

## **Diversities of regional resilience. Case studies from resource periphery in Eastern Finland**

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### **Introduction**

Changes in the global economy and division of labour as well as changes in technologies have caused regions with a strong dependence on the exploitation of their natural resources to undergo changes in the structures of their local economies. In this paper we explore two cases in Eastern Finland, where the resources economy has played a crucial role in the past, but where there have been, for decades, conscious attempts to overcome constant crisis by introducing new lines of industrial production and new sources for local livelihoods. While some of these have been based on imported raw materials (industrial production of tires, clothing and plastic products), others (bioenergy, tourism) have drawn from local natural resources. The attempts have been a mixture of national scale policies and local endeavours.

We suggest a framework for studying regional resilience in regions which draw a major part of their income from local natural resources, with resilience defined as a region's capacity to react, adapt to and foresee changes. In this framework, changes in population, employment, extraction of natural resources and ecosystems and the physical environment each contribute to aggregate changes, but on a different time-scale each. Each of these sub-developments is path-dependent in its own way, adding to the overall path-dependency of the region. In assessing the resilience of a region, different results are reached depending on which sub-category of change is in focus.

The paper presents two long-term case studies from Eastern Finland (see also Kotilainen et al. 2014; Kotilainen & Eisto 2010). As research material, the study utilises and compiles statistical data from Statistics Finland, historical narratives from various sources on local developments, and published studies on local histories. Methods include statistical analysis of

population change and employment figures as well as qualitative research to understand local developments.

## **Methods and data**

There have been various attempts to capture regional and community resilience in quantitative terms. Wilson (2012) has studied community resilience and vulnerability by using the variables of economic, social environmental capital. Simmie and Martin (2010) have analysed the resilience of regions on a 40-year time span by using the number of employed and the development of industries and services as indicators. Martin (2012) has sought to explore regional resilience by observing how regions have recovered from recessions in the end of the 1980s and 1990s.

In this paper, we use individuals as research units. The data describes changes in population as well as the number of jobs. It is our aim to test the possibility of utilising population change and employment figures as indicators for regional resilience. We seek to observe these changes during a 100-year period. As research material, the study utilises and compiles statistical data from Statistics Finland, historical narratives from various sources on local developments, and published studies on local histories. Methods include statistical analysis of population change and employment figures as well as qualitative research to understand local developments.

## **Regional change, resilience, and evolutionary economic geography**

Resilience is a multidisciplinary concept that has been applied to the explanation and understanding of regional stability and change. It has been used for explaining the outcomes of regional change and creating hypotheses on diverging regional transformations (Simmie & Martin 2010). In other discussions, the aim has been to understand the components that constitute the persistence of hard-hit communities by including social and environmental capital alongside economic capital (Wilson 2012). It is a key feature of the concept of resilience that it revolves around the ways a system deals with change it encounters. Often the pressures to change originate from outside the system in question, but they could just as well result from local causes. Often resilience is related to the adaptation of a community in the face of abrupt change, such as an environmental catastrophe or economic shock, yet slower pressures to change can be in question as well.

There are various ways to conceive of the ways to deal with change, including resistance, return to a previous state, adaptation to change and preparation to future change (Martin 2012). In effect, there are also several interpretations of how resilience could be observed in regional economies. Resistance to change in a regional economy could be degree of sensitivity or depth of reaction in economic recession. It is also possible to investigate the speed and degree of recovery, in other words how much or to what extent a regional economy is able to return to the state it was in before the crisis. However, it is not necessary for a regional economy to regain its previous function and qualities in order to be resilient, as the

industries and the regional economy can also adapt to change. If the regional economy changes enough it transforms to a new trajectory with new livelihoods gaining importance in the regional economy. In this regard the capability of local economies and communities to change economic and social structures to meet the needs of new situations has been discussed (Maguire & Cartwright 2008; Shaw & Maythorne 2012). On these grounds, a useful starting point for a definition for resilience sees it as the capabilities of a system, community or regional economy to change its non-essential elements enough in order to maintain its essential elements and functions (Manyena 2006).

