Jari Hautamäki & Minna Vesasto (Eds.)

Proactive Approach to Structural Change

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Jari Hautamäki & Minna Vesasto (Eds.)

Proactive Approach to Structural Change

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Preface

The Proactive Approach to Structural Change (ENNE) project has studied regional preparation for the impacts of sudden structural changes. From the point of view of regions, this preparation is a question of renewal as regards the economic, employment, education and innovation policies, decreasing the sensitivity and vulnerability of regions for the negative impacts caused by sudden structural changes. Using the Lahti region in Finland as a case study for the preparation, the project has developed a good practice which is potentially applicable in the regions at the European level. The good practice is based on methods typical of futures studies for the identification of potential future risks and the recognition of strategic key factors preventing the realisation of the risks. This publication introduces the identification process of the risks as a good practice, in addition to highlighting various aspects critical for the renewal of regions.

The Finnish regions have faced and experienced the impacts of sudden structural changes, but the earlier research exploring long-term preparation for sudden structural changes has been scant. Consequently, the project has built a conceptual framework for the various processes related to preparation and utilised underpinning studies and research of regional science conducted in Europe as the basis of the development work. For the description of the preparation for sudden structural changes, a scientific approach was adopted in this publication to provide a comprehensive overview of the phenomena related to structural change, these having features that are rapid, unexpected and somewhat fuzzy. Further implementation of the development work of regional preparation can be continued at national and international level on the basis of this publication. From this point of reference, the publication was written for the dissemination of the results and outcome of the project and it is intended for the use of experts and management of economic, employment, education and innovation sectors, participating in regional research, development and innovation activities.

In addition to the identification process, the publication explores and discusses, inter alia, future risks, the significance of innovation activities and international business, the potential and opportunities of regional networks and clusters as well as the challenges in the development of skills and competences. In the project, the lock-in of regional collaboration was discovered as the primary risk and the renewal of collaborative leadership as the key factor preventing the realisation of this risk. Therefore, the publication presents perspectives and insight related to shared leadership and the development of regional collaboration.

Acknowledgements: We would like to express our sincere gratitude to the organisations financing the development work, in addition to our national and international partners for their engagement and contribution to the creation of the good practice and the conceptualisation of the phenomenon of preparation for sudden structural changes.

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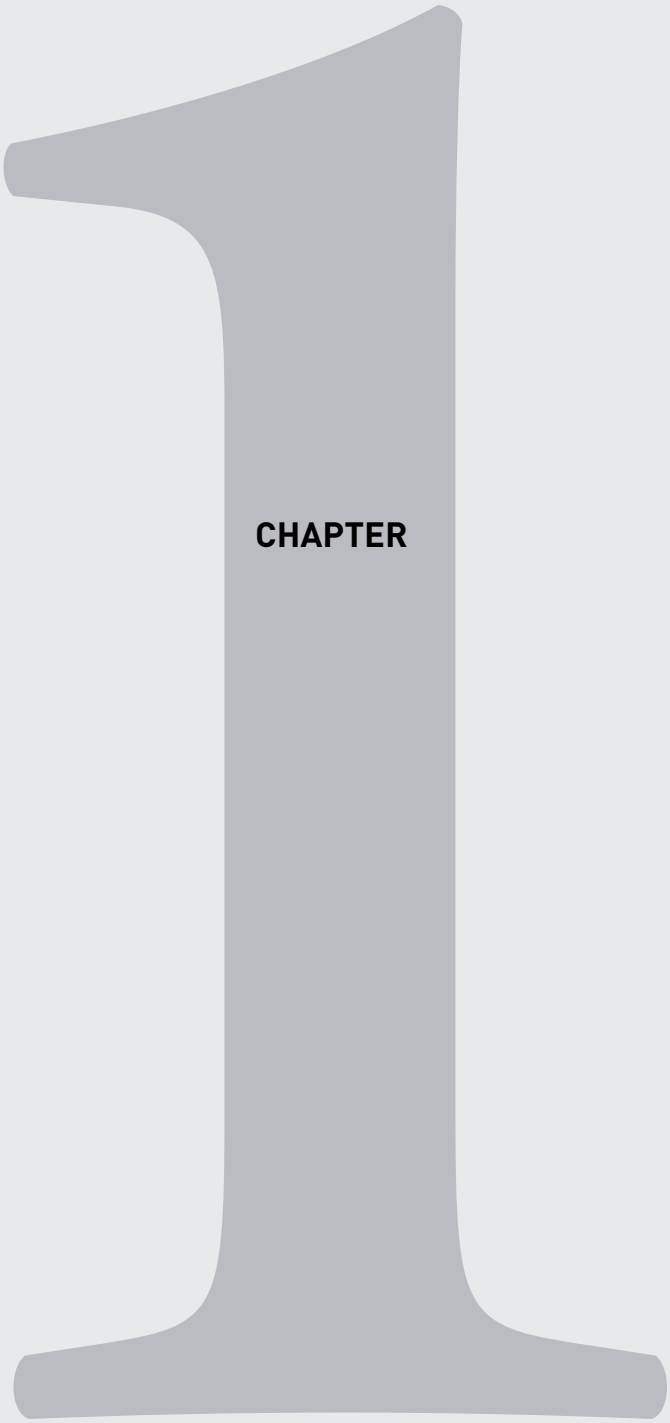
Table of contents


CHAPTER

Jari Hautamäki & Minna Vesasto

Introduction to the publication

Introduction

Globalisation and changes in production structures may pose unexpected, sudden and extensive threats to regional development, especially when an industrial or a public sector cuts down on jobs in the region or shuts down a production unit entirely. With sudden structural changes, difficulties usually arise in terms of employment, production and economic structure. Citizens are often faced with unemployment and social problems. The current financial crisis and crisis of the real economy have generated quite a wave of structural changes in Europe. At the same time, they have become more difficult to deal with. If the changes are extensive in relation to the urban structure, interventions by the state and regional actors are required. (cf. Martin, 2012; Chapter 2.)

Finland faced an extremely severe structural change in the early 1990's. Trade with Russia came to a halt during the already downward economic trend, which resulted in an almost complete collapse of the clothing industry for instance, and caused very severe problems to other industrial branches. It also resulted in a sharp fall in the value of citizens' real assets. The consequences of the sudden structural change were particularly grave in the Lahti region. The unemployment rate in the region rose to almost 30% and its effects still show in the region in the form of a high unemployment rate and an unusually high level of social exclusion. After 2007, a number of sudden structural changes have again taken place in the Finnish regions (cf. Chapter 2).

Maintaining national competitiveness calls for foresight planning of skills and competence to a greater extent in a way that takes note of the profiles of regions and the global development trends. The aim of foresight planning is to produce knowledge for the support of strategic planning and decisions. The essential thing is to bring together the key parties and the sources of futures information which have an essential role with the change, to create strategic visions, to make foresight plans and to develop regional capabilities in order to prepare for sudden structural changes. Foresight planning supports the creation of innovation initiatives and conditions for innovations at regional level. Collaborative foresight activities of various stakeholders are

a means to create a shared image of the future. (cf. Ministry of Employment and the Economy, 2012; Chapters 5 and 6.)

The objectives of the project

The overall goal of the Proactive Approach to Structural Change (ENNE) project is to increase European cooperation, skills and competence in employment, educational and economic policies. The main objective was to learn to identify regional long-term risks increasing sensitivity and vulnerability for the impacts of sudden structural changes (Chapter 4) and to learn to recognise those factors which will prevent the realisation of risks (Chapter 6). Moreover, the project has developed and applied long-term oriented foresight and analysis methods, typical of futures studies. The aim has been to create and disseminate a good practice referred to as the Regional Analysis Model (RAM) (Chapter 5). The project used Lahti region as a developmental case study and frame of reference. Tailored to the specific characteristics of the regions, the Regional Analysis Model (RAM) can be applied and used at national and European level. (Lahti University of Applied Sciences, 2010.)

The project used morphological futures work to elaborate the foresight information collected from the regional stakeholders as well as business clusters and education. In the process, the effects of change were examined and analysed in collaboration in order to build an undesirable scenario for the future of the region. The intensive participation of regional actors and businesses was one of the prerequisites and strengths of scenario working. Typically, by analysing both negative and positive impacts of the driving forces, the work groups were able to draw conclusions from different angles, such as future changes in skill needs, labour, business structures or the preconditions of economic policies (Figure 1; Chapter 5).

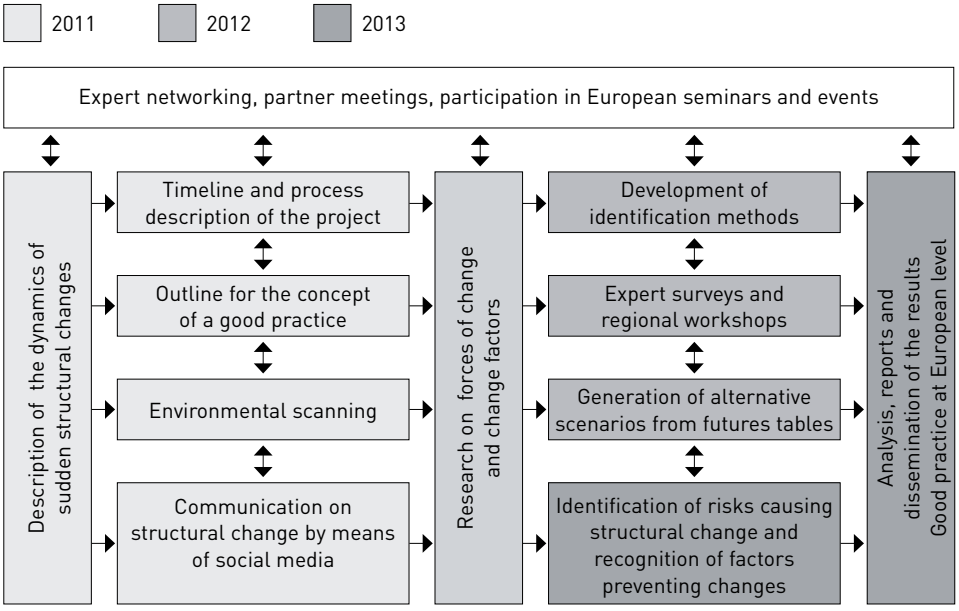


Figure 1. The progress of the project (Lahti University of Applied Sciences, 2010)

"PREPARATION ACTIVITIES ARE A CENTRAL MEDIUM IN THE DEVELOPMENT OF REGIONAL COMPETITIVENESS"

Partners involved in the development work

The main question of the project has been "How is it possible to prepare for sudden structural changes in the regions?" Priority 4 of the European Social Fund has targeted development measures on partnerships associated with the finding of a good practice and exchanging international experiences. The development work of the project has been financed by Centre for Economic Development, Transport and the Environment in Häme and Lahti Region Educational Consortium. The activities and measures have primarily been targeted on the Lahti region (Finland) by the administrative organisation Lahti University of Applied Sciences.

National partners of the project include Kymenlaakso University of Applied Sciences and Kotka-Hamina Regional Development Company Cursor Ltd in Kymenlaakso region (Finland); Kymenlaakso has been observed as a region suffering from sudden structural changes. As regards research on the nature of structural change from the angle of international business and cluster formation, the National University of Ireland Galway in County Galway (Ireland) has been our main partner. Torun Regional Development Agency in Kuyavia–Pomerania region (Poland) has been a partner to assess the possibilities of adopting the Regional Analysis Model (RAM) in the region as a good practice. (Lahti University of Applied Sciences, 2010.) In Finland, the key partners include the Ministry of Employment and the Economy with their experts of sudden structural changes. Furthermore, the representatives of regional stakeholders from Lahti and Kymenlaakso regions have participated in the main development measures.

During the implementation of the project measures, many phenomena and perspectives regarding preparation for sudden structural changes have been identified (Figure 2). Structural change is path-dependent as the structures of industries and workforce continually transform taking new shapes based on changes in the operational environment (cf. Boschma, 2004). It is also a question of a tension between localisation and globalisation as the changes in global environments often lead to sudden changes in local level industries (cf. Martin, 2012). Moreover, preparation and adaptation to sudden structural changes call for multilevel cooperation based on collaboration between the main stakeholders in the regions. Therefore cooperation structures and shared leadership are emphasised (cf. Sotarauta, 2007). A well-functioning innovation environment offers new kinds of methods for the creation of futures knowledge, identification of the risks and implementation of preventive measures through co-creation requiring knowledge absorption and social capital (cf. Kallio, Harmaakorpi & Pihkala, 2010).

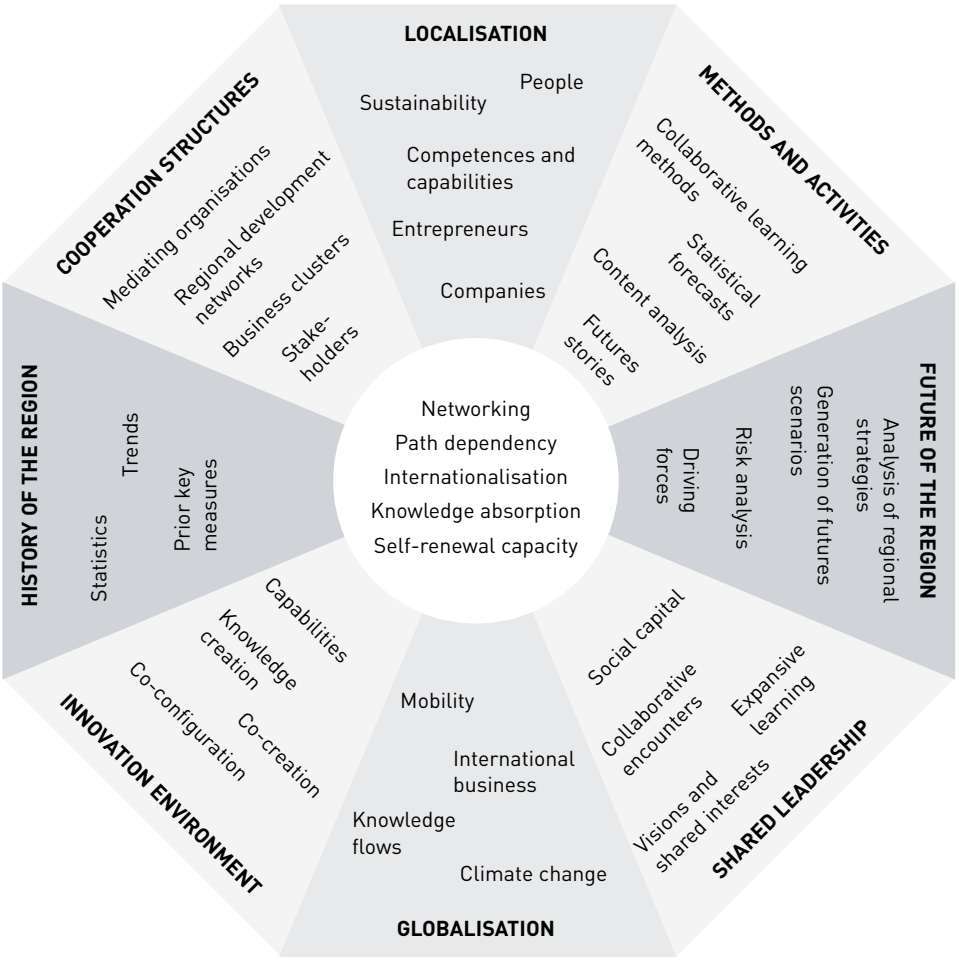


Figure 2. Phenomena and perspectives related to preparation for sudden structural changes

The content of the publication

The aim of this publication is to introduce and describe the main perspectives and practices related to the development and application of the good practice. The intention is that it could be used as a handbook for regional stakeholders. It was co-written in order to disseminate the Regional Analysis Model (RAM) based on applying methods typical of futures studies. The publication also enables regional stakeholders, companies and networks to assess the importance and nature of the regional risks and preventive factors. Moreover, the needs for the development of regions in general are discussed. The triggering entities of preparation for sudden structural changes are also enlightened in the publication.

Chapter 2 describes the role and measures of the Ministry of Employment and the Econo-

my in supporting regions to adapt to sudden structural changes in practice. Chapter 3 elaborates the nature of sudden structural changes and describes the practices and prerequisites of regional collaboration in general terms. The aim of chapters 2 and 3 is to create the big picture of sudden structural change and to portray the links to evolutionary change in the regions. Chapter 4 describes the features of a statistical indicator set estimating the sensitivity of a region to sudden structural changes. Chapter 5 presents the Regional Analysis Model (RAM) as a good practice in the preparation for sudden structural changes in the regions in Europe. Sensitivity, collaborative methods and methods typical of futures studies are presented as the core of preparation. In chapter 6, the main risks affecting the Lahti region and factors preventing the realisation of the risks are covered. Chapter 7 describes challenges of a regional innovation environment as regards preparation. Chapter 8 describes the significance of international business and local business clusters in Ireland, discussing their importance in the regions. Chapter 9 deals with the leadership of regional collaboration as regards the preparation for sudden structural changes. Chapter 10 creates a perspective on employee competences and educational challenges in the future and chapter 11 combines the main results of the chapters and aims to provide insight on how we can prepare for sudden structural changes in practice in the regions.

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CHAPTER

2

Ilkka Mella

Responding to sudden structural changes - The central government and regional perspectives

Introduction

An essential aspect of structural change is the continuous evolvement of the region's key resources, such as population, labour force, industries, economy and competence base. Geographical concentration of these resources has continued for decades, and it is expected to increase as a result of large age groups ("baby boomers") retiring. The numbers of the working age population and labour force will fall in this decade in nearly all Finnish regions, and only the largest urban centres can expect moderate growth. In addition, slow economic growth and increasing financial problems in the public sector are bound to weaken the regions' resources and accelerate structural change.

As resources become concentrated in major population centres, the age structure and economic structure of many of the more remote regions will become distorted. These regions and areas of smaller scale (such as sub-regions and municipalities) have a more specialised business structure, and they are dependent on a handful of companies and their supplier networks. Due to rapid changes in the global market and economy, the impacts of structural change on regions and smaller areas are often sudden and unprecedented, if a major corporation operating in the area and its network of suppliers are forced to cut their operations. In this sense, areas that have a specialised economic structure are the most sensitive, and they are not always capable of renewal. As a result, in many areas which have undergone structural change, the local authority has

"STRUCTURAL CHANGE IS A MULTI-FACETED PROCESS THAT IS CLOSELY LINKED TO REGIONAL DEVELOPMENT"

become the largest employer, and social and health care services are the only growing industry. Structural change is usually seen as a negative phenomenon, as affected areas lose businesses or labour force as a result of continuous negative net migration. Nevertheless, it is an integral part of regional economies and development and creates opportunities for renewal in the local economic and business structure.

In Finland, when businesses suddenly close down operations in an area with a weakened production structure, the government can designate the affected area as an area of a sudden structural change. In 2007–2012, the number of areas designated as areas of a sudden structural change was 28 of which 25 were subregions and 3 were individual municipalities. The total number of layoffs in these areas was close to 17,000. Four areas were re-designated, and eight areas were granted an extension. Moreover, the maritime industry was designated as a sector affected by sudden structural changes in 2010–2012. Cuts in production have been especially widespread in the forest industry, where the number of facilities closed down around the country in 2005–2012 was in double figures. Production capacity has decreased by one quarter. Besides the maritime industry, the ICT sector has also been designated as a sector affected by sudden structural changes. As global competition intensifies, the metal and mechanical engineering industries and the electrical engineering industry have also been forced to cut production. The cuts have usually affected areas which have relied on manufacturing industries; typically these are smaller towns and rural centres. However, in recent years, many larger urban centres, such as Oulu, Jyväskylä and Joensuu, have also become affected by structural changes.

Areas of sudden structural changes 2007–2012

The majority of areas affected by sudden structural changes are in Eastern and Northern Finland, but there are examples from across the country. The areas include provincial centres, smaller regional centres and rural centres. What is common for all of these areas is their dependence on a handful of large enterprises and public sector jobs and financing. Figures for business closures and cuts and the number of layoffs in areas of sudden structural changes as designated by the Finnish government are presented in Tables 1 and 2. In the paper and forest industry (Table 1), the number of layoffs totalled nearly 7,500 personnel. In addition to the forest industry, closures and job cuts have been implemented in the electronics industry, metal manufacturing, and component and equipment manufacturing industries. These industries are particularly sensitive to economic fluctuations and increased competition. As a result of job cuts at eight facilities, the number of layoffs is nearly 10,000. Furthermore, the number of layoffs across maritime companies and associated supplier companies was nearly 1,000.

As support measures are introduced and they become effective, the unemployment rate begins to fall in the following years and becomes more consistent with national unemployment trends. The recession in 2009 and the prolonged period of slow economic growth that followed have led to consistently high unem-

"IN AREAS OF A SUDDEN STRUCTURAL CHANGE, FACTORY CLOSURES AND LAYOFFS ARE FOLLOWED BY A SIGNIFICANT INCREASE IN THE UNEMPLOYMENT RATE"

ployment rates in many sub-regions, including Salo, Oulu, Varkaus and Raasepori. In 2006-2013, the greatest reductions in unemployment were seen in many sub-regions affected by high unemployment, including Itä-Lappi (Eastern Lapland), Kajaani, Keski-Karjala (Central Karelia), Nivala-Haapajärvi and Keuruu. It should be noted that the size of the labour force in these areas has decreased due to the ageing population, which is expected to reduce the number of unemployed as people retire (cf. Järvinen & Hautamäki, 2013; Chapter 4).

