

Introducing of smart work – opportunity to increase economical development of municipalities in Latvia

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Abstract — research focused on analysis of smart work, its advantages and disadvantages. There are possible to find out benefits from smart work and also disadvantages of smart work for three main society groups – employers, employees and government. The goal of the research is to verify hypothesis, that introducing of smart work will promote economic development of municipalities in Latvia and that people in municipalities are ready to do smart work. Research methods are analysis and synthesis, quantitative data analysis, comparison, graphical methods, survey. Analysis of economic development of Balvi municipality (Latvia) shows, that there are economic problems that can be solved by introducing of smart work. From survey of Balvi population it is possible to conclude, that people are ready to work smart and to do distant work in Smart Work Centers (SWC). Smart Work Centre will be real way how to increase development of Balvi municipality, it will provide new working places, decrease unemployment and help to maintain population in the municipality

Keywords— smart work; Smart Work Centre; regional development; local municipality

I. ICT DEVELOPMENT – BASE OF SMART WORK

The nature of economy has been changing during last centuries – from the agriculture age in 18th century to the information era nowadays. Economy development is cyclical. There have been five technological waves till now. In economics theory these waves are known as long waves or Kondratiev Waves. These waves and innovations are shown in the Figure 1.

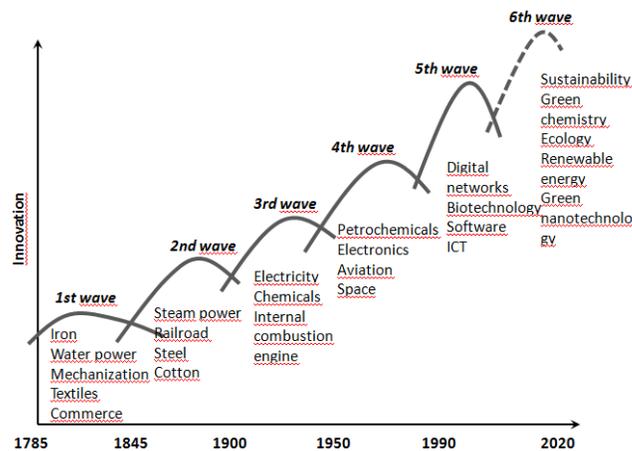


Fig. 1. Waves of innovation based on long Kondratiev waves [1]

Nations and firms are increasingly aware of the importance of being ahead of the next so called 'wave' of innovation. If the last wave of innovation, ICT, was driven by market needs such as reducing transaction costs, that there is significant evidence that the next waves of innovation will be driven by the twin needs to simultaneously improve productivity whilst lightening our environmental load on the planet [2].

The development of ICT gives advantages for private and public sector. Electronic flows of documents in the public administration can increase efficiency and transparency. Business climate is affected positively by e-Development. It lightens to start business and creates room for innovative applications. E-Finance develops access to rural finance. It improves general quality of services across industries and sectors of the economy and creates opportunities for cross-country and cross-sectorial development. The set of tools, competencies and applications of e-Development in the knowledge economy may be distributed among four main pillars of general development: institution-building, capacity-building, policy-making, investment-making [3].

Development of ICT and reaching of the 5th and in future the 6th waves of innovations is the basis for smart work development. For example, development of ICT has encouraged the development of companies that offer such services as customer catering using ICT and the gathering, storing, processing and selling information in the North of Sweden [4].

Innovation is well at work when it reaches strong, on-going and diversified community support along with rigorous evaluations [5]. But ICT will not automatically stimulate the regional or rural economy. The technologies should be integrated in the rural economies according to the needs of local inhabitants and entrepreneurs. In order to stimulate that, awareness raising and training is crucial.

II. CONCEPT OF SMART WORK

The past six generations have amounted to the most rapid and profound change mankind has experienced in its 5000 years of recorded history [6]. This has led also to the transition in the way of working. An increasing share of businesses and other organizations are keen to use smart work (telework, distant work, e-work, mobile work) - a wide-spread practice that allows employees and their tasks to be shared across settings away from central place of business or physical organizational location [7].

