

Chapter 11: Rail Marketing, Jobs and Public Engagement, Dr Anna Fraszczyk, Mrs Nathalie Amirault and Dr Marin Marinov

Rail Marketing, Jobs and Public Engagement, Dr Anna Fraszczyk, Mahidol University, Thailand, anna.fra@mahidol.ac.th, 066 993308025, Nathalie Amirault, Unit Expertise Development, UIC, amirault@uic.org, 0033 153620379 and Dr Marin Marinov, NewRail, Newcastle University, marin.marinov@newcastle.ac.uk, 0044 191 2083976

Abstract

The chapter briefly explains the marketing mix in a rail context and then discusses marketing strategies to promote rail from two perspectives. Firstly, rail is perceived as a transport service offered to potential users and various marketing tools are used to maximise rail companies' profit. Secondly rail is seen as a career path and variety of marketing, skills training and public engagement actions are targeting potential talents, already within the industry as well as those beyond the railway sector. The pool of talented individuals includes students, graduates, academics and professionals who are exposed to recruitment and retention activities of the railway sector. Various activities and projects run by the rail industry, targeting audience at school, university, professional and general public's levels, are presented with their success stories as well as challenges some of the initiatives faced. Also, results of a survey focusing on skills and jobs for rail (and transport sector) of the future are presented and commented on.

Keywords

Rail, marketing, skills, jobs, talent

11.1 Introduction

Railways have been offering their transport services to the public and freight sectors for the last two centuries. Rail vehicles design, rail operations, rail management and many other aspects of the railway system have been based on the same principles for many decades. However, in the 21st century the rules of the game are changing. The numbers of rail passengers are falling in most of the European countries, with an exception of the United Kingdom (Fraszczyk et al, 2016). New technologies such as high-speed rail and driverless metros are developing fast and taking over traditional rail solutions. In freight, large containers transporting bulk goods, such as e.g. coal or other heavy materials are losing their market share. New high value and low-density goods (e.g. mobile phones, pharmaceuticals) are now of interest more than ever before (Spectrum, 2015). In addition, issues like e.g. ageing rail force in Europe or deficit of rail engineers in Asia, where technology has been purchased from abroad for decades, present a challenge on how to recruit talented individuals, train them and retain within the railway sector. These issues present a challenge to the railway industry to re-think their

strategies of running their 'business as usual' as well as an opportunity to innovate.

In response to some of the challenges the railway industry has been facing recently, a number of new rail marketing and public engagement initiatives emerged.

In this rail context, public engagement essentially entails public participation in taking decisions that concern projects on infrastructure and aspects of railways that generally affect the public. Moreover, it is a two-way process, where involved parties interact and listen to each other in order to achieve mutual benefits (National Co-ordinating Centre for Public Engagement, 2017). An example of a public engagement activity is a public consultation on a new rail/metro line developments. Unlike public engagement, public outreach entails activities and projects that inform the public about a rail organisation's involvement with the community (e.g. a railway company supporting Railway Children's charity) or influence in the community (e.g. Women in Rail) and serve in various aspects of the industry (Oxford Dictionaries 2017). In a broader sense rail outreach can include activities such as e.g. informing young people and professionals outside of the industry about possible careers in the sector.

As can be seen there is a significant difference in definitions between public engagement and public outreach. However, to avoid confusion, and to follow terminology used by the railway sector (e.g. Network Rail's community engagement objectives; Network Rail, 2014) the term 'public engagement' will be used in this chapter to describe both types of activities.

The chapter is organised as follows. Section 11.2 presents the concept of a marketing mix in the rail context with "7Ps" briefly explained. The next three sections present rail marketing strategies from different perspectives. Section 11.3 discusses marketing strategies to promote rail as a service to potential users with examples of rail campaigns and events. Sections 11.4 and 11.5 showcase rail as a career path to potential pool of talents with examples of one-off events and long-term programmes targeting talents from the sector and from outside, respectively. The final section, Section 11.6 focuses on skills and jobs for railways of the future, where new skills and talents will be needed due to forthcoming technology innovations. The case studies presented in the chapter, with their success stories and challenges faced, provide valuable lessons for the rail industry and organisations considering organisation of or involvement in similar activities in the future.

11.2 Marketing mix in a rail context

Marketing includes variety of actions, from market research to advertising to selling products or services, all falling under the umbrella of managing a profitable relationship between a company and a customer (ESCAP, 1998; Kotler and Armstrong, 2012; Oxford Dictionaries, 2017;). In the rail context

this means promoting and selling rail services (e.g. 1st class train ticket between Newcastle and London or rail freight services between a mine and a power station) and products (e.g. a new tram or a new freight wagon).

Beyond train tickets, the railway sector sells a variety of products and services to its customers that perhaps are less visible to a rail passenger. Table 11.1 shows examples of products and services in the railways.

Table 11.1 Examples of products and services in the railway sector

INFRASTRUCTURE MANAGER sells:	TRAIN OPERATOR sells:
<ul style="list-style-type: none"> • slots... to (freight and passenger) operators; • maintenance contracts... to external companies; • not needed asset (buildings)... to buyers; • etc. 	<ul style="list-style-type: none"> • tickets... to passengers; • advertising space... to companies; • rolling stock... to other operators; • etc.
PRODUCER sells:	OTHER PLAYERS
<ul style="list-style-type: none"> • rolling stock (locos, trams)... to operators; • software... to education/training providers; • equipment... to infrastructure managers and operators; • etc. 	<ul style="list-style-type: none"> • Magazines; • Charities; • Training/education providers; • Heritage; • etc.