Table 1. Areas affected by sudden structural change 2007 – 2012 (paper and forest industry)

SUB-REGIONAL UNIT	PERIOD	NUMBER OF LAYOFFS
Jämsä sub-region UPM-Kymmene Oyj paper mill Smead Paperisto Oy paper products	2007 – 2008	349
Keuruu sub-region UPM-Kymmene Oyj wood processing facility Puhos Board Oy fibreboard factory Relicomp Oy cable factory	2007 – 2008	168
Lappeenranta sub-region UPM-Kymmene Oyj paper mill	2007 – 2008	350
Etelä-Pirkanmaa sub-region UPM-Kymmene Oyj paper mill and pulp mill Kuitu Finland Oy viscose fibre production	2007 – 2009	745
Kouvola sub-region UPM-Kymmene Oyj, Voikkaa paper mill Stora Enso Oyj paper mill	2007 – 2009	848
Itä-Lappi sub-region Stora Enso Oyj pulp mill	2008 – 2009	215
Imatra sub-region Stora Enso Oyj, Imatra mills	2008 – 2010	250
Keski-Karjala sub-region mechanical wood products industry, several companies	2008 – 2013	329
Koillis-Savo sub-region Stromsdal Oyj cardboard factory	2008 – 2010	204
Kaskinen sub-region Metsä-Botnia Oyj pulp mill + suppliers	2009 – 2010	223

Table 1. (continues)

Table 1. (continued) Areas affected by sudden structural change 2007 – 2012 (paper and forest industry)

SUB-REGIONAL UNIT	PERIOD	NUMBER OF LAYOFFS
Kotka-Hamina sub-region Stora Enso Oyj, the Summa paper mill Sunila pulp mill	2008 – 2011	770
Nivala-Haapajärvi sub-region **Siikalatva sub-region** Incap Furniture Oy furniture factory + suppliers	2009 – 2011	323
Varkaus sub-region Stora Enso Oyj paper mills Enics electronics factory	2008 – 2011	373
Heinola sub-region Karelia Parketti parquet flooring factory and several wood processing companies UPM-Kymmene Oyj plywood mill Reumansairaala hospital	2008 – 2011	497
Kajaani sub-region UPM-Kymmene Oyj paper mill Incap Oyj electronics factory, Kajaani	2008 – 2011	665
Kouvola sub-region UPM-Kymmene Oyj paper mills Stora Enso Oyj paper and board mills Myllykoski Paper Oyj paper mill + forestry product suppliers	2011 – 2012	658
Ylä-Pirkanmaa sub-region Metsä Tissue Oy household paper factory Visuvesi Oy plywood mill Visuvesi sawmill	2011 – 2012	297
Äänekoski sub-region M-Real paper mill and supplier network	2011 – 2014	210

Table 2. Areas affected by sudden structural change 2007 – 2011 (other industries)

SUB-REGIONAL UNIT	PERIOD	NUMBER OF LAYOFFS
Joensuu sub-region Perlos Oyj, plastic covers for Nokia mobile phones	2007 – 2008	1,650
Vakka-Suomi sub-region Valmet Automotive Oy car plant	2007 – 2008	260
Saarijärvi-Viitasaari sub-region Efore Oyj + suppliers, electronics factory	2007 – 2008	157
Forssa sub-region Helkama Forste Oy refrigeration appliances Finlayson Forssa Oy textile factory Novart Oy kitchen furniture factory	2008 – 2009	506
Salo sub-region Nokia Oyj mobile phone manufacturing + supplier network	2009 – 2011	1,975
Karkkila sub-region Moventas Santasalo Oy, industrial gears	2012 – 2014	170
Oulu sub-region Nokia, Nokia Siemens Network, Accenture, suppliers ICT	2012 – 2014	3,750
Raasepori sub-region FNSteel metal factory	2012 – 2014	390
Kemiönsaari sub-region FNSteel metal factory	2012 – 2014	260

Action model and support measures for sudden structural change

The Ministry of Employment and the Economy has drawn up an action model for responding to sudden structural changes, which provides immediate measures to be taken after major job cuts. The ministry has established a response group consisting of representatives from different ministries, which coordinates the introduction of the measures and reports to the government on the progress. The local Centre for Economy, Transport and the Environment organises a regional working group on structural change, which also includes representatives from local authorities, businesses, the Employment and Economic Development Office, regional economic development companies and employee organisations. If necessary, the government can designate the locality as an area of a sudden structural change and allocate the necessary funding for special measures aimed at creating replacement jobs over a period of 2 – 3 years. To date, extensions have been granted only in circumstances where the area has undergone a second large-scale structural change.

"AN INTER-MINISTERIAL RESPONSE GROUP IS ESTABLISHED TO COORDINATE THE INTRODUCTION OF IMMEDIATE MEASURES IN THE AREA OF A SUDDEN STRUCTURAL CHANGE"

The following criteria and assessments have been used in designating the status of an area of a sudden structural change: (1) the number of job losses is substantial and there are major impacts on the supply chain, (2) the reduction in the number of jobs is at least 1.5% of the total number of jobs in the area, (3) an assessment of the potential increase in unemployment rate if all laid-off personnel were to remain unemployed, (4) an assessment of the possibilities of renewing the local production structure and creating new jobs, and (5) an assessment of the duration of the problems caused by sudden structural changes in the area. The assessments take into account the national economic situation instead of responding to layoffs caused by economic fluctuation alone, even if the volume of layoffs is significant. The government programme emphasises proactive management of structural change, which means that multiplicative effects that lead to immediate job losses in the area can be taken into account when assessing whether the area qualifies for the designation.

The action model for responding to sudden structural changes has been developed since 2006 after the closure of the Voikkaa paper mill in Kuusankoski. From the start, the objective was to facilitate fast response and flexible cooperation between different parties, both in central government and at the local level. The principles of the model are the same for all cases of sudden structural changes, but the response measures can vary depending on the resources of the company or area in question. In some cases, the business that is closing down operations or cutting jobs in the area has played a significant role in the management of the structural change. One example is the Kajaani sub-region, where in 2008, after closing its paper mill, UPM launched a new company in its former factory facility for new business projects. In 2009, the Ministry of Employment and the Economy together with Stora Enso introduced a new procedure, which emphasises proactive management of structural change. The idea is to initiate response measures even before the company has finalised its decisions on layoffs. The aim is to encourage the set-up of new businesses in the vacant factory facility as soon as possible. The proactive action model is being developed further based on positive experiences of the procedure to date.

Financial support for areas of sudden structural change

When the government designates an area the status of an area of a sudden structural change, it can be granted funding from a number of different sources. To date, funding has been granted from appropriations allocated for business investment and development initiatives and through employment-based investment appropriations, the reserve component of structural funds, and the European Globalisation Adjustment Fund (EFG). Finnvera plc has contributed with guarantees and loans. In addition, change security, start-up grants and wage subsidies for solo entrepreneurs have been used in areas of sudden structur-

"RAPID AND CONCRETE ECONOMIC, EMPLOYMENT, EDUCATION AND INNOVATION MEASURES ARE TARGETED AT THE AREAS OF A SUDDEN STRUCTURAL CHANGE"

al changes. The Finnish Industry Investment Ltd has also made investments in businesses in these areas. Areas of sudden structural change have been supported in many different ways in recent years. The measures include direct business grants, business environment development aid, other projects, loans and guarantees. Different types of training measures and labour market initiatives have been organised for employees. These include change security and other labour market measures from various sources and projects. Different initiatives are aimed at helping laid-off individuals find new jobs or new careers. From the regional perspective, it is important to leverage the resources and human capital that become available in the area. Workers who leave the area as a result of a sudden structural change can become an irrecoverable loss.

Direct aid allocated to areas of sudden structural changes in 2007 – 2012 totalled approximately €250 million. Geographically, the majority of this aid was granted to areas in Southeast Finland, a total of €50 million. The next two most significant sub-regions that received aid were Pohjois-Karjala (North Karelia) and Pohjois-Savo (North Savonia). The most important sources of funding were the European structural funds and business grants, which provided a total of €150 million of appropriations to regional Centres of Economy, Transport and the Environment. In addition, in 2011, the maritime industry received aid, the majority of which was allocated to the region of Southwest Finland. The Joensuu sub-region received aid from the European Globalisation Adjustment Fund (EFG) for the aftercare and follow-up of, inter alia, the Perlos factory closure. The Salo sub-region received similar funding after the cuts implemented by Nokia in its operations in the area. In addition, the change security procedure was actively utilised in areas of sudden structural change. In 2007 – 2012, direct aid for businesses totalled nearly €100 million, which generated 4,100 new jobs in 800 businesses and an €850 million increase in turnover.

Developement of the action model for responding to sudden structural change

The model for responding to sudden structural changes is being developed in order to make it more proactive by strengthening cooperation between different governmental departments and local actors and by increasing the use of different risk analysis methods in the areas. A matrix-oriented model that is based on cooperation between public administration and the private sector has proved effective in different situations. A good example of this is the Kajaani sub-region where, after the closure of its factory, UPM actively participated in the renewal of its factory area with local actors. The number of new jobs created in the factory area was 535 - the same as the number of people laid off from the paper mill. The management of structural changes that have already taken place needs to be supported with measures to promote a type of structural change that generates new growth. The action model is being prepared based on experiences from local best

practices in responding to sudden structural change and from the management of structural change in the maritime industry and the ICT sector in particular.

Plans for preparation will be initiated as part of regional and economic policies. Analyses are carried out to identify localities and sectors where structural development that generates new growth has come to a halt. Plans can be drawn up either by region and sector or by cluster. A new action model will be designed for this purpose. Key aspects include the continuous renewal of areas and sectors and the diversification of the economic structure. Regional economic development companies are increasingly more focused on concrete activities and piloting. This facilitates the testing of new solutions and business ideas in the early planning stage and rapid elimination of ineffective development ideas. Funding for pilot projects and other forms of financing will be targeted to promote proactive renewal in cooperation with businesses. The commitment of businesses to the management of sudden structural changes will be enhanced by developing proactive cooperation measures and joint financing methods and funds. Fund models will be developed in a way that ensures that both businesses and public bodies can be involved in the same funds. Administrative agencies (Tekes, Finnvera plc, Finnish Industry Investment Ltd, Finpro) of the Ministry of Employment and the Economy will be more closely involved in the management of sudden structural changes through the allocation of existing resources. What is essential is that the model for responding to sudden structural changes is only used to intervene in substantial structural changes that have notable impacts, in both regional and sectoral terms.

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CHAPTER

3

Jari Hautamäki

Regional proactive collaboration in the preparation for sudden structural changes

Introduction

Increasing structural changes have a major impact on the population, labour force, industries, economy and competence in a number of European regions. A reduction in the working-aged population will be evident almost everywhere in the next decades, transforming the provision and availability of the labour force, regional economic prerequisites, growth prospects for sectors and businesses, and public finances. Continuing migration to growth centres may significantly decrease the variety of age and business structure in a number of regions.

According to Martin (2012), it is regions like these that are sensitive to rapid changes resulting from global market and economic fluctuations. Changes may force local businesses to abruptly limit operations or implement significant staff cuts. The impact of the shock from a sudden structural change may slow down and weaken regional development permanently. In the best case, regions are capable of self-renewal and utilise the resources in the region more efficiently. The occurrence of a sudden structural change in a certain location is difficult to foresee. As the impact of the shock depends on regional adaptive capacity, long-term planning for sudden structural changes should focus on the way the region is able to resist and recover from the impacts of the shock as well as redirect the released resources (Martin, 2012). After a shock, retraining and employing labour force pose major regional challenges that can be considerably expensive and exhausting.

"REGIONAL AUTHORITIES, BUSINESSES, EDUCATION AND RESEARCH SHOULD PREPARE FOR SUDDEN STRUCTURAL CHANGES THROUGH PREVENTIVE COLLABORATION"

Preparation transforming the nature of regional foresight

The nature of regional foresight is becoming increasingly comprehensive. As collaboration is enhanced, foresight can be examined from diverse perspectives. On the one hand, an evolutionary approach is increasingly evident in regional development (cf. Sotarauta & Srinivas, 2006; Boschma & Martin, 2007), whereby, in order to outline new development paths, regional stakeholders analyse the region's recent history, create shared future outlooks, and assess whether to diverge from past development history and how existing, diminishing resources should be redirected. It is a question of a proactive approach, whereby changes in the operating environment cannot be predicted, but they can be anticipated through foresight planning in the regions and investing in preventive measures (cf. Hamel, 2000, 119).

At the same time, preparation becomes a natural part of regional strategic decision-making and planning. Regions often feature strategies, programmes and plans created by a multitude of operators and networks, sometimes dealing with the same issue but using different or new concepts, terminology and perspectives. As a result, finding shared views and meanings based on the dialogue related to regional foresight collaboration may be difficult. As the discourse is sometimes fuzzy (cf. Markusen, 2003), creating a shared future outlook requires leaders and experts to intensify collaboration, interaction and reflection on various alternatives. Preparation is a question of "exploration" (cf. Sotarauta & Srinivas, 2006), which involves regional stakeholders to create strategic meanings, success factors, shared visions and development paths for a region's future.

Preparation to sudden structural changes

According to Martin (2012) there are four dimensions of regional resilience which typify together the adaption of a region to sudden structural changes. First, the regional resistance capacity (Martin, 2012) embodies sensitivity of a regional economy for disturbances like recessions. Secondly, the regional recovery capacity demonstrates speed and degree of recovery of a regional economy from a recessionary shock (Martin, 2012). Thirdly the region's re-orientation capacity concerns the extent to which the regional economy undergoes structural re-orientation and what implications such re-orientation has. The fourth dimension, the regional renewal capacity (Martin, 2012), characterises the extent to which the regional economy renews its growth path before and after a sudden structural change.

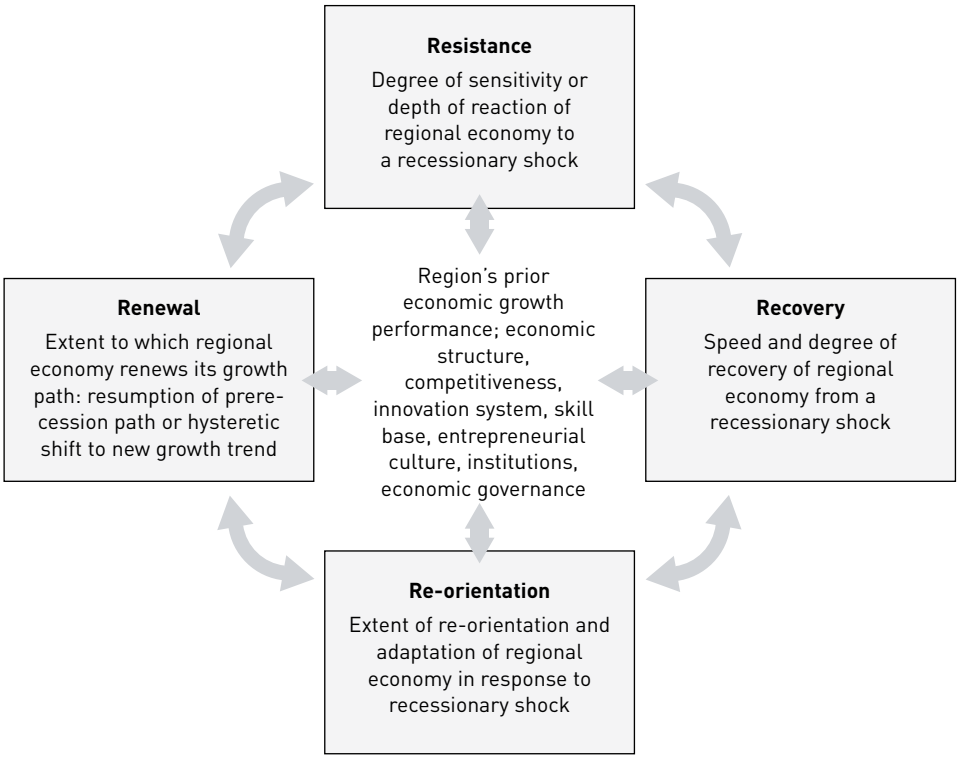

Figure 1. Four dimensions of regional economic resilience to a recessionary shock (Martin, 2012, 12)

The dimensions form an entity which can be used on the background of targeting the regional measures in preparing for sudden structural changes. As employment and consumer markets are strongly shaped by international business activities, regional competitiveness needs to be promoted by focusing on collaboration among businesses, education and research. The aim is to foster the creation of competitive capabilities in companies and to improve the well-being and competences of workforce. Generally, it is relevant to promote the economic activities of local industries in the region (Martin, 2012). This can be accomplished by consciously increasing cluster-like relationships and interdependence of companies. Moreover, this will enhance the renewal and diversification of a narrow base of business structure in the region (Martin, 2012). In practice, this means increasing the number of entrepreneurs and growth companies that operate in an international market and provide regional employment.

Growth companies must be supported through functional infrastructure (e.g. transport connections, business incubators), funding and innovation environments, which allow the companies to make use of other regional resources, boost product and service development and ensure the availability of competent workforce. Moreover, the functionality of the labour market needs to be enhanced in the region. That means investments for the improvement of the competences of workforce and preparedness to mobility regionally and nationally. (cf. Martin,

"AS FORESIGHT TRANSFORMS INTO PREPARATION, IT BECOMES INTEGRATED INTO THE ACTIVITIES OF THE REGIONAL INNOVATION ENVIRONMENT"

2012.) Martin (2012) highlights also the improvement of the region's potential to undergo thorough reforms. Reforms may be targeted at e.g. the development of the innovation environment with a focus on new, promising industries, infrastructure investments to boost business activities, and promotion of knowledge services.

Nature of development work

Development is influenced by the nature of preparation. In line with its evolutionary character, regional knowledge must be generated in three different ways to support preparation. Firstly, knowledge is required on the region's long and medium term development history. This knowledge forms a scenario-oriented, historical development path illustrating the direction and content of previous development especially in (1) changes affecting population and the workforce, (2) development of business life and the underlying infrastructure, (3) enhanced regional competence and innovation structures, and (4) the formation of regional collaboration. This knowledge should be supplemented with analyses of previous, similar sudden structural changes in other regions.

Secondly, preparation should be supported by knowledge of alternative regional scenarios. From the perspective of preparing for sudden structural changes, development should be based on strategic knowledge on (1) regional driving forces, (2) positive and negative impacts resulting from these forces, and (3) risks resulting from these impacts, in addition to factors preventing their realisation. Future-oriented work of this type can be implemented as a presentation of e.g. alternative regional scenarios (see Chapters 6 and 11).

Thirdly, preparation needs to be underpinned by statistical information, transformed into easily interpreted indicators that can determine a region's sensitivity to the effects of sudden structural changes. Related indicators are created by combining key foresight knowledge on structural change. These types of forecasts are readily available on a national level, but require refinement of indicators with differing regional perspectives. Refinement is carried out by assessment of indicators using alternative scenarios or statistics and descriptions on regional development history (see Chapter 4).

Collaboration processes for regional preparation

Foresight work related to preparation can be integrated into the wider development of the regional strategy (1) through collaboration among regional authorities and stakeholders, (2) by considering the foresight results in the formulation of regional strategic goals, and (3) by compiling foresight, diverse methods and forecasts into a regional preparation model. Collaboration aims to increase regional self-renewal capacity (Sotarauta, 2005a) by using existing knowledge, combining new knowledge to existing knowledge, steering the process in the desired direction, and consciously searching for new regional solutions to improve preparation capacity. Increasing self-

"IN THE FUTURE, THE ECONOMY MAY NOT BE ABLE TO ABSORB THE COSTS OF RESPONDING TO THE INCREASING NEGATIVE IMPACTS OF SUDDEN STRUCTURAL CHANGES IN THE REGIONS. MORE APPROPRITATELY, POLICIES SHOULD BE GEARED TOWARDS PROACTIVE PREPARATION."

renewal capacity and preparation for sudden structural changes demand new forms of network collaboration. This requires collaboration between businesses and regional stakeholders in (1) generating foresight knowledge related to preparation, (2) identifying key factors for the region's future, and (3) embedding factors fostering preparation in the creation of strategic plans. Successful collaboration is based on regional learning (Morgan, 1997), which takes place in all the afore-mentioned collaboration forms and processes (see Chapter 5; Chapter 9).

Foresight knowledge is often in the form of tacit knowledge, which leaders and experts render visible during their mutual creation process of regional futures knowledge (cf. Nonaka, Toyama & Konno, 2000). Usually foresight knowledge that has been made visible includes contradictions. Thus, identification of knowledge and factors that are most vital for a region requires collective learning, which is often characterised by co-configuration based on expansive learning (e.g. Engeström, 2001). The creation and refinement of new strategic plans, solutions and regional services to support preparation usually occurs in processes that display typical features of co-creation and service design (e.g. Sanders & Simons, 2009). A well-maintained, continuous cyclical process of creating knowledge, learning and new solutions generates increasingly concrete and refined solutions for the region.

Skilled leaders are able to strengthen the said processes through interaction, participation and relevant discussion. Interaction must be long-term and continuous, as changes in the operating environment constantly transform mutual dependency among stakeholders, which in turn changes the content and character of shared interests. The most experienced leaders and experts understand the character of the individual elements within the preparation process, and are able to support development cycles through management actions at the right time and in the right place. These management actions usually empower leaders and experts, accelerating and strengthening the preparation process (cf. Doz & Baburoglu, 2000; Chapter 9).

Summary

The share of the working-aged population will diminish in almost all regions in the next few decades, which may result in limited regional business prospects. Moreover, global market disturbances are on the rise, which can increase the regions' sensitivity to sudden structural changes. Foreseeing the changes is difficult, yet the regions must be prepared. Preparation must pay attention to the region's past development history as well as the future driving forces and related risks. Preparation can also be supported by an analysis of collective views obtained on the basis of specific statistical forecasts.

Collaboration encompasses businesses and regional stakeholders searching for a shared view on the desired development path, which can be found by understanding the mutual dependency among stakeholders and reconciling diverse interests. This process needs to be supported by new regional knowledge resulting from collaboration, identification of the key factors for regional development, and new solutions in the preparation for sudden structural changes. The key success factors of diverse regional collaboration include successful regional leadership and solid social capital.

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CHAPTER

4

Jari Järvinen, Jari Hautamäki & Minna Vesasto

Regional sensitivity to sudden structural changes

Introduction

The Proactive Approach to Structural Change (ENNE) project has worked in partnership with Foredata Ltd to examine the long-term sensitivity of Finnish regions to sudden structural changes and their negative impacts. In this chapter, sensitivity is examined based on the concept of resilience - that is to say, the regions' adaptive capacity or ability to absorb shocks (Gallopín, 2006; Reggiani, Graff & Nijkamp, 2002). According to Martin (2012), the concept of resilience can be applied when assessing regions' capacity to resist, recover, reorientate and renew in the face of regional economic shocks. As sudden structural changes have long-term effects on a region's economic growth, economic resilience is increasingly important. The results of the sensitivity indicators compiled by Foredata Ltd can be used in regional discussions to analyse how the regions differ from one another in terms of their capacity to adapt to sudden structural changes and how individual regions can influence their long-term growth by preventing the impacts of shocks.