With the ongoing transformation of developed economies into service and knowledge societies and the wide spread use of information and communication technologies organizations have increasingly implemented telework arrangements for various reasons. Telework may not only reduce costs for office space and travel in large countries with long distances and in cities with crowded traffic, it may also help companies to attract and retain a highly qualified workforce [8].

New ICT solutions, rapidly developing technologies, as well as managerial changes can facilitate an increasing proportion of smart workers. Smart work is the way how enterprises and public authorities can become more progressive. They will allow their employees to join together work, private and social life – not only domestic life, but also participation in nongovernmental or political organizations, cultural activities, that allows people to express themselves as social beings [9].

Research firm Capgemini defines smart work as „an approach to organising work that aims to drive greater efficiency and effectiveness in achieving job outcomes through a combination of flexibility, autonomy and collaboration, in parallel with optimising tools and working environments for employees” [10].

But there are various approaches how to define smart work or telework. Some of them hold a view that telework is employment when only IT and network of data transmission are used without interruption. The others accept as telework any job, even not concerned with use of IT and data transmission, inter alia all forms of self-employment. The first concept of telework definition is used in USA, but in European Union the second approach of telework definition is used. But in last years International Labour Office begins to separate telework and self-employment to apply different political instruments for teleworkers and handicraftsmen [11].

Smart working is about taking a comprehensive and strategic approach to modernising working practices. It is based on the following principles [12]:

- work takes place at the most effective locations and at the most effective times;
- flexibility becomes the norm rather than the exception;
- everyone is in principle considered eligible for flexible working, without assumptions being made about people or roles;
- employees have more choice about where and when they work, subject to business considerations;
- space is allocated to activities, not to individuals and not on the basis of seniority;
- the costs of doing work are reduced;
- there is effective and appropriate use of technology;
- managing performance focuses on results rather than presence;
- smart working underpins and adds new dimensions to diversity and equality principles;
- employees have the opportunity to lead balanced and healthy lives;
- work has less impact on the environment.

The latest concept of smart work is concerned with working anywhere, any time, but it needs strong intrinsic motivation [13]. There are different places, from where is possible to do smart work. The most popular working places for smart workers are home, library, Smart Work Centre (SWC), hotel, cafe, airport or railway station.

Working in SWCs is considerably new way of doing smart work or telework. There are positive and also negative aspects of smart work at home or at SWC.

III. BENEFITS AND DISADVANTAGES OF SMART WORK

Each distance work is influenced by many factors (e.g., the type of work being done in the company or work nature, technological infrastructure, the stage of readiness to adopt smart work approach in the company, the skills and knowledge experienced by each employee, flexible staff management). If elaborated, implemented and managed effectively, smart work approaches and smart work centers can be successful and can return numerous benefits.

Main benefits from smart work for an employer are summarized in the Table 1.

TABLE I. MAIN BENEFITS FROM SMART WORK FOR EMPLOYERS [MADE BY AUTHORS]

Economic benefits	Social benefits
If employer's business is in an expensive area, distance working can save employer a lot of money. If employees live in areas with a low cost of living and good internet connectivity, they can afford to accept relatively low salaries	Recruitment and retention of staff – it is possibility to attract good specialist, who otherwise will not work in this office (no possibility to pay so big wage / specialist is living far from the office / the office is located in rural area, where are not good specialists)
Rent cost reduction due to reduced office space requirements	Adherence to company's regulations and increased organizational commitment
Decrease in furniture costs due to reduced working places	Reduced absenteeism
Improved productivity	Better service (longer service / opening hours) and opportunity to offer more flexibility
Less purchase costs of ICT	Promoted diversity
Public utilities payment reduction (employees may consume less energy at work for heating and lighting, sewerage)	Decrease of production time: short time between customer's order and product delivery
Less staff training	New channels of service distribution and an increase in market reach

Successful companies have vision on work as an activity, not a place. Smart work approach results in reduced costs which allow the company to offer the products at a lower price to its customers. From the perspective of the employer, aspects such as cost savings, increase in productivity and turnover are important because effect profit. Telework gives the opportunity to work more efficiently and to offer a better service to the client and to foresee longer service/opening hours. Telework can give the opportunity to redesign and simplify the work processes too.

