

THE QUINTUPLE HELIX MODEL: WAY OF REGIONAL DEVELOPMENT CENTRES IN LATVIA TO SMART PUBLIC ADMINISTRATION

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Abstract

People in their lives are divided into different social groups that cooperate with each other; all people are involved in many social groups at one time that may depend and mutually cooperate. The article shows how regional development centres Talsi and Cesis cooperate with other society groups in their territory to develop a smart public administration. The cooperation level was determined by a survey that was provided to the municipality workers, NGO members, and employees in higher education institutions, companies and mass media. The results show that the cooperation is above average, though a lot of work should be done to provide smart public administration in territories. Both municipalities are similar in their size, municipality structure and used cooperation approaches, therefore it is essential to learn from each other to receive greater loyalty from residents and improve cooperation that is significant for smart administration.

Key words: the Helix Model, development centres, smart administration.

Introduction

Individual human beings are, and always have been, completely dependent on the rest of human society and the ecosystem for their economic well-being. Therefore, humans perceive their well-being in reference not only to economic outcomes, but also in terms of changes in their social and natural environments. The expanded interrelationships among people, businesses, organisations, social groups, governmental agencies, and other groups bring about very complex economic and social structures that can generate an almost infinite variety of outcomes (Berg, 2012).

According to forecasts of the World Bank, the number of residents in cities will double by 2050. Already in 2030 six out of ten people will live in cities and towns, and specific weight of city dwellers will increase to seven out of ten by 2050. Such urban globalisation demands new methods in urban planning, innovative solutions for the improvement of infrastructure, as well as the necessity for well-timed prevention of different problems, such as overpopulation, lack of energy, and environment pollution (United Nations, 2014).

In relation to the abovementioned facts, a new term has appeared in Europe – Smart City that is a general strategy, the aim of which is a long-term development and negotiation of such difficulties as social insecurity, lack of working places and low energy efficiency. Currently, there are vast discussions about precise functions and criteria for measuring the ‘smartness’ of cities, as well as a general concept of the smart city that has been based on six basic elements, i.e., smart economy, infrastructure, environment, residents, buildings, and administration.

Latvia as a member state of the European Union follows the current trends and cities and towns already think of being smart, not only providing

smart technologies and buildings, but also starting their way to smart public administration. It cannot be done without residents’ involvement and taking into consideration the fact that residents represent different social spheres and municipality is the joint among those spheres, the direction towards smart public administration could be implemented with a smart cooperation among all spheres.

The aim of the present article is to define whether regional development centres in Latvia provide smart public administration for other society groups defined in Quintuple Helix Model, as well as provide evaluation of both centres to determine the level of current smart public administration.

Materials and Methods

The towns of regional importance, examined in the present article, are Cesis and Talsi, which were chosen due to their similarity in size, number of residents and other indicators. To carry out the present research, the authors used topic-related research papers and information available from the Central Statistical Bureau (CSB). The research methods employed were the monographic and descriptive methods, analysis and synthesis, as well as logical and constructive methods. The main data was collected from a survey that was disseminated both in Talsi and Cesis towns. The survey consisted of different questions concerning municipality cooperation with other spheres of community – higher education institutions, mass media, entrepreneurs, and public organizations (NGOs). The survey was held both in Talsi and Cesis during January and February 2016, questioning 88 units (organizations, companies, municipality deputies and employees) in total and evaluation criteria in points from 1 to 10.

Results and Discussion

The Evolution of Quintuple Helix Model

To describe the communication process in 1967, Frank Dance proposed a communication model called Dance's Helix Model. The word helical derives from 'Helix', which is defined as *an object having a three-dimensional shape like that of a wire wound uniformly around a cylinder or cone*. It shows communication as a dynamic and non-linear process. Frank Dance explains the communication process based on this helix structure and compares it with communication. In the helix structure, the bottom or starting point is very small, then it gradually moves upward in a back-and-forth circular motion, which forms the bigger circle at the top and it still moves further. The whole process takes some time to reach. Just like helix, the communication process starts very slowly and defines a small circle. Communicators share their information only in small portions to their relationships. It gradually develops into the next level, but it will take some time to reach and expand its boundaries to the next level. Later the communicators commit more and share more portions themselves. The main characteristic of helical model of communication is that it is evolutionary (Helical Model of Communication/Communication Theory, 2013).