Content of the sensitivity indicators

The set of sensitivity indicators was formulated based on the approach proposed by Martin (2012) by combining statistical data that are freely available from Finnish online sources. The method facilitates flexible repeatability of measurements and offers a broad view of the regions' capacity to adapt to and prepare for sudden structural changes. The data are from 2011, and the trends were examined from 2007 onwards. In the sensitivity indicators, the regions are subjected to statistical comparison. Each region is given a ranking from 1-18 for each of the eight indicators, and the average score is calculated as an overall indicator of the region's resilience.

The economic structure is described using statistical data on the regions' industrial structure and the number of public sector jobs. The rationale for the inclusion of the industrial structure in the analysis is the assumption that a diverse economic structure reduces the risk of a sudden structural change. This means that ad-

"THE SET OF SENSITIVITY INDICATORS IS DIVIDED INTO FOUR THEMES: ECONOMIC STRUCTURE, LABOUR FORCE, BUSINESS SECTOR AND INNOVATION"

versity in an individual industry will not necessarily cause a regional economic shock. The diversity of the industrial structure is measured using the Hirschman-Herfindahl Index (HHI) (Palan, 2010). A relatively high number of public sector jobs in a region is assumed to be a resilience-reducing factor, as sudden structural changes are increasingly caused by structural changes in public administration. In addition, the creation of new jobs, which boosts recovery from a sudden structural change, is less likely to happen in the public sector.

A higher education level among the labour force is assumed to increase a region's long-term resilience, as recovery from a sudden structural change and the re-orientation of the redundant human resources to other sectors become much easier if the education level is high. This is generally down to a skilled labour force's ability to start new businesses and attract investment to the region, which helps create new jobs and boost recovery. The VKTM Index of Statistics Finland was used as the education level indicator. The VKTM Index calculates the education level of a region's population by taking into account the highest educational attainment of all inhabitants over 15 years of age. Conversely, high unemployment rate is assumed to reduce a region's resilience, as long-term high unemployment deters businesses from making new investments and, on the other hand, the level of skills and competence and the working capacity are reduced during long periods of unemployment.

The rationale for the inclusion of the business sector in the set of indicators is based on the dynamic nature, flexibility and adaptive capacity of SMEs. A proportionally high number of small enterprises (businesses with fewer than 50 employees) is assumed to promote continuous, long-term structural change and renewal, which prevents regions from gradually heading towards inevitable regional economic shocks. Furthermore, when a sudden structural change does take place, a dynamic business sector with adaptive capacity is able to recover faster and re-orientate towards new growth areas in a more agile way, creating growth and new jobs. The proportion of businesses with fewer than 50 employees was calculated by comparing the number of employees and entrepreneurs in small businesses to the total workforce in the region. The number of new businesses was selected as an indicator based on the assumption that it is indicative of the dynamics of a region's business sector and of its potential to recover from a sudden structural change and move to new growth areas. The proportion of new businesses was calculated by comparing the number of new businesses started to the total number of businesses in the region.

"INNOVATIVE REGIONS RECOVER FASTER BY TAKING NEW DIRECTIONS FOR GROWTH AND READJUSTING THEIR ECONOMIC FOCUS"

The rationale for the inclusion of innovation among the indicators is the assumption that innovation activity helps to maintain continuous development, which enables regions to resist sudden structural changes. Furthermore, when a sudden structural change does take place, innovative regions recover faster by moving to new growth areas, readjusting their economic focus and the direction of growth. From the point of view of long-term development and economic growth, one of the main resources for supporting innovation is investment in research and development; in the indicator set, this factor is represented by the number of R&D workers compared to the total workforce of the region. Regional innovation capability is also indicated by the number of patent applications originating from the region, as they are assumed to involve activities that could support long-term economic growth.

Results of the sensitivity measurement

The purpose of the sensitivity indicators is to measure the combined effect of a number of resilience factors with regard to sudden structural changes (see Table 1). In this light, a highly specialised economic structure and a high number of public sector jobs appear to be resilience-reducing factors that can make regions more sensitive to sudden structural changes and their negative impacts. Similarly, a low education level and high unemployment rate also increase sensitivity. When this method of measurement is used, the effect of business size on sensitivity is somewhat conflicting as larger regions inevitably have larger businesses than smaller regions (cf. the rankings of Pirkanmaa, i.e. Tampere region, and Uusimaa). However, a high number of new businesses seems to be a sensitivity-reducing factor, as are proportionally high rates of R&D workforce and patent applications. Based on the sensitivity indicators, the most sensitive regions were Kainuu, Kymenlaakso and Pohjois-Karjala (North Karelia); all three regions have faced several regional economic shocks resulting in sudden structural changes in recent years. The least sensitive regions were those that are concentrated around Finland's largest cities, namely, Uusimaa, Tampere Region and Varsinais-Suomi (Southwest Finland) - although the Turku region in Southwest Finland has suffered from a structural change affecting its shipyard industry for a number of years.

Table 1. Sensitivity measurement results.

	Economic structure		Labour force		Business sector		Innovation		
Region	Industrial structure indicator	Public sector jobs	Education level	Unemployment	Business size	New businesses	R&D workforce	Patent applications	Resilience
Uusimaa	18	2	1	2	18	1	3	3	3
Varsinais-Suomi	5	4	4	6	11	3	4	8	2
Satakunta	2	9	15	8	16	12	13	13	13
Kanta-Häme	7	11	8	5	8	6	10	4	5
Pirkanmaa	4	5	2	7	17	2	2	5	1
Päijät-Häme	3	1	11	12	13	8	15	12	9
Kymenlaakso	16	13	13	16	10	5	18	15	17
Etelä-Karjala	8	7	11	13	9	9	7	6	7
Etelä-Savo	15	17	18	11	2	14	17	2	15
Pohjois-Savo	14	14	7	9	7	11	6	9	10
Pohjois-Karjala	12	16	9	18	6	18	9	11	16
Keski-Suomi	9	12	5	14	12	7	5	7	8
Etelä-Pohjanmaa	6	3	16	3	3	15	16	16	11
Pohjanmaa	1	6	6	1	15	16	8	1	4
Keski-Pohjanmaa	13	8	13	4	4	13	14	18	12
Pohjois-Pohjanmaa	10	10	3	10	14	4	1	10	6
Kainuu	17	18	17	17	1	17	12	14	18
Lappi	11	15	10	15	5	10	11	17	14

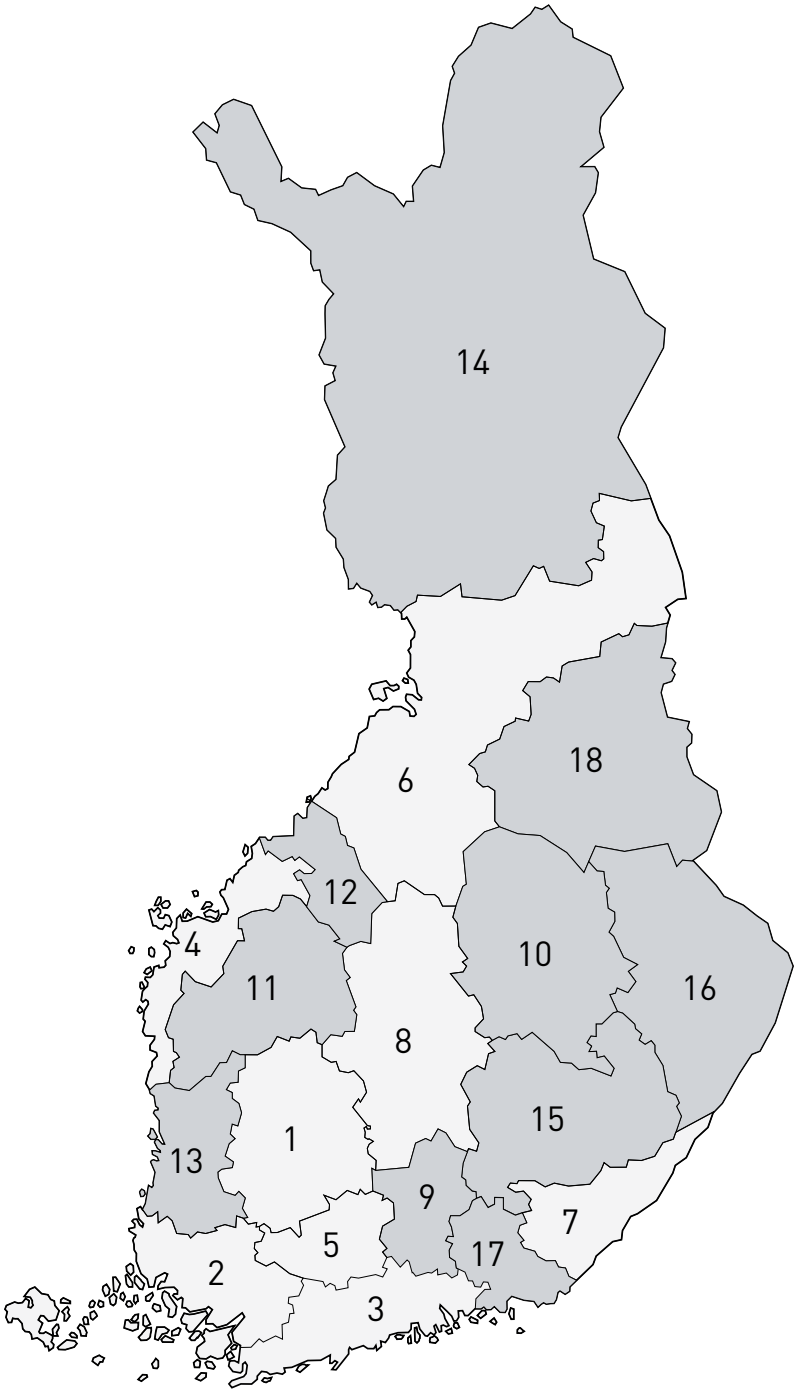

Figure 1. The regions most sensitive to sudden structural changes in Finland (dark-coloured)

"THE SET OF SENSITIVITY INDICATORS IS INTENDED FOR THE GENERATION OF DISCUSSION WITHIN AND BETWEEN THE REGIONS"

The Lahti region (Päijät-Häme) was ranked ninth on the sensitivity indicators, close to the average ranking of all regions. What is positive for the Päijät-Häme region is the fact that it has a diverse economic structure and the largest industries are fairly small in terms of workforce numbers. The percentage of public sector workers is the lowest in Finland (26%); the highest percentage was in Kainuu (40%). However, Päijät-Häme suffers from high unemployment, which is perhaps the main factor that hinders the region's development and increases its sensitivity to structural change. Furthermore, education level (300) in Päijät-Häme is still below the national average (314), which is mainly due to the lack of a local university and a trend of social exclusion, which originated as a result of the structural change in the 1990s and is currently manifested in the high number of uneducated males under the age of 25. Education level has risen since 2007 (281), largely as a result of less educated age groups retiring from work.

The overall ranking of Päijät-Häme is affected by the company size indicator, as only 66.6% of the region's workforce work in companies with fewer than 50 employees. The highest percentage of workforce employed by small businesses is in Etelä-Savo (South Savo) (76%). However, in the rate of new businesses, Päijät-Häme was among the top regions (9.0%); Uusimaa was ranked first in this category (10.1%). This suggests that the Päijät-Häme region has been successful in the provision of business support and incubator services. On the other hand, Päijät-Häme did not perform well in statistical data on innovation capacity, as only 1.2% of the region's workforce worked in research and development, compared with the national average of 2.4%. Similarly, the rate of patent applications (0.020%) originating from Päijät-Häme was below the national average – the highest rates of application were in Uusimaa, Etelä-Savo and Pohjanmaa (Ostrobothnia) (0.039%). In this respect, the innovation statistics do not do justice to Päijät-Häme, a region that is fast becoming one of the foremost innovation clusters in Finland, due to investments in practice-based innovation.

Conclusion

The set of sensitivity indicators is not intended as a tool for ranking the regions based on their performance; rather, the idea is to generate discussion within and between the regions. Comparisons between regions can be made with regard to the impact and type of long-term regional development measures which are designed to help the regions which are particularly sensitive (Table 1; Figure 1), to start preparing in a more effective way for the impacts of sudden structural changes. The statistical data selected for the set of indicators are interdependent in certain cases, as are the resilience factors proposed by Martin (2012).

Two of the factors of the resilience concept proposed by Martin (2012) were left out at this stage; namely, the social and political analysis of the region, and the extent and type of inter-organisational networking in the region - the reason being that both are very difficult to measure. Nevertheless, these are issues which must be evaluated as part of the regional discussion on the preparation for sudden structural changes. In addition, it is imperative that the indicator set be developed further in order to improve its accuracy and quality in the interpretation of the data. Taking the indicator set to the municipality level could produce very interesting results. It could create new insight and debate about topics such as the municipal reform. Finally, it should be noted that the results of the sensitivity indicators serve only to provide a current statistical view of the regions' preparedness for sudden structural changes. Nevertheless, the indicators can be used in the regions to refocus futures research and long-term measures on processes which could help reduce a region's sensitivity. In practice, this means using the results in strategy processes, which are based on interaction and collaboration between different regional actors to identify new development paths (cf. Boschma & Martin, 2007).

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CHAPTER

5

Jari Hautamäki & Timo Ahonen

Good practice in the preparation for sudden structural changes in the regions

Introduction

The main aim of the project "Proactive Approach to Structural Change (ENNE)" has been the creation of a good practice in preparing for sudden structural changes in the regions in Europe. The definition of a "good practice" varies between European countries depending on factors such as culture, language and different experiences. In addition, different groups with their interests and levels of knowledge have divergent understandings as regards a good practice. According to the European Agency for Safety and Health at Work (2009), good practice information and examples often include for instance guidance and guidelines, non-theoretical case study examples, risk assessment, product information, checklists, and so on. Moreover, the term "good practice" is often used to mean an effective practice or a practice that promises results. According to the European Social Fund (2007) a good practice functions well and can be replicated elsewhere.

Regional analysis model in practice

The project has developed a good practice using the region of Lahti in Finland as a case study. The development process has been tested in a practical context, thus it is potentially applicable in the regions at the European level. The application of the Regional Analysis Model (RAM) is based on the identification of risks increasing overall vulnerability and sensitivity for the impacts of a sudden structural change in the regions and on the recognition of the factors preventing and reducing the realisation of the risks.

"THE REGIONAL ANALYSIS MODEL (RAM) CAN BE APPLIED AND TAILORED TRANSNATIONALLY AND INTERREGIONALLY"

Despite the differences between European regions, the model can be easily applied and tailored transnationally and interregionally. The methods used during the process are based on methods typical of futures studies. Moreover, the process has its foundation on regional collaboration between main stakeholders, and the practices applied are based on futures knowledge creation (cf. Nonaka, Toyama & Konno, 2000; Uotila, Melkas & Harmaakorpi, 2005), identification and learning by co-configuration (Engeström, 2001), in addition to the creation of regional prospects by means of co-creation (Edvardsson, Gustavsson, Johnson, & Sandeen, 2000).

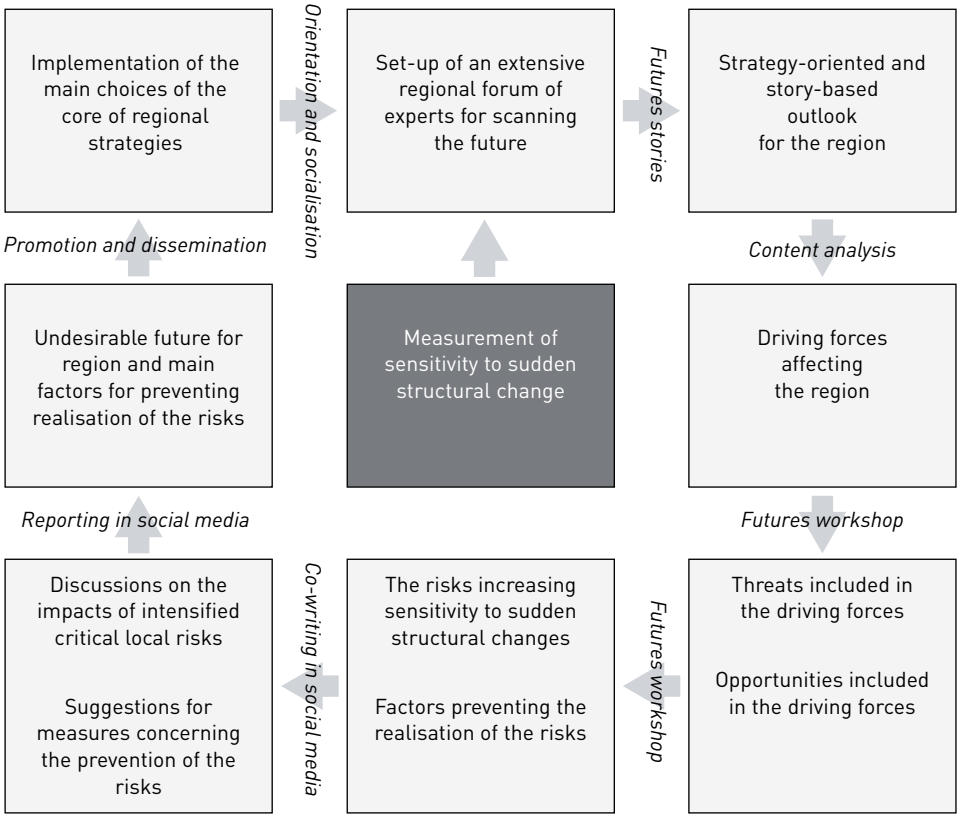

Figure 1. The Regional Analysis Model (RAM)

"PREPARATION IS BASED ON METHODS TYPICAL OF COLLECTIVE LEARNING AND FUTURES STUDIES"

Measurement of sensitivity to sudden structural changes

To begin with, the project created an indicator set for monitoring the sensitivity of regions (cf. Gallopín, 2006) to the impacts of sudden structural changes. Based on statistics, the indicators make regional features visible in certain factors which have been discovered in earlier studies increasing sensitivity to the impacts of sudden structural changes (e.g. Martin, 2012). The set of indicators to monitor the "rate" of sensitivity to sudden structural changes comprises e.g. the relative values of a region's levels of economic structure, employment, education and innovation (Järvinen, Hautamäki & Vesasto, 2013; Chapter 4).

Sensitivity is presented as a ranking of Finnish regions containing statistical values which indicate the levels of the aforementioned elements. The indicator set is intended for the assessment of the needs for a wider collaborative application of the Regional Analysis Model (RAM) (Figure 1). The aim of articulating the sensitivity rate further is to engender discussion and assessment of the region's economic and social situation. It may be used as a triggering entity (Doz, Olk & Smith Ring, 2000) and as background information for the collaborative risk identification process in the networks participated by main stakeholders in the region.

Creation of driving forces

The regional collaboration process is initiated by setting up a broad-based regional forum or team of experts for scanning the future. The forum defines the key strategic choices of the region by studying the main regional strategic documents. For example in the Lahti region, the six key choices were determined as practice-based innovation, design, environment, networking, competence development, and internationalisation. Furthermore, it is worthwhile to arrange a briefing session for the forum with a review of the main content of the strategies and the results of sensitivity indicators in relation to the impacts of sudden structural changes and use it as an orientation for producing futures knowledge. Next, the appropriate method related to futures studies should be selected. It is useful to exploit the European Foresight Platform (2009) service for finding out and assessing the suitability of the methods.

In the Lahti region, the project decided to introduce an active role-playing method (cf. Boess, 2006) for the creation of futures knowledge. The local experts of the futures forum wrote future stories from the perspective of the regional key strategic choices. Each writer elaborated an imaginative empathy-based 4 – 5 page story simulating a certain personal role amongst everyday life in the future, e.g. 20 years forward (Ginsburg, 1979). The futures stories elicited the tacit futures knowledge of the writers (Nonaka, Toyama & Konno, 2000) articulating and rendering visible meaningful factors and the events which may take place in the future (cf. Miller, 2007). The factors and events could be interpreted as weak signals.

As the stories contained so many independent pieces of information, it was appropriate to ex-

amine the stories by using a content analysis method. The purpose of content analysis was to interpret the substance of the futures stories. The aim was to classify the observations on the basis of what kinds of forces will drive changes in the regions in the future. Driving forces were interpreted as external factors that might cause changes in livelihood systems and practices. According to Kaivo-oja (2004, 38) the underlying long-term driving forces may be expected to propel the socio-economical and physical environment into the future at local, regional, national and international levels. In the Lahti region, ten separate driving forces were found (cf. Hautamäki & Ilmonen, 2013; Chapter 6).

Examination of opportunities and threats

Having finished the initial content analysis, a collaborative futures workshop was arranged with an aim to present the results of the content analysis and to orientate and prepare the participants of a futures forum to process the driving forces. The purpose of the workshop was to explore, by means of collective learning, the main opportunities and threats included in the driving forces discovered earlier. For boosting collaboration, a collective learning method - the Learning Café (Bunker & Alban, 2006; European Foresight Platform, 2006) - was used and at least two driving forces were processed simultaneously at each Learning Café table.

The Learning Café is a process that fosters authentic discussion and takes about two or three hours to complete. Each café table focuses around a theme to engage the invited group of stakeholders. They sit at small café style tables, four or five persons at a table, covered with "tablecloths" made of drawing paper, and are given pens or markers. Each group is given about twenty to thirty minutes to both talk about certain driving forces and sketch their ideas on the tablecloth. After timeout, a table host instructs them to move on to the next café table and invites the next group, summarising first the content of the previous conversation. The process then goes on and repeats itself. There are a couple of iterative rounds of this process before the final groups post or report the ideas that their table has created (Bunker & Alban, 2006). This functioned as a mind opener for the participants and created unexpected linkages between the driving forces. In-depth discussion was needed to elicit the tacit knowledge of the participants, related to opportunities and threats (cf. Uotila, Melkas & Harmaakorpi, 2005). Before taking the next step, the opportunities and threats were compiled and reported.

Risk identification process

Next, a process for the identification of risks increasing the impacts of sudden structural changes in the region was launched. The risk identification was based on an analysis of the threats related to the driving forces. However, missing an opportunity included in a driving force was also interpreted as a risk. Subsequently, the factors preventing the realisation of the risks, based on the opportunities of the driving forces, were recognised (cf. Hautamäki & Ilmonen, 2013; Chapter 6; Chapter 11). This was a remarkably challenging phase and it is therefore recommended that the participants of the futures forum attend a pre-training session on the identification process before tackling it in practice. Furthermore, the concept of risk must be jointly defined before identifying the risks in a workshop. In general, the risk was potential if a chosen action or activity included a choice of inaction which would result in a loss or an undesirable outcome. Almost any human endeavor carries some risk, but some are much riskier than others.