The ability to work with people in virtual spaces may extend a network of relationships to clients that are further and further away. This may lead to as virtual meetings become so common that it is impossible to meet everyone a decrease in the urge to physically meet.

Smart work adoption in companies is rather often met with resistance. The main disadvantages are:

- it is difficult to control employees, process of work. Flexible companies adopt change in view: from performance to result-oriented leadership. Employer pays salary that depends on job done;
- there is concern about accessibility of teleworkers. Agreements need to be made about fixed deliberation moments of the team; the hours during which the distance worker needs to be accessible by telephone or by mail, and the e-work days must be carefully selected in order not to impede daily operations;
- safe of information and produced product. The e-worker remains responsible for the correct use and management of material and the information put at his/her disposal by company. The distance worker must assure that confidential information on his/her personal computer is kept to a minimum. If this is not possible, the employee must take the necessary measures to limit the risk of loss or theft. In some cases it is necessary to get special equipment that provides safe distant accessibility to office computers.

Main benefits from smart work for an employee are summarized in the Table 2.

TABLE II. MAIN BENEFITS FROM SMART WORK FOR EMPLOYEES [MADE BY AUTHORS]

Economic benefits	Social benefits
Money saving on fuel and parking	Improved quality of life and work life
Money saving on public transport tickets	Better work/family balance
	Increased job satisfaction
	Increased autonomy
	More flexibility
	Quiet rooms or areas to allow for uninterrupted time
	Holding meetings only when necessary
	Ability to speak up about concerns without fear of retaliation.
	Reduced commute time
	People with disabilities/health problems can work
	Child care issues less stressful. Lower stress level
	Mentoring opportunities
	De-routinization of work
	Possibility of living in rural areas while retaining challenging jobs in the knowledge economy traditionally linked to metropolitan areas.

Employees usually indicate time gain and efficiency as the most important advantages. These were mainly caused by less living-working traffic and better concentration at the distance work place. An improvement of work/life balance was indicated, as well as an increase of independence and of working by planning. The disabled can cooperate in the labor process. Transport can be a problem for this particular group. The possibility to work in an adapted home workplace can attract more people of this group of possible workers.

Compared to office-based employees, teleworkers experienced higher job satisfaction, less work-life conflict and higher productivity. Teleworkers are also able to avoid some of the stress associated with meetings, casual conversations, and other interruptions in the workplace, which can take away from the ability to focus and complete work. But telecommuting comes with its own challenges and stresses.

From the perspective of the employee the main disadvantages are:

- less contact with the team- less communication with supervisors and colleagues. Although teleworkers are in touch with people less often, they seem to be able to remain connected to the information they need even without constant communication;
- it is difficult to find balance between private life and work for some teleworkers. Therefore it is important to find out- does individual fit to e-work. Each application for e-work is submitted to the person directly in charge by the member of staff and includes a comprehensive questionnaire. This application must be approved by the person in charge on the basis of a list of selection criteria;
- ICT problems. It depends on individual skills and specific PC programs;
- reduced informal mentoring;
- career development and promotions. There’s concern about employees working in an environment that does not allow for ongoing face-to-face communication with co-workers and managers—that people will be ‘out-of-sight, out-of-mind’;
- reduced informal communication;
- interruptions from home;
- reduced informal training and development;
- employees may feel isolated. Informal communication in the workplace can provide social support as well as the ideas and information needed to perform a job more effectively.

Main benefits from smart work for local municipality are summarized in the Table 3.

