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Mapping Resilience
The role of agency and technological novelty in
facing crises

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Abstract

The present thesis aims to describe the role of resilience in recovering from a systemic shock in peripheral regions. To do so literature review and a theoretical framework is assessed, for then taking into consideration an empirical case. Such an empirical case leads the thesis in confirming the important role of resilience on a firm-level (in this case trough the creation of technological novelty industrial paths in the region), as well as its relationship with a cultural background that aims to innovation instead than tradition.

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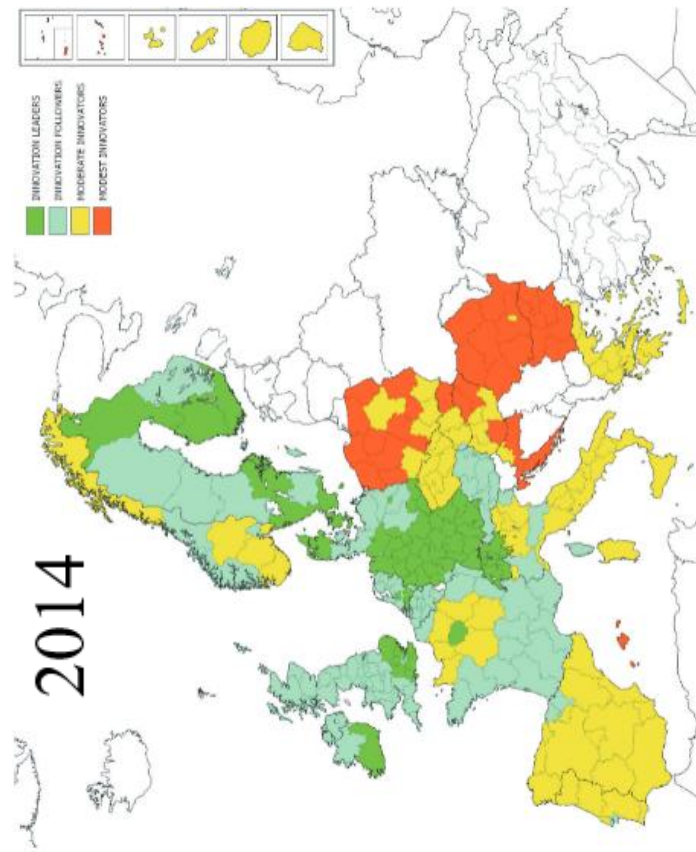
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1. Introduction

1.1. *Technology and Underdevelopment*

Underdevelopment has ties with different causes and economic indicators; however, the role of technology is known in academia as an important booster able to tackle and hinder its negative impact. Indeed, the technological gap and the subsequent access to technological advancement plays an important role in defining innovation of a region and could benefit its overall development (Wolfe 2002:5, Maskell 1999). In the Euro-zone had been recognized by academia as a weak innovator as well as incapable of connecting the production world with the institutions who promote and create knowledge resulting in a slowed-down technological development (Malerba 1993; Malerba and Orsenigo 2013). On top of that Italy is divided between the northern and the southern part, in which the northern regions are reported as having a higher rate of innovation than the southern ones. However, such differentiation had been challenged by the data, especially after 2013. Indeed, the RIS (regional innovation scoreboard) from 2012 and then from 2014 shows the presence of a returning underdevelopment in northern Italy, which lead two of the main regions (Lombardy and Veneto), to reach the same level of innovation of the south of the rest of the peninsula:



The EU Member States Cyprus, Estonia, Latvia, Lithuania, Luxembourg and Malta are not included in the RIS analysis. Group membership shown is that of the IUS 2011 (Cyprus, Estonia and Luxembourg are innovation followers, Malta is a moderate innovator and Latvia and Lithuania are modest innovators). Map created with Region Map Generator.

- INNOVATION LEADER
- INNOVATION FOLLOWER
- MODERATE INNOVATOR
- MODEST INNOVATOR

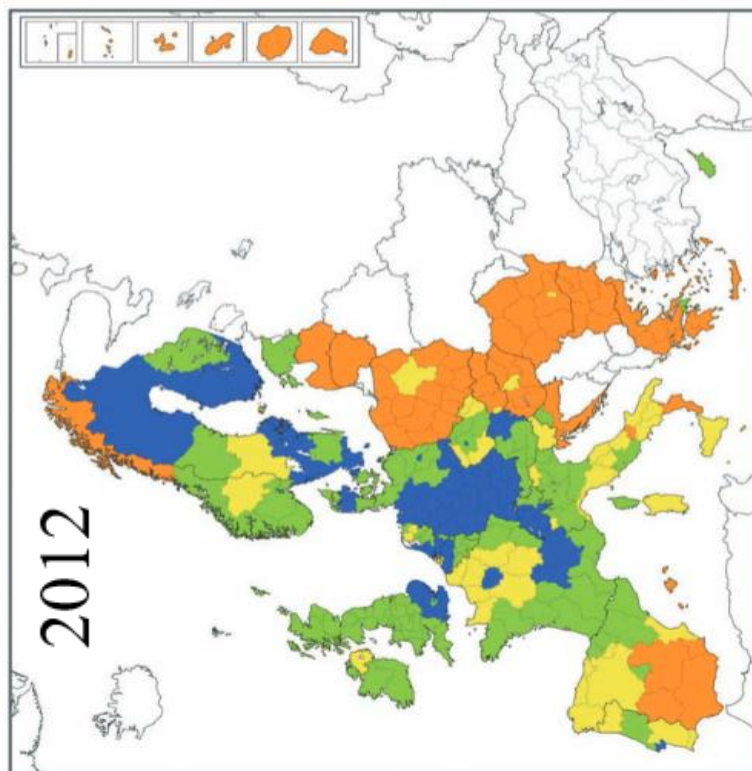


Figure 1. Regional Innovation Scoreboard in Eu, from 2012 to 2014. To notice the passage from innovation followers to moderate. Source is from RIS from 2012 and 2014. All edition of it could be found in: https://ec.europa.eu/info/research-and-innovation/statistics/performance-indicators/regional-innovation-scoreboard_en.

The reason might be the economic crisis in the region that was peaking in the years 2012- 2013, due to the double-dip recession (Orsi, 2017). However external and internal reasons are to be pointed when talking about underdevelopment. On top of that reasons could be related to institutions as well as with local firms, so much that the role of agency in technological development and in combating signs of crisis should be taken into consideration when analyzing the recession of the northern Italian peninsula. To achieve such a goal, a particular regional area had been chosen from one of the northern macro-regions mentioned above (Veneto), both for its intrinsic features and for more methodological ones.

1.2. The empirical case of Vicenza

Indeed, the choice of the region of Vicenza has both theoretical, methodological, and empirical reasons. On a more theoretical perspective the need for an empirical case to be profoundly investigated is central to obtain any possible results in terms of understanding the mechanics of a technologically and economically underdeveloped region (especially if we took into consideration its relationship with technological developments and firm-level agency). On a more methodological take, the necessity of utilization of qualitative methods for understanding firm-level agency means the necessity of knowing the region as well as of speaking the language and understanding the culture that surrounds it. Being a native from such a place, I understand the culture and how to approach firms and institutions for the collection of qualitative data. Empirically then the region of Vicenza is an interesting zone considering it has demonstrated traits of a heightened level of crisis in comparison with the macro-region (Veneto), in which it is contained. Indeed, during the 2012 -2013 an employment rate crisis seemed to have struck in the region:



Figure 2. Number of employed people per region (base: 100= 2004). source is pag.13 from occupational records of the Vicenza province, fundable here: https://www.provincia.vicenza.it/ente/la-struttura-della-provincia/servizi/statistica/dati-statistici/Lavoro/serie-storiche/lavoro_202003.pdf

From such graphic it could be seen a series of interesting points:

- **During 2006 – 2010**, while the national and regional occupation rate was heightening, in Vicenza it didn't until 4 years later, as from 2010-2011 it skyrocketed for then falling.
- While the higher number of employment people had finally skyrocketed within a 4-year delay (signifying the amplification of the regional firm's workforce) in comparison with the national and regional median, the fell in the number of employed people in the time span **between 2011 and 2013**, tells us how the number of reduced firms' workforce was way higher than the national and supra national averages.

These two factors mean that the entire region of Vicenza represents a region which suffered from a delayed development and higher rate of unemployment (and therefore a heightened crisis) during the overall economic and technological crisis (as from the RIS results that the technological advance was in crisis too) of 2013 and could signify a slowed-down development of the region, especially in its peripheral spaces. Indeed, taking into consideration the Product pro Capita of the different municipalities of the region of Vicenza it could be noticed the difference between the ones that were nearer to the biggest city center and the peripheral ones in terms of distribution of wealth from the year 2011 to 2013 (representing the one of the crisis):

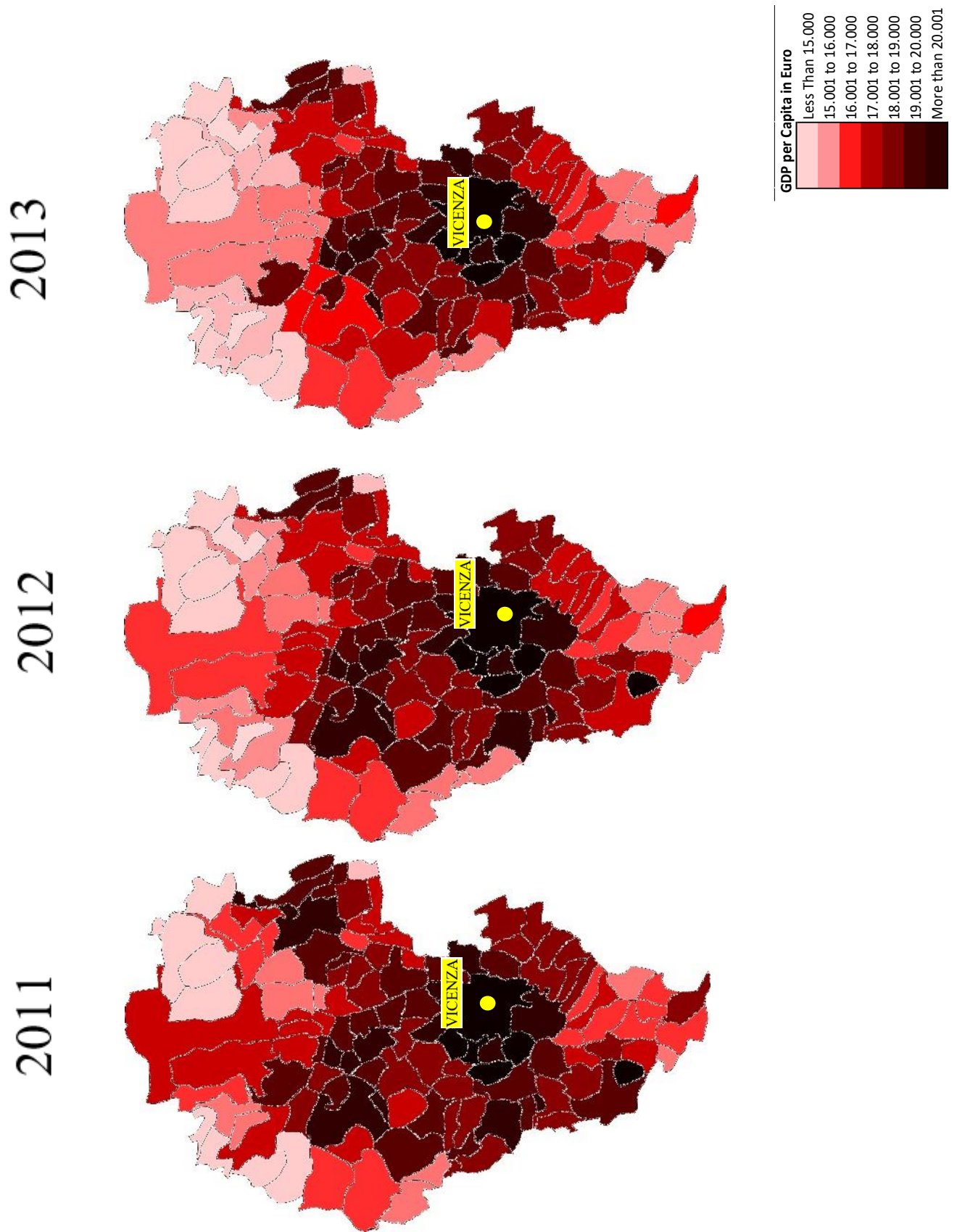


Figure 3. this series of maps shows the GDP per Capita during the years 2011, 2012 and 2013, which correspond to the occupational crisis described above. As it could be seen the northern peripheral area had suffered greatly from such crisis, passing from a GDP per capita of 17.000 to a lower one of 15.000, while the central zones of Vicenza had suffered just slightly from such crisis. map made by the author utilizing the data from: <http://www.comuni-italiani.it/024/statistiche/redditic.html> ; repository which keeps track of the GDP, and GDP pro capita from 2001 until 2016 , dividing it by municipalities.