The helix model system begins from a simple Double Helix Model that includes the contacts between academic circles and entrepreneurs, and establishes a linear relationship. Later, with the development of information and communication technologies, the role of knowledge in society and the need to develop a knowledge-based economy increase. The knowledge base of the economy is thus increasingly a part of the infrastructure of society, and there is the necessity for a proactive role for the state in science, technology, and innovation policies (Leydesdorff & Etzkowitz, 1998).

Afterwards there was a shift from a dominating industry-government dyad in the industrial society to a growing triadic relationship between university-industry-government in the Knowledge Society (Triple Helix Model). This model improves on the non-linear model that replaced linear models based on 'market pull' or 'technology push' (Leydesdorff, 2012). Thus, the Triple Helix Model is closely connected with the conception of innovation and economic development in a knowledge society, and its potential lies in a more prominent role for the university and in the hybridisation of elements from university, industry and government to generate new institutional and social formats for the production, transfer and application of knowledge. Through subsequent development, a significant body of Triple Helix theoretical and empirical research has grown over the last two decades that provides a general framework for exploring complex innovation dynamics and for informing national, regional and international innovation policy-making (the Triple Helix concept).

Quadruple Helix Model is based on the Triple Helix Model and adds as fourth helix the 'public', more specifically being defined as the 'media-based' and culture-based public' and 'civil society'. The Quadruple Helix already encourages the perspective of the knowledge society, and of knowledge democracy for knowledge production and innovation. In a Quadruple Helix understanding, the sustainable development of a knowledge economy requires a co-evolution with the knowledge society (Carayannis, Barth, & Campbell, 2012).

The Quintuple Helix Model is based on the Triple Helix Model and Quadruple Helix Model and adds as fifth helix the 'natural environment'. The Quintuple Helix Model can be proposed as a framework for transdisciplinary (and interdisciplinary) analysis

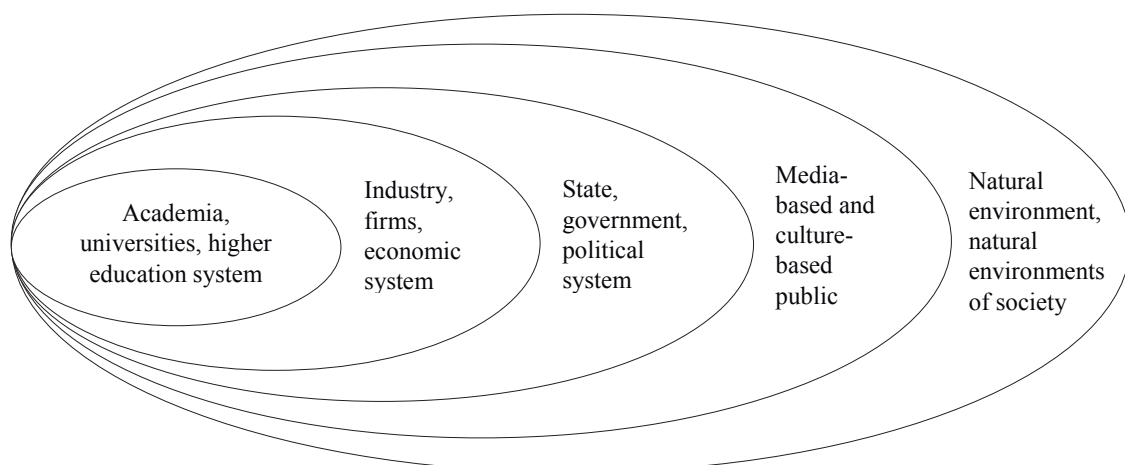


Figure 1. The subsystems of the Quintuple Helix Model (after Carayannis, Barth, & Campbell, 2012).

of sustainable development and social ecology (Carayannis & Campbell, 2010).