As in any other sector, the focus of marketing activities is on customer satisfaction and profitability (ESCAP, 1998). In other words, the main two goals of all (rail) marketing actions are (Kotler and Armstrong 2012):

- to keep and grow current customers by delivering satisfaction (e.g. monitor customer satisfaction with rail services and offer discounts to loyal users);
- to attract new customers by promising superior value (e.g. discounts for new freight service users).

The two marketing goals in the railway sector are usually achieved by considering a marketing mix model. The marketing mix is the range of activities needed to achieve voluntary and profitable exchanges of products or services between two parties (e.g. a passenger and a train operator). The mix includes seven items, also called '7Ps' (ESCAP, 1998): Product, Price, Promotion, Place, People, Process and Physical evidence.

Product is usually a service offered to individuals (passenger transport service) or companies (freight transport service), but in a broader sense of the

railway sector a product is also for example a new railway vehicle offered to railway operators or a railway software offered to academia.

Price is the value, usually in monetary terms, paid by a customer for a product (or a service) purchased (e.g. trainset price or ticket price in £).

Promotion includes variety of activities such as advertising, sales and Public Relations (e.g. an advert in a magazine, social media campaign).

Place represents location of selling points and distribution channels for services and products (e.g. railway station, social media).

People such as railway staff or potential rail talents are the railways most valuable asset critical in meeting marketing goals while dealing with customers.

Processes change as technology and customer expectations evolve and are designed to meet customers' needs (e.g. an online ticket sale, an on-board comfort).

Physical evidence relates to variety of facilities linked to a rail service or a product, such as for example access to a railway station facilities or a level of comfort provided by trains, which influence overall customer satisfaction with the service or the product provided.

Considering all '7Ps' in the process of planning rail marketing activities guarantees that each of the items will get the attention needed and will not be overlooked. The marketing mix holistic view at marketing activities also helps to see a bigger picture and evaluate delivered actions (e.g. promotional campaigns, accessibility of services) with their reasons for success or a failure.

11.3 Targeting rail customers

People who use trains to travel within a city (by a metro or a tram), on a short-distance (by train) or on a long distance (by a conventional train, or High Speed Train) are all called passengers. However, passengers are not the only customers of the railway services as railways offer their tracks and wagons to move freight, too. Therefore both, passengers and freight customers contribute to the railway sector and are targeted by marketing strategies. Various marketing tools are used to maximise rail companies' profit and Table 11.2 gives three examples of these.

Table 11.2. Examples of rail marketing strategies

Type of rail services promoted	Metro	Long distance train	Rail freight services
Title	Tyne and Wear Metro special offers	Skyfall train	Tesco freight train

Audience	General public	General public	General public, freight operators
Scale	Local, Tyne and Wear	National	National
Country	United Kingdom	United Kingdom	United Kingdom
Frequency	On-going	One-off campaign	On-going
Description	A range of money-saving offers to help customers make the most of their Metro ticket. Includes discounts on services and free travel to cultural events (e.g. with a theatre play ticket).	A campaign promoting a train service between Edinburgh and London with trainset covered with a '007' themed mega stickers from a new James Bond film.	Intermodal service offered by a partnership between DRS, Stobart Rail and Tesco in the UK.
Tools	Discounts, free travel	Video, 'Skyfall 007' branded train	'Less CO2 Rail' branded containers
Website	www.nexus.org.uk/metro/offers	goo.gl/5KVAJG	goo.gl/NgUCfX
Social media	Twitter: @My_Metro	n/a	n/a

It must be noticed that social media expansion also provided new tools for companies to use when engaging with the public and communicating their messages to potential customers. Most of the large rail companies and train operators will have a social media presence (e.g. Twitter, Facebook, LinkedIn, Instagram) and update their customers on a regular basis on the level of service offered, delays, events, campaigns, job offers, etc.

11.4 Targeting rail talents from the sector

Due to declared shortages in rail skilled workforce across the world (NSARE, 2013; Panteia and PwC, 2015; Rail Technology Magazine, 2016; Professional Asia Pacific, 2016) a list of rail initiatives with a talent in mind has been expanding over the last decade. Many of those activities have been designed in order to help recruit talented individuals from outside of the rail industry and retain them within the industry and they tend to focus on a specific audience: graduates, academics and/or professionals. This group of interested parties will be discussed in more details in Sec. 5.

The railway sector recognises that in order to keep rail talents within the industry it needs to improve the image of the sector and offer staff more

opportunities to grow. The activities targeting rail talents who already joined the railway sector can take different forms and use different tools, depending on a scale and a budget. Examples of such activities include a 2-day paid event 'Next Generation Rail' in the United Kingdom or a free online platform 'UIC eLearning', with courses currently under development, initiated by the International Union of Railways (UIC) for their members across the world. A greater engagement of staff in the company's activities and skills development supported by an employer aim to create a stronger bond between an employee and employer, but also create a space for employees' skills and personal development for the benefit of both, the company and individuals. Table 11.3 shows examples of such activities targeting people already within the sector, from graduates through to academics and professionals.

