

## SOME ASPECTS FOR MODERN SOLUTIONS FOR STRENGTHENING SOCIAL RESILIENCE AS GUARANTEE FOR THE FUTURE WELL-BEING OF AN OPEN AND INCLUSIVE SOCIETY

*Biruta Sloka, University of Latvia*

*Ginta Tora, University of Latvia*

*Juris Dzelme, University of Latvia*

*Ilze Buligina, University of Latvia*

**Abstract.** Social inclusion and reduction of inequalities is becoming an increasingly topical problem in a range of OECD countries, due to the demographic structure of inhabitants and inequality of income, in many cases depending on labour contribution taking into account skills and competence often lacking for part of population gaining education many years ago. Big share of this part of the population currently is not able to keep the speed of technology development and increase of requirements for digital skills and internet use.

The aim of the current research is to investigate possible solutions to address social inclusion by possible involvement in the labour market of different groups at risk – based on provision of digital skills, computer availability, as well as health conditions by regions in Latvia, by age groups, by gender, by employability status.

The tasks of the research: analyse recent scientific findings on innovative approaches on involvement of different groups of inhabitants being at poverty risk into labour market and social inclusion, making them feel as valuable and esteemed members of the society; analyse data of several survey results: EU-SILC; Labour Force Survey and Survey on ICT skills for different groups of society in Latvia; analyse tendencies on internet use in Latvia by gender.

Main research methods – analysis of previous conducted research results reflected in scientific publications and policy analysis documents; analysis of data of EU-SILC and Labour Force Surveys as well as survey results on ICT skills on aspects of digitalisation and willingness to be involved in training and improvement of skills to avoid social exclusion and poverty.

Findings – different regions have different results in digital literacy, however, implementation of innovative approaches in inhabitants' involvement in labour market help to avoid or diminish social exclusion.

**Keywords:** *Income Distribution; Government Policy and Regulation; Innovations; Technological Change; Human Resources.*

**JEL Code:** D6; O3; O15; M48

### Introduction

#### Problem

International organisations have pointed out problems in Latvia regarding poverty reduction, support for the implementation of social equality, as well as to certain aspects of social inclusion. The aim of the research is to study the possibilities for building of social security by linking it to well-being and quality of life and ensuring an open and inclusive society.

Significant factors for social resilience are foreseeable income, digital literacy, individual characteristics, ability to trust other people. A significant role for achieving this is education, health, ability for members of the society to co-operate with others, as well as trust to public administration.

Trends that pose additional challenges on a global scale are the robotisation of production and the polarization of society, with declining demand for average qualifications in the labour markets, exacerbating inequalities. The availability of digital literacy for seniors and vulnerable groups, their ability to function successfully in the digital environment to ensure an independent, prosperous life is essential. Localizing the economy and building intergenerational solidarity by involving seniors and vulnerable groups in lifelong learning in partnership with the younger generation within the local community is a hitherto underestimated way of building an inclusive civil society and a "silver economy". Demographic change contributes to decision-making at local, regional and national levels across Europe, aimed at developing an environment that supports active and healthy ageing, improves independent living and well-being for older people, and creates a society for all ages.

The aim of the current research is to investigate possible solutions for social inclusion by possible involvement in labour market of different groups at risk – based on provision of digital skills, computer availability as well as regarding health conditions by regions in Latvia, by age groups, by gender, by employability status.

Tasks of research: analyse recent scientific findings on innovative approaches on involvement of various groups of inhabitants being at poverty risk into labour market and social inclusion - making them feel as valuable and esteemed members of the society; analyse data of several survey

results: EU-SILC; Labour Force Survey and Survey on ICT skills for different groups of society in Latvia; analyse tendencies on internet use in Latvia by gender.

Design/Methodology/Approach – analysis of previous conducted research results reflected in scientific publications and policy analysis documents; analysis of data of EU-SILC and Labour Force Surveys as well as survey results on ICT skills on aspects of digitalisation and willingness to be involved in training and improvement of skills to avoid social exclusion and poverty; survey results were analysed using indicators of descriptive statistics: indicators of central tendency or location (arithmetic mean, median and mode); indicators of variability or dispersion (range, standard deviation, standard error of mean), as well as cross-tabulations by regions, by education level and household size; testing statistical hypotheses using t-test on differences of arithmetic means and analysis of variance – ANOVA, time series analysis.

Fast development of information technologies (IT) changes all social relations and business during the life of one generation. In addition to the previous conflicts between generations new conflicts arise inside the generations, first of all between digitally included in the new forms of life and excluded as a result of insufficient digital literacy. Digitalization of life creates conflicts, inequality and many other new problems. Digital literacy becomes a necessary condition for inclusion in social relations. Many contacts between people switch to internet and digital means for the exchange of information. Free market and competition between people do not allow to continue the previous way in the business. The biggest problems arise in countryside and for elder people, but the changes influence everybody.

Society, state and local communities must support people to solve the arising difficulties, linked with significant changes in economics, with growing inequalities, with loss of social contacts. Social inclusion and reduction of inequalities is becoming the significant problem for all countries. The demographic structure of inhabitants in OECD countries creates additional problems due to the reason that part of population with education received many years ago currently is not able to keep the speed of technology development and increase of requirements for digital skills.

It is difficult to predict future development of IT and artificial intelligence (AI), therefore we need to investigate carefully the basis of IT and to plan different alternative actions to keep the society ready for the future changes. Society and state must plan actions to reduce increasing inequality of income based on labour contribution. Education system must change to ensure timely and effectively necessary changes for the acquisition of respective knowledge, skills and attitudes. Support to acquire new skills and competences, often lacking in case of older population and marginal groups, becomes extremely essential for social inclusion. Entrepreneurship must be included in the education process with the support of the state, non-governmental organizations (NGO) and local communities.