"THE RISK IDENTIFICATION IS BASED ON AN ANALYSIS OF THE THREATS RELATED TO THE DRIVING FORCES"

For the implementation of the identification process, applying a risk analysis tool such as the Lotus Blossom method (Michalko, 2006) was deemed appropriate. At first the participants identified risks based on previously defined threats of the future driving forces and experiences of the participants (cf. Michalco, 2006; Higgins, 1994). Individual Lotus Blossoms were created for each risk by locating the identified risk to the center of the blossom and eight recognised preventive factors around the risk (Figure 2). After exploring the risks, they were analysed one by one (in small groups) or at the same time (in several groups) from the angle of how to prevent the realisation of them. Discussions addressing the prevention generated several key preventive factors per risk, which were located in the cells around a single Lotus Blossom.

After completing the individual Lotus Blossoms, they were located around the main problem to form the Lotus Blossom diagram (cf. Higgins, 1994; Morthland & McPeek, 2010; Figure 3). The main problem discovered was expressed as follows: "how is it possible to prevent the risks which will increase the overall vulnerability for sudden structural changes in our region". For the completion of the Lotus Blossom, innovative brainstorming is recommended in order to focus on how to build the preventive factors (cf. Wulfen van, 2011). The results of the brainstorming are placed in the outer rows and columns. For the creation of these measures, a boost and an encouraging atmosphere were needed amongst the futures forum. The method was very effective for the articulation and visualisation of how it was possible to prevent the risks identified in practice.

PREVENTIVE FACTOR	PREVENTIVE FACTOR	PREVENTIVE FACTOR
PREVENTIVE FACTOR	RISK	PREVENTIVE FACTOR
PREVENTIVE FACTOR	PREVENTIVE FACTOR	PREVENTIVE FACTOR

Figure 2. Individual risks in Lotus Blossom to paraphrase Michalco (2006) and Higgins (1994)

PREVENTIVE FACTOR	PREVENTIVE FACTOR	PREVENTIVE FACTOR	PREVENTIVE FACTOR	PREVENTIVE FACTOR	PREVENTIVE FACTOR	PREVENTIVE FACTOR	PREVENTIVE FACTOR	PREVENTIVE FACTOR
PREVENTIVE FACTOR	RISK	PREVENTIVE FACTOR	PREVENTIVE FACTOR	RISK	PREVENTIVE FACTOR	PREVENTIVE FACTOR	RISK	PREVENTIVE FACTOR
PREVENTIVE FACTOR	PREVENTIVE FACTOR	PREVENTIVE FACTOR	PREVENTIVE FACTOR	PREVENTIVE FACTOR	PREVENTIVE FACTOR	PREVENTIVE FACTOR	PREVENTIVE FACTOR	PREVENTIVE FACTOR
PREVENTIVE FACTOR	PREVENTIVE FACTOR	PREVENTIVE FACTOR	HOW IS IT POSSIBLE TO PREVENT THE RISKS WHICH WILL INCREASE THE VULNERABILITY FOR SUDDEN STRUCTURAL CHANGES IN OUR REGION			PREVENTIVE FACTOR	PREVENTIVE FACTOR	PREVENTIVE FACTOR
PREVENTIVE FACTOR	RISK	PREVENTIVE FACTOR				PREVENTIVE FACTOR	RISK	PREVENTIVE FACTOR
PREVENTIVE FACTOR	PREVENTIVE FACTOR	PREVENTIVE FACTOR				PREVENTIVE FACTOR	PREVENTIVE FACTOR	PREVENTIVE FACTOR
PREVENTIVE FACTOR	PREVENTIVE FACTOR	PREVENTIVE FACTOR	PREVENTIVE FACTOR	PREVENTIVE FACTOR	PREVENTIVE FACTOR	PREVENTIVE FACTOR	PREVENTIVE FACTOR	PREVENTIVE FACTOR
PREVENTIVE FACTOR	RISK	PREVENTIVE FACTOR	PREVENTIVE FACTOR	RISK	PREVENTIVE FACTOR	PREVENTIVE FACTOR	RISK	PREVENTIVE FACTOR
PREVENTIVE FACTOR	PREVENTIVE FACTOR	PREVENTIVE FACTOR	PREVENTIVE FACTOR	PREVENTIVE FACTOR	PREVENTIVE FACTOR	PREVENTIVE FACTOR	PREVENTIVE FACTOR	PREVENTIVE FACTOR

Figure 3. Lotus Blossom diagram to paraphrase Michalco (2006) and Higgins (1994)

INNOVATIVE MEASURE	INNOVATIVE MEASURE	INNOVATIVE MEASURE	INNOVATIVE MEASURE	INNOVATIVE MEASURE	INNOVATIVE MEASURE	INNOVATIVE MEASURE
INNOVATIVE MEASURE	PREVENTIVE FACTOR	PREVENTIVE FACTOR	PREVENTIVE FACTOR	PREVENTIVE FACTOR	PREVENTIVE FACTOR	INNOVATIVE MEASURE
INNOVATIVE MEASURE	PREVENTIVE FACTOR	RISK	PREVENTIVE FACTOR	RISK	PREVENTIVE FACTOR	INNOVATIVE MEASURE
INNOVATIVE MEASURE	PREVENTIVE FACTOR	PREVENTIVE FACTOR	PREVENTIVE FACTOR	PREVENTIVE FACTOR	PREVENTIVE FACTOR	INNOVATIVE MEASURE
INNOVATIVE MEASURE	PREVENTIVE FACTOR	RISK	PREVENTIVE FACTOR	RISK	PREVENTIVE FACTOR	INNOVATIVE MEASURE
INNOVATIVE MEASURE	PREVENTIVE FACTOR	PREVENTIVE FACTOR	PREVENTIVE FACTOR	PREVENTIVE FACTOR	PREVENTIVE FACTOR	INNOVATIVE MEASURE
INNOVATIVE MEASURE	INNOVATIVE MEASURE	INNOVATIVE MEASURE	INNOVATIVE MEASURE	INNOVATIVE MEASURE	INNOVATIVE MEASURE	INNOVATIVE MEASURE

Figure 4. An example visualising the Lotus Blossom diagram after packing

"THE MAIN RISKS WERE USED TO OPEN A PUBLIC DEBATE IN ORDER TO FIND OUT HOW TO PREVENT THE REALISATION OF THE RISKS AND TO INFLUENCE THE THOUGHTS OF THE KEY DECISION-MAKERS"

The Blossoms were then combined in an innovative way. Finally, the Lotus Blossom was ready for 'packing' which was implemented by removing duplicate ideas and expressions of risks, preventive factors and innovative measures and clarifying the main message of the Lotus Blossom. For example, it was possible that preventive factors could be shared between various risks (Figure 4).

Moreover, the Lotus Blossom technique of idea generation can be used to develop creative ideas and innovative measures, generate ideas when problems exist in doing so as trapped in a single mode of thinking and to create better ideas using the initial idea. The technique adds focus and power to classic brainstorming (Michalko, 2006) for the implementation of risk identification in a futures forum. Workshops with collective learning methods and collaborative teams are recommended for the organisation of an identification process, since forming the Lotus Blossom diagram is based on in-depth discussions and shared analyses. After the first development cycle, it is appropriate to apply the (Lotus Blossom) technique for the creation of innovative measures, potentially preventing the realisation of the risks.

The power of the Lotus Blossom lies in the users' ability to quickly generate a visual map of multiple issues or themes related to risks. It encourages the users to think beyond issues directly tied to the central problem. The Lotus Blossom shifts users from reacting to a static snapshot of the problem and broadens their perspective toward the problem and the relationships and connections between its components (Michalco, 2006; Morthland & McPeek, 2010, 135). It provides the basis for a simple, systematic, and repeatable approach telling participants how to design but not telling how to address the issues they uncover.

Creation of an undesirable future

After the completion of the Lotus Blossom diagram, the undesirable Future was visualised (Chapter 6). The main risks were specified and intensified and they were used to open the debate in public. A Facebook social media service was used as a means to expand and publish the discussions focusing on what kind of impact the realisation of the risks may have. Also, opinions and views on how to prevent and prepare for regional and local risks were needed. A Facebook group was set, and tens of regional and national experts as well as citizens were invited to participate in the discussion. There were a few experts of the original futures forum facilitating the discussion launched on March 7th, 2013, for a period of three weeks. After the close-up of discussion, the undesirable future was briefly visualised with a couple of important elements which were launched as factors of high importance to be included in the content of local strategies and plans for preventing the realisation of the risks (Chapter 11). It was a question of co-writing in social media that allows participants to use all earlier personal experiences and knowledge for the creation of the undesirable

Future (Saunders, 1989; Ravenscroft, 2009; cf. Näkki et al., 2011).

If it is possible for local and regional decision-makers and politicians to participate in the discussion in Facebook, it will open up an excellent opportunity to influence their thoughts and opinions. The discussion process will then expand to a form of co-creation (cf. Edvardsson et al., 2000) which aims to include the preventive measures in the regional and local strategies and plans as part of visions of a desirable future. In order to strengthen the impact of the content included in the undesirable future, it would also be appropriate to share the preventive ideas and arguments to regional and local groups composed of leaders of the main public and private organisations and authorities. Persons with prominent roles have the power and authority to influence politicians and managers of regional organisations and experts of regional strategy processes in order to embed the measures and ideas of preparation for sudden structural changes into the content of regional strategies and plans.

Summary

Foresight work related to the preparation for sudden structural changes can be integrated into the wider development of the regional strategy (1) through collaboration among regional authorities and stakeholders, (2) by considering and integrating the foresight results in the formulation of regional strategic measures, and (3) by compiling foresight, diverse methods and forecasts into a regional preparation model. Collaboration aims to increase regional self-renewal capacity (Sotarauta, 2005a) for consciously searching for new regional solutions to improve the preparation capacity of the region (cf. Martin, 2012).

The Proactive Approach to Structural Change (ENNE) project has developed a Regional Analysis Model (RAM) as a good practice in preparing for sudden structural changes. The process of the RAM was carried out in a practical context in the Lahti region. A measuring instrument based on indicators assessing a region's sensitivity to sudden structural changes was developed with a documented measuring of the regions. Moreover, innovative methods typical of futures studies have been applied to produce and analyse futures knowledge. This knowledge was critical for the identification of the risks increasing overall vulnerability and sensitivity to the impacts of sudden structural changes, and for the recognition of the factors preventing the realisation of the risks. In addition, several interesting driving forces were recognised, as well as opportunities and threats included in them.

For the visualisation and articulation of the undesirable Future and the impact of the realisation of the risks, it is possible to influence the thoughts of the main decision-makers and politicians in the region in order to incorporate preventive measures into regional and local strategies and plans. The promotion can be reinforced by participating citizens and prominent persons in Future discussions in social media forums. The Regional Analysis Model (RAM) is easily customisable to be applied in the regions in Europe. The most important terms for the implementation of the model are capabilities and competences to use methods typical for futures studies, in addition to the set-up of a futures forum to engage experts and managers of regional stakeholders. An active and effective intermediary organisation is also needed for the planning and maintenance of the preparation process and for a smooth application of the Regional Analysis Model (RAM). The implementation of the RAM process will be successful, if it engages participants that are inspired and stimulated.

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CHAPTER

6

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Regional risks increasing vulnerability for sudden structural changes and factors preventing the realisation of the risks in the future - case Lahti region

Introduction

According to ISO 31000, risk is the effect of uncertainty on objectives. Uncertainties include events, which may or may not happen, uncertainties caused by ambiguity or lack of information, in addition to both negative and positive impacts on objectives (International Organization for Standardization, 2009). Risk is ubiquitous in all areas of life and risk management is something that we all must do, whether we are managing a major organisation or simply crossing the road. When describing risk, however, it is useful to acknowledge that risk practitioners operate in some specific practice areas.

Nowadays, sudden structural changes usually emerge due to disturbances in international business markets or reformation and restructuring of public services at national level (Martin, 2012). For example, in the Lahti region,

"DRIVING FORCES WERE IDENTIFIED WITH THE IDEA OF THESE BEING EXTERNAL FACTORS THAT MIGHT CAUSE LONG-TERM CHANGES"

two shut-downs of foreign-owned factories and the closure of a local garrison of the Finnish Defense Forces have been carried out after the financial crisis of 2008. These changes were based on decisions made outside of the region, and the economic, social and organisational risks have materialised unexpectedly and abruptly. Some risks have already materialised – which means that it is too late to resist sudden structural changes by preventing those risks. Therefore it is appropriate to be proactive and prepare for changes by identifying risks related to the future.

Driving forces affecting the Lahti region in the future

Ten distinct driving forces were identified during the preparation process (cf. Hautamäki, Ahonen, Arasola, Ilmonen, Seitsara, Toijala & Vesasto, 2012), with the idea of driving forces being external factors that might cause long-term changes in the socio-economic environment of the region (e.g. Kaivo-oja, 2004). The future driving forces are presented from the point of view of growth or increase. (1) Increasing porosity of interregional boundaries as a driving force anticipates that regions will cooperate more and more in the future, providing e.g. interregional services for citizens or planning the future together. (2) Growing demand of multi-skills as one of the driving forces tells that in the future there will be a need for interdisciplinary skills and competences, as separate technologies and services will gradually converge. (3) Increasing adoption of smart and sustainable solutions will lead to a future where less energy or natural resources are needed because of the intelligence and eco-friendliness of the physical products and services. (4) Growing need for creative services will become evident because people will like to purchase individual and tailored solutions. (5) Growing need for interaction supporting well-being encompasses a valuable idea of continuous interaction between generations based on a mix of technology and face-to-face encounters improving atmosphere and mental well-being. (Hautamäki et al., 2012.)

(6) Increasing flow of information and knowledge will allow anyone anywhere at any time an equal access to the knowledge highway or space of flows (Castells, 2000) where the everyday problems of citizens will be solved by supercomputers. (7) Increasing convergence of cultures and international business means that local companies will be a part of international business chains enabling people from all over the world to meet and collaborate face-to-face at any time in the international network. (8) Growing need for fast learning business networks will become the core of business and competitiveness in the future. People will form nodes and links for in order to deal with large, complex and global business challenges by combining knowledge, identifying the main success factors and making the solutions together (Castells, 2000). (9) Increasing complexity of authentic markets anticipates that in the future there will be a large market for high-quality, individual human services and for

"THE KEY ISSUES OF THE RISKS WERE THE STAGNATION OF REGIONAL COLLABORATION, THE DETERIORATION OF PREREQUISITES FOR BUSINESSES AND THE COLLAPSE OF THE LEVEL AND QUALITY OF OVERALL WELL-BEING"

real, genuine products. (10) Increasing reality of global asynchronocity means that 24/7 services will be needed for the matching of global business and keeping all the information-based systems on around the clock.

Risks affecting the Lahti region in the future

The risks increasing the sensitivity of a region to sudden structural changes in the future were identified by a futures forum during the preparation process. They were determined by analysing and focusing on threats included in the driving forces affecting the region in the future (Hautamäki & Ahonen, 2013; Chapter 5). The purpose of this risk identification was to obtain a base for the creation of undesirable future prospects and the elaboration of the risks and factors preventing the realisation of the risks (see Chapter 11). Six key risks were identified in the Lahti region during the preparation process (Table 2).

1) Working and living in a bubble means, from the point of view of risks, that people will withdraw from the complexity of working life and social relations by distancing themselves from other people and working teams or start to avoid challenging jobs or responsibilities of the society, family and working life. Therefore there will also be a danger of diminishing collaboration between regional stakeholders (cf. Frechter, 2007). (2) Loss of international business competence will decrease the capabilities of small and medium-sized enterprises (SMEs) to join international business chains and to have a deeper understanding of the needs of foreign-owned companies and foreign customers abroad and in their own region (cf. Knight & Kim, 2009). (3) Disregard for new innovative business models will appear to compromise our companies' ability to develop novel, unique and practical products for rapidly changing local and international markets. Without innovative business models, we will go out of sustainable local and international business (cf. Chesbrough, 2006).

(4) Indifference towards water resources and the ecosystem will generate disturbances for living and business environments in the future. These disturbances may decrease the attractiveness of the region and increase the mobility of citizens and employees out of the region and arouse suspicion on the purity of natural raw materials utilised by the local industry (cf. Rosegrant, Cai & Cline, 2002). (5) A decrease in the number of SMEs and risk-taking will compromise the launching of new innovative business ideas and creation of new jobs (cf. Parker, 2001). New jobs and ideas will be needed, since large companies prefer to invest in international markets and cut jobs in the Finnish regions (6) Division of society into wanted and unwanted people will entail significant problems for democracy and working life by increasing exclusion, compromising overall well-being and decreasing the number of skilled employees committed to work for companies in the region (e.g. Cornes, Joly, Manthorpe, O'Halloran & Smythe, 2011).

Integration of families and individuals in social neo-tribes	Reduction of the degree of complexity and fuzziness in working and everyday life	Development of core competence and protection of fundamental knowledge	Attraction of foreign investments and new entrepreneurs to the region	Reinforcement and creation of new key areas of competency (i.a. Cleantech, design)	Creation of preconditions for the enhancement of self-renewal capacity among regional development networks	Leading-edge technology research in the Lahti region (genetic, biotech, nanotech, materials science)
Promotion of support services for young (men)	**WORKING AND LIVING IN A BUBBLE**	Acceptance and appreciation of diversity as a potential in working life	**LOSS OF INTERNATIONAL BUSINESS COMPETENCE**	Reinforcement of interface cooperation between clusters	**DISREGARD FOR NEW INNOVATIVE BUSINESS MODELS**	Substantial investment in the Russian (st. Petersburg) and the Chinese market
Building of interaction and trust	Transformation of mutual dependency into strategic collaboration	Articulation of fundamental common interests of society and organisations	Development of business competence through practise-based learning environments	Investing in future-oriented management skills	Exploitation of knowledge generated through cross-pollination in business activities	Adoption of new (hybrid) business models, promotion of tourism as new line of business
Social responsibility as part of all products and services	**INDIFFERENCE TOWARDS WATER RESOURCES AND THE ECOSYSTEM**	Strengthening the innovation capacity of children and young people	**DIVISION OF SOCIETY INTO WANTED AND UNWANTED PEOPLE**	Creation of new business and establishment of incubation on large corporations	**DECLINE IN SET-UP OF NEW SMEs AND RISK APPETITE**	Investment in the development of SME competences
Use of renewable natural resources and energy	Development of environmental technology and related competencies	Fostering sustainable development and responsible business management	Enriched and diversified living/residential environment (Anti-Boring City)	Cross-disciplinary, discipline-independent education and creation of new forms of working and adult learning	Making Lahti a high-quality region in e-logistics with high-speed connections to the metropolitan area, St. Petersburg, Barents and Baltic Sea regions	Development and production of consumer-oriented and user-driven services through RDI

Table 1. The Risks increasing sensitivity to sudden structural changes in the Lahti region in the future and the factors preventing realisation of the risks, paraphrasing the Lotus Blossom (Hautamäki, Ahonen, Arasola, Ilmonen, Seitsara, Toijala & Vesasto, 2012).

Factors preventing realisation of risks in the future

(1) From the point of view of preventing the stagnation, i.e. lock-in, of regional collaboration, the main shared interests of the organisations in the region should be determined in order for them to be used as the basis of regional strategies. The prerequisites for renewing the competitiveness of regions will be created by collaboration in regional networks such as business clusters and public development hubs. New kinds of business models like hybrids, green business and open innovation should be tested by these aforementioned networks. Investments in the collaboration at the interfaces of regional business clusters should be increased. In addition, cross-disciplinary and field-independent education should also be increased in order to prevent the fragmentation of employment. Therefore business-oriented and individual-oriented tutoring services should be designed to support competence management. Moreover, efforts to obtain innovative research - such as genetic, bio and nanotech research - in the region should be increased. The focus of collaboration and cooperation in business should be directed to a greater extent to the metropolitan areas of Helsinki and Saint Petersburg and furthermore to the regions around the Baltic Sea. (Hautamäki, Ahonen, Arasola, Ilmonen, Seitsara, Toijala & Vesasto, 2012; Table 2.)

(2) Preventing the deterioration of prerequisites for businesses includes many perspectives. The regional authorities should focus their efforts on attracting foreign investments and new businesses in the region. Also, incubation of new spin-outs could be partly embedded into the processes of subcontracting and RDI of the companies. Moreover, it should not be impossible for the Lahti region to be the state-of-the-art region of e-logistics and e-connections in the future. For Lahti, to pursue becoming one of the most practice-oriented innovation-based regions in Finland in the future will mean that consumer and customer orientation of services should be increased by implementing research, development and innovation (RDI) measures, particularly in companies, educational organisations and networks. New capabilities of managers and leaders will be needed in the future and therefore innovative management training and coaching systems should be launched in the Lahti region. For boosting business, significantly more resources should be invested in the markets in Brazil, Russia, India and China (BRIC). Notably, an industry having a significant amount of impact in the marketing of the region's businesses is international tourism which should be conducted in the region in the form of a well-designed and genuine green business. In general terms, strategy-based core competences should be strengthened in all business activities in the region, in addition to foreseeing opportunities for a new knowledge-based industry. Therefore, the capabilities of businesses - particularly SMEs - should be enhanced in practice-based learning environments, for instance by utilising innovative cross-pollination between businesses and education. (Hautamäki et al., 2012; Table 2.)

(3) Preventing the collapse of overall well-being is regarded as a complex and multiform process. Demand-driven and municipal well-being services should be produced for families and individuals, such as young men. The ability of young people to manage the increasingly complex everyday life should be set into motion by tutors at educational institutes, as most vocational and higher education studies will be connected as a part of work and service production processes of the companies in the future. The aim is to maintain the core competences of workforce and enhance the core capabilities of companies to ensure competitiveness on high-technology and new solutions of business. Rich and multiform living with anti-boring learning environments will be needed in the future. It is essential for chil-

dren and young people to adopt innovative capabilities and develop for responsibility. In addition, more prerequisites for the business of social enterprises should be created in the region. (Hautamäki et al., 2012; Table 2.)