Table 11.3. Examples of rail talent recruitment and skills development activities

Targeted audience	Graduates (and professionals)	Academics	Professionals (and academics)
Title	UIC eLearning	RailSkills (Researcher Links event with Brazil)	Next Generation Rail
Scale	International	2 partner countries	National
Country	Worldwide	UK-Brazil	UK
Frequency	On-going	One-off	Annual
Description	An online platform with rail-related eCourses delivered by rail professionals and academics. (The project is under developments, December 2016)	A 5-day event for early career researchers from Brazil and the UK to exchange knowledge about rail research, update soft skills and plan future academic collaborations.	A 2-day event for young rail professionals from academic and industry to showcase their work and network with colleagues.
Tools	Online platform	Event, presentations, talks, group activities, networking, dinners, technical visits	Event, presentations, talks, group activities, networking, dinner, technical visits
Website	www.uic-elearning.org	N/A	http://www.rruka.org.uk
Social media	Twitter: @uic	N/A	Twitter: @RRUK_A

Many other activities targeting rail students, academics and professionals have been taking place around the world. For example, RailNewcastle intensive programme and conference, coordinated by Newcastle University, created a friendly atmosphere for knowledge exchange and promotion of careers in the rail industry (Marinov and Ricci, 2012; Marinov, 2013; Marinov 2015a; Marinov 2015b; Fraszczyk et al, 2015b). It appears that many students around the world are not aware of the extensive benefits the rail industry has to offer to its employees.

UIC has been supporting rail talent and skills development in a number of ways. Their flagship project called Railway Talents (UIC Talent) started in 2014 and is aimed at attracting and retaining the talents into the rail industry. As the backbone of the project, UIC wishes to establish a strong & sustainable foundation for fostering international cooperation among the young and experienced talents in the railway industry.

One important aim of the project is also to facilitate the process of knowledge, values and experience sharing between different generations of railway people, as well as to stimulate the active dialogue between cultures and generations.

According to a report published by the European Transport Research Alliance (2014, p. 12): “The multidisciplinary nature of the Transport industry requires competencies from multiple bodies of knowledge, matching with the multidisciplinary character of mobility systems”.

After having identified a number of specific challenges, the reports makes a series of recommendations, one of them calling for the creation of (European Transport Research Alliance (2014, p. 23):

- “New courses and programmes (more flexible and not focusing on fundamental disciplines only);
- Specialisation courses offering higher flexibility, tailored contents, operational and practical subjects; and through offering well designed and coordinated at European level;
- Lifelong Learning and Vocational Training courses.”

How to provide these new courses and programmes in a sector, which is in constant evolution, is a burning question. Also, issues on how to make these learning opportunities accessible to all, whether full time students or busy professionals, need to be recognised To address those challenges, the UIC Talent project is currently exploring the potential of online learning (eLearning) as a mean to attract and develop talents in the rail sector.

Using two learning modules as a testbed, the UIC Talent team is currently designing a learning environment with the goal to providing learning opportunities that are:

- **Flexible** — different paths are available to achieve one's own learning objectives. When participants register to a learning event or programme, they usually come with their own agenda. The level of engagement can range from interested to committed, from "I would like to know more about this subject" to "I need to get that certificate for my career." Some participants only interested in a very specific part of a programme might leave once they have received what they came for. Others who join as interested can become committed once they start interacting with the learning material, the other participants and the tutor.
- **Self-paced** — learn at one's own pace and in one's own time.
- **Authentic** — develop competencies through challenging and meaningful learning activities.
- **Collaborative** — benefit from the collective intelligence of a community of practice.
- **Reflective** — connect learning to previous learning and future actions.
- **Evolutive** — the course grows over time through the contributions of the participants.
- **Recognised** — credentials (badges, certificates, etc.) enrich participants' professional profile.

The development of the UIC eLearning platform is a key component of the UIC Talent project, the initiative aiming at preparing a new generation of railway talents working on domestic and international challenges. The eLearning courses are developed in cooperation with several stakeholders, namely RailUniNet. Another initiative within the UIC Talent project is the design of an eCareers website, to support the railway industry in their continuous search for best talents.

In addition, other examples of events targeting rail talents within the sector include, e.g.:

- NSAR-Connect (UK);
- INNOTRANS Career Concept (Germany);
- Next Generation Rail (UK);

- RailExchange, United Kingdom + Thailand.

11.5 Targeting talents from outside of the rail sector

Public (customer) engagement (and outreach), as mentioned in Sec. 11.1, is an important two-way process aimed at achieving benefits for both the public and the company involved.

From a railway company's perspective a well-organised public engagement is essential for at least for two reasons:

- it helps to build a positive brand as it shows that a company cares about something/someone (e.g. 'Adopt a Station' scheme in Scotland);
- it gives people (customers and non-customers) an opportunity to 'meet' the company and its employees and learn more about it.

Network Rail, a rail infrastructure manager in the United Kingdom, set three objectives for their community (public) engagement activities (Network Rail, 2014, p. 24):

1. "To contribute time and money to good causes through the charitable giving and actions of employees;
2. To address key social issues through strategic national social programmes and partnerships;
3. To invest in the local communities within which we operate".