There are some inherent problems for achieving overall resilience in a regional economy. It has been recognised that the issue concerning scale is important for understanding regional resilience, as occurrences on larger or smaller scales have importance for the resilience of systems at other scales. Moreover, attempts at securing resilience at one scale may hamper resilience at another. For example, from the perspective of national economy it might be wise not to support recessive peripheral regions, which would hinder the possibilities for development in communities in these regions. Or, it could be beneficial for the global economy if industries could be relocated as flexibly as possible, yet for the regions experiencing the relocations as loss of industrial production, employment and income, the situation does not turn out as resilient. Furthermore, a challenge for understanding resilience is that focussing on different sub-systems in a regional economy might show different results, as they change on a different time-scale. For example, forestry is dependent on the succession of the forest ecosystem, even if the ecosystem is heavily managed, which hinders possibilities for changing the trajectory on which the industry has been built upon. A related problem for regional economies is that the resilience of some livelihoods could also be in contradiction with others (Cote & Nightingale 2012). This could occur, for example, between forestry and tourism, or the extractive industry and northern nomadic cultures (Vatanen et al. 2006). Later in this paper, we discuss the consequences of paying attention temporal scales for conceiving of regional resilience.

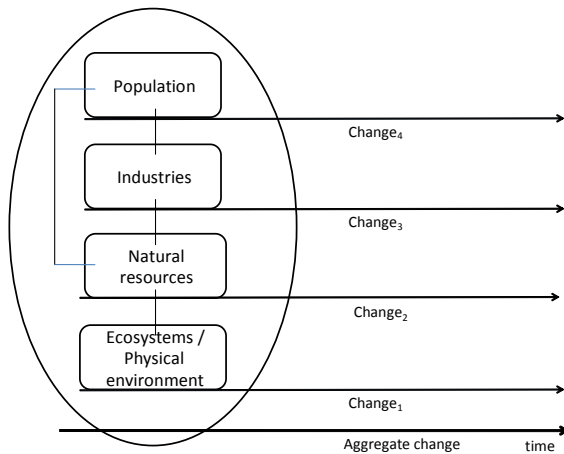
Resilience is closely related to some other concepts. Vulnerability is sometimes seen as its antipode (e.g. Wilson 2012; Adger 2006). A regional economy can be vulnerable for example due to a non-diversified economic structure and domination of a single industry, or specialisation on the manufacturing of a single product. Readiness to respond to pressures to change could thereby be weak and the region economically vulnerable. Adaptation is also closely related to resilience and could be seen as one form in which it takes shape. Adaptation is probably one of the most common forms of resilience for societies, as they seldom return to a previous state in the same way as other types of systems, such as ecosystems, might.

Debates on the similarities and differences between the theories of regional resilience and evolutionary economic geography have resulted in suggestions for mutual benefit (Simmie & Martin 2010) and reservations about the additional value brought by the notion of resilience for research into regional economies (Hassink 2010b). With the understanding that the past of regions guides their future options, evolutionary economic geography explores the spatiality of economic innovations, new firms and new industries (Boschma & Martin 2007). Overall, theories on regional resilience and evolutionary economic geography similarly focus on change in a system and the preconditions, processes and mechanisms through which the

system transforms itself at the same time maintaining its existence. Within evolutionary economic geography, the regional economy is seen as a dynamic non-reversible process, and not explainable with static models. In a dynamic world with no equilibriums, new issues arise constantly, causing a continuous transformation of the regional economy (Martin & Sunley 2010).

Path dependence is one of the key notions for evolutionary economic geography, referring to a situation in which the transformation of a region is constrained by previously successful industries. Under such circumstances, it is not easy for a region to change when it faces a new situation in which the earlier conditions for strength are no longer valid. Consequently, path dependence is part of the processes that lead to the creation of or lack of resilience and vulnerability. Regions and communities may be locked to a certain trajectory, making it difficult to shift to a new trajectory (Hassink 2010a). This has often been the case for regions and communities specialised in the extraction and processing of a certain natural resource, especially if major economic investments have been required for the establishment of the production facilities. Specific vocational skills of the population could also slow down response to pressures to change. However, it is also possible to see path dependence in a sense that it provides opportunities for local and regional change if the earlier industries, livelihoods and institutions make available facilities and infrastructure, such as educated work-force and physical infrastructure, for new economic activities (Martin 2012).

It is worth discussing the role of resilience in its various forms as a part of such an evolutionary regional economy. In the sense that resilience may be the most useful for the social sciences, with the inclusion of conscious making of choices in its definition, we could think of conscious action by economic actors that creates capacity to change in a regional economy as an important part of an evolutionary evolving regional economy. Against this background, we suggest a framework for studying regional resilience in regions which draw a major part of their income from local natural resources. We define resilience as a region's capacity to react, adapt to and foresee changes. In this framework, changes in population, employment, extraction of natural resources and ecosystems and the physical environment each contribute to aggregate changes, but on a different time-scale each. Each of these sub-developments is path-dependent in its own way, adding to the overall path-dependency of the region (fig. 1). In assessing the resilience of a region, different results could be reached depending on which sub-category of change is in focus. In order to be able to reveal these differences, we deem it important to investigate regional transformations on a long time horizon, and introduce an empirical analysis of case study data for a hundred year time span. Next, we analyse our case study data according to this framework, starting by examining changes in population and then turning to changes in livelihoods and industries in the case study regions.