Indeed, it could be noticed that the higher rate of wealth is distributed in administrative zones close to the provincial city center of Vicenza (which is represented in the map as the darker spot). If then we took into consideration the overall production of GDP in 2012 (during the first year of the crisis), it could be noticed how the higher amount of wealth of the region is concentrated in the higher populated city.

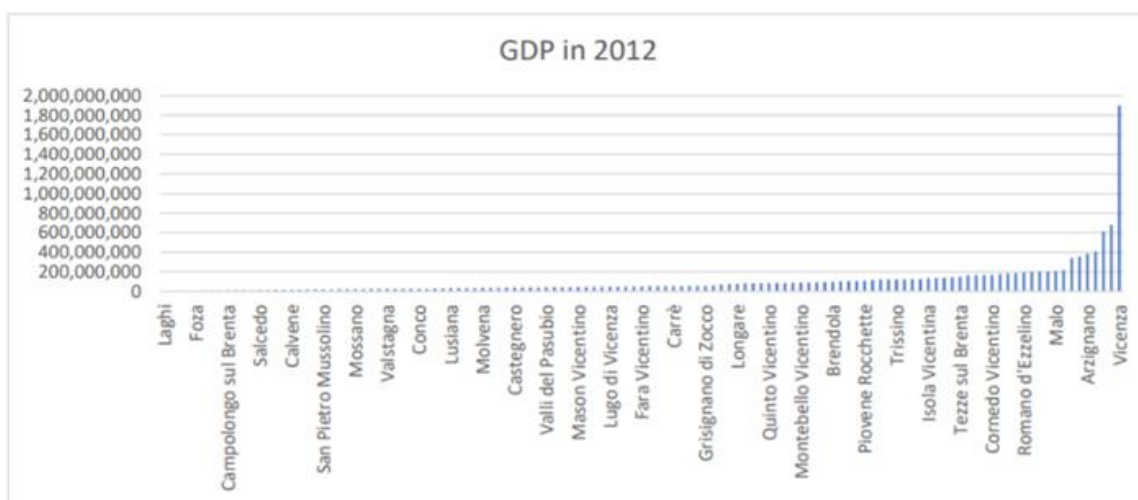


Figure 4. GDP in 2012, which shows how the distribution of wealth is focused on the central city and almost residual in the rest of the region. Graph made by the author using the data from: <http://www.comuni-italiani.it/024/statistiche/redditic.html>; repository which keeps track of the GDP, and GDP pro capita from 2001 until 2016, dividing it by municipalities.

This relation describes two other main points in the years of the crisis:

- **First the existence of a higher fall in GDP** pro capita in the peripheral municipalities (and their sub-regions).
- **Second, how there is a higher concentration of produced wealth (and therefore production) in the city**, and less in the peripheries: in this way there could be not only an higher rate of fall in GDP, but even in innovation and reaction to a generalized shock as the crisis described above.

Such a region, in this way, permits in this way a deep analysis of both of agency as well as economic data able to understand the mechanism of

underdevelopment in some municipalities, as well as the possible implementation that would lead to a solution.

2. Aim of the thesis and research questions

2.1. *Problem Definition*

The deep interaction between agency and technological innovation seems to have a role in the overall development of a region, especially in its peripheral area. However, such development is challenged in its fundamentals when an overall shock would come into being from the external world. For summarizing the connection between different zones could be described in the following graphics, in which agency plays a role in a resilient reaction against a system spread shock:

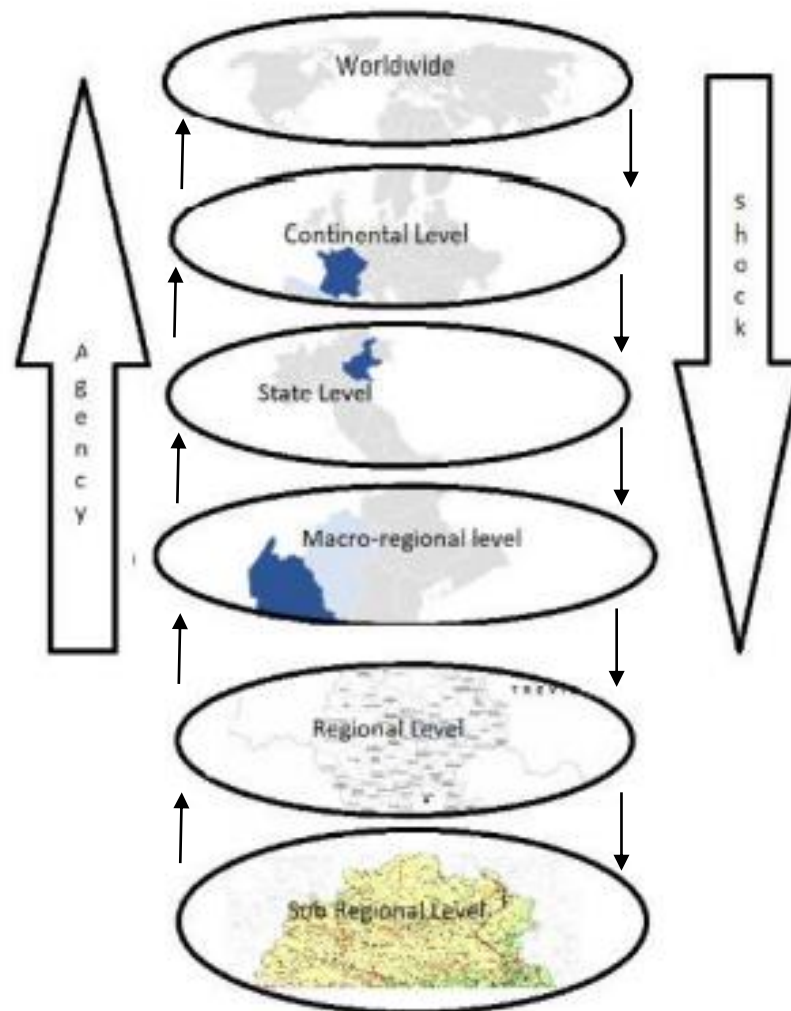


Figure 5. The interplay between worldwide to sub-region shock and reaction.

The main problem my thesis will focus is the role of agency in its relationship with technology to obtain a resilient reaction to a more systemic shock such as the one of economic crisis on a worldwide level and of double dip recession on a national one during the years 2012-2013. Basing myself on the empirical case analysis of the northern region of Vicenza, chosen for its unique feature (beside theoretical and methodological reason described above), I indeed aim to notice how underdeveloped region's firm agency may use technology to achieve an economic recovery, as a reaction (resilience oriented) towards a systemic shock generated outside the region itself.

2.2. *Aim of Research and Research Questions*

In this way the main aim, as mentioned previously, would be to understand the interplay of resilience in disaster recovery, meaning in the recovery process from a wider economic crisis. Another point that had been taken into consideration is how firms could collaborate for utilizing technological development as a mean for resilience in front of a local crisis, in this case an occupational one. This aim would generate the following research questions:

- What was the role of agency and resilience in both the stages of such crisis (during the crisis and after its happening) in the sub-region taken into consideration? How did they intertwine with innovation and technology accessibility?
- What practices on a firm-level had brought a recovery? Which one instead had hindered it?
- What were, finally, the cause and the outcome of the heightened occupational crisis in the sub-region (northern part of Vicenza region) taken into consideration during 2012 and 2013?

2.3. *Delimitations*

As the scope of the thesis is broad, I would need to limit its actual length to some extent to avoid the risk of becoming inconsistent with the information and research provided. As said, it is my interest to notice the mechanics of an underdeveloped region in relation to technology and that led such region both first to suffer during the crisis in 2012 -2013 and secondly, eventually, to recover in the following years through firm-level agency. The first delimitation would be based on the empirical case taken into consideration, therefore limiting myself to the northern part of the region that shows the major signs of underdevelopment under the GDP data shown previously (therefore the northern part of the region). The second delimitation is given by the role of agency that we took into consideration, that is related mostly to the companies' structure on

a firm level and institutional aid especially in connection with the technological development that we mention previously as relevant in describing the development.

2.4. *Disposition of the thesis*

The following chapter of this thesis will outline the research field concerning underdeveloped and peripheral regions, agency, and its relationship with technology, developing on the different ways in which the issue predominantly has been represented by researchers as well as present the theoretical framework for the study based on the previous research and its interconnection with technology and various definitions as well as the theoretical concepts that are central for the study. The fourth chapter would introduce the methodology followed to resolve the research questions. The subsequent chapter introduces the background on a more general level and in relation with the sub-region took into consideration (northern part of Vicenza region). The research questions will then, one by one, be applied to the region through the methodology described in chapter 4 and the results of the analysis will be presented in the seventh chapter. Finally, the results will be discussed in relation to the theoretical framework and previous research in the eight chapter, in which the thesis is ended with some concluding remarks.

3. Previous research and theoretical horizons

3.1. *Definitions*

To articulate as described above the thesis, it would be necessary to give a clear definition on the light of the literature review and the theoretical framework that previously described:

- **Region:** an area defined and closed by limits (being physical, administrative, or economical). Obviously, such limits could overlap, and in my intention, they represent much more a different layer that could be add to determinate zone that has homogenous characteristics.
- **Underdeveloped Region:** Characteristics of underdevelopment, would be Physical deficiencies, Mindset deficiencies, Project deficiencies, Coordination deficiencies, User-Level deficiencies, Geographical and Closeness deficiencies. They need to result from qualitative and quantitative methods used in the region took into consideration.
- **Agency:** I refer as agency as the systemic interplay between individuals and structure in the region, which could be intended as any action took by individuals and institutions.
- **Resilience:** I refer to resilience as the process of rebuilding existing paths through technological novelties, as well as developing them with characteristics able to survive in the post-crisis region.