The three objectives show clearly the direction of Network Rail's public engagement activities, which aims to benefit charities and national programmes (e.g. STEM programmes in schools), but also maximise social benefits of the railway network to local communities and to the company itself. In a longer run the company's image can be potentially improved and a stronger brand image with a serious social responsibility actions can be created.

Other rail membership-based organisations as well as individual companies run events, campaigns and initiatives directly targeting customers as well as potential clients in order to introduce them to the world of career in the rail sector. Scope of the outreach activities vary and are dependent on a desired scale and a budget. Variety of careers in the railways is showcased on Fig. 11.1 as well as in Table 11.4.

Rail Careers Matrix distinguishes between three levels and eight job categories (Fig. 11.1). The Matrix was developed within the UIC Talent project and is publicly available on the project’s website (www.railtalent.org).

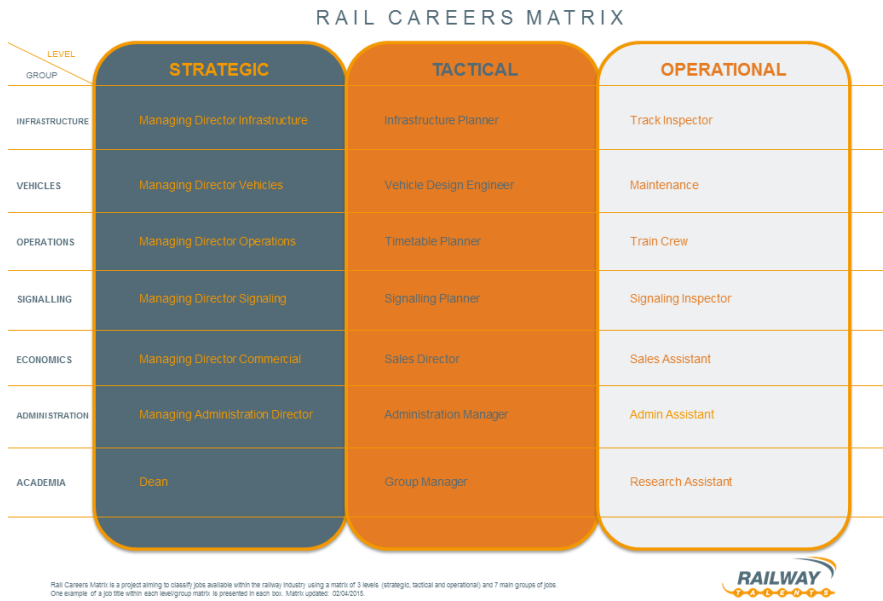


Fig. 11.1 Rail Careers Matrix developed by Railway Talents project
Source: Railway Talents, 2017

Richness of railway jobs is also visible in Table 11.4, which features examples of four job families and job titles in the railways. However, Sheldon and Wallace (2014) identified the total of 24 job families with 121 related jobs in the railway sector, which shows the scale of this ‘hidden’ career path.

Table 11.4 Examples of job families in the railways

Rail job family	Job title
Engineering	<ul style="list-style-type: none"> • Signaling Engineer • Electrical Engineer • Civil Engineer • Environmental Engineer • Etc.
Trades and technicians	<ul style="list-style-type: none"> • Infrastructure Workers • Cable Joints • Electrical Lines Worker • Telecommunications Worker • Etc.
Operations	<ul style="list-style-type: none"> • CCTV Operator

	<ul style="list-style-type: none"> • Fire Officer • Timetable Officer • Train Driver • Etc.
Corporate support	<ul style="list-style-type: none"> • Accounts Officer • Public Relations Officer • Web Designer • Rail Safety Investigator • Etc.

Source: based on Sheldon and Wallace, 2014

More recently, the railway industry is becoming more active online in promoting careers in the railways. Online initiatives such as Rail Careers portal in Australia (www.caricareers.net.au), Global Rail Jobs (www.globalrailjobs.com) website for jobseekers or the UIC eCareers, currently under development, all aim to give a free and transparent access to the world of rail job vacancies to talented people from outside of the sector. However, more variety of appropriate marketing tools should be used for a better promotion of such services if they want to attract talents who would perhaps not think about a career in the railway sector. Therefore substantial increase in visibility of those portals must be achieved if recruitment results are expected to reach the pool of talents globally.

An active engagement of railway industry in career events, professional organisations and skills development projects can only help to promote railway careers to the right audience. Examples of such activities are presented in Table 11.5.

Table 11.5 Examples of rail outreach and public engagement activities

Type of initiative	Event	Organisation	Project
Title	Rail Careers Week	Women in Rail	Railway Talents
Audience	School children, general public	Women, men, railway staff	Talents in and beyond railway sector, general public
Scale	National	National	International
Country	Australia	United Kingdom	Worldwide
Frequency	Annual	On-going	On-going

Description	A week full of activities organised by rail industry to showcase variety of careers in the railways	An organisation promoting and supporting women working in the railway sector.	A project run by International Union of Railways focusing on promotion and retention of talents in the rail industry worldwide.
Tools	Events, technical visits, video	Events, mentoring, social media network	Website, training, social media network, Railway Talents' Ambassadors and RailUniNet sub-projects
Website	http://rail-careers.net.au	www.women-inrail.org	www.railtalent.org
Social media	Twitter: @Aus-tRail	Twitter: @Women-inRail	Twitter: @railway-talents