Conclusion

Ten distinct driving forces were identified during the preparation process with the idea of driving forces being external factors that might cause long-term changes in the socio-economic environment of the region (e.g. Kaivo-oja, 2004). For the identification of the regional risks, it is essential to bring together a diverse futures forum and capabilities to organise a collaboration process by applying user-friendly methods like the Lotus Blossom. Six distinct risks were discovered during the preparation process concerning the Lahti Region. The risks will compromise 1) the cooperation and collaboration between people and between regional stakeholders, 2) the connections to international business, 3) the adoption of innovative business models, 4) the purity of natural raw materials, 5) the creation of innovative business and new jobs and 6) the well-being of citizens and their ability and skills to be productive.

By using the Lotus Blossom technique, many factors preventing the realisation of the risks were discovered. The main factors were determined as 1) preventing the stagnation, or lock-in, of regional collaboration, 2) preventing the deterioration of prerequisites for businesses and 3) preventing the collapse of well-being. New dynamic capabilities are called for in the region, including interaction and collaboration, creation of networks and new business models, in addition to the promotion of open innovation. The enhancement of well-being, equality and competences, redirection of regional resources, foreign investments, encouragement of SMEs and RDI, renewal of management and coaching skills, strengthening of foresight planning, utilisation of cross-pollination, support of young people's development and creation of multiform living, learning and working environments should be at the hearth of regional collaboration.

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CHAPTER

7

Jari Hautamäki

Challenges of a regional innovation environment in the preparation for sudden structural changes

Introduction

Globalisation and changes in the structure of production have given rise to unexpected, sudden, vast threats to the development of many regions. Crises of this kind often stem from the fact that disturbances taking place on the global market affect the business of a large-scale enterprise that plays an important role from the perspective of the region's biased industrial structure or the region as a whole, as a result of which companies begin to radically cut down the number of employees. This usually causes a severe shock in the region, to which the region has gradually adapted. A sudden structural change is usually followed by unemployment and social problems, the effects of which might have an impact in the region for decades to come (Martin, 2012). The deep economic recession forced Finland's regions to make structural and functional reassessments in the late 1990s. The Finnish government developed a new economic strategy, heavily geared towards technological innovation with heavy investment in RDI (research, development and innovation) and education (Leadbeater et al., 2008). As the result of this strategic policy Finland transformed into one of the premier knowledge economies in the world during the 2000s (Leadbeater et al., 2008; Ministry of Finance of Finland, 2006).

"REGIONAL CAPABILITIES AND RESOURCES MUST BE CONSTANTLY RENEWED AND EXTENDED THROUGH COLLECTIVE LEARNING"

According to experts, structural change will deepen all over Europe in the 2010s. The importance of preparation has become apparent during the period of high economic uncertainty in the last few years, as more and more regions have faced sudden, unexpected structural changes. It would have been much more advantageous and appropriate from the point of view of the national economy and the regions themselves if preparation had been in place for situations of this kind. In addition, it has also become more difficult to deal with these structural changes, as some of them have been so vast that the state and various regional actors have had to launch joint support measures in order to resolve them (Paasivirta, 2006). It has been noticed in the project Proactive Approach to Structural Change (ENNE) that, in order to prepare for sudden structural changes, regions must, in particular, (1) promote the effectiveness of development networks and business clusters, (2) utilise and apply innovation environments and innovation processes, and (3) lead collaboration between stakeholders such as organisations and experts working for them.

The innovation environment supporting regional development

The regional innovation environment encompasses among other things a regional knowledge base, development networks and clusters, other partnerships promoting learning and cooperation, communication and interaction between different parties, and different types of mediating mechanisms, such as business incubators, guidance services for adult education and other corresponding services (cf. Kautonen, 2006, 48). Innovation activities are considered interactive, open processes, which emphasise learning and are maintained and supported by actors responsible for regional development (cf. Tödtling & Trippl, 2005). Regional innovation environments increasingly resemble the learning economy model in terms of their characteristics and properties (Morgan, 1997). In the model, regional competitiveness is based on the ability to develop capabilities and resources for the regions that distinguish them from other regions. In the face of changes taking place in the competition environment, regional capabilities and resources must be constantly renewed and extended through learning (cf. Best, Ryan, Das, Tulum & Giblin, 2010; Porter, 1998).

Regional collaboration relies on strengthened networking (e.g. Doz & Baburoglu, 2000), in which networks and clusters form structures aimed at mutual interaction and learning (cf. Granovetter, 2005) in addition to creating new knowledge to support innovation activities (e.g. Nonaka, Toyama & Konno, 2000; Uotila, 2008). Therefore innovative futures research is increasingly needed in order to outline development paths (cf. Uotila, 2008), targeted at expanding absorptive capacity (Uotila, Harmaakorpi & Melkas, 2006). The key question in future knowledge production is the nature of the knowledge base used in the region. Almost all industries and clusters make use of an analytic, synthetic and symbolic knowledge base, although special emphasis is often given to one of these (Asheim & Coenen, 2005; Mariussen & Asheim, 2003). Therefore, for instance, the creative industry is not able to succeed just anywhere. The knowledge base is decisively important from the point of view

"THE NETWORKS OF INNOVATION ENVIRONMENTS CONSIST OF SOCIAL RELATIONS BETWEEN ORGANISATIONS AND PEOPLE"

of innovation activities, as the development of new products and services is based on the information, knowledge and capabilities available to customers and consumers, experts, companies and institutions.

The knowledge interests of the various stakeholders in the regional innovation environment often differ so much that interpretation and knowledge mediation are needed in the processing of new knowledge. Interpretation and mediation will have a materialised form in development targets, in which it is often possible to identify features of structural holes, as discussed by Burt (2004). Knowledge flows are mediated between experts, who contribute to development, and forms of cooperation are created in order to bring together people from the opposite sides of the holes. Knowledge flows are usually mediated by intermediate organisations in the regional innovation system (cf. Kautonen, 2006, 48), such as regional science and technology parks, regional development companies, universities and research centres. Therefore, long-term 'exploration' should constantly be pursued in regional networks in order to find a shared view of the challenges facing the region and to be able to identify new, meaningful future needs (cf. Sotarauta, 2010) and structural holes (Burt, 2004) to develop. Finding shared views is often hampered by the discontinuity of development work, which is due to the heterogeneousness of the interpretations, views and conclusions concerning the decisions or results of collaboration. Emergent phenomena often occur in connection with discontinuity; according to Kauffman (2004), these are bottom-to-top phenomena typical of networking, and they emerge and manifest themselves unexpectedly and suddenly. Emergent phenomena are very important to deal with as they often consist of unique ideas and insight for the innovation process.

The purpose of networked collaboration is to steer the social process and the joint effectiveness of several partners in a new way (Kickert & Koppejan, 1999; Kale & Singh, 2009). The networks of innovation environments consist of social relations between organisations and people. The social structure of networks influences their ability to carry out their tasks. Particularly important are the transmission of tacit knowledge and the creation of unplanned interactive relations in order to generate a positive innovation process (Granovetter, 2005; Bathelt, Malmberg & Maskell, 2004; Leydesdorff & Mayer, 2006). Networking supports a learning process based on innovation activities (cf. Harmaakorpi & Melkas, 2005). The precondition for increasing the innovative potential and successful collaboration is strong social capital, which underlines interaction, the growth of mutual trust, shared learning and the generation of shared views (Nahapiet & Ghoshal, 1998). With networked collaboration, it has been possible to break loose from the region's earlier development history by creating new development paths (cf. Boschma & Sotarauta, 2007) geared towards new opportunities. A good example of this is the foundation of the Cleantech Cluster in the Lahti region and its development into a leading, internationally renowned competence network of environmental technology in Finland and one of the most successful Cleantech Cluster in the world.

The formation of Lahti cleantech cluster

In the 1900s, the city of Lahti became particularly known as a city of industry focusing on e.g. wood and furniture, food and brewing industry, in addition to construction, plastic and metal industries. For decades the wood and furniture industry was located just beside the city next to Lake Vesijärvi because of the transportation opportunities of raw material – wood – via waterways. However, the lake was gradually overburdened and polluted by substances protecting materials like wood against decay and mold. Moreover, the level of degradation was increased by effluents and fertilisers of agriculture. Overburdening and pollution was seen as a shared problem in the 1970s and the 1980s as the ridges and lakes in the Lahti region contained one of the main fresh water reserves in Finland. Furthermore, fresh water was used as raw material by the beverage industry in the region. Around the same time, many units of Finnish universities were established in the Lahti region. Some of the research and development measures of collaborative units were targeted on Lake Vesijärvi, particularly by the Faculty of Environment of Helsinki University, making the state of the lake more widely known.

After the wood and furniture factories were relocated away from the waterfront in the 1990s, systematic measures to improve the state of the lake were instigated. The measures were implemented for years by companies having experience in environmental business and the university having the expertise. During the course of the measures, the lake was cleaned up in the 2000s and the companies and universities networked due to long-term collaboration. Moreover, many companies located permanently close to the university and gradually they formed an informal local environmental hub. Lahti Cleantech Cluster was officially established in 2004 by clean technology companies, universities and Lahti Science and Business Park Ltd (LSBP), or what is today called Lahti Region Development LADEC Ltd. A shared vision and strategy were prepared and LSBP's development measures were established to support the expertise on water issues and the cleaning of contaminated land, in addition to renewable energy, waste and recycling technology. Nowadays, the hub operates as a well-coordinated and managed cluster and cleantech is the main choice of business strategy of the Lahti region. The transformation of the cluster has been very fast because of the change in attitudes to local collaboration and environment, and the effort of extremely active, innovative and visionary persons.

At the moment, a mix of national high technology, innovative companies, cutting-edge research, and regional centres of expertise lie at the heart of Cleantech Cluster. Lahti Region Development LADEC Ltd business development and internationalisation services for Finnish cleantech companies are offered in the form of 1) internationalisation programmes to China, Russia and India, 2) investor and financer contacts, 3) annual Cleantech Venture Day which gathers together international investors looking for cleantech start-ups and growth companies, 4) business incubator and ICT services, 5) invest-in activities and soft-landing services, 6) R&D labs and pilots and 7) test-beds. The combination represents a strong expert network with the potential to take innovation in the field to a new level. The Cleantech Cluster inspires a new level of cooperation between companies and scientific communities nationally – and generates innovative new solutions addressing today's and tomorrow's energy, water and air quality issues. The regional cluster management organisation Lahti Development Company LADEC Ltd takes the lead in coordinating the activities of the cluster as a whole. The stipulated goals are to boost cleantech business in Finland and at international level, create new jobs and take ad-

vantage of the global market by setting up international networks. Another goal is to utilise Finnish expertise in business and services both in Finland and abroad. The cluster also strives to generate new, expertise-intensive business either through the incorporation of new enterprises or by establishing new units within existing enterprises in cooperation with foreign enterprises and organisations whenever possible.

One of the key strategies of the Cleantech Cluster is to form networks with venture capital investors. In 2012, the annual Cleantech Venture Day event gathered over 60 international investors looking for more than 40 Cleantech start-ups and growth companies pitching for business. The Cleantech business is estimated to grow at a pace of 5-15 % per year worldwide. The growth is accelerated by people's increasing worry over their living environment and the growing demand for a sustainable use of natural resources. Thanks to the cooperation with companies and scientific community, the Cleantech Cluster forms a strong expert network for the generation of new innovative solutions for today's environmental challenges. In 2010, Finnish Cleantech Cluster was ranked in the top three with the world's best green technology Clusters by the international Cleantech Group (USA).

In 2012, three Finnish companies, among 200 other companies, were selected as finalists of the 2012 Global Cleantech Later Stage Award and two of them were selected in the Top 10 Winners. The vision of the cluster is that by 2013 the growth of the industry and mergers amongst cleantech businesses will have generated new export drivers that take advantage of cutting-edge research findings. The high quality of the research will also lure new enterprises from outside Finland's national borders. Cleantech Cluster targets in increasing cleantech know-how and innovative business in Finland and internationalise the Finnish SME's. Cleantech Cluster aims to create 1500 new jobs, 40 new companies annually, 20 new spearhead companies to international market and RDI venture portfolio €170m by the year 2013.

The innovation environments of the Lahti region

Cleantech Cluster's measures are based on a practice-based innovation system and a network-facilitating innovation policy adopted in the region. Nowadays, innovations are seen to emerge as non-linear processes deeply embedded in normal social and economic activities and as processes of interactive learning between firms and their environment (Harmaakorpi & Melkas, 2005). Thus the goal of the Lahti Urban Region Innovation Environment Development Strategy (2005) was to turn Lahti into a region with the best practice-based innovation activities in Finland and the best developer of public sector innovativeness and productivity in Finland.

Since 2005, the regional development networks and clusters have created together and separately practice-based innovation processes, reached the targets set in other regional strategies, brought knowledge located outside the region to the use of local stakeholders by means of interregional networking. Furthermore, the networks and clusters have promoted the generation of creative social capital and creative collective eruptions in the networks, promoted collective learning by producing and sharing futures knowledge, eliminated bottlenecks and problems in the networks, prevented the development of the regional lock-ins by actively searching for new development paths and created chances and interfaces for coincidences. (cf. Sotarauta, 2010: Uotila, Mäkimattila, Harmaakorpi & Melkas, 2012, Harmaakorpi, 2010.) During the cooperation, special and unique capabilities have been created with an emphasis on the lake's clean-up and protection of water resources. The Cleantech Cluster

"CLEANTECH CLUSTER'S MEASURES ARE BASED ON A PRACTICE-BASED INNOVATION SYSTEM AND A NETWORK-FACILITATING INNOVATION POLICY ADOPTED IN THE REGION"

is not only about export promotion. For foreign companies the cluster represents a gateway for finding research and business partners in Finland.

The companies and public sector actors in the Lahti region have gradually engaged in networking more and more intensely in the past two decades. Networking has helped interaction between the key persons in particular. The results achieved together have increased mutual trust between the actors and also improved collaboration. Social capital has been found to play an important role in leading efforts. In practice, the formation of shared views, especially in the Cleantech Cluster, have meant promoting interaction and dialogue between stakeholders representing different views, problem-based development and making visible the tacit knowledge related to practical work.

It also seems that expanding social capital has strengthened collaboration between networks (Nahapiet & Ghoshal, 1998; Blomqvist, 2002). In particular, social capital has been needed for boosting the practice-based innovation processes. Based on Kallio, Harmaakorpi & Pihkala (2010) empirical findings, three forms of social capital are included in the regional innovation system: organisational bonding social capital for assimilating and transforming knowledge in innovation processes; regional bridging social capital for acquiring diverse knowledge in the innovation processes.; and personal creative social capital for taking risks and to continue positively after mistakes. Moreover, a feeling of togetherness and social cohesion has been built inside the cluster (cf. Coleman, 1988).

The importance of the role of innovativeness is generally recognised, and innovation policy has become a part of the agenda for social development. As a result of long-term regional collaboration, the dynamics characteristic of business clusters has also been embedded in the processes of regional development networks (e.g. Leibovitz, 2004). Practice-based innovation environments are emphasised in the Lahti region, in which most of the actual innovations stem from practical situations that combine knowledge from different disciplines (Harmaakorpi, 2004). Even though knowledge complying with the scientific 'Science, Technology and Innovation' (STI) model has utilised in practice-based innovation environments, efforts have been taken to develop new customer-oriented and consumer-based solutions through experience in accordance with the 'Doing, Using, Interacting ' (DUI) model, in which case development has emphasised open innovation and learning at work and in customer projects, for instance (cf. Chesbrough, 2003, Lundvall, 2007).

Innovation policy behind the development of cleantech

One aim of the network-facilitating innovation policy is to search for structural holes between the regional knowledge-base and the scientific knowledge-base found in the surrounding research centres. A special task is to create practice-based ways to remove the obstacles to innovation and bring the knowledge needed to support the innovation processes at local level. (cf. Kallio, Harmaakorpi & Pihkala, 2010; Morgan, 2004.) In practice-based innovation

"JOINTLY AGREED DEVELOPMENT THEMES HAVE OFTEN BEEN TURNED INTO REGIONAL DEVELOPMENT PLATFORMS THAT HAVE BROUGHT EXPERTS TOGETHER"

processes, a common practical context exists within each problem to be solved and this context needs to be specified. The practical context is a concrete object. Within this practical context, each cooperator may have a different perspective, hence the specific problem they have in mind may differ. However, the cooperators are solving their problems within the same context. They localise the context in a dissimilar way – by asking different questions. Still, they need to have a common dialogue – each of them must be a dialogist in a common dialogue, that is, in a process of building something new within a context. Such a common dialogue supposes a common intention. To have this, the dialogists must share some factors within a context. (Harmaakorpi & Mutanen, 2008.)

The local RDI units have already been engaged in customer-oriented, practice-based innovation, research and development activities in the region for several years. Measures have been taken to create innovation potential in the region, e.g. with the help of business incubators, higher education networks and RDI hubs (cf. Lyytinen, 2011). From the point of view of the growth of innovation potential, it has been important to look for new mechanisms in order to expand cross-disciplinary innovation activities that are based on distance between dissimilar sectors (cf. Harmaakorpi, 2004). Jointly agreed development themes have often been turned into regional development platforms that have brought together experts from clusters and regional development networks and other resources. New knowledge on the development target has been created through these development platforms, knowledge has been used to learn new things and new, innovative products and services have been formulated based on such knowledge.

There have been conscious efforts to increase absorptive capacity through collaboration between higher education institutions and companies, for instance. In practice, this has involved acquiring new knowledge for a business cluster or company in the region to use. New knowledge has been merged with the development prospects of the companies' core businesses by means of strategy work, coaching of key persons or other corresponding forms of collaboration. Companies have then converted their development prospects to commercial products and services, which has enabled them to utilise new knowledge to develop their competence and create new capabilities. A number of cluster-level development projects have been implemented in the Lahti region, with the aim of developing new, innovative solutions. Development efforts have more increasingly been based on the principles of practice-based innovation activities, which emphasise the use of an open, symbolic knowledge base generated at the customer interface (cf. Chesbrough, 2003). In practice, organisations have been actively looking for external ideas and created conditions for their customers to contribute to the development of products and services. (cf. Uotila, Harmaakorpi & Melkas, 2006.)

The challenge from the point of view of innovation environments is how clusters and networks are capable of utilising new knowledge of the resources and capabilities that will be

needed in the future and how new knowledge can be turned into innovative collaboration renewing the region and increasing absorptive capacity (Uotila et al., 2006). Frequent use has been made of co-configuration in learning and mediating knowledge between clusters and development networks, which involves networked, shared, mutual, multi-level development work (Engeström, 2007; 2004). The question has been of collaboration, in which different stakeholders in the network have sought to influence each other's choices and processes so as to evoke real changes through the cooperation (cf. Sotarauta, 2010). Co-configuration has also taken the form of close cooperation between experts, in which the sharing of experiences from the perspectives of different roles has supported shared learning and allowed commitment to new policies and to the generation of new ideas. For example, people on the opposite sides of structural holes have been made aware of the interests and challenges of the other group, after which shared interests have been promoted in development groups that seemingly have nothing in common (cf. Burt, 2004).

Cluster policy and network-facilitating innovation policy in the Lahti region has been based on the regional innovation platforms which includes the weak ties of the regional – and particularly interregional – networks. It has been formed as a result of the creation of the so-called Regional Development Platform Method (RDPM) in the Lahti region. The method has been designed to function as a tool for regional innovation policy, and its aim has been to explore the existing competitive resource configurations in a region and to exploit the potential underlying them. (Harmaakorpi, 2010; Harmaakorpi & Melkas, 2005.) The regional innovation platform has tried to increase potential absorptive capacity, in particular, by new methods of futures research and foresight. Platforms have been based on physical and functional proximity, but also benefit from cognitive, cultural and social distance which are important for middle-ground innovations (Harmaakorpi, 2010; Boschma, 2005). Moreover, the development of practice-based innovations have been fostered by reflection used as an instrument to integrate research-based knowledge with practice-based knowledge to scrutinise and possibly revise prevailing thought and action patterns, thus facilitating creative learning (Nilsen & Ellström, 2012).

Challenges of the innovation environment in preparing for sudden structural changes

From the point of view of the macro economy, a sudden structural change is an emergent phenomenon, which usually gives rise to a number of unexpected phenomena in the business sector and regions. Therefore clusters and development networks should improve their ability to deal with unexpected, sudden events. To succeed in this, networks should maintain a continuous innovation process, which will improve their ability to quickly generate new knowledge, to find the key meanings of new knowledge and to come up with novel solutions in order to resolve emergent situations. The experiences gained of the operation of the most advanced clusters and development networks (e.g. Valkokari, Paasi & Rantala, 2012) suggest that minor emergence, obscurity and fuzziness is in fact welcomed, as it seems to boost the development of new, innovative solutions or policies.

Taking concrete steps to address the development challenges of regions should be seen as a shared mission, which calls for reconciliation of strategies between organisations (Sotarauta, 2010) and finding opportunities for encounters between different groups and experts in varying, innovative environments. New collaboration mechanisms are needed in the regions in order to promote development in development networks and clusters, identify structur-

al holes (Burt, 2004) and commit to fulfilling shared interests (Nahapiet & Ghoshal, 1998). From the point of view of preparing for sudden structural changes, cooperation mechanisms are needed in order to maintain a continuous innovation process between the region's clusters and development networks. Mechanisms are needed e.g. for strengthening interdisciplinary RDI activities (e.g. Harmaakorpi, 2004), harnessing the innovation potential of university students for use by the region's companies (Charles & Benneworth, 2002) and creating and expanding innovative companies (Schumpeter, 1967; Rogers, 2003). A more influential source of innovations seems to be factors like the ability to interact, learn collectively, and build trustful relations between the innovating partners (Asheim, Coenen & Vang, 2007; Hautamäki, 2013).

In the future, cooperation mechanisms should ensure that regional innovation activities in the Lahti region will be increasingly targeted at cooperation between clusters that are unfamiliar to each other. This will allow the creation of new synergies and prevent the realisation of the risks of sudden structural changes. At the same time, the competence of RDI personnel should be reformed so that they will be capable of acting in remote areas lying outside the strong development cores of business clusters (Clark, 1998), of promoting networking and of implementing a visionary development approach (e.g. Sotarauta, 2010). The success of innovation processes also requires that the knowledge flows between clusters, companies, education and research, and between regional development actors are open and effective. In addition, the intermediary organisations that activate regional cooperation mechanisms should be closely networked with other regional and international actors.

