Recommendations for Human Resources Development in Danube Inland Ports

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Abstract. Triggered by the growing and fluctuating freight volumes arriving in European seaports, peaks and bottlenecks are caused in hinterland terminals such as inland ports. Measures to increase the performance of inland ports previously focused on technological advancements such as infrastructure and ICT. However, recent developments show an increased awareness of human resources. Inland ports constitute a 'socio-technical' system since port performance is equally dependent on technological equipment as on skilled employees. However, the importance of human resources is not yet fully recognized in the inland port sector. The aim of this paper is to present recommendations for human resources development in inland ports. The Danube region is the geographic scope of the study including Austria, Hungary, Croatia, Bulgaria and Romania. A survey completed by eleven inland port authorities (employing 1,487 staff members in total) is presented. Additionally, three transnational expert rounds are held to develop so-called "personas". These personas describe requirements and challenges for different types of future port employees. Results of the survey and the transnational expert rounds are used to better assess the current and future needs concerning human resources development in inland ports and to derive recommendations. Results suggest that the main challenge for Danube inland ports is the risk of staff shortages due to the high number of old employees. In addition, the inland port sector lacks training offers for port employees.

Keywords: Human resources development · Inland ports · Danube region · Sustainability

1 Introduction

Inland ports represent logistics hubs which facilitate transhipment between transport modes in a transport system (Dooms and Macharis 2003) and act as regulators of freight flows in supply chains (Rodrigue et al. 2010). In previous years, inland ports have hardly been recognized as a major factor that supports the improvement of transport flows in the whole supply chain since earlier research focused only on the efficiency of sea ports (Wiegmans et al. 2015). Ongoing measures to improve efficiency of inland ports mainly focus on infrastructural and technological development and hardly consider human resources (European Commission 2013; Witte et al. 2014). Political measures, companies and research focused on the improvement of infrastructure and often neglected the human factor (Fawcett et al. 2008; Rožić et al. 2016).

M. Freitag et al. (Eds.): LDIC 2020, LNLO, pp. 3–20, 2020.
https://doi.org/10.1007/978-3-030-44783-0_1

In fact, research frequently lacks analysing the role of human resources in supply chain management and rather focuses on operational issues such as transhipment infrastructure (Ellinger and Ellinger 2014; Gowen and Tallon 2003). In particular, little attention has been paid to the development of human resources in inland ports (Meletiou 2006). Thus, the goal of this paper is to provide recommendations for human resources development in inland ports. Human resources development can be defined as "a combination of training, career development, and organizational development [which] offers the theoretical integration needed to envision a learning organization, but it must also be positioned to act strategically throughout the organization" (Marsick and Watkins 1994, p. 355). In order to identify the recommendations for human resource development in inland ports, a study including a survey and three transnational expert rounds was conducted to derive the recommendations for human resources development in inland ports. The geographical scope of our study is on the Danube riparian countries. The Danube connects ten countries from the Black Forest region in Germany to the Black Sea in Romania on a distance of about 2,800 km and is hence Europe's second largest river (Dolinsek et al. 2013). The Danube area constitutes one of the most important economic regions in Europe (via donau 2018). We received responses from Austria, Slovakia, Hungary, Croatia, Bulgaria and Romania. According to CCNR, these six EU Danube countries account for 15% of total goods transport performance on European inland waterways (CCNR 2017). Table 1 illustrates the cargo volumes that are handled in the ports of these six EU Danube countries. In the past three years, the cargo volumes were on a stable level with a tendency of increased volumes in 2017 (Danube Commission 2018).

Table 1. Overview of cargo handling in EU Danube ports (data from Danube Commission 2018)

Country	Cargo volume handled in 2015 (figures in thsd. tons)	Cargo volume handled in 2016 (figures in thsd. tons)	Cargo volume handled in 2017 (figures in thsd. tons)
Austria	7,449	7,493	7,981
Slovakia	2,009	1,969	2,127
Hungary	5,978	5,439	5,799
Croatia	566	677	631.6
Bulgaria	4,547	n.a.	5,570
Romania	24,462	25,096	23,785

To cope with the increasing transport volumes that are shipped on the Danube and to meet the growing importance of Danube ports as multimodal hubs, highly qualified personnel will be needed. This is also reflected in the EUSDR, the EU Strategy for the Danube Region, where human resources represent a key issue. "People and skills" is one out of eleven priority areas that are focused by the EUSDR. This priority area aims to tackle unemployment in the Danube region, improve education and training, ensure

equal learning and labour opportunities for all persons and contribute to a closer cooperation between educational, training, labour market and research institutions (EUSDR 2018). The present paper addresses these ambitions as we aim to derive recommendations for human resources development in European inland ports.