TABLE III. MAIN BENEFITS FROM SMART WORK FOR LOCAL MUNICIPALITIES [MADE BY AUTHORS]

Economic benefits	Social benefits
Growth of productivity	Activation of entrepreneurship
Multiplier effect increases	Better availability of job places, services and reduction of inside emigration
Increase of revenues in the local authority budget from income tax due to people staying, living and working in rural area.	Reduction of transport intensity will incur: -air pollution reduction; -traffic congestion reduction; -traffic accident reduction;
	Local and regional development
	Region becomes more attractive place for people staying and living there

The smart work extends into a wide range of areas of political responsibility and public administration. Government policy plays an important role. Smart work may be a specific target for development strategies in the context of regional economic planning. There are main five potential means of measuring smart work benefits for local authority and society [14]:

- *Local and regional development.* The development of telework can be a significant contributor to local, regional development and regional competition. A traditional measure that is used in the evaluation of economic activity is output, usually represented as gross value added. This is an important measure when one examines the performance of regional and local economies and when one seeks to evaluate the performance of particular linkages in a production or value chain. Another important measure is gross domestic product.
- *Employment.* For measuring the impact of telework on national economy is possible in terms of contribution to GDP and employment. The telework promotes better availability of services and more jobs in rural areas. The telework helps to involve young mothers after baby care, college’s graduates in the business and disabled persons in the labor market. Better availability of job places and services can reduce people migration from rural areas to metropolitan cities. In general, migration would have a significant impact on demographic and labor force development of regions. It would benefit most affluent regions, whereas poor regions would lose population due to migration. Therefore we may expect that migration would be a strong factor increasing regional disparities. Still telework would strengthen local, regional development and competitiveness.
- *Activation of entrepreneurship.* As well as enhancement of the economic and entrepreneurial competitiveness of firms is important in rural areas. In the result of stakeholder interaction, critical boundary arises for creation of new innovations and business.
- *Domestic and foreign investments.* Private investments in the different industries may be encouraged or channeled in certain directions by specific fiscal or regulatory measures.
- *Reduction of transport intensity.* Telework influences reduction of daily movement from home to work (vica versa) by different transport modes. Consequently less daily transport intensity effects less energy consumption and less environmental pollution. A study by United Kingdom Department of Transport found that teleworking reduces the commuting car mileage travelled by teleworkers by 48-77% which, taking into account some increases in domestic travel, represents an 11-19% reduction in both mileage and trips.
- The greatest impact in terms of *greenhouse gas (GHG) emission* reductions enabled by teleworking, however, would be achieved in a smart world, where total emission reductions of 455 MtCO₂ and 1575 MtCO₂ would be achieved in 2030 and 2050, respectively. In smart world, indirect rebound effects would produce an increase in GHG emissions in 2030 (of about 38 MtCO₂) and a decrease (of about 191 MtCO₂) in 2050. This is due to the fact that over the years 2030 – 2050, a growing number of regions are assumed to deploy policies and strategies that can effectively channel the additional economic resources generated by the reduction in transportation costs enabled by teleworking into activities that lead to further reductions of GHG emissions.

After the analysis of smart work concept, its benefits and disadvantages, the main conclusion is, that smart work can help to increase economic development of regions and local municipalities. Technology companies have been predicting that telework — performing work from home or another remote location — soon will become the most common mode of work [15].

IV. ECONOMIC DEVELOPMENT OF BALVI MUNICIPALITY

There are 6 statistical regions in Latvia – Riga, Pieriga, Kurzeme, Vidzeme, Zemgale and Latgale. Balvi municipality is located in the statistical region of Latgale, it takes 1045 km² and consists of 10 parishes and city of Balvi. The municipality was created in 2009 in the framework of Administrative territorial reform, so there are data only about years 2009-2014 in the research.

Economic development of Balvi municipality in comparison with other municipalities of Latgale statistical region is evaluated using simplified formula (Formula 1) of Regional Competitiveness Index (RCI) and method of regional competitiveness evaluation worked out by authors (Fig.2)

$$RCI = \frac{1}{N} \left(2 * \frac{f_1 - f_{min_1}}{f_{max_1} - f_{min_1}} - 1 \right) + \dots + \left(2 * \frac{f_n - f_{min_n}}{f_{max_n} - f_{min_n}} - 1 \right) \tag{1}$$

where:

RCI - regional competitiveness index;

f₁ ... f_n- real values of indicators;

f_{min} ... f_{max}- minimal and maximal values of indicators;

N – number of indicators.