The European Commission (2009) identified the 'socio-ecological transition' as one of the major challenges for current and future societies and economies. The Quintuple Helix innovation model offers here an answer that is oriented toward problem-solving and sustainable development, furthermore, indicating how this socio-ecological transition may be mastered in combination with knowledge production and innovation. Therefore, nowadays the concepts of helix models encompass five elements by adding to the Quadruple Helix the natural environment factor as the fifth element in the interaction network - leading to the Quintuple Helix innovation model. The evolution of the helix model is given in Figure 1.

Figure 1 shows the following trend in the evolution of the helix model system.

1. First Helix: Academia / universities. Universities (higher education institutions) of the sciences and of the arts, as well as students, researchers, academic entrepreneurs, etc. which are the resource for creation of new knowledge and technology, the generative principle of knowledge-based economies. (Theoretical framework, 2011)
2. Second – Double Helix: Academia and industry/business. It consists of the creativity economy and the creative industries where it is possible to apply the resource of knowledge and to generate new innovations.
3. Third – Triple Helix: Academia, industry and state/government. The most important helix element for the creation of a knowledge economy is an effective state/government management policy. The maintaining of sufficient institutional capacity, active mobilisation of stakeholders through governance modes and policy coordination shows the states possibility to create a knowledge economy (European Parliament, 2015). The stable and developed economies can ensure the creation, diffusion and usage of ICT, foster investment in human capital as well as in innovations and stimulate knowledge-intensive enterprises.
4. Fourth – Quadruple Helix: Academia, industry, government and media, and culture-based public and civil society: arts, artistic research and arts-based innovation, that have introduced 'knowledge society and knowledge democracy': culture and innovation culture, knowledge of culture and culture of knowledge, values and life styles, multiculturalism and creativity, media, arts and art universities, multi-level innovation systems with universities of the sciences and arts (the Quadruple and Quintuple Helix innovation systems).

5. Fifth – Quintuple Helix that includes: Academia, industry, government, media-based and culture-based public and civil society as well as natural environments of society and economy. The Quintuple Helix finally frames knowledge and innovation in the context of the environment (or natural environments). Therefore, the Quintuple Helix can be interpreted as an approach in line with sustainable development and social ecology, and imply for eco-innovation and eco-entrepreneurship that should be processed in such a broader understanding of knowledge production and innovation. (Carayannis & Campbell, 2010; Carayannis, Campbell, & Orr, 2015)

The basic innovation 'core model' of the Triple Helix focuses on the knowledge society (and on knowledge democracy). From the point-of-view of the Quadruple Helix innovation model, it is evident that there should be a coevolution of the knowledge economy and of knowledge society. The Quintuple Helix finally stresses the socio-ecological perspective of the natural environments of society. Social ecology focuses on the interaction, codevelopment and coevolution of society (Dubina, Carayannis, & Campbell, 2012).

The background of Talsi and Cesis Municipalities

For the current research, the authors chose two towns in Latvia that, despite of the fact that one of the towns is located in Kurzeme region (Talsi, geographic position 57.246351, 22.58769), but the other – in Vidzeme region (Cesis, geographic position 57.313426, 25.266803), are similar in terms of size, number of residents, branches of universities located there, distance to the capital of Latvia etc. Both municipalities are regional centres of development of the Republic of Latvia.

Talsi town is located in the Northern part of Kurzeme, almost in the middle between Ventspils and Riga. The total area of town is 7.8 km², the number of residents – 11 371. Talsi town is the centre of Talsi municipality that is the fifth largest municipality in Latvia. The main decision-making body is Talsi Region Council, consisting of 17 council members, but public administration is implemented by Talsi Region Municipality. Talsi town is well-known for its tourism possibilities and beautiful landscape, as well as with different events and festivals. After the implementation of administrative-territorial reform, Talsi municipality lost direct exit to sea and natural tourist flow in summer decreased; due to global crisis the town experienced massive emigration wave, thus the local government needs to rethink tourist and resident attraction possibilities and implement smart specialization in different fields.