There are several reasons why in Latvia there are more problems than in other European countries to implement training programs for all members of the society. Nevertheless other countries also could meet similar problems, potentially, with some delay in time. First of all this is due to the high rate of the mobility and therefore also emigration of the more active part of the young, generation who usually is the most capable to cope with the training and digitalization. Second reason, linked with the growing mobility is increasing inequality between different groups of inhabitants and between different regions. Latvia together with Romania, Bulgaria and Lithuania have the greatest in Europe Gini index and other similar criteria of inequality. Liberal politics and "free market" during the last 30 years created growing inequality of income, depopulation and aging in the most part of Latvia. The Riga region is the least affected, but also is facing certain problems. All other regions in Latvia suffer from deindustrialization and depopulation. Many schools are subject to closing and inhabitants are aging significantly. Third reason is low support for all education system, low prestige of teachers and low level of teachers' salaries. Lack of prestige and support prevent young generation from joining education system and create the "vicious circle" for the development of society. The last but not least is the problem of the ideology. The aims of the life and future perspectives become unclear. Mutual trust and solidarity must be strengthened in all Western countries. Post-soviet countries with divided ethnically and ideologically society, such as Latvia, must be very careful, but support for education, art, culture, philosophy is important for the whole world. Solutions must be found to promote inclusive, supportive society with mutual trust, help and clear vision of future.

Investigation of these problems are very urgent in the fast changing world. Latvia and other countries should create future politics to prevent exclusion and to provide new possibilities for all citizens of the Europe Union to participate in social networks and to receive all necessary support from state, local communities and society.

## Literature Review

Academic researches world-wide have analysed different aspects on social inclusion. The contribution of digitalisation to business longevity from a competitiveness perspective was pointed out (Rossato, Castellani, 2020). Researchers have underlined that freedom of access to information and freedom of expression: the Internet as a tool for global social inclusion (Hamilton, Pors, 2003). Researchers have paid attention on exploring

smart economic development and competitiveness in Central and Eastern European countries (Dagilienė, et al, 2020), libraries there pay an important role (Johnson, et al, 2018) with increasing importance of libraries for social inclusion of elderly people (Gil, Patricio, 2020). Researchers have investigated links between socio-economic variables and digitalization worldwide: the unsettled debate on digital divide (Mubarak, Suomi, Kantola, 2020). Researchers have paid attention also to leveraging service design for healthcare transformation: toward people-centered, integrated, and technology-enabled healthcare systems (Patricio, et al, 2020) and role of children to make and shape our digital futures – from adults creating technologies to children transforming cultures (Iivari, 2020). Researchers have indicated and investigated importance of mass media for social inclusion as well as social exclusion (Ewart, Snowden, 2011).

Documents of EU pay attention mainly to the legal problems, which are linked with the use of information technologies (IT) and Artificial Intelligence (AI) (EC, 2020). Less attention is paid to the social problems and to the development of education and business, using AI.

The new problem, which arises for the first time is the so called "*black box effect*". Nobody, including creators, can explain and predict actions of AI, therefore new type of relations of people with technologies should be discussed. "*The specific characteristics of many AI technologies, including opacity ('black box-effect'), complexity, unpredictability and partially autonomous behaviour, may make it hard to verify compliance with, and may hamper the effective enforcement of, rules of existing EU law meant to protect fundamental rights*" (EC, 2020, p. 12).

The rights of elderly persons are mentioned as the problem to be solved. "*Explicit obligations for producers of, among others, AI humanoid robots to explicitly consider the immaterial harm their products could cause to users, in particular vulnerable users such as elderly persons in care environments, could be considered for the scope of relevant EU legislation*" (EC, 2020, p. 8).

The existing approach to AI does not make difference with other new technologies, however the risks at least partly are understood. "*As with any new technology, the use of AI brings both opportunities and risks. Citizens fear being left powerless in defending their rights and safety when facing the information asymmetries of algorithmic decision-making, and companies are concerned by legal uncertainty. While AI can help protect citizens' security and enable them to enjoy their fundamental rights, citizens also worry that AI can have unintended effects or even be used for malicious purposes. These concerns need to be addressed. Moreover, in addition to a lack of investment and skills, lack of trust is a main factor holding back a broader uptake of AI*" (EC, 2020, p. 10).

There are new challenges for education, linked with the development of Artificial Intelligence (AI) and mentioned by European Commission, which should be answered, at least partly, by the activities of member states, but the proper activities need to be investigated in much more details. "*The updated Digital Education Action Plan will help make better use of data and AI-based technologies such as learning and predictive analytics with the aim to improve education and training systems and make them fit for the digital age. The Plan will also increase awareness of AI at all levels of education in order to prepare citizens for informed decisions that will be increasingly affected by AI. ... Beyond upskilling, workers and employers are directly affected by the design and use of AI systems in the workplace. The involvement of social partners will be a crucial factor in ensuring a human-centred approach to AI at work*" (EC, 2020, p. 6).

The consequences of the "free market" (more precisely - the expansion of capitalism and globalisation) are the fast development of technologies, first of all IT and AI. Linked with AI and IT are the rapid changes in the social structure of society - a significant increase in stratification, poverty and exclusion, large migration flows, which significantly change the situation in many countries, including Latvia. The failures of multiculturalism calls for ways to solve societal problems, to review earlier predictions (Frumkin, 2003), and to develop concrete solutions. Some concrete legal and administrative provisions already have been developed to overcome the effects of globalisation and the introduction of the AI, but this is only a small part of the solutions needed.

Frumkin pays particular attention to the already ongoing changes in ethics, choice, freedom, work, sport and art and the trends of these changes in the future (Frumkin, 2003). The development of AI and new technologies are increasing choice, including increased possibilities to change the physical, physiological and mental (psychological) state of the human body. The use of psychotropic substances makes it possible, with the choice made by the "free will", to influence this "free will", choice and desires. As a result, the feedback generated by the "free will" changes itself by reflexively changing desires and needs, motivation. Bostrom's negotiated *coherent, extrapolated will* (CEW) must ensure the stability and friendliness of AI (and its final form - superintelligence) for humanity, while CEW itself, as an integral gathering of individual desires, is becoming unstable (Bostrom, 2014). (Strong and short interactions between individuals (the "crowd" effects) destroy stability and do not allow to use the Gaussian distribution.)

The stabilisation of the CEW and the stabilisation of the social structure of society can be achieved by reinforcing people-to-people interaction through the development of networks. Digital, virtual networks, that have an increasing impact compared to personal, “direct” contacts, real-relation networks, are gaining increasing influence in networking. Networks are effective means for creating CEW, controlling the “free will” of individuals, halting progress towards unfettered “absolute freedom”, arbitrary choice, creating a social structure conducive to cooperation, integration and coherence, a united morality, virtue and moral behaviour. Three main conditions for the development of CEW are: 1) networks and digital skills as means to use and developed networks; 2) motivation (economic, cultural, political) to engage in networks in person or in virtual, digital form; 3) harmonising the norms of morality, moral behaviour, desires and virtue.