Another good example of an outreach activity targeting students from outside of the world of rail is a research placement scheme at NewRail, Newcastle University, which runs since 2012. The scheme has been offered to both, A-level Maths students (age17+) and university students (age 19+; any course) who applied either for a Nuffield Research Placement or a Newcastle Work Experience job. Over a period of 4-6 summer weeks students work on a Maths project with a rail flavor. They learn IBM SPSS software and the basics of data collection, cleaning and analyses. As an outcome a number of papers with students' input have been written and published in scientific journals or presented at conferences (e.g. Fraszczyk et al, 2015a; Fraszczyk et al, 2015b; Fraszczyk et al, 2016). While being on a placement, students apply their Maths knowledge, but also improve their rail competences and soft skills, including teamwork and work ethics.

Other examples of public engagement/outreach activities targeting audience from outside the railway sector are:

- Enjoyment to Employment (UK)
- Rail Safety Week (Australia)
- Railway Talents' Ambassadors (UK)
- Rail Week (UK)
- LA Metro Entry Level Trainee Programme (US)
- Railway Talents (international)
- IMECHE Rail Challenge (UK)
- Routes into Rail (UK)

- Young Rail Ambassadors (UK)
- Adopt a Station (Scotland)
- Amtrak National Train Day (US)
- Rail Day and Railroad Night (US)
- iRail competition (UK)
- GenYRail (UK)
- Youth Transport School (US)
- Station Master game (international)
- Women in Rail (UK)
- Young Rail Professionals (UK)
- Level Crossing Awareness Day (international)
- SNCF Girls Day (France)
- UIC eCareers (international)

11.6 Skills and jobs for rail

We live in a time of change. Industrial revolution has taken its place, brought many developments into fruition and paved the way towards the era of electronics and wireless communication. It did not come without a price though. It is a commonly held opinion that due to industrial revolution in the past there is now pollution and climate change. As a result actions have been taken to reduce pollution and influence climate change by developing and promoting environmentally friendly technologies and transport modes. Due to its credentials the railways have taken a top position. The rail operation now is not the same as it was before. The whole railway industry is in the verge of modernisation now, following current changes in the international transport market. These changes require new skills as they create new jobs and job categories. Once new jobs have been created, old jobs are no longer needed.

In the quest of gaining a better understanding about this situation a short scale survey on the rail skills and jobs topic has been organised and 35 responses have been collected. Geographical coverage of respondents is well spread but dominated by EU member states, as shown in Fig. 11.2.

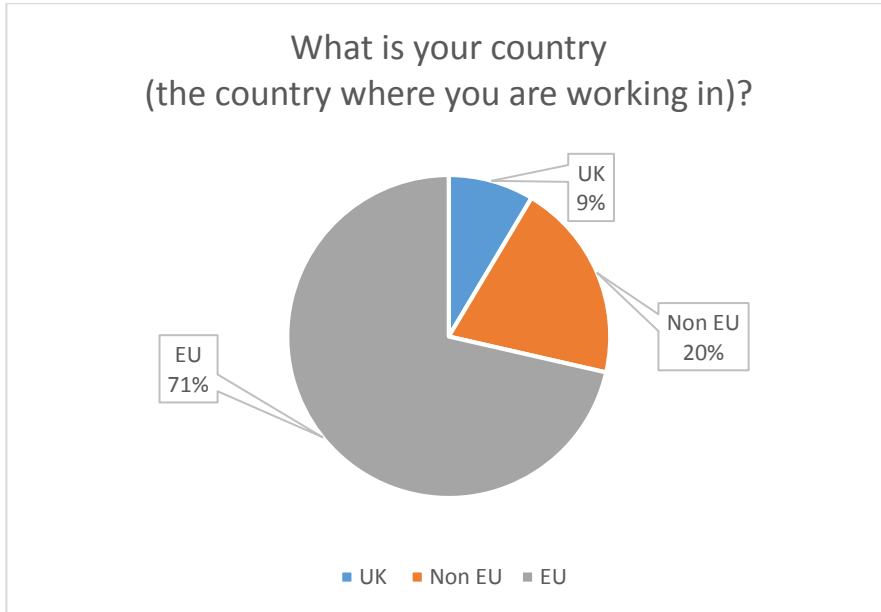


Fig 11.2 Geographical coverage of respondents

Gender ratio of the survey's respondents is 28 males vs. 7 females (Fig. 11.3).