The following indicators to characterize economic development of chosen municipalities were used:

P - Population

NI - Natural increase per 1000 inhabitants

MB - Migration balance per 1000 inhabitants

EASU - Economically active statistical units of market sector per 1000 inhabitants

PIT - Revenues per person from Personnel Income Tax in municipalities’ budgets, LVL

U - Level of unemployment, %

For the basis of working out the matrix for development level and indicator growth rate the matrix of “The Market Share / Growth Rate” developed by the scientists of the Boston Group was used, which for defining the regional development is shown in Figure 2.

<i>Competitiveness level</i>	1	DEVELOPMENT POTENTIALLY HINDERING FACTOR	DEVELOPMENT CURRENTLY ENSURING FACTOR
	-∞	DEVELOPMENT CURRENTLY DECREASING FACTOR	DEVELOPMENT POTENTIALLY FACILITATING FACTOR
		-1	+∞
		<i>Growth rate</i>	

Fig. 2. Matrix of the development influencing factors for regions [made by authors]

In Figure 2 it can be seen that development *currently ensuring* are those factors that have been with a positive growth and have ensured the region’s indicator above the average development level.

Development *currently decreasing* are those factors that showed a negative growth and determined the region’s ranking below the average development level.

If the development influencing factor in regions is above the average compared to other regions but its development tendency is negative then in future if this tendency continues to be the same the region can become less developed. Such factors are development *potentially hindering*.

If the development influencing indicator is comparatively low (below the average level) but with a tendency to improve then in future if this tendency persists the given factor can become development facilitating. Such factors are development *potentially facilitating*.

In Figure 3 values of RCI for local municipalities of Latgale statistical region are given.

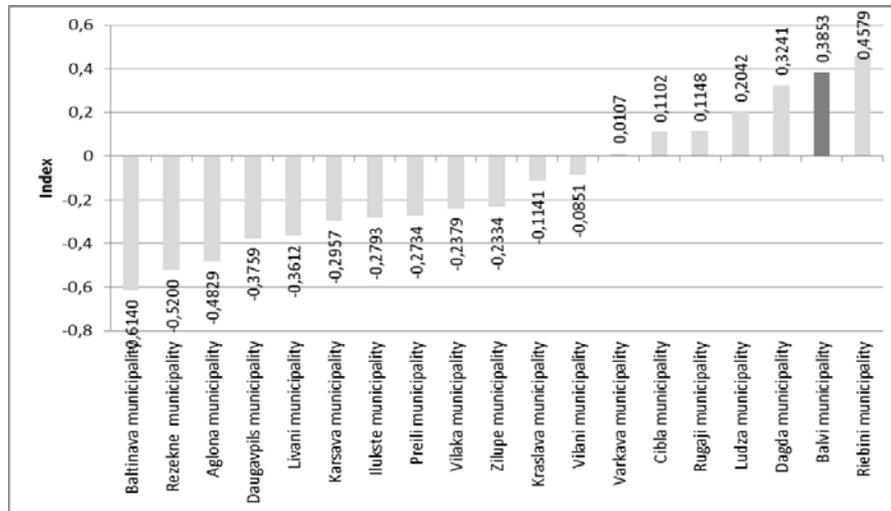


Fig. 3. Values of RCI for local municipalities of Latgale statistical region, 2014. Made by authors after [16], [17], [18], [19]

From Figure 3 it is possible to see, that Balvi municipality took the 2nd place among other municipalities of Latgale statistical region. The value of RCI in 2014 was 0,3853. Balvi municipality is one of the economically developed municipalities of Latgale statistical region, but in the scale of Latvia its competitiveness is considerably lower than competitiveness of municipalities of other statistical regions.