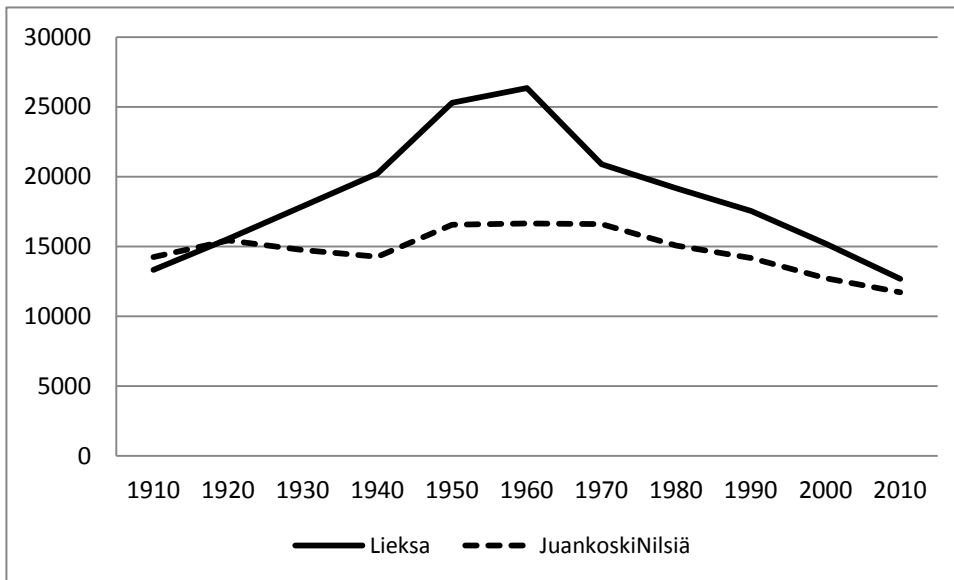
**Figure 1.** Framework for analysing regional resilience.

## Case studies

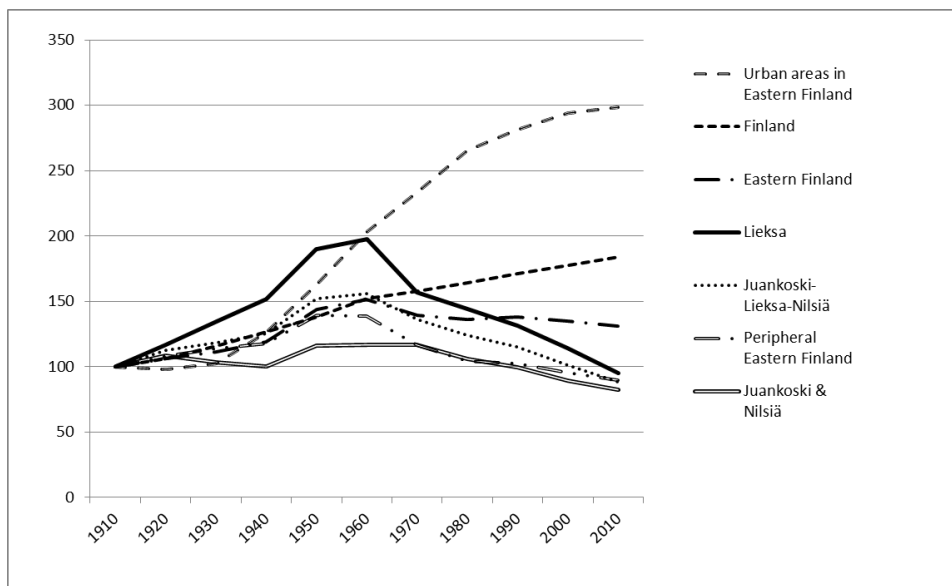
### *Changes in population*

We suggest that changes in the number of population can be seen as an indicator of the condition of a regional economy. A community or region that is experiencing large-scale loss of its inhabitants is arguably not in a good shape economically. We therefore start by exploring the possibility of using population change as an indicator of regional resilience. In the case study regions, the size of population peaked in the mid-20<sup>th</sup> century, after which it has decreased continuously with slight changes in the rate of decrease (fig. 2). How is the curve to be explained? As is shown in figure 3, changes in population in the case study regions have been in stark contrast to the Finnish average and also urban areas in Finland. Their development was also much more negative than in the larger regions the case studies are part of.

It would be rather easy to conclude that the case study regions have not been resilient if only focussing on their population change per se, as they have not been able to turn their declining population trend. The situation is even more severe if compared with the country as a whole, where the number of population has grown, or the larger regions, where, even if there has been population decline, it has not been as sharp as in the case study regions.



**Figure 2.** Population change in the case study regions, consisting of the municipalities of Lieksa on the one hand and Juankoski and Nilsjä on the other hand (data source: Statistics Finland).



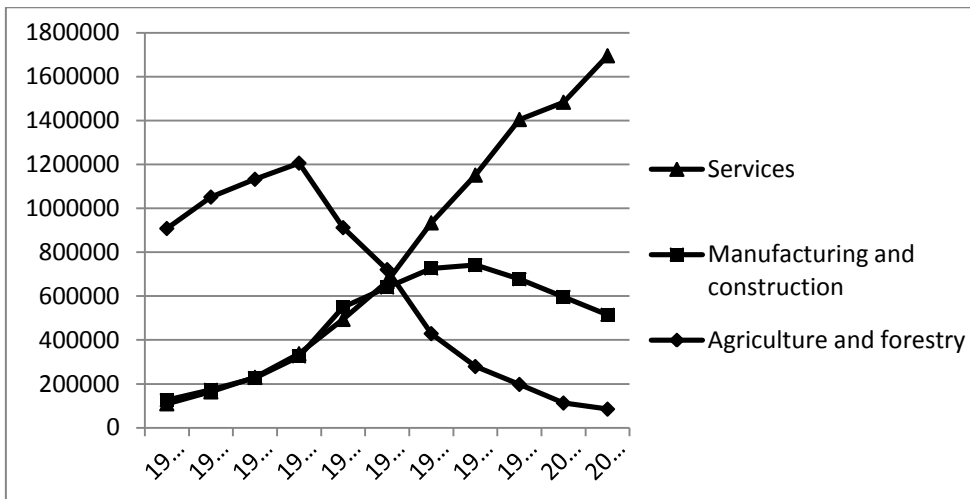
**Figure 3.** Population change index in case studies and larger-scale regions for comparison (data source: Statistics Finland).

### *Changes in the main sectors of the economy*

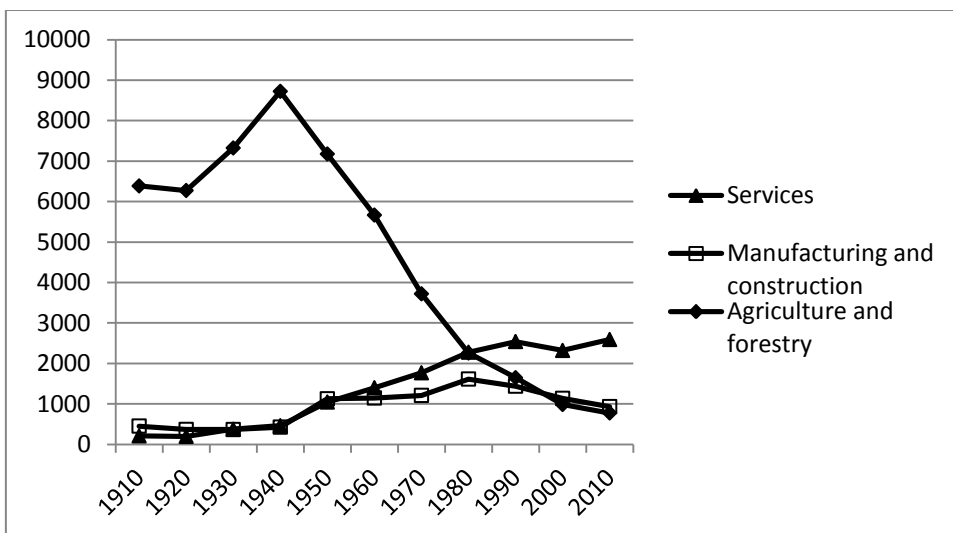
Another possibility of analysing regional resilience is to focus on employment figures in the main sectors of the regional economy. In the country in general, employment agriculture and forestry have come down since the 1940s (fig. 4), and this applies to the case studies as well. Likewise, manufacturing and construction have followed a similar curve country-wide and in the case studies, with a rise until the 1980s and decline after that. There is difference in how the service sector have developed. While in the country as a whole employment in services have expanded for the whole century, in one of the case studies the expansion of services has

been more modest (fig. 5). In the other case study, employment in the service sector started to decline with the turn of the 1990s and has not stopped since (fig. 6).

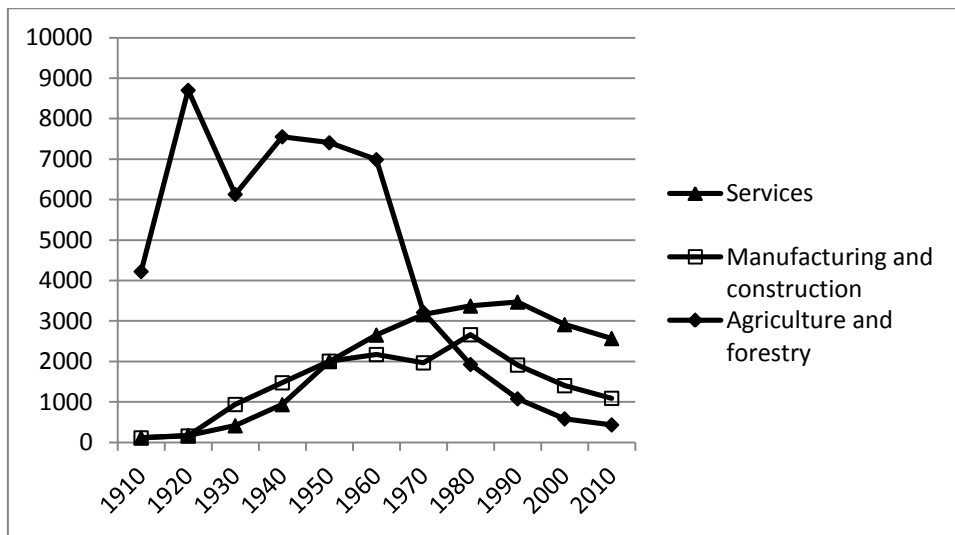
Thinking of these empirical results through the lens of theories of resilience, it turns out that there might have been capacity to adapt to pressures to change in one of the case studies. This is shown in figure 4 in the way that increasing employment in the service substitutes declining employment in agricultural production and forestry. In the other case study, however, similar development seems to have not occurred (fig. 5), as employment in services has been on a decline for two decades.



**Figure 4.** Employment in Finland according to the main sectors of the economy 1910-2010 (data source: Statistics Finland).



**Figure 5.** Employment in the main sectors of the economy in the Juankoski-Nilsia case study 1910 – 2010 (data source: Statistics Finland).



**Figure 6.** Employment in the main sectors of the economy in the Lieksa case study 1910 – 2010 (data source: Statistics Finland).

### *Changes in industries*

However, investigating these developments in more detail will reveal that there have been shorter-term transformations within the regional industries that remain hidden in the figures on main economic sectors. This provides a possibility for analysing whether there has been resilience in any form. More detailed research into the case studies reveals that there have been several moments during which the regional economy has recovered, at least partly, from a shock caused by decline in some sectors and industries by being able to create employment in other sectors and industries (figs. 7 and 8). For one case study, the number of employed population has declined since 1940, just as its total population. For the other case study, this decline started later, only in the 1960s. As we can see from the figures, this is in line with changes in employment in agriculture and forestry.

Changes in other livelihoods than agriculture and forestry have been less dramatic, but they reveal the extent to which the regional economy has been resilient, that is, able to adapt to changes by creating new forms of production and thence employment. These transformations can be described as follows specifically for one case study. There was an increase in manufacturing from the 1920s until 1950s that was caused by industrialisation in the forestry sector (see also Kotilainen & Rytteri 2011), after which a slight decrease occurred. Most importantly, however, sharp decline in employment in forestry was caused by its mechanisation. Nevertheless, for observing and understanding the mechanisms through which resilience has been built, a significant event was the increase in employment in manufacturing in the 1970s.

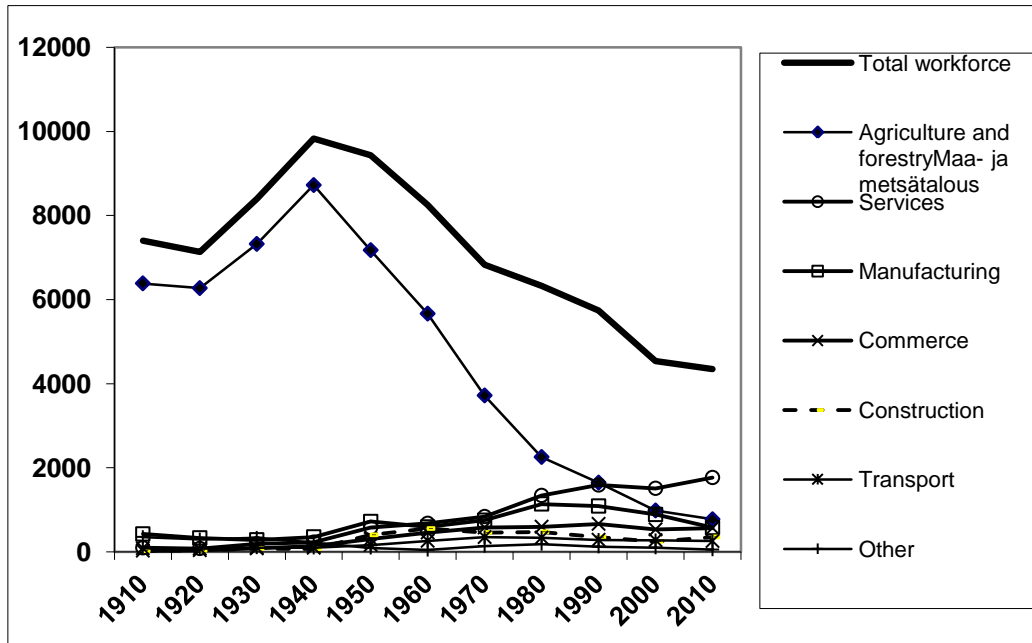
The reason for this increase was that as the population and employment figures had been decreasing nation-wide without much hope of the trend turning, new regional development policies were introduced at the national scale. These policies included industrialisation and broadening of the industrial basis in peripheral regions. Also semi-rural areas were sought to be industrialised through these measures. One instrument on a national scale was the



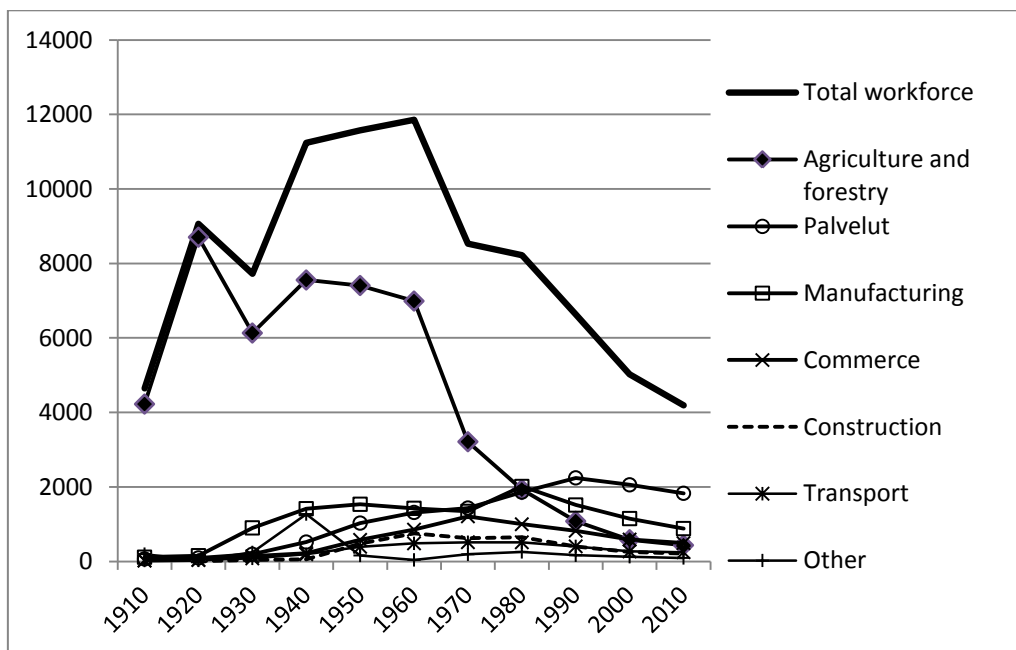
establishment of industrial estates. In our case study, this meant the introduction of entirely new branches of industrial production into the region. Importantly, it also meant that for the first time there was a separation of industrial production from local and regional natural resources (minerals and timber). Thus far, it had been first lake iron ore and, secondly, timber that had formed the basis for regional industries. In the early 1970s, industrial production started to be built on imported raw materials, such as rubber and fossil carbons. In our case, manufacturing of car tires, rubber boots and plastic products was started (Vuorenmaa 2003). One of the justifications for the industrial estate that was established was the industrial heritage and tradition already existent in the region (Vatanen 2010). In contrast, the other case study was left waiting for a decision for support for such an industrial development policy tool due to lack of sufficient industrial traditions. Thinking through the concept of resilience, we can argue that the parallel efforts of nation-scale politicians and governmental bureaucrats as well as actors at the local government and local developers succeeded in creating a situation in which the problems of the regional economy were reduced by introducing new industrial activities (see also Kotilainen et al. 2014). These activities, while containing significant new elements, were also built on the heritage of old industrial traditions dating back several decades. In this way, resilience in the sense of redirecting the regional economy through the reorganisation of its industrial base, can be argued to have been essentially present in this turn of the regional economy. However, there are some inherently problematic factors embedded in this resilient transition. While the new manufacturing industries did help in fighting the forest industrial decline in employment caused by industrial restructuring, on a long term the activities made the regional economy vulnerable to later problems brought by industrial restructuring and relocation a decade two two later, that were at that time unforeseen.