3.2. *Evolutionary Economic Geography in relation to technological development (lock ins and regional collective learning)*

The concept of agency and its implication in the development of the technological change as a resilient strategy against a shock induced by endogenous or heterogenous factors , implies the wider aspect of EEG, which is a branch of economic geography that uses concepts and ideas from evolutionary economics, and evolutionary thinking in general, to study the economic landscape change over time and underlining the importance of geographic dimensions in the structural composition and development trajectory of the economic system. Two of the main concepts to take in consideration are the creation of clusters and a spillover effects trough collective learning, and the hindering of it through lock-in effect. Innovative milieu could be defined as: “*a set of territorial relationships encompassing in coherent way a production system, different economic and social actors, a specific culture and a representation system, and generating a dynamic collective learning process*” (Camagni, 1991: 130). In this context, spatial proximity is regarded as essential because it stimulates a process of collective learning, which lowers transaction

and search costs and encourages co-ordination between actors. This process of localized technological learning has been confirmed by some studies (Jaffe et al. 1993; Feldman, 1994): from a side knowledge spillovers (e.g., through inter-firm diffusion of knowledge) are facilitated by geographical proximity and are therefore often region-specific, while the local accumulation of human capital, (intangible, uncoded) knowledge, information linkages, network externalities (technological spillovers) and supportive institutions (industry associations, local authorities, R&D-facilities, etc.) leads to a comparative advantage which is hard to copy and difficult to transfer to other areas. This view of cumulative and collective learning embedded in a regional context is echoed more recently in notions like technology districts (Storper, 1997) and learning regions (Morgan, 1997). The second case of the application of path-dependency to regional adjustment concerns the literature dealing with problems of adjustment that old industrial regions (like the Ruhr area in Germany) have been trying to cope and explains how path-dependency may cause difficulties for regions as well as firms to generate or adapt to new basis technology, due to their limited learning capability when faced with new things. The notions of inertia or negative lock-in seem to be highly relevant to describe the lack of adaptability in this type of region (Grabher, 1993). Old industrial regions, indeed, are rather homogenous entities, characterized by a particular techno-industrial structure and institutional environment that are strongly geared towards their industrial past. This type of path-dependency is related to a negative situation of lock-in. In other words, it illustrates how established industrial regions can become locked into rigid trajectories because their techno-industrial legacy of the past (in terms of resources, competences, and socio-institutional structures) has eroded or weakened their ability to adjust to new technology. This theoretical framework, which take into consideration the role of path development should be addressed in this thesis to describe the sub-region cluster-s lock-ins or their collective learning triggered by the crisis itself. The connection between the main aim of this thesis and path development could be stated even starting from the fact that resilience-agency had been described as playing a role in both the case of regional collective learning and lock-ins effects. So far, most empirical studies on resilient regions looked at the economic performance of regions during recessions or other situations of economic shocks to identify common structural characteristics of resilient regions in contrast to non-resilient regions. The results showed negative impact of high levels of specialization, in particular on industrial goods with export orientation and durable consumption goods (Groot et al., 2011; Hill et al., 2012; Fingleton and Polombi, 2013), and remoteness (Bristow et al., 2014) on the resistance to crisis, while a high level of innovative capabilities (Bristow et al., 2014), highly-qualified workforce (Duschl, 2014),

export orientation, non-related and related variety of regional industries (Boschma, 2014; Diodato and Weterings, 2012; Otto et al., 2014) and a low level of hierarchy in network linkages between regional firms and organizations (Crespo et al., 2014) support the reorientation and renewal of regional economic systems in crisis. In response to a crisis, therefore, as we had underlined above in terms of collective learning, proximity, interplay with institutions as well as variety and differentiated markets, are all aimed to the collective learning for new path development or path strengthening through the utilization of novelty in technological devices. In this way a theoretical map could be drawn.

3.3. Literature regarding Agency and Resilience

3.3.1. Introduction

As said in defining the main aim of this thesis, the role of agency, especially as resilience in reaction to a wider external crisis penetrating in the sub-region, is central to be defined and utilized. The following therefore would be first an analysis of the definition and inquiry about agency in general, and secondly a more focused and deep inquiry on a literature review regarding resilience as a firm-level agency able to react to crises in a region.

3.3.2. Literature on the concept of “Agency” in Regional Studies

A distinction has been made in the literature between types of agencies that transform existing structures and such that reproduce them, taking into consideration that notions of structure, agency and their interrelations were undoubtedly hot topics in human geography in 1980s, with structuration approaches seen as a way of bringing together the somewhat divergent Marxist and humanistic perspectives that had prospered in the 1970s. As such, attempts to connect human agency – ie, intentional, purposive, and meaningful actions – with structures – i.e., the conditions that simultaneously enable and constrain action – figured prominently in intellectual histories of geography published in the early 1990s (e.g., Cloke et al., 1991; Johnston, 1991). The debate is important in contemporary economic geography, especially as it reports not only the nuances of the concept of agency, but as it is addressing the main issue of agency both empirically and methodologically: its ontology. From a side the *Structuration theory* of agency from Giddens (Giddens, 1979; 1981; 1984; 1985), had described as both structure and agency were implicated in every moment of social interaction and semantic rules, resources (e.g., authority and property), and moral rules were seen as the ‘modalities’ connecting structure and action, both through repetitive conduct and long-term institutional change (therefore the role for institutions and single agents was important in the same way , therefore transcending the boundaries of social/individual contrasts). Ontologically, this means that agency is deeply connected with a broader aspect

of social structures, that intertwines with it. Jessop (2001) has then proposed refinements to the theory, whereby structures should be seen as ‘structurally inscribed strategic selectivity and actions as ‘structurally oriented strategic calculations. While the former determines the scope for the reflexive reorganization of structural configurations, the recursive selection of strategies and tactics depends on individual and collective learning experiences at different conjunctures. The ontological problem of structuration is however its deeply abstract nature (leaving with the main issue of the methodology on how to report such agency) , that is faced by its main critics such as Goss and Lindquist (1995: 345) who have applied meso-level *structurationist* to their studies , underlying “*the articulation of agents with particular interests and playing specific roles within an institutional environment, drawing knowledgeably upon sets of rules in order to increase access to resources*” , in this way underlining the hierarchical nature of power structures over the singular agencies. In this way there would be different types of agencies based on the work of Cumbers et al. (2010) and Katz (2004):

- **Resilience**, meaning small acts of ‘getting by’ that help individuals and groups cope with everyday realities but do not change existing social relations (they were described as coping structures by Scott in 1985).
- **Reworking**, which reflects people’s efforts to materially improve their conditions of existence (e.g., strategies to leverage better terms and conditions, subverting redevelopment schemes).
- **Resistance strategies**, direct challenges to capitalist social relations through attempts to regain control of labor time and its use in the spheres of production and social reproduction (e.g., non-capitalist cooperatives, alternative currencies).

If this is a horizontal way of seeing it, it needs to be taken into consideration even a vertical one, therefore as said before in its relationship with policymakers and society of the region taken into consideration. Agency in this case ontologically articulates differently on an individual or a systemic level, and then on a structural one. This is a diversification that had been underlined by Isaksen et al. (2018), distinguishing analytically between two types of agencies, that is, firm- and system-level agency. The differentiating feature is that firm-level agency has its main field of influence within one firm or organization, while system-level agency exerts influences outside its institutional and organizational borders. The concept of structure resonates in the one of system agency, as defined by Battilana, Leca, & Boxenbaum in 2009 as a broad range of different actors (policymakers, politicians, university leaders, firm managers, etc.) who ‘mobilize resources, competence, and power to create new institutions or to

transform existing institutions' (Sotarauta & Pulkkinen, 2011, p. 98). This differentiation however needs to take into consideration the relation between the two sides: the social and structure and its relationship with the singular, and in which ways the first could change the second (top-down approach), and vice versa (bottom-up approach). As said before the role of firms , institutions and individual users in the region could define the difference between a locked-in effect (and subsequent hindering of economic and technological development) and collective learning able to generate a spill-over effect (and subsequently the boost of innovation in such region) , and therefore we could underline the role of agency and its interplay with structure in the deficiencies that could lead to the subdevelopment of the region: my approach would therefore need to take into consideration such an interplay , and notice how top-down and bottom-up approach (as described before as the interplay between institutions and their policies , the firms and their entrepreneurial vision, and finally the user and its knowledge of an innovative product and its feature) , could play a role in the differentiation between new path creation and renewal , and the possible subsequent spill-over effect , and the exact opposite lock in effect , which crystalizes the innovation hindering its own foundation.

3.3.3. Literature on the concept of Agency as “Resilience”

As described in the previous paragraph, in Cumbers and Kantz the different definition of resilience and resistance, in which the first would be re-affirming the previous social structure, while the second would try to change it drastically. In this view regional actors are increasingly recognized to have key roles in organizing diverse responses including but not limited to sector specific state support and policies encouraging resilience (Fromhold-Eisebith, 2015; Pike, Dawley, & Tomaney, 2010). Resilience has however several orientations, to which scholars from different disciplines, subscribe. Engineering-oriented resilience refers to the ability of a system to go back to its pre-shock state (Pendall et al., 2010). Socio-ecological resilience focuses on the ability of resource-dependent communities to recover from natural disasters (Adger, 2000; Folke, 2006; Holling, 1973). Resilience informed by complexity science, on the other hand, emphasizes adaptation, adaptability, and adaptive capacity as forms of resilience (Martin, 2012). Regarding Economic Geography the concept of Resilience in connection with agency had been stresses by Bristow and Healy (2014), which articulates the concept in a different and peculiar way. Indeed, they focus on the “systemic” nature of resilience, and how it had been overlooked the role of individuals in determining its systematicity. Indeed, Complex adaptive systems are comprised of groups of heterogeneous individuals or ‘agents’ (such as cells, consumers, nations, atoms) between which are inherently dynamic relationships. The agents in complex adaptive systems

are constantly reacting to what the other agents are doing and to the environment and are thus continually evolving through feedback and learning. As a result of their interconnected structure, these systems exhibit unexpected emergent properties. These are structures or patterns that cannot be reduced to the properties of the agents themselves. Given then the infrequent introduction and diffusion of radical, disruptive innovations on regional economies, evolutionary economic geographers have made a distinction between resilience based on adaptation (the tendency to replicate and reproduce existing economic activities and ways of working) and adaptability (characterized by a dynamic capacity to develop and pursue new economic trajectories) (Grabher and Stark 1997; Pike et al. 2010). The differences between the two have significant implications for the relative economic resilience of regional economies in the face of unexpected economic shocks, with those places able to effect greater adaptability regarded as exhibiting greater resilience (Simmie and Martin 2010). The nature and source of adaptability in regions would thus appear to be key to resilience, with evolutionary economic geographers increasingly asserting that it is the innovation capacity of regions or their capacity to continually reinvent themselves and break from their past that is central to this adaptability (Simmie 2014a; Xiao et al. 2016). This innovation capacity, if not yet clearly defined, is conceived broadly as embracing both the effective social, organizational, and institutional capacities for innovation in a region, as well as its technological research and development (Isaksen and Trippel 2014; Xiao et al. 2016). In doing so, it moves beyond traditional conceptions of innovation as science and technology-led, to embrace conceptions that emphasize experiential learning through doing, using, and interacting (Jensen et al. 2007). In this way adaptive resilience involves the capacity of a regional economy to absorb the effects of recessionary forces and the ability of its industrial and technological structure to react to exogenous shocks through adaptation and innovation (Martin, 2012). Acknowledging the role of human agency thus requires the analysis of resilience to be much less structurally deterministic and much more people-oriented and focused on understanding how human actions and behavior interact with key structural and environmental factors and constraints (Bristow/Healy 2013; also, Skerratt 2013). This is because human agents have innate capacities to imagine, anticipate and respond to change, as well as the ability to take pro-active, intentional action to build up their capacities to be resilient through, for example, social learning (e.g., Magis 2010; Berkes/Ross 2013). This human agency may function through both individual and collective forms and at multiple scales including the household, community, region, and country level (Davidson 2010; Skerratt 2013).

3.4. Literature on the concept of “Underdeveloped Region”

Another literature to take into consideration is the one that defines the mechanics existing in underdeveloped and peripheral regions, as it could represent the application of the concept of agency, considering the way in which the sub-region initially reacted to the external shock could be related to its intrinsic nature as peripheral region (as shown in the GDP). A well-known conceptual approach to identify regions with less-developed research and innovation systems draws attention to various types of system deficiencies or system failures that result in low levels of research and innovation activities at the regional level. Tödting and Tripl (2005) have suggested a typology that distinguishes between three forms of system deficiencies, i.e., organizational thinness, (negative) lock-in, and fragmentation. In summary:

- **Organizationally thin regional innovation systems** are systems in which essential elements are missing or only weakly developed. Examples include the lack of a critical mass of innovative firms, a weak endowment with other key organizations and institutions and low levels of clustering.
- **Locked-in regional innovation systems** are characterized by an over-embeddedness and over-specialization in traditional, declining sectors and outdated technologies.
- **Fragmented regional innovation systems** suffer from a lack of networking and knowledge exchange between actors in a system, leading to insufficient levels of collective learning and systemic innovation activities.

Another literature stream to take into consideration in defining a peripheral region is the one on the attribute “*less developed*” could then apply to those regional innovation systems, which exhibit a weak capacity to nurture regional transformation. This might be due to:

- i. **lacking assets for path renewal and new path creation** (Tödting and Tripl, 2013) or
- ii. **failure to overcome various forms of distance** that characterize combinatorial knowledge dynamics (Strambach and Klement, 2012).

