isaksen, A. (2017). Exogenous sources of regional industrial change: Attraction and absorption of non-local knowledge for new path development. *Progress in Human Geography*.

Truffer, B., & Coenen, L. (2012). Environmental innovation and sustainability transitions in regional studies. *Regional Studies*, 46(1), 1-21.

Tschang, F. T. (2005). Videogames as interactive experiential products and their manner of development. *International Journal of Innovation Management*, 9(01), 103-131.

Uyarra, E., Marzocchi, C., & Sorvik, J. (2018). How outward looking is smart specialisation? Rationales, drivers and barriers. *European Planning Studies*, 26(12), 2344-2363.

Vallance, P. (2014). Creative knowing, organisational learning, and socio-spatial expansion in UK videogame development studios. *Geoforum*, 51, 15-26.

van Lente, H., Hekkert, M., Smits, R., & Van Waveren, B. A. S. (2003). Roles of systemic intermediaries in transition processes. *International journal of Innovation management*, 7(03), 247-279.

Vincent, S., & O'Mahoney, J. (2018). Critical Realism and Qualitative Research: An Introductory Overview. *SAGE Handbook of Qualitative Research Methods*, 36-78.

Watson, A. (2008). Global music city: knowledge and geographical proximity in London's recorded music industry. *Area*, 40(1), 12-23.

Weber, K. M., & Truffer, B. (2017). Moving innovation systems research to the next level: towards an integrative agenda. *Oxford Review of Economic Policy*, 33(1), 101-121.

Whitley, R. (1998). Internationalization and varieties of capitalism: the limited effects of cross-national coordination of economic activities on the nature of business systems. *Review of international political economy*, 5(3), 445-481.

Whitley, R. (1999). *Divergent capitalisms: The social structuring and change of business systems*. Oxford: Oxford University Press.

Witt, M. A., & Redding, G. (2013). Asian business systems: Institutional comparison, clusters and implications for varieties of capitalism and business systems theory. *Socio-Economic Review*, 11(2), 265-300.

World Bank. (2009). World development report 2009: Reshaping economic geography. Washington, DC: World Bank.

Yang, C. (2009). Strategic coupling of regional development in global production networks: redistribution of Taiwanese personal computer investment from the Pearl River Delta to the Yangtze River Delta, China. *Regional Studies*, 43(3), 385-407.

Yeung, H. W. C. (1997). Critical realism and realist research in human geography: a method or a philosophy in search of a method? *Progress in Human Geography*, 21(1), 51-74.

Yeung, H. (2019). Rethinking mechanism and process in the geographical analysis of uneven development. *Dialogues in Human Geography*. Forthcoming.

Yin, R. K. (2003). *Case study research and applications: Design and methods* (3rd edition). London: SAGE.

Yin, R. K. (2009). *Case study research and applications: Design and methods* (4th edition). London: SAGE.

Yin, R. K. (2018). *Case study research and applications: Design and methods* (6th edition). London: SAGE.

Yusuf, S., & Nabeshima, K. (2005). Creative industries in East Asia. *Cities*, 22(2), 109–122.

Zhang, J., & Peck, J. (2016). Variegated capitalism, Chinese style: Regional models, multi-scalar constructions. *Regional Studies*, 50(1), 52-78.

Appendix A. Interview guide

上海游戏产业调研提纲

调研日期: 采访时长:

公司名称: 地址:

受访者从业时间: 受访者职务:

第一部分：个人履历及公司创立过程介绍

1. 您是从何时开始进入游戏行业的？彼时上海以及中国游戏产业有何特点？
2. 请介绍贵公司的发展历史，并重点介绍在公司发展过程中关键性的事件。
3. 贵公司成立之时，中国的游戏产业发展处于怎样的阶段？选择这一时机是否有特殊的历史契机或机遇？如果有，是怎样的契机？
4. 在公司成立初期，公司是否获得过政府、投资机构等外界各方面的支持？如果有，请具体指出是哪些机构和团体。

第二部分：与公司相关的外部环境的变迁及其影响

1. 从整个大的社会经济大环境来看，与公司日常事务关系密切的机构和部门有哪些？这些机构（或团体）主要与公司的哪些业务相关联？
2. 当地政府以及产业园区对于贵公司的发展有怎样消极或者积极的作用，可否举例说明？
3. 自公司成立以来，国家相关部门针对游戏产业出台了哪些对整个游戏行业有重大影响的政策制度？这些政策对贵公司的产品开发和产品策略制定上有哪些影响？
4. 和您刚进入游戏行业的时候对比，目前游戏行业的立法和执法状况是否有得到一定程度的改善？当遇到游戏法律纠纷的时候公司通常采取的做法是怎样的？
5. 和您刚进入游戏行业的时候相比，上海的游戏融（投）资环境经历了哪些变化？您认为这些变化是什么原因造成的？
6. 从动态的视角看，玩家的游戏品味是否在不断提升？如果是，这对公司开发产品有什么启示作用？
7. 目前中国高校的游戏教育状况如何？游戏教育同企业的人才需求是否存在矛盾或者问题？如果有，是怎样的矛盾？