2 Methodology

Data collection for this study took place in three steps. The first step of our study was to conduct a literature review to identify the current status of human resources development in inland ports in Europe. Based on the results of the literature review, an online survey was developed to identify the current status of human resources management and the demand for human resource development measures in the identified countries. The questionnaire for this survey was structured in four sections. The first section included general questions such as general information about the respondent and the port. The second section included questions concerning the human resource structures of the ports (i.e. number of employees, age distribution, level of education, hierarchical level). The third section dealt with the current training and educational offers which are implemented in the ports. The fourth section of the questionnaire identified the future need for training and development measures of Danube inland ports. The questionnaires were distributed to port authorities in all ten Danube riparian countries in the period from February to March 2018. In total, eleven ports from five Danube riparian countries (Austria, Hungary, Croatia, Bulgaria and Romania, see Fig. 1) completed the survey.

Fig. 1. Geographical scope of the study

As a third step, we organized three transnational expert rounds with international experts from the inland port sector to evaluate current and future needs of the inland port sector concerning measures for human resources development. These expert

rounds took place in May 2018 in Vienna (Austria), Budapest (Hungary) and Constanta (Romania). Each expert round was held in the national language (German, Hungarian and Romanian) to reduce misunderstandings due to foreign language barriers. In total, 135 experts from research and the inland port sector (such as representatives from port authorities, shippers or logistics service providers) attended the transnational expert rounds. In addition, potential future inland port employees such as logistics students were invited to attend the expert rounds. During the expert rounds, the participants developed so-called 'personas' which support the definition of requirements of future inland port employees. Personas represent a method to develop an abstract description of real people on an individual basis (Miaskiewicz and Kozar 2011). Using personas, demographic characteristics such as job tasks and requirements (e.g. tasks for future port employees) can be described (LeRouge et al. 2013).

Based on the results from the survey and the transnational expert rounds, recommendations for human resources development were derived for internal stakeholders (port authority) and external stakeholders (economic stakeholders – e.g. port companies, public policy stakeholders – e.g. government bodies, community stakeholders). The differentiation between internal and external stakeholders is necessary since both stakeholder groups require different types of measures for human resources development (Notteboom and Winkelmans 2002).

3 Literature Review

Recent trends in the transport industry such as an increasing transport of containers have a significant impact on port operations and management. These changes also bare challenges for human resources in ports. Challenges arise due to changing logistical activities, which require new qualifications for port employees in terms of education and skills. In addition, applying the principles of modern management in inland ports may be difficult since the port industry is a traditional sector (Muntean et al. 2010). The increasing number of innovations in technology such as advances in infrastructure or communication between transport modes have a great influence on jobs in the port industry. In fact, current jobs may be changed or completely new jobs or disciplines will emerge, which are not yet present in the port industry (Meletiou 2006). The hypothesis that a growing abundance of new technologies causes a rise in the employment of high-skilled staff as well as an increase in income inequality, has become known as the 'Skill-Biased Technological Change' thesis (Violante 2012). This hypothesis deals with the proven statement that job requirements and therefore qualifications, in terms of relevant skills required regarding the progressive development, caused by the development process will change. Based on these statements, better skilled workers are preferred over less-skilled workers (Trkulja 2008). It is evident that the transport industry as well as the port sector face gradual changes in terms of skill requirements caused by the rising blur of the technology. In the last decades, technological advances in the port sector focused on reducing the dependency on human effort, knowledge and skills. Only in recent years developments show a recurring importance of human resources (Meletiou 2006). Meletiou (2006) argue that a port should be seen as a 'socio-technical' system, because port performance is equally

dependent on technical applications and skilled employees. In order to see this correlation work successfully emphasis has to be given to human resource development in terms of training (Meletiou 2006). Human resources development can be defined as educational measures such as training to develop work-based knowledge or expertise aiming to foster the performance of organizations, companies or communities such as ports (McLean and McLean 2001). The aim of human resources development is to improve performance of individuals and groups in an organizational setting. Training and education can be seen as crucial parts of human resources development (Umesh 2014). Taking into account that a majority of employees in the transport sector are older than 36 years (Ecorys et al. 2015), lifelong learning measures are crucial to provide up-to-date training to current employees in the transport sector (Meletiou 2006). Due to constant changes in technology and the emerging trend of digitalization in the transport sector lifelong learning plays a crucial role (Meletiou 2006). Given the demographic change and the potential skill shortages in freight transport a central demand is to increase the employment rate of older workers aged 50 to 64. As the hiring rates of older workers are still very low compared to other age groups, a critical point is to implement measures to employ people on the long term. Although firms have promoted early retirement in the past, awareness has increased that firms are dependent on their existing workforce. As a result, firms are developing strategies to hold on to the potential of older employees (Boockmann et al. 2018). Even though the importance of human resources is recognized, there are no standardized rules for professional training of inland port employees on European level. Considering the heterogeneous standards, a regulatory option might be considered, including EU rules for port employees exceeding health and safety issues (Muntean et al. 2010).

4 Findings

In this section, we summarize the main results from the survey conducted in eleven Danube inland ports located in Austria, Hungary, Croatia, Bulgaria and Romania. It will be shown that the human resource structure of these ports varies remarkably. Especially the port of Constanta plays a crucial role as it is relatively large compared to the other ports and engages more than 60% of the employees under investigation in this study. In addition, we present and analyze the personas, which have been developed during the three transnational expert rounds.

4.1 Current Human Resource Structure in Danube Ports

To be able to develop human resource measures, it is important to first understand human resource structures in inland ports. We analyzed the age structure of the employees in inland ports since age is considered to have an impact on human resource development (Ishizaki et al. 1998; Nitrini et al. 2008). In total, the eleven participating port authorities employ 1,487 employees. The majority of employees (86%, 1,276 employees) is older than 36 years. In fact, 45% are between 36 and 50 years (669 employees) and 41% are older than 50 years (607 employees). Figure 2 summarizes the age distribution of the sample. As seen in Fig. 2, in all observed countries the majority

of the employees is older than 36 years, except for Hungary. In Hungary, the majority of people employed by port authorities are between 21 and 35 years old (53%). In particular, in the port of Adony (Hungary) the employees are relatively young since 32 port employees (68%) are between 21 and 35 years old.

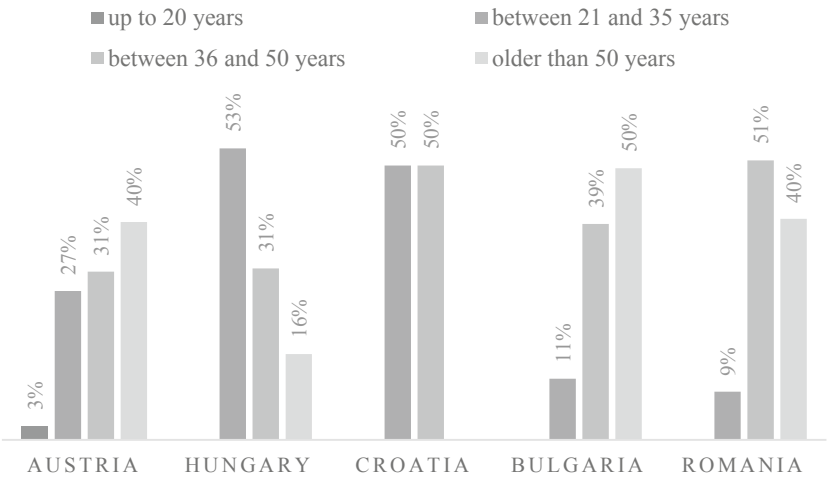

Fig. 2. Age distribution of port employees

Second, in Table 3 we analyzed the level of education of the employees. The respondents were clustered in five levels of education (1) academic degree (i.e. university degree), (2) higher education (i.e. vocational secondary school), (3) school-leaving qualification (i.e. middle school), (4) no occupational training (i.e. early school leavers), (5) other (i.e. people rejoining the labor market).

The most common reported level of education by respondents is a school-leaving qualification (58%). This result corresponds with the results of an analysis conducted by the European Commission in 2009 for the transport and logistics sector in Europe. More than half of the employees (58%) in the European transport and logistics sector have medium qualification referring to school-leaving qualification. In Central and Eastern Europe, more than three quarters of employees (81%) in the transport and logistics sector completed compulsory schooling and are medium qualified (European Commission 2009).