The formation of the CEW should involve all groups of society, preventing any group from being ousted, failing to respect its interests. The education system, NGOs, political and cultural organisations should address the destructive tendencies of *deviant behaviour*, the tendency to *anarchy*, the tendency of free will to disorganise, to “disperse” society, to divide, to “atomize” the social structure.

The development of a balanced system of desires and needs that could be extrapolated to *the general set of principles of law*, investigated by Rezevska (Rezevska, 2015), essentially equivalent to the CEW, should take into account the main objective, biological development needs and their subjective representation in the individual system of emotions, archetypes and virtues of the society (*nation*). In biological evolution, two related, complementary, mutually competitive trends, expressed as *objective needs* and partly emerging as *subjective tendencies*, are manifested in different subjective forms: 1) the propensity to acquire and store for the future use as much as possible and as accurate and diversified as possible, potentially usable behaviour models, which ensure successful survival and expansion in a wide variety of variable situations (relatively simplification - the propensity for *information*); 2) the propensity to acquire and manage as much resources, energy and materials as possible, which ensure reproduction and distribution at the highest possible amount and speed (relatively simplification - *energy* propensity).

The biological imperative is the survival of the group, the survival and spread of the *nation*. An individual is only important as an element forming a group, an element forming the overall system of nation (similar to the activity of individual cells and organs subject to the interests of an organism as a whole). As a result, the analysis of the formation of the CEW should take into account at least four basic needs and their objective and subjective features and the maximum effective acquisition, storage and use of means corresponding to each basic need: 1) *information* (knowledge) *for the group*, nation (acquisition, storage and use of the behaviour models of the group); 2) *information of the individual*; 3) *energy for the group* (nation) (resources for survival and expansion of the group, acquisition, storage and use of the resources); 4) *energy of the individual*.

In developing networks and justifying the need for cooperation, objective reasoning is based on the objective needs of the nation, but on the subjective, reflecting level motivation is based on ideology and mythology, including Christian values, language, traditions. The individual's needs, which are secondary to the nation's (primary) needs, take the form of solidarity and mutual assistance, the inclusion of marginal, excluded groups, the integration of society to meet common, national needs, by exposing the individual's selfishness and free will to the demands of society, the consolidation of nation and the mutual, complementary cooperation and collectivism of individuals. This objective compliance of the individual with public requirements should be demonstrated as a system of subjective virtues and values, which is formed in the interests of the nation, in the cooperation of individuals with all groups of the nation. In view of the structure of the nation, cooperation should also be adequately structured in order to create a hierarchical value, principle, legal system. A formalised law as a minimum of morality is needed only as an aid for supporting a system of values and rights in cases where the *ideology* adopted by society and its component morality are unable to convert sufficiently effectively to the *worldview* and its component *virtues* of all individuals. Society (nation), through various formal and non-formal means, must ensure that the objective needs of society and the individual are adequately transformed into subjective needs. Priority is given to the informal means, without which formal means can never fully function. The EC documents on ICT, AI, Internet and robotics challenges and hazards (EC, 2020) draws attention to the major transformation of the human contact system. EC documents calls for an appropriate transformation of the social structure of the society, such as education, culture, public administration, health and social care systems. The minimum necessary means of supporting new transformations is the acquisition of digital skills and the inclusion of all individuals in digital social contact networks, combining *personal*, *physical* and *virtual*, *digital* contacts as needed.

Computer power continues to grow exponentially under Moore's Law, doubling in about a year and a half. Automation, robotics, information and communication technologies (ICT) are fundamentally changing all areas of life. The World Economic Forum (in Davos) continues to discuss the replacement of accountants, drivers and other similar professionals, including also teachers, with robots (Jordan & Mitchell, 2015). Rapidly changing technologies within one generation force to change people's relationships, habits, lifestyle, social structure. New opportunities are

emerging, but also new, serious risks emerge (Barrat, 2015; Bostrom, 2014). The call of more than 17 thousands computer specialists to stop the use of military robots goes unheeded (Metz, 2018).

The rapidly growing flow of information creates serious difficulties in mastering the existing scientific achievements in order to be able to continue the development of science, which was warned, for example, by Wigner (1970). According to his prediction, the main future sciences will be physics and psychology. Physics allows us to understand the basic foundations of the world structure and helps to form all other branches of science. Psychology is capable of methods for transforming scientific achievements into a form that can be understood and used by humans.

The fundamental and complementary nature of physics and psychology has been highlighted by many scholars such as Wigner, Einstein etc. (Wigner, 1970). *Physics* and *psychology* are two "comprehensive, universal", complementary sciences that describe the world (matter) on the one hand and the activities of the psyche (soul) on the other. Wigner believes that "we can combine" these two main sciences and thus significantly expand the limits of human possibilities in the world and self-cognition, to overcome the "second kind of transformation". (The process of changing the main principles and models (paradigms) of the science sector the "revolutions" in science are the "first type of transformation." The "second type of transformation", a comprehensive crisis in science, is related to the inability to absorb too much previously accumulated knowledge (Wigner, 1970). According to Wigner, the development of science is characterized by a gradual process of changing the main principles and models (paradigms) specific to each branch of science - "the first type of transformation", but the second type of transformation threatens to stop it. To overcome the second type of transformation, Wigner recommends changing education: making "simplification" and using demonstrable "capacious" concepts and generalizations using the possibilities of psychology (Wigner, 1970).

The development of the education system must solve the problem of understand-ability for all levels and types of education and for all age groups. Rapid changes of knowledge demand repeated returns to the education, including acquisition of new basic skills, such as the *digital literacy*. The problems, analysed by Wigner as the changes for several generations, now is necessary to solve during one generation, using *life-long learning* (LLL).

The greatest uncertainties and risks are posed by the consequences of the development of information technology (IT) and artificial intelligence (AI). Significantly, these threats outweigh all other possible dangers associated with other singularities (demographic, cultural, ecological, etc.) in human evolution. Mankind needs to understand what and when can be expected from AI and how to guide the development of IT and the process of creating AI. The development of the AI could also create many new opportunities and prevent or at least reduce many threats. The main threats to mankind right now are the following.

- Natural disasters (hurricanes, earthquakes, eruptions of volcanoes, collisions with asteroids and comets in etc.) which can be prevented or at least significantly reduced by timely anticipation through AI.
- Epidemics and pandemics that can significantly impair people's lives. Rapid management of epidemics can be ensured by the use of AI.
- Conflict between or within countries which can lead to partial or even complete destruction of each other. The General, the Habilitated Doctor of Engineering, Kārlis Krēšlīņš believes that "... *international organizations must prevent other countries from intervening in the conflict. ... the introduction of peace in a region or country is supported by the UN, using strict principles, without any policy and individual interests. Artificial intelligence can do it better. This would diminish the role of real politics in a world*" (Krēšlīņš, 2019).

The use of AI for healthcare has been described by (Cheatham, Javanmardian, & Samandari, 2019). There are many ways for development and many possibilities, but also many problems and risks. The future development of AI itself, its interaction with humans and influence on health care, including basic human biology, is greatly uncertain. The changes of healthcare and interaction with AI are very important field of research. "*Healthcare is one of the major success stories of our times. ... By 2050, one in four people in Europe and North America will be over the age of 65 – this means the health systems will have to deal with more patients with complex needs. Managing such patients is expensive and requires systems to shift from an episodic care-based philosophy to one that is much more proactive and focused on long-term care management. ... Last, AI is in its infancy and its long-term implications are uncertain. Future applications of AI in healthcare delivery, in the approach to innovation and in how each of us thinks about our health, may be transformative. We can imagine a future in which population-level data from wearables and implants change our understanding of human biology and of how medicines work, enabling personalised and real-time treatment for all*" (Cheatham, Javanmardian, Samandari, 2019). Many other researchers have also developed upon those issues.

## Research methods

Analysis of previous conducted research results reflected in scientific publications and policy analysis, documents analysis of data of EU-SILC and Labour Force Surveys on aspects of digitalisation and population's willingness to be involved in training and improvement of skills to avoid social exclusion and poverty and CSB data which are obtained conducting survey on the use of information and communication technologies (ICT) in households and by individuals. The source of the data is the questionnaire No. ICT-persons "Use of computers and the internet in households" (CSB, Latvia, 2020),

survey results were analysed using indicators of descriptive statistics:

- indicators of central tendency or location (arithmetic mean, median and mode);
- indicators of variability or dispersion (range, standard deviation, standard error of mean), as well as cross-tabulations by regions, by education level and household size;
- testing statistical hypotheses using t-test on differences of arithmetic means and analysis of variance - ANOVA.

## Results and discussion

### Social needs and aims

The main problem to be solved for better involvement of socially excluded inhabitants is creation and development of *motivation* to participate in the social contacts and in business. Socially excluded persons often have lost the social contacts and they do not have motivation to change anything in their life. This situation creates the negative return: *less motivation – less contacts, less contacts – less motivation*. The problem is to stop the negative return ("*vicious circle*") and to switch to some new activities. An access to internet, possibility to start or renew some additional business activities should be linked with new possibilities to change the life, including the basic physiological and safety needs (also the *health* problems) which could be solved by participation in some business, mainly as an employee, or by participation in non-governmental organisations (NGO) and different cultural and political activities.

Data collected about the digital literacy by state statistics services (CSB) (Table 1, Table 2, Table 3) shows that there are serious problems. The biggest concern is about the very great difference between generations. Even in the case of the very simple skills (*transferring files between computers or other devices*) (Table 1) difference is rather big: 89% for the age group 16-24 years old and 26% for the age group 65-74 years old in the year 2017. Positive trend is fast increase of the skills for the elder generations during 2 years, from 2015 till 2017. Surprising are some cases of decrease of skills for the age groups 16-24 and 25-34 years old. There is strong correlation between employment level and also the education level and the digital skills: higher level of employment and education - higher skills (this correlation partly could be explained by the age, because younger generations have higher level of education and higher level of the employment).



**Computer/ Internet usage regularly: (at least once a week) by individuals at the beginning of the year (% of total population within the corresponding group) 2017-2019**

Characteristics	2017	2018	2019
<i>Gender</i>			
TOTAL	78,5	81,2	83,7
Men	78,6	80,8	85,2
Women	78,3	81,5	82,4
<i>Age group</i>			
16-24 years old	98,9	98,6	99,8
25-34 years old	97,3	98,6	98,1
35-44 years old	92,5	94,9	95,0
45-54 years old	80,0	83,7	89,1
55-64 years old	62,6	67,6	71,1
65-74 years old	35,5	40,1	47,4
<i>Education level</i>			
Primary education	65,2	72,7	68,0
Secondary education	72,9	75,8	79,9
Higher education	94,8	95,0	95,8
<i>Employment status</i>			
Employed	89,6	91,9	93,1
Unemployed	73,8	74,1	73,8
Pupils, students	98,4	99,4	100,0
Other inactive	43,4	47,2	52,8
<i>Regions</i>			
Riga region	83,4	84,9	87,3
Pieriga region	78,9	83,0	83,4
Vidzeme region	75,2	78,9	80,5
Kurzeme region	77,0	80,5	82,4
Zemgale region	79,3	81,3	86,7
Latgale region	69,2	71,8	76,5

Source: Author's construction based on CSB data

In the case of more complicated skills (*installing software or applications (apps)*) (Table 2) and (*changing the settings of any software, including operational system or security programs*) (Table 3) the trends are similar, but the decrease of skills from 2016 till 2017 is more clear. For higher level of skills the decrease is greater.

Table 2

**E-skills in 2015 -2017 in Latvia: Installing software or applications (apps) (% of total population within the corresponding group)**

<i>Gender</i>	2015	2016	2017
TOTAL	24,20	33,90	32,60
Men	33,10	38,60	37,00
Women	16,70	29,90	28,70
<i>Employment status</i>			
Employed	28,60	40,50	38,60
Unemployed	15,60	29,90	24,80
Other inactive	4,80	6,70	7,20
<i>Education level</i>			
Primary education or no education	26,70	29,20	28,70
Secondary education	19,30	26,40	25,60
Higher education	32,90	49,30	46,30
Pupils, students	64,40	69,70	71,90
<i>Age groups</i>			
16-24 years old	57,70	66,10	67,40
25-34 years old	46,00	61,30	59,70
35-44 years old	27,80	41,00	37,30
45-54 years old	13,90	22,90	22,30
55-64 years old	6,40	10,70	10,20
65-74 years old	2,10	3,60	3,00
<i>Region</i>			
Riga region	32,20	43,00	40,30
Pieriga region	25,80	37,80	34,10
Vidzeme region	19,50	31,40	29,30
Kurzeme region	19,70	31,20	27,90
Zemgale region	18,30	25,50	26,80
Latgale region	16,90	19,70	24,10

Source: Author's construction based on CSB data (latest available data in 2020)

In all cases, for all kinds of digital skills the highest level has been achieved by people involved in the education process - by pupils and students. This could mean that only permanent education can solve the problem of digital literacy. Other problem is low level of higher digital skills - for all groups less than 35%. As a result independent use of IT is possible only for small part of people and situation becomes worse. Serious investigation is necessary for future strategy and right plans for the development of AI.

Table 3

**E-skills in 2015 -2017 in Latvia: Changing the settings of any software, including operational system or security programs (% of total population within the corresponding group)**

Responses by gender	2015	2016	2017
TOTAL	15,00	19,90	16,60
Men	23,00	26,30	22,40
Women	8,30	14,20	11,50

Responses by economic activity	2015	2016	2017
Employed	18,50	23,80	19,70
Unemployed	9,00	15,60	12,10
Other inactive	2,80	4,20	4,10

Responses by education level	2015	2016	2017
Primary education or no education	14,30	16,70	15,90
Secondary education	11,80	15,10	12,40
Higher education	21,80	29,60	23,70
Pupils, students	35,00	41,30	35,00

Responses by age group	2015	2016	2017
16-24 years old	30,20	38,80	32,00
25-34 years old	28,50	34,50	29,80



35-44 years old	18,90	23,70	18,80
45-54 years old	9,50	14,10	11,60
55-64 years old	4,50	7,00	6,40
65-74 years old	2,20	2,30	2,30

Responses by region	2015	2016	2017
Riga region	22,70	26,40	20,70
Pieriga region	11,40	22,20	16,70
Vidzeme region	11,10	17,00	11,10
Kurzeme region	12,90	17,40	15,90
Zemgale region	11,80	12,40	12,40
Latgale region	9,90	12,60	14,80

Source: Author's construction based on CSB data (latest data which are available in 2020)

Recent data on ways of contacting or interacting with public authorities or public services over the Internet by individuals for private purposes are included in table 4.

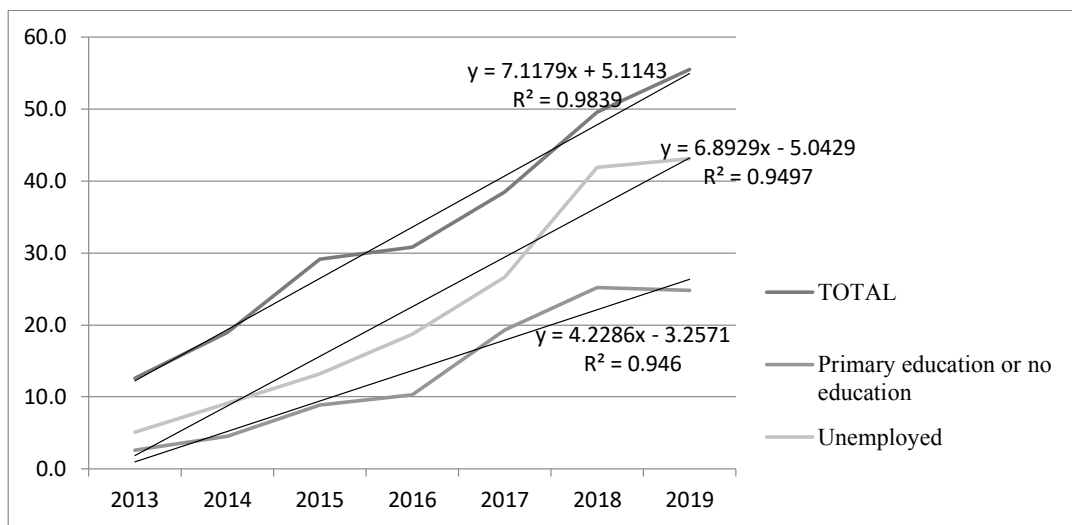
Table 4

**Contacting or interacting with public authorities or public services over the Internet by individuals for private purposes (% of total population within the corresponding group) – in Latvia in 2017 - 2019**

Group	Obtaining information from web sites			Downloading official forms			Submitting completed forms			Internet is not used for contacting or interacting with public authorities or public services		
	2017	2018	2019	2017	2018	2019	2017	2018	2019	2017	2018	2019
TOTAL	68,5	...	57,7	16,6	14,8	18,4	38,5	49,6	55,5	13,8	19,0	17,1
Men	66,9	...	54,7	14,8	12,3	14,7	36,1	46,1	53,3	15,7	22,2	20,7
Women	70,0		60,3	18,3	17,0	21,6	40,6	52,8	57,5	12,2	16,2	14,0
16-24 years old	80,1		54,1	15,0	12,2	21,5	35,9	48,8	53,6	19,2	29,0	27,4
25-34 years old	90,2		77,0	28,6	22,0	28,4	58,7	72,6	79,8	8,8	11,8	8,4
35-44 years old	81,6		71,7	21,7	21,8	24,7	48,9	66,9	71,5	13,2	14,9	13,1
45-54 years old	71,9		63,4	15,2	14,7	18,3	40,0	52,8	60,6	14,3	18,3	15,9
55-64 years old	52,7		47,4	11,4	10,1	11,8	28,1	33,9	42,0	16,1	22,5	20,2
65-74 years old	27,8		22,9	3,8	4,2	3,3	11,2	13,4	15,8	13,3	22,3	23,2
Primary education or no education	52,2		32,5	6,1	6,6	6,8	19,3	25,2	24,8	17,1	33,3	30,0
Secondary education	62,5		52,5	12,5	11,1	13,2	30,8	41,9	47,9	15,8	21,2	20,2
Higher education	87,2		75,5	29,2	25,3	31,2	61,6	75,4	79,4	8,7	8,3	7,3
Pupils, students	76,6		48,8	10,2	10,1	19,4	23,7	34,4	41,0	22,3	38,0	34,5
Employed	80,8		68,6	21,9	19,3	23,6	51,0	63,8	70,3	12,1	15,3	12,8
Unemployed	61,7		47,7	13,9	11,3	11,3	26,6	41,9	43,1	17,0	19,8	20,1
Other inactive	34,8		30,1	5,3	4,1	4,2	13,6	15,7	18,8	14,7	24,1	24,0
Riga region	72,1		62,6	18,7	14,8	19,6	41,6	56,5	60,7	14,8	16,0	14,9
Pieriga region	73,6		58,0	18,1	19,0	21,0	42,6	53,3	59,3	9,5	17,3	16,3
Vidzeme region	66,9		50,9	11,6	9,0	12,9	31,5	43,3	44,3	12,7	19,5	24,0
Kurzeme region	69,9		46,6	15,0	12,9	14,3	39,6	41,4	53,8	11,7	27,8	17,4
Zemgale region	68,4		68,2	21,1	18,4	26,7	41,3	52,5	58,7	14,0	19,2	14,9
Latgale region	53,4		50,9	11,0	11,4	11,9	27,5	37,9	44,6	19,5	20,1	20,5

Source: Author's construction based on CSB data

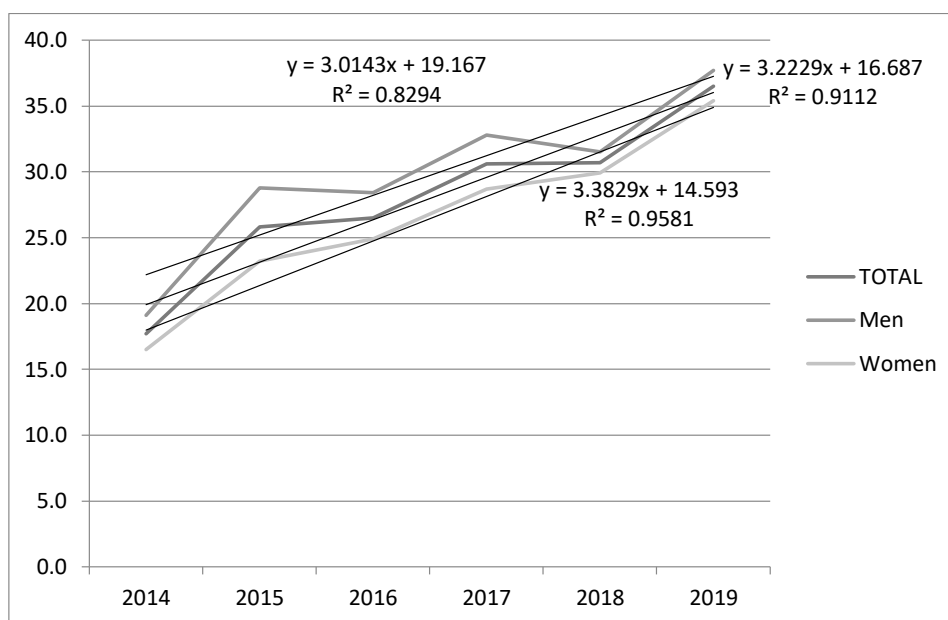
Data included in table 4 indicate that in many groups of inhabitants still are not active in using contacting or interacting with public authorities or public services over the Internet. This is a very big problem in limited face-to-face communication. Time series on contacting or interacting with public authorities or public services over the Internet by individuals for private purposes (% of total population within the corresponding group) - submitting completed forms in 2013-2019 and respective linear trends are reflected in figure 1.



Source: author's construction and calculations based on CSB data

Fig. 1. Contacting or interacting with public authorities or public services over the Internet by individuals for private purposes (% of total population within the corresponding group) - submitting completed forms in 2013-2019 and respective linear trends

Data indicate that there are significant increases in all groups in Latvia including persons with primary education or no education, as well as unemployed persons. Time series on use of storage space on the Internet (% of Internet users within the corresponding group) in Latvia 2014-2019 and respective linear trends are reflected in figure 2.



Source: Author's construction and calculations based on CSB data

Fig. 2. Use of storage space on the Internet (% of Internet users within the gender group) in Latvia 2014-2019 and linear trends

Data indicate that there are significant increases in all person groups in Latvia including persons by gender. Data on the main reason (lack of skills or knowledge (e.g. did not know how to use website or use was too complicated) for individuals not submitting completed forms to public

authorities websites for private purposes in the last 12 months (% of Internet users during the last 12 months within the corresponding group) - in Latvia in 2013-2019 are reflected in table 5.

Table 5

**The main reason (lack of skills or knowledge (e.g. did not know how to use website or use was too complicated) for individuals not submitting completed forms to public authorities websites for private purposes in the last 12 months (% of Internet users during the last 12 months within the corresponding group) - in Latvia in 2013-2019**

Groups of inhabitants	2013	2014	2015	2016	2017	2018	2019
TOTAL	3,6	4,6	5,5	7,6	9,8	12,6	12,3
Men	2,6	4,1	4,1	6,3	8,0	10,4	11,4
Women	4,5	5,0	6,9	8,9	11,6	14,8	13,4
16-24 years old	0,6	1,2	1,2	1,5	2,4	2,1	0,3
25-34 years old	2,2	2,5	3,2	3,8	4,3	5,3	6,1
35-44 years old	4,3	4,2	5,0	7,8	10,4	9,6	12,7
45-54 years old	6,5	6,9	7,3	10,5	11,4	15,9	15,6
55-64 years old	4,3	7,0	7,8	12,7	16,2	20,5	19,0
65-74 years old	4,5	8,6	11,6	11,6	17,6	19,1	16,0
Primary education or no education	2,4	4,7	6,0	6,5	9,7	7,1	4,9
Secondary education	4,4	6,4	5,8	9,6	11,2	15,1	13,7
Higher education	2,8	1,8	4,3	3,9	6,8	10,5	15,1
Pupils, students	0,0	0,4	0,0	0,3	2,6	0,0	0,0
Employed	3,5	4,2	4,9	8,0	10,0	14,1	15,2
Unemployed	4,2	7,2	7,0	5,8	9,2	12,0	15,4
Other inactive	7,1	7,8	9,8	12,3	14,3	15,5	11,8
Riga region	3,4	4,2	4,5	7,6	10,9	16,1	13,0
Pieriga region	6,5	3,7	5,9	7,7	11,3	9,5	12,1
Vidzeme region	4,0	3,4	7,3	8,2	9,6	11,3	13,5
Kurzeme region	2,8	6,4	5,9	6,2	8,8	18,0	13,1
Zemgale region	2,5	5,5	2,7	9,3	6,0	6,4	4,2
Latgale region	1,6	5,3	7,7	7,2	9,5	8,8	15,8

Source: Author's construction calculations based on CSB data

Realisation of several digital activities mostly is possible by use of computer or other technical solutions, like use of smart phones. Still presence or absence of computer is one of the questions asked in EU-SILC survey. Data on having or not having computer in households by different reasons by administrative territory in Latvia in 2019 are included in table 6.

Table 6

**Do you have a computer by administrative territory in Latvia in 2019**

Responses of respondents	Territory		
	Cities	Rural	Total
yes	2435	1170	3641
no-cannot afford	261	181	444
no-other reason	718	473	1194
Total	3414	1824	5279

Source: Author's construction and calculations based on EU-SILC data in 2019, n=5279

Data included in table 6 indicate that there is a very big share on population in Latvia who do not have computer and it can be a very big problem in situation of limited personal contacts, like pandemic situation when communication within the society is limited and libraries where rather big share of population were using computers with assistance of librarians are closed. Data on limitation of activities due health problems in Latvia in 2019 are included in table 7.

Table 7.

### Limitation of activities due health problems in Latvia in 2019

Evaluations	Frequency	Percent	Valid Percent	Cumulative Percent
not filled	298	2.6	3.1	3.1
yes, many restrictions	937	8.2	9.8	12.9
yes, some restrictions	3268	28.7	34.1	47.0
no restrictions	5075	44.5	53.0	100.0
Total	9578	84.1	100.0	
Missing	1816	15.9		
Total	11394	100.0		

Source: Author's construction and calculations based on EU-SILC data in 2019, n=11394

Data included in table 7 indicate that only for 53% of inhabitants in Latvia do not have limitations of activities due health problems in 2019, it is rather small share of the population and that has to be taken into account in supporting different activities including social marketing and lifelong education training programs to improve health situation of the inhabitants in Latvia.

### Complex reforms

Motivation and technical possibilities should be created for the new, digital *contacts* for social inclusion, which include: social service to help to join and to use the technical possibilities; motivation for the inhabitants to join, which could include possibilities to receive some goods, using the new contacts; desire to be a part of the group should be supported by the desire for esteem, which means the desire for reputation, respect from others. The needs for belonging and esteem should be acquired through new social contacts, which should start with personal contacts, cultural and political activities and can be continued and partially switched to social networks in internet. **Digitalisation**, as a complex process, should be developed to solve various real tasks using linked *overlapping networks*. The possibility to participate in several overlapping networks is crucial for the development of social contacts, *trust* and further development of social and business activities. Special attention should be paid to the use of *blockchain technologies*. Possibility to use blockchain technologies is very important for business, but trusted, confidential social contacts will improve also the social networking. The use of digitalisation and blockchain technologies is twofold: from one side it is the tool to solve the **business tasks**, where *trust* is necessary; from the other side it is the tool for **social inclusion**, to involve people in social contacts and to create the networks and mutual *trust* for business.

Support to receive the necessary skills and motivation is very important for socially excluded part to return to active social contacts, to restore belonging and esteem. Application of information technologies, including block chains, provides opportunities for effective communication and *lifelong learning* (LLL) as well as entrepreneurship, however, human motivation and technical support plays a decisive role. Local communities, social workers and other people, responsible for local culture, education, social and health care should be involved to support the establishment and development of the complex networking possibilities, including internet, blockchain technologies, technical and social services, distance education, adult education. Improvement of knowledge, skills and competencies of the workforce reduces social exclusion and improves the quality of life.

### Conclusions, proposals, recommendations

1. According to the available data there are significant differences in digital literacy for different regions and different groups of people. Education system including life-long education must support acquisition of new skills, knowledge and attitudes, but changes must be performed also in the education system to meet new challenges. Society, including education system, must develop networking, switching partly to the virtual space, but keeping and developing social contacts also in physical space, using together face to face and virtual contacts. Innovative approaches in inhabitant involvement in different networks and in labour market to avoid social exclusion should be supported by all stakeholders. The main attention must be paid to the digital literacy and to the possibilities to cope with quickly developing IT, especially paying attention to the artificial intelligence (AI).

2. Practical implications include recommendations for the education system, business, NGO and policy makers, developed on the basis of analysis of data about digital literacy and social structure. The main conclusions are about the significant role of training and networking for reduction of poverty and avoiding social exclusion. Possible use of *work-based learning* performed by vocational education system has been suggested, involving the recommended possibility to create attitudes and to provide skills and competence for trainees for involvement in the labour market.
3. The task to improve social contacts is complex and all stakeholders should participate. The *digital literacy* can help to improve the involvement of inhabitants and creates new possibilities for business. Digitalisation and *networking* improves the social conditions, involvement of inhabitants in different activities and creates mutual *trust* and new possibilities for business, therefore all parts should help to develop the networking.
4. Public authorities, together with business and employees themselves must improve *social contacts* combined with the *networking in internet* to improve social and business environment and to receive positive outcome for the people, for the business and for the state. Competence based education, starting from preschool and applying modern *lifelong learning* opportunities with the help of information communications technologies (ICT), *work-based learning* and digitalization must provide the motivation and skills to use ICT and AI for the improvement of social and business environment, to create human friendly business ecosystems and to avoid exclusion.
5. Digitalisation, including the use of Distance Education, Adult Education, internet, blockchain technologies, is an important way to change the life of the socially excluded inhabitants. The necessary social and technical services should be provided together by all stakeholders (business, local communities, public authorities etc.). The main attention should be paid to the motivation and education, creation of social contacts and networking. Different cultural activities, participation in NGO and political activities should be used to involve inhabitants in mutual interaction, creating trust, necessary for successful life, including business.
6. The rapid pace of technological development is leading to a real synergy in society's global structure, which means significant, difficult-to-anticipated social, political, economic and cultural changes in virtually all countries. A number of parallel processes (demography, ecology, technology changes etc.) may be the cause of singularity, but the most likely are changes that will result in AI taking over the actual technological development leadership. By the end of this transition process, it will be virtually impossible for the mankind to restore control over technology and public administration in general.
7. The main task of scientists, politicians and the general public now is to understand the nature of the principles and criteria for AI management, possible changes and possibilities for influence. It is necessary to establish an AI with a human-friendly system of all agreed AI management criteria, a coherent, extrapolated will (CEW).