The networked innovation environment places new demands for collective knowledge production. The cluster model tends more likely to foster knowledge production based on meetings between the companies and university members in a cluster operating within the same branch. However, knowledge production within practical contexts as an innovation potential is explored between dissimilar industries (e.g. Howells, 2002; Burt 2004). In order to be able to utilise the innovation potential in structural holes, knowledge should often be transferred between research-oriented and practice-oriented partners, as well as partners of completely different horizontal knowledge interests. Business innovations are essentially tied to practical business. That is, the framework of research is only one factor to determine the context of innovation. To innovate usually means to cooperate which refers to knowledge production within groups of people that have a shared interest, determined by the practical context in which the group is working. (Harmaakorpi & Mutanen, 2008.)

"ENCOUNTERS BETWEEN EXPERTS REPRESENTING NEW KNOWLEDGE AND DIFFERENT COMPETENCIES OFFER OPPORTUNITIES FOR THE CREATION OF SUCCESSFUL INTERFACE INNOVATIONS"

More customer-based forums, development platforms and mechanisms are needed in order to support practice-based development and to promote the effectiveness of collaboration between the companies, higher education institutions, development organisations and citizens involved in the region's networks. This calls for leadership in regional learning to promote the ability to handle and assess different types of knowledge together in relation to the development target or entity (e.g. Charles & Benneworth, 2002; Castells, 2000). From the point of view of preparation, building trust

between organisations and experts is perhaps the most important element supporting collaboration. Particular attention is paid to a new methodology to assimilate foresight information and convert it into future-oriented innovation knowledge (cf. Uotila, Harmaakorpi & Melkas, 2006). Learning and the creation of shared views call for increasingly confidential interactive relationships, which are established in networks through small-scale development groups, for instance. In addition, encounters between various groups and experts in more relaxed environments and face-to-face collaboration are needed.

A particularly prominent challenge will be the parallel generation of science-based (STI) and practice-based (DUI) knowledge (Uotila, 2008, 30) and its use as the base of open innovation activities. Therefore, regions should focus on acquiring broad futures knowledge that supports different knowledge bases. Futures knowledge is needed particularly if sudden, unexpected changes take place in the operating environment, which calls for knowledge and competence for redirecting strategies. Therefore, preparing for sudden structural change should be one of the key themes in the regional development platform, in which there is a quest for a shared understanding of the concrete measures through which the risks related to preparation can be prevented.

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CHAPTER

8

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Significance of international business and local business clusters for the preparation of sudden structural changes in the regions

Introduction

McMillan (2004), utilising a mechanical approach, based on linear understanding of life and the universe, describes change as a disturbing process which generally leads to problems. The flows of the globalising economy have made borders and rhythms fuzzy, which has changed the world and made it more hyperactive (Thrift, 2002). An evolutionary conception of change highlights the forces, which make the world change and adapt to the changes taking place in an environment and which generate, select and instil new ideas to regions (Boschma & Martin, 2007). The significance of the region in the global economy has increased and recent developments have enhanced the importance of regional business clusters and development networks as well as regional innovation systems (Asheim, Cooke & Martin, 2006). In addition, an evolutionary conception of change (cf. Sotarauta & Srinivas, 2006) is gradually changing traditional development views in business clusters. Based on this new approach, clusters have been determined to be capable of outlining new development paths (Sotarauta & Kautonen, 2007), in which new phenomena, trends and the needs

of the citizens, customers and consumers using products and services play an important role in preparing proactively for sudden regional structural change (cf. von Hippel, 2005; Chesbrough, 2003).

The diversity of the business structure is one of the key factors in preventing sudden structural changes in the regions (Martin, 2012; cf. Järvinen, Hautamäki & Vesasto, 2013). From the point of view of preparing for structural changes, it is of key importance to build and expand regional business clusters. Clusters can have their genesis in university science (Braunerhjelm & Helgesson, 2006), entrepreneurship (Feldman & Braunerhjelm, 2006) or pioneering multinationals (Giblin & Ryan, 2012), where technological capabilities are the mainstream of cluster well-being (Best, 2001) and are manifested in a firm's ability to shape and integrate core competencies with external resources and complementary assets (Teece, Pisano & Shuen, 2000). Innovation activities in clusters are often considered interactive, open processes, which emphasise learning and are maintained and supported by stakeholders responsible for regional development (cf. Tödtling & Trippl, 2005). The dynamic is of collaboration in which different stakeholders in the network and clusters influence each other's choices and processes so as to evoke real changes through cooperation (cf. Sotarauta, 2010). Accordingly, clusters inspire a new level of cooperation between companies, scientific communities and regional stakeholders for the generation of innovative new solutions for today's and tomorrow's products and services.

Knowledge complying with the scientific 'Science, Technology and Innovation' (STI) model is often utilised in practice-based innovation environments (cf. Uotila, 2008). Efforts are taken to develop new customer-oriented and consumer-driven solutions through experience in accordance with the 'Doing, Using, Interacting ' (DUI) model, in which development emphasises open innovation and learning at work and in customer projects (Cara, Lundvall & Mendon, 2009). A particularly prominent challenge is the parallel generation of science-based (STI) and practice-based (DUI) knowledge (Uotila, 2008, 30). Knowledge flows are usually mediated by intermediary organisations in the regional innovation system (cf. Kautonen, 2006) Long-term 'exploration' should constantly be pursued in regional networks like clusters in order to find a shared view of the challenges facing the region and to be able to identify new, significant future needs (cf. Sotarauta, 2010). The role of local activity in the creation of innovations becomes more prominent, as innovations are dependent on tacit knowledge, which is embedded in the people, companies, networks and local relations of the region (Lundvall, Johnson, Andersen & Dalum, 2002).

The backround of international business

Today, learning and innovation are the most important dynamic elements in the region (cf. Turok, 2004), which aim to create new knowledge and utilise it (Tödtling & Trippl, 2005), in addition to making regions sticky in order to enable businesses establish and embed in the region in a slippery environment (cf. Markusen, 1996). Globalisation and the possibilities of innovation environments increasingly highlight the role of international business as boosting regional competitiveness (cf. Bathelt, Malmberg & Maskell, 2004; Turok, 2004). Divergent development paths may exist in the background of the development of international business in the regions. The development may be very fast as a result of e.g. foreign direct investments (FDI) (cf. Cooke & Schwartz, 2012; Giblin & Ryan, 2010) or a slower process based on increasing business collaboration between small enterprises in the region (cf. Isaksen, 2012; Melkas & Uotila, 2012). Regardless of the formation mecha-

"INTERNATIONAL BUSINESS EXPANDS INCREASING THE REGION'S COMPETITIVENESS AND CAPACITY TO PREPARE FOR SUDDEN STRUCTURAL CHANGES"

nism, it is nevertheless important, from the point of view of regions, that international business expands increasing the region's competitiveness and capacity to prepare for sudden structural changes (cf. Martin, 2012). Expanding international business decreases the sensitivity to sudden structural change. At the same time it increases the regions' vulnerability to sudden structural changes caused by the negative impact of disturbances in global markets (cf. Gallopín, 2006; Martin, 2012; Järvinen, Hautamäki & Vesasto, 2013; Chapter 4).

The basis of expanding international business in the region has its foundation in the ability of businesses to collaborate, to learn together and to connect to the local innovation environment, as well as to promote and invest in entrepreneurship, to create international linkages and to manage cooperation (cf. Cooke & Schwartz, 2012; Isaksen, 2012; Kale & Singh, 2009). It is a question of building new capabilities to increase regional self-renewal capacity (cf. Saarivirta, 2007) and absorptive capacity (cf. Uotila, Harmaakorpi & Melkas, 2006), which are supported by regional innovation environments (Kautonen, 2006). Generation of new business may be based on spin-outs, as larger companies divest or diversify existing products and services in order for them to be further developed in new small businesses, along with the creation of new markets. Moreover, new small businesses are often founded on the principles of practice-based innovation activities, which emphasise the use of an open, symbolic knowledge base generated at the customer interfaces (cf. von Hippel, 2005; Chesbrough, 2003). It is essential that new small businesses are a part of the same business chain to strengthen local business clusters. The companies engage with suppliers, strategic partners, and sister offices globally in an effort to reach the global marketplace with their products.

Regional impacts of international business in Ireland

The presence of FDI in industry agglomerations or clusters has been shown to contribute to the advancement and dynamics of clusters, particularly through the transfer of technology (Enright, 2000) or enhancing the perception and reputation of the cluster (Birkinshaw, 2000). In addition, the presence of foreign-owned Multinational Companies (MNC) is found to enhance the degree of internationalisation of domestic firms in terms of engaging in outward foreign investment (Mariotti, Mutinelli & Piscitello, 2008). However, the degree of advancement or enhancement will vary. Padilla-Pérez (2008) has concluded that technology transfer from FDI can impact a region, but rather than being an automatic occurrence, certain regional characteristics should be present, such as high local capabilities, engaged universities and specialised labour. In certain regions, public policy has also exogenously attempted to create industrial agglomerations through attracting FDI to a region (Giblin & Ryan, 2012). MNCs can also connect the cluster to other clusters in global locations (Hervás-Oliver, Albors-Garrigós & Dalmau-Porta, 2008) and thereby improve the external connectivity of the cluster. The local clusters are not only about export promotion. For foreign companies the clusters represent

a gateway for finding research and business partners (cf. Chapter 7) and an opportunity to 'tap into' local knowledge networks (Andersson, Forsgren & Holm, 2002; 2007).

When MNCs wish to enhance their future wealth-creating capabilities in a cost-effective way (Dunning, 2000), they locate in regions in order to gain access to local knowledge spill-overs (Narula & Zanfei, 2005) and tend to favour sites with a cluster of related firms. MNCs exploit local capabilities and contribute to collective learning that builds cluster competencies and upgrades the knowledge-intensive capabilities of the clusters (cf. Porter, 1990; Cumbers, MacKinnon & Chapman, 2003; Kautonen, 2006; Cantwell & Piscitello, 2005; De Propris & Driffield, 2006; Mudambi & Swift, 2012). They are attracted to, and attract partners within existent clusters and advance the dynamics of the cluster rather than instigate clusters. Generally they enhance the perception and reputation of the cluster (Birkinshaw, 2000) and the degree of internationalisation of domestic firms in terms of engaging in outward foreign investment (Mariotti, Mutinelli & Piscitello, 2008).

Moreover, FDI can instigate a clustering process, thus contesting the view that there are limited local spillovers in FDI-generated clusters and showing that external economies can be captured locally from FDI in such clusters (cf. Markusen, 1996). FDI can generate a clustering process that goes beyond vertical subcontracting relationships (cf. Giblin & Ryan, 2012). Co-locating firms within the same or similar field of activity facilitates access to knowledge and establishment of global links. Given that it is foreign investors that are creating a clustering effect, it can be argued that the survival of the cluster depends on the continued presence of these investors in the region (Giblin & Ryan, 2012). Countervailing this view is the rise of an indigenous base through capability reconfiguration and establishment of new firms and capturing of external economies in the locale. The FDI mechanism is particularly palpable in an economy like Ireland's, where the economy is too limited indigenously to build a sector in which the country does not have a comparative advantage (Giblin & Ryan, 2012) nor a sufficiently sized domestic market. Policy which continues to attract FDI by building on the capacity of the growing indigenous base is of paramount importance in an effort to sustain the local hub. MNC affiliates may act as a source and conduit of knowledge for this change and as such can play a role in anchoring and possibly extending clusters' lifespans (Giblin & Ryan, 2010).

Over the past thirty years or so, Ireland has evolved from a relative economic backwater (Powell, 2003) to one of the most developed, albeit FDI-dependent economies in the world (Barry & Kearney, 2006; McDonnell, Lavelle, Gunnigle & Collings, 2007; Giblin & Ryan, 2012). FDI in Ireland is concentrated in a number of key sectors like IT, pharmaceuticals and the medical technology sectors. The medical technology sector, for instance, is a significant employer in the Irish context particularly in the Galway region with many thousands of employees. The Galway Medical Technology Cluster is rooted in public policy that attracted large foreign investors such as Medtronic and Boston Scientific to the region.

These foreign companies were initially attracted to Galway due to alluring tax structures and financial packages as well as the availability of both skilled and semi-skilled affordable labour. The Galway Medical Technology Cluster is an export-oriented cluster with all of the firms studied selling output internationally, particularly to North America and Europe. Beyond attracting FDI, public policy has played a role in the development and dynamics of the sector locally, where a growing indigenous base of companies has developed alongside the foreign investors. Besides areas of activity such as diag-

"CREATING LINKAGES TO INTERNATIONAL BUSINESS MEANS MORE BUSINESS ACTIVITIES FOR THE KEY LOCAL COMPANIES AND CLUSTERS"

nostics and respiratory, over time, the production of cardiovascular-related devices and their components has become a particular area of expertise in Galway, with coronary drug-eluding stents, produced by the aforementioned Boston Scientific and Medtronic, being the largest export from the region. Other products, produced by other companies also, include related cardiology products, such as guidewires, balloon catheters, and hypotubes and filters. Over time, indigenous firms emerged. The first wave acted as suppliers to the MNEs. The second wave was led by former MNE employees who set up their own companies based on R&D. This provided some diversity in the cluster as did R&D conducted by the local university and institute of technology. This guards against a sudden change such as a disruptive technology. (For a full discussion of the origin and evolution of the Galway medical technology cluster and its innovation and technological capabilities development see Giblin & Ryan (2012) and Ryan & Giblin (2012)).

The significance of international business in the preparation for sudden structural changes

Multinational companies and domestic businesses pursuing international markets often seek cooperation with local business clusters and development networks. The companies aim to access external resources within local innovation environments in order to develop business (cf. Teece, Pisano & Shuen, 2000). To create visionary and innovative capacities in the regional innovation system, innovation processes often take place in heterogeneous multi-actor innovation networks setting special demands for the absorptive capacity of the entire system (Kautonen, 2006). In the long run, regions with functional and dynamic innovation environments turn out to be less sensitive to sudden structural change than regions of a more static nature (Martin, 2012; Järvinen, Hautamäki & Vesasto, 2013; Chapter 4).

In order to support international businesses and reduce sensitivity to sudden structural changes, the regional development networks and local clusters are expected to be able to reach, jointly and separately, the targets set in other regional strategies (cf. Sotarauta, 2010), bring knowledge located outside the region for the use of local stakeholders by means of interregional networking (cf. Bathelt, Malmberg & Maskell, 2004), and to promote the generation of creative social capital and creative collective eruptions in the networks (Elsner, 2001). Furthermore, the networks and clusters should promote collective learning by producing and sharing futures knowledge, eliminating bottlenecks and problems in the networks, preventing the development of the regional lockins by actively searching for new development paths and interfaces for coincidences (cf. Sotarauta, 2010; Harmaakorpi, 2010; Cumbers, MacKinnon & Chapman, 2003).

The expansion of international business in a region may manifest itself e.g. as the success of local companies in international markets or as international companies being established in the region (Czinkota, Ronkainen & Moffett, 1999) through foreign direct investments (FDI). The impacts on the region,

from the point of view of decreasing sensitivity to sudden structural changes, are very similar in both approaches. In the region, more business means usually more small and medium-sized companies (SME) and jobs created in the region (cf. Martin, 2012). According to Järvinen, Hautamäki & Vesasto (2013), a low unemployment rate in the region reduces the region's sensitivity to sudden structural changes (see Chapter 4). Moreover, various new relationships and links emerge in the region between companies within clusters. That is because for the initiation of new business activities, local resources, such as the competences of applicable workforce and capabilities of local companies, need to be pooled (cf. Birkinshaw, 2000).

Due to the changes in the global and local markets, creation and innovation of new products and services with customers and clients are called for (cf. von Hippeln, 2005; Chesbrough, 2003). Therefore it is important for companies to locate themselves to a region with a conducive innovation environment (Kautonen, 2006). Highly developed local innovation environments allow the build-up of the kinds of links to global research and markets (Tödtling & Trippl, 2005) that are exploitable in developing and creating new business in a manner that sustains open innovation. Furthermore, as a result of international business activities, it's possible that new business branches emerge in the region or at least new SMEs are established having new kinds of capabilities to do business on the interfaces between local clusters and international markets (cf. Cooke & Schwartz, 2012; Isaksen, 2012). The diversity of regional industry and business will gradually increase, which reduces the region's sensitivity to sudden structural changes in the long run. Moreover, the expansion of business activity decreases the proportion of public sector jobs in the region, which is again estimated to reduce the degree of sensitivity to sudden structural changes. (cf. Järvinen, Hautamäki & Vesasto, 2013; Chapter 4.)

The main factors in the establishment of foreign business are related to the promotion of financing and availability of skilled labour. Regional business development companies are needed to support foreign business by seeking out solutions for financial investments and finding adequate facilities and infrastructure. Experts are needed for assessing the possibilities and risks as regards new businesses, in addition to finding financing at national level. Moreover, experts try to find business networks for new companies in order to create opportunities for local knowledge transfer (Giblin & Ryan, 2012) and to increase company turnover (Cooke, 1996). Business networks are vital for interconnecting the innovation environment so as to create and refine new business ideas, in addition to development of new business capabilities. As a consequence of MNC investments, the set-up of small businesses will be activated and their share of the overall number of businesses will grow, thus lowering the region's sensitivity to sudden structural changes (cf. Järvinen, Hautamäki & Vesasto, 2013; Chapter 4).

According to Järvinen et al. (2013), a high level of skills and competence in the region increases the degree of long-term resilience to sudden structural changes. In addition, it could be concluded that the more the businesses and education are engaged in mutual research, development and innovation activities, the less vulnerable the region is (cf. Chapter 4). For better availability of skilled labour, the educational system is required to be efficient and respond quickly to new skills needs. From the perspective of preparing for sudden structural changes, the content of vocational and higher education in the regions has to be based on foresight results which have emerged during the collaboration and futures studies between educational institutes, clusters and companies. Moreover, it is sensible to implement education and training in close collaboration with working life (cf. Knight, 2002). Therefore it is

very important that functional local business services and high-level skills and competences of the local workforce are maintained. What is particularly needed in the regions is adult education which responds quickly to the changes in the operating environment. (cf. Hautamäki & Leveälahti, 2013; Chapter 10.)

Conclusion

Overall, the key success factors for attracting foreign direct investment (FDI) and creating new international business by local companies are based on the region's reputation in supporting new business and transferring knowledge (cf. Giblin & Ryan, 2012), being entrepreneur-friendly (Wang, Gu, Tse & Yim, 2012) and implementing shared leadership as regards collaboration and in pooling significant resources of the regional innovation system (cf. Kautonen, 2006; Sotarauta, 2010). Beyond attracting foreign direct investment or promoting internationalisation of local companies, public policy and collaboration play a significant role in the development and dynamics of the region (cf. Knight & Kim, 2009; Giblin & Ryan, 2012). Moreover, a sustainable advantage in the market is increasingly dependent on cultural factors, which have to be taken into account in strategic planning and business management (Mazur, 2010). Regional collaboration that is functional in terms of social interaction, renewal-oriented and features political decision-making which supports the business and economic development, contributes to the degree of resilience of the region (Martin, 2012).

Regions are able to improve their reputation by creating a regional innovation environment, which responds by building business clusters and public networks in order to maintain continuous development in the creation of new business and improvement of capabilities for innovation and collaboration. To ensure this, regions need structures and activities allowing the activation of their innovation environments, reformation of their networks, and introduction of new synergies based on their existing regional strengths and opportunities (cf. European Commission, 2010). Therefore, long-term exploration should constantly be pursued in regional networks in order to find a shared view of the challenges facing the region and to be able to identify new, significant future needs (cf. Sotarauta, 2010). The role of local activity in the creation of innovations becomes more prominent, as innovations are dependent on tacit knowledge (Lundvall, Johnson, Andersen & Dalum, 2002).

Industries and clusters make use of an analytic, synthetic and symbolic knowledge base (Asheim & Coenen, 2005; Mariussen & Asheim, 2003). Knowledge flows are usually mediated by intermediary organisations in the regional innovation system (cf. Kautonen, 2006). To support balanced, continuous change, a highly effective, collaborative and innovative regional education system and RDI are needed with a capacity to expand the skills and competences required for change in the long term and to take responsive, flexible action in order to improve job mobility in the face of sudden structural change. Cooperation should be pursued between the business sector and RDI actors in order to consciously expand cross-disciplinary research and development activities and establish new international contacts. Furthermore, the visibility and permanence of innovation structures in the region must be secured so that their mutual cooperation can be activated and their development activities linked with regional, national and international development frameworks. Several intermediary organisations (Melkas & Harmaakorpi, 2008) are needed in the region, such as regional business development agencies and universities which have significant roles in maintaining continuous, moderately sized change in the economic structure of the region.

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CHAPTER

9

Jari Hautamäki

Leading the regional collaboration of the preparation for sudden structural changes

Introduction

The share of the working-age population will diminish in almost all regions in Europe in the next few decades. This may result in limited regional business prospects. Global market disturbances are also on the rise, which can make the regions vulnerable for sudden structural changes. Foreseeing such changes is very difficult, yet the regions must be prepared. Therefore, preparation for sudden structural change must be part of broader strategic regional development (Cooke & Eriksson, 2012; Sotarauta, Horlings & Liddle, 2012). Preparation can to be promoted among other things by gathering foresight planning results from regional actors, identifying the risks occurring in them and preventing the realisation of risks through strategic regional measures.

The most important aim of preparation is to increase regional self-renewal capacity (cf. Sotarauta, 2005). In practice, this can take the form of the ability of the region (1) to resist sudden structural changes, (2) to recover from the effects of an unexpected structural change, (3) to redirect the resources released in the region and (4) to renew the region by carrying out more reforms (cf. Martin, 2012; Chapter 3). To increase self-renewal capacity, collaboration is needed between regional stakeholders and companies. From the point of view of preparation, collaboration aims to produce knowledge of the driving forces of relevance to the future of the region, as the risks to which the region is exposed and factors preventing these risks can be determined by analysing the threats and opportunities of the driving forces (cf. Saarivirta, 2007; Chapter 5; Chapter

6). According to Hautamäki (2013), shared leadership in the development networks controls the dynamics and balance of collaboration taking place in the complex environment, which increases the region's self-renewal capacity due to social processes between the regional experts.

A region faces a crisis sooner or later (Saarivirta, 2007). Regions can be prepared for it by developing self-renewal capacity. Self-renewal capacity can be seen as a set of capabilities aimed at renewing regional resources for the production of something to be used in preparing for the future and in facing future crises (cf. Sotarauta, 2005). To increase self-renewal capacity in the regions, 1) integration is needed to bring experts and organisations together in the networks, 2) exploitation is needed as a way of creating and utilising new knowledge, 3) exploration is needed to boost research, development and innovation structures and processes, 4) absorption is needed to promote the utilisation of existing information and to create spin-outs. Shared leadership is about having collective power to link the visions, mutual interests, structures and processes of stakeholders together. (Saarivirta, 2007.)