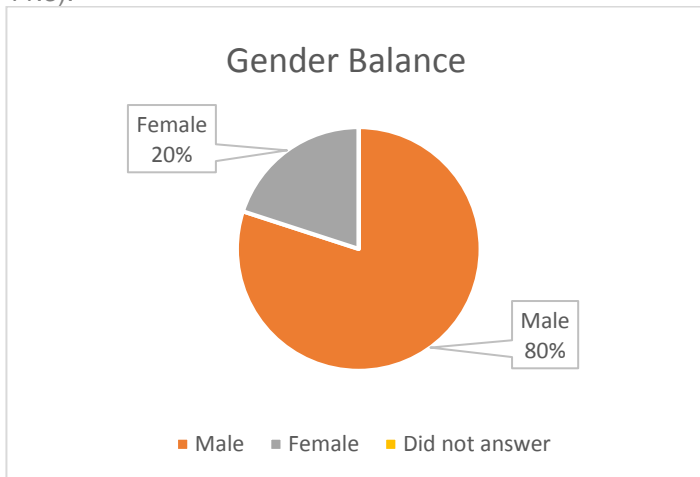


Fig. 11.3 Gender ratio of respondents

Professional areas of respondents include:

- Operations, Managements & Engineering
- Research

- Logistics & OR
- Spatial Planning
- EU Integration
- Business & Adult Education
- Electronics, Telematics, Ground Penetrating Radar
- Safety & Security
- Project management

Years of professional experience amongst the respondents are rather good with slight dominance of respondents who have worked in the sector for more than 15 years (Fig. 11.4).

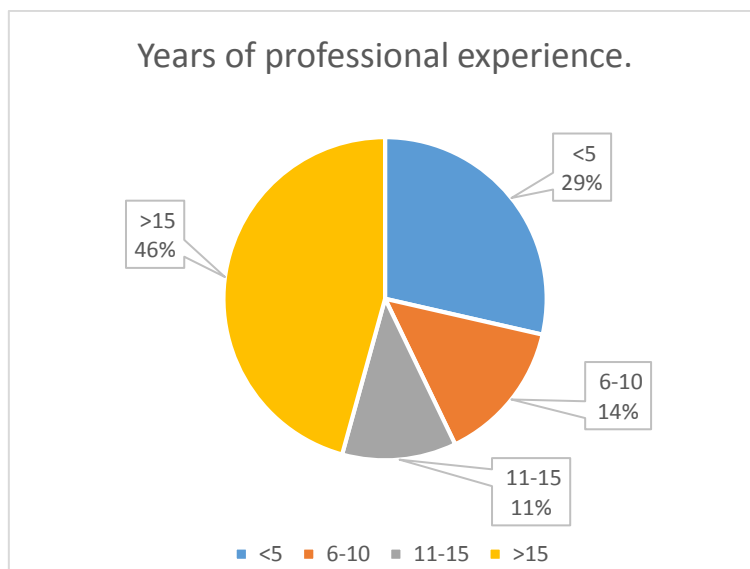


Fig. 11.4 How many years have you worked in the rail industry?

As for respondent work positions, they include:

- Directors
- Postdoc fellows
- Teaching assistants
- Consultants
- Senior Researchers
- Researchers
- University Teachers/ Professors
- General/ Technical manager
- Industry / others

The respondents were asked to identify the most crucial factors causing changes in the entire transport sector. Some suggestions were given as shown in Fig. 11.5. The responses collected suggest that the top five crucial factors are:

1. Greening of Transport (for all modes).
2. Electrification in all transportation modes and alternative fuel technologies.
3. Multimodality, Syncromodality.
4. "Feel safe, feel secure" - more resilient transport systems capable of responding reliably to terrorist attacks.
5. Wide range digitalization and connectivity of all modes, followed by autonomous and unmanned transport systems (from drones to road and rail automation and robots for logistic operations).

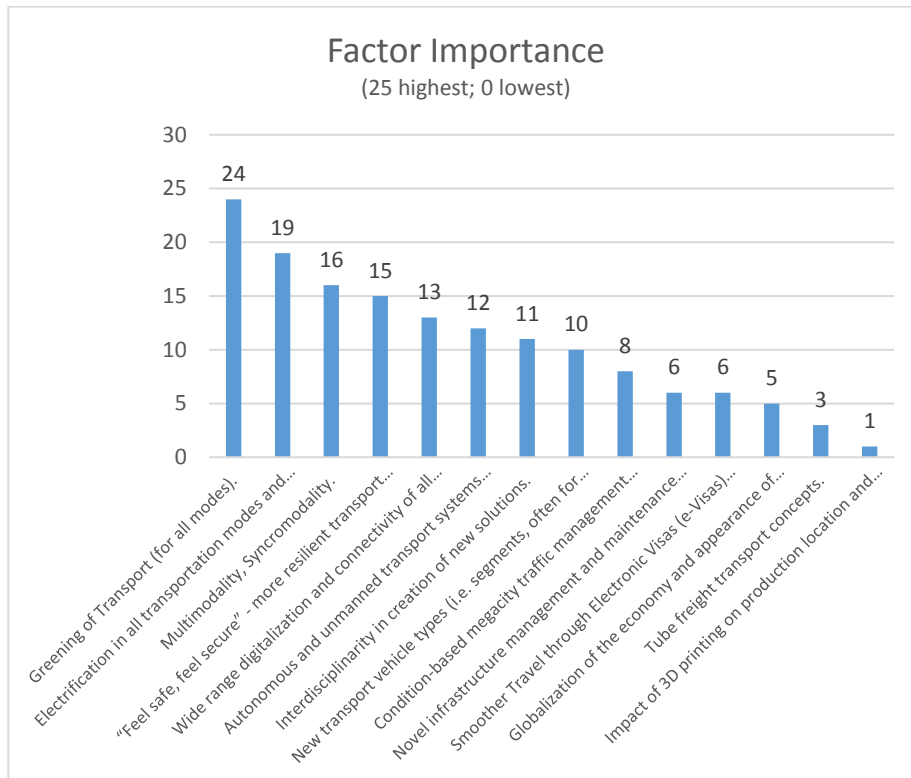


Fig. 11.5 Potential factors causing changes in the transport sector

Factors that appear to have less importance for upcoming changes in the transport sector are:

- Globalization of the economy and appearance of new areas of production.
- Tube freight transport concepts.
- Impact of 3D printing on production location and logistics.

