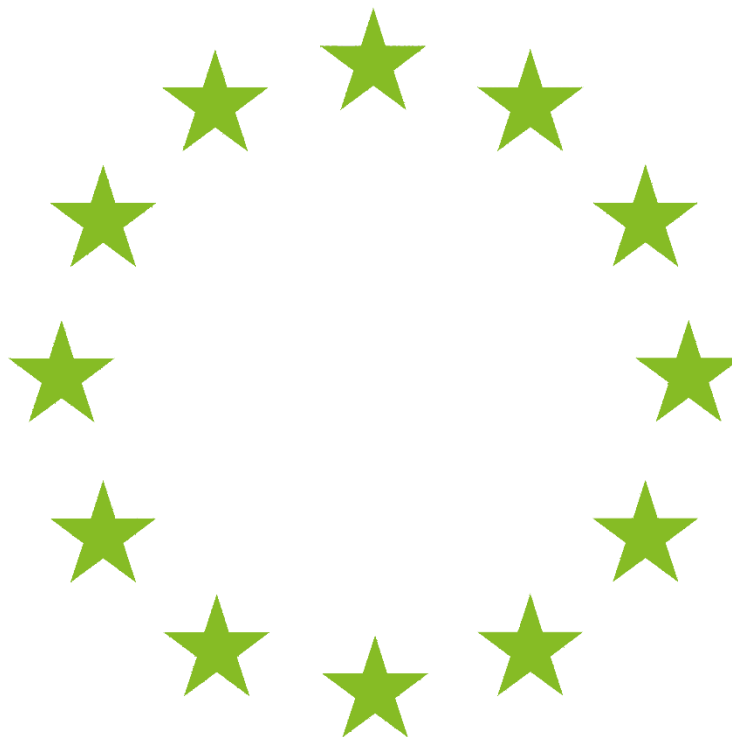


Study on a Pilot project: Making the EU transport sector attractive to future generations

MOVE-A1/5/2016-LOT3



Final Report – Annex B.3: Job vacancies, skills mismatches, recruitment difficulties inventory

22 June 2017

A study prepared for the European Commission DG Mobility and Transport

Annex B.3 – Final inventory of activities concerning expected job vacancies, skills mismatches, recruitment difficulties

The nature of the transport labour market

In 2012, the transport sector¹ accounted for some 4% of total EU28 GDP, as well as 5% of total employment in the EU, accounting for about 10.5 million jobs². The sector is relatively capital intensive overall, as reflected in the level of labour productivity, although that varies across subsectors. For example, the share of labour in value-added ranges from a low of 30% in water transport to a high of 95% in civil aviation, against an average of around 66% across the EU economy as a whole. In general, labour costs per employee are higher in the transport sector than in the total economy.

The economic and financial crisis and its aftermath has led, among other things, to the postponement or halting of investments in transport, infrastructure and business in general, which has, in turn, affected the EU transport labour market. However, expectations of a progressive recovery in the EU economy is expected to have a positive effect on future demand for labour in the sector.

In addressing the characteristics of the EU transport labour market, it is important to note two particular factors:

- Firstly, that the connections between the labour markets of the various modes of transport are relatively limited;
- Secondly, that the companies in these various sub-sectors are, nevertheless, competing with companies in other sectors of the economy for many of their labour requirements.

As a consequence, enterprises in the various modes and subsectors are involved in many different labour markets, many of which have to conform to specific legal requirements – whether these are defined at global, EU, or national level – as well as being subject to more general EU labour market and social legislation.

Hence, while some labour requirements may be very specific, others may be much broader. The fact that the transport sector as a whole is competing against companies and other organisations in much of the rest of the economy is particularly relevant in terms of attracting younger age groups including school-leavers with limited formal skills.

¹ Including postal and courier services.

² EU Transport in figures – Statistical pocketbook 2015, European Union, 2015.

Even within the (sub)modes, therefore, there can be major differences between business activities, with plenty of examples in national and cross-border trucking, coastal and international maritime transport, low fare carriers and legacy carriers, traditional taxi companies and Uber.

This means that, in practice:

- Different modes may compete with each other on the labour market, especially when it comes to attracting young people and those with low to medium skills.
- Some (sub)modes may nevertheless be over-subscribed – an example being for air traffic control work in the Netherlands where 1000 applicants are expected for only 40 places in the period 2017/8.
- Different (sub)modes may want to attract different types of employees (depending on job characteristics, educational level, flexibility).
- There can be a many different reasons why some particular modes or jobs are seen as unattractive, and these have to be recognised in order to be able to develop effective strategies at sectoral level. For instance, the ‘dirty work’ image of some ports jobs, and the financial risks involved in becoming an airline pilot, represent very different problems.
- As a result of the above, and other factors, there is often very limited mobility between different jobs and/or (sub)modes, which can have a negative impact on career perspectives.

It is also important to recognise that transport occupations exist in non-transport sectors of industry as well as in the transport sector as such. Two important examples are truck drivers and logistic professionals. As a further example, only 5% of crane, hoist and related plant operators (ISCO 5111) actually work with employers categorised as being the transport sector.