The regional preparation process

Regional knowledge is generated by rendering visible and analysing the region's long and medium term history to form an evolutionary path illustrating the direction and content of region's transformation, especially in changes affecting the population and workforce, evolution of business life and the underlying infrastructure and regional competence structures (Nunn, 2009). Preparation is supported by knowledge of alternative regional scenarios by creating strategic knowledge on regional driving forces and risks resulting from these impacts and factors preventing the realisation of the risks. Future-oriented work of this type can be implemented as a presentation of e.g. alternative regional scenarios (Uotila, 2008). Moreover, preparation needs to be underpinned by statistical information transformed into easily interpreted indicators that can determine a region's sensitivity to the effects of sudden structural changes (cf. Martin, 2012; Chapter 4).

The foresight knowledge related to preparation is often embedded in the form of tacit knowledge, which the leaders and experts of the region's stakeholders make visible during their mutual process of knowledge creation (cf. Nonaka, Toyama & Konno, 2000; Uotila, Melkas & Harmaakorpi, 2005). Collaboration seeks to produce and look for knowledge that is most relevant from the point of view of the future of the region. As regions are path-dependent, a parallel examination of futures knowledge and knowledge produced of the region's development history is worthwhile. The process results in regionally important knowledge of the driving forces affecting the region and of the related threats and opportunities. Foresight knowledge of relevance to the region manifests itself as a gap between futures knowledge and current knowledge. Therefore, finding a shared view of the future requires learning between regional stakeholders (Uotila, 2008), which often has features of expansive learning (Engeström, 2004). A shared development path begins to take shape when the collaborating parties begin to learn to identify the risks that are most relevant from the point of view of the future of the region and the factors preventing such risks (cf. Morgan, 2004).

Leadership from the perspective of social capital and interaction

The experts and leaders engaged in the collaboration can influence the transformation of the region and promote the adaptation of actors to the changing operating environment. The management of a preparation process is based on shared leadership among regional stakeholders and networks (Sotarauta, 2005),

"INTERACTION IN THE NETWORK IS AN INSTRUMENT OF LEADERSHIP FOR THE RECONCILIATION OF INTERFACES AND DEVELOPMENT CONTEXTS"

with mutual interests transformed into concrete cooperation and action in an atmosphere of open interaction and mutual trust. Efforts to plan preparation for sudden structural change are managed and steered across organisational boundaries, in which leadership is determined through action, not ownership or position. As a result, leadership does not occur in manager-subordinate relations. In this respect, leaders must support the creation of new collaboration mechanisms in order to activate and promote development in development networks and clusters (cf. Bathelt, Malmberg & Maskell, 2004). Trialogical interaction enables discussion and transference of knowledge between the experts and key managers related to the shared focus of development. Shared development targets may to be changed until the experts have learnt enough in order to create a shared understanding of the changes. Therefore, trialogical interaction is also a tool for learning in the network (Hautamäki, 2013).

Collaboration aimed at preparation should pay special attention to the growth of social capital. Stakeholders network with each other in social networks, in which different connections bind persons together. By increasing social capital, leaders can promote the learning and mutual trust of persons participating in the operation of the network. Leaders then act as social architects capable of shaping values and norms through their actions and even influencing people to accept new things and identities (cf. Bennis & Nanus, 2003). The operation of networks can be balanced through encounters with people, motivation and intellectual stimulation to empower the persons involved in collaboration (Bass, 1998). The leaders and experts possessing most insight understand the character of the preparation process and are able to support learning in multi-context and multi-cyclical development cycles (Hautamäki, 2013; Figure 1) through leadership actions implemented at the right time and in the right manner. These leadership actions empower participants and experts, accelerating and strengthening the preparation process (cf. Sotarauta, Hukkinen, Bruun & Linnamaa, 2002; Doz & Baburoglu, 2000).

Collaboration is based on reconciling the interfaces and development contexts in the network (Sotarauta, 2010; Hautamäki, 2013). Achieving this requires long-term efforts, face-to-face encounters (Asheim, Coenen & Vang, 2007), reconciliation of differences, influencing opinions, negotiation and agreement (cf. Sotarauta, 2010). Mutual dependency among regional stakeholders and the discovery of its significance (Doz & Baburoglu, 2000) are the prerequisites of cooperation and leadership. According to Hautamäki (2013) the leadership of regional development network integrates and instills the practices of preparation for sudden structural changes to collaboration based on multi-organizational, multi-administrative, multi-level structures and multi-layered activities. Persons skilled in shared leadership can strengthen processes through interaction, participation and relevant discussion. Interaction must be long-term and continuous, as rapid changes in the operating environment constantly transform mutual dependency between stakeholders, which in turn changes the content and character of shared interests.

"LEARNING PRODUCES A SHARED VIEW OF THE RISKS THAT ARE MOST RELEVANT IN TERMS OF REGIONAL PREPARATION AND INDICATES THE FACTORS TO WHICH THE REGION SHOULD DIRECT PROACTIVE EFFORTS AND MEASURES"

Leadership from the perspective of collaborative learning

Leadership aims to boost the participation of regional actors in networks and to increase awareness of future with an aim to create and look for new paths (cf. Sotarauta, 2007). Collaboration in the regional development network is based on a learning process having an innovative character (Hautamäki, 2013). Collaboration creates significant knowledge (cf. Nonaka, Toyama & Konno, 2000), plans and develops shared solutions (cf. Engeström, 2004) and designs customer-oriented and demand-driven services (cf. Sanders & Simons, 2009; Chesbrough, 2003) for the development of region. (Hautamäki, 2013.) Leadership requires the ability to perceive the benefits that collaboration pursues (cf. Sotarauta, 2008). The mission of the leadership is to create shared significances in the preparation for sudden structural changes (Hautamäki, 2013). To ensure this, the region's key development challenges must be identified, which calls for new ways of collaboration and interaction between companies, education and regional development units (Sotarauta, 2010; Uotila, Melkas & Harmaakorpi, 2005).

According to Burt (2004), this involves the ability to identify structural holes - development gaps between the present state and anticipated future - in the development sphere. Structural holes often include a variety of development challenges, which must be reviewed to identify those which will be included in the regional development framework and to which joint development efforts will be directed (cf. Sotarauta, 2010). Taking concrete steps to address development challenges should be seen as a joint mission, which calls for reconciliation of interorganisational strategies and introducing opportunities for encounters between groups and experts in diverse innovative environments. The question is of a shared vision, the fulfillment of which requires visioning between visions by organisations. Therefore, the leaders must be capable of creating interesting, attractive development windows to the region and introducing new meanings to development. Above all, this requires merging new knowledge with the development prospects of education and partners through joint strategy work and development planning (Sotarauta & Srinivas, 2006; Uotila, 2008).

Leadership works for renewing the region's dynamic elements by creating new regional capabilities (Hautamäki, 2013). It is based on supporting capabilities development in organisations engaged in networks and the reconciliation and coordination of resources (cf. Sotarauta, 2008; Bass, 1998). Through this, leadership has a major impact on the knowledge, resources and competences available to the region's companies (Porter, 1998, Lagendijk, 2000). The aim of leadership is to influence thinking and action in all cooperation organisations by managing development processes. The purpose of leadership is to strengthen networked development work and pursue towards a shared development vision. It is important to ensure that employment and economic organisations and clusters have access to

strong, high-quality, multi-sector regional innovation hubs. (Sotarauta, 2010.) The experts of these hubs must have considerable creative, customer-based competence and cooperation capabilities, enabling stronger practice-based innovation activities. In addition, the permanence and visibility of innovation structures in the region must be ensured so that cooperation between them can be activated and their regional, national and international development activities can be linked with the regional development framework.

Conclusion

Management of the preparation process management is based on shared leadership (cf. Hautamäki, 2013; Figure 1) among regional stakeholders (Sotarauta, 2005), with mutual interests transformed into concrete cooperation and action in an atmosphere of open interaction and mutual trust. Achieving this requires long-term efforts, face-to-face encounters, reconciliation of differences, influencing opinions, shared visioning, negotiation and agreement. Mutual dependency among regional stakeholders and the discovery of its significance are the prerequisites of cooperation, commitment and shared development.

Steering a regional preparation process is extremely demanding. Skilled leaders are able to strengthen the said processes through interaction, participation and relevant discussion. Interaction must be long-term and continuous, as changes in the operating environment con-

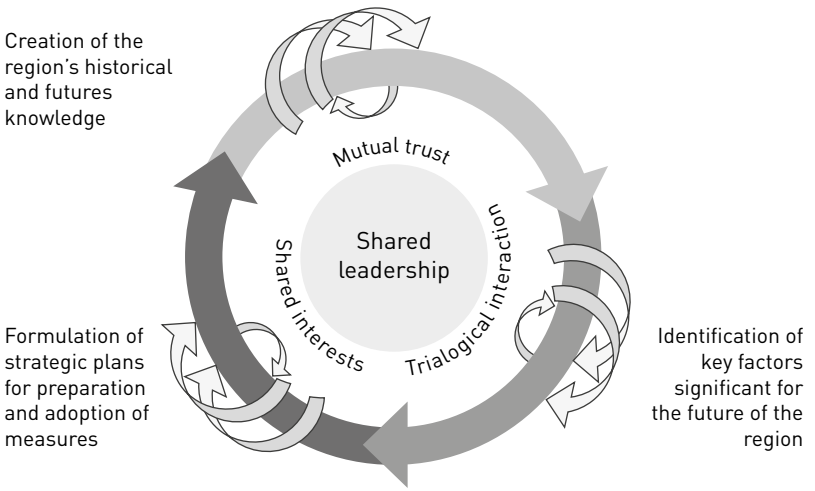

Figure 1. Regional collaboration processes of preparing for sudden structural changes (Hautamäki, 2013)

stantly transform mutual dependency among stakeholders, which in turn changes the content and character of shared interests. The most experienced leaders and experts understand the character of the individual elements within the preparation process, and are able to support development cycles through management actions at the right time and in the right place for mobilising the resources. These management actions usually empower leaders and experts as well accelerate and strengthen the preparation process for instilling the results of collaboration.

Preparation for sudden structural changes requires proactive measures in the regions, with emphasis on the leadership of the regional innovation environment. The question then is of leadership that activates regional development networks and clusters, refines their knowledge base, expands mutual communication and interaction, and reforms different types of mediating mechanisms, such as business incubators, cluster development services, adult education guidance services or other corresponding services. This allows increasing and boosting the exchange of knowledge between network stakeholders and the usability of innovation activities (Dhanaraj & Parkhe, 2006; Uotila, Mäkimattila, Harmaakorpi & Melkas, 2012). Leadership should support the growth of the region's innovation potential e.g. through investments in improving the innovation capabilities of students and teachers. This requires problem-based learning environments, which are available through on-the-job learning, for instance (cf. Chapter 10). To support the largely practice-based development of this kind, forums, development platforms and mechanisms are needed in order to promote the fluency of collaboration among the companies, higher education institutions and development organisations engaged in the region's networks.

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CHAPTER

10

Jari Hautamäki & Samuli Leveälahti

A perspective on employee competences and educational challenges in the future

Introduction

The Päijät-Häme region is facing driving forces which will expose it to sudden structural changes in the future. The region aims to adapt to these forces and leverage the opportunities these changes bring. The 2008 global financial crisis continues to influence the future of the regions. At the moment, it looks like there will be a slowdown in economic growth, while the number of SMEs rises as the business structure breaks down as a result of structural change. The financial crisis also accelerates change in the revenue models of businesses towards a more network-based form. Rising unemployment - especially youth unemployment - seen across Europe is also a reality in the Lahti region, which is why the region needs innovative growth enterprises to create new jobs and competences. What new competence requirements and practical challenges does the future hold for vocational education and higher education in Finland? The question is discussed in this chapter in light of the reports of the OECD (2013) and the European Commission (2007) and the outcomes of the report by Buschfeld, Dilger, Heß, Schmid & Voss (2011) for the European Commission.

"THE ROLE OF CONTINUING EDUCATION BECOMES INCREASINGLY IMPORTANT IN THE CONTEXT OF STRUCTURAL CHANGES"

The impacts of forces driving change

According to the analysis on the economic operating environment of the Lahti region (Vepsäläinen, Vainikka & Paakkunainen, 2008), forces driving change in the future include (1) increasing global competition in business, (2) the concentration of population and economic activity in growth centres, (3) networking and links with international business, (4) increasingly knowledge-intensive services and accelerated technological development, (5) the ageing population and the reorganisation of public services, (6) the increasing importance of sustainability and responsibility, (7) the increasing importance of cultural issues, (8) the diversity of lifestyles and the increased complexity of life management, (9) the growing role and rising prices of energy and raw materials, and (10) the economic rise of BRIC countries, especially Russia and China. In analyses carried out as part of the Proactive Approach to Structural Change (ENNE) project (e.g. Hautamäki & Ilmonen, 2013; see Chapter 6), the driving forces in the future are identified as follows: (1) Increasing porosity of interregional boundaries, (2) Growing demand of multiskills, (3) Increasing adoption of smart and sustainable solutions, (4) Growing need for creative services, (5) Growing need for interaction supporting well-being, (6) Increasing flow of information and knowledge, (7) Increasing convergence of cultures and international business, (8) Growing need for fast learning business networks, (9) Increasing complexity of authentic markets and (10) Increasing reality of global asynchronocity.

In terms of change, the future seems very challenging, which is why it is wise to prepare for the impacts of the driving forces (Smith, 2005; Martin, 2012) by creating shared, scenario-type perspectives (cf. Uotila, Melkas & Harmaakorpi, 2005). From the point of view of structural change and driving forces in the future, the key issues are the leadership of collaboration and competence development. Regional development is seen as a competence-based process that emphasises the role of collaboration in the employment and business sector and the public sector in the production and application of innovative new knowledge (e.g. Deakin & Allwinkle, 2007; Morgan, 1997) and competence related to sustainability and entrepreneurship (Sotarauta, Horlings & Liddle, 2012; Kibler, 2013). Success in a global, networked business world requires regions and local work organisations to be able to create new regional capabilities (Sotarauta, Horlings & Liddle, 2012; Davidsson, Delmar & Wiklund, 2002). This emphasises the importance of continuous cooperation between experts and employees in work organisations, when considering the long-term competence requirements in vocational and higher education offered to young people and adults (OECD, 2013). From the point of view of short-term structural change, it makes sense to invest in retraining and professional development of the unemployed working age population especially, but also of those who continue to work in an organisation.

Multiple skills are needed in the creation of innovative new solutions. Innovative, sustainable and entrepreneurial solutions can be generat-

"INNOVATIVE AND COLLABORATIVE MULTI-SKILLS WILL BE NEEDED IN THE FUTURE"

ed by combining different types of knowledge and competences in businesses, public organisations and their networks (Leydesdorff & Mayer, 2006; Harmaakorpi & Melkas, 2005), and examining things with a new approach. In practice, this means that companies, entrepreneurs and employees come together to solve shared problems (cf. Bruun, 2002; Ylitalo, Mäki & Ziegler, 2006) related to products or services that are attractive to different operators or that are transforming revenue generation models. In many cases, problems are related to changes in production or service processes as a result of a change in customer and consumer behaviour or a change anticipated by the market. Customers and consumers expect new solutions to be economically, environmentally, societally and socially sustainable (Tukker et al., 2008; Hautamäki, Vuorimies, Leveälahti & Järvinen, 2012). When it comes to creating new solutions, the ability to engage in increasingly broad-based collaboration is required, as different companies and stakeholders work together to combine, in diverse ways, the latest knowledge from different industries and evaluate it in terms of the product or service being developed with the customer (Chesbrough, 2003; Ritzer & Jurgenson, 2010).

In the future, businesses will be increasingly connected via different types of networks, and as a result, shared expertise and leadership between businesses will slowly become common practice. Networking shifts the responsibility for the end result towards a more collective and, at the same time, more individual engagement. Companies and entrepreneurs work in networks to create new knowledge and leverage it in their own businesses, which means involvement in the steering of the network's activity and, consequently, being part of its shared leadership. On the other hand, future networks will have a greater need for individual specialist expertise that can be combined and shared with other experts in order to create novel solutions needed in business development. As a result, partnerships and joint business ventures between entrepreneurs and businesses will become more common. A more sustainable approach will be needed in the employment sector, as work processes are developed based on changes in customer and consumer behaviour. One particular challenge in a globalising business world is the way international environments encounter and how these environments and local operations are reconciled. In addition, the myriad networks of working life require the ability and willingness to learn new, be flexible and quickly respond to changes. (cf. OECD, 2013; European Commission, 2007; Buschfeld et al., 2011.)

Future competence needs

In the future, the ability to produce continuous small improvements - incremental innovations - as part of work processes and a developmental approach to work will be part of the core skill set needed by all active employees. Hybrid business solutions of the future and consumer-driven development of products and services require future employees to have sound networking skills underpinned by multi-skills, multi-channel communication skills and the ability to encounter difference. Learning and maintaining these skills require employees to have excellent interaction skills and the ability to meet different types of experts in work

and development processes, which is why students should have opportunities to participate in collaboration structures involving students from different fields of study, and in genuine work-related learning environments. In problem-based workplace learning environments, students should learn to discern the complexity of challenges and to create relevant knowledge for the development task at hand. At the same time, students should learn to practise co-configuration in organisational changes (Engeström, 2001) and develop learning skills, which will be later refined into life-long learning skills as students enter working life. (cf. OECD, 2013; European Commission, 2007; Buschfeld et al., 2011.)

For businesses to succeed, future employees must have internal entrepreneurship skills, with emphasis on a project-like work approach, new way of thinking and consumer/experience-driven development of products and services. For that reason, students as future employees must be given opportunities to get accustomed to the changing market, improve their prerequisites to participate in international and local business networks and study innovative business concepts before they enter working life. Furthermore, they must learn to assess their own competences so that in their future careers, as entrepreneurs or employees, they will be able to flexibly participate in competence development processes in their workplaces in order to generate competences and well-being that enhance a business's competitive advantage. One important area now emerging is lifestyle and well-being management, as future students and employees will be faced with continuously changing work and learning environments and different work and operating cultures, which require the ability to make complex choices and assess their impacts, including at a personal level. (cf. OECD, 2013; European Commission, 2007; Buschfeld et al., 2011.)

Workplace learning environments offer students opportunities to develop their professional competence and ability to anticipate changes that will take place in the near future. Exploring the future prospects of their chosen field will benefit students later in their work, as it helps them plan their personal life-long learning processes and identify personal goals in career development. In addition, foresight competence helps students develop skills to identify sustainability aspects of products and services. By becoming accustomed to sustainable and responsible practices as students, individuals will be able to apply them later in their working lives, for example, in the assessment of the economic performance of work processes, in ecosystem conservation, or in building and maintaining social relationships. One of the main future challenges will be the promotion of social sustainability. Students can begin to cultivate these skills by exploring real-world questions related to intercultural encounters, the bridging of generational differences, and managing the exchange between rural and urban. Sufficiently long student exchange periods and culturally rich learning environments help future employees identify cultural meanings, have the ability to renew and assess their own competence and that of others, and be able to operate in changing global and local markets. (cf. OECD, 2013; European Commission, 2007; Buschfeld et al., 2011.)

Development challenges in education

Finnish regions need high innovation potential, which can be increased by strengthening the cross-disciplinarity of research, development and innovation (RDI) in vocational education and especially in higher education (cf. Harmaakorpi, 2008). Making the innovation potential available to the region's employment and business organisations requires that new ways of learning and new mechanisms be developed in education (e.g. Charles & Benneworth, 2002). Therefore, schools and

higher education institutions should engage in broad-based discourse with the employment and business sector and create structures, forums and contexts where the public actors of regional development, the third sector, businesses and higher education students can meet in the spirit of open innovation (e.g. Charles & Benneworth, 2002; Chesbrough, 2003; Gunasekara, 2006). In order for collaboration to become a reality, the education sector must reinforce its role in the coordination and leadership of regional networks and assume a greater responsibility for the incubation and growth of new businesses. (see Clark, 1998; Lyytinen, 2011.) Regional development is about improving the exploitability of innovation (Dhanaraj & Parkhe, 2006), which allows educational organisations to act as intermediaries - for example, between clusters - to accelerate mutual, innovative collaboration at their interfaces (cf. Lyytinen, 2011). Secondary and higher education institutions should look for joint mechanisms to increase and steer regional impact and collaboration. (e.g. Science and Technology Policy Council, 2008.) At the same time, it means that secondary and higher education institutions should develop their competence in the leadership of regional developer networks (Clark, 1998; Lyytinen, 2011; Chapter 8).

From the point of view of preparing for sudden structural changes, regional education units should engage in closer cooperation with regional business clusters and regional development actors and be active in offering innovative business development opportunities for business clusters (e.g. Kautonen, 2006). This requires joint efforts from different actors to secure external financing and to channel it into the development of the region's competitiveness and business sector (e.g. Clark, 1998; Lyytinen, 2011; cf. Chapter 3). Successful long-term business development requires exploration of the region's future with innovative and diverse methods. This would allow the education sector to create interesting and attractive development windows for businesses and public organisations (e.g. Uotila, 2008), which can further be used in the creation of shared visions (e.g. Valkokari, Paasi & Rantala 2012). To this end, the region needs network-like development platforms and intermediary mechanisms for future-oriented collaboration between businesses, public organisations, developer organisations and the education sector, which can give students and teachers more contact with work-related processes in different forms of long-term on-the-job learning and research, development and innovation (e.g. Clark, 1998; Lyytinen, 2011.)