The respondents were asked to identify the potential jobs and work positions, which are likely to vanish in the near future. The outcome of the survey suggests that the job categories, which are most likely to vanish, include: Drivers (train, tube, bus, taxi, subway-tramway), Human drivers (Truck, taxi, tram, train etc.), Assistant Engine Drivers, Shunting Drivers, Train Drivers in short distance, HGV/Freight vehicles.

This change will be caused by: Complete Automation, Robotics, Application of ICT, Automatic and remote shunting (partly reality), Driverless trains, AI and IoE. For short distance public transport, there will be no drivers hence no rostering required. Automatic or semi-automatic train driving with human intervention in the event of failure will be in operation instead.

Next job categories, which are likely to vanish, include: Ticket sellers, Tickets vendors, Sales, Street Sellers, Small retail sellers, Ticketing, Tool stations. Causes for this include the implementation of Ticket vending machines, Modern technology, Automatic Payment, Smart Payments, Digitalisation, Multimodality & Syncromodality, Mega cities & Multi-stakeholder.

A job category which includes: Manual Operators, Factory workers, Machine Operators, Warehouse Operatives, Conductor, Shunter, Loaders/unloaders (Terminals/warehouses) and Simple manual jobs can be easily replaced by automation and monitoring, therefore is also likely to vanish due to: Automation, Robotics, Digitalisation, AI, 3D printing, IoE, IT, Automatization, Automated transport, Greening, Electrification/battery technology.

As some jobs will vanish, new jobs and work positions will emerge. Hence the respondents were asked to identify those jobs and job positions, which are likely to emerge in the near future. Job category, which is most likely to emerge, according to the respondents, includes: Supply chain manager/Controller, Urban logistics manager, Local Transport brokers, Global Freight Forwarder/Manager, Intermodal, Multi-modal Transport Managers & Experts & Specialists.

The reasons for this job category to emerge are: New requirements for intermodal and multimodal operation/service, providing one stop shop solutions to customers, sustainability, cities expansion, displacement of people, open urban data, Improved remote control over transport fleets (IT) and robotics/automation, Open urban data, expert systems, new data business

models, Need for real time mobility without owning a private car, Globalisation, Digitalisation, Multimodality & Syncromodality, Interdisciplinarity. Mega cities & Multi-stakeholder system.

Next job category, which is most likely to emerge, includes: Systems admin, AI experts, Digital Transformation Expert/consultant. ICT based Jobs, Big Data experts, Data Analyst. People who will be working within this job category will need to be equipped with knowledge about Artificial Intelligence (AI), Re-engineering process, identifying technological gaps, and coordinating with business units, IT based system admin handling exceptions, Handling and analysing big data sets, large datasets analysis to improve and optimise transport provision and public transport services.

Reasons for this job category to emerge are: Automation of customer, order and production process, digitalisation, Low investment with high returns. Innovators developing & maintaining Automated System, RST Architect, Transport and railway Engineers, Automation Engineers will be new jobs coming into light soon. For this job category to emerge it is necessary to re-shape the existing transport system, implement new technologies and bring new solutions for more reliable services to ease people's travel choices and decisions. The current need for reliable public transport, which is more competitive and user friendly in order to encourage more people to use it will be met by the implementation of Unmanned Transport systems, Digitalization, Interdisciplinary solutions for a safer & more secure automated transport service.

It is very likely for some current jobs and work positions to experience transformation. As a result the respondents were asked to identify those jobs, which are likely to change. Hence Service Delivery, Public Transport Operations and Management, Airport operators, Marshalling operators, Actual Manual Operator, Supply Chain Management, Terminal workers, Train personnel, Fleet Manager, Dispatchers are jobs which are very likely to change in the near future.

These jobs are likely to experience transformation because of: Automation, Real time management, Unmanned Transport, 3D printing, Globalisation, Digitalization, Interdisciplinary, Multimodality & Syncromodality, Mega cities & Multi-stakeholder system, Safety & Security, Continuing competitive service and product developments from other modes. There is also a need for more analysis and fleet e-management, flexibility and real-time adaptation to changes, Autonomous/digitalization, development of novel infrastructure, speed connectivity. Ageing society has also been identified as one of the reasons for such transformations.

These transformations will lead to self-operating system handling maintenance, product and service delivery using ICT, Data science, data analysis and visualisation, e-fleet management, digital interface with autonomous vehicles and robots. More understanding of information technology, systemic view, multidisciplinary approach for customers orientation will be in place.

For Product managers, Logistics Specialist, ICT Solutions, Multiple vehicle management, Freight e-management there will be changes as well. This is because of integration in supply chain management, digitalisation, data acquisition and analysis. Demand for sustainable “green” freight delivery, reduction of long distance containerisation, emergence of circular economy. New competences will be required in Supply Chain, Combining data from multiple origins and using predictive analytics, Cloud based solutions, Big data, security, Development of ICT competencies, data analysis, multimodality, sustainability.