Cesis town is located in the Northern part of Vidzeme; the town also is one of the 21 regional development centres of Latvia. The total area of town is 19.28 km², the number of residents – 15 666. The main decision-making body is Cesis Region Council, consisting of 15 council members, but public administration, similarly to Talsi, is implemented by Cesis Region Municipality. Cesis also experienced the emigration wave during the global crisis, but currently the municipality has worked out re-emigration program with the help of which the municipality will try to return its residents. Cesis is well-known for its nature and various culture and arts festivals, beautiful and interesting architecture, famous people and versatile tourism proposal, therefore it can be defined that Cesis has proven its smart specialization in culture, tourism and arts.

Way to smart public administration

Smart public administration can be defined as a balanced administration that takes into consideration the needs of all community, including four abovementioned environments – higher education institutions, public organizations, companies, and mass media. It is very essential to cooperate among them, since it leads not only to smart public administration, but also to smart economy and smart residents, forming the concept of smart city. The Quintuple Helix Model helps to analyse the current situation and show future trends for improving the cooperation, building stronger and smarter environment and society.

The article further on analyses the current public administration trends according to the Quintuple Helix Model in both municipalities – Talsi and Cesis, showing current situation, similarities and differences between them and stressing further improvements to be done on their way to smart public administration.

Municipality and higher education institution cooperation

Despite extended mobility the municipalities must think of services that can be offered in their territories, and higher education is one of the key factors that will be taken into consideration in time of changing place of settlement, furthermore – a presence of higher education institution (hereinafter – HEI) in a particular territory increases its prestige. Both Cesis and Talsi municipalities have two higher education branches in their territory; the closest HEI is located in 50-80 km area (Valmiera, Ventspils). Every year all programs of these HEIs have students, studying for their degrees, therefore it can be stated that all these HEIs play a significant role in municipalities' life.

In order to evaluate the current cooperation between Talsi and Cesis municipalities and their HEIs both employees of municipality and HEIs were

surveyed and their opinion in five aspects were taken into consideration.

As concerns to publicity in local mass media, responsiveness in different HEI events and projects, Talsi municipality shows more interest, however, Cesis municipality provides more real action, such as guest lectures, material and financial support for HEI. Both municipalities have the same evaluation in implementation of educational projects. Furthermore, it has to be determined that responses from employees in Cesis municipality are more homogenous, which means the activities of Cesis municipality are more visible to others.

There is no single formula that would say that some criteria are better than others for smart public administration, since all criteria are significant, but both municipalities should take into consideration that activities concerning public relations must be closely connected to work and vice versa. Current situation shows that Talsi municipality manages the public relations without any real work, but Cesis municipality, in its turn, provides real projects, gets involved in different activities, but there is no external information to society.

Municipality and public organizations

According to the data of Central Statistical Bureau, there are 152 foundations, societies and associations in Cesis and 227 foundations, societies and associations in Talsi in 2015, respectively. It is a great number of different NGOs, registered in both municipalities, though local authorities of NGOs in both municipalities confirm that only one third of all registered units are economically and socially active. Both municipalities have one or two strong core organizations that are well-known in their field in all Latvia – Talsi County Fund and Kurzeme NGO Support Centre in Talsi Municipality and Science centre Z(in)oo and Cesis Forum in Cesis Municipality. Different other NGOs with delegation contract implement the functions of municipality, for example, Talsi Crisis Centre works with socially vulnerable people etc. It is a quite common situation when different municipality functions are delegated to NGOs that have previous experience and better knowledge of how to provide such services – more often NGOs get involved not only in social field, but also in culture (culture funds), sports (different clubs), education etc., implementing a very important role in society's daily routine.

The cooperation with NGOs has always been quite controversial, since organizations would like to be involved in municipality work to a greater extent than it is, but it cannot be implemented due to laws and regulations restricting that and also because of lack of manpower and experience in a particular field (see Table 1).