A fourth element is then the presence of innovative firms in defining the “*innovativity*” of the region, defining therefore the undeveloped region as knowledge periphery, i.e., in **areas with a limited knowledge infrastructure** (Markus Grillitsch & Magnus Nilsson in 2015). From what described above therefore we could theoretically describe the “*undeveloped*” and “*peripheral*”

areas” as regions or sub-regions which suffers lack of innovative firms , and therefore even lack of structure to develop them as well as clusters , secondly a low level of directionality due to lack of policy intended to achieve a direct path renewal of development , and therefore a third point would be the crystallization on traditional and declining sectors by the firms (*Locked in effect*) , that would boost an higher difficulty in user knowledge of innovation as well as utilization of it (even by actors), the lack of connection between firms as well as the involvement of them in an innovation process is a final component to take under consideration in defining even a lack of policy coordination, and finally the geographical an physical distance would play a role in its necessity to be overcome.

From such a literature review I had chosen a series of deficiencies to take into consideration in defining an underdeveloped region in its interplay with agency (both on a systemic and firm-level):

- ***Physical deficiencies***: lack of innovative firms and clusters able to trigger spill overs.
- ***Mindset deficiencies***: existing firms choose the specialized in traditional and non-innovative sectors, therefore crystalizing and hindering any development.
- ***Project deficiencies***: not having a unified or localized direction for the possible innovation as well as for the vision of entrepreneurs lead to isolation of the singular firms.
- ***Coordination deficiencies***: lack of policies able to coordinate the requirements foreseen on a wider national and international level bring less competitiveness as well as less possibility in development.
- ***Geographical and Closeness deficiencies***: being in more secluded and remote areas, way more distant from the developed areas means finding yourself in a more closed reality, therefore having higher possibility of lock in effect and other deficiencies (such regions indeed would have more emigration than immigration, that means older regions with older users more connected with known traditional ways than new innovative products).

Such features are to be took into consideration in the thesis to assess the reality of the sub-region after the quantitative and qualitative data, meaning that after the utilization of such data it could be assessed the presence or lack of such features in the sub-region I will take into consideration.

3.5. A Theoretical Framework Map

The figure below (inspired by Grillitsch and Sotarauta 2019; Bristow and Healy 2014b; Martin and Sunley 2015; Sensier 2018; Giddens 1984) describes the different concepts and their interconnections discussed previously:

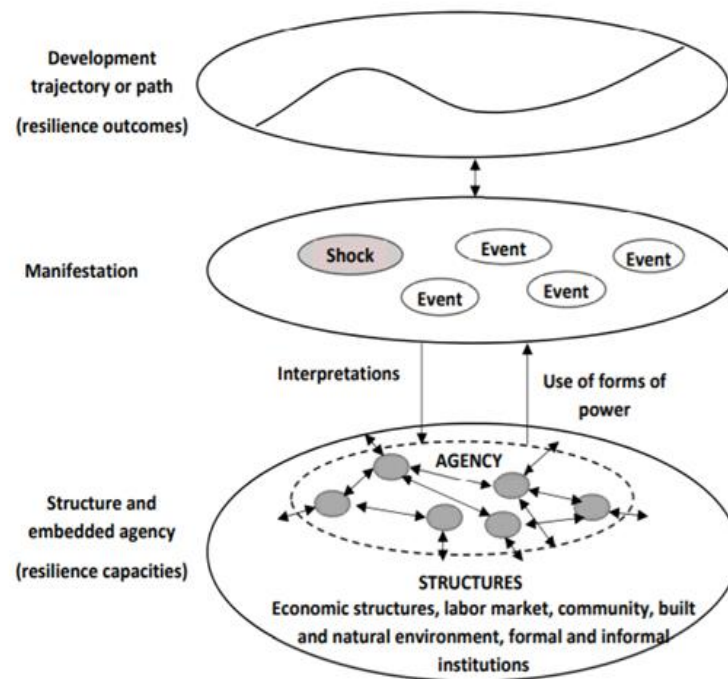


Figure 6. Image taken from: Kurikka, H. and Grillitsch, M., 2021. *Resilience in the periphery: What an agency perspective can bring to the table*. In *Economic Resilience in Regions and Organisations* (pp. 147-171). Springer, Wiesbaden.

The three levels indicated here represent a deeper description of the role of agency in a resilient way in connection with structure, and how they result from quantitative data as outcomes. Indeed the “*resilience outcomes*”, such as observable changes in economic performance like GDP or employment and industrial structures, are deeply related to the “*manifestation*” level, in which the event following the shock are relevant in describing indication of the agency role (such events are described even as new technologies, and therefore even technological development plays a role here). Finally, the basic and analytical layer had been described by the academics as “*the constant interplay of structure and agency from where these events rise*”. This structure describes both the possibility of technological development as a resilience based event, as well as giving a roadmap for the empirical case took into consideration in

previous chapters , as the region of Vicenza had suffered an higher employment crisis (given therefore by a particular economic shock) , while its economic resurgence needs to be faced from 2014 , in order to understand how the evolution and the possible access to new technology could have play a role in the agency interplay in order to develop a “*regional learning*” able to overcome the crisis.

4. Methodology

4.1. Empirical case selection

The empirical illustration builds on a comparative case study design covering one main peripheral sub-region (defined as the northern part) of the region of Vicenza taking into consideration the years from 2010 to 2015 as they represent the one in which the number of employed people had fallen drastically, and the double dip recession had happened in Italy. Such sub-region had been selected based on what could be expected regarding the potential information and knowledge that can be drawn from its study, to “*maximize the utility of information from small sample and single cases*” (Flyvbjerg, 2006). The sub-region on a physical map would look as follows:

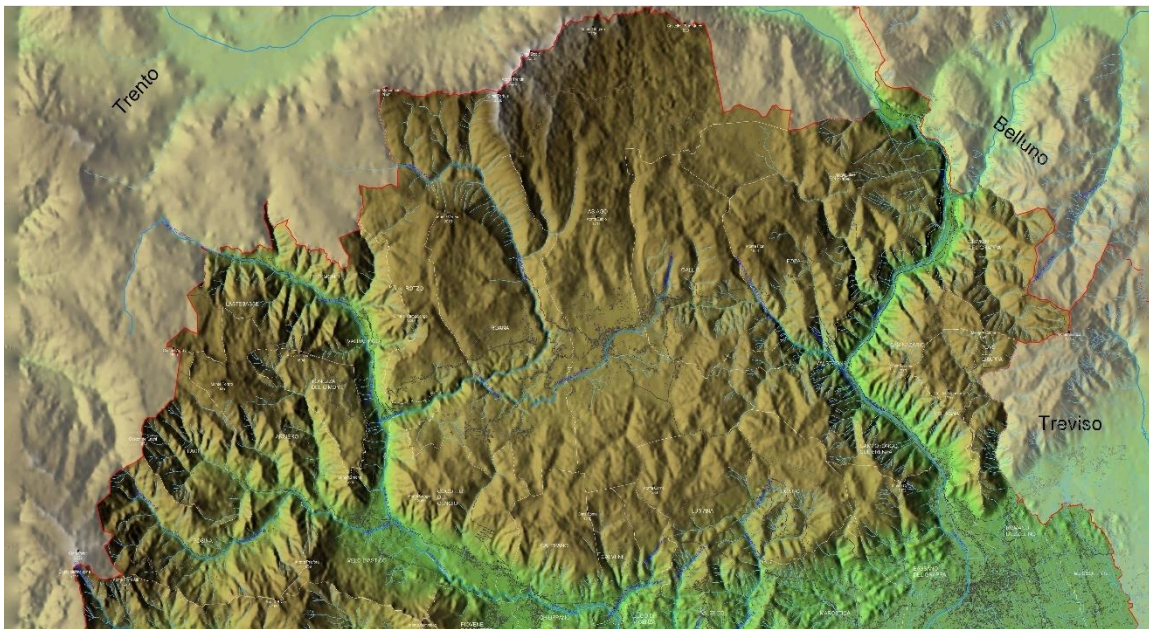


Figure 7. Physical map of the sub-region took into consideration, in the northern part of the administrative province of Vicenza. cropped image from: https://www.provincia.vicenza.it/immagini/CartaFisicaPTCP.jpg/image_view_fullscreen.

4.2. Quantitative Methods

4.2.1. Physical geography

The nature of physical geography of the region is to take into consideration in evaluating the nature of the sub-region (indeed as many of the location would be accessible just through the utilization of a bus, the more mountainous nature of a region means a more closed and secluded environment, therefore less possibility of innovation). Indeed, remoteness of the region could represent the main point of its underdevelopment (considering it is situated in the north and mostly mountainous part of the region). On top of that on a cultural and anthropological perspective the physical geography could influence the culture of the sub-region took into consideration.

4.2.2. Quantitative Data

To understand the possible lock in effect as well as the mechanics of the resilience during and after the crisis, quantitative data could be addressed through the chamber of commerce statistical data repository.

4.2.2.1. Number of firms

To describe the crisis of employment, we would need to track the fall in number of firms in the region, which eventually leads to less jobs available, and then unemployment. Such quantitative data could be accessed easily through the analysis of the number of firms yearly detailed from the chamber of commerce of Vicenza, which had divided per municipality the number of firms.

4.2.2.2. Number of firms per sector

Another data to take into consideration about the sub-region is the subdivision of the firms per economic sector. Indeed, sector as the secondary or tertiary are subjected to more innovation than the primary, and in this way could lead to a higher number of productions therefore an evolution of the niche market, and eventually a raise in the number of the firms.

4.3. Qualitative Methods

4.3.1. Semi structured interview

To understand the role of agency, its relationship with technological development as well as with the nature of the sub-region, semi structured interview had been conducted with several firms. The sample of interviewees was of 10 agents (9 of which were companies, of which 4 were of the primary sector, and 4 of the secondary one, while 1 of them was a private institution), they were selected from different places in the region took into consideration and specifically:



Figure 8. Location of the firms who had accepted to be interviewed

6 of the interview were conducted in person while 4 of them through the phone , all of them were made in the following steps: data protection information (in which I described that I would anonymize all of the data beside the most generic ones) , getting to know each other , collaboration with institution such as private or public associations in order to achieve innovation; view of innovation and how they try to achieve that on their firms; secondly their experience of the crisis in 2012-2013; finally the way in which they reacted in such a moment of crisis (for example would they prefer to try to have state aids or regional aids by institutions or would they prefer to reevaluate their economic strategy by themselves?) and closing the interview. Another component the interviews were utilized for, is for understand the features of underdevelopment as defined in the literature review for what could be concerned to the firms. In this way I took in consideration the following topics to be added while interviewing presence of innovative firms in the surrounding of the firm; choice of production strategy (especially in relation with technological novelties); access to eventual financial aids. Interview partners would then be identified using a “*snowball sampling*” technique (May,2011) in which Interview partners were asked to give recommendations about additional interview partners that they perceived as having information, which was relevant to the topic.

5. Historical and Economic Background of the region – National and Macro-region Level

5.1. *The National Level - 2008 recession in Italy and the subsequent double-dip recession in 2012 and 2013*

Italy was among the countries hit hardest by the Great Recession of 2008–2009 and the subsequent European debt crisis. The national economy shrunk by 6.76% during the whole period, totaling seven-quarters of recession¹. In November 2011 the Italian bond yield was 6.74 percent for 10-year bonds, nearing a 7 percent level where Italy is thought to lose access to financial markets (Moody, Barry; Mackenzie, James, 8 November 2011). As a shock therapy to avoid the debt crisis and kick-start growth, the national unity government led by the economist Mario Monti launched a program of massive austerity measures, that brought down the deficit but precipitated the country in a double-dip recession in 2012 and 2013, receiving criticism from numerous economists. (Krugman, Paul, 24 February 2013; Orsi, Roberto, 2017). Such a recession is the external shock which seems to be related to the mayor unemployment crisis in the region of Vicenza.