8. 贵公司的员工受教育程度是怎样的？主要来自于哪些高校？上海和外地的高校在对公司进行人才输送方面哪个比较重要？
9. 您认为社会舆论对于游戏的评价总体上是怎样的？这对游戏产业产生了怎样的影响？相比您进入游戏行业的时候，社会和政府对游戏产业的态度是否有变？如果有，您认为是哪些因素导致了这些变化？
10. 目前上海市游戏产业的劳动保护强度如何？您个人如何看待游戏企业 996 的行为？
11. 员工的利益是否可以得到充分的法律保障？员工跳槽的频率如何？如何理解员工跳槽的现象？

第三部分：制度企业家精神

1. 贵公司是否是中国游戏行业协会的会员？是否是上海市游戏行业协会的成员？
   您认为这些行业协会对于游戏企业的生存发展有何作用
2. 您个人或者贵公司是否有过利用个人与政府相关部门人员的人际关系，来争取对本公司或者是整个行业发展利好的政策支持的经历？如有请举例说明
3. 您个人或者贵公司是否有过利用企业社会影响力来争取对整个行业发展利好的政策支持的经历？如有请举例说明
4. 大小企业在同政府或者其他部门协商谈判中他们的权力和地位是否一样？如不同，是哪些因素导致的？

第四部分：公司出海战略

1. 公司有无出海（海外发行，组建海外团队等）的计划？如果有，具体的出海计划是怎样的？催生这一计划的契机又是什么？

第五部分：其他

1. 您是否还有其它需要补充的地方？或者更有趣的主意想和我分享？

至此，您已完成了全部作答，非常感谢您宝贵的时间与积极的配合，祝您生活愉快!

Hamburg online games industry Interview guide

Date of interview: length of time:

Name of company: Address:

Function of respondent:

Part 1. Basic information

1. When did you start to work in the game industry? please describe your career path in the industry.
2. When was the company founded? Could you briefly talk about the history of the company?
3. Why did XXX decide to locate in Hamburg? What are the competitive advantages of Hamburg?

Part 2. Institutional environment

1. How did the industry look like in Hamburg when XXX was founded? Was there already a gaming industry in Hamburg?
2. Which individuals or organizations in Hamburg have supported your company from the institutional point of view? How did (do) they support the industry? Could you give some examples?
3. Which public sectors have close relationship with the game industry in Hamburg? Could you please describe their main responsibilities?
4. What is the main financial source of your company? What about other companies in Hamburg (private investment, VC, or public funding)?
5. Comparing to the time when you entered the industry, how would you evaluate the financial conditions of local game companies nowadays? Are there enough financial sources for firms of different sizes? Is it easy for a games company to get venture capitals in Hamburg? Why (not)?
6. What are the education qualitications of employees in XXX? Which universities do they come from? Hamburg vs. the whole Germany vs. Global mobility? What are the main knowledge sourcing channels in your company?
7. What about German university game education? Are there many universities offering game-specific or game-related courses? If yes, could you please give some examples?
8. To what extent does the university education fit the need of the industry?
9. What is the mainstream voice on gaming in Germany? Has such voice changed through time? And why? How does that influence game developers and the game industry?

10. Are German labor laws implemented well in the gaming industry? To what extent are flexible employment and overtime work prevail in the industry?
11. What's your opinion about the news that the federal government is going to set up a fund for game developers in Germany? How did this whole initiative come about? Who were behind the initiative (public, association, industry)?

Part 3. Institutional entrepreneurship

1. Is XXX a member of any association or network organization? What are the main channels that game companies based in Hamburg used to express their opinions with regard to industry-specific laws, regulations and promotions?
2. Do big and small companies have the same or different power in this respect? How powerful games companies are in influencing such institutions? Could you give some examples?

Part 4: Foreign branches

Does XXX have any foreign branches? If yes, where are they based? What is the motivation behind opening subsidiaries abroad?

Part 5: Others

Do you have any other interesting insights that you wish to share with me?

Thanks a lot for your time!

Erklärung

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person no material which has been accepted for the award of any other degree or diploma from the university or other institute of higher learning, expect where due acknowledgement has been made in the text.

This thesis has been prepared subject to the Rules of Good Scientific Practice of the German Research Foundation.

This doctoral work was conducted from September 2015 to June 2019 under the supervision of Professor. Dr. Robert Hassink at Department of Geography, Kiel University.

Name: Huiwen Gong Signature:

Place: Kiel Date: