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CZECH REPUBLIC REGIONAL REPORT OF LABOUR MARKET'S CHARACTERISTICS AND SUMMARY OF CHALLENGES AND OPPORTUNITIES.

**REPLAY-VET - *Strengthening key
competencies of low-skilled people in VET to
cover future replacement positions***

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SECTION 1. CHARACTERISATION OF THE LOW SKILLED LABOUR MARKET IN THE CZECH REPUBLIC

1.1. Social and labour characterisation of population with low qualification

Analysis of the Czech labour market in comparison to EU 28

The Czech Republic is country located in central Europe with 10.5 million inhabitants in January 2015. Its potential workforce (population between the ages of 15 and 64) is 67 %, as in the EU2 as a whole. However, it is declining quicker than in the EU28. Between 2008 and 2015 the Czech Republic saw a decline of -4 % while the whole of EU28 had a decline of -1 %. The total occupation represents 48 % in the Czech Republic that is above average of EU28 with 43 %.

The employment rate amongst the age group of 20 to 64 represents 75 % in the Czech Republic, while in the case of the EU28 it represents only 70 %. In the 2008-2015 period, employment rate in this age group increased by 3,3 % in the Czech Republic, whereas the development in the EU28 were stagnant. Among the youngest (15-24 years old) the rate increased by 1,1 % and now represent 28 %, which is still below the EU28 average of 33%, although there is a decreasing trend. The same happens with the economic activity rates between the youngest, which increases a 4,5 % in the Czech Republic.

LABOUR MARKET BASIC INDICATORS	EU 28		CZECH REPUBLIC	
	2015	Δ 08-15	2015	Δ 08-15
Population on 1 January (000)	508.504	2%	10.538	2%
Population between the ages of 15-64 (%)	66%	-1%	67%	-4%
Total occupation (%)	43%	-1%	48%	1%
Employment rate(%population age group 20-64)	70%	0%	75%	3,3%
Employment rate(%population age group 15-64)	65,6%	0%	70%	5,4%
Employment rate(%population age group 15-24)	33%	-12%	28%	1,1%
Employment rate(%population age group 25-54)	78%	-2%	85%	0,8%
Employment rate(%population age group 55-64)	53,3%	17%	56%	16,6%
Full time employment rate (%population age group 20-64)	56%	-4%	71%	2,3%
Self-employment (%total occupation)	13,8%	-12%	14%	25%
Part-time employment rate (%total occupation)	19,6	8% (*)	5%	23,3%
Fixed term contract (%total employees)	14	-1%	10%	38,7%
Employment in services (%total occupation)	71	1%	59%	4,9%
Employment in Industry (%total occupation)	24,2	-1%	38%	-6,2%
Employment in Agriculture(%total occupation)	4,2	-22%	3%	-7,8%
Economic activity rates(%population 15-64 age group)	72,5	3%	74%	6,2%
Economic activity rates(%population 15-24 age group)	41,5	-6%	33%	4,5%
Total Unemployment (000)	22 898	36%	268	16,6%
Unemployment rate(% active)	9,4	34%	5%	13,6%
Youth Unemployment rate (%active 15-24 year group)	20,4	28%	13%	27,3%

Long-term unemployment rates (%active)	4,5	73%	2,4%	9,1%
long-term unemployment (% total unemployment)	48,3	30%	47%	-4,1%
Youth Unemployment rate (%population 15-24 age group)	8,2	19%	4%	31%
Employment rate of the population with low qualification 25-64 years (ISCED 0-2)	52,6	-7% (*)		

(*) Variation 2008 - 2014.

Source: EUROSTAT. Regional statistic by NUTS: Regional labour market statistics. Population and social conditions: Labour market: Employment and unemployment

Despite the increase of part-time employment by 23,3 % in between 2008 and 2015, there were significantly lower share of part-time employed people (5%) in the Czech Republic in 2015 in comparison with EU28 20 %. Concerning self-employment rate, there were no differences in 2015 in the Czech Republic and the EU28, but regarding full time employment rate, the Czech Republic had 15 p.p. higher than the EU28.

Concerning the sectorial distribution, the importance of the population employed in industry is slightly greater than in Europe, having in exchange less people working in services. However, the recession in industry employments has been notably greater in the case of the Czech Republic.

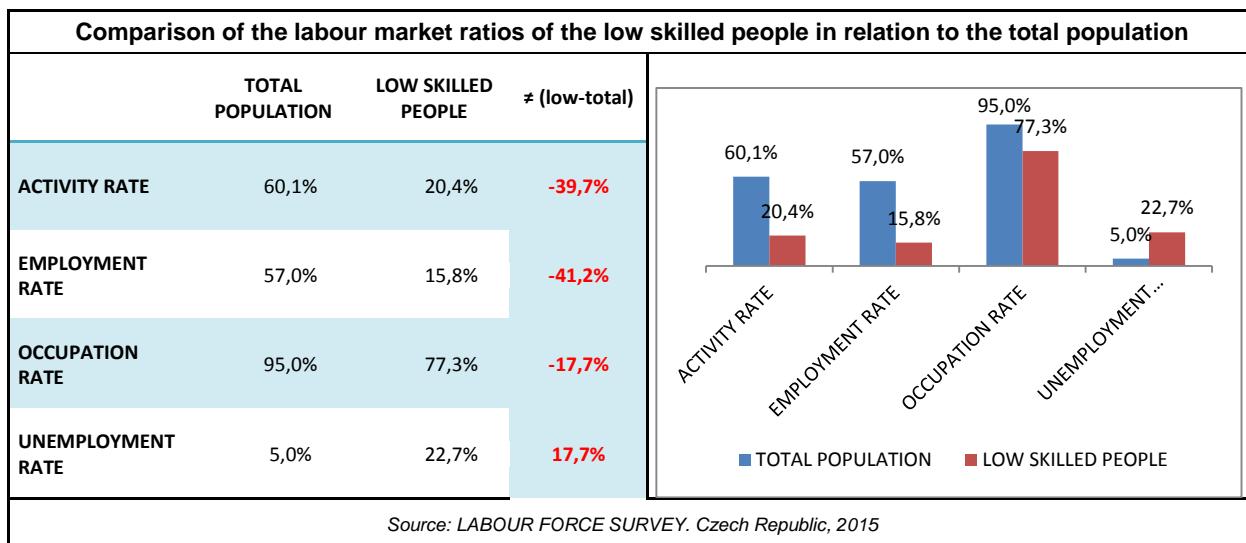
The unemployment rate has risen a 13,6% in the Czech Republic to 5 % in 2015 that is almost twice less than in the EU28. Youth unemployment rate represented 13% in 2015 that is also rather exceptional result in comparison with other European countries. Long-term unemployment in the Czech Republic (2,4%) is also well below the EU28.

Low skilled labour market characterization

Activity and occupation

For this report, the population with low qualification has been defined as those older than 16 years old and with educational levels going from ISCED 0 to ISCED 2, which include preschool education (ISCED 0), primary education or first stage of basic education (ISCED 1) and first cycle of secondary education or second cycle of basic education (ISCED 2). The LFS data from 2015 was used in the analysis.

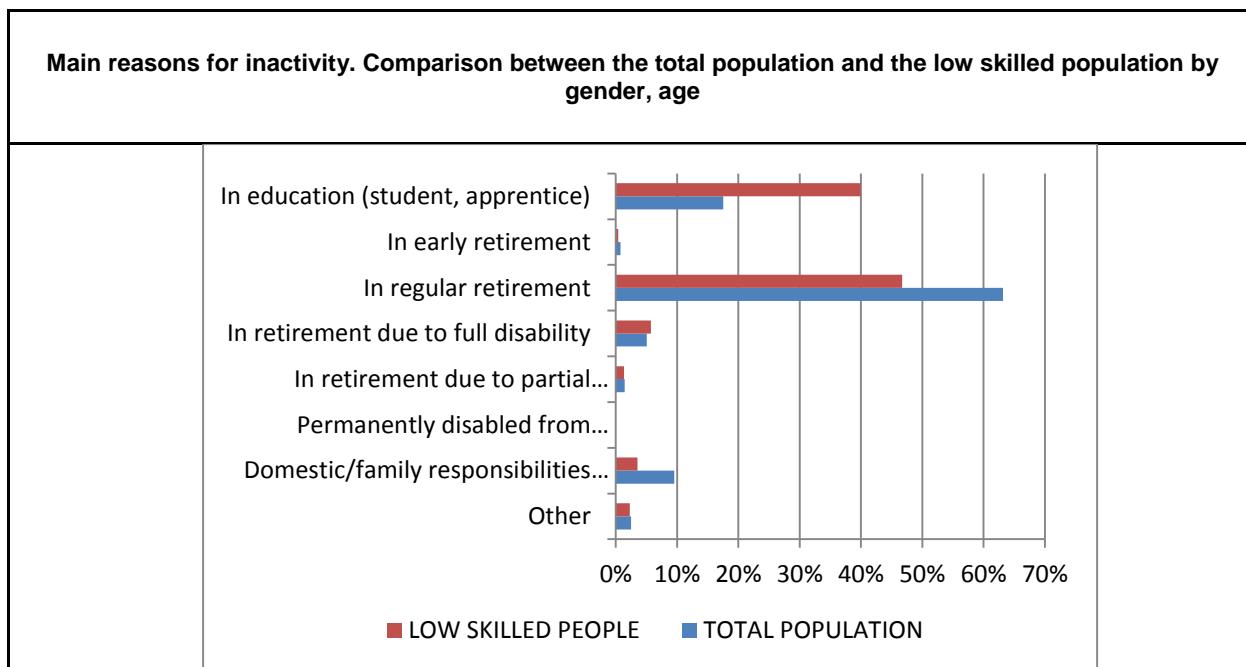
The population with low qualifications in the Czech Republic represents 14.4% of the population (1 270 553 people). Counting with a lower activity rate than the population as a whole, they also suffer from lower employment and occupation rates as well as higher unemployment rates.

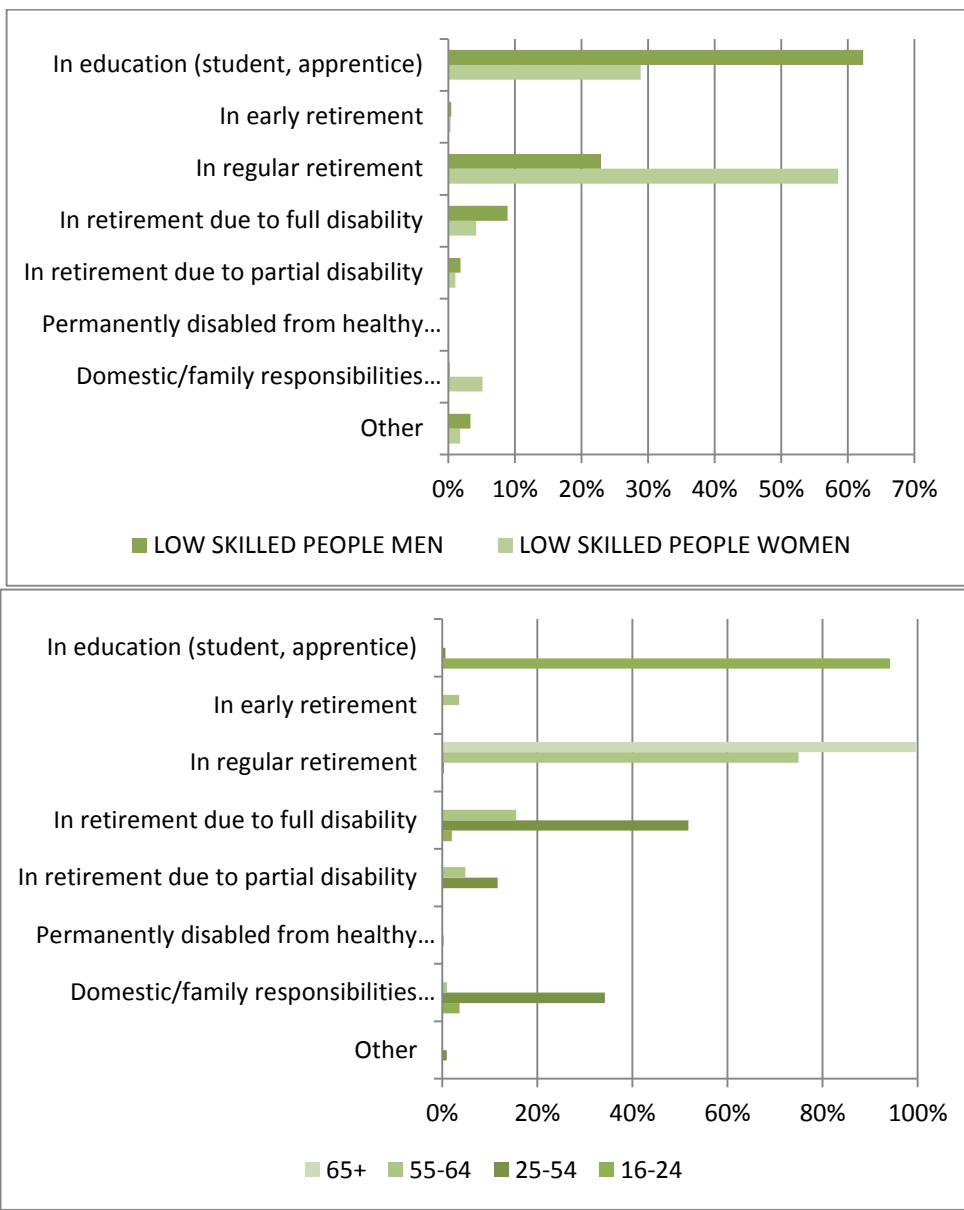


The main reasons of inactivity in total population are being in regular retirement (63%), in education (18%) and domestic/family responsibilities (10%). Among low skilled people the three main reasons of inactivity are being in regular retirement (47%), in education (40%) and in retirement due to full disability (6%).

There are some interesting differences between low skilled men and women. While the most frequent reason for inactivity for low skilled men is being in education, it is being in regular retirement for low skilled women. As for the second most frequent reason for inactivity it is just opposite.

Regarding age groups, young people are inactive, mainly, because of studies and older people logically due to retirement.

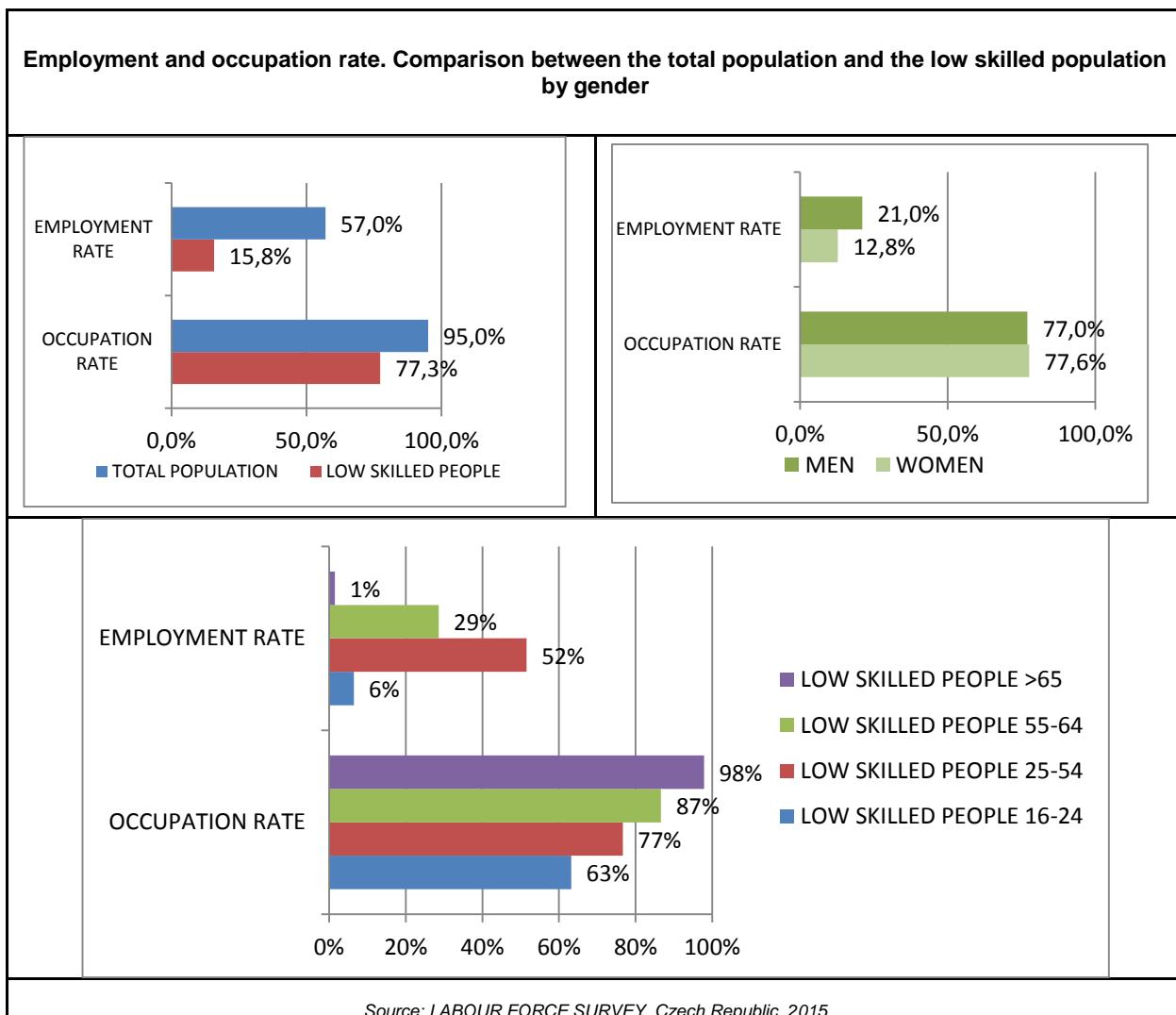




Source: LABOUR FORCE SURVEY. Czech Republic, 2015

Employment rate

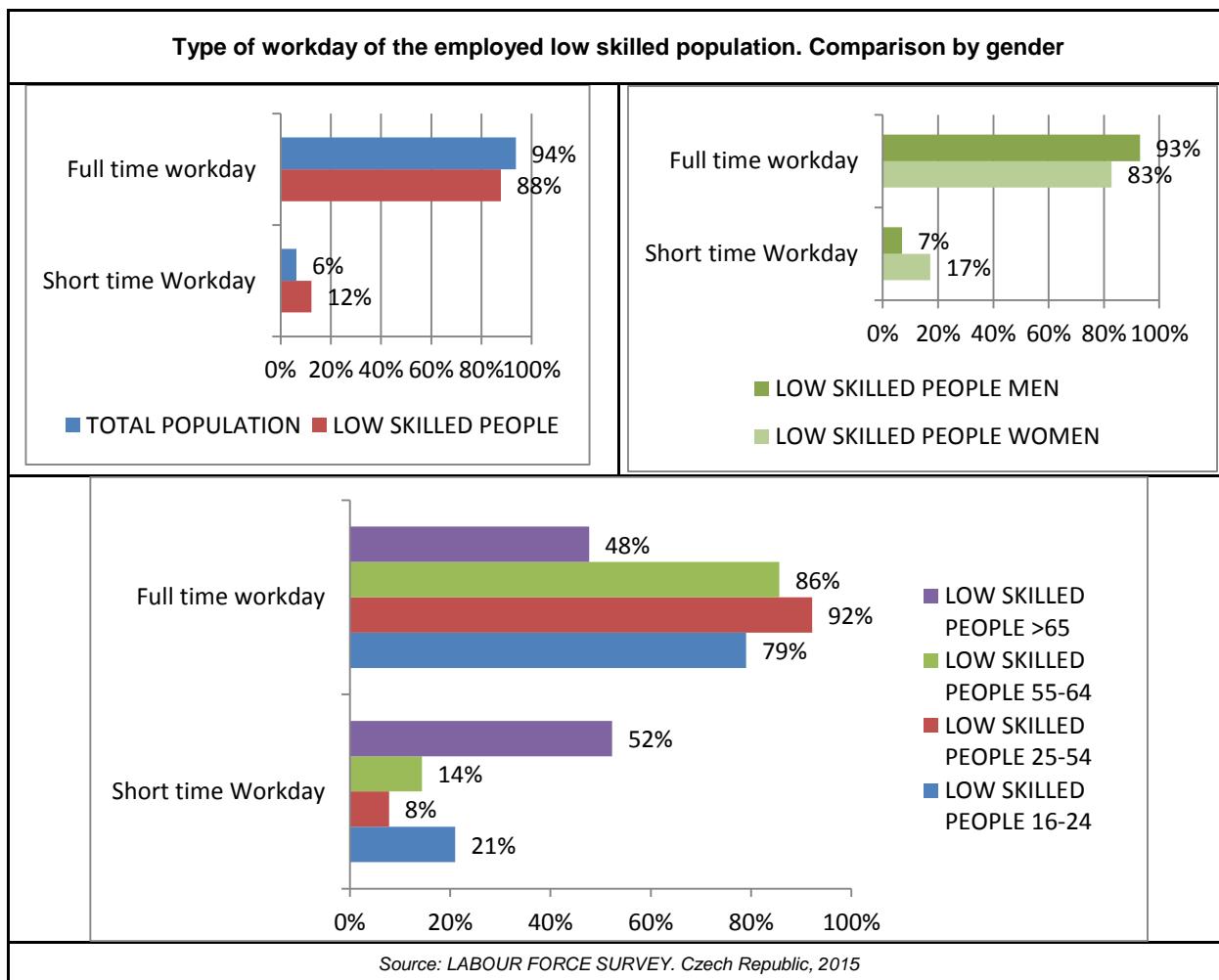
The employment rate of low skilled people is only 15.8% which is 41 points lower than in total population. Occupation rate of low skilled people is also lower than in the total population, 77.3% and 95% respectively. If we look at the gender differences, the employment rate is higher among men than women (21% men, 12.8% women). The occupation rate is same for low skilled men and women (77%). Regarding age groups, it is the youngest who have a much lower employment rate (of course, after group of people aged 65 and more). It is alarming, that low skilled people between the ages of 55 and 65 have an employment rate of just 29 %.



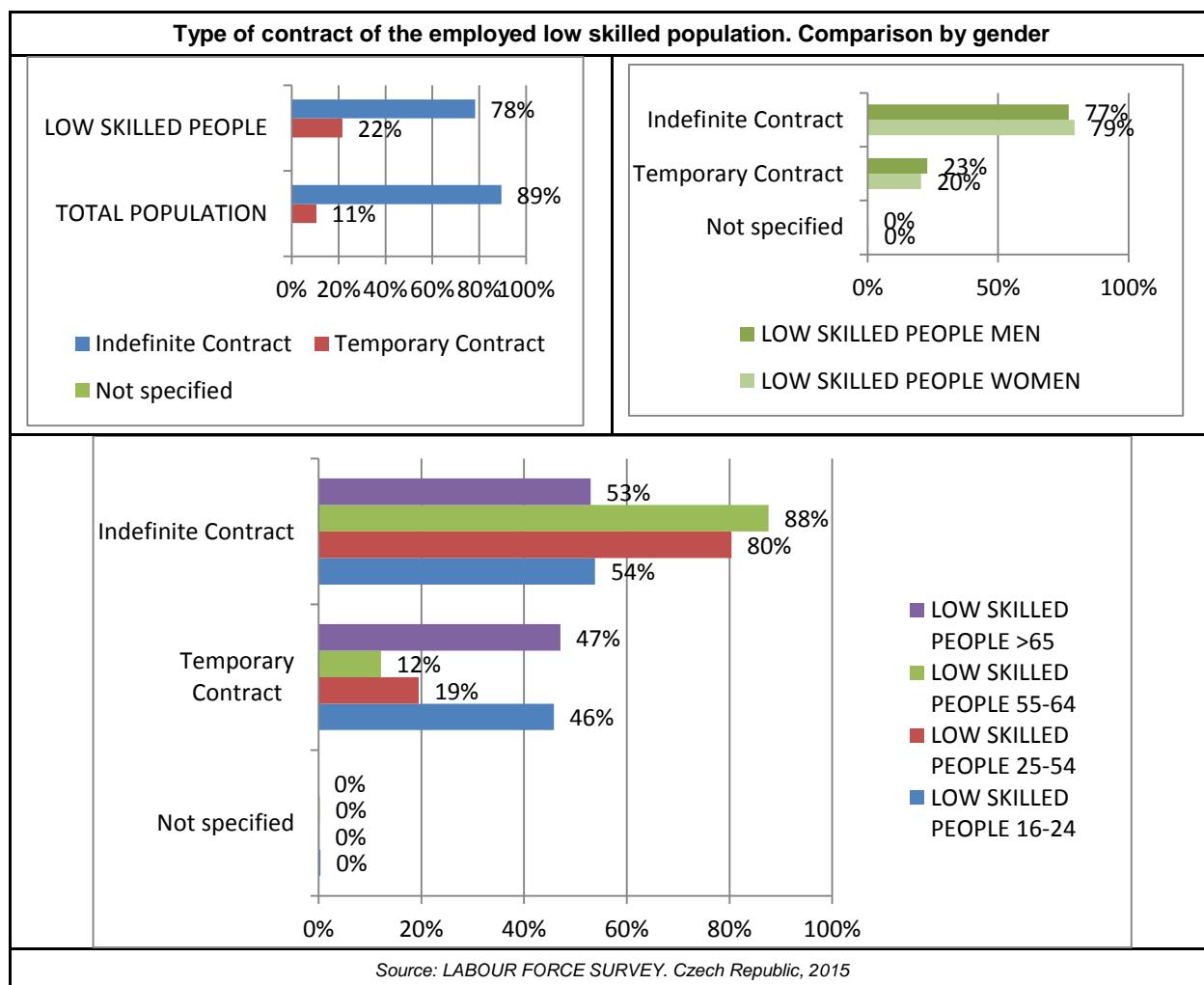
Labour conditions

Regarding labour conditions of low skilled people, we have analysed their workday (full-time/part-time) and the kind of contract they have (Indefinite/Temporary).

There is a fairly large difference in the weight part-time jobs have for low skilled people compared to the population as a whole, more precisely low skilled have twice as much part time jobs (12 %) than the total population (6 %). Besides, once low skilled people are filtered by sex the differences grow even more significantly. 17% of low skilled women have a part-time job, while only 7% of equally low skilled men are in that situation. Regarding differences between age groups, more than 50 % of the oldest age group have a part-time job. Which contrast with only 8 % of 25-54 age category.



When it comes to types of contracts, there are only slight differences of importance when compared with the main population. Indefinite contracts represent a 78% in the case of low skilled people and 89% in the entire population. There are no discrepancies of importance between both sexes. There is, however, an important distinction between both the youngest and the oldest age group and the rest age groups. In their case, temporary contracts represent about 50 %. It could be said that the Czech labour market is polarized in the sense of distributing the risk of precarized forms of work among age groups.



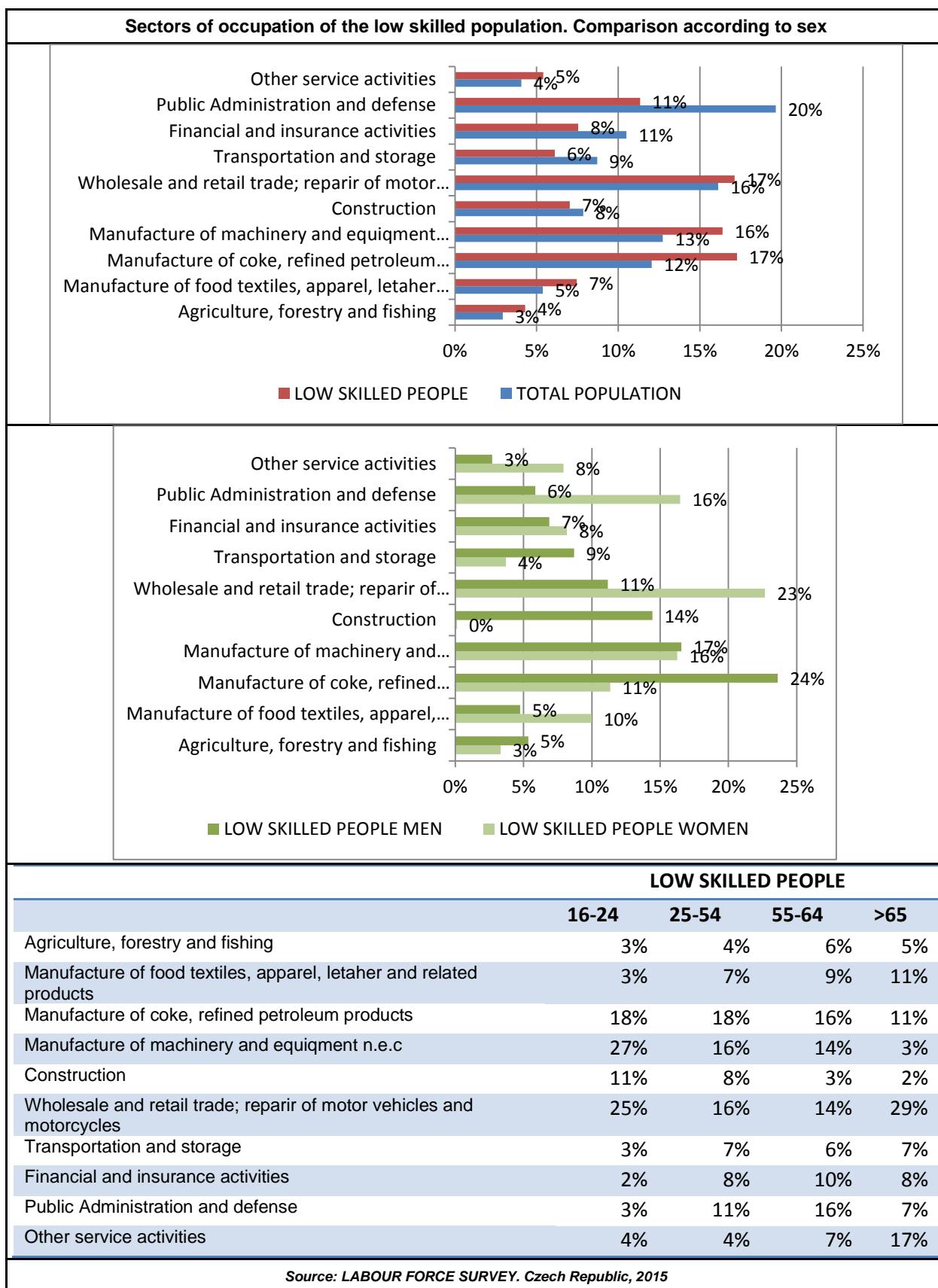
1.2. Participation by sector and occupation

Activity sectors

The largest share of low skilled people work in sectors of *Wholesale and retail trade; repair of motor vehicles and motorcycles* and *Manufacture of coke, refined petroleum products* (17 % for both sectors). With the share of just 1 p.p. lower stands the sector of *Manufacture of machinery and equipment n.e.c.* The remaining sectors hover between 4% and 11%. Sectors with the lowest share of low skilled people are *Agriculture, forestry and fishing* (4 %) and *Other service activities* (5 %).

Regarding the gender differences among the low skilled, the sector employing the highest share of low skilled women is *Wholesale and retail trade; repair of motor vehicles and motorcycles* (23 %), while for men it is *Manufacture of coke, refined petroleum products* (24 %). *Manufacture of machinery and equipment n.e.c* is for both sexes the second largest sector.

Concerning age groups of low skilled, the highest share of the youngest are employed in *Manufacture of machinery and equipment n.e.c* and *Wholesale and retail trade; repair of motor vehicles and motorcycles*. These sectors are losing importance with increasing age, on the other hand services sector is employing higher share of older workers.

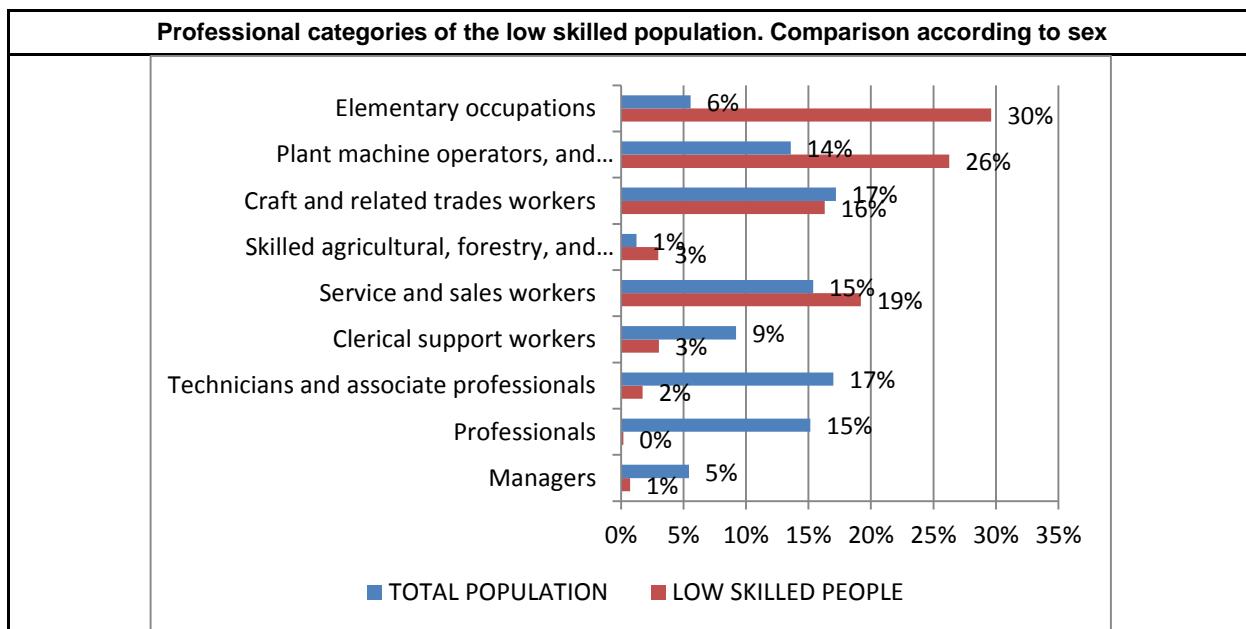


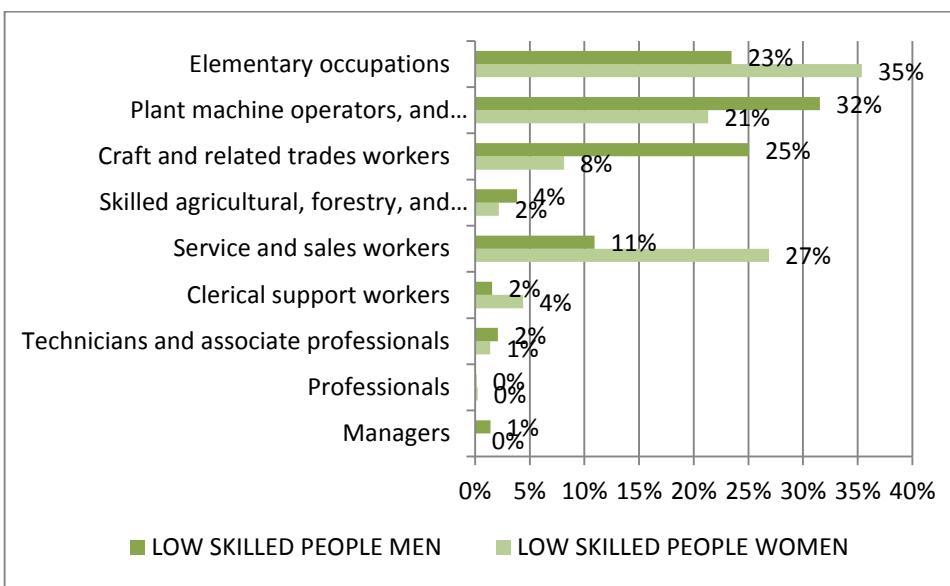
Professional categories

When it comes to occupations, 75% of low skilled people's jobs concentrate in just 3 occupational categories: *Elementary occupations* (30 %), *Plant machine operators and assemblers* (26 %) and *Service and sales workers* (19 %). A significant proportion of low skilled people work as *Craft and related trades workers* (16 %). The divergence between low skilled people and the main occupied population are of great significance, especially in those occupational groups where skills of some sort are required, such as *Technicians and scientists and/or health and education intellectuals* where is the difference of 15 p.p.

There are some differences between both sexes within low skilled people too. While 62 % of low skilled women work in the *elementary occupations* and *service and sales workers* category, just 34 % of men do. On the other hand, men have a larger share in occupations such as *Plant machine operators and assemblers* and *craft and related trades workers* representing 57 % of low skilled men' occupations, while only representing 29 % of women's low skilled occupations.

In the case of age groups, there aren't so huge differences between age groups. The highest share of the youngest low skilled workers work as *plant machine operators and assemblers* and in *elementary occupations*, while the highest share of the oldest low skilled workers works in *elementary occupation* and as *service and sales workers*.





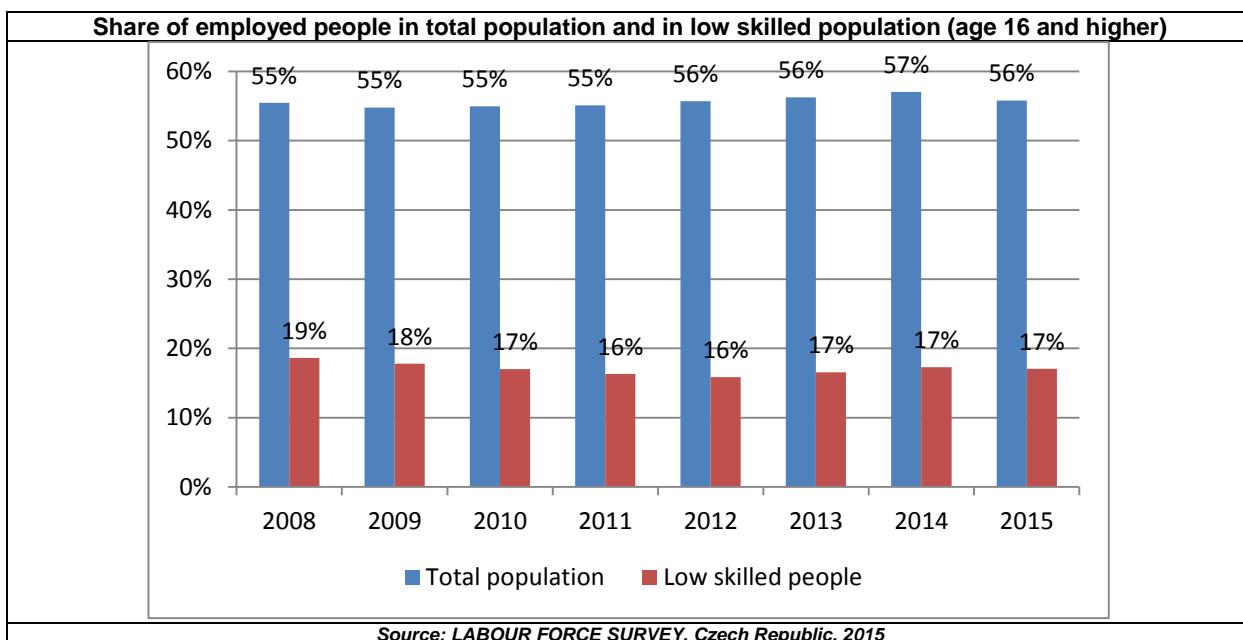
LOW SKILLED PEOPLE				
	16-24	25-54	55-64	>65
Managers	0%	1%	0%	1%
Professionals	1%	0%	0%	0%
Technicians and associate professionals	1%	2%	1%	3%
Clerical support workers	4%	2%	4%	6%
Service and sales workers	20%	18%	19%	30%
Skilled agricultural, forestry, and fishery workers	1%	3%	5%	5%
Craft and related trades workers	22%	17%	12%	8%
Plant machine operators, and assemblers	28%	28%	23%	7%
Elementary occupations	23%	28%	36%	40%

Source: LABOUR FORCE SURVEY. Czech Republic, 2015

1.3. The evolution of the contracts of low skilled people

Evolution of employment

The share of employed people among total population and also among low skilled people remains on the same level in the past few years. 56% of total population and 17% of low skilled people are employed in the Czech Republic.

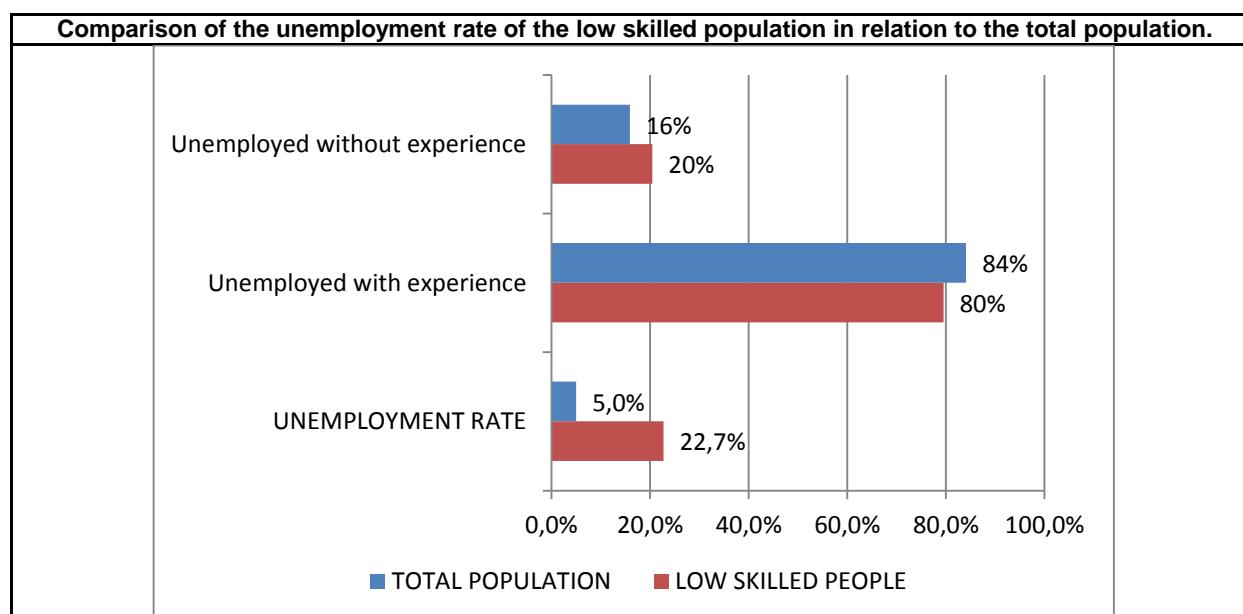


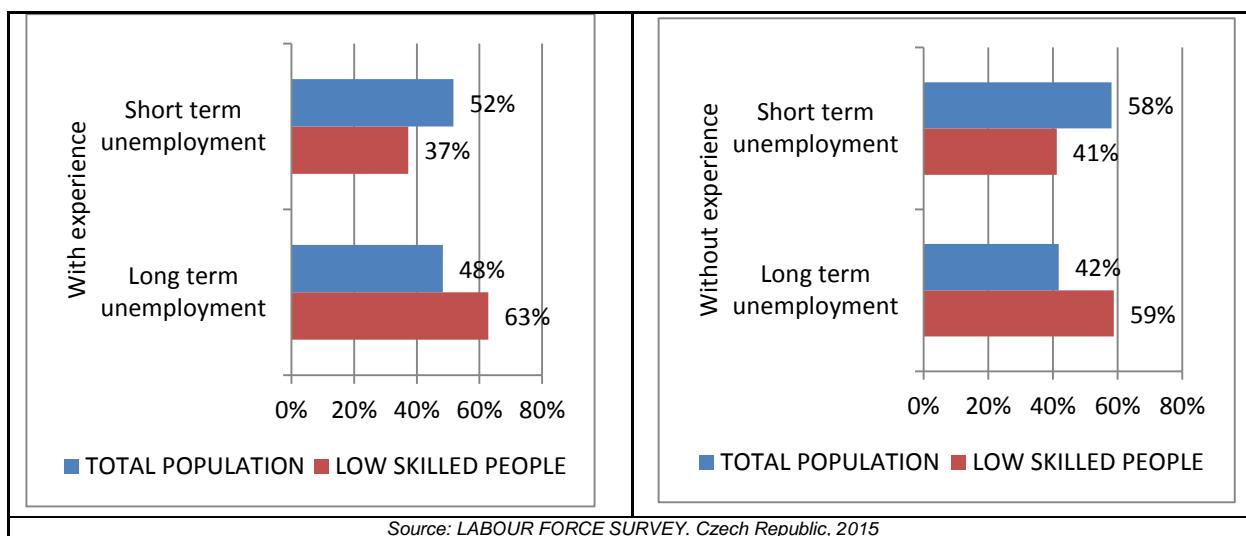
Unfortunately in the Czech Republic statistical information about contracts are not available.

1.4. Unemployed low skilled people

The unemployment rate among the low skilled is 17.7 p.p. higher than that of the Czech Republic population as a whole, 22.7% and 5% respectively. Unemployed people can be divided on those who have some working experience and on those who are without any working experience. Unemployed people in total population have in 84% some working experience, 4 percent lower share of low skilled people have working experience (80%).

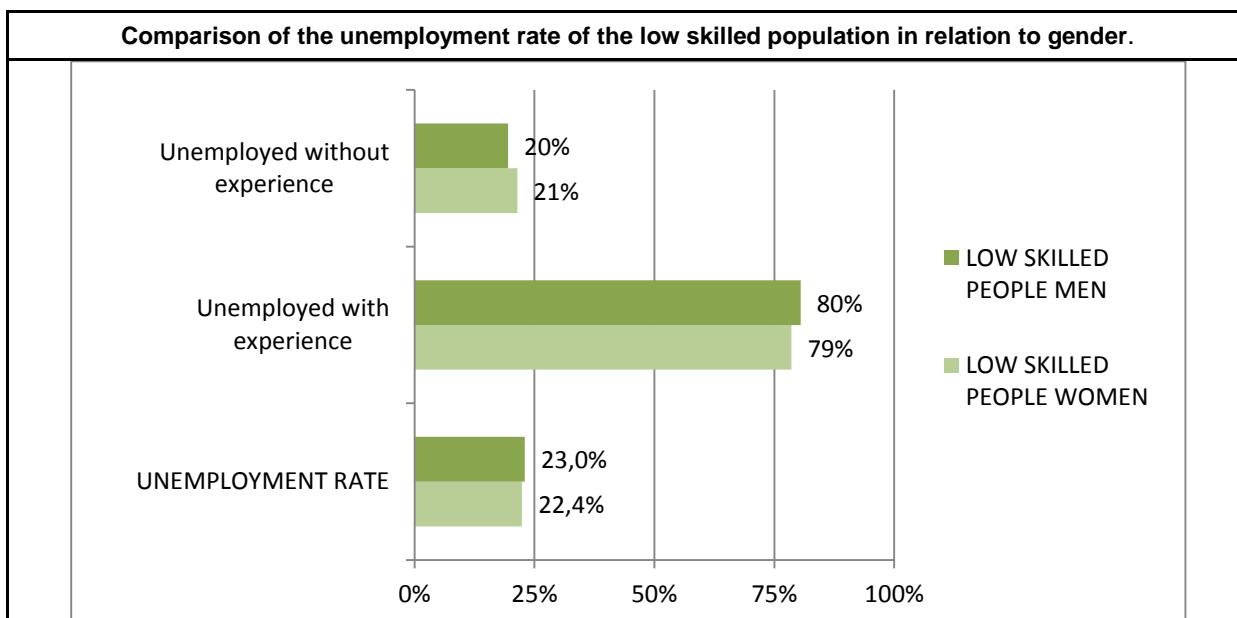
Unemployed people in total population experienced more often short term unemployment (less than 12 months) than long term unemployment (over 12 months) and unemployed low skilled people vice versa.

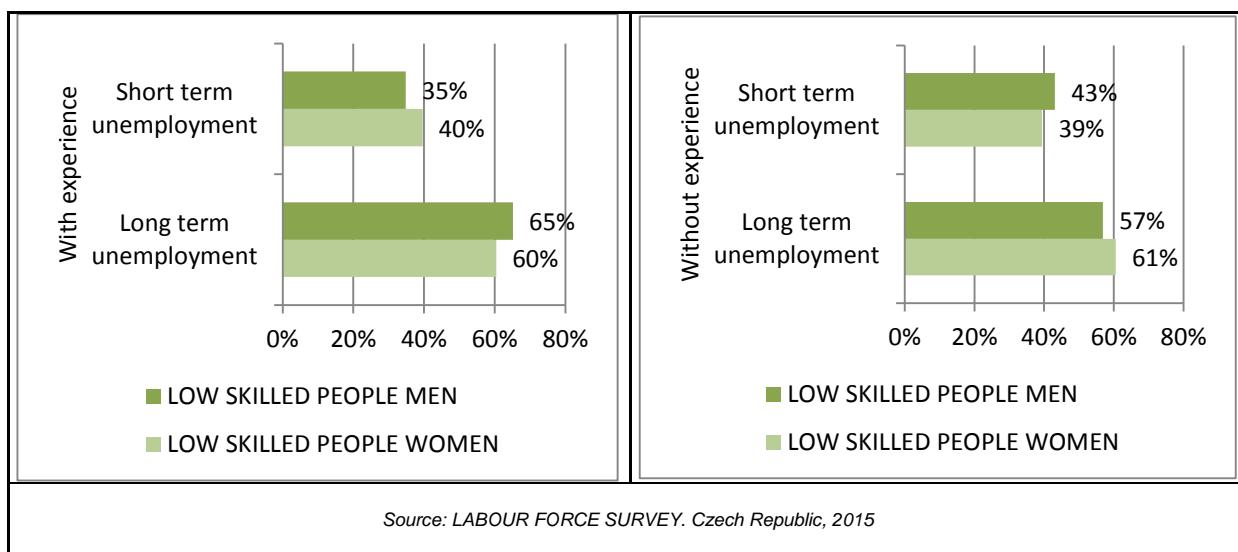




Unemployment rate and share of people according to working experience does not differ between low skilled men and women.

In the group of unemployed low skilled people with working experience women more often experienced short term unemployment (40% women, 35% men) and in the group of unemployed low skilled people without working experience is the situation contrary (43% men experienced short term unemployment and 39% of women).





The unemployment rate is highest among the youngest low skilled population and rises up to 37 %, where 60 % of them have, logically, no previous working experience. Long term unemployment is more common among middle age categories of low skilled people with previous working experience than among youngest.

Comparison of the unemployment rate of the low skilled population in relation to age				
LOW SKILLED PEOPLE				
		16-24	25-54	55-64 > 65
With experience	Short term unemployment	65%	34%	32% 100%
	Long term unemployment	35%	66%	68% 0
	Unemployment with experience	40%	90%	100% 100%
Without experience	Short term unemployment	42%	38%	0 0
	Long term unemployment	58%	62%	0 0
	Unemployment without experience	60%	10%	0 0
UNEMPLOYMENT RATE		37%	23%	13% 2%

Source: LABOUR FORCE SURVEY. Czech Republic, 2015

1.5. Statistical analysis conclusions

- Low skilled people in the Czech Republic represent 14,4 % of the total population. With a lower activity rate than that of total population (20% and 60%), they also show a lower employment rate (16% and 57%), lower occupation rate (77% and 95%) and a higher unemployment rate (23% and 5%).
- Part-time jobs are of a greater significance among the low skilled than among total population. However, the indefinite-temporary contract rate is despite expectations quite similar among both groups.
- The main sectors in which low skilled people are contracted is *Wholesale and retail trade; repair of motor vehicles and motorcycles, Manufacture of coke, refined petroleum products and Manufacture of machinery and equipment n.e.c.* The main

occupational groups of low skilled people are *Elementary occupations, Plant machine operators and assemblers* and *Service and sales workers*.

- The unemployment rate is almost 18 p. points higher among low skilled people than in total population.
- Regarding gender differences among low skilled people:
 - The inactivity is higher among women (twice as high as among men), having a significantly lower employment rate.
 - Part-time jobs are more common among women.
 - Two thirds of employed women concentrate in the *elementary occupations* and *service and sales workers* category. Men have a larger share in occupations such as *Plant machine operators and assemblers* and *craft and related trades workers*.
 - Same unemployment rate.
- Concerning differences among age groups:
 - More than 50 % of the oldest age group of low skilled people have a part-time job, which contrast with only 8 % of 25-54 age category.
 - Temporary contracts are more common among both the youngest and the oldest low skilled people. In their case, temporary contracts represent about 50 %. It could be said that the Czech labour market is polarized in the sense of distributing the risk of precarized forms of work among age groups.
 - The highest share of the youngest are employed in *Manufacture of machinery and equipment n.e.c* (27 %) and *Wholesale and retail trade; repair of motor vehicles and motorcycles* (25 %). These sectors are losing importance with increasing age, on the other hand *services sector* is employing higher share of older workers.
 - The highest share of the youngest low skilled workers work as *plant machine operators and assemblers* (28 %) and in *elementary occupations* (23 %), while the highest share of the oldest low skilled workers works in *elementary occupation* (40 %) and as *service and sales workers* (30 %).
 - The unemployment rate is highest among the youngest low skilled population and rises up to 37 %.

SECTION 2. OPPORTUNITIES OF THE REPLACEMENT DEMAND FOR THE CZECH REPUBLIC

2.1. Projections for total employment by sector and occupations

In this section, we work with recent Cedefop's employment projection for the period 2015 - 2025, which is publicly accessible on the web <http://skillspanorama.cedefop.europa.eu/en>.

According to this projection, the total employment will grow over the period to 2025 in more than 133.000 jobs compared to 2015's occupation data. This means an increase of 2,5 % on the current volume of jobs.

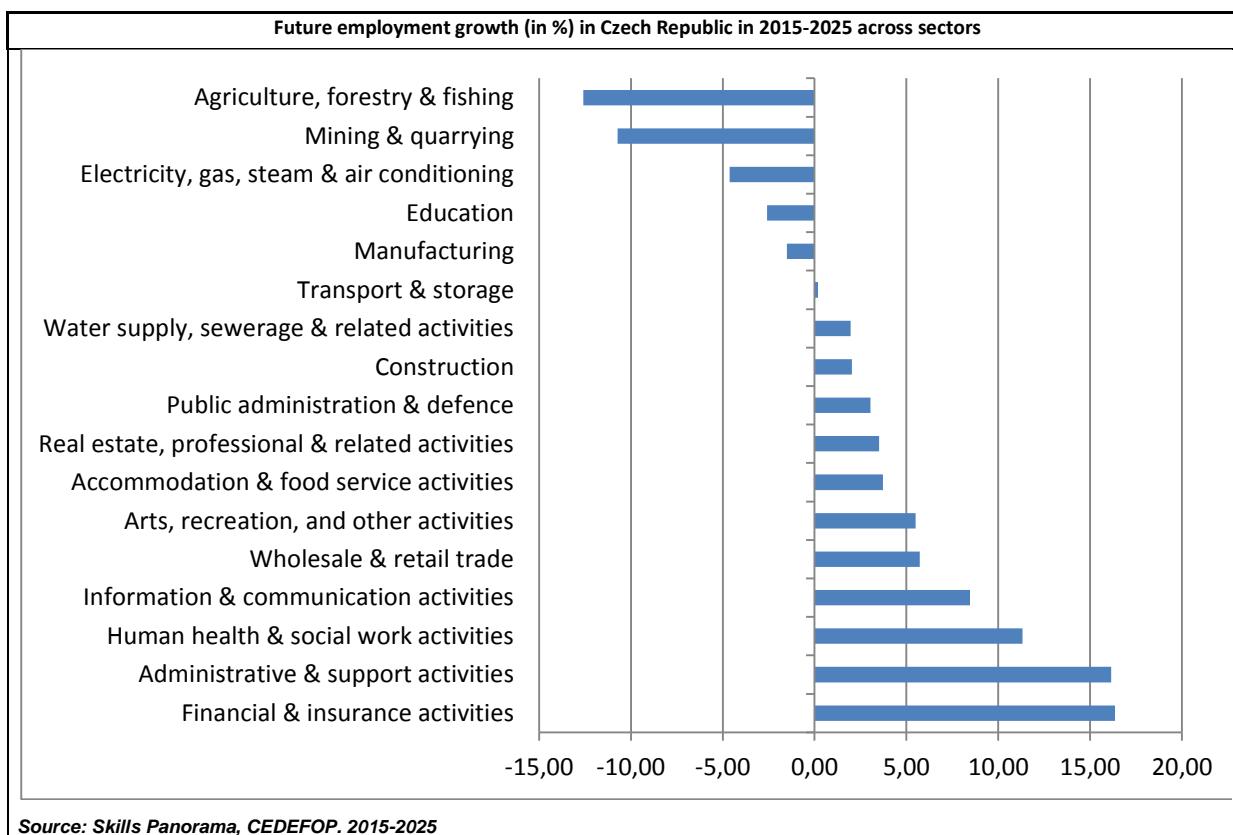
Most of the job growth is concentrated in the services' sector, specifically 86 % of the activity branches. Most employment growth in total will be in *Wholesale and retail trade* (more than 44.000 jobs), *Health* (35.000) and *Administrative and support service activities* (26.000). Significant growth will be also in *Financial and insurance activities* and *Computing programming, info services*. On the other hand, the following economic activities will lose labour force: *Basic metals & metal products* (-20.000), *Agriculture* (-20.000), but also *Education* (-7.000), *Motor vehicles* (-7.000) and *Textiles, Clothing & Leather* (-6.500).

Employment demand (000s) in the Czech Republic 2015-2025, regarding main economic sectors			
	2015	2025	variation 2015-2025
1 Agriculture, etc	160,8	140,6	-20,2
2 Mining and quarrying	30,3	27,2	-3,1
3 Food, Drink and Tobacco	109,9	110,6	0,7
4 Textiles, Clothing & Leather	59,0	52,5	-6,5
5 Wood, paper, printing and publishing	107,6	102,2	-5,4
6 Coke & ref petroleum	2,7	2,8	0,1
7 Other chemicals	26,2	28,6	2,4
8 Pharmaceuticals	13,8	16,5	2,7
9 Rubber & plastic products and other non-metallic mineral products	136,8	142,5	5,7
10 Basic metals & metal products	229,3	209,0	-20,3
11 Computer, optical & electronic equip.	41,2	45,3	4,1
12 Electrical equipment	110,9	118,8	7,9
13 Other machinery & equipment	130,7	132,3	1,6
14 Motor Vehicles	155,0	147,7	-7,3
15 Other Transport Equipment	21,0	20,2	-0,8
16 Manufacturing nes	127,3	123,9	-3,4
17 Electricity	22,0	21,7	-0,3
18 Gas, steam & air conditioning	10,4	9,2	-1,2
19 Water supply	63,8	65,1	1,3
20 Construction	455,3	464,8	9,5
21 Wholesale and retail trade	774,4	818,6	44,2
22 Land transport	197,3	194,2	-3,1
23 Water Transport	0,7	0,6	-0,1
24 Air Transport	2,8	2,8	0,0
25 Warehousing and postal services	104,3	108,2	3,9
26 Accommodation and food service activities	212,9	220,8	7,9

27 Media	30,3	28,9	-1,4
28 Telecommunications	18,8	17,6	-1,2
29 Computer programming, info serv.	85,9	99,9	14,0
30 Financial and insurance activities	100,5	116,8	16,3
31 Real estate activities	106,5	111,2	4,7
32 Legal, account & consulting services	111,0	116,2	5,2
33 Architectural & engineering	85,1	87,0	1,9
34 R&D	22,7	24,2	1,5
35 Advertising and market research; other professional nes	85,8	86,7	0,9
36 Administrative and support service activities	159,3	185,0	25,7
37 Public administration & defence	277,0	285,0	8,0
38 Education	283,2	276,0	-7,2
39 Health	310,9	346,1	35,2
40 Arts, entertainment and recreation	67,5	69,5	2,0
41 Other service activities	108,9	116,1	7,2
42 Unallocated	0,0	0,0	0,0
Total	5159,7	5292,9	133,2

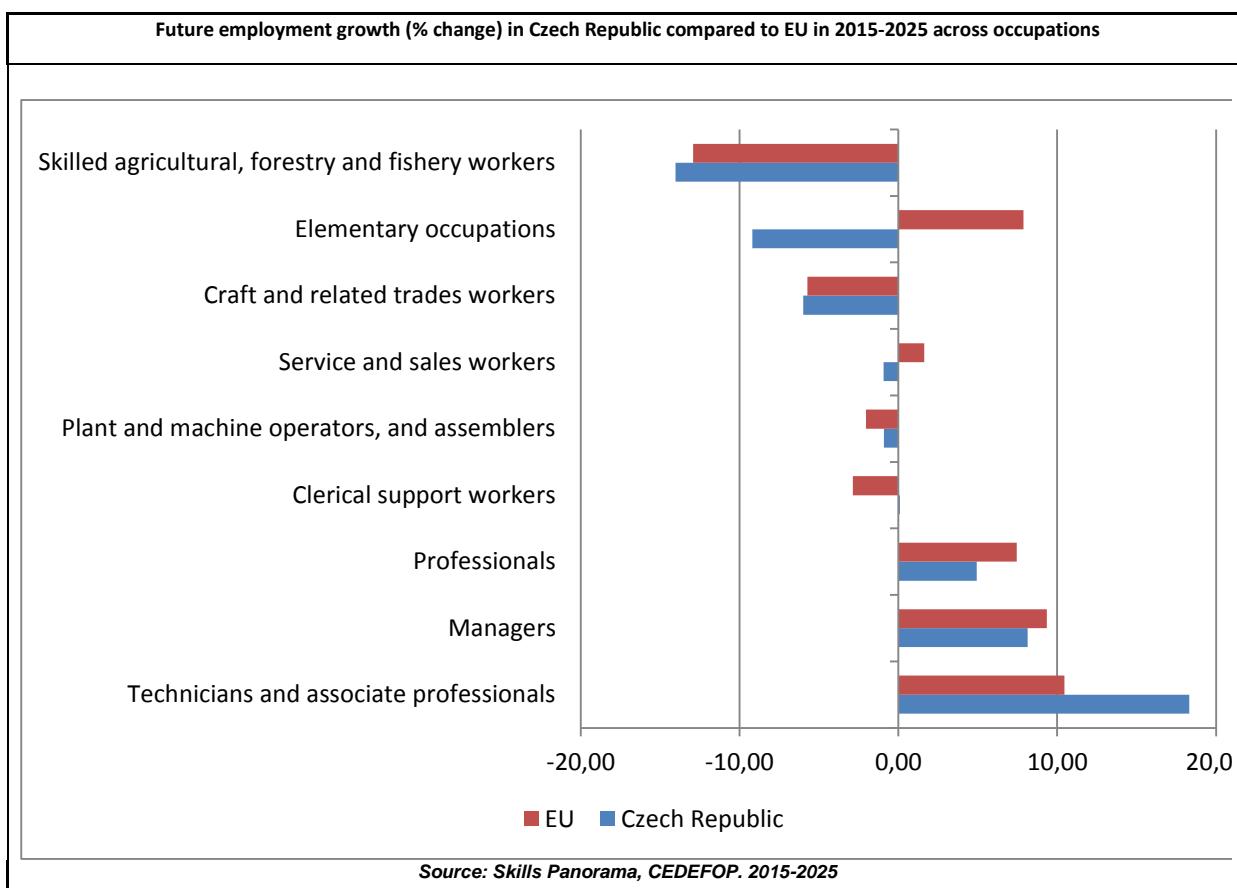
Source:CEDEFOP Employment projection, 2016

Economic activities with the biggest future employment growth (in %) in Czech Republic in 2015-2025 are following: *Financial & insurance activities; Administrative & support activities; Human health & social work activities; Information & communication activities and Wholesale & retail trade*. On the contrary, the biggest employment decline is expected in sectors: *Agriculture, forestry & fishing; Mining & quarrying; Electricity, gas, steam & air conditioning; Education and Manufacturing*. The following graph shows a more detailed analysis of the projection by sectors and activity branches.



However, it is necessary to keep in mind that the employment demand in these sectors will vary depending on the occupational profiles. The occupations which will see an increase in the demand in the 2015-2025 period will be the following: *Business & administration assoc. professionals* (218.000 new jobs); *Science & engineering associate professionals* (138.000); *Legal, social, cultural & related assoc. professionals* (130.000); *Drivers & mobile plant operators* (116.000) and *Metal, machinery & related trades workers* (87.000).

Concerning the total % change over the 2015-2025 period in the Czech Republic, the biggest increase will be recorded by *Technicians and associate professionals* (especially *Legal, social, cultural and related assoc. professionals*); *Managers* (especially *Administrative and commercial managers*) and *Professionals* (especially *Health professionals* and *Business and administration professionals*). On the contrary, the biggest job loss is expected in following occupations: *Skilled agricultural, forestry and fishery workers*; *Elementary occupations* (especially *Labourers in mining, construction, manufacturing and transport*) and *Craft and related trades workers* (especially *Metal, machinery and related trades workers*).



2.2. Trends in replacement demand

If the expansion needs in the Czech Republic will mean an increase in employment of 133.000 odd people, the projections show that the replacement demands will be even greater; meaning about 1897.000 employments more. The concept of replacement demand is based on the fact that some jobs become available due to people leaving work places for different reasons (retirement, migration etc.).

Most vacancies which should be replaced by 2025 will be in *Distribution and Transport* (25 %) and *Manufacturing* (23 %). The activity sectors with the greatest replacement opportunities are the following: *Wholesale and retail trade; Health; Education; Public administration & defence; Basic metals & metal products*. On contrary, the least replacement opportunities will be in following activity sectors: *Water transport; Air transport; Coke & ref petroleum; Gas, steam, air conditioning; Pharmaceuticals*. The following table and graph show a more detailed analysis of the replacement demand projection by sectors and activity branches.

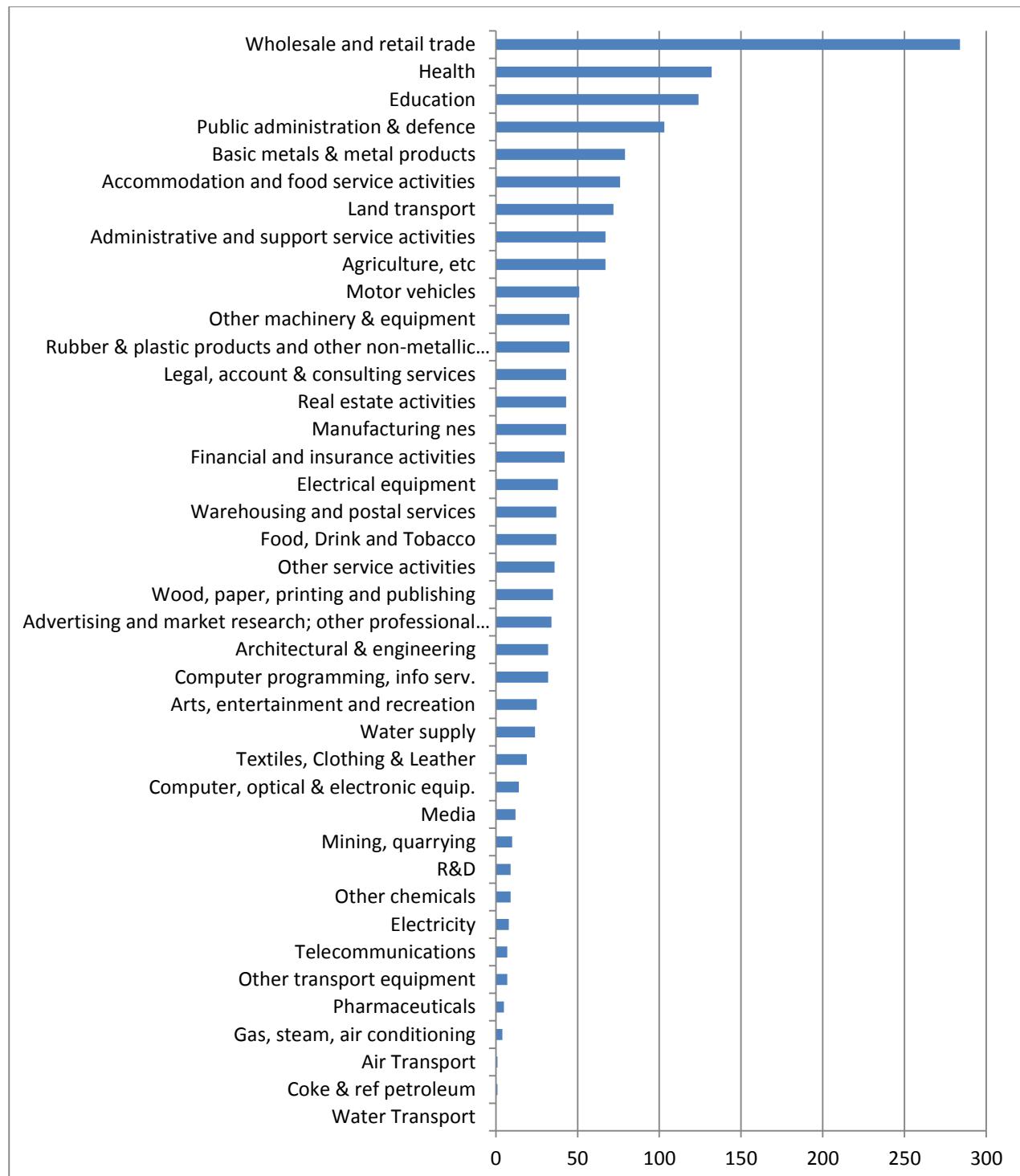
Future replacement demand (in thousands) in Czech Republic in 2015-2025 across sectors