Moreover, according to recent Cedefop material³, the 10 most common occupations in the transport sector (expressed in terms of the % of jobs in the sector) are:

- Drivers and mobile plant operators (41%)
- Numerical and material recording clerks (8%)
- Other clerical support workers (8%)
- Labourers in mining, construction, manufacturing and transport (6%)
- Business and administration associate professionals (5%)
- Science and engineering associate professionals (<5%)
- Customer services clerks (<5%)
- Production and specialised services managers (<5%)
- Personal service workers (<5%)
- General and keyboard clerks (<5%).

³ Cedefop Forecast (2016), <http://skillspanorama.cedefop.europa.eu/en/content/cedefop-skills-forecast>

In other words, it is clear that most of these occupations are not only relevant for transport companies. This is further illustrated by the results of the online questionnaire addressed to social partners, trade unions and major employers as listed under section 2.7: there the respondents indicate many of the sectors that are important competitors for young people recruitment, with the ICT sector mentioned just as often as 'other transport modes'.

As a consequence, it is important to recognise that:

For the general public, including the target groups of potential employees to be addressed in this project, there may not be any clear distinction between the transport sector and transport jobs and professions.

Competitors from outside the sector need to be taken into account when designing actions, especially if they could possibly be included in the actions – an example being truck drivers, where the image of the sector may affect the possibility of attracting drivers in the future.

While modal labour markets may be separate, in some cases they may nevertheless have similar experiences. For example, issues such as ageing and low female participation, the needs of high mobility workers, fatigue and stress, the reconciliation of private and professional life, skills upgrading, global competition, law compliance and enforcement, may all represent challenges that may need to be addressed in terms of best practice solutions and applied across a wide range of transport activities.

As a general indication of the challenge to be addressed, it can be seen that the share of young workers (15-24 years of age) is lower in transport than the EU overall average in all of its sub-sectors, except for warehousing and support activities, where it is more or less on a par.

Typology of shortages on the labour market⁴

Many sectors and countries face labour shortages that can be characterised as a mismatch between supply and demand. Such labour market shortages can be of a quantitative, or a qualitative, nature. They can also be the result of a lack of transparency in the way the labour market is organised. Analysing demand and supply against one another can help identify the reasons behind the shortages.

Quantitative labour shortages occur when there are not enough sufficiently qualified school leavers or job seekers in a sector as a whole. Equally, when there are not enough vacancies to make use of the supply of labour, a labour surplus can arise. Importantly, these aspects can influence one another. Thus in a labour market characterised by labour shortages, wages will often rise which, in turn, may lead to an increase in the labour supply to the sector in the form of new school leavers. In the case of transport, it may be the case that, in the long term, a shortage of employees may lead to improved working conditions, including salary

⁴ Based on Panteia and PWC, 'Analysis of the trends and prospects of jobs and working conditions in transport (2015)', Annex 1

levels, although other adjustment processes are also possible. It may also lead to a higher presence of non-EU workers.

Qualitative labour shortages occur, on the other hand, when there is both a sufficient supply of labour and a sufficient number of vacancies, but where the demands and wishes of employees and employers regarding level of qualification, content and organisation of the work diverge. It may be the case that there are simply not enough people who are qualified to do specific work. This may become the case for High Speed Train drivers, for example, but it may also be the case that school leavers simply prefer to work in other sectors of industry. Many transport occupations require employees to work flexible hours and to be available on a 24hour basis, while potential employees may attach more importance to a better balance between work and private life.

Thirdly, there is also the problem of **information asymmetries** related to a lack of transparency within the labour market. In such cases, employers and job seekers are unable to find each other due to poor job search and recruitment strategies on both sides. This problem may also be accentuated by flawed images of the sector or of job seekers (or groups thereof) which prevent a better matching of supply and demand. This problem may be worse at EU level than it is at national level in so far as employers fail to, or unable to, approach job seekers from other countries, immigrant groups, or workers from other sectors. In this respect, different legal requirements can also play a role, in addition to the operational difficulties in ensuring effecting matching.

Factors influencing (mismatch on) the labour market⁵

The flows as well as the shortages on the current and future EU transport labour market are also influenced by external factors within the macro environment, which may pose challenges, but also create solutions, for labour market management within the transport sector.

A useful tool for identifying these factors is the PESTLE-analysis which is originally a business-study model describing a framework of relevant factors on macro-context level which considers six specific dimensions, namely the political, economic, social, technological, legal and environmental. While it is mainly used for analysing the strengths and weaknesses of businesses and for helping organisations to develop strategies, it can also be used for a contextual analysis of (sectoral) labour markets – in this case the transport sector in Europe (EU-28).

The dimensions of the PESTLE-model could comprise the following issues:

- **Political:** Global, EU, national, regional, local and community trends, changes, events etc. Changes in national transport policy, EU initiatives, distribution of influence between social partners and government, public private partnerships, financing issues connected to the sector, immigration policies regarding labour migrants, etc.;

⁵ Based on Panteia and PWC, Analysis of the trends and prospects of jobs and working conditions in transport, Annex 1, 2015.

- **Economic:** Global, EU, national and local trends, changes, events etc. Increasing international competition, emerging economies, economic crisis and its impact on national finances, restructuring as a result of economic development, shifts in relative costs of various modes, etc.;
- **Social:** Development in society – culture, behaviour, expectations, composition etc. Demographic change and ageing of society, impacting both work force and client population, migration flows within EU and from third countries, social tensions, etc.;
- **Technological:** Developments: computer hardware, software, applications, other equipment, materials, products and processes, etc. New technologies, leading to new demands on skills, but also task or even business reallocation, etc.
- **Legal:** Global, EU, National legislation changes, prospects etc. Deregulation of economy and labour market entry, internal market rules, labour law, changes in occupational health and safety legislation, changes in environmental protection legislation;
- **Environmental:** Global, EU, national, local issues; pressures, movements, etc. Increasing emphasis on sustainability throughout the economy, environmental legislation leading to stricter regulation in the handling of specific materials, increasing emphasis on local small-scale solutions in the context of energy efficiency.

Collecting reliable data on labour shortages

The collection of reliable data on labour and skills shortages can be challenging, but the results from the available sources are presented below. The following sources have been included in the analysis:

- Input from national experts from several Member States concerning the availability of data at country level (sometimes sectoral/modal).
- A dataset based on Cedefop's Forecast 2016⁶
- Responses to the online questionnaire addressed to social partners and employers (a one-off survey containing questions concerning their expectations regarding labour shortages now (2017), and in 2022, and in 2027;
- Expert interviews currently being under taken;
- Existing research: Panteia and PWC, Analysis of the trends and prospects of jobs and working conditions in transport, Annex 1, 2015;
- Other relevant labour market literature.

These somewhat diverse sources of information suggest the following.

Measurement and comparability

A primary difficulty with measuring labour shortages is the absence of a universally accepted method, or form, of measurement. Two approaches are most commonly used⁷.

• ⁶ <http://skillspanorama.cedefop.europa.eu/en/content/cedefop-skills-forecast>);

A first approach involves the use of **indicators of imbalance**, relating indicators of labour demand and supply, such as the number of open vacancies and unemployment figures. Based on trends, data on labour supply (the number of jobs) can be forecasted. Obviously, this requires substantial assumptions. Useful data on labour demand (the number of persons wanting a specific job) is more limited. However, apart from forecasting problems, the main issue is that a match between supply and demand has, in practice, a number of dimensions, which can include location, attractiveness, competences (contents, level, the degree to which competences are up-to-date) and so on. At EU and Member State levels, a range of existing indicators are being used to address the problem but they are not always fully relevant.

A second approach to the measurement of labour market shortages is to look at **employer perceptions of labour shortages**, through employer surveys. This provides a good indicator of current problems on the labour market, taking into account all the reasons for mismatches discussed above. For future problems, however, this instrument is less useful as those reporting do not necessarily have an appropriate overview of broader economic developments (at meso and macro level). Moreover, the questions generally lack a detailed sectoral or occupational background, limiting their relevance for the current study.

In this study, we focus on the first approach (Cedefop and Panteia/PwC material) and use the second approach (surveys and interviews) in order to derive more detailed conclusions in terms of modes and occupations.

Comparable data at EU level

The European Labour Force Survey can be used as a source for data on overall labour supply but information on the demand side is more limited, although some initiatives (such as the European Vacancy Monitor and the European Vacancy and Recruitment Report) are intended to bring improvements. Recently Cedefop has been working on skills anticipation and shortage/mismatch indicators, as presented in the following section.

Data at Member State level

Coverage of issues varies across Member States. Despite the general caveats above regarding current lack of data availability, there are some prospects of improvement in several countries. Indicative conclusions based on the input from Austria, Cyprus, Czech Republic, Germany, Spain, Latvia, Portugal, The Netherlands, Slovakia and Sweden suggest a rather polarised situation:

In Northern and Western European countries, relevant data is usually available while in Southern and Eastern European countries, this is not usually the case.

⁷ Based on Directorate-General for Internal Policies, Policy Department A: Economic And Scientific Policy (2015). Labour market shortages in the European Union. Study for the EMPL Committee. Available at: [http://www.europarl.europa.eu/RegData/etudes/STUD/2015/542202/IPOL_STU\(2015\)542202_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/STUD/2015/542202/IPOL_STU(2015)542202_EN.pdf).

Where data is available, however, it is either very specific, relating to specific modes, or too aggregated to be really useful, even if it is at a less aggregated level than Cedefop material (see below).

Overall conclusions

Overall, it is clear that it is difficult to envisage compiling data on labour market shortages, especially at the more detailed level of skill, sector, occupation that is required in order to focus communication and promotion activities.

Initial findings on current and future shortages

Population ageing is a challenge for virtually all European labour markets which, according to forecasts by Cedefop⁸, will result in ‘replacement demand’ to fill job vacancies left by the retirement of the ‘baby boomer’ generation.

In this context, and with fertility rates low in most European countries, it is said that skills shortages are likely to emerge unless education and training systems can provide the necessary skills in demand. In this respect, vocational education and training (VET), which is most relevant for the transport sector, is better placed than general education to provide the skills needed in the labour market, provided it can succeed in attracting the teachers and trainers it needs.

Much depends, at present, on the performance of national systems which, in turn, depend on the active involvement of employers, as is the case, for example, in Austria, Germany, and Denmark – all countries that tend to perform better in terms of supplying the skills needed by the economy⁹. Success depends, particularly, on ensuring that the funding of VET systems is organised in such a way that it ensures that all employers contribute to, as well as benefit from, such training in order to avoid ‘free-loading’ by employers who fail to train and simply ‘poach’ trained staff from other employers.

Cedefop data and analysis

As explained in the note ‘Imbalance indicators’¹⁰, the Cedefop forecasting model distinguishes between indicators that are based on the distribution of so-called ‘constraint demand’, and those that can be calculated independently of its distribution. The first sets of indicators, the indicator of constraint and the measure of change, summarise information on the level of constraint and level of change that a specific occupation is forecasted to undergo, as described below.

The **Measure of Change (MC)** indicates the adjustment that needs to take place from the base year to the end of the forecasting period (2025) in order to achieve the projected

⁸ Cedefop (2015), Replacement demand: driving millions of job openings across the EU: http://skillspanorama.cedefop.europa.eu/en/analytical_highlights/replacement-demand-driving-millions-job-openings-across-eu.

⁹ Buechtemann, C. F., Schupp, J., & Soloff, D. (1993). Roads to work: school-to-work transition patterns in Germany and the United States. *Industrial relations journal*, 24(2), 97-111.

¹⁰ Kriechele, B. (Ecnomix Research & Consulting), Imbalance indicators.

outcome. Adjustments are changes in the skill (qualification) mix of an occupation that are projected to take place. Large values of the indicator of adjustment indicate high levels of change and a higher level of required adjustment relative to the current (base year) state of the labour market.

The **Indicator of constraint (IC)** concentrates more on a core of imbalances, the constraints that are necessary to impose, while bringing supply and demand together. Again, we concentrate here on the final forecasting year 2025. The imbalance we are investigating is based on comparing what is called unconstraint demand with constraint demand. Unconstraint demand is the qualification mix demanded by the model. This demand is developed irrespective of the availability of the qualification mix of supply. In other words, imbalances can occur when too many highly qualified people are demanded, while the supply consists of fewer highly qualified people.

The indicator shows the level of change that is necessary relative to the forecasted path that the occupation is taking (over the projected years) in order for imbalances to be resolved. Higher levels indicate higher levels of constraint, and more adjustment to the current path of employment.

The **Indicator of Future Imbalances of Demand (IFIOD)** is calculated for each (two-digit level) occupation and denotes the difficulties an organisation is likely to confront in hiring a worker for a specific occupation. In effect it summarises the overall supply-demand relationship of qualification levels weighted by the likelihood that an occupation is filled with these qualification levels. The weighting is based on observed (base year) shares of the occupation-qualification matrix while the number of people working with a specific background (qualification) in an occupation determines these weights.

The implicit assumption is that all shortages in qualification types will be felt in the same way by all occupations, but weighted to the importance of that qualification type for the respective occupation.

The following table provides an overview of the main findings by occupation.

Table 1 – Imbalance indicators 2015-2025 by occupation, generalised overview

Occupation	MC (low change, some change, high change, very high change)	IC (no constraint, some constraint, constraint, high constraint)	IFIOD (low imbalances, some shortages, significant shortages, high shortages)
Drivers and mobile plant operators (41%)	No general conclusion possible	Constraints	High or Significant shortages
Numerical and material recording clerks (8%)	High or very high changes	Constraints or high constraints	Shortages, significant in some countries
Other clerical support workers (8%)	Very high changes in a large majority of countries	Constraints, the degree varies	Shortages, significant in many countries
Labourers in mining, construction, manufacturing and transport (6%)	No general conclusion possible	Constraints, the degree varies	High shortages in most countries
Business and administration associate professionals (5%)	No general conclusion possible	High constraints in most countries, some constraints elsewhere	Some shortages in most countries
Science and engineering associate professionals (<5%)	No general conclusion possible	Constraints, the degree varies	Some shortages dominates, significant shortages in some countries
Customer services clerks (<5%)	No general conclusion possible	Constraints or high constraints	Some shortages dominates, significant shortages in some countries
Production and specialised services managers (<5%)	Some change	Some constraints or constraints	Low imbalance or some shortages
Personal service workers (<5%)	Low, some and high changes	Constraints, the degree varies	Shortages, significant or high in many countries
General and keyboard clerks (<5%).	High and very high changes	Constraints, the degree varies	Mainly some shortages

Source: Panteia based on Cedefop

Other sources

The findings from the literature review and from the expert interviews suggest that there are two approaches to follow in developing insights into current and future labour shortages:

Current and future shortages related to ‘current jobs’ where the following trends seem to hold across the EU transport labour market as a whole:

- **Current labour shortages/surpluses:** Many transport branches already report serious structural labour shortages, in particular for mobile jobs. As a result of the economic crisis, the scale of these shortages were temporarily mitigated, but they are slowly becoming apparent again;
- **Prognoses for labour shortages/surpluses 2022 and 2027:** In view of the ageing population in Europe and competition among transport branches and between companies to attract (young) workers, labour shortages will cause serious problems for the transport sector in the future. While levels of employment in transport-related occupations are expected to remain constant over the next decade, labour supply is expected to fall;

Potential future shortages due to innovation and the consequent development of new jobs and transport jobs generally, particularly in some specific transport sectors. The overall expectation is that this impact will be substantial and may not be too far away, but, for the moment, no one appears to have any substantial insight into how or when this will occur.

Because of the impact of the recent EU-wide economic difficulties, labour and skill shortages are not particularly visible, except with regard to long haul heavy truck drivers. Nevertheless, a combination of both staff shortages and redundancies is expected to become a reality in the future, even within the same firms, as the EU economy recovers and further technological advances affect job requirements.

Overall, transport activity is expected to grow in the future, even under rather weak economic scenarios, although it is not expected to be uniform across modes and market segments, creating local/temporal imbalances. In addition, growing demand may increase pressure on a workforce that is older than the average in the economy as a whole, and where the gender imbalance is particularly large.

While predictions are always uncertain, the growth in available jobs is currently expected to be mainly in high and medium skills. Moreover, while the demand for low skills is expected to fall, the actual content of those low and medium skill jobs is likely to increase. This predicted future skills mismatch is confirmed by the results of the stakeholder consultation held in the context of a previous Panteia study¹¹, some highlights of which are summarised below:

¹¹ EC and JRC 2015 Analysis of trends and prospects on jobs and working conditions in transport (Panteia and PwC).

Almost half of enterprises (44%) are currently experiencing labour or skill shortages, and two out of three enterprises active in freight and passenger transport work are experiencing shortages. In aviation, labour shortages are the highest of all with more than half of the enterprises indicating skill or labour shortages. Some regional enterprises are also currently experiencing even greater shortages than national or international enterprises;

Labour or skill shortages are estimated to be equivalent to 13% of the 2014 workforce on average in those enterprises affected. Some enterprises experiencing labour shortage specifically mention a lack of drivers, such as train drivers;

Enterprises expecting a labour or skill shortage in 2015-2020 estimate that shortage to be 23% of their current workforce on average. A lack of education capacity (outside enterprise) is one of the main reasons according to these enterprises. However, for this perception no proof was found. Shortages of skilled workers are foreseen in several transport professions over the coming years despite there being no evidence of a shortage of training capacity, with the very specific exception of training berths for officers in the maritime sector. The obvious and important implication is that simply increasing training and education capacity is not the answer to the types of labour shortages being experienced or expected. The perception of employers may concern specific competences, for example very specific flight certificates or qualifications concerning dangerous goods in road and rail transports.

Approximately 1 in 5 enterprises in transport were (in 2014) experiencing redundancies in labour or skills, with further expectations in the near future. Enterprises in passenger transport (50%) and in the maritime sector (43%) were particularly experiencing and expecting labour or skill redundancies;

Enterprises experiencing labour or skill redundancies estimated that these accounted for 7% of their current workforce, on average, while those expecting a labour or skill redundancy in 2015-2020 estimated that this would affect 10% of their current workforce. A decline of business activities was one of the main reasons generally given.

In particular, enterprises involved in transport activities could well experience shortages in technical jobs as they compete with other sectors for such technical talent. Such shortages are liable to emerge mainly in high skill jobs where jobs in transport are not currently competitive with other sectors, while redundancies are expected in lower skill jobs where the technological change impact is expected to be greatest. The same is true for other occupations that are 'shared' with other sectors.

These earlier research findings are confirmed by the response to a comparable question asked in the online questionnaire addressed to social partners, trade unions and major employers in this project (see section 2.7). Specifically, respondents were asked to identify the professions most likely to suffer from skills shortages in their sector at present, in 5 years, and in 10 years. The results are presented in the table below. The figure between brackets is the number of times a specific answer was given. The total number of respondents was 141.

Table 2 – Current and expected labour shortages in respondents' transport sector

Now	In 5 years	In 10 years
Truck drivers (3), drivers (15), train drivers (8), bus drivers (4)	Truck drivers (3), drivers (10), train drivers (10)	Drivers (10), truck drivers (3), bus drivers (2), train drivers (2)
Engineers (20), including aircraft engineers (2)	Engineers (21), including aircraft engineers (2)	Engineers (16), including aircraft engineers (2)
Pilots (11)	Pilots (9)	Pilots (8)
IT experts (11)	IT experts (6)	IT experts (9)
Mechanics (9), including aircraft mechanics (3), technicians (8), maintenance staff (1), support staff (1)	Mechanics (5), including aircraft mechanics (2), technicians (11), maintenance staff (1), logistics operators (2), support staff (1)	Mechanics (5), technicians (3), maintenance staff (1), logistics operators (1), support staff (1)
Managers (6), executives (1), administration (1), apprentices (1)	Managers (3), executives (2), administration (2), apprentices (2)	Managers (3), executives (2), administration (1), apprentices (1)
Cabin crew (3), train attendants (1)	Cabin crew (3), customer service (1), train attendants (1)	Cabin crew (2), customer managers (1), train attendants (1)
Marketing (2), sales representatives (2)	Marketing (1), business developers (2)	Marketing (1), sales representatives (2), demand analyst (1)
Call center staff (1), network planning (2)	Warehouse operatives (1)	Cleaning staff (1)
Boat crew (1)	Boat crew (1)	Boat crew (1)
Dispatchers (1)	Dispatchers (1)	
	Air traffic controllers (1)	Air traffic controllers (1)
Road transport operators (1), train operation workers (1)	Road transport operators (1)	

Only two respondents indicated that they did not expect labour shortages in specific professions within their sector.

A specific response that merits further investigation is the fact that, for almost all occupations, fewer respondents expected shortages in 10 years from now, than they do today. In the light of the demographic data, this seems to be an unexpected result, and suggests a lack of awareness of more general economic and labour market developments into the future.

Table 3 – Shortages/redundancies in multiple transport modes

Profession	Shortages/ redundancies			Reasons
	2017	2022	2027	
Structural labour shortages	No	Yes	Yes	<ul style="list-style-type: none"> Due to the economic crisis, shortages were temporarily mitigated. Ageing population in Europe and competition among sectors and companies to attract (young and female) workers.
Shortages technical jobs and IT specialists	Yes	Yes	Yes	<ul style="list-style-type: none"> Competition with (technical) talent from other sectors. This is especially the case at mid and high level jobs. Technical changes/more automation?
Shortages high skill jobs	?	Yes	Yes	<ul style="list-style-type: none"> Jobs are not competitive with jobs requiring a similar skill level in other sectors.
Redundancies lower skill jobs	No	?	Yes	<ul style="list-style-type: none"> Impact of technological change is higher Labour pool is wider

In addition, long haul (overnight) mobile jobs are a generally problematic group in which already shortages exist. These are however discussed per mode.

Table 4 – Shortages/redundancies in logistics/intermodal

Profession	Shortages/ redundancies			Reasons
	2017	2022	2027	
Shortages managers of change	No	?	Yes	<ul style="list-style-type: none"> Requirements related to innovations (automation, green jobs, etc.) Part of a general problem

Table 5 – Shortages/redundancies in civil aviation

Profession	Shortages/ redundancies			Reasons
	2017	2022	2027	
Reduncancies pilots (general certificates)	No	No	?	<ul style="list-style-type: none"> Shortages are only expected in economic growth scenarios. However, as it is likely that as of 2015 more pilots and cabin crew members would be needed in for airlines to comply with revised FTL rules, labour shortages may arise for some pilot types.
Shortage pilots (very	Yes	Yes	Yes	<ul style="list-style-type: none"> Currently, shortages exist for specialised types of flight certificates.

Profession	Shortages/ redundancies			Reasons
	2017	2022	2027	
specific certificates)				<ul style="list-style-type: none"> Companies are unwilling to invest in training.
Shortage air safety technicians / engineers	Yes	Yes	Yes	<ul style="list-style-type: none"> General problem with insufficient number of highly qualified technicians.
Possible shortages cabin crew	No	No	?	<ul style="list-style-type: none"> Professions seem less attractive because of decreasing level working conditions. Expected rise of competition between Asian and European crews.
Expected redundancies and current shortages air traffic control	Current shortage	?	Expected redundancies	<ul style="list-style-type: none"> Because of the functional airspace blocks in the Single European Sky, in five to ten years there may occur job losses in the ATM sector. As a result, currently replacement is at a low level.

Table 6 – Shortages/redundancies in road

Profession	Shortages/ redundancies			Reasons
	2017	2022	2027	
Progressive shortages heavy truck drivers	Yes	Yes	Yes	<ul style="list-style-type: none"> Currently, in UK, DE and NL, shortages are particularly important. Technological advances, globalisation, increased complexity of regulations and additional tasks have brought the required competences to a higher level. Low attractiveness of working in the sector, especially in long haul. Lack of enforcement social legislation and differences in position Member States. There is a migration of (the best) Eastern drivers to the West. Considering the still relatively low-skilled nature of road transport sector jobs, the potential labour reserves are large. Many drivers are employed by employers outside the road sector, or even transport. Many leave the sector (esp long haul) after 5

Profession	Shortages/ redundancies			Reasons
	2017	2022	2027	
				years being 'king of the road'

Table 7 – Shortages/redundancies in urban public transport

Profession	Shortages/ redundancies			Reasons
	2017	2022	2027	
Shortages bus and tram drivers.	Yes	?	?	<ul style="list-style-type: none"> Increased importance of social competences / customer orientation Required competences are changing – not only due to innovations There are substantial regional differences, mainly linked to the image of (working in) the sector. Social acceptance – proud customers – proud employees. Driverless vehicles is a very realistic scenario in this sector.
Shortages managers of change	No	?	Yes	<ul style="list-style-type: none"> Requirements related to innovations (automation, green jobs, etc.) Part of a general problem

Table 8 – Shortages/redundancies in maritime transport

Profession	Shortages/ redundancies			Reasons
	2017	2022	2027	
Current shortages European officers, expected (global) increase				<ul style="list-style-type: none"> Recruitment of cadets into junior officer positions; too few possibilities for practical training of new entrants (training berths). Insufficient investment in employability of seafarers; lack of continuous career and professional development of seafarers. Very low share of women in workforce. Reduced time on-shore due to innovative ports logistics. Global figures on expected shortages are available.

Table 9 – Shortages/redundancies in ports (coast and inland)

Profession	Shortages/ redundancies			Reasons
	2017	2022	2027	

Profession	Shortages/ redundancies			Reasons
	2017	2022	2027	
-				<ul style="list-style-type: none"> • No specific shortage/redundancy was identified • The slowly decreasing number of employees due to demographics helps to adapt to the consequences of automation • The image of working in the sector is improving (perception slowly follows actual labour conditions) • Ports invest substantially in education and training (mainly ICT) and in working conditions • For both, a strong argument being that mistakes are extremely costly

Table 10 – Shortages/redundancies in rail

Profession	Shortages/ redundancies			Reasons
	2017	2022	2027	
Shortages locomotive and train drivers	No	?	Yes	<ul style="list-style-type: none"> • Ageing workforce. • Changing requirements. Skill shortages could be critical, for example, in the deployment of ERTMS which should provide the central system of the Single European Railway Area. • Possibly an Insufficient number of training places in public training centres: training costs (with employers perceiving the training they provide will benefit to other employers) • Unattractiveness of work in railway transport. • Required flexibility (working hours, different shifts). • Very low share of women in the workforce. • Cross-border mobility is still difficult due to different assessments related to certificates • Unmanned driving is so far not implemented anywhere but people may still anticipate to it and it is possible it influences the choice of profession
Shortages railway brake	No	?	Yes	
Shortages Signal and switch operators	No	?	Yes	
Shortages (transport) conductors	No	?	Yes	
Shortages higher educated staff (engineers)	Yes	Yes	Yes	

Table 11 – Shortages/redundancies in inland water transport

Profession	Shortages/ redundancies			Reasons
	2017	2022	2027	
Expected shortages, current shortages only in the Rhine region (higher) qualified personnel (captains, steersmen)	Yes	Yes	Yes	<ul style="list-style-type: none"> • High barriers to change jobs in IWT, lack of continuous recruitment strategies, lack of predictable leisure times, unknown career opportunities in combination with a low profile and the general image of the inland waterway sector. • Attractiveness of profession is decreasing over time (problem with career opportunities, low budget for training, time away from home). • Mobility hampered by recognition of competences/certificates/qualifications issues

Data at Member State level

As demonstrated in this chapter, there is a general lack of available and comparable data, which makes it difficult to reach generic conclusions. Some national experts have however identified useful data on the Member State level. This data is presented here and is merely meant as an illustration for the trends identified above.

Sweden: shortages in the transport sector

Road and rail – The Swedish [Public Employment Services \(PES\) report](#) that there is currently very little or no competition on the labour market within many ‘manual’ road transport occupations. Vehicle mechanics and technicians are among the principal shortage occupations. [A 2017 study by the Training Board of the Swedish Motor Trade \(MYN\) indicates](#) that the greatest need will be for technicians (trained mechanics with a minimum of three years of work experience, over 2,000 new employees needed) and mechanics (newly graduated, nearly 1,400 employees needed).

Lorry drivers, bus drivers and tram drivers are also in high demand. This generally also applies to taxi drivers and train drivers, except in some specific parts of the country. Around [80% of employers in the sector currently report difficulties in finding qualified drivers](#)

The statistical authority [Statistics Sweden \(SCB\) estimates](#), based on employer survey studies, that the labour market imbalances regarding mechanics/technicians will further increase in the decades to come. Highly educated vehicle engineers, currently facing some competition on the labour market, will be in short supply by the 2030s.

Air transport – [Research by the Vocational Training and Working Environment Council of Transport Trades \(TYA\)](#) shows that in the air transport sector, 60% of the employers report having experienced difficulties in recruiting qualified aircraft technicians. Another 76%

believe they will be recruiting new technicians in the next three years. Little reliable data has been found on other occupations in the air transport sector.

Water transport – No fresh and reliable data was discovered regarding labour shortages in the water transport sector, and [the available data](#) are somewhat ambiguous. The sector is pressed hard by international competition and there have been many dismissals within the sector in recent years, yet the number of unemployed seafarers has not significantly increased.

Poland: professional drivers' labour market in Poland

Professional drivers' labour market in Poland is characterised by quantitative labour shortages¹². It is estimated that the shortages in employment of professional drivers reach 20%. Similar estimates result from a survey of employers of the transport sector. In absolute numbers, this result implies a shortage of approx. 100 000 professional drivers¹³.

The aggregated data also indicate that approx. 25 000 drivers leave this profession every year, and the number of individuals who obtain a preliminary qualification within the same period reaches approx. 35 000. This difference prevents supplementing the existing shortages, even if it is assumed that the dynamics of this sector's growth will slow down in the period 2016-2025 reaching the level of approx. 2.5%-3% p.a. Taking into account the current number of drivers who decide to leave this profession, the number of individuals who obtain the preliminary qualification should reach approx. 60 000.

The most important factors influencing (mismatch on) the labour market are of:

- **Economic nature:**
 - An increased demand for transport services, resulting from intensification of international trade
 - The cost, time-consuming nature and complexity of obtaining necessary qualifications. The estimated cost of courses and exams required to commence work in this profession is likely to range from 9800 to 12300 PLN, which is an equivalent of

¹² PWC & TLP (2016), 'Rynek pracy kierowców w Polsce, <https://www.pwc.pl/pl/pdf/pwc-raport-rynek-pracy-kierowcow.pdf>

¹³ An estimate performed based on the information on the number of persons that undergo periodical trainings and obtain qualifications on the annual basis; currently this number is estimated to reach the level of approx. 600-650 000. The 20% shortage scale indicates that the market should currently hold over 100 000 active professional drivers more.

two to three average monthly salaries. At the same time obtaining the necessary licence does not mean that the young person will automatically start working for international transport companies, which constitute the most attractive market segment, as the employers prefer to give such jobs to experienced workers.

- In the case of long haul heavy truck drivers unsatisfactory level of remuneration plays a role (the feeling that the level of remuneration does not fully compensate inconvenience of the drivers' work, which mainly involves long and frequent periods of separation from their families).
- **Social nature:**
 - Deteriorating demographic situation
 - Perceiving this profession as an unattractive career path, which causes burdens in terms of the drivers' private life
 - Mismatch between the system of drivers' education and market needs; main weaknesses include such aspects as too many theoretical classes, which are often delivered in an e-learning form that is not very effective, inappropriate use of simulators, no training in the field of economic driving, and the lack of courses and trainings of soft competences.
- **Legal nature:**
 - Uncertainty of the law in relation to carrying out business activity in the road transport, caused by the national legislation concerning minimum wage, including regulations which classify employees who are highly mobile in the international transport as delegated employees
 - In the case of foreign nationals – complex and time-consuming administrative procedures, which are required to legalise such drivers' stay and work in Poland as well as the requirement to pass qualifying tests in Polish.

UK: labour shortages in the UK transport sector

Labour market research and data (reported below) has flaws and is not helped by different definitions of the sector, transport often included as part of a wider logistics sector. There is relatively little sub-sector information (certainly at governmental level) and forecasts tend to be short term (normally not going beyond 2020).

The key source is the UK Commission for Employment and Skills (UKCES). In 2016 a report '*UK Employers Survey*' was published using 2015 data based on a survey of 91.200 UK employers. The survey is not specific to the transport sector but provides some general labour market pointers (e.g. increase in unfilled vacancies across all sectors, only 49% employers provide off-job training with the average days for training for person trained ranging from 6-8). Transport is grouped with communications, the survey showing a rise in business numbers between surveys (2013-15) at 1.3% and 4.9% for employees (2.231.000). The survey highlighted skills shortages, in transport and communications, in customer services, health and safety, IT and managerial occupations (occupations also found in competing sectors). Two thirds of businesses providing training were targeting skills in new

technologies.

UKCES also provided skills forecasts including '*UK Labour Market Projections 2016*' and the '*Future of Jobs and Skills in 2030*' (written in 2014). Both studies are for all sectors. Transport is included together with logistics. There is little that is specific to the sector and forecasts are pegged to 2020.

The *UK Skills Survey*¹⁴ within the highways sector shows that urgent action is required to prevent skills shortages from delaying delivery of the highways investment programme. 71% of respondents is (very) concerned that skills shortages within their organisation could impact delivery of client programmes. The skills shortage is most acute at the supervisory level. The skills shortage is furthermore forecast to get worse in the longer term, particularly with new skills required to handle the integration of big data on the network.

Transport specific data is included in '*Transport Statistics Great Britain 2016*' a government produced compendium of transport statistics across all activities including road accidents, emissions and transport modes as well as skills. It is static data with no forecasts nor longitudinal comparisons (although it would be possible to compare against previous years). It does split transport from logistics and does make a breakdown of occupational types (by SOC). Table TSGB0116 a/b shows 805.000 transport jobs in Great Britain with 59.000 in rail and 62.000 in aviation but with the bulk (716.000) classified as 'other road transport' the data has limited utility in informing the labour market position of the sector. In terms of occupations the three prominent categories are taxi and cab drivers (198.000), van drivers (182.000) and bus and coach drivers (104.000).

Skills for Logistics is a not-for-profit agency targeting the logistics sector, charting the rise in businesses and jobs in logistics between 2010-15 (28% growth in number of businesses, 13% growth in jobs). Whilst its focus is a sector baseline (850.000 jobs) some its finding highlight structural weaknesses in the labour market and point to future difficulties if logistics continues to grow. Only 22% of employees are women and less than 10% of the workforce is 25 or under, whereas almost half are over 45. According to the survey data the number of logistics firms reporting skills gaps fell from 15 to 12% between 2011 and 2016 but the work (2016 Logistics Employment and Statistics) noted a rise in businesses identifying training needs in relation to levels of proficiency for existing staff.

Concluding remarks

The results of this section underlines the need for action. Mismatch problems already exist in the transport labour market, and are expected to increase. This not only concerns the typical transport occupations, but also those occupations that occur in other sectors of the economy. In any case, for both types of occupation, the competition for new employees will be economy wide.

¹⁴ Highways UK (2017). Highways skills shortage: the ticking time bomb. Available at: <http://www.highways-uk.com/content/huk/docs/hukskillssurvey-2017.pdf>

Mismatches between supply and demand on the labour market can arise for different reasons – including a lack of transparency of information - but they ultimately result in shortages, or redundancies, whether they are of a quantitative or qualitative nature.

Research so far has identified a large number of data sets on mismatches now and into the future but they are usually at too aggregate a level (sector/mode, occupation) to be really useful for this study. Moreover, problematic vacancies vary in terms of size and nature. As a result, solutions will often need to be different. While it is difficult to briefly summarise the findings and/or create a clear typology of shortages, it is possible to say that the main problematic vacancies are expected in the following types of occupation:

- Mid and high level technical and ICT jobs. This is a general problem, not specific to the transport sector, but it seems to be overlooked by many organisations in transport;
- High level jobs, e.g. management, logistical planning etc. Again, this is not a sector specific problem, although there are some exceptions (e.g. air traffic control).
- Administrative staff (low to medium level). This is not necessarily sector specific, but sectoral particularities may be relevant as 'change', in this case (mainly IT and task related activities) may be particularly relevant in transport.
- Mobile jobs (at all levels but, in particular, jobs that imply being away from home for long periods). Long haul truck drivers are the most obvious example. An issue for potential employees might be the uncertain prospect related to automation, for instance related to unmanned vehicles, platooning, etc.;
- Jobs related to innovation and the follow-up/incorporation/implementation thereof (mainly at high level). This is, as yet, highly uncertain and dependent on actual innovations: will unmanned vehicles, platooning and IT based client contacts become the norm, and by when?