Table 1

**Cooperation among municipality and public organizations
(societies, associations, NGOs) in Talsi and Cesis municipalities, points**

Criteria	Talsi			Cesis		
	min	max	mean	min	max	mean
Cooperation of municipality with local NGOs in different fields	4	9	6.53	2	9	6.40
Municipality support (material, financial etc.) for the provision of NGO work	4	8	7.36	4	10	7.20
NGO projects, implemented in cooperation with municipality	5	8	7.37	3	9	6.40
Level of NGO involvement in municipality work (commissions, consultative boards, provision of different functions etc.)	2	8	6.05	1	7	4.90

After the survey it can be seen that, though the results are quite average, the current situation in Talsi municipality is better than in Cesis, especially in NGO involvement in the municipality work, where results of Cesis are below average, showing a low involvement level. Talsi municipality is currently trying to delegate more functions in culture and sports field and encourage people to form clubs for implementing sports activities, tournaments, championships, and survey results show the improvement in cooperation area and the right direction to smart administration.

The results of Cesis municipality are heterogeneous and none of the results are higher than those of Talsi municipality which show that cooperation between the municipality and NGOs in Cesis municipality currently is not developed to a high level and since organizations implement very important actions for the society in total, the cooperation improvement between both sides is highly recommended.

Municipality and companies

It is essential that the development of regional centres are subjected to the number of economically active companies that are not only located in a particular territory, but also have their legal address registered there in order to receive personal income tax, hence municipalities should be closely interested in the establishment and development of companies in their territory. Companies provide working places for local residents, which is the key factor for people when choosing their place of settlement. If NGOs mainly implement social functions and activities, then companies take care of the economic side, consequently.

Both regional centres are struggling to attract companies in their territory due to the proximity of Ventspils and Valmiera, which are cities of national level. Both Talsi and Cesis intensively think of attracting new companies, putting emphasis on small

and medium-sized companies that provide niche production, but also providing vast areas for big companies, establishing industrial areas.

Survey results show controversial attitude and cooperation trends – though all results are above average, the trend is slightly negative (see Table 2).

Cooperation between Talsi municipality and companies is slightly lower than in Cesis municipality despite different cooperation models, such as Talsi Businessmen Club, Entrepreneurship Council, joint seminars and discussions. Survey answers of company representatives show the current cooperation is not so successful as expected and further on municipality must think of new approaches, how to involve companies into municipality's work to give entrepreneurs the possibility to make decisions concerning society and economy on a local level. Cesis municipality, in its turn, should think of common projects in business field, creating new, interesting ideas, and promoting new entrepreneurial ideas.

Municipality and mass media

Mass media and information itself is a new force nowadays, and every society group tries to use it more and more efficiently. If some time ago our only sources of information were radio, TV and newspaper, then now it is possible to receive information in every possible way – there are different social networking possibilities like home pages, Twitter, Facebook etc., as well as newspapers and magazines that are becoming more interesting and approaching all types of target audience.

Municipalities also have their own sources hot to distribute information about events in their territory – Talsi has their own television, two local newspapers (one is owned by the municipality), a home page and active accounts in Facebook, Twitter and in local social media draugiem.lv (social platform for friends). Cesis municipality has one local newspaper with a

Table 2

**Cooperation among municipality and companies
in Talsi and Cesis municipalities, points**

Criteria	Talsi			Cesis		
	min	max	mean	min	max	mean
Municipality support to companies (tax refunds, seminars, technical support, promotion of identification etc.)	3	9	6.48	2	10	6.09
Projects in the field of entrepreneurship, implemented in cooperation with the municipality	4	8	6.10	2	8	5.59
Educational initiative of the municipality to promote mutual cooperation	4	9	6.33	2	10	6.41
Level of company involvement in municipality work (commissions, consultative boards, provision of different functions etc.)	1	8	5.43	2	9	6.00

home page, municipality home page and active social network accounts, which provide information for the Internet users. Broadcasting is performed by regional television and radio in Valmiera.