5.2. *The Macro-Region Level - Background during the years 2008 -2014 of the macro- regions (Veneto)*

The region of Veneto had been indicated as suffering from the 2008 crisis, considering its economy based majorly on small and medium size companies of more traditional sectors. The recessionary impulses have been concentrated in the sector of construction and manufacturing, and within the latter have been the sectors most exposed to international trade to be most affected of the crisis. The regional economy has suffered above all from the slowdown in exports, which in 2009 recorded a contraction of more than 20 per one hundred. Effects were also evident on the production structure side negative, with the opening of corporate crises and the closure of numerous businesses. The decrease in employment, which was mitigated only by the high recourse to the ordinary and extraordinary CIG, a support of small businesses hit by the crisis. The unemployment rate official touched 4.8 per cent, but the real one exceeded 9 per cent². The Innovation Scorecard of 2009 then, reports the Region of Veneto as a

¹ "Quarterly Growth Rates of real GDP, change over previous quarter". OECD. Retrieved 8 February 2015.

² "Relazione sulla situazione economica del Veneto nel 2009", Francesco Galletti e Serafino Pitingaro, Centro Studi di Union Camere, present at https://www.unioncamereveneto.it/wpcontent/uploads/pre/ID171_testo_relazione_09.pdf.

Medium-low innovator, therefore as suffering from the crisis not only in the employment rate, the import/export, or the production, but even on the innovation rate. As the RIS score card reports, after and during the economic recession of 2008 the Veneto macro-region was a mere follower of innovation, in the same way as other regions in central Italy, however during 2011 the region had a major push in innovation that seems to follow the higher number in occupational rate. In the following years, the ones of the double-digit recession on a national level, the situation however had fallen again, considering the percentage change of -1.9% of GDP in the macro-region. The added value of services shows a stagnation (-0.6%), against -3.3% of industry in the strict sense, -5.6 of construction and the positive percentage change, 0.5%, of agriculture. According to the Link Campus University Suicides for Economic Motives Observatory, in the period following the Great Recession, Veneto was the Italian region that for the greatest number of years achieved the primacy of suicides caused by the economic crisis and banking , and the year with the highest number of suicides ever was 2014, with 201 confirmed cases.³ In terms then of technological innovation, in 2014 the region was downgraded to moderate innovator , from innovator follower.

³ [«Crisi, Veneto prima regione per suicidi»](#), su *vvox.it*. URL consultato il 2 febbraio 2020.

6. Empirical Results

6.1. Quantitative Analysis

6.1.1. Physical Geography of the Sub-region

The physical geographical side of the sub-region took into consideration is the one of the Vicentine Alps, a mountain range of the Eastern Alps in Trentino and the provinces of Verona and Vicenza. The central part is represented by the “Seven Communities”, a Cimbrian enclave in the region, which had a social structure as well as a community history deeply rooted in a different culture than the Venetian and Italian one (so called the “Cimbri”). The physical zone in which the community lies is the Asiago Plateau, between the Astico and Brenta rivers, which has an extension, relatively to the administrative area of the Seven Communities, of 473.5 km², but the geographical extension of the mountain group as a whole reaches 878.3 km² which however falls into other administrative areas (such as the Val di Sella, the plain of Vezzena and part of the Marcesina in Trentino and the subalpine hills in the Vicenza foothills). Its altitude is between 87 m and 2341 m. The extension of the plateau in the strict sense is instead equal to 560.1 km² with an average altitude of 1317 m. The map could be described in the following way taking into consideration the different physical zones of the sub-region took into consideration that differentiate between the higher and lower plateau:

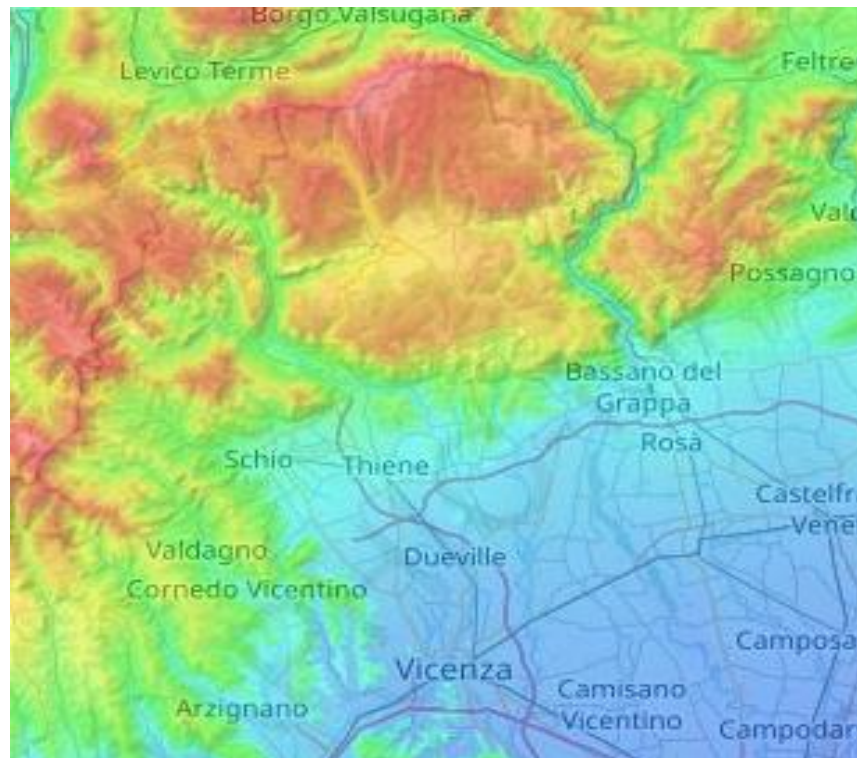
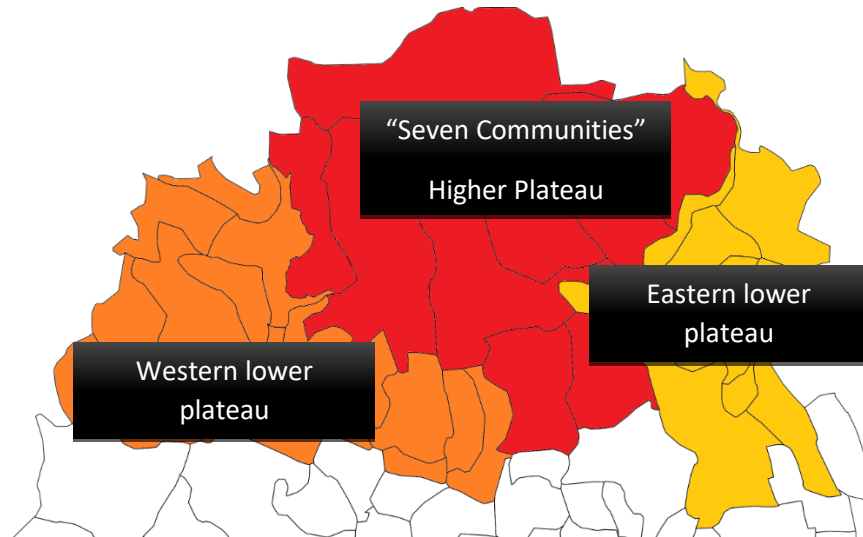


Figure 9. In the image it could be seen the altitudes of the mountainous sub-region. The red northern plateau is the Seven communities one, while on its left and right there are two lower plateaus. image took from:

https://image.routeyou.com/shrink/fit/400x300/7e24dc531cb3026193d6d70a1d32fec0_07684aaa19d3f4b3d6f0654decb94d1209eacd74.png.

As said previously in the Vicentine sub-alps the administrative division had granted to the seven communities plateau a particular liberty in its self-organization, and in this way, it could be divided both administratively, physically, and culturally from the lower plateaus around it.

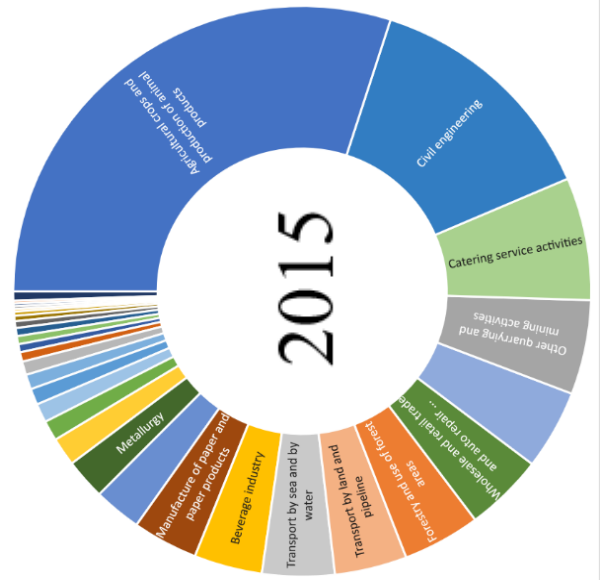
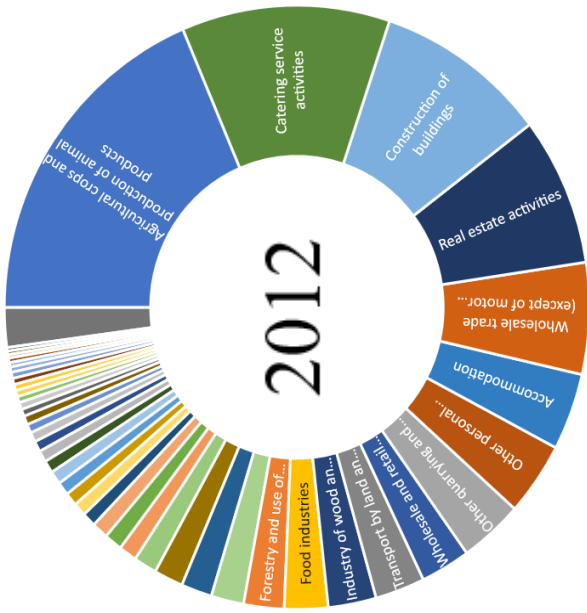


In the same sub region, there are no highways that would permit the access between this mountainous side to the more southern located city center of Vicenza, which is the center of this administrative region, instead just one higher size road connects Asiago (the epicenter of the plateau where the enclave administrative organ resides) with the lower plateaus and the flat lands. No railway is present, and the only public transport is the bus.

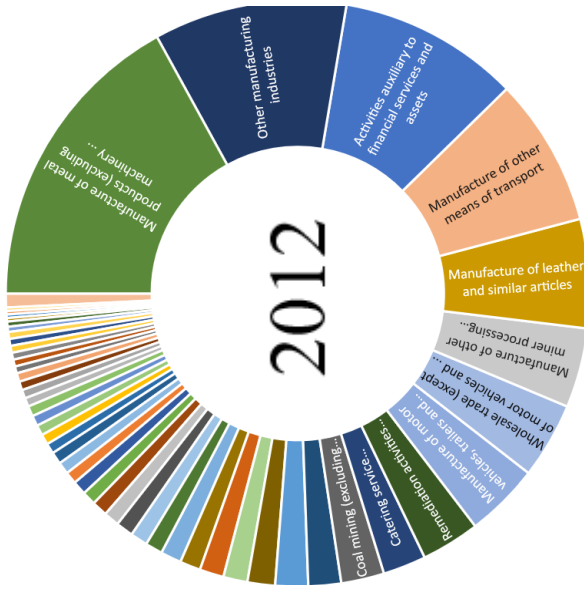
6.1.2. The Different economies present in the land during 2012-2013

As said before the seven communities and eastern and western lower plateaus are radically different in term of economy. While the seven communities have mainly a primary sector focus, especially related to agriculture and cattle breeding, the two lower plateau secondary sector industries had been developing. Below indeed are the result from the calculation of the chamber of commerce, all the data could be downloaded by their site. We have taken into consideration the years from 2012 to 2013, which are the one in relation with the time span during employment crisis, and confront it with the one form 2015, to notice any difference in its development. From the data revised and represented it could be seen the prevalence in the seven communities of the Agricultural