We found that high qualified employees which refers to higher or academic education represent the second largest group of educational level. In fact, 10% of all employees at port authorities have an academic degree and 27% completed higher education. This finding is contrary to the study conducted by the European Commission in 2009, which suggested that low qualified employees represent the second largest group (28%). According to the European Commission (2009), high-qualified employees represent the smallest share in the European transport and logistics sector (European Commission 2009). However, only 3% of people employed by port authorities considered in this study have no occupational training. As shown in

Table 2. Educational level of port employees

	Austria	Hungary	Croatia	Bulgaria	Romania
(1) Academic degree	18	7	5	–	120
(2) Higher education	22	12	3	59	310
(3) School-leaving qualification	129	23	–	246	466
(4) No occupational training	25	5	–	–	15
(5) Other	5	17	–	–	
Total	**199**	**64**	**8**	**305**	**911**

Table 2, in particular in Croatia (port of Vukovar) a high share of employees at port authorities have an academic degree or completed higher education.

Table 4 categorizes the port employees in five management level (1) top management (e.g. CEO), (2) middle management (e.g. head of department), (3) lower management (e.g. administration or accountant), (4) operational level (e.g. crane driver, warehouse worker) or (5) other. The majority of employees (52%) are working on operational level followed by lower management (e.g. administration or accountant) (34%). Few employees can be found in the top management such as the board of directors or CEO and middle management such as head of department or logistics manager.

Table 3. Management level of port employees

	Austria	Hungary	Croatia	Bulgaria	Romania
(1) Top management	4	4	2	6	9
(2) Middle management	12	9	–	19	45
(3) Lower management	49	16	6	42	361
(4) Operational	34	34	–	151	496
(5) Other	–	–	–	89	–
Total	**99**	**63**	**8**	**307**	**911**

Figure 3 shows the distribution of male and female employees for the responding countries. The majority of people employed by port authorities included in the survey were male (77%). This is also the case on national level (see Fig. 3). Worth mentioning, is that on port level two inland ports show different results concerning gender distribution. In the port of Vienna (Austria), more women (78 women) than men (38 men) are employed. This result is similar to the port of Baja (Hungary), with three female and one male employee.

The gender distribution on management level is summarized in Table 4. Results show that the majority of female employees (62%) is working in lower management positions (e.g. administration) followed by operational positions such as crane drivers (25%). The majority of male port employees can be found in operational (61%) or lower management positions (25%). It is evident that all management levels are

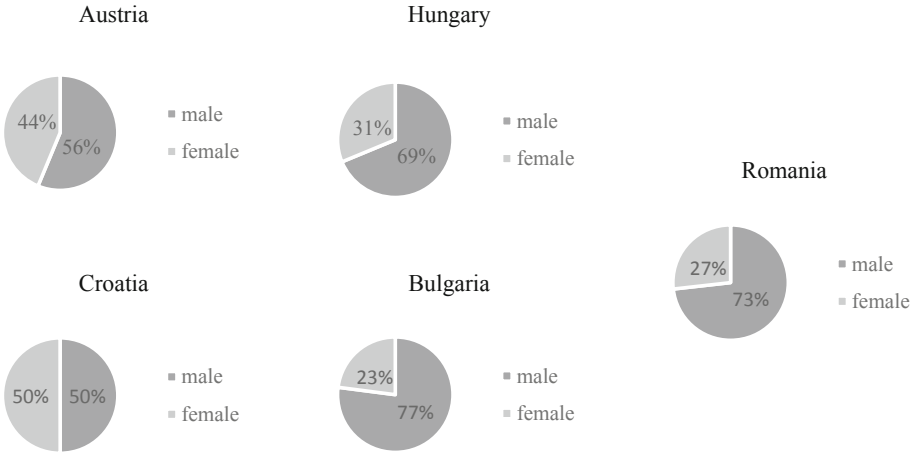

Fig. 3. Gender distribution of port employees on national levels

Table 4. Gender distribution categorized in management level of port employees

		Austria	Hungary	Croatia	Bulgaria	Romania	Total
Top management	Male	3	3	1	6	6	19
	Female	1	1	1	0	3	6
Middle management	Male	9	7	–	12	24	52
	Female	3	3		7	21	34
Lower management	Male	35	1	3	29	183	251
	Female	14	13	3	13	178	221
Operational	Male	34	31	–	106	455	626
	Female	0	5		43	41	89
Other	Male	–	–	–	82	–	82
	Female				7		7
Total	Male	81	42	4	225	668	1020
	Female	18	22	4	70	243	357

dominated by male employees. The share of male employees is the highest in the top management level (76%) and the operational level (88%), which represent both a male domain in inland ports.

Concerning the management level, results demonstrate that the majority of port employees are working on operational level. This result is in line with the statistics presented in a report elaborated by Christidis et al. (2014). The authors concluded that in the transport industry a small share of employees works in top and middle management positions and a higher share of employees in the lower management or operational level (Christidis et al. 2014).

4.2 Current and Future Training Requirements

The survey included questions about trainings that are currently offered by port authorities. In Austria, operational training (e.g. operation of logistical equipment), administrative training (e.g. IT training, accounting), social skills training (e.g. communication skills) and safety training are provided by port authorities. In general, these trainings are carried out by experienced employees for new employees on an individual basis. Trainings on port level (e.g. for all companies located in the port area and port authorities) are only organized in the case of safety trainings. The trainings offered by port authorities in Hungary focus on logistics, administration, safety and sustainability. The ports in Hungary do not provide trainings concerning social skills or law. Trainings at ports are organised annually or if required by employees. New employees may demand training by port authorities if required. Currently, there are no funding sources in Hungary, which would support training in the inland port sector. Substantial financial support would be needed for trainings in port operation, port management (incl. port strategy, lean management), as well as trainings for operators of cranes, forklifts, front loaders or truck drivers. Funding for training on the topic of IT and language skills are also considered relevant by Hungarian port authorities. In Croatia, the port authority Vukovar as a public institution is not in charge of offering any trainings for employees in the port. Training measures of Bulgarian ports focus on operational, administrative and safety training. In contrast, the port of Constanta offers a wide range of trainings for port employees. Training measures include operational, administrative, social skills and safety training as well as trainings on the topic of sustainability and law. Trainings are in most cases organized if demanded by employees (e.g. new employees are hired).

Port authorities were also asked whether they are planning to adapt their current training programs for employees in the near future. Only two port authorities from Austria and Hungary mentioned that they are planning to adapt their current training programs in the future. Respondents mentioned that further training is required in the fields of administration, operation, social skills, law and safety. Port authorities indicated that they prefer online learning materials/online courses, expert rounds moderated by experts from the industry, field-trips to other ports or companies located in port areas and specified courses organized by educational institutions such as universities for training purposes in the future. The survey also included a question whether port authorities think that standardized training in Danube inland ports may increase the competitiveness of inland ports and inland waterway transport in the Danube region in the future. Results show a contrary result: respondents indicated that on the one hand standardized training may facilitate standardized processes in inland ports and that the quality of port processes may be increased. On the other hand some respondents mentioned that standardized training would be needed in logistics in general but despite that, national peculiarities must be taken into account. The European Commission (2009) also mentioned the issue, that the training and education system should rather be adapted on national than on European level. However, cooperation on sector-specific level should be pursued to facilitate cooperation in the inland port sector (European Commission 2009).

4.3 Personas – Description of Future Employees Types

Three transnational expert rounds were organized in Austria, Hungary and Romania in May 2018. Stakeholders from research and the inland port sector such as representatives from port authorities, shippers or logistics service providers attended the expert rounds. During each expert round, three personas were developed for the top management, the middle management and lower management/operational level. The lower management and operational level have been summarized during the expert rounds since stakeholders argued that they are not sure whether the operational level will be obsolete due to technological advances. The results for each management level are summarized in Table 5. The first line shows the main biographical background, the second line contains the main working conditions of the job and in the third line the required competences and skills are summarized. The last line includes the main chances and challenges for the personas for the three management levels. Expert rounds participants mentioned that the top management positions can also be occupied by women. In fact, expert rounds participants stated that they believe a woman or man can occupy a position in the top and middle management in the future and that these management levels will not be dominated by men in the future. This result is contrary to the results of the survey stated above. Based on the survey 76% of port employees in the top management and 60% of port employees in the middle management are male. Concerning the operational level, expert rounds participants mentioned that the operational level would remain a male domain in the future. These results are in agreement with those obtained in the survey conducted prior to the expert rounds. An interesting result is that in all three transnational expert rounds participants mentioned that each of the three personas need to have IT know-how (e.g. general computer skills).

Table 5. Summary of personas developed in the three transnational expert rounds

	'CEO/Port Manager' (top management)	'Operations Manager' (middle management)	'Port Worker' (lower management/operational)
Biography	• Male/female • 40 years or older • Work experience in port business/general business: +15 years • Lives close to port (short distance commuter) • Work-life balance is important • Married/divorced with children	• Male/female • 35 years old • Lives close to port (short distance commuter) • Work-life balance is important • Technical/commercial education with engineering background • Long work experience (~5–10 years) • Married/divorced with children	• Male • 25–30 years old • Migration background (Austria) • Not married, no children • Lives close to port (short distance commuter) • Secondary education/school-leaving qualification
Working conditions	• Income: ~3,000 € (50% fixed and 50% variable part) • High responsibility • Working more than 8 h/day, weekends if necessary, overtime is own responsibility (~10 h overtime per week) • From CIO (Chief Information Officer) to CEO (Chief Executive Officer)	• Income: ~1,800 € (70% fixed and 30% variable part) • Flexible working hours (home office) • Responsible for operational (e.g. logistical) activities in port • High availability necessary (24/7) in case of emergencies	• Income: ~1,000€ • Diverse responsibilities which include maintenance, facility management and other operational tasks (e.g. forklift driver) • Shift work with fixed hours

(*continued*)

Table 5. (*continued*)

	'CEO/Port Manager' (top management)	'Operations Manager' (middle management)	'Port Worker' (lower management/operational)
Competences/ skills	• Financial skills and competences • Multiple languages: local language, English, second foreign language • IT know-how (ECDL exam, general computer skills) • Leadership skills • Social and networking skills • Logistical knowledge • Sensitivity for innovation (knows which trend is relevant to the port and which is not) • Life long learning and further training to stay up to date (e.g. attending expert rounds, online trainings,…)	• Technical, commercial and engineering know-how • Multiple languages: local language, English, second foreign language • IT know-how (ECDL exam, general computer skills) • Stress resistant • Social competence • Networking/communication skills	• Language skills: local language and English • IT know-how (general computer skills) • Willing to learn new things (further training) • Networking/ communication skills • Skilled craftsmanship
Chances and challenges	Chances: • Various development opportunities through collaboration with different industries • Further training possible (life-long learning) Challenges: • Has to handle a high level of stress • Pressure to reduce costs from various stakeholders • Has to react to market changes	Chances: • Freedom of design in the job • Possibility to inspire and stimulate colleagues Challenges: • Maintain port operations 24/7 • Stress • Multitasking skills are required	Chances: • Training courses for constant professional development • Interactive work environment Challenges: • Working on shifts, fulfilling different tasks

5 Discussion and Recommendations for Human Resources Development

The freight transport sector is often recognized as unattractive labor sector as it is associated with long working hours, poor working conditions and low salaries. Due to the lack of clear career progression and funding sources, especially young persons, which are interested in working in the transport sector, have to obtain the relevant training on their own costs (e.g. driver training costs). Another challenge in the freight transport sector is that almost a third of employees are older than 50 years and will retire in the coming 10 to 15 years. The inability to attract new employees in combination with the current age-distribution of employees in freight transport poses a major challenge to the transport sector (Ecorys et al. 2015). This finding is in agreement with the results obtained in the study. The majority of people employed by port authorities are older than 36 years. Only few port authorities employ students or people who are still in training. Ecorys et al. (2015) indicate that campaigns to attract young people and females to work in freight transport are an important measure to counteract the shortage of employees in the freight transport sector. This measure may also counteract the

increasing shortage of qualified personnel in the inland port sector. Port authorities themselves can launch these campaigns in order to attract qualified young people and female employees. Thus, port authorities can also make sure to include country or region specific prerequisites, which only apply for their own inland port. In addition, campaigns on international level (e.g. Danube region) launched by politics or other interested groups from the inland ports industry such as non-profit organizations (e.g. EFIP - European federation of inland ports) could increase the awareness of inland ports as an attractive work place for young people. By organizing field trips to inland ports for educational institutions with logistics specialization young people such as students could learn more about the work place inland port. Putz et al. (2018) argue that field trips can be seen as an effective measure to inform students about the possible future career paths in logistics by involving practitioners and hands-on experiences.