The most and less developed spheres in Balvi municipality, which were evaluated using indicators of RCI, are shown in Figure 4.

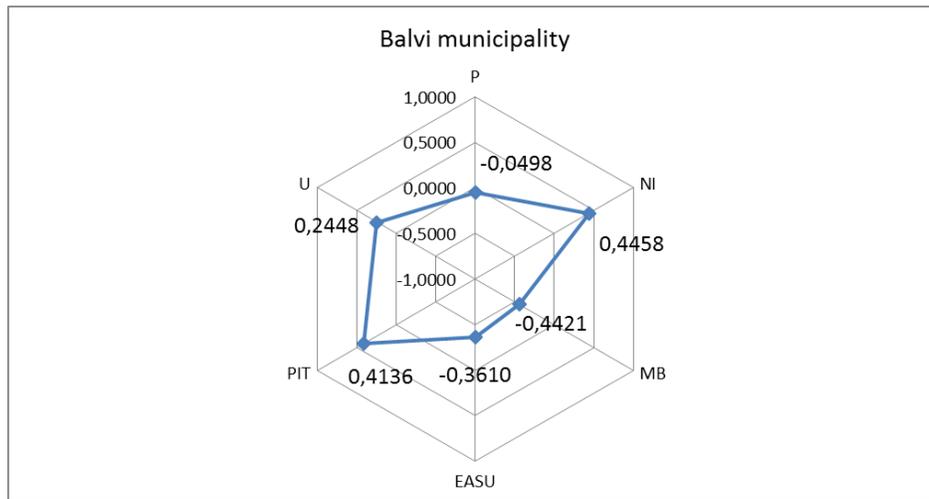


Fig. 4. The most and less developed spheres in Balvi municipality, 2014. Made by authors after [16], [17], [18], [19]

From Figure 4 it is possible to conclude that in Balvi municipality most competitive spheres in comparison with other municipalities of Latgale statistical region are revenues from personnel income tax, comparatively low level of unemployment and comparatively high natural increase (but this indicator is still negative in Balvi municipality). One of the important problems is negative migration balance – it means that people are tended to leave municipality.

Using matrix of development influencing factors for Balvi municipality helps to point out main factors that promote or hinder economical development of the municipality (Figure 5).

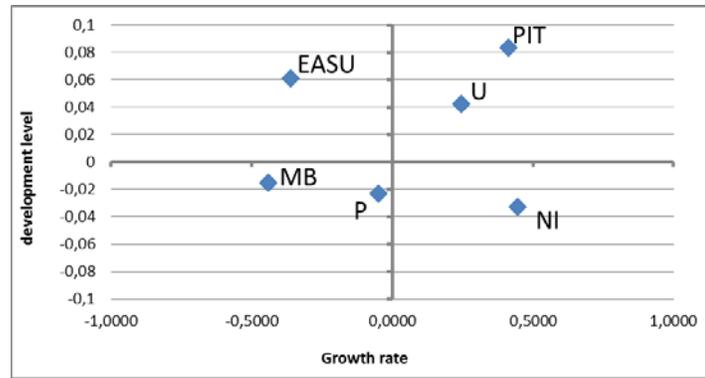


Fig. 5. Matrix of the development influencing factors for Balvi municipality, 2014. Made by authors after [16], [17], [18], [19]

From Figure 5 it is possible to see that in 2014 development currently ensuring factors in Balvi municipality were comparatively low level of unemployment and revenues from Personnel Income Tax in municipalities' budgets. These indicators have values above the average and have positive trend.

Development potentially facilitating factor is natural increase, because the value of this indicator is less than an average, but it is tended to improve.

Development currently decreasing factors are negative and less than an average migration balance, as well as little number of population, which continues to decrease.

But development potentially hindering factor in future would be economically active statistical units of market sector, because now the amount of enterprises is above the average, but it has negative trend.

Development of SWC and introducing of smart work could help to improve the situation in Balvi municipality almost in all indicators. To get know the opinion of Balvi municipality's population about smart work, the survey was done.