Cooperation with mass media is good, which can also be seen after the results, though data is comparatively heterogeneous. Currently it can be seen that interest of municipality is comparatively higher to provide and distribute information from mass media, which is a common situation nowadays, when there is much information to choose from. Cesis municipality works with mass media in order to make a good image, but Talsi tries to provide information in regional and national level. Both approaches are good, though they need to be balanced – information provided should be interesting for different target audiences in different places of Latvia and promote a good image of municipality. It can be done with the help of Internet and social networks that are cost-efficient and reach more readers. Both municipalities do not work with mass media frequently, which is one of the greatest mistakes from the viewpoint of territory marketing and on their way to public administration both municipalities must rethink their marketing strategy.

Current cooperation – way to smart public administration

Cooperation is a significant factor in municipality’s way to smart public administration. This article provides analysis of municipality cooperation with different society groups taking into consideration various factors that make the total cooperation index (see Figure 2).

Both municipalities are on their way to smart public administration – they both have strong cooperation with higher education institutions and mass media, though the cooperation with companies should be improved since companies are the economic milestone for every territory. It could be done in different ways by offering tax refunds, making joint seminars, discussions, providing information about companies in their social networks. Cooperation can be also achieved by implementing joint projects in the result of which the true beneficiaries are all members of the society.

The same situation appears in cooperation with non-governmental organizations – although the cooperation level in Talsi municipality is higher than in Cesis, there can be some improvements made.

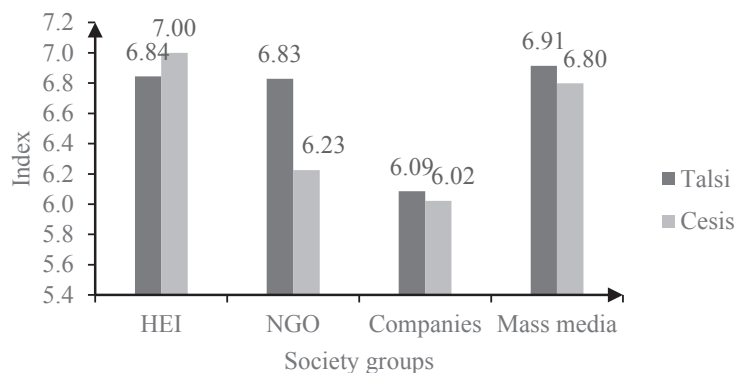


Figure 2. Total cooperation indexes for Talsi and Cesis Municipalities.

Almost all residents are involved in some kind of organizations, which means that cooperation with organizations is indirect cooperation with the society itself. Furthermore, taking into consideration the next planning period of the European Union when a great amount of financing will be provided for organizations, not municipality and state institutions, and cooperation improvement with organizations would give also a financial contribution to the development of the territory.

Conclusions

In order to determine a way to smart public administration cooperation among five groups – municipality, NGOs, mass media, HEIs, and company – were surveyed. During survey, the authors revealed that current cooperation trends in both municipalities are above average, in a range of 5 to 7.

Talsi municipality is more responsive to different HEI events and projects, however Cesis municipality provides more real action, such as guest lectures, material and financial support for HEI.

The cooperation with NGOs is better in Talsi municipality, especially in NGO involvement in the municipality work, where the results of Cesis are below average, showing low involvement level.

The cooperation between Talsi municipality and companies is slightly lower than in Cesis municipality

and survey answers of company representatives show that the current cooperation with Talsi municipality is not so successful as expected and further on municipality must think of new approaches to involve companies into municipalities work.

Cesis municipality works with mass media in order to create a good image, but Talsi tries to provide information in regional and national level. Both approaches are good but municipalities should think of more extensive work in Internet, where they can choose distributable information by themselves.

Both regional development centres have all the conditions to build knowledge economy and knowledge society in their territories that is the key base of smart, skilful and knowledge-based administration, but it cannot be done without involvement and cooperation of the abovementioned society groups.

Acknowledgments

The preparation of the paper was supported by the National Research Program 5.2. Economic Transformation, Smart Growth, Governance and Legal Framework for the State and Society for Sustainable Development-a New Approach to the Creation of a Sustainable Learning Community, Project EKOSOC_LV.

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