The majority of employees in the freight transport sector are male. In fact, the share of male employees in the freight transport sector is projected to remain at 80% until 2020 (Christidis et al. 2014). In 2006, 84% of employees in the EU-25 transport sector were male (Schneider et al. 2011). The share of female employees is particular low in the land and water transport sector (Christidis et al. 2014). Even though in recent years the share of female employees in the freight transport sector has increased, the freight transport sector is still dominated by men. This may be due to the fact that the majority of jobs with a risk of accidents and injuries are occupied by men (Schneider et al. 2011). As the results of the study show, the majority of port employees are working on operational level (e.g. forklift driver, berth operator) and thus are confronted with a higher risk of accident and injuries than employees in office jobs. This may be an explanation for the male dominance in the inland port sector. The findings presented by Schneider et al. (2011) and Christidis et al. (2014) are also in accordance with the results of the study: the majority of employees were male (77%). However, as the personas elaborated during the three transnational expert rounds show, participants do not perceive top and middle management positions in inland port authorities as a male domain. In fact, during all three transnational expert rounds participants mentioned that gender is not an issue in the top and middle management (see Table 5). The image of the freight transport sector in general as well as the image of inland ports as a work place need to be improved in the future to attract women (European Commission 2009). Again, specific campaigns to disseminate inland ports as attractive work places can be named as an effective measure to attract women to work in inland ports in the future (Ecorys et al. 2015). By organizing field-trips to inland ports for women (e.g. women's day in inland ports) including a special program tailored to the target group of women, female participants can have practical insights into potential career paths in inland ports (Putz et al. 2018).

Currently, only standardized rules for health and safety issues for professional training of port employees on European level exist (Muntean et al. 2010). As results of the study show, training measures vary on national as well as on inland port level on national level. The European Commission (2009) argues, that harmonized training and education systems on national level are required in the freight transport sector. Transnational cooperation on sector-specific level such as the inland port sector should

be pursued to facilitate cooperation in industry. In addition, demographic prerequisites including gender and age should be taken into account when implementing these training measures. Joint training measures such as shared training facilities and the implementation of various learning materials such as online learning may be considered (European Commission 2009). van Hoek (2001) and Gravier and Farris (2008) argue that an adaption of the curriculum in logistics education is needed. Since curricula in logistics education have not been fundamentally changed in the last decades, new requirements from the freight transport industry concerning skills of logistics graduates are not respected (Gravier and Farris 2008; van Hoek 2001). Besides including relevant topics such as digitalization or new trends in the inland port sector, teaching methods need to be adapted in logistics education. Including interactive teaching methods such as presentations and practical teaching methods such as field-trips are considered as suitable teaching methods in logistics education (van Hoek 2001).

The trend of digitalization has mainly influenced the education sector. Educational resources such as textbooks or course materials are publically available online and free of charge. Due to the trend of digitalization, distance learning is also facilitated (Butcher et al. 2011). An adaption of the curriculum in logistics education including topics relevant for the inland port sector may be an appropriate measure to develop standardized training for port employees in the Danube region. However, national prerequisites should be respected in such standardized training measures, since this was also mentioned by port authorities in the survey and pointed out by the European Commission (2009). As already mentioned at the beginning of this chapter, almost a third of employees in the freight transport sector are older than 50 years and will retire in the coming 10 to 15 years (Ecorys et al. 2015). This can also be supported for the inland port sector by the results of the survey conducted. Lifelong learning measures can be identified as important measures in human resources development to guarantee that current port employees are up-to-date concerning relevant trends and developments in the freight transport sector with special focus on inland ports. Finally yet importantly, providing adaptable online learning materials may be an effective measure to provide learning materials for employees of port authorities at low or now costs. National prerequisites can be included by port authorities themselves (Butcher et al. 2011). As a supplement, field trips or expert rounds with stakeholders from the inland port sector may be suitable to transfer the required knowledge. By allowing logistics students to gain firsthand insights into the various tasks in the inland port sector the learning experience of participants may be enhanced (Butcher et al. 2011; Putz et al. 2018) (Table 6).

Table 6. Recommendations for human resources development in Danube inland ports

Problem description	Recommendations	Target group	Measures
Majority of port employees are older than 35 years and will retire in the next 10–15 years	Promote inland ports as attractive work place for young people	*Internal*: Port authorities *External*: Economic stakeholders (e.g. port companies) Public policy stakeholders (e.g. educational institutions) Community stakeholders (e.g. non-profit organizations such as EFIP)	• Dissemination of career opportunities for young people in inland ports • Field-trips for schools
Majority of port employees are male, especially top management and operational level are male dominated	Promote inland ports as attractive work place for women	*Internal*: Port authorities *External*: Economic stakeholders (e.g. port companies) Public policy stakeholders (e.g. educational institutions) Community stakeholders (e.g. non-profit organizations such as EFIP)	• Dissemination of career opportunities for women in inland ports • Field-trips for women (women's' day)
No standardized training for port employees; training measures on individual basis	Development of standardized training for port employees	*Internal*: Port authorities *External*: Economic stakeholders (e.g. port companies) Public policy stakeholders (e.g. research institutions, educational institutions) educational institutions)	• Adaption of curriculum in logistics education • Long-life learning measures • Blended learning: online learning in combination with expert rounds