V. MAIN RESULTS OF SURVEY ABOUT SMART WORK IN BALVI MUNICIPALITY

The survey focused on:

- specific aspects of SWC usage including use of e-services and support for e-business, online communication, community;
- demographic information of the potential SWC users and their participation in the smart work.

The questionnaire was held from 27.06.2012 till 21.10.2012 and 169 respondents from Balvi municipality took part in this survey. The smart work is the way how to improve social and economic situation for individuals and it is obviously proved by results of the survey (Figure 6).

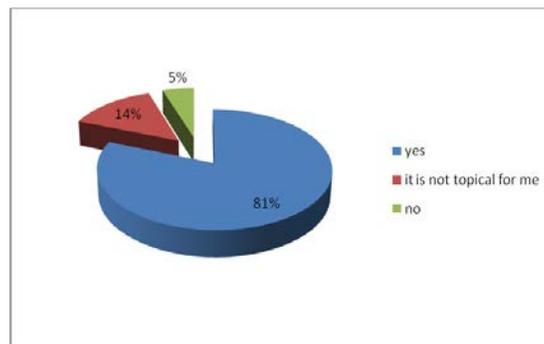


Fig. 5. Answers to the question „If there will be possibility to work in distance without the presence in the office, will You use it?“. Made by authors

From Figure 6 it is possible to conclude, that 81% from inhabitants of Balvi municipality who participated in the survey are interested in the smart work. 26% from them are in the age of 18-30. Only 5% are not interested to distant work. So, the population expresses interest about this new way of working, especially young people.

To work smart is not enough only to wish to do it, it is also necessary to have appropriate skills to work with ICT. The results of survey about the population skills in this sphere in Balvi municipality are shown in Figure 7.

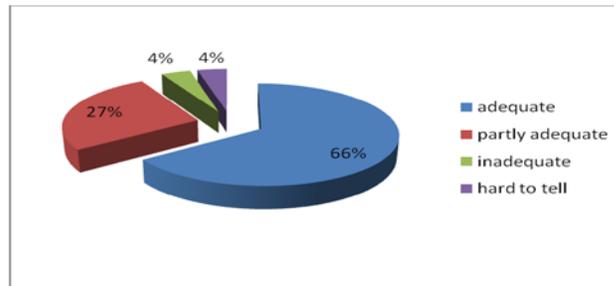


Fig. 5. Answers to the question „If there will be possibility to work in distance without the presence in the office, will You use it?“. Made by authors

From Figure 7 we can conclude, that 66% of Balvi population evaluate their skills as adequate and 27% as partly adequate. And only 4% of surveyed people evaluate their skills as inadequate. So, there is potential workforce to do smart work in Balvi municipality.

It is possible to do distance work from different places – home, library, SWC and others. Is it necessary to establish SWC in Balvi municipality to promote this way of working? This was also one of the questions of survey.

Both kinds of smart work have their own advantages. So, to choose the way of working, it is necessary for everybody to evaluate advantages and disadvantages of telework, personal touches and specific features of the work (Table 4).

TABLE IV. MAIN ADVANTAGES OF WORKING AT HOME AND IN THE SWC [20], [21], [22]

Work at home	Work in smart work center
Time economy. Money economy. Person can plan the working hours by itself. It is not necessary to simulate working. It is possible to combine work with child care or sick-nursing. At the same time with work it is possible to do many other home works that do not need continual presence. There is no discomfort for shy people, which can appear in the communication process in the office. It is real possibility to work for handicapped persons [22].	There is equipped special working space. It must be very big motivation to work at home, otherwise the work will be postponed and will be done in a big hurry and non-quality later. There is possibility to meet and communicate with other professionals. There is bigger protection against break down of technique. Safety of communication – to provide safe access to office equipment for teleworkers, communication must be encoded. Responsibility about providing of encoded communication, safety of e-mail and protection against viruses lies on company’s IT staff. Possibilities to use additional services. Savings on energy, for example, electricity costs [20], [21], [22].