In order to promote structural change in the employment sector, the region's educational actors should invest in meta-skills and skill diversity for students; first and foremost, this requires cooperation between education staff across disciplines, project-like solutions that are based on customer-driven, problem-based pedagogy, and the integration of business-driven RDI into the learning process. (e.g. Lyytinen, 2011.) In addition, the staff, especially senior management, of secondary and higher education institutions should build functional relationships with the region's employment and business sector in order to promote a demand-based approach and collaboration in education. This will allow the education sector to assume a regional role in tasks such as increasing and expanding an entrepreneurial approach to innovation (e.g. Lyytinen, 2011), creating more opportunities and possibilities for different types of groups and people to encounter one another in versatile, inspirational environments enriched with diversity (Asheim, Coenen & Vang, 2007), reinforcing contacts with other regional, national and international networks (Bathelt, Malmberg & Maskell, 2004) and creating new mechanisms to activate and promote the processes of knowledge creation, learning and innovation in developer networks (cf. Hautamäki, 2013). The education sector should aim to operate in a more

"COLLABORATION BETWEEN EDUCATION AND WORKING LIFE SHOULD BE INCREASINGLY PROMOTED"

business-like way in order to speak the same language and engage in more efficient cooperation with major corporate customers and the region's business clusters. Educational organisations should work to increase the impact of collaboration by creating new regional, national and international contacts that could be significant from the point of view of customers' value creation and business development, and build as much collaboration as possible between schools and higher education institutions with regard to the application and dissemination of practice-based innovation. (cf. Charles & Benneworth, 2002.) Collaboration should be supported, especially by higher education institutions, through investments in producing new, future-oriented competences (Kautonen, 2006).

In order to increase students' business competence, some students could launch or incubate businesses that could be developed as part of the supplier chains of the region's SMEs and innovation activities of education. This way, the integration of consumer, customer and user-driven RDI activities in learning would become easier (Clark, 1998; Lyytinen, 2011), and competence related to new types of business models, such as hybrids and open innovation, would be improved. In any case, what is needed in education is collective pedagogy, which can help students learn to accumulate social capital through diverse interaction and dialogue in environments that include learning and development projects to produce multi-disciplinary and novel practices (Charles & Benneworth, 2002). Learning to learn in knowledge-intensive networks is essential even before graduation, as it improves the ability of both teachers and students to process and evaluate different types of information flows and their contents from the point of view of studied subjects and, later, working life development subjects. In education offering, cross-disciplinary education that is not tied to particular industries and emphasises individual study paths must be strengthened to ensure diverse skills and competence required in working life (Lyytinen, 2011; Buschfeld et al., 2011). In the future, shorter programmes will become subject of review as part of life-long learning. In order to promote lifestyle and well-being management, schools and higher education institutions need an increasingly high standard of guidance competence, which can influence the ability of students and staff to cope in the ever more complex everyday life of work and learning.

Discussion

A global, business-driven and networked way of thinking should be made an integral part of national and regional systems for the anticipation of labour, education and skill needs. The role of SMEs as economic locomotives of clustered production chains has been identified in several studies. The number of people employed in businesses with less than 50 employees grew by 3 percent between 2007 and 2011, and the increase in turnover in the same period was as high as 9 percent; in contrast, employment in businesses with over 50 employees fell by 2 percent and turnover fell by approximately one percent (Tilastokeskus, 2012). In addition, the vocational structures - and therefore the competence structures and skill needs - of the workforces in SMEs and

large corporations are different in many ways. High-growth SMEs, in particular, base their growth on expanding their core functions and outsourcing their support functions (financial administration, production, logistics, distribution).

For further development, new types of industry and cluster specific foresight-oriented reviews that include analyses between company sizes should be conducted. This would facilitate the forecasting of proactive need for economic and educational policy measures to support growth entrepreneurship in the SME sector in particular. This would support the development of a new, growing business and economic structure, which would serve to dampen the national and regional impacts caused by falling employment in industries affected by structural change. Capabilities especially important to SMEs include the ability to leverage networking skills in the development of products and services and the ability to identify and exploit learning and development opportunities at the interface of enterprises and clusters. This re-emphasises the importance of networking on a regional, national and international level. As a result, traditional forecasts on vocational structures that describe the rate of employment in different industries are not necessarily valid anymore, and anticipation should be focused on the educational and skill needs of clusters. As regards the anticipation of educational and skill needs, broader consideration is required as to how the business structure of different industries will develop as a result of cluster development in order to ensure the availability of competent workforce for growing SMEs. This would provide a new dimension to traditional foresight models that describe industry-specific employment rates and to the interpretation of foresight results.

The anticipation of company sizes could include (1) industry and/or cluster specific anticipation of business structures to simultaneously analyse links between changes in the number of companies, the economic development of the industry, and employment, (2) vocational structure forecasts for growth/unchanged/shrinking businesses based on company sizes, (3) industry and/or cluster specific, simultaneous economic and educational policy scenarios that are aimed at increasing employment and productivity and derived from a change in the business structure, and (4) anticipation of skill needs of industries and/or clusters based on issues that are specific to businesses of a size that is expected to provide the best prerequisites for economic growth and increased demand for workforce. As a collaborative effort of the education and employment sectors, the analysis of the change in company sizes and the anticipation of the qualitative and quantitative labour needs of regionally strategic clusters should be combined at the regional level in order to control the increasing competition for competent staff between clusters.

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CHAPTER

11

Jari Hautamäki & Minna Vesasto

What should be done to avoid the realisation of an undesirable future in the region

Introduction

Preparation for sudden structural changes is based on renewing the region's economy prior to the shock and resisting the impact of sudden structural changes. The speed and degree of recovery of a regional economy from a recessionary shock will be positive if the region is able to redirect released resources. Overall, the region's potential to undergo thorough reforms must be continuously enchanced (Martin, 2012). In the mutual, regional process leaders and experts must render visible regional futures knowledge which is in the form of tacit knowledge (cf. Uotila, Melkas & Harmaakorpi, 2005; Nonaka, Toyama & Konno, 2000). Recognition of the most vital factors for a region requires collective learning, which is often characterised by co-configuration based on expansive learning (e.g. Engeström, 2001). Co-creation (e.g. Sanders & Simons, 2009) is called for in the regions in order to exploit the results of learning processes so that new strategic plans and concrete solutions could be created.

Collaborative regional processes emphasising future knowledge production, co-configuration and co-creation are needed to bring the targets of regional reforms into focus. Reforms may be targeted at e.g. innovation environment development with an emphasis on new, promising industries, infrastructure investments to boost business activities, and the improvement of knowledge services such as education and RDI services. Thus, regional authorities, businesses, education and research must prepare for sudden structural changes

through preventive collaboration (Hautamäki, 2013). This collaboration should focus on foresight planning to outline new development paths as well as to assess the means to renew the region through investment in the economy, employment, education and innovation by redirecting the released resources of the region in a continuous structural change (cf. Boschma & Martin, 2007).

Creation of an undesirable future

Collaboration is a means to create future outlooks and plans for a region to diverge from its past development by embedding these outlooks in strategies, decision-making and implementation of the strategic plans. Preparation for sudden structural changes is established on regional collaboration with an emphasis on diverse forms of learning process (Hautamäki, 2013). As the environment is transforming at an accelerating pace, the preparation process must be repeated regularly in various forms. Therefore, the good practice developed by the project is a viable tool (Chapter 5) to be applied for the creation of alternative futures. The Proactive Approach to Structural Change (ENNE) project has summarised the determined negative future outlooks in a brief description of an undesirable future of the region in order to outline a few key measures to be embedded in the regional strategies and plans.

Table 1. Risks included in an undesirable future and the factors preventing the realisation of the risks in the Lahti region

RISK Future operators will be stuck in the past **PREVENTIVE MEASURE** Continuous identification of future risks and opportunities	**RISK** Innovation activities will not be anchored in business and public services **PREVENTIVE MEASURE** Exploitation of the potential opportunities of practice-based innovation environment	**RISK** The growth and renewal of small and medium-sized businesses (SMEs) at standstill **PREVENTIVE MEASURE** Engagement and connection of SMEs with the metropolitan areas
RISK Indifference towards the ecosystem **PREVENTIVE MEASURE** Prevention of groundwater contamination; Securing the purity of food supplies	**RISK** Lock-in of regional collaboration **PREVENTIVE MEASURE** Renewal of collaborative leadership	**RISK** SMEs fail to succeed in international business **PREVENTIVE MEASURE** Support for the expansion of SME business to the BRIC markets
RISK Failure to utilise the opportunities of technological development due to lack of know-how **PREVENTIVE MEASURE** Development and application of technology to create and improve well-being	**RISK** Collapse of well-being caused by extreme intensification of work **PREVENTIVE MEASURE** Early identification of problems in work capability; Support and facilitation of return to employment	**RISK** The unemployment of young people and specific social groups will lower the development potential of growth centres **PREVENTIVE MEASURE** Action to curb the social exclusion of young people and immigrants

"A REGIONAL ECONOMY THAT HAS A STRONG UNDERLYING GROWTH DYNAMIC IS LIKELY TO BE MORE ADAPTIVE TO A SUDDEN STRUCTURAL CHANGE"

"It may be difficult to identify risks in the region, because important stakeholders would prefer to look past instead of the Future as they're trying to resolve the present-day issues and problems in their own organisations. Moreover, from the point of view of regional risks, collaboration between the main stakeholders may be prone to lock-in due to a lack of long-term social capital, interaction and shared leadership. A lack of true partnerships may compromise the implementation of innovative learning prosessess of regional networks and collaboration between networks such as development hubs and business clusters. A lot of knowledge exists in the region without the capabilities to exploit it. Lack of innovative learning may weaken the anchoring of innovation activities in business and public services. If there are problems to identify the key factors significant for the future of region, it will pose serious difficulties for the creation of new solutions, products and services even if there were a lot of techological and environmental opportunities around. The region will develop too slowly and therefore a gap relative to other regions will widen. Unless people learn to work together in a future-oriented way, the growth and renewal of SMEs may be very slow or peter out totally. Therefore the future intentions as regards access to international markets may only remain managers' dreams with empty words."

"The staff working for these kinds of SMEs, companies and regional organisations may constantly be under the threat of dismissal or working under the pressure of the rapidly changing jobs. A lack of well-being at work and problems in social life may occur. Moreover, the unemployment and social exclusion of young people and specific social groups will increase the regions sensitivity and vulnerability for sudden structural changes. Frustration among the unemployed often leads to insufficient improvement of skills and competences, an increase in mental problems and a decrease in the potential of the young to develop their working and living environment. That may compromise the availability of skilled workforce needed by companies. At the worst, the large natural water resources of the region, especially groundwater, could be contaminated and control over the genetic engineering of grain could be lost. Realisation of a threat posed to water and grain resources would result in huge losses of jobs in agriculture, grain and brewing industry, retail grocery and food production sector as well as long-term problems in the living environment causing unemployment, negative migration and a decrease in the attractiveness of the region."

Creation of collaborative prerequisites for the renewal of the region

To avoid the realisation of an undesirable future, preparation is needed which requires regional collaboration. The lock-in of regional collaboration in the Lahti region is the most crucial risk in the future. Well-functioning collaboration is the main prerequisite for the success of regional preparation. Networks of the region are important structures for innovation activities and therefore the functionality of networks is a critical factor for the creation of new products and services for business and society which support the base of a region's economy, success of companies and well-being of citizens. Therefore leadership needs to be renewed in order to make collaboration and processes in companies, networks and clusters efficent, flexible and creative (cf. Hyypiä & Parjanen, 2013; Hautamäki, 2013; Chapter 9.), in addition to the fluency of the regional preparation process.

Boosting regional collaboration and expanding practice-based innovation to create new solutions will increase the adoption and exploitation of opportunities included in technology and the environment. The identification of risks may open a way for the recognition of opportunities which would simply call for a future-oriented way to be co-curious and create shared futures knowledge, as well as to use innovative learning methods to generate co-configuration in order to obtain ideas and patterns for the designing and creation of novel products and services (Chapter 5; Chapter 6). Preventive collaboration means that regional stakeholders need to participate in public development networks so that prerequisites for regional business could be created (Chapter 3). Therefore collaboration between the development networks and clusters is needed, in particular. Preparation is about exploration which involves regional stakeholders to create strategic meanings, success factors, shared visions and development paths for a region's future. (cf. Sotarauta & Srinivas, 2006; Boschma & Martin, 2007.) Therefore regional leaders should form and identify strategic networks and support the creation of new regional collaboration mechanisms in order to activate and promote development in public networks and clusters (cf. Bathelt, Malmberg & Maskell, 2004).

Social capital is mainly based on trust and mutual, shared interests among the stakeholders (e.g. Cohen & Prusak, 2001; Nahapiet & Ghoshal, 1998). As regards long-term collaboration, a great deal of time should be devoted to the building of trust between people and organisations (Nahapiet & Ghoshal, 1998; Burt, 1992). Furthermore, new competences and leadership skills are needed in the collaborative networks (Sotarauta, 2010). The mechanisms to increase trust and to create shared interests include maintaining rich, multilateral and equal interaction and shared discussions within the context of regional preparation (cf. Blomqvist, 2002). Therefore the network leaders need to learn to empower the participants and experts in order for the preparation process to be accelerated and strengthened (cf. Doz, Olk & Smith Ring, 2000; Hautamäki, 2013). In practice, this means that a new interaction culture is to be developed by the networks and formal and informal structures to be created for the support of collaboration. The new structures are based on development groups and forums coordinated, participated and brokered by regional leaders and experts. Moreover, new informal structures are needed to create opportunities for encounters of people from other networks, regions and administrates. Face-to-face contacts and buzzing in social media foster innovativeness and creation of weak links (cf. Asheim, Coenen & Vang, 2007; Burt, 1992).

"NETWORKS ARE BASED ON A NEW AND OPEN INTERACTION CULTURE TO INCREASE SOCIAL CAPITAL AND GROUPTHINK"

To reach fluency and smoothness in the preparation process, the networks must engage in collaboration for a long term since the capacity to make shared decisions evolves gradually by gaining diverse experiences and originating small-scale solutions. Mutual interests are the result of a preparation process which creates and visualises future knowledge in the form of regional driving forces and risks. By embedding the factors preventing the realisation of the risks in regional strategies, the implementation of the mutual interest as a shared mission may be accomplished. Efforts to increase regional social capital and groupthink (Janis, 1982) in the public development networks and business clusters are critical challenges for the leaders of the region (Sotarauta, 2005). The participation and engagement of the main leaders of organisations in the network is significant, as the shared meanings of everyday development work are needed for the shared decision-making and redirecting of resources. Moreover, multi-administrative and multi-layered shared leadership is needed to increase the opportunities to exploit futures knowledge and to create new solutions together with experts, collaborating in everyday development processes. (Hautamäki, 2013.) Of particular importance is the creation of regional, national and international connections for the promotion of business. For example in the Lahti Region, SMEs need promotion and support to establish business contacts in the Helsinki metropolitan area, Russia, India, China and Latin America.

Renewal of the region by means of preventive collaboration

Integration of the factors preventing the realisation of the risks into regional strategies will not ensure the implementation of the mutual interests. The challenge, from the perspective of the region, will be how clusters and networks are capable of utilising new knowledge on the resources and capabilities needed in the future and how this new knowledge could be turned into innovative collaboration renewing the region and increasing its absorptive capacity (cf. Uotila, Harmaakorpi & Melkas, 2006; Chapter 7). Moreover, the regional operators should be able to identify the future threats and risks, as well as the seeds of change, in everyday working life. These challenges call for a new kind of innovative leadership – visionary, modern leaders of the new generation will be needed to appreciate and use the jointly created futures knowledge and to foresee the meanings included in the knowledge and choices, in order to adopt them as a part of the research, development and innovation policies and measures of the organisations. (Cf. Hautamäki, 2013; Chapter 9.) It is a question of knowledge and competences to increase absorptive capacity which is the key success factor of a company or a public stakeholder. New knowledge is merged with the development prospects of the companies' core businesses by means of strategy work and coaching of key persons. After knowledge has been converted into initial products and services, these are developed and tested by the customers for in order to obtain and generate external ideas and experiences, and furthermore - successful business and jobs.

"AFTER THE ECONOMIC CRISIS, IT WILL BECOME EVIDENT TO ENSURE THE AVAILABILITY OF SKILLED WORKFORCE FOR THE REGION'S BUSINESS CLUSTERS"

As regards education, perhaps futures studies should be introduced as one of the main subjects in educational programmes for the adoption of a developmental way to work in the region. From the point of view of long-term renewal, it means investments in the participation of children, young people and as well students in the collaboration. In the old days, we studied history to understand the future, today we ought to have future studies to understand - besides the future - the development paths of the past. By underlining futures studies, it might be easier to adopt and make visible all the technological and environmental opportunities included in a regional innovation environment. Having a comfortable and creative atmosphere to work and to study will result in a better capacity for employees and students to take responsibility in sharing new innovative challenges in an anti-boring society and work environments. Shared objectives for increasing proactive efforts in the region should be focused on the creation of viable solutions to support the employment of the young and to increase humanity and pleasure at work. Furthermore, Lahti has been manifested as one of the leading regions in the world in the application of practice-based innovation – could it be possible to also declare the Lahti region as the most convenient, cooperative and pleasant region to work, live and study in the future.

Awareness of the significance of regional natural resources such as water and grain will increase and citizens will have the motivation to protect the resources in the future to ensure their sustainable use in everyday life, in addition to maintaining and enhancing local comfort and attractiveness of the living environment. Indifference towards the ecosystem was identified as one the main risks in the region – in order to prevent the realisation of the this risk, systematic information and long-term plans are needed through influencing attitudes related to the ethical protection of natural resources and water resources in particular. The Lahti region could have state-of-the-art capabilities and competence as regards water, recognised at the European level in future. (Chapter 6.)

To engage employees, students, unemployed persons and older people in the development of diverse working and living environments, the Lahti region will need functional and shared support services. One of the most important services is a regional, multi-administrative guidance and coaching service of education not only for the unemployed and students but also for employees willing to develop their skills and competences. (cf. Chapter 10.) What should be done in particular is to create diverse opportunities for immigrants to study and work in the region to enable an optimal use of their special skills and competences. In our region, networking and stimulation of employees are needed for the initiation of new innovative business by putting new ideas into practice and taking bold action.

Moreover, guidance is needed for people planning to set up small businesses. In the Lahti region, incubation of small businesses could be integrated deeper into educational pro-

"FOR THE REGIONS SUFFERING FROM THE IMPACTS OF SUDDEN STRUCTURAL CHANGES, FOREIGN DIRECT INVESTMENTS MAY BE ONE OF THE MOST EFFICENT WAYS TO RECOVER FROM ECONOMIC SHOCKS"

grammes, in addition to the investment in the development of innovative business models connected to the innovation environment of the region. Being a part of this kind of collaboration and looking for innovative resources from the regional innovation environment will lower the sensitivity of SMEs to changes and increace their capacity of renewal and growth. (Chapter 7.) SME entrepreneurs and employees will be the main resource of renewal and growth which usually means intensive interaction, stimulation and empowerment of staff.

More start-ups and spin-outs, as well as business angels, will be needed to boost growing small businesses and SMEs to gain access to global markets. The encouragement of immigrants to set up a business and utilise their foreign contacts would enable an increase in the internationalisation of local SMEs and foster the generation of opportunities to bring foreign direct investments (FDI) to the region. Promotion of international business means growing needs to invest in foreign language studies, especially Russian, Spanish and Chinese. Moreover, support for the financing of foreign direct investments (FDI) and the promotion of exports are needed. Supporting international business in the region will increase the number of jobs offered in the long term. Significant foreign investments will increase networking between companies lay a foundation for the diversification of local business sectors. What will be needed in particular is networking at the interfaces of businesses, clusters and education in order to invest in research, development and innovation environments to create "cross-pollination" for the enrichment of knowledge, in addition to the identification and implementation of business ideas in the spirit of open innovation. Competitive SMEs with competent employees and innovative products will be able to engage in international business chains and networks to expand their business. This will create more jobs particularly for young people and specific social groups and essentially, the loss of development potential in the Lahti Region can be avoided. (cf. Chapter 8.)

Summary

The regional innovation environment encompasses, inter alia, a regional knowledge base, networks and partnerships, communication and interaction, and mediating mechanisms promoting collaborative learning between stakeholders to boost innovation processes (cf. Kautonen, 2006, 48). Proactive efforts and measures are first integrated into regional strategic documents as development challenges. Further on, they are taken to the development agenda through mediating mechanisms, such as development projects or development organisations. Channeling resources to development challenges calls for close collaboration between regional business networks, authorities, education institutes and RDI actors. The diversity of regional innovation environment creates opportunities for the use of versatile and creative collaborative methods (Harmaakorpi, 2004). Reforms of this kind may be targeted at developing innovation and knowledge environment or focusing on new, promis-

ing industries. Producing measures connected with development challenges more commonly involves features characteristic of modern service design and open innovation activities (Chesbrough, 2003). Nowadays service customers and users contribute to the planning and development of services before the actual service is launched to a broader audience.

Collaboration engages businesses and regional stakeholders in a search for a shared view of a desired development path, which can be found by understanding the mutual dependency among stakeholders and the reconciliation of diverse interests. Key success factors of diverse regional collaboration include regional goal-oriented, shared leadership and solid social capital. Preparation for sudden structural changes is based on renewing the region's economy prior to the shock by diversifying the economic structure, increasing competitiveness, improving the regional innovation system and capabilities, in addition to strengthening entrepreneurial, educational institutions and economic governance. To resist the regional impacts of sudden structural changes (cf. Martin, 2012), a narrow base of business structure can be diversified by increasing the number of entrepreneurs and growth companies that operate in an international market and provide regional employment. Growth companies must be supported through functional infrastructure, funding and innovation environments to boost production and service development and to secure the availability of competent workforce.

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Torun Regional Develoment Agency | Torun Regional Development Agency (Poland)

Työ- ja elinkeinoministeriö | Ministry of Employment and the Economy

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The transnational and interregional project Proactive Approach to Structural Change (ENNE) has studied regional preparation for sudden structural changes. The project is financed by the European Social Fund (ESF) via the Ministry of Employment and the Economy and the Centre for Economic Development, Transport and the Environment in Finland. In the course of the investigation and project implementation, a good practice was developed for the preparation across Europe, based on an innovative application of futures studies and the methods of collective learning within the context of regional development. These methods include e.g. the content analysis of futures stories and monitored discussions of futures workshops in social media. For the support of the methods typical of futures studies, the project developed a statistical measurement to provide a presentation on the sensitivity of regions for the negative impacts caused by a sudden structural change.

Through the application of the good practice, the project identified the lock-in of regional collaboration as the primary future risk in the Lahti region. This lock-in has a significant impact on the possible realisation of other risks identified. Renewing the leadership of regional collaboration is assumed to be a key factor in preventing the realisation of the risk, which will allow the redirection of regional development and collaboration to adopt necessary measures as regards the economic, employment, education and innovation policies – jointly approved, planned, implemented and strategically justified measures to prevent the realisation of crucial risks and decrease the sensitivity of regions for the negative impacts of sudden structural changes.

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