### Bibliography

Barrat, J., 2013. *Our Final Invention*. New York: St. Martin's Press.

Bostrom, N., 2014. *Superintelligence: Paths, Dangers, Strategies*. UK: Oxford University Press.

Cheatham, B., Javanmardian, K., Samandari, H., 2019. Confronting the Risks of Artificial Intelligence. *McKinsey Quarterly*. Available at: <https://www.mckinsey.com/business-functions/mckinsey-analytics/our-insights/confronting-the-risks-of-artificial-intelligence#> OR [Online] Available at <https://www.healthindustryhub.com.au/wp-content/uploads/2019/05/Confronting-the-risks-of-AI-2019.pdf> [Accessed 09.12.2020].

CSB, 2020. *Use of Computers and the Internet in Households*, Data of Central Bureau of Statistics, Republic of Latvia.

Dagilienė, L., Bruneckienė, J., Jucevičius, R., Lukauskas, M., 2020. Exploring Smart Economic Development and Competitiveness in Central and Eastern European countries. *Competitiveness Review*, 30(5), 485-505.

European Commission, 2020. *White Paper on Artificial Intelligence A European Approach to Excellence and Trust*. [Online] Available at: [https://ec.europa.eu/info/sites/info/files/commission-white-paper-artificial-intelligence-feb2020\\_en.pdf](https://ec.europa.eu/info/sites/info/files/commission-white-paper-artificial-intelligence-feb2020_en.pdf) [Accessed 16.11.2020].

Ewart, J., Snowden, C., 2011. The Media's Role in Social Inclusion and Exclusion. *Media International Australia*, 142(1), 61-63.

Frumkin, H., 2003. Healthy Places: Exploring the Evidence. *American Journal of Public Health*, 93, 1451-1456.

Gil, H., Patricio, M.R., 2020. Lifelong Learning and Info-inclusion: Perspectives of the ageing population in the borderland region of Portugal. In Iberian Conference on Information Systems and Technologies, CISTI Volume 2020-June, June 2020, Article number 914088815th Iberian Conference on Information Systems and Technologies, CISTI 2020; Seville; Spain; 24 June 2020 through 27 June 2020; Category numberCFP2003K-ART; Code 161865.

Hamilton, S., Ole Pors, N., 2003. Freedom of Access to Information and Freedom of Expression: the Internet as a Tool for Global Social Inclusion. *Library Management*, 24(8/9), 407-416.

- Iivari, N., 2020. Empowering Children to Make and Shape our Digital Futures – from Adults Creating Technologies to Children Transforming Cultures. *International Journal of Information and Learning Technology*, 37(5), 279-293.
- Johnson, A.M., Willenborg, A., Heckman, C., Whitacre, J., Reynolds, L., Sterner, E.A., Harmon, L., Lunsford, S., Drerup, S., 2018. Library Instruction and Information Literacy 2017. *Reference Services Review*, 46(4), 628-734.
- Jordan, M.I., Mitchell, T.M., 2015. Machine Learning: Trends, Perspectives, and Prospects. *Science*, 349(6245), 255–260.
- Krēsliņš, K., 2019. Lielākais drauds Latvijai ir mūsu sliktā savstarpējā sapratne. *NRA*, 13.09.2019.
- Mannino, A., Althaus, D., Erhardt, J., Gloor, L., Hutter, A., Metzinger, T., 2015. *Artificial intelligence: Opportunities and risks*. Policy Paper by the Effective Altruism Foundation. [Online]. Available at <https://ea-foundation.org/files/ai-opportunities-and-risks.pdf> [Accessed 01.10.2020].
- Metz, C., (2018). Pentagon Wants Silicon Valley’s Help on A.I. *The New York Times*. 15 March 2018.
- Mubarak, F., Suomi, R., Kantola, S.-P., 2020. Confirming the Links Between Socio-Economic Variables and Digitalization Worldwide: the Unsettled Debate on Digital Divide. *Journal of Information, Communication and Ethics in Society*, 18(3), 415-430.
- Müller, V.C., 2014. Risks of General Artificial Intelligence. *Journal of Experimental & Theoretical Artificial Intelligence*, 26(3), 297-301.
- Patrício, L., Sangiorgi, D., Mahr, D., Čaić, M., Kalantari, S., Sundar, S., 2020. Leveraging Service Design for Healthcare Transformation: toward People-Centered, Integrated, and Technology-Enabled Healthcare Systems. *Journal of Service Management*, 31(5), 889-909.
- Rezevska, D., 2015. *Vispārējo tiesību principu nozīme un piemērošana*. Rīga: Daigas Rezevska izdevums.
- Rossato, C., Castellani, P., 2020. The Contribution of Digitalisation to Business Longevity from a Competitiveness Perspective. *The TQM Journal*, 32(4), 617-645.
- Sault, S., 2020. *What they're saying about the future of work: key quotes from Davos*. [Online] Available at <https://www.weforum.org/agenda/2020/01/future-of-work-reskilling-workforce-ivanka-trump-davos-quotes/> [Accessed 01.08.2020].
- Spatharou, S., Hieronimus, S., Jenkins, J., 2020. Transforming Healthcare with AI. The impact on the workforce and organisations. *McKinsey Quarterly*. Available at: <https://www.mckinsey.com/industries/healthcare-systems-and-services/our-insights/transforming-healthcare-with-ai> [Online] Available at: <https://www.tandfonline.com/doi/full/10.1080/0952813X.2014.895110> [Accessed 21.09.2020].
- Wigner, E.P., 1970. *Symmetries and Reflections*. London: Indiana University Press.

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