Seven Communities



West Plateau



East Plateau

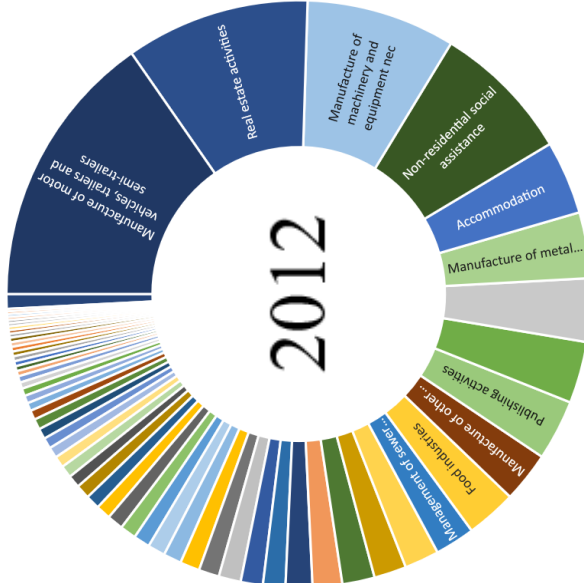
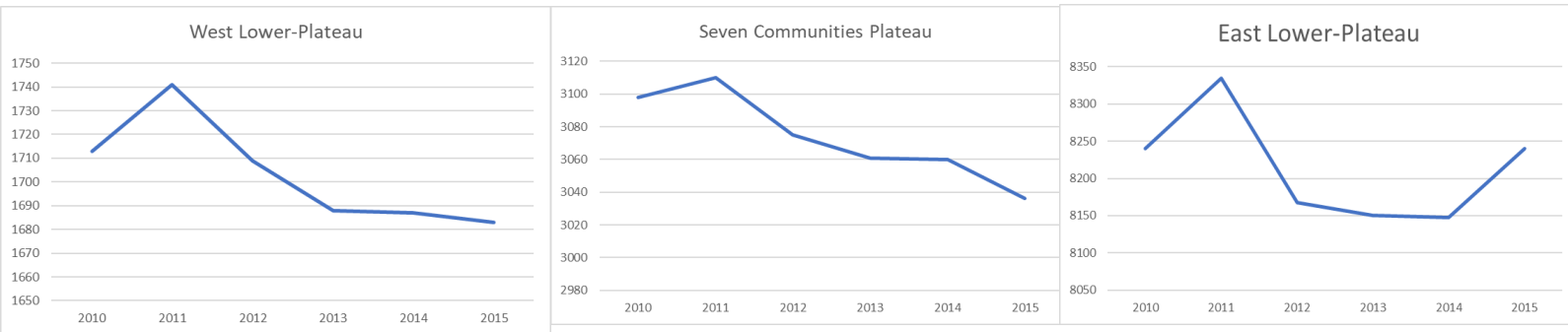


Figure 10. The six graphs represent: first the cumulative number of firms per sector in the seven communities' plateau; the second represents the cumulative number of firms per sector in the Western Lower plateau, while the third the cumulative number of firms per factor in the Eastern Lower plateau. The upper three (first column) represent the number of firms per sectors in the various plateaus during the year 2012, while the second row represent the number of firms per sectors in the various plateaus during the year 2015.

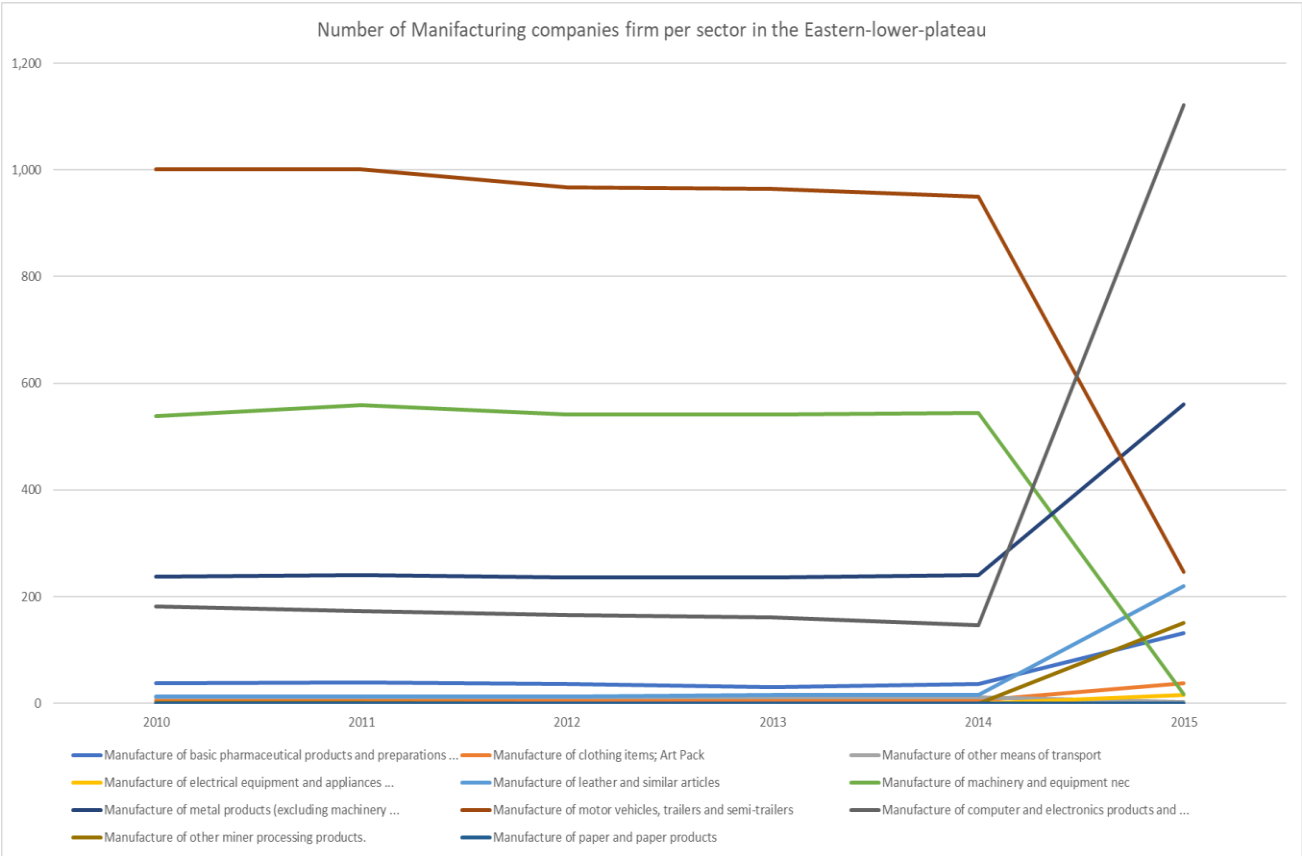
sector, while more innovative sectors are way lower in number of firms. Therefore, the clusters that are present would be the one related to the agricultural industry, but no real manufacture were present there during those years. Instead regarding the eastern and the western part of the lower plateaus, as we had reported, the role of manufacture is way more important. On an evolutionary perspective it could be notice that while in the initial phase of the crisis the major industries were the agriculture for the seven communities , manufacturers of metal products for the western plateau , and for the eastern manufacture of motor vehicle , after the crisis the seven communities industry focus remained unchanged , while the western plateau has shifted towards the manufacture of motors , and instead the eastern one on the manufacture of computers and related IT technology. In this way the striking difference between the three sub-region locations is related deeply to the economic sector in which their culture focuses. While the Seven Communities focus on the traditional sectors of Agriculture and farm herding, the lower plateaus, which are closer both culturally and spatially to the industrial centers, are investing in manufacture of mechanical components and other products, which could lead to spill-over effects as well as to more innovation during time, and this could be the case for the eastern plateau, which seems to have developed a technological and innovation market niche.

6.1.3. The number of firms during the years 2010- 2015

As said initially the area of Vicenza had features of a deeper occupational crisis, which reported a higher occupation during the year 2011-2012, while a drastic fall of it during 2012-2013, and a subsequent return to normality in the following years. As we had said previously, the area we had took into consideration has differences both physically, culturally, and finally economically, and it has reacted in different ways to the shock that had arrived from the external European, and national area (as we said were the years in which on a national level Italy suffered from a great economic crisis, as well as from drastic measure on a national level to face them). We had at this point track the total number of firms during that period divided for the three sub region locations.



The above graphs show again a deeper understanding of the mechanisms of peripheral regions in terms of innovation and reaction to generalized crisis: the seven communities as the one which had a lower rising spike in the number of firms, during the years of 2011, which are the one of general wellbeing of the macro regional and national economy. Indeed, the east and west have a spike in number that is way more acute than the one of the seven communities, however all three of them have a general crisis in the number of firms (therefore generating a less demand for workers, resulting in a higher number of non-occupied persons) during 2012-2013-2014, the two years of the occupational crisis registered on a regional level. Now, while the West and the seven communities had not recovered from such a crisis in the following 2 years, the opposite is true for the East, which was able to restart its economic growth. Indeed, the west was just able to stabilize the crisis, while the seven communities kept falling in number of firms present in the area. This means that the economic sector of investment is surely something important, as west and the east had demonstrated a higher generation of firms as well as capacity of stabilizing the downfall due to the external shock, however both had a different story to tell regarding recovery. The following chart then represents the historical evolution of the manufacturing firms present in eastern lower-plateau area:



As it could be noticed, the peak of technological industries had happened from 2014, after the employment crisis. In this way I honestly think that the main difference is in the resilience process of the entrepreneurs of the east as well as their deeper interest in the technological industries, and for proving this I have proceeded to perform interviews in the area to have more data to work on.

6.2. Qualitative Analysis

6.2.1. Interviews - Technical and methodological considerations

During a time, span of 10 days, I have performed 10 interviews, which were around 20 minutes each with several firms of the various sub-regions' locations I took into consideration: the east, the west and the seven communities. I have tried in the interviews to search contact with firms both from primary and secondary sectors. However, it is to notice that it wasn't possible for all the locations: the seven communities have a stronger presence of primary sector, and almost a nonexistent secondary one; regarding the east and west the primary sector is way more under-developed, while the secondary (as reported above) is way more developed. I have therefore performed 4 interviews in the seven communities, while 3 in both the east and the west; the 4 interviews of the central location of the 7 communities are 3 firms of the primary sector and 1 of a private institutions (a consortium which is a communitarian management association, as said the traditional way in which the communities manage the soil is trough community work, instead of private property); regarding instead the 3 of the east, 2 of them are secondary while one was form the primary sector; finally the 3 of the western part are all secondary. Of the 9 firm that we have interviewed just two of them were demonstrating some sort of innovative approach to the market, both were from the eastern lower plateau (one of them was a 3d printing business while the second a cybersecurity firm). Below a summary table of the interview done:

	Sector	Help	Innovativity	Strategy	Innovative / Traditional	Sub-region
Firm 1	Primary	No	Local	Unchanged	Traditional	7 communities
Firm 2	Primary	No	Local	Unchanged	Traditional	7 communities
Firm 3	Primary	Yes	Local	Changed	Traditional	7 communities
Firm 4	Consortium	N/a	Regional/National	Unchanged	Traditional	7 communities
Firm 5	Secondary	Yes	Local	Unchanged	Traditional	West
Firm 6	Secondary	Yes	International	Unchanged	Traditional	West
Firm 7	Secondary	No	Local	Unchanged	Traditional	West
Firm 8	Secondary	No	International	Changed	Innovative	East
Firm 9	Secondary	Yes	International	Changed	Innovative	East
Firm 10	Primary	Yes	Local	Unchanged	Traditional	East

Regarding the question that had been made they follow the theoretical framework that we have described above in describing the concept of peripheral region: the sector, the access to financial help (being national or extra national), the access to innovation, their strategy, the type of product sold. The main aim of such questions (and subsequent division of the diverse indication), was to notice the role of resilience in the different possible cause of failure, being in the impossibility of innovation (therefore possible lock-in effect), or the uninterest in access to innovation, as well as the changes in the strategy that the crisis had led. Finally, indication of the type of product and production process followed had been taken into consideration, as it could indicate the possibly interest in development a new path and a new niche market, especially around tech novelties.

6.2.2. The Different Cultures present in the subregion

A layer to be taken into consideration before assessing the interviews is the cultural variety present in the region we are analyzing. Indeed, from an administrative perspective the “Seven Communities” Plateau is a unicum, as it has its own administrative way, different from the one of the western and eastern part of the lower plateau lands. Indeed, while the first has the title indeed of “Comunita Montana” (mountain community), which historically was a particular administrative title given in Italy to preserve the local culture. Indeed, a German ethnic minority speaking the Cimbrian language, having settled in Seven Communities. This community is culturally different even economically, as they have persevered a collectivistic aspect of their economy based on collective usage of the land. This peculiarity is far very different from the two sides of the lower plateaus: indeed, both in the east and in the west the administrative organization is much more the contemporary one, meaning differentiation in different municipalities, any of them with their own mayor (while the seven communities has just one mayor for the whole of the different 7 municipalities). Secondly the collectivistic example of the division of the land is not present at all, and the classic capitalistic property standard are foreseen. The language they speak in the lower plateaus is the Venetian dialect and the Italian, as the whole of the macro region. In this way the two lowlands have an administrative and cultural difference in comparison to the seven communities.

6.2.3. The seven communities’ interviews

As reported previously the seven communities have as main business agricultural and herding activities, as even their typical products are a particular brand of cheese. The interviewed indeed were farmers, 2 of them much more

interested in cattle herding, while the third was a forestry firm, which would focus mainly on lumberjack activities. All these firms since the beginning have no innovation at in regards of the product, they work on traditional economic activity of the sub-region. The two herding firms had collaborated with the consortium the private association for the treatment and the utilization of the land, as well as for administrative reason. The consortium had several herders and other firms (agricultural and lumberjack) that aim to administrative the land and control its development as well as managing it. The structure and relation between the firms and the consortium was brought up. The three firms reported me they experienced the crisis in 2012-2013, and the following years were not so good too. They explained me that they started to have been paid less and less for their product during their time. One of the two herders informed me that he had reduced the number of cattle he was working with, to have less cost to face, and have a little profit from selling them. The forestry firm reported me that the real issues started in 2013, when the whole of the community started to show problems over problems related to production and money. At this point I asked if they have any connection with agencies or association to face such a general crisis in the sub-region and if they benefitted from any external help trough the region or any other form of financial help. The two herders reported me they never asked any help from the region or the consortium, and one of them had decided to leave it after a while, as he reported me, "*it was getting detrimental for finances*". Indeed, for what they explained me, they have a fee to pay to the consortium as an association fee, and the latter would help them regarding the management of the land as well as the possible request and financial help that they could receive. The forestry firm, instead, benefitted from the European union financial help at the time, and was able to buy new tools for their job. Now the interview changed between the two firms: to the two herders I asked why they did not ask for filing the request for financial aid, and eventually if they have changed their strategy as entrepreneurs, if they have incorporated technology, and if so, how they access information about technological novelties. This latter question was made even to the lumberjack, as I asked if he attended to fairs or any other event to choose the new tools to buy, or if he did in any other way. Such question was aiming in describing the accessibility of these people to technology and innovation (as the local fairs normally had companies from all over Europe that bring the latest technology to sell it). The two herders reported me that they had preferred to do everything by their own, as while talking with other herders they were counselled to avoid such financial help, as they interpreted it as a loan, which would eventually be a too heave cost to pay. As said one of them grew a sort of distrust towards the consortium, as he received from the tax authority a fee to pay due to bad paperwork when filing

his taxes. Regarding the technology and innovation part of my question, they have reported me that they had acquired some innovation from time to time, such a better tool; however, they said to me that they do not attend to fairs, instead they normally refer to their pairs and their community. The lumberjack, instead, reported me that he had chosen such tools talking with other local firms that he is friend with him, when I asked about the possible attendance to fairs, he reported me he had never went as “*what works in Germany or France, does not work here*”. In this way I proceed to ask if after the crisis, they had proceeded to change anything in their business strategy: while the two herders reported me, they had made no great changes if not on the number of the cattle, the lumberjack reported me that he had incorporated (as said above) more technological tool. Finally, I have decided to proceed in an interview with one of the main members of the consortium (the latter which was indicated by the herders) which job had been during that time to help the firms in their land management as well as their relationship with other institutions on a national and international level (for example for having financial aid trough EU aids or at a national level). I asked what their relationship with the firms is especially during the crisis. She explained me she had mainly worked in helping some firms obtaining financial aids, as well as in counselling them regarding possible strategies to perform. I asked her as this point which kind of strategies did she give privilege during the crisis and after it , and she reported me that normally she had tried , where possible , to call for technicians to give an opinion on how to heighten the productivity of a particular land or firm; secondly she pointed out that they organize with the “*Pro Loco*” (a local ONG aiming to value the local territory) , fairs and exposition inside the community and outside of it , in order to crate business relations outside the community itself. In this fair (as mentioned above) technological novelties as well as workshop are held. I asked how they bring innovation to the firms, as said above, they reported me they prefer to create workshops to implement knowledge of the working of the products to avoid lack of production (for example due to sickness of the cattle or the plants).

6.2.4. The interviews with West lower plateau firms

On the west side, as said previously, I have talked just with firms related to the secondary sector. All of them were small and medium firms that were working in the mechanical field. I have considered them as traditional firms, since the zone in which they have worked (Arsiero and Cimone), are two well-known zones in which the mechanical industry had been developing at least in the last 30 years. Two of them reported me that many of their clients were both on a national and some of them on an international level, especially Switzerland, Germany, and Austria. The remaining one of the firms reported me instead, that

their job is way more connected with the other firms around them. The first thing I ask was about the crisis and how they have experienced it: the two bigger (both with clients on a national and international level), reported me they have a downsize during that period, due to a lower amount of sold product, however they decided to invest much more in the international level, as they notice that while the Italian client were getting late in the payments, the German and Swiss ones were always in time. In this way one of the two had hired a young professional that could speak German and French and asked to try to find new clients in the respective nation (France and Germany). Instead, the second firm with national and international connections decided just to concentrate to the few clients they had in Austria, prioritizing their orders (since they notice that they always were punctual in the payments, instead of the other Italian firms with which they were having business). The third firm, which was smaller than in the other two, reported me they had tried to specialize in a particular function of the production-chain, and therefore to acquire and collaborate with all the firms they could at the time around them. I asked to all the three if technology had any relation with the strategies they had utilized: two of them they reported me that they use the technology they can afford, therefore on a technological level they are always one or two years behind than the bigger companies, as they could not acquire the more innovative tools. The third firm, the smaller, reported me that they prefer to collaborate with other companies for order in which they need a more innovative tool, as they would not have, nor they had previously, enough money to hire someone that knows how to utilize them. In this way needs to be notice that the firms reported me that they could not change their production strategy, and just one of them had tried a new approach, however just slightly changing the business relations. Regarding their relationship with the financial help during the time, two of them, the smaller on the two-medium business, reported me they had applied for it, however they have done so by themselves, while the other medium reported that they had preferred downsizing. I then asked how they had used such financial aid, and the small company reported me they had used it for buying new tools and for some outstanding payments. I asked how they had choose their new equipment (as previously in order to understand the innovation relation with resilience) , and he reported me that he is based on the companies he is collaborating with , which would basically guide him in deciding which equipment would he be buying , considering his idea is full independence in the future , instead of utilizing third parties for a particular job that requires technological specialization he does not have. The second medium company reported me that they had used the liquidity from the financial aid to hire new specialized people and a tool for cutting the “pieces” (being parts of the product they sell). The

owner reported me that he normally frequents fairs and workshop organized by the chamber of commerce or by private organizations that provides training; they use such services for specializing their employee too in particular processes of the production. Finally, the innovation for the other medium company is based on what they know by the other people that work in the field. As said previously during the crisis they suffer tremendously locally, that's why they had pushed for a change in a more international level, secondly, they have chosen to change slightly their strategy, hiring new employee, but basically empowering the same processes as before.

6.2.5. The lower eastern plateau interview

The firms from the east lowlands that I have interviewed were two from the secondary, and one from the primary sector. The secondary firms were both of an innovative field, as said, one was working in 3d printing while the second in cybersecurity. The primary firm instead was working in agriculture. The two secondary companies described me the problems they have during the crisis, which was their initial years of working in the field: not only they faced the issue of being innovative firms which needed to build up a new market niche for them, but at the same time they had faced the main issue of having a region around them that seems to suffer heavily from the occupational and financial crisis. To face such an issue, they use financial aid from a European fund for startups, and then proceeded to face the crisis changing their initial strategy. Initially the 3d printing business indeed was based on trying to have business relations with local firms and help them out in creating pieces of the final product.; of course, to do so at the time, the company would need to have relation with smaller firms which did not have hired any specialized worker for that piece crafting. During the crisis the cost of 3d printing were too high for leading this strategy to succeed considering the partners were smaller firms; the radical change was to instead of focusing on the mechanics business that was around them, to have a larger pool of clients through having projects for a series of other businesses, basically anyone possible. They initially choose the mechanics business as normally they would have the project already to work on, instead of doing everything from scratch, but in that moment, they had chosen to try this second option too. In this way they started to become producer of mechanical products to be presented and sold almost as an "alternative" to the traditional factory-crafted ones. This is a deep change in strategy, as they moved from assistance to production to production itself. Being quite innovative they were having contacts much more with international firms, or firm on a national level for other macro-regions in Italy. This connection was formed as the owner had perform private trainings and workshops from a private course organized by the chamber of commerce of Milan (therefore not a local one). He reported me

they used their connections as a reliable way to reorganize the workflow and try to have more sharper business strategies (being even the technology at that time at its beginnings). The cybersecurity firm instead changed a lot: initially they were providing solutions for local industries, and (as the other firm) depending basically on them. Noticing the lower amount of profit that was happening in the sub-region, they started to expand their offering to cloud solutions and data science too, hiring one new individual expert of cloud, and acquiring international licenses and certifications. This led them to have much more relation outside the sub-region, especially with the big city in the southern part of the region (Vicenza), where the major clusters of industries are located. Secondly the same solutions had been developed for privates and being at the time almost alone in the niche market it was a smart move to develop their business, as it enlarged the pool of the customers. Finally, the primary company in agriculture reported me they have took a European financial help and bought new equipment, but their business strategy basically stayed the same. Regarding the technological innovation, the two secondary companies were of course very interested and aiming towards it, meaning they would try to have both local and international feedback. They reported me that at that time they would have to check workshops and training by the chamber of commerce, but mainly doing licenses and certifications to be up to date with the market. As the niche market had been developing in the sub-region, they developed a higher collaboration with other companies, especially in exchanging news and possible novelties. Both reported me about this such spillover effect on the developing cluster, that in ten year is still, however not big as the manufactures present in the area. The agricultural company had reported that he normally goes to fairs to have better equipment, however due to the cost he would not buy much of them, resulting in lower access to technological change. In this way the two innovative solutions had reported that the changes they had performed regarding the strategies were based on the technological turn, as well as production methodology and business relation creating. Unfortunately, the same could not be said for the primary company, which being related to a sector that is way less innovative, it as nor changed his business strategy nor acquired new technological changes to do so.

6.2.6. Conclusions

In the main sub-regions took into consideration the problem of innovation as well as changes in strategy in face of a crisis must be assessed to understand the possibility of a particular economical and geographical location to recover from such crisis. Indeed, the interviews had shown how the change of strategy could represent a way for facing and recoverin faster from the financial problems coming from the crisis. Secondly the role of collaboration is twofold: while in the central sub-zones of the seven communities such collaboration seems to be

based on the same background culture , so much they would not trust anything over their peers (for example regarding the financial aid , which was proposed by the consortium , and was not followed by them); collaboration instead for the firms in the eastern and western lowlands signify to open nationally and internationally , and search for new solutions (that this the case for the innovative possibilities in the east lands for example). Thirdly another component to take into consideration is the difference approach to tradition and innovation : while the seven communities believe firmly in tradition as even a sign of identity into a community (the one of the cattle herders for example); the same does not value for the lower plateaus on the east and on the west , in which tradition is many time choose due to the costs of innovation , and collaboration is used to generate a possible help from third parties that have such innovation in place (however this does not mean that the firm requiring such external help would acquire such technological tool or novelty , and in the interviews we had made this was related to costs). In the final chapter I would try to draw the conclusions form the quantitative and qualitative data I had collected and try therefore to answer the research questions we had made for ourselves.