Another point of interest that the figures show is the growth of employment in the service sector. The growth that took place before the 1970s can be attributed to the needs of growing manufacturing and other industries and that pulled with them the growth of services. The reason for the growth in services in the 1970s is more unique in time. It was the nation-wide idea for the construction of a Nordic-style welfare state that led to this growth. There is a difference between the cases since the 1990s that calls for explanation. In one case study, the employment in services have continued to grow for the last two decades, whereas in the other one employment in services started to decline by the turn of the 1990s. The explanation should be sought for at least in the nation-wide economic recession that hit in the 1990s, with the changing position of the national economy within the global economy and factors such the dissolution of the Soviet Union and the resulting collapse of bilateral trade agreements. In the other case study, however, the regional service sector did not go down with this nation-scale recession. The reason can be attributed to the simultaneous growth of the local tourism industry. There are some peculiarities behind this development. A local tourism entertainment cluster was created that emerged around a greenfield skiing resort. The story shows the power of contingency, as it was much by chance that the local promoters of the idea started thinking of the hilly landscape as a skiing resort (Rimpiläinen & Pelkonen 2007). Later developments include a spa and a relatively large concentration of hotels and holiday home accommodations. Locational factors have likely impacted upon the relative success of this local tourism industry that is accessible via main roads at a tolerable distance. Hence, projecting these developments through the notion of resilience, in contrast to the other case

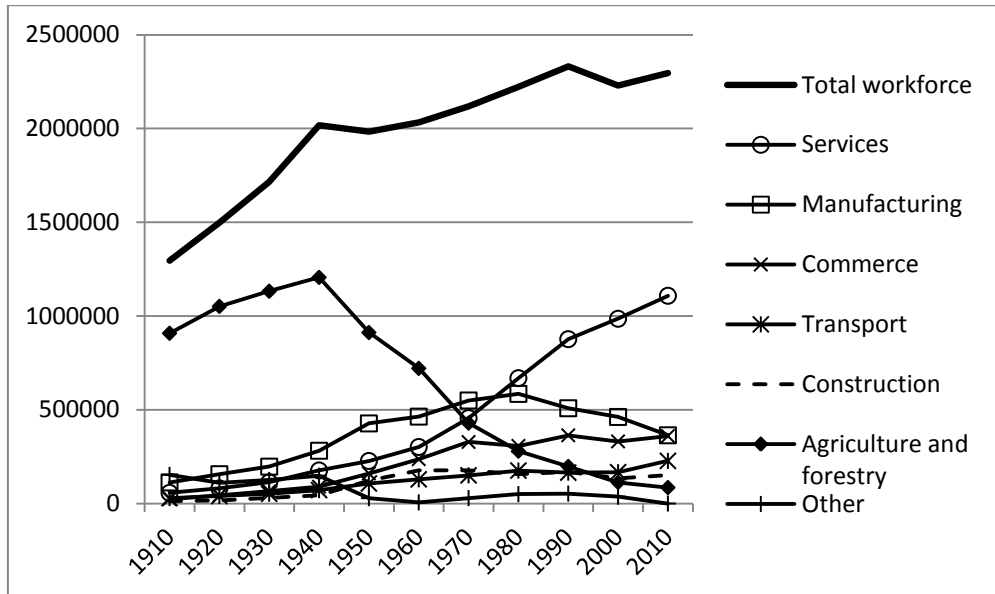
study with new manufacturing as a key to partially overcoming of the problems with industrial employment in the regional economy, in this case study the resilience in the sense of adapting the regional economy to respond to declining employment in the primary sector, succeeded in introducing a more novel solution, tourism industry, to the problems of the regional economy.