In Figure 8 are illustrated the answers of Balvi municipality population about necessity of SWC.

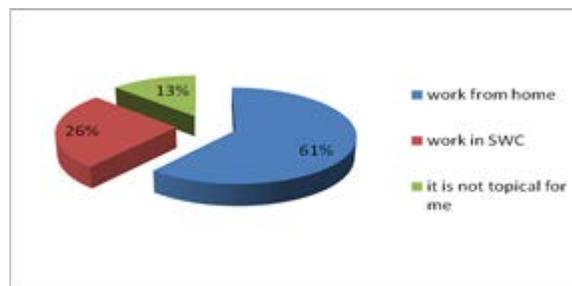


Fig.8. Answers to the question „If You will be allowed to use distant work, which place for telework do You prefer?“. Made by authors

From Figure 8 we can see, that 61% from all surveyed inhabitants of Balvi municipality will prefer working from home. But there are also 26% of populations who are ready to work in SWC. The main reasons, why to choose work in SWC, are:

- possibility to use Xerox, scanner, printer -53%;
- well equipped working space (PC, Internet) – 46%;

- possibility to get consultations about starting and developing of entrepreneurship – 37%;
- chance to meet other people who do the same work – 34%;
- possibility to search for job – 31%.

The main benefits for employees, if they would use distant work, are shown in Figure 9.

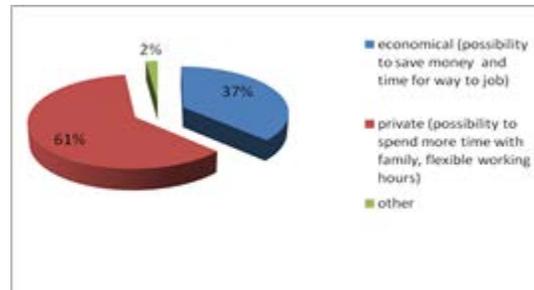


Fig.9. Answers to the question „ Which benefits from distant work are the most important for You?“. Made by authors

61% from all population pointed out private benefits from smart work – possibility to spend more time with family and flexible working hours. 37% mentioned, that the most important will be economical benefits.

After analysis of survey results it is possible to conclude, that population in Balvi municipality is ready to do smart work and part of them will be ready to work in SWC. To get know the employers point of view, the next survey is going on.

CONCLUSIONS

ICT development is the bases of smart work and now it is the best time to introduce smart work, because society has reached the 6th innovation wave.

ICT development, implementation of smart work approach and establishment of smart work centers can create new jobs for people with different qualification and skills in rural areas. The availability of new jobs and services increases people’s willingness to stay and live in native land; nevertheless that it is located in rural area. Consequently the region enhances its economic and entrepreneurial competitiveness.

According with results of questionnaire employees indicate time gain, efficiency and an improvement of work/life balance as the most important advantages. Companies are also interested implement smart work approach. They can save money by transferring production (service) from the city to the rural areas where rent and wages are lower. Companies usually want to maximize profit trying to be innovative and elastic. This is one way how to maximize profit using modern personal management. Smart work adoption in companies is sometimes met with resistance mostly due to unawareness and distrust. Therefore the initiative of municipality and cooperative strategy between entrepreneurs, employees and municipality is crucial for smart work implementation in the region. Smart work can help to increase economic development of regions and local municipalities.

Development currently decreasing factors in Balvi municipality are negative and less than an average migration balance, as well as little number of population, which continues to decrease. Establishing of SWC and introducing of smart work could help to improve the situation in Balvi municipality almost in all indicators:

- decrease unemployment level;
- increase incomes from Personnel Income Tax;
- improve migration balance;
- increase number of economical active statistical units of market sector;
- improve natural increase.

Survey of population in Balvi municipality about smart work and necessity of SWC shows, that population in Balvi municipality is ready to do smart work and part of them will be ready to work in SWC. Smart Work Centre will be real way how to increase development of Balvi municipality, it will provide new working places, decrease unemployment and help to maintain population in the municipality.

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