Sector	Replacement demand 2015-2025
Total	1896
Primary sector and utilities	113
Agriculture, etc	67
Mining, quarrying	10
Electricity	8
Gas, steam, air conditioning	4
Water supply	24
Manufacturing	430
Food, Drink and Tobacco	37
Textiles, Clothing & Leather	19
Wood, paper, printing and publishing	35
Coke & ref petroleum	1
Other chemicals	9
Pharmaceuticals	5
Rubber & plastic products and other non-metallic mineral products	45
Basic metals & metal products	79
Computer, optical & electronic equip.	14
Electrical equipment	38
Other machinery & equipment	45
Motor vehicles	51
Other transport equipment	7
Manufacturing nes	43
Construction	143
Distribution, transport	477
Wholesale and retail trade	284
Land transport	72
Water Transport	0
Air Transport	1
Warehousing and postal services	37
Telecommunications	7
Accommodation and food service activities	76
Business, other services	375
Media	12
Computer programming, info serv.	32
Financial and insurance activities	42
Real estate activities	43
Legal, account & consulting services	43
Architectural & engineering	32
R&D	9
Advertising and market research; other professional nes	34
Administrative and support service activities	67
Arts, entertainment and recreation	25

Other service activities	36
Non-marketed services	359
Public administration & defence	103
Education	124
Health	132

Source: Skills Panorama, CEDEFOP. 2015-2025

Future replacement demand (in thousands) in Czech Republic in 2015-2025 across sectors



Source: Skills Panorama, CEDEFOP. 2015-2025

2.3. Expected changes in labour demand due to the 4th Industrial Revolution

It should be emphasize that the demand for labour is influenced, among other things, also by technological changes brought about by the Fourth Industrial Revolution (also "Industry 4.0"). Forecasts of job losses as a result of informatization and cybernetization attract the mass media attention. But such forecasts are taken over from foreign studies, are not verified on the conditions of the Czech labour market and might thus contribute to creating unfavourable expectations in society (Národní vzdělávací fond, 2016).

The impacts of the 4th Industrial Revolution (hereinafter only 4IR) will be differentiated in relation to the possibility of replacing individual work tasks with new technologies (computers, robots). In this respect, routine professions, both manual and cognitive, which are performed according to an established repetitive procedure that is relatively simple to algorithmizable are threaten the most.

At present or in the near future, certain non-routine professions will also be threatened. Regarding non-cognitive professions, it will concern the professions for which there is a large amount of data (so-called "big data") that already allow using the computer to detect the appropriate formulas. Computerization of non-routine manual tasks will be facilitated by the development of the machine learning field and conditioned by declining robot prices.

Again, other barriers will be opposed to the replacement of human work by the technique; the following three will be decisive: (i) perception and manipulation of subjects (especially performing more complex tasks such as identifying subjects in unstructured environments), (ii) creative intelligence, (iii) social intelligence (Frey, Osborne, 2013).

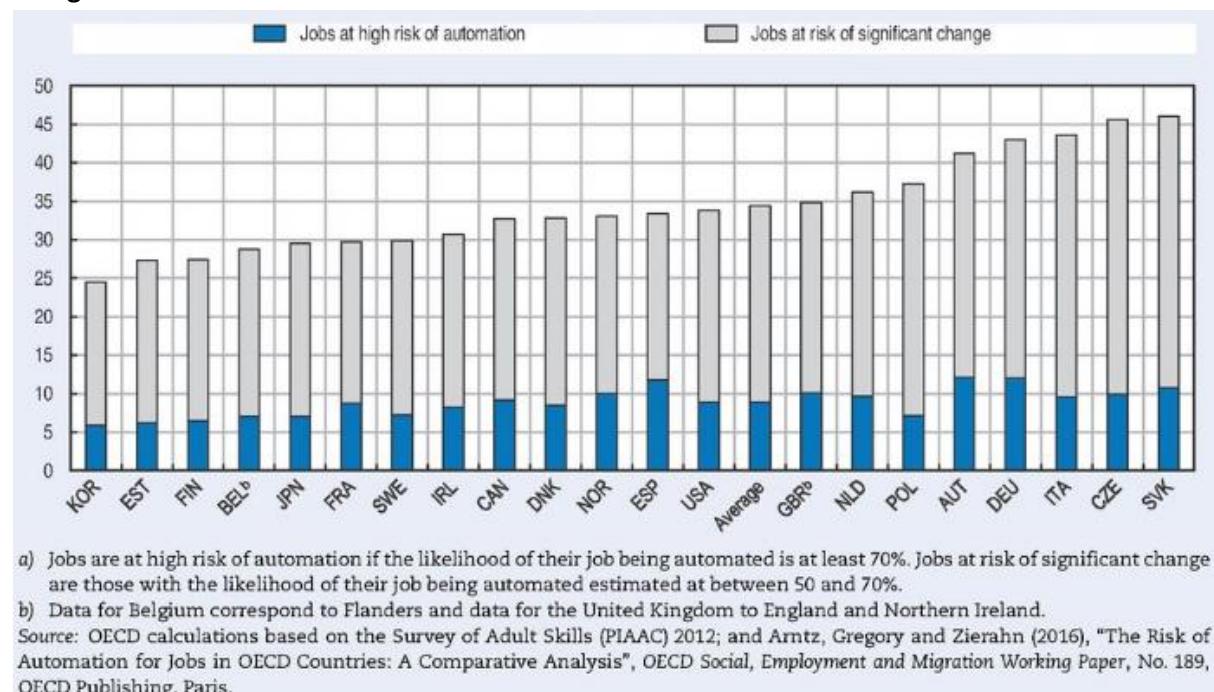
The processes of replacing work with the technology will not be influenced only by the development of the technology itself, but also by other circumstances that can inhibit these processes. This will include, in particular, legislation that will, for example, modify the regulatory environment for operation or the adoption of technological change by companies. The speed and extent of digitization penetration into services may come to the limits of acceptability by service users and customers. Above a certain level of process automation in healthcare, education, or other services, patients, students and customers may feel that they are the subject of an impersonal process, and they will prefer services that will be provided by people. The unavoidable fact is that automation of certain services and the use of electronic tools that are serviced by the customer itself lead to the cost of service being transferred from the provider to the customer to the detriment of his or her comfort, which may be of particular concern to the older generation of users.

Although it is quite obvious that there will be an extinction and, on the contrary, the emergence of new professions, the estimates of their extent vary considerably. The results are significantly influenced by the methodology of calculating whether the calculations are based on professions or job tasks. The disadvantage of profession-based quantification is the assumption that a particular profession will either disappear or will not disappear as a whole, and the different chance of automation of individual work tasks is not taken into account. This approach leads to overestimation of the automation of professions, as the professions identified as highly threatened often still contain a considerable proportion of tasks that are hardly automated. Computers or robots substitute only a fraction of the total amount of work

required to perform the profession, and it can be assumed that most occupations do not completely disappear, but the job content will change, that is jobs tasks. Differences in estimates are also influenced by the time horizon considered.

The rate of job threatening by computerization was also assessed in the OECD study (Employment Outlook 2016). For the Czech Republic, it is estimated that over the next 20 years, 10% of jobs will be highly threatened by automation, and a further 35% of jobs will experience significant changes in the activities carried out. If we convert these shares to the number of jobs existing in the Czech Republic's economy in 2015, expressed in the number of employees this year, then about 408,000 jobs would be threatened, and 1.4 million jobs would have to be substantially changed.

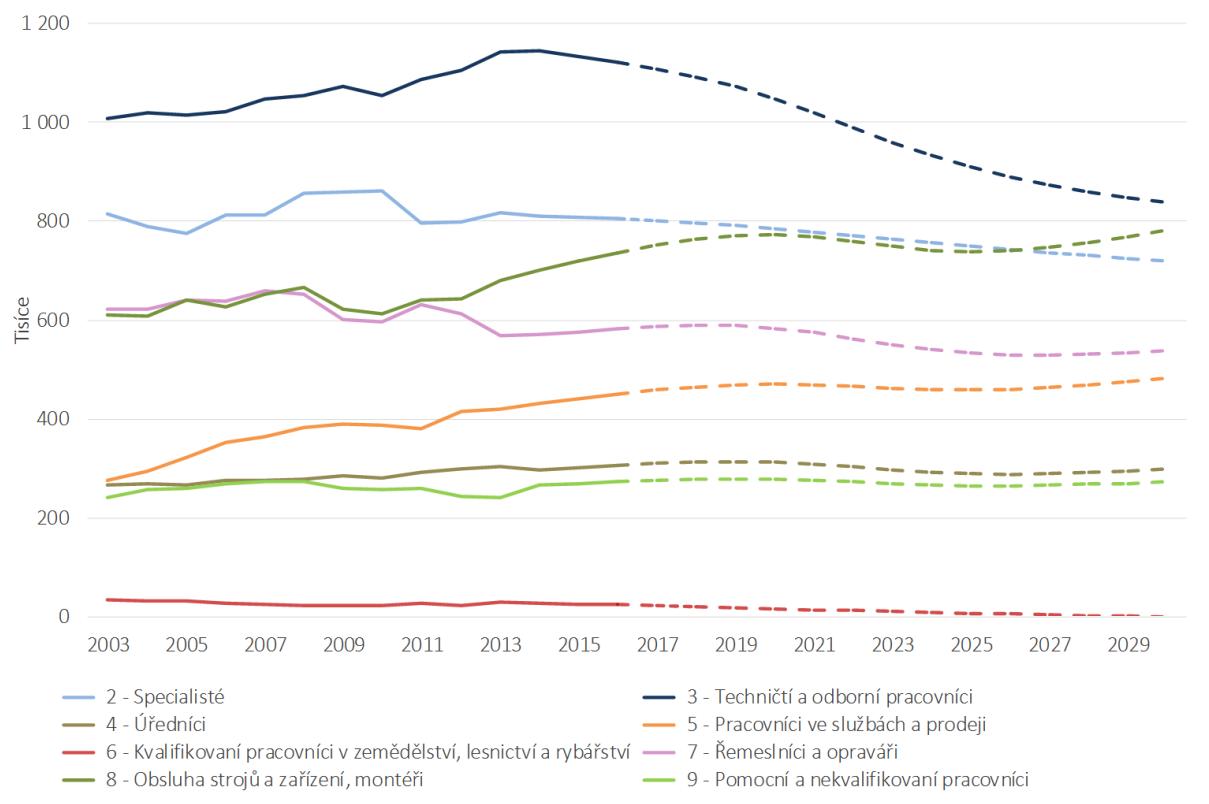
Chart: Percentage of workers in jobs at high risk of being automated or in jobs facing significant change



Source: *OECD Employment Outlook 2016*, p. 78

According to the study of the Office of the Government of the Czech Republic (Chmelař et al. 2015), the least favourable effects of the 4IR over the next 15 years are anticipated for Technicians and Associate Professionals (ISCO 3), whose numbers will be significantly reduced; on the contrary, the increase in employment is foreseen for the Plant and Machine Operators and Assemblers (ISCO 8) and Services and Sales Workers (ISCO 5). While the demand for rather lower qualifications will increase, the demand for skill-intensive professions will remain more stable (Chmelař et al. 2015).

Chart: Number of professions according to CZ_ISCO and development by 2030



Source: Chmelař et al. 2015

The results of all studies on impact quantification need to be interpreted very cautiously and understood as indicative because they are always based on expert estimates that may not be accurate and will change over time as the current situation and understanding future trends changes.

Despite the differences in the magnitude of these estimates, there is a predominant opinion that the decline in old jobs will be higher than the growth of new generation jobs. When assessing the overall impact on job savings, it should also be borne in mind that this impact will be spread over time, and even though robot development is moving forward, in the next few years, the mass expansion can't be expected in the Czech Republic. On the contrary, employers in the Czech Republic still feel a shortage of workers to fill technical positions, and this shortcoming is likely to persist in the next few years. There is also a wage level in the Czech Republic against the trend of robotization, which is still relatively low compared to the developed countries. Little is explored in particular the area of emergence of new fields and professions induced by the 4IR.

Future demands for specific knowledge and skills are difficult to estimate, as technological developments are so rapid and unpredictable that new trends and technologies are likely to emerge. It is therefore necessary nowadays to focus on general and soft skills training in conjunction with a thorough understanding of the professional background of the discipline and its principles which are unchanged. It will be necessary to distinguish between the skills that

are temporary and the principles that are always valid. To maintain the competitiveness of the economy, it will be necessary to develop entrepreneurial skills and support the implementation of innovative ideas and practices (Národní vzdělávací fond, 2016).

The key will be the ability to learn a lifetime, to actively seek out current trade information, to use new technologies, the internet, social media, and so on. The role of a creative approach to solving problems, independence, self-regulation, initiative, responsibility and ethics will rise.

SECTION 3. SELECTED ECONOMIC SECTOR AND TARGET GROUP IN THE CZECH REPUBLIC

3.1. Manufacturing

In the case of the Czech Republic we have selected *Manufacturing*, mainly, for these reasons:

- 1) Manufacturing is a sector with the largest share in employment in the Czech Republic (27,3 % in 2015) thus being a sector of strategic importance in our country with positive evolution the last few years;
- 2) Manufacturing is a sector currently employing the second highest share of people with low education level (after Primary sector & utilities) in the Czech Republic and the sector with the highest number of low skilled people in total and is expected to employ low skilled in the future as well;
- 3) Manufacturing is a sector which is expected to decline over the period 2015-2025 (change by -1,5 %) even though it has one of the highest expected replacement demand.

Manufacturing includes a wide range of economic activities including, amongst other things, the manufacture of food and drink products, textiles, clothing, pharmaceuticals, chemicals, computers and electrical equipment, metals, vehicles (e.g. cars, trains and ships), furniture, etc. In the Czech Republic, the most important activity of manufacturing from the employment point of view is *Manufacture of motor vehicles, trailers and semi-trailers*; *Manufacture of fabricated metal products, except machinery and equipment* and *Manufacture of machinery and equipment n.e.c.* Only these three segments account for a third of Czech industry, both in terms of share of value added and employment.

Regarding professional categories, most workers in Czech manufacturing are part of *Craft and related trades workers*; *Plant and machine operators, and assemblers*; *Metal, machinery & related trades workers*; *Technicians and associate professionals*; *Stationary plant & machine operators*.

Industry plays a significant and irreplaceable role in the Czech economy, accounting for approximately one third of the national economy. In the speech of specific figures from the national accounting for 2014, the industry contributed to the gross value added of the Czech Republic by 32.4%, manufacturing itself by 27 %. Until the end of 2008, industry showed a growing trend that was greatly interrupted by the global economic crisis. The industry has reached its "crisis bottom" in the first half of 2009. At that time, industrial output was one fifth lower than at the beginning of 2008, when pre-crisis growth peaked. Since then the Czech industry has been gradually adding to its performance, in 2014 for the first time surpassed the pre-crisis maxima and continues to grow.

In the long run, the importance of the manufacturing industry in the Czech Republic does not decrease, but on the contrary it is slightly increasing. While in 1996 the manufacturing industry accounted for 24.8% of the added value generated by the domestic economy, it was 27.1% in 2016. By contrast, this share fell from 19.2% to 16% in the same period within the European Union.

During the period 2011-2015, the employment level of manufacturing in the Czech Republic changed by 6.92%, compared to 0.08% in EU. Over the period 2015-2025, employment for manufacturing in Czech Republic is projected to change by -1.50% compared to -3.92% in EU.

Evolution of employment in Manufacturing in CR (thousands)	2004	2005	2006	2007	2008	2009	2010	2011*	2011	2012	2013	2014	2015
	1 225,4	1 249,1	1 310,6	1 348,3	1 378,5	1 242,7	1 235,9	1 294,0	1 287,6	1 299,1	1 285,3	1 329,8	1 376,8

Source: LFS, Czech statistical office, own calculations.

Regarding the foreseen evolution, employment in manufacturing is expected to decrease globally, mostly due to mentioned impacts of 4IR and ongoing automation trends. Thus in economic activities that are already in the advanced stages of robotizing, the employment growth will either sluggish (a typical example is the automotive industry), or there will be a release of labour (this is expected especially in the light industry sectors). On the other hand, the use of new devices will, of course, also create jobs to maintain and adjust, update software, etc.

Estimate of the replacement need in Manufacturing in Czech Republic by economic activities in the period 2015-2025 (thousands)

	Net change	Replacement demand	Job opportunities
03. Food, Drink, Tobacco	1	37	38
04. Textiles, Clothing Leather	-6	19	13
05. Wood, paper, print, publishing	-5	35	30
06. Coke, ref petroleum	0	1	1
07. Other chemicals	2	9	12
08. Pharmaceuticals	3	5	8
09. Rubber non-metal min products	6	45	51
10. Basic metals, metal products	-21	79	59
11. Optical, electronic equip	4	14	18
12. Electrical equipment	8	38	45
13. Other machinery, equipment	2	45	47
14. Motor Vehicles	-7	51	43
15. Other Transport Equipment	-1	7	7
16. Manufacturing nes	-3	43	40
Manufacturing Total	-19	430	411

Source: Skills Panorama, CEDEFOP. 2015-2025

In the projections of employment needs for the sector of Manufacturing, the final sum of job opportunities is mainly driven by replacement needs. So regardless expecting negative trend in employment over the period 2015-2025, Manufacturing will remain a key employer in the Czech economy.

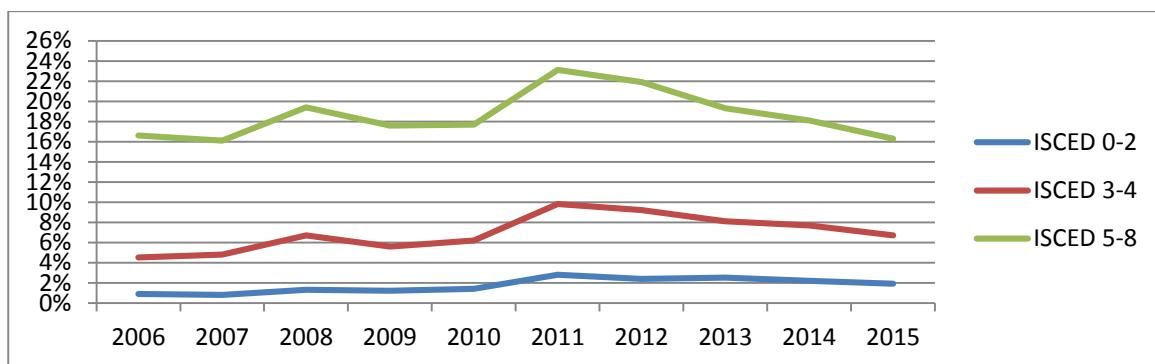
Finally, we consider it to be a very suitable sector for the target group the project has, because this sector actually employs 5,4 % of low skilled workers (ISCED 1-2), which is one of the highest share across the Czech economy.

3.2. Target group

The target group of this project in the Czech Republic is not further specified and includes whole low skilled population. We will seek to focus further analysis, especially qualitative, on existing workers in the sector of Manufacturing. But due to low share of low skilled people (14,4 %) on total population in Czech Republic, it would not be strategic even more narrow the scope of already quite small target group.

Low skilled population group is highly vulnerable group in the labour market with the highest level of unemployment which is more difficult to adapt and in this respect can't be predicted to change significantly in the future. This population is characterized by relatively low willingness to improve their position in the labour market, as demonstrated by their low participation in further education which oscillates about 2 %, while the population with tertiary level of education is 8-10 times higher.

Chart: Participation in further education by level of formal education (people aged 25-64, in last 4 weeks before questioning)



Source: Czech statistical office / Eurostat.

The main differences within this group will concern mainly age, which is especially important for the relationship with vocational education and training (VET) and its possible development and is also very important for subsequent work with this group. Work with young low-skilled (and projects oriented to them) should be a quiet different from working with low-skilled 50+. This is also related to the evaluation of the resulting effect of the various instruments in terms of the ratio of resources spent and the possible economic impact.

This group also includes other subgroups whose relation to further education is very specific. These include, for example, individuals who have not completed school, for example because of criminal activity or drug addiction, individuals from a fundamentally different socio-cultural environment without work habits, refugees, asylum seekers, etc. On the other hand, there is

also a large proportion of people with disabilities or different psychological problems. Individual handicaps often accumulate, complicating the work with this target group. Within the framework of this report, these individual subgroups will not be analyzed in detail, but they will try to offer different views on the overall situation of the low-skilled.

As is demonstrated in the table below, low skilled workers in the Czech republic are concentrated mostly in Manufacturing.

Employment of low skilled population in Czech Republic by main economic sectors, 2015

	Low skilled population			
	Men	Women	Total	% of total
Agriculture, forestry and fishing	5169	3443	8612	4%
Manufacture of food textiles, apparel, leather and related products	4603	10346	14949	7%
Manufacture of coke, refined petroleum products	22849	11769	34618	17%
Manufacture of machinery and equipment n.e.c	16018	16847	32865	16%
Construction	13960	133	14093	7%
Wholesale and retail trade; repair of motor vehicles and motorcycles	10811	23511	34322	17%
Transportation and storage	8418	3840	12258	6%
Financial and insurance activities	6659	8479	15138	8%
Public Administration and defense	5665	17068	22733	11%
Other service activities	2615	8221	10836	5%
TOTAL	96767	103657	200424	100%

Source: LFS 2015, own calculations.

With predicted falling demand for lower qualifications, the population with only elementary education will face increased competition in the labour market. In this context, it is warning that in the population aged 20-24, i.e. population that will move in the labour market in the next 20 years, the share of persons with only elementary education is almost double that of the population aged 45-53, i.e. population that, to the contrary, will leave the labour market over the next 20 years. Not inconsiderable factor of high degree of unemployment among people with low level of education is however the willingness to work influenced by the relationship between the wage offered, the social benefits and the moral - volition individual characteristics.

SECTION 4. RESULTS OF INTERVIEWS

4.1. Relevance of the sector for low skilled workers

4.1.1. Relevance of the chosen sector for the selected target group

Manufacturing is a sector that employs largest share of people of all sectors in the Czech Republic. In Manufacturing almost 90% of employees work in Manufacture of motor vehicles, trailers and semi-trailers division. This division consist of includes the manufacture of motor vehicles for transporting passengers or freight, the manufacture of trailers and semi-trailers, and the manufacture of various parts and accessories. It's very important part of the Czech Republic economy in GDP and employment.

Employment in this sector is rising since 2000 and it offers stability and usually an adequate paid job positions. Despite these facts Manufacturing struggles with shortage of employees – the main problem is the lack of students in technical secondary vocational school.

In the Manufacturing Industry, male workers are predominantly employed in the Czech Republic. Men represent more than two-thirds (65%) of all employees in this sector. This is 8 percentage points higher than the proportion of men among all employed in the Czech Republic.

4.1.2. Kind of jobs that the target group develops in the selected sector

Qualitative demands in Manufacturing sector is significantly lower than in the rest of the economy. Almost one half of the workers in this sector have lower secondary education. More than one third of workers achieved secondary education with maturity exam. 11% of workers have tertiary education and 7% have attained basic education. Although employers most often require at least lower secondary education, people who have achieved basic education can also find a job in this sector.

The largest group of occupations in the industry are Assemblers, Blacksmiths, toolmakers and related trades workers, Stationary plant and machine operators and Metal, machinery and related trades workers. It means than in Manufacturing work mainly low-skilled workers. Among the five most demanding manual positions in the Czech Republic there are production operators (formerly labourers), welders, machinists, locksmiths and warehouse -drivers of forklift trucks.

From the employers' point of view, the most demanding professions or branches where companies contend with labour shortages are in technical or engineering professions, in particular: machinery operators, locksmiths, lathe operators, CNC plants operators, technicians, joiners, masons and tillers.

4.1.3. Existence of 'black (underground) economy' in the selected sector and in these occupation types and steps to overcome this

A very common and often debated form of black work is the so-called Schwarz system in Czech law. The Schwarz system refers to a widespread practice of employers hiring their workers not as employees, but rather as independent contractors (collaborate with them using their trade certificates) in order to avoid paying social security tax. Although illegal, this system is still used among the employers.

Manufacturing is one of the sectors (along with Wholesale and retail, Construction and Services) where black economy exists. Especially in the manufacturing industry, the practice is that the official payroll is just a minimum wage and the rest of the salary is paid on hand in cash. The low-skilled take the 'black job' due to the need for immediate earnings, regardless of the risks and disadvantages of such position.

In the Czech Republic, some historical tolerance towards the black economy is linked to the perceived inefficiency of the public sector and relatively low penalties for black economy activities. The solution for black economy is difficult. It requires either strict controls or significant tax incentives.

4.1.4. Problems of low skilled workers in finding and maintaining employment in the selected sector

There are few problems in finding an employment as low skilled worker in the Manufacturing sector.

The impacts of the 4th Industrial Revolution threaten mainly manual routine professions which can be defined in repetitive procedures that are relatively simple to algorithm. Because most people in Manufacturing are in low-skilled jobs, labour market experts predict that 4th Industrial Revolution will probably lead to replacement of these job positions with robots. Also the Ministry of Industry and Trade of the Czech Republic is of the opinion that the Czech Republic should concentrate in the long run more to grow sectors with higher added value, which will bring more benefits. These are for example high-tech centres that will not only use manual work but will be based more on the use of know-how.

The highest share of employees in the Manufacturing works in the Central Bohemia Region, accounting for almost 22% of the total employed in this sector. Furthermore, more than 12% of the employed are in the Moravian-Silesian Region and almost 10% in the Liberec region. Compared to other sectors, the geographical concentration of this sector in the Czech Republic is above average. It means that low skilled workers from other regions will have to be willing to move. Generally, willingness to move for work is relatively low in the Czech Republic. Poor availability of remote locations is a more serious problem for low-skilled than for other groups because commuting is financially unaffordable due to low wages of low-skilled people.

Future demands for specific knowledge and skills are difficult to estimate because of technological developments is so fast and unpredictable that it is likely that new trends and

technologies will emerge. Requalification focused on technology will be important. Manufacturing is and most likely will be sector where low skilled people can be employed.

4.2. Training, Participation, Engagement and Recruitment

4.2.1. Current training in the sector for low-skilled people

Retraining

In the case of the Czech Republic, there is a wide range of training actions. In relation to the labour market, retraining as well as the guidance services is provided by the Labour Office of the Czech Republic. The Labour Office primarily targets people who are registered as jobseekers (officially unemployed). Overwhelming majority of socially disadvantaged people apply for the registration as there are noticeable financial benefits (besides the unemployment and/or social benefits also their social and health insurance is covered in most cases). The registered people are subject of regular Labour Office measures (active labour market policies) and are bound to cooperate with the Office (stick to the agreed commitments such as visits at the Office etc.).

One of the main tools that the Labour Office uses for the further education of its clients is retraining that allows individuals to get a qualification for new job or to maintain an existing job. Also a person who has not obtained any qualification yet can be included in retraining to get a qualification for the employment. In determining the content and extent of retraining, it is based on the qualifications, health status, abilities and experience of a person to be retrained by acquiring new theoretical and practical skills in further vocational education and training.

As said by labour market experts from Further Education Fund (FEF), there are a number of weaknesses and threats that stand in the way of better functioning of this tool, especially for the low-skilled target group. One of the problematic areas that has often been mentioned is to check the quality of courses, assess their effectiveness and focus on the specific needs of the individual participants. Even the accreditation has no significant impact on the quality of the courses, as they are, according to the majority of experts, purely formal. Often, the unsatisfactory structure / focus of courses, which does not reflect the needs of specific sub-groups has also been criticized. For example, if the course is targeted at the low-skilled, it is often no longer taken into account that e.g. older long-term unemployed men require a different type of training and access than young, short-term unemployed mothers. Another weakness of this tool of active labour market policy is its high institutionalization that brings about problems with administration of tenders for providers. Due to poor methodology of low bid price which is mostly the main criterion in public procurement system, retraining is often rather formal, there is insufficient verifiability of efficiency. Thus, retraining courses are not practical enough and missing link with the employer. High administration barrier also caused that retraining offer isn't flexible and thus can't respond quickly to changes in the labour market.

Traineeship

It is another tool that is offered both by the Labour Office (*Professional Practice for Young Under 30s*) as well as in other projects (eg *Placement in Companies* organized by the FEF), for a number of projects certain form of traineeships in companies is a part of acquisition of practical knowledge or retraining (eg *Young without qualifications*). The traineeship principle is based on practical training that takes place directly at the employer. Trainee has a mentor who is dedicated to him and who introduces him to practical skills in the field. The traineeship is usually unpaid for the trainee, but there are also programs where the trainee has some basic income. Certain traineeships are also suitable for participants without prior qualifications and allow them to acquire basic qualifications in a particular field. For low-qualified, traineeships have the advantage of not including formal education here, against which they have a negative attitude. On the other hand, the disadvantage is that participation in a number of traineeships is subject to a certain level of qualification.

In relation to the target group of low-skilled people traineeship is considered a suitable tool. Its great advantage is the possibility of individual approach to trainees, thanks to which training takes into account the needs of participant. Another advantage is the opportunity to give applicant from labour office a tryout. An important role is also played by the social dimension of traineeship. A trainee, thanks to social interaction with other staff, gets better with work and acquires working habits more easily. Traineeships can also be linked to another tool that is often used to work with this target group - mentoring. The mentor's role is not only in the transfer of knowledge and experience, but also in the transfer of attitudes and the positive impact on the trainee.

Initial training with the employer

This form of further education is a natural part of the adaptation process, through which a large proportion of newly recruited employees pass. New employees are thus often trained in new technologies, familiarizing themselves with new workflows and extending their existing practices. The Labour Office has specific active labour market tools that can support the applicant's placement in the company and ensure that the applicant has undergone the basic training required to perform the work. Specifically, these are socially meaningful jobs and subsidized jobs created by many projects. Both measures consist in the time-limited support received by the employer for the salary of an employee he recruits from the Labour Office. The amount of support may vary and may often cover the entire salary of so recruited employee.

This way of gaining new work experience is also suitable for a low-skilled group as it can help keep their working habits. At the same time, it can enable them to acquire basic qualifications that can be further extended to full professional qualifications.

On-line courses

Given that the percentage of Internet users in the target group of low-skilled is very low (according to the World Internet Project 2014, it is 39% among the low-skilled in the Czech Republic) regardless of any employment or unemployment, the participation of low-skilled in

this form of education is declared by only 2% of them¹). Due to the development and expansion of information technologies, low-skilled people are facing a major threat, which may continue to deepen their difficult situation in the future. The reason why low-skilled do not use online courses are, first, the lack of computer skills, second, the unavailability of computer with internet for financial reasons. Another reason is disinterest and distrust in these courses. Overall, the use of this VET tool mainly points to the growing gap between low-skilled and better-educated groups.

National Register of Qualifications (NRQ)

Since 2007 the Czech Republic has been developing a new element – a possibility of validation and recognition of skills, regardless how they were acquired (the system is based on Act 179/2006 Coll. on validation and recognition of the results of further learning and on the National Register of Qualifications). The NRQ contains descriptions of qualifications that are derived from the labour market, including assessment criteria (employers participate in its development). This is a possibility of gradually acquiring "partial" professional qualifications that can lead to full professional qualification. Just the opportunity to have a state-accredited certificate confirming that although I have not completed my apprenticeship, yet I manage practical skills belonging to a particular profession, it can be an opportunity to gain a higher qualification for a number of low-skilled people.

However, the general public does not have enough information about this opportunity.

4.2.2. Training on companies for low skilled people: motivation and barriers

Many of the companies working in Manufacturing directly offer qualifying training accreditation for their workers, mainly in the form of traineeship for newly hired workers and retraining for up-skilling existing long-term employees. Training of employed people on companies is more effective than training courses offered by Labour Office for jobseekers, because employed people are more motivated to participate in order to maintain employment. It turns out that employees who realize how they can use what they have learned are more motivated to receive new knowledge. Training courses on companies are assessed as more useful, more practical and they bring more benefits to both employees and employers.

As for the barriers that are on the side of companies the most common problem is in effectiveness of educational activities and uncertain outcome. By offering the training companies develop employees not only for their company, but also increase workers' labour market price. The direct proportion between investment in education and employee loyalty to the firm does not apply. One practical example would show that many employees will use a firm to increase their value in the marketplace and look for a new employer who will pay him a higher salary for what he has earned by all. For this reason, it is necessary to find the right balance between what company invests in man and the effort that the employee has to make on his own growth.

¹ Source: Kooperace research, 2015

Many of the companies in Manufacturing, especially on the top of innovative ladder, has own education plan which is not based on summarizing individual educational needs, but considered from a wider perspective. Main motivation for that could be

- Improving the skills and performance of working teams;
- increasing labour productivity;
- future changes in the environment and in the company.

The need for new training and educational activities can in particular be provoked by following future changes:

- new laws (environmental, safety, ...);
- the crisis period, placing greater demands on cost monitoring;
- introduction of new technologies or automation;
- mergers or strategic partnerships that call for cultural and linguistic barriers;
- growth of the company to new markets;
- restructuring the company and creating new combinations of work activities.

Regarding the preferred way of education / training of their employees, companies are not decided. They are always judged individually according to the current offer and need. Rather, they prefer employees' self-motivation and the desire to learn something new: "Lessons will not help to someone who does not care and does not want to use it."

4.2.3. *Funding the training*

In the Czech Republic the costs of training (course fee) is paid to the applicant or job seeker by the Labour Office if the applicant is recommended to the training by the Labour Office. Jobseekers may also provide a contribution to cover proved necessary costs associated with training (eg travel expenses for public transport, insurance against damage caused by the job seeker to the retraining facility). The selection of candidates for participation in training is preceded by a professional-consulting interview, which is carried out by the employment department of the contact Labour Office. During this interview, the appointed employee of the Labour Office shall determine whether the successful completion of the chosen course will actually increase the chances of the person concerned to obtain a new job.

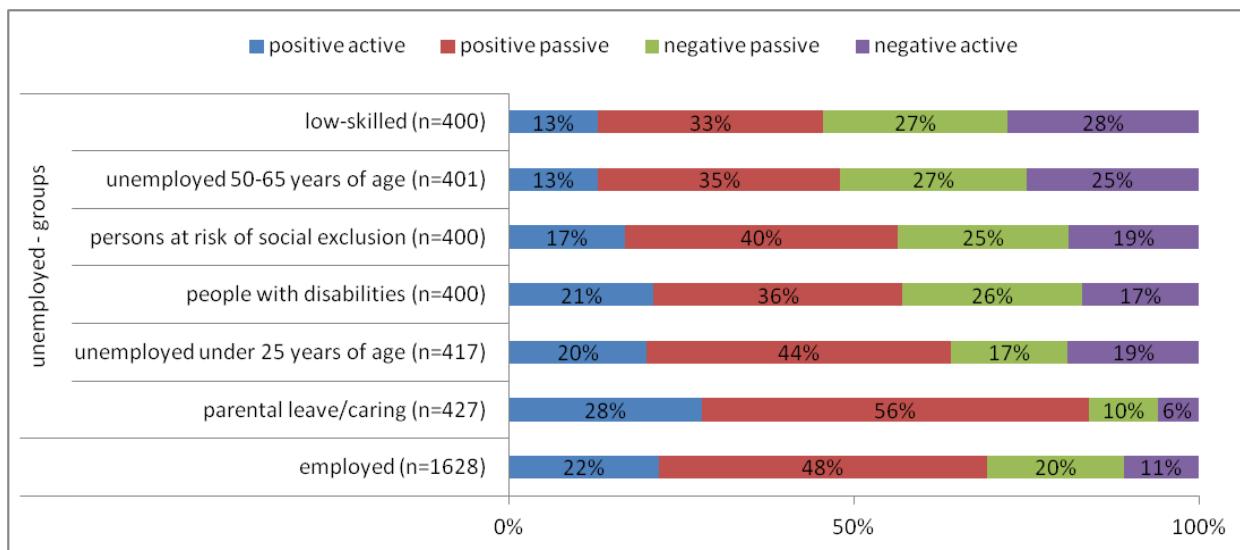
The costs associated with training may be fully or partially covered also to employers who perform training in order to further employment of its employees on the basis of a written agreement with the competent Labour Office. In this case, it is only possible to cover the costs of implementing the training course (course fee), not wage compensation to the retrained employee.

4.2.4. Difficulties and barriers to achieving a higher participation rate from people belonging to the target group

Negative attitude

Low-skilled people perceive further education as the most negative among all the selected groups in the labor market, as you can see at Figure 1. Together with the unemployed 50+, they are the only two groups with mostly negative attitudes, and the low-skilled themselves have the most negative attitude from all the groups studied, which is related to the clear rejection of the presented topic. One obvious reason for this is that low-skilled people may perceive education in general as an area where they have failed and can be associated with a sense of failure and disappointment. These feelings can also be encouraged by people around them, which is what further reduces their motivation.

Figure 1: Attitudes of employed people and vulnerable groups in the labor market to further education and training



Source: 'Kooperace' research, 2015

Barriers to higher participation of low-skilled in training

Based on the 'Kooperace' research that was conducted in between 2013 and 2015 by Further education and training fund and was focused on analyzing the current state of VET in the Czech Republic from the point of view of the system (its actors and tools), and from the point of view of the individuals.

- Lack of money

Low-qualified respondents of 'Kooperace' research expressed the highest degree of consent with the lack of money for the VET as the biggest barrier, 71% of the respondents agreed. The question is to what extent this barrier is real and well-founded. Taking into account that the most frequent source of information on VET options for this group is the Labour Office, it is unlikely that they would not be informed about the fact that the training is also paid by the Labour Office. It is possible that low-skilled people rather indicate a lack of resources as a reason to mask their passive approach. On the other hand, travel and other expenses to the participants are in a number of training programs paid retroactively. In addition, travel documents are often submitted for reimbursement at the end of the month and can only be reimbursed until the end of the next month. For many of the low-skilled, paying for a two-month commuting for training is a real barrier.

In this case, there are several ways to solve these barriers: organize education as close as possible to the residence of a participant; reimburse travel costs at shorter intervals - for example, after a week, and try to think about providing for other costs related to participation in training (e.g. accommodation, meals, necessary aids), and advance payment for support in the first days of training. It is therefore a barrier that could be removed by implementing systemic measures to minimize these costs.

- The importance of practice versus education and training

Another barrier with a high level of consent is the importance of practice versus education. As shown by the extent to which low-skilled workers are involved in tools that allow them to gain practical experience (internships, work with the employer), reducing this barrier also fails. On the one hand, the barrier is again passive access for the low-skilled, on the other hand it is usually part of these tools to choose the candidates that employers want to work with. It is logical that, with the same level of financial support, the employer selects candidates with better qualifications, ie better education, more practice, shorter unemployment.

If tools for effective practical training of low-skilled with employers were to work, it would be necessary to take into account the longer time-consuming training of low-skilled and consequently higher financial demands. Another option is to create a special tool targeted at the practical preparation of the low-skilled unemployed, with appropriate support for employers and practical training contents appropriate for this group.

- Fear of the school environment and concerns about failing the training

The other two barriers concern the school environment and the fear of the failure to master the course, both closely related to the motivations. The question is how to deal with these concerns stemming from the sense of failure and leading to decline of further education. There is probably only one solution - to focus on motivation and individual support during training, where the strengths of participants will be promoted, to better adapt the training to them, and to emphasize the feedback indicating that participants understand the content of learning. Furthermore, it is necessary to adapt the system of training under the NRQ (National Register of Qualifications) to this target

group (time allocation of courses, awareness of participants, combination of training with the internship system, etc.).

- Narrow offer of training

The low-skilled also face a narrow offer of training courses, because a large part of them do not have a priori access because of their low education. It is very common that low-skilled people participate on training significantly less than those with secondary education. Career guidance experts also confirm that entry requirements in many courses require a higher level of qualification.

- The pace of learning

The public procurement system where the low price of course is the main criterion has led to the fact, that the majority of providers are pushed to a minimum of flexibility. This leads to the fact that during the course there is no room for working with people who need more time to understand. Participants who are expected to experience such a problem are often at a disadvantage before starting a course, retraining or other training.

- The social support system combined with the possible wage levels

The last barrier to be mentioned is once again the social support system combined with the possible wage levels low-skilled people could reach. Low skilled people risk losing their social benefits by accepting employment. The risk of being dismissed in probationary period and thus the need to handle all the benefits again are reasons why they won't even accept the job.

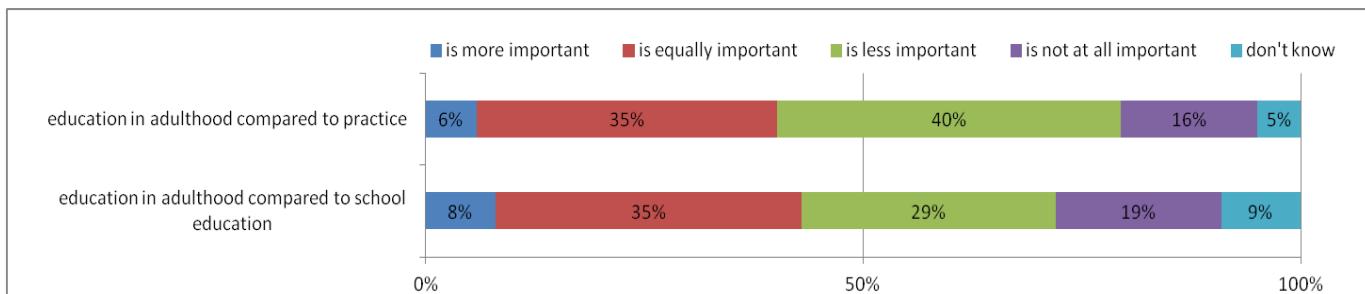
- Low quality of training due to the public procurement system

To subordinate the selection of training activities carried out by the Labour Office to the public procurement system leads to reducing the quality of education in general. Education is not a typical commodity from the rigid point of view of economists, but a service that must be evaluated and assessed by a number of qualitative parameters, as it creates the future of society. Preparing the population to employment must primarily aim at high quality of service and its added value and therefore it is not necessarily the price of offer what matters most.

4.2.5. Factors to motivate low skilled people to complete their training

As shown by results of "Kooperace" research made by Further Education Fund (Figure 2), low-skilled consider school education to be more important than continuing education, as well as they consider the practice to be more important than continuing education. This suggests that they often face up situations that low education and the lack of adequate practice disadvantage them in the labour market. On the other hand, 70% of them think employers attribute the importance of education in adulthood. There is a clear mismatch that, despite this belief, participation in the further education of this group is very low. It seems that in this case, barriers are stronger than motivations.

Figure 2: The importance of further education compared to school education and practice



Source: 'Kooperace' research, 2015

Other causes of insufficient motivation of low-skilled to enter training and education activities can be summarized as follows:

- Uncertain result - low-skilled in advance anticipate only a small impact of their participation in training and education program on potential improvements in job prospects (employment, better employment, wage growth).
- Fear of failure - negative self-evaluation of low-skilled and fear of sanctions in case of non-completion of the training program are additionally enhanced by the nature of training courses, which often take the form of school education (people with low education usually do not have too positive experience with the system of formal school education and labour policy measures may in their view evoke "return to school benches" - the "psychological costs" of participation in the training program are several times higher for low-skilled than for highly qualified people).
- A traditional concept that favours job (practice) rather than training - some of low-skilled can evaluate their participation in training and education as too costly (elderly people, breadwinners).
- Insufficient link between the training program and the needs of disadvantaged job seekers - for candidates with a deficiency of basic knowledge or attitudes towards work, generally-based training programs can be too demanding (too many "lessons" transferred in a very short time).

Despite the existence of a number of particular tools targeting this group, there is still no developed system that will integrate low-skilled step by step into the labour market. Also socio-economic factors complicate the situation. Even after obtaining some basic qualification, the income of most low-skilled is slightly above the minimum wage. Such an amount of income then "competes" with the amount of social support. Relating this situation, the "inactivity trap" is often mentioned, when the access to the labour market does not give the person any prospects of increasing income and improving the overall situation. Besides, there is still a "low-income trap", a situation where wage increase can lead to a drop in real income due to household's getting out of material poverty.

4.2.6. Monitoring job outcomes (if they get into employment after the course)

The Employment Act and other related regulations and documents do not define any (albeit minimal) level of achievement. Even though the resulting effect of retraining is not specified, it can be assumed that it is increase in chances of people in training programmes, more precisely their equal rights in the job competition and the dropout of the applicants from the register of unemployed and starting a new corresponding job in the upshot. But, although the participant in retraining doesn't leave the register of unemployed persons and entry to employment does not take place, yet participation in the training program may lead to positive effects. These are mainly reflected in the increased self-confidence of the client, the establishment of wider social and communication networks (which in turn can lead to employment), the maintenance and cultivation of knowledge and skills and the maintenance of certain working morals and motivation to continue to work in the labour market.

Although the law does not mandate labour offices to monitor the progress, structure and effects of retraining programs, this need is emphasized in policy statements and strategic documents (for example, the implementation plan of the Lifelong Learning Strategy includes a requirement for regular monitoring of retraining and training programs, the effects of these programs and on the development of a specific methodology for overall monitoring of programs and their effects in several points). The implementation of a wide range of measures funded by the European Social Fund also raises the need for feedback for those who fund and finance these activities, which is also reflected in the growing number of evaluation and monitoring reports that are linked to the implementation of active labour market policy measures.

In connection with the nature and quality of retraining programs, interviewee from Labour Office expressed concern about fact, that retraining programs, which are usually short-term, are not recognized and respected by the employer as a full-fledged form of acquiring qualification.

As regards *Placement in Companies*, the project of Further Education Fund, there is an ongoing monitoring of the result as it is co-financed from EU funds – Operational Program Education for Competitiveness. This monitoring includes both process evaluation (course of internship, administrative burden etc.) and impact assessment (placement effect, subjective project evaluation, project goals, side effects etc).

4.3. Skills gaps and barriers

4.3.1. Main gaps in employability (transversal -e.g. non-job specific skills- and personal skills) in the target group

Regarding transversal skills, reading and understanding work instructions, willingness to learn, interest in craft, good working habits and personality characteristics such as responsibility and reliability are highlighted as key elements for job performance of low-skilled population. Employers from Manufacturing sector emphasize also other soft-skills such as ability of team

work, ability of problem solving that requires good communication skills, adaptability and flexibility.

The interviewees point out that mainly younger low-skilled people lack positive patterns in their surroundings that leads to the multiplication of unemployment when the whole family is on social benefits which in turn complicate any further work with them. The lack of positive patterns in the family has a negative impact on the motivation of young people from target group, both for further education and for active job search. For this reason, it is important to focus not only on the up-skilling of the low-skilled but also on the overall positive impact on the socio-cultural environment where low-skilled people come from.

Specific problems also arise in the young generation of low-skilled. Labour market experts have agreed that many of them often show mood swings, character fluctuations, low ability to concentrate. These qualities are often the cause of an early interruption of education and are a barrier to successful integration into the labour market. Typical are exaggerated expectations about self-employment, followed by resignation at the time of the first failure. Getting work habits is very challenging for many young people, they have problem with staying focused and concentrated for the entire eight-hour working time, and in the case of manual activities they often lack sufficient physical condition.

A low-skilled group is also often exposed to financial problems due to low financial literacy leading to debts and the resulting constraint. Any potential earnings from employment, which primarily repay debts, do not help in any way improve their economic and social situation. These are other factors that reduce the motivation of low-skilled and their employability.

4.3.2. Main gaps in academic skills and qualifications of this group

As the Manufacturing sector contains wide range of professions depending on production branch it's hard to enumerate specific skills that our target group is lacking. But in general, employers in Manufacturing often look for workers with technical skills and ICT and digital skills.

Experts from Labour Office pointed out that low level of education stands behind other problems that accompany this group. With the gradual development of information technology, a number of representatives of this group are getting into some information and social isolation. The rate of Internet use is significantly lower for this group than for higher educated groups. It follows that Internet use to get a new job or to use social instruments is very limited. So developing digital competences is very important both for people who have been out of education for a long time and for those with low or no qualifications. For them, technical changes are particularly unreadable and they need support in their handling.

4.3.3. Necessary Skills in the medium future (5-10 years)

Coming up with ongoing technological innovations the need for interdisciplinary knowledge from multiple professions at one go is increasing. Concerning production, greater concentration, dexterity, precision and patience has been mentioned by companies, as the

products will be more compact and complex and thus any fault will be irreversible and more expensive. In connection with the overall increasing skill demands of manufacturing, the problems of low-skilled people and graduates of general secondary education without higher education may intensify.

The primary need for a change of mind especially for middle and low qualified workers in manufacturing exist already today, where information and communication technologies are still perceived as a superstructure, "complement" to work, not as a basic infrastructure for company's activity. An important example of ongoing automation and cybernetization in production and its impact on workers' skills is presented by one of the largest players in the manufacturing industry in the Czech Republic: work of machine/line operators will be physically less strenuous, operator will work with a digital tool where simple control will be enough. Work steps to be performed will be showed on the tool (tablet), thus paper technical documentation will not be required; work steps will be displayed on the device in 3D and will indicate what action to take. Automatic sensors will scan the workflow and compare the result with the plan. In case that an error occurs, the device will immediately signal and indicate the repair procedure. There is no need for operators to be apprenticed in the field, initial training would be enough. They must, however, be flexible enough to adapt to the necessary changes and to be able to handle digital devices. The operator's work will also be more variable as it will be able to perform a larger range of activities and work on different products as the product series will be smaller.

In general, workers will need to have sufficient foundations, including soft skills, to complete their professional skills quickly during working process.

4.4. Good practice and automation

4.4.1. *Established good practices and policies which have helped achieve the involvement of the target group within the sector and best results*

Identified good practices:

- **Project GOAL – Guidance and Orientation for Adult Learners**

International project financed through the Erasmus+ programme, in the Czech Republic co-financed by the National Institute for Education – an institution under the purview of the Ministry of Education, Youth and Sports. It aims to develop existing models of guidance and orientation for adults in order that these services can specifically reach low skilled adults, early school leavers without completed upper secondary education and socially disadvantaged adults. General objective of the project is to contribute to more participation of low skilled adults in education and learning programmes to increase their chances on inclusion in society and in the labour market. The project also has two other specific objectives: first - to identify critical factors and criteria of success as basis for evidence-informed policy development and implementation of centres for guidance and orientation with opportunities for validation of prior learning in Europe and the second - to develop a

structural support basis amongst decision makers and relevant stakeholders for scaling up the model of educational guidance and orientation in all partner countries.

Creation of career guidance centres

Within the project, the activities of the National Institute for Education (*Národní ústav pro vzdělávání, NUV*) were focused on the creation of career guidance centres in two regions, which would provide support for the target group. They were established in Olomouc (the Olomoucký region) and in Most (the Ústecký region). Each centre is operated by two trained consultants. The centres are focused on providing information and career guidance services especially in the field of education (linked to the existing lifelong learning centres and using existing structures). Validation (retraining) centres are often part of VET schools (lifelong learning centres) and the project aims to introduce career guidance services as a new part of these centres. Nevertheless, the career guidance does not serve for particular school needs – it works as a centre with regional outreach. Although there are no official partners/networks involved in the project, the cooperation is taking place on a non-formal basis. There are extensive contacts with VET schools, social partners, local units of the Labour Office, social services, employment agencies, job providers and other relevant stakeholders in the regions. Within the project, critical factors and criteria of success are being identified as a basis for evidence-informed policy development.

In order to provide a high quality guidance to the clients and to overcome the difficulties the counsellors may face during career guidance process, the GOAL counsellors has received an intensive training focused on obtaining core competences for work with this particular target group, self-management of client (to teach client to "take responsibility for their life"), implementation of guidance process (from initial contact to feedback), selecting appropriate tools and methods "in line" with client's needs, structuring the interview, setting up control mechanism, stages of guidance process etc.

Approaching clients

Clients are referred to the counsellors mostly through the regional units of the Labour Office (in some cases, particularly in Most, by the non-profit organisations focusing for example on the Roma minority and disadvantaged groups in the labour market). Due to the cooperation with Labour Office units, initial challenges in reaching the target group have been overcome. Direct contact remains the most effective way to reach the target group. Clients easily approach counsellor by telephone contact they receive in the Labour Office. In terms of client recruitment and referral, the GOAL service is reliant on advisers travelling to clients, as clients largely live in areas where public transport is limited and beyond their means.

The additional information is provided to the clients according to their individual preferences (phone call, email, face-to-face conversation). Nevertheless, regarding clients' recruitment, the direct contact through cooperation with relevant stakeholders is seen as the most effective tool. The number of those clients who contacted counsellors through website remains very small.

The GOAL service in the Czech Republic has mainly reached unemployed Czech citizens in early middle age (36 to 45 years old) but also young unemployed with a low level of education.

Guidance process

The guidance process itself has several stages including the identification of client's needs, meeting the objectives, career diagnosis (mapping the past, present situation), educational trajectories, personal development journeys, setting the "action plans" and "checkpoints" in clients' development based on their career goals. The tools counsellors use in order to find out the level of client's skills include career portfolio, mapping the client's competences, level of education, current life situation, etc. Career diagnosis/mapping the client's needs and attitudes are applied in the first stages of the guidance process. It is considered to be the crucial phase of the process because client finds out (often for the first time) what his/her skills are, how and if they can achieve their career goals. One of the methods counsellors use in order to identify client's needs and attitudes is structured interview with the help of GROW method which is extensively used in coaching.

In the later stages, guidance and counselling is provided. Available web services are often used during sessions (National Registry of Qualifications website, portals focused on educational opportunities for adults, etc.). It is considered important to show the client practically where and how they can obtain information related to their possible career development or learning pathways.

The long-term unemployed without completed upper secondary education with limited access to the labour market constitute a significant number of clients. The most effective way to support this group is convincing them to return to education process (through formal education, retraining). Clients were regularly informed about those options during the entire process, including the option to have their skills recognized and validated (none of the clients was previously aware of the possibility).

Results and evaluation

Feedback data gathered from the clients suggest that the GOAL service users view education as a means of accessing labour market that is currently closed to them. Clients are usually looking to career guidance to steer them towards the higher qualifications required to make them more competitive in the labour market, although they are not always specific about their employment ambitions. Their expectations are generally met in terms of obtaining information they have required. Most clients felt after the session motivated and that they were better prepared for the next steps. A major part of the clients stated that they were motivated to start some course after the counselling session and that they were now more aware of education options.

None of the GOAL clients had previously received any guidance service. This was their first experience. They have usually responded positively to the opportunities and information provided by counsellors and there is definitely demand for these services in future. However, at this stage of project implementation, it is hard to determine if the clients' motivation for further education activities is real or just a reaction to their current

social situation. It is not possible to precisely describe the effects of guidance sessions at this moment, but those activities have been seen, both by the counsellors and the clients, as "a missing piece".

There is a will at the regional level to maintain the cooperation at the current level after the project will conclude, which is also a good achievement of the project. The initial difficulties that included mainly cooperation with strategic partners (Labour Office regional units) and target group acquisition (this target group is usually very hard to reach and they don't have good experiences with services provided by schools or by the Labour Office) have been successfully overcome. Among the policy makers, the GOAL is taken as a significant step to the integrated system of career guidance and there is awareness about this service at the regional level.

Cooperation with regional Labour Office units is crucial in the Czech environment because they are "the" institution having access to the target group (unemployed, very often low skilled adults). The cooperation should be done within the existing networks (lifelong learning centres, etc.) and should involve other schools as well in order to get access to dropouts from the upper secondary education. Career counsellors must have an extensive knowledge about continuous education system (National Register of Qualifications). Direct contact with the client remains the most effective tool – the GOAL project enables this kind of opportunity for client. This approach has a huge impact on the psychological aspects and confidence of the counselled clients.

- **Project Key to Employment**

The project was created as a result of efforts to reduce the number of applicants with elementary education among job seekers at labour offices in the Zlín region. The aim of the project was to eliminate the most frequent barriers to entry into the labour market and to acquire working habits to increase the chances of keeping a job. The project was targeted at low-skilled graduates and supporting their further education and employment. The aim of the project was to give these people the opportunity to supplement or renew their knowledge and skills, to increase their motivation, self-confidence and to mediate an appropriate job to them.

Realization

The project activities could be divided into three main areas: the motivation part, the optional training and the modular part in which the candidates could choose from various activities (bilingual diagnosis, retraining, professional experience or subsidized employment). Other motivational and educational activities and courses were also part of the project: how to search the internet, how to work with a PC and use job offer servers, soft skills training focused on communication. Furthermore, a wide range of counselling, writing CVs, motivation letters were provided.

Results

The advantage was that the supplier was paid for the output, so he tried to fill the numbers, this way of motivation is working. Suppliers also compete for successful performance of indicators. Functioning of counselling was also positively evaluated. An individual

approach to clients and the ability to offer bilateral diagnostics that can help many clients to properly orientate and find the right job is very positive.

- **Project School of Second Chance**

The aim of the project was to create conditions for young people under the age of 25 to acquire professional skills within the so-called Second Chance School. It is a social program for young people without education regardless of gender, health handicap, nationality, skin colour, religion, linguistic diversity or other reasons that have not received vocational training and whose position on the labour market has been significantly worse compared to other young people with professional qualifications. The partial aim was to return the representatives of the target group back to formal education.

The project addressed the transfer of proven experience and tools from EU countries concerning the training of young people who had dropped out of school voluntarily or were excluded from study for various reasons, or had not started a career path after completing compulsory schooling. The specific objective of the project was the transfer of practical experience in the vocational training of young people in Sweden to the conditions of the Czech Republic, including the pilot verification of this model in the Central Bohemian Region and its possible introduction to the other regions as well.

Realization

The project was not based on the principle of education in order to obtain a certificate of education, but to master a particular profession or part of it. A graduate of the School of Second Chance went through individual counselling, and during the 5-12 months of training, he could gain practical knowledge in the chosen field and master the working habits necessary to return to the work process. This model was based on an individual approach and on conditioning of the positive characteristics of each participant. Even very passive individuals were succeeded to activate thanks to this approach. The mastering of professional skills was carried out in small groups according to the individual competencies and the trainers were experienced workers in the given field.

- **Project Working Habits**

The aim of this project was to prepare long-term unemployed people in regions (in places with higher unemployment) for new employment. This preparation could take a form of self-help workshop, handicraft production, processing of local raw materials, recycling services, or work in the non-profit sector, etc. Achieving this goal was associated with a new approach to activating key actors from selected localities. The project aimed at changing the attitudes, behaviour and thinking of local actors in the labour market.

At the heart of the change of mind was the assumption of co-responsibility and the acquisition of the ability to integrate long-term unemployed from selected localities into the local labour market. Local actors have been co-responsible for the status and development of localities where they work and live, while being motivated to create new types of jobs to strengthen the self-sufficiency of the site. The project helped to identify and actively

contribute to the creation of new types of job opportunities (eg community services, municipal enterprises, local cooperatives).

Realization

The project focused on addressing the employment / employability of long-term unemployed in connection with the current shortage of job opportunities for long-term jobseekers registered in the local Labour Offices in selected regions. The project focused on selected locations with higher unemployment. On the basis of the results of the mapping of local potential and needs, ideas for products and services that could be of interest in the site and for which the unemployed can be trained were generated. Ideally, the creation of a job for the client from the target group would follow.

The main activity was individual counselling, which was carried out following the selection of a counsellor. Counselling to this target group has proven to be a very important aspect of motivation, activation and further routing of the client in finding a new job, including the choice of the appropriate type of training resulting from local needs.

4.4.2. Probability of automation in the next 10-15 years of the low-skilled jobs in selected sector:

a. Jobs or activities subject to automation in the next 10-15 years?

Digitization and automation concerns a wide range of sectors of the economy. From manufacturing branches it concerns electronics, electrical engineering, construction and production of machinery and equipment, instrument manufacture, automotive, chemical and pharmaceutical production, metallurgy and steel, information technology and industrial automation, etc., but also other sectors such as power engineering, maintenance, telecommunication and radiocommunication, banking, financial and marketing services, business activity, advisory services, advertising activity, software development, agriculture, environment, health, nutrition and others.

The impacts of the 4th Industrial Revolution (4IR) will be differentiated in relation to the possibility of replacing individual work tasks with new technologies (computers, robots). In this respect, routine professions are threatened the most, both manual and cognitive, carried out according to a constantly repetitive procedure, which is relatively easy to algorithmize. In general, the most threatened professions are those that require a medium to low level of qualification. Although robots are moving forward, they could be hardly expected to expand in the next few years. It should be mentioned, that technological impacts on employment are often overestimated and often understood too narrowly and separately and that they do not take into account the flexibility of career changes and the multiplier effects on job creation that new technologies will bring. Labour market experts point out that technology will certainly replace or change some of the professional activities, but that does not mean that these professions will completely disappear.

In this respect, labour force should be constantly prepared for cooperation of human and machine. This area is related to the development of skills and qualifications. Instead of monitoring skills that will be handed over to machines, we should rather examine what

activities and skills must remain in the hands of a human, whether individual or collective. Then appropriate skills must be developed within education at all levels.

b. Impact on training centres and the way of training of low-skilled people

As regards the estimated impacts of technological changes on professions, it will be important to respond quickly to the trends of atrophy of low to medium-skilled activities in the given fields by creating an environment of continuous training and education. This would enable employees in these professions to keep up with technical changes, and it would allow at least some of them to move up the qualification ladder within the given field, ie to acquire new knowledge and skills in information, communication, cybernetic and automation technologies and to be able to combine them with traditional knowledge in the field.

The ability to effectively work with information is closely related to digital literacy, which will be as important as reading, writing and counting in the future. It is important to learn the ability to think in these technologies, to be able to effectively solve the problems using the technologies yet in initial education. There will be need to create enough quality opportunities for generations who have not been able to acquire the so-called informational thinking to overcome this shortcoming. All people who want to prove successful in the labour market will feel more attentive to their digital literacy and their ability to adapt to rapid ICT developments. Technological changes are particularly unreadable especially for people with no or low qualifications and they need support in their handling. Combination of specific field knowledge and relevant ICT knowledge and continuous replenishing and updating will be crucial.

New forms of further education and training will need to be developed, resulting from the fact that learning becomes more a process of interconnection of specialized nodes or sources of information. The ability to find information, find contexts and parallels between different areas, ideas and concepts will become increasingly important.

It is difficult to estimate future demands for specific knowledge and skills as technological developments are so rapid and unpredictable that new trends and technologies are likely to emerge. It is therefore necessary to focus education today on general and soft skills in conjunction with a thorough understanding of the professional background of the field and its principles that are unchanging. It will be necessary to distinguish between skills that are temporary and that are valid principles. In order to maintain the competitiveness of the economy, it will be necessary to develop entrepreneurial skills and promote the implementation of innovative ideas and practices.

c. Impact on organisations

The concept of Industry 4.0 as rather in-house processes is still prevalent in the Czech manufacturing companies. They perceive it as direct automation of production or digitization of processes, documentations and warehousing but not as technology crossing the boundaries of individual entities, and connecting to higher communications and feedback units (e.g. digitization of supply- customer relations, etc.).

In terms of incorporating Industry 4.0 Czech companies are (except for a small group of leaders) rather in a passive role; current trends are adopted from foreign owners, or they are "waiting" for what will appear in their field. Manufacturing companies are hardly anticipating far-reaching developments in Industry 4.0 over the horizon of ongoing or planned changes (about 1-2 years). Horizons for 5 years are usually very difficult to evaluate. Indications of longer-term visions exist still only within ICT companies or those dealing with, for example, automated management systems.

Czech companies in manufacturing sector don't expect a significant reduction in the number of employees due to Industry 4.0. What can be expected is increase in productivity, efficiency, quality of production and labour etc., and in some companies it can lead to some labour savings, but these are not the primary objective. Business representatives usually are not able to provide more accurate estimates of labour savings as a result of further implementation of Industry 4.0 at the current stage.

The return on investment in automation depends largely on the type of business activity, the nature of the product and the complexity of production. Manual workers have at current work prices more value particularly for smaller companies than automatic system deployment. It concerns both simple operations (e.g. smaller warehouse) and complex (e.g. demanding installation of a large and complex product made to order). Generally speaking, automation and digitization are better paid off in large scale operations with the production of simpler products (band production) than in small-scale production and small customized production operations with high product differentiation, where high flexibility is needed.

SECTION 5. SOME CONCLUSIONS ABOUT THE IDENTIFIED OPPORTUNITIES

- Manufacturing offers a lot of employment opportunities as it is a sector with the largest share of employed people in the whole economy in the Czech Republic. In the future, workers in manufacturing will be needed, despite the risk of automation of large scale of manual job tasks, due to an aging population when 430 thousands vacancies is predicted to be replaced by 2025 in this sector. Above that there exist great labour shortages of technical profession for companies in the manufacturing industry.
- Employment in this sector is rising since 2000 and it offers stability and usually an adequate paid job positions. Men represent more than two-thirds (65%) of all employees in Manufacturing.
- Computers or robots substitute only a fraction of the total amount of work required to perform the professions in Manufacturing, and it can be assumed that most occupations do not completely disappear, but the job content will change. To tackle this situation, flexible system of vocational education and training able to offer individualized training programs will be needed.
- There are quite lot of different tools of educational programs and training in Manufacturing sector in the Czech Republic. It appears that these common tools for the development and education of job seekers prove to be difficult to apply for low-skilled people. They don't take part in retraining, seminars, educational courses, internships or training with an employer. The experience from abroad as well as from successful project in the Czech Republic shows that the introduction of an individual approach and complex work with low-skilled clients can lead to the improvement of situation.
- Successful work with this target group is evident especially in smaller projects that can afford to draw resources for expert counselling and other forms of individual support that is essential for working with low-skilled. Successful return of the low-skilled to the labour market is a very demanding process that must be preceded by long-lasting systematic work with them including constantly strengthening and seeking motivation, pushing for gradual acquisition of work habits. So, various mental and social problems that low-skilled people (often long term unemployed) face need to be resolved first if we want to help them to activation. Further education and training of low-skilled must be designed the way to take into account the reduced ability to acquire new knowledge, work with less adaptability and flexibility and offer longer time for understanding.
- A significant barrier to higher participation of our target group in training is a narrow offer of training courses, because a large part of them do not have a priori access because of their low education. This can be removed by a consistent application of the system of gradually acquiring "partial" professional qualifications that can lead to full professional qualification within National Register of Qualification. This tool and its potential should be widely disseminated into the awareness of both ordinary people and employers.
- In terms of transversal skills required by employers from Manufacturing sector, reading and understanding work instructions, willingness to learn, interest in craft, good working habits and personality characteristics such as responsibility and reliability are highlighted as key elements for job performance of low-skilled population.

- As regards the ongoing technological changes manifested itself in automation, the primary need for a change of mind especially for middle and low qualified workers in manufacturing exist already today, where information and communication technologies are still perceived as a superstructure, "complement" to work, not as a basic infrastructure for company's activity.
- It is important to learn the ability to think in these technologies, to be able to effectively solve the problems using the technologies yet in initial education. There will be need to create enough quality opportunities for generations who have not been able to acquire the so-called informational thinking to overcome this shortcoming. All people who want to prove successful in the labour market will feel more attentive to their digital literacy and their ability to adapt to rapid ICT developments.
- Czech companies in manufacturing sector don't expect a significant reduction in the number of employees due to Industry 4.0 and automation. What can be expected is increase in productivity, efficiency, quality of production and labour etc., and in some companies it can lead to some labour savings, but these are not the primary objective. Business representatives usually are not able to provide more accurate estimates of labour savings as a result of further implementation of Industry 4.0 at the current stage.

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