7. Conclusions from the collected data and final remarks

7.1. The role of agency and resilience in both the stages of such crisis

7.1.1. Agency in the sub-region

The previous data had initially shown us a difference between the three zones in which the sub-region could be divided due to its physical and administrative reality. The first difference that quantitative data had brought us, is the fact that the seven communities, which resides in a higher plateau than the two other locations, had a prevalence of primary firms, that work in traditional businesses of the region. The cultural background of the seven communities had influenced their agency. They preferred to stick to tradition, do not trust any suggestion outside their peers, and do not consider any possible technological advance to work in their reality. Their agency reaffirmed resilience intended as a reaffirmation of the old ways. This is done willingly, as outside the cattle herders, the lumberjack example had demonstrated that technology is used and took into consideration, however it is done uniquely due to the help of associations and financial help. Instead, such a cultural diffidence towards new strategies is not present in the other two locations, which instead have a more industrially evolved clusters, related to a partially innovative field as mechanics. However, the problem is that just the more innovative firms seem to have choose to change drastically they strategy, and that seems to be related to the major recovery that one of the lower locations in the plateau had obtained. However, in the locations in which the interviewee had reported to not change, or changing minimally their strategy, the entire location seemed to slow down the crisis generating the disappearance of many firms, while the seven communities had kept losing firms even when the other two locations have demonstrated a heighten in their numbers. However, the west, in which the agency had not led to a drastic change of strategy, and therefore remaining partially locked to the past, both technologically and on a strategy level, no recovery was achieved. The data in this way seems to suggest that agency directly influence the recovery from a crisis, way more than possible financial aids. Changes of strategies and use of technological novelties seems to have influenced clusters as the one of the East which (at least from the interviews) seems to have developed a spill-over effect able to boost such recovery. The difference between locations therefore not only shows how much a cultural landscape that is strongly attached to tradition both technologically and in culture (as well as in production and type of firms) would suffer heavily from an external crisis , and more it hangs to the past more it would result detrimental for the region, but even if the firms present are more innovative, if they won't change strategy and not interact with technological novelties , they seems to

have achieved just a slowing down of the progressively closing of firms (and therefore the generation of more unemployed people , aka occupational crisis).

7.1.2. The role of technology in its relationship with agency in the recovery

As said the role of technology seems to be evident from the data shown: the locations in which the approach of the firms was more interested in developing technology and creating new paths are the one that were able to recover. The entire sub-region is a clear peripheral region, exactly for their uninterested in the role of technology, or better for their impossibility in accessing the technological turn. The limitations, being monetary or culturally, in doing so resulted in a slowed down recovery or in absence of it. In this way at least from the data that we have collected , the role of technology is deeply intertwined with agency , as novelty means inserting a new technology inside a particular niche market able to challenge the old ways (and this was done just in the east , although tools and equipment was bought through financial aid , the strategy of the other locations did not change accordingly , therefore no real innovation was brought to the table , able to boost an economic boom). The role of the locked-in effect could work for the west, but interestingly even for the seven communities, although they are agricultural firms, and therefore there is no industry. Indeed, they had maintained the old ways, the first refusing to access to source of knowledge an outside the cluster, and the second outside the community. Especially for the second the locked in effect is related to the cultural background which refuses what is generated outside the community as alien. On the other side the academic concept of collective learning had worked wonderfully in the east, in which new clusters emerged linked to technology and were able to challenge the old ways generating a spillover effect. Their approach was winning even though their connections with international and national level, which lead to pass knowledge and collaboration.

7.2. *The nature of the sub-region and the possible recovery from the crisis*

7.2.1. The peripheral nature of the subregion

The sub-region has all the connotation of the peripheral region that we described at the beginning. First of all it is to notice the lack of innovative firm in the two third of the locations , and the absence of spill over outside the smaller and older cluster (in the east) , resulting in a physical deficiency; regarding then the mindset of the two third of the sub-region , which are not interested or have not the possibility of change their business strategy for example through technology , therefore focusing on traditional methods and traditional technology (hence mindset deficiencies); even with the presence of policies able to help out the technological advance in order to boost a change in strategy , many had refused to access to it , simply not trusting the agencies that

could help them in filing the request (hence coordination deficiencies); finally the remoteness of some of the areas (the seven communities) have a detrimental heightening of the previous mentioned features. Now using the different features detailed in the literature review we can take into consideration the different locations we have analyzed and merge them together to notice if fully the sub-region could be assessed as having fully the peripheral features. For doing so I have put the different locations on a table and give a number between 0 and 1, if the feature had been noticed as present from the interview and the qualitative data. Being the maximum score 5, if the whole is higher than 3, that represents the 60% of the feature we would have a reasonably peripheral region, if instead it is lower, we could assume it is missing more than the important features that we would need for determining (as per literature) a peripheral region. This is the table I had obtain:

	West		Seven Communities		East	
Physical deficiencies	1		1			0
Mindset deficiencies	1		1			0
Project deficiencies	1			0		0
Coordination deficiencies	1		1		1	
Geographical and Closeness deficiencies	1		1		1	
total	5		4		2	
total	3.66666667					

The result of 3.67, represent an empirical (and quantitative) proof of the whole subregion has having reasonably the features of a peripheral one.

7.2.2. A possible recovery plan for such a region

The example of the eastern lower plateau demonstrates a way in which it was possible, and it could be possible, a recovery for the subregion. The initial problem that we face is a reduction in firms (as it is shown in the quantitative data graphs shown previously), this led to a raising of unemployment as well as less possibility for spillovers and possible innovation. Innovation results to be important as it could represent a possibility for change, as well as for resilience, obtaining a change of strategy and possibly a cheaper and better way of obtaining the same result that was obtained through the traditional method (for example the 3d printing in the east). For achieving all this a change in mindset is necessary initially, meaning the will to leave behind whatever traditional

methodology or trait that does not let the clusters or the firms change their strategy towards in the market. The east has done so through the innovation of the 3d printings and the cybersecurity firms. Thirdly the presence of financial aids able to booster innovation and agency of the firms is necessary in these cases, or at least a legislation able to work with them. It was present in this case, but the firms, willingly or unwillingly had problems in accessing it. Another role is the role of association which shall work out for gaining the trust of the firms, possibly helping in the filing of the request for financial aids as well as for investing a technological novelty in the field. All this had been proven to work for the east, and could work at least for the west too, where the only missing thing is the interest and the presence of more innovative firms. For the seven communities the problems are even cultural, and unfortunately deciding to live as an enclave, and losing themselves to the world won't let the community grow again (as it could be seen from the number of firms in that years had been slowly losing firms, therefore people, from their land).

7.3. The cause of the occupational crisis in the sub-regions

From what said above and from the data we have, at least for the sub-region took into consideration, the role of agency was crucial in generating the occupational crisis, or at least in heightening it. Indeed, the presence of cultural framework which are deeply connected with the territory and its own way of doing production, means the refusal for noticing novelty outside of the community. Another problem would be the uninterest in technological novelty which could lead to a more competitive location on a higher scale (indeed the macro-region itself was downgraded as innovator, meaning the trend seen in the two locations is much more generalized than what it seems). Then the missing intervention of the state -agency in giving financial aid directly, as well as in connecting with the firms, means they would not understand or even being interested in having possible financial aids and using them for good investments (this is the coordination problem mentioned above). The remoteness then of the areas had plied a role in generating the culture we mentioned initially as well as a more difficult area to access and to generate collaboration with. The whole nature of the subregion (which contains almost 1/5 of the surface of the Vicenza region), had brought the problem of the lowering firm's number. The lowering and closing of so many firms in a short time span, means a high number of unemployed people. Such crisis in the number of the firms, of course is related to the major problems on a national and international level, that had crashed with the main cultural and organizational problems that we have described above. The nature of the sub-region, being already on a bad spot on an agency level, had refused to react proficiently to the crisis. The incapability of reacting proficiently have represented for two third of the sub-region the impossibility of

recovery. We can imagine that the same had occurred in other locations, that seems to be in the south of the Vicenza region, as it could be seen in the lower amount of GDP in the area, however lacking the data for such sub-region it cannot be confirmed.

7.4. Final Remarks

7.4.1. Limitations of the study

The study clearly has several limitations: first, the number of the interview sample is a small one and could give just a partial view of a more widespread issue that ad occurred in the region. Another component to take into consideration is the fact that the firms interviewed were limited to the primary or secondary sector, unfortunately tertiary sector firms were impossible to find, or they refused to be interviewed. A third missing component is the side of the institutions: indeed, in a number of 10 interview just one is from a private institution of the subregion. It would be interesting to have the opinions and memories of the mayors and public institutions, as well as form ONG. However, when approached they all refused to be interviewed. I have sent them (as per their request) a questionnaire; however, they had chosen to not answer to it (indeed I have still to receive an answer until the present day). On the quantitative methods one important data is missing, and that is the unemployment rate in the municipalities of the sub region: indeed, the chamber of commerce could provide it just for the present year (2022), and it was ot possible to access to the data of the previous ones. The only data we could access regarding unemployment are the one regarding the region (Vicenza) and the Macro-region (Veneto), even on an historical perspective. However, this does not help for the subregion.

7.4.2. Resilience and Technology in face of a crisis

The present thesis aimed toa dress the interplay between resilience and technological innovation in an empirical subregion, in order to notice how it could be relevant in obtaining a recovery in face a generalized shock generated outside the region took into consideration. As it could be seen, the role of resilience, intended as willing to take a step further in responding proactively to the crisis, had beneficial effects for a particular location in the subregion, as well as generating an economic recovery trough the implementation of technological novelties. In this way it could be understood that technological change, and especially the will to resist and face the crisis need to go hand in hand for achieving recovery, as in other locations I had mention the fact that technology accessibility was not enough to recover, as there was no changing in the strategy of the firms. Of course, more research is needed in this case, as having more

funds and time would represent a way for investigating phenomena like this one described here in more deeply way.

Sources

1. Images

Figure 1: source is from RIS from 2012 and 2014. All edition of it could be found in: https://ec.europa.eu/info/research-and-innovation/statistics/performance-indicators/regional-innovation-scoreboard_en.

Figure 2: source is pag.13 from occupational records of the Vicenza province, fundable here:

https://www.provincia.vicenza.it/ente/la-struttura-della-provincia/servizi/statistica/dati-statistici/Lavoro/serie-storiche/lavoro_202003.pdf

Figure 3: map made by the author utilizing the data from: <http://www.comuni-italiani.it/024/statistiche/redditic.html> ; repository which keeps track of the GDP, and GDP pro capita from 2001 until 2016 , dividing it by municipalities.

Figure 4: graph made by the author using the data from: <http://www.comuni-italiani.it/024/statistiche/redditic.html> ; repository which keeps track of the GDP, and GDP pro capita from 2001 until 2016 , dividing it by municipalities.

Figure 5: figure crated by the author (no source needed).

Figure 6: took from: *Kurikka, H. and Grillitsch, M., 2021. Resilience in the periphery: What an agency perspective can bring to the table. In Economic Resilience in Regions and Organisations (pp. 147-171). Springer, Wiesbaden.*

Figure 7: cropped image from: https://www.provincia.vicenza.it/immagini/CartaFisicaPTCP.jpg/image_view_fullscreen.

Figure 9: image took from:

https://image.routeyou.com/shrink/fit/400x300/7e24dc531cb3026193d6d70a1d32fec0_07684aaa19d3f4b3d6f0654dec94d1209eacd74.png .

Figure 10 and from following pages (27,28,29): graphs created through the utilization of data from the chamber of commerce. Source link: <https://www.vi.camcom.it/it/servizi/statistica-e-studi/tabelle-statistiche-dati-comunali.html> .

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