**Figure 7.** The structure of employment according to different industries in the Juankoski-Nilsia case study 1910-2010 (data source: Statistics Finland).



**Figure 8.** The structure of employment according to different industries in the Lieksa case study 1910-2010 (data source: Statistics Finland).



**Figure 9.** The structure of employment according to different industries in Finland 1910-2010 (data source: Statistics Finland).

## Discussion

We can learn several lessons from these case descriptions for the resilience debate. First, it was the interaction of several scales of decision making and action that led to the utilisation of capacity to adapt to world-scale economic change. From the regional employment perspective, it was decisive that there were national scale governmental policies for the further industrialisation of the periphery. These were only able to operate, however, in conjunction with the local scale governmental activities, and, importantly, decisions in the headquarters of industrial firms. The latter was made easier by the fact that industrialisation was for decades seen as a goal for nation-wide modernisation, and many companies were seen and even saw themselves as engines of this development. The state was also an important owner of many industries exploiting natural resources available in the country (timber, minerals) and manufacturing products of various degrees of processing.

Second, the knowledge and traditions available were important factors having an impact on the decisions that led to further industrialisation. Third, work-force has a dual function in these processes. On the one hand, due to regional development policies, the unemployed population has been the primary reason for the support that has been targeted to the region from the national scale government and its regional development organisations. On the other hand, it has been a resource and attraction for the industries to locate in the case study regions.

The figures illustrate the existence of regional economic resilience as the new industrial employment helped counter the decline in other sectors and industries. It appears that there has been resilience in the form of ability to transform the regional economy in the face of

economic disruptions and shocks. This has occurred at intervals of about a decade. On a long term, however, things look different. The solutions for employment have not turned out to be very long lasting. Investments in production that specialise in products manufactured of imported raw-materials, have made it easy for the firms to relocate their activities.

As to the question of whether there have been conscious decisions to adapt, the answer may be that it has rather been reactions to already existing pressures that have led to changes in regional industrial and economic structures through political decisions. There is not much evidence that there would have been political decisions aiming at creating capacities for future adaptations.

The observation that in one of the case studies we can see change that led to considerable increase in services while in the other not, calls for explanation. In one case study, there have been two competing lines of regional economy, one based on tourism and the other on manufacturing. It was considered by the active figures in local government development organs that both could not be invested in at the same time, and a choice should be made between these. In both there were regional traditions. The choice was made on the benefit of manufacturing and importation of raw-materials for the purpose of diversifying regional production. In retrospect, we could doubt the long-term sensibility of this decision, as the manufacturing industry turned out not to bring with it decades long employment. In the other case study, there was a similar choice to be made, but as there was lack of industrial tradition, the national scale governmental industrialisation policies did not reach this region. Instead, and as a result, the local development targets were set on tourism, which undoubtedly was a risky choice but has turned out to be quite lasting up until today.

## **Conclusions**

In the case study regions, the size of population peaked in the mid-20<sup>th</sup> century, after which it has decreased continuously with slight changes in the rate of decrease. Regarding the local economies, on the other hand, there has been a pattern in which the rise and fall of an economic sector as measured by employment has been followed by the rise and fall of another economic sector. These economic sectors include agriculture, the mining industry, industrial forestry, manufacturing, as well as public and private services. Therefore, focussing on population, it seems to turn out that the regions have suffered from continuous lack of resilience; however, focussing on employment, it can be concluded that the regions have been resilient due to their ability to recover, several times, from economic disruptions caused by the development of less labour-intensive technologies and transformations in the global economy and spatial division of labour.

It can be concluded that national scale regional development policies have had an effect on local employment, i.e. they have contributed to regional resilience, as long as the policy measures have been active. Once the active measures have ceased to exist due to political changes on the national scale, the employment effect has started to decrease as well. The effectiveness of regional development policies has therefore been very temporary, and in

reality the national-scale regional development policies have not been able to create capacities for adaptation in the local economy.

Focussing on the extraction of natural resources reveals that the regions have switched from utilising one resource to another after it has turned out difficult to maintain the existing livelihoods and industries. During decades, the ecosystems and physical environments providing the resources have been modified to meet the needs of the local economy. However, if there are changes in the economy on a larger scale, while the social-economic sphere might be able to adjust, it may take a much longer time for an ecological/environmental system to change into a new path, in effect hindering the capacity of the social-ecological system as a whole to adapt. An overall regional resilience, therefore, would consist in the spatially manifested parts of ecosystem/environmental resilience, sustainability in natural resource utilisation, resilience in industrial development, and resilient population change, each of these different levels of regional resilience also having impact on one another.

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