The job of transport planners has also been identified as one that is going to change in the near future. This job category includes: Planners, Train scheduling, Scheduler, transport systems planner/designer. Reasons for this are: developments in IT & Integrated Planning, Open urban data, big data, Internet of things, Globalisation, Digitalization, Interdisciplinary, Multimodality & Syncromodality, Mega cities & Multi-stakeholder system, Novel Infrastructure.

It has been suggested that a self-planning system employing dynamic approaches for route planning, using real-time O-D matrices and Simulation will be developed. This system will be based on: Systemic view, multidisciplinary approach, and will be fully customer-orientated.

As the job of transport planners will experience changes, so will the job of maintenance staff. Specifically Maintenance Engineer, Fleet Maintenance workers and managers, Onsite/Outdoor maintenance staff.

Autonomous & unmanned systems, Electrification, Novel infra, Safety and Security, Data acquisition and analysis, New maintenance standards for clean vehicles, Automation were identified as causes for such a change to happen.

Hence maintenance staff will need to be equipped with skills to master and operate with ICT tools, Expertise in diagnosing and rectifying faults in advanced electronic sensor and control systems and networks (both wired and wireless), e-vehicles, ICT, real time controls, GSM-radio, Higher IT skills or skills to deal with expected automation.

Acknowledgements

The SKILLFUL project funded by the European Commission.

Reference list

- Fraszczyk, A., Brown, P., Duan, S. (2015a) Public perception of driverless trains. *Urban Rail Transit* 2015, 1(2), p.78-86.
- Fraszczyk, A., Dungworth, J., Marinov, M. (2015b) Analysis of Benefits to Young Rail Enthusiasts of Participating in Extracurricular Academic Activities. *Social Sciences* 2015, 4(4), p.967– 986.
- Fraszczyk, A., Lamb, T., Marinov, M. (2016) Are railways really that bad? An evaluation of rail systems performance in Europe with a focus on passenger rail. *Transportation Research Part A: Policy and Practice* Volume 94, December 2016, p.573–591.
- Marinov M. (2013) *Introduction: Handbook: An intensive Programme in Railway and Logistics*. *Research in Transportation Economics* 2013, 41(1), p.1-2.
- Marinov, M. (2015a) *Editorial: Special Issue, RailNewcastle Conference 2015, Urban Rail Transit and Light Rail*. *Urban Rail Transit* 2015, 1(2), p.69-70.
- Marinov, M. (2015b) *Introduction to the Special Issue on Rail Operations, Management and Economics*. *Research in Transportation Economics* 2015, 54, p.1.
- Marinov, M. and Ricci S. (2012) *Organization and Management of an Innovative Intensive Programme in Rail Logistics*. *Procedia-Social and Behavioral Journal* 2012, 46, p.4813-4816.
- Economic and Social Commission for Asia and the Pacific. (1998) *Marketing the railway product in Asia and the Pacific region*. United Nations. [Online] Available from: <http://www.unescap.org/sites/default/files/marketing-fulltext.pdf>. [Accessed: 1st February 2017].
- European Transport Research Alliance. (2014) *Education and training issues for the transport researchers of the future European Research Area (ERA/T)*. Report. [Online] Available from: http://www.etralliance.eu/Portals/0/ETRA%20report%20on%20Education%20and%20Training%20issues_final.pdf. [Accessed: 1st February 2017].
- Kotler, P. and Armstrong, G. (2012) *Principles of Marketing*. Fifteenth edition. Pearson.
- SPECTRUM. (2015) *Electronic Handbook*. [Online] Available from: <http://www.spectrumrail.info/handbook/mobile/index.html#p=1>. [Accessed: 27th January 2017].
- National Co-ordinating Centre for Public Engagement. (2017) [Online] Available from: www.PublicEngagement.ac.uk. [Accessed: 1st February 2017].
- Network Rail. (2014) *Network Rail Sustainability Update 2014 – Community*. [Online] Available from: <http://www.slideshare.net/GarethLlewelyn/network-rail-sustainability-update-2014>. [Accessed: 1st February 2017].

- NSARE. (2013) "Forecasting the Skills Challenge". Report.
- Oxford Dictionaries. (2017) [Online] Available from: <https://en.oxforddictionaries.com>. [Accessed: 27th January 2017]
- Panteia and PwC. (2015) Analysis of the trends and prospects of jobs and working conditions in transport [Online] Available from: https://www.panteia.nl/uploads/sites/2/2016/12/ReqNo_JRC95093_Final-report-Panteia-Report-1.pdf. [Accessed: 1st February 2017].
- Railway Talents. (2017) Rail Careers Matrix [Online] Available from: <http://railtalent.org/rail-careers-matrix>. [Accessed: 1st February 2017].
- Rail Technology Magazine. (2016) A one industry call for skills development. December 2016/January 2017 issue, p.24-25.
- Rail Professional Asia Pacific. (2016) Ditsapol Padungkul. September 2016 issue, p.12-17.
- Sheldon, N. and Wallace, M. (2014) Report on the Career Pathways Guide for the Australasian Rail Industry. CRC.
- SKILLFUL. (2017) Available from: <http://www.skillfulproject.eu> [Accessed: 3rd February 2017].