6 Conclusion, Limitations and Research Outlook

The aim of this paper was to derive recommendations for human resources development in European inland ports. Therefore, a survey in inland ports and three transnational expert rounds were conducted to assess the needs of the inland port sector concerning human resources development. The geographical scope of the study was the Danube region which represents a major economic area in Europe (via donau 2018). In total, eleven port authorities covering 1,487 employees from five countries on the Danube participated in the survey. We found that the majority of the employees in Danube inland ports are male and have a school-leaving qualification. This is also concordant with previous studies conducted by European Commission (2009) and Ecorys et al. (2015). The majority of port employees employed by port authorities participating in the study are older than 36 years entailing the risk of shortage of staff in inland ports in the next decades due to the retirement of current employees. In the future, experts from the inland port sector expect a balance in terms of gender in inland ports. Results show that in the future, further training measures are required by inland ports. In addition, measures to promote inland ports as an attractive work place to young people and women are required.

This research contributes to existing knowledge about human resources in the freight transport sector as we point out additional insights about the inland port sector as a work place in the freight transport sector. As results of the study show, inland ports are work places which are dominated by older and male employees. Results of the survey emphasize the need for a higher level of understanding of the work place inland port. Based on the empirical data, we derived three recommendations for internal and external stakeholders to support the development of human resources in inland ports. The first recommendation aims to promote inland ports as a work place for young people. The majority of employees in inland ports is older than 36 years. These employees will retire in the next 10 to 15 years which may lead to a shortage of staff in inland ports. By promoting inland ports as attractive work places among young people such as logistics students by promoting inland ports as work places during lectures (e.g. guest lecture from port authority in school), new qualified employees may be recruited for inland ports. Port authorities, as internal stakeholders, as well as external stakeholders such as educational institutions should be involved to successfully implement this recommendation. The second recommendation focuses on promoting inland ports as work places for women since the majority of employees in inland ports are male. Organizing field trips to inland ports only for women (e.g. a women's day in inland ports) can be named as a potential measures to implement the second recommendation. Again, internal and external stakeholders should be involved to increase the probability of success. Developing standardized training for port employees in inland ports was identified as the third recommendation in this study. As the results of the study show, no standardized training is provided in Danube inland ports included in the survey and port authorities remarked that they lack adequate training for port employees and partly are planning to adapt their current training measures. This may be achieved by adapting current logistics education curricula and by providing online learning materials, which can be used independently by employees in inland ports. Furthermore, we identified the

challenges for future employees in inland ports and developed possible scenarios in form of three personas. Those three personas were elaborated based on management levels. The personas aimed to better understand the challenges of future employees in inland ports and to derive measures to meet the training needs of future employees.

This study has several limitations, which influence generalizability. Out of seven EU-member Danube states, we received responses from five EU-member states. Thus, results could be different if we would have received data from the missing Danube states Germany and Slovakia. Moreover, the sample size is limited to eleven respondents which may influence validity of the results. A comparison including more Danube inland ports would be interesting to better assess the current needs concerning human resources development. For future surveys, we suggest translating the questionnaires to tackle possible linguistic barriers.

For further research, we would recommend the inclusion of inland ports in the Rhine area to provide a comprehensive picture of the current needs concerning human resources development in a broader European region. Moreover, we assume that a comparison of human resource development needs in the Danube and the Rhine region may identify interesting differences and similarities. In addition, a survey on individual level rather than port authority level may be required to better understand the individual needs of employees in inland ports concerning human resources development. By including shippers or companies located in the port area of the considered inland ports similarities and differences may be identified concerning the needs for human resources development in inland ports. Besides training and qualification, an additional focus in future could be on the appreciation of the different jobs. Moreover, there may be country-specific differences in providing the training and qualification measures in cooperation between ports, authorities, universities and training centers, which could be analyzed in future. Finally we suggest that future research should analyze the current funding schemes for human resources development in European inland ports to provide internal and external stakeholders with recommendations for financial funding sources.

Acknowledgment. This research is part of the research field 'sustainable transport systems,' which was funded by the State of Upper Austria as part of the research program 'FTI Struktur Land Oberösterreich'. The results presented are part of the project DAPhNE, funded by Interreg Danube Transnational Programme (DTP1-196-3.1). Any opinions, findings, and conclusions or recommendations expressed in this paper are those of the authors and do not necessarily reflect those of the cooperating partners.

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