

COMPETENCE REQUIREMENTS FOR LOGISTICS MANAGERS IN SERBIA: A LONGITUDINAL ASSESSMENT

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Abstract: *Today, logistics and supply chain management is attractive and very demanding field for a professional career. The competences that the employers in this field require from employees continue to evolve and change. This paper aims to provide a longitudinal assessment of two studies of online ads of logistics and supply chain management jobs conducted in the Republic of Serbia. Both these studies used the same methodology of collected, coded and analysed job ads. The ads were analysed by deductive content analysis and related quantitative indicators. The aim is to reinforce the results of these studies by searching statistical similarities in professional and fundamental competences of logistics and supply chain managers. Also, several studies done in the US, the UK, Germany, Brazil, etc. will be used for drawing conclusions. The outcomes of this paper can be valuable to educators, to educational and professional institutions, and to other interested parties.*

Keywords: *logistics and supply chain professionals, competence, longitudinal study, the Republic of Serbia.*

1. INTRODUCTION

Logistics and supply chain management (SCM) is one of the most important fields for the competitiveness of participants in supply chains and total supply chains. In this field competences of the logistics and SCM professionals are more important than physical infrastructure and information and communication processes. The logistics and SCM professionals should have a right combination of competences to continually manage processes in supply chain, and to improve them with collaboration and integration, in order to satisfy real customer requirements. The required competences of these professionals can vary from one country to another, from one industry to another, from one market to another, from one supply chain to another, from one company to another,

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and from one process to another. It is very important that logistics and SCM professionals are well educated, trained and 'equipped' with both professional and fundamental competences. The focus here will be on what logistics and supply chain managers need to do in companies in the Republic of Serbia, and what important competences they need to have to do what they need to do in that companies.

The reminder of the paper is organized as follows. In the next section, a review of studies on competence frameworks and models for logistics and SCM professionals is given. Then, the methodology of this longitudinal study is presented. The following section presented the results of this longitudinal assessment of two studies of logistics and SCM job ads conducted in the Republic of Serbia and gave discussion of these results. Finally, some conclusions are offered.

2. LITERATURE REVIEW

The connection between SCM and human resource management (HRM) can be viewed as a key to business success of supply chains (e.g. Derwik et al., 2016; Derwik and Hellström, 2017; Sun and Song, 2018). There are a number of studies that have considered the HRM issues in the logistics and SCM field. Some of these studies are focused on developing new competence framework or model for logistics and SCM professionals, and some of them tried to test the importance of different competences of these professionals (e.g. Cvetić et al., 2017; Cvetić et al., 2018).

Here, it is valuable to start with the well-known BLM (Business, Logistics and Management) framework developed by Poist in 1984 (Murphy and Poist, 1991). The BLM framework has been customized several times by the same or other interested researchers (e.g. Murphy and Poist, 1991; Murphy and Poist, 2006; Murphy and Poist, 2007; Thai, 2012; de Almeida Vilela et al., 2018), often, in order to reveal the importance of business, logistics and management competence requirements for logistics and SCM professionals. Almost all of these studies confirmed that these professionals first should be managers, than logisticians and businessmen. The empirical studies which used the BLM framework were carried out in the US, Ireland, Spain, Singapore, Malaysia and Australia, according to Cvetić et al., 2018. Several researchers try to reveal the most important competences of logistics and SCM professionals. Thus, Gammelgaard and Larson (2001) identified 45 SCM competences and grouped them into the three groups: interpersonal/managerial basic skills, quantitative/technological skills and SCM core skills. Giunipero with colleagues have been tried to find the most important skills for supply managers (Giunipero and Percy, 2000; Giunipero et al., 2005; Giunipero et al., 2006). The very well-known association for supply chain management APICS developed five competence models for logistics and SCM professionals in 2011. These competence models were slightly, more visually, were changed in 2014 (APICS, 2014). Cvetić developed the competence model for logistics and supply chain managers in 2014 (Cvetić, 2016), and further used it with her colleagues for empirical findings in the Republic of Serbia (e.g. Cvetić et al., 2015; Cvetić et al., 2017; Cvetić et al., 2018). Derwik and Hellström (2017) determined the competence in SCM as a combination of four elements: functional competence, relational competence, managerial competence and behavioral competence; on the individual, intra-organizational and inter-organizational levels. Sun and Song (2018) identified the following five competence categories: professional knowledge, business management, communication and teamwork, self-management and

improvement, and social responsibility. Campos et al. (2019) examined competences for SCM professionals in the mid-sized supermarket sector in Brazil. Bak et al. (2019) put attention to the required soft skills for supply chain managers.

Some researchers try to identify really important competences from logistics and SCM professionals throughout the empirical studies based on job ads analysis. Radovilsky, Hegde and Kandasamy probably were the first authors who conducted logistics job ads analysis in 2007 (see e.g. Radovilsky & Hegde, 2012, Cvetić et al., 2017). Sodhi et al. (2008) analysed job ads for MBA graduates from the field of SCM and offer interesting view about important supply chain topics for leading business schools in the US. Rossetti and Dooley (2010) examined SCM job ads and suggested the three major types of SCM jobs, namely sourcing manager, operations consultant and supply chain information manager. Cacciolatti with colleagues analysed SCM job ads in the UK labour market and provided some good propositions for educational institutions (Cacciolatti and Molinero, 2013; Cacciolatti et al., 2017). Kotzab and Wünsche (2015) examined logistics jobs in Germany and made relation with primary and secondary qualifications. Cvetić, Vasiljević and Danilović collected logistics and SCM job ads in the Republic of Serbia in 2014 and 2017 and indicated on the most required professional and fundamental competences of logistics and supply chain managers (e.g. Cvetić et al., 2017; Cvetić et al., 2018). Kotzab et al. (2018) examined key competences of logistics and SCM professionals from the perspective of lifelong learning.

Of course, there are other studies that have examined the general or specific connections of both HRM and SCM domains.

3. METHODOLOGY

The focus of this study is to provide a longitudinal assessment of two studies of online logistics and SCM job ads conducted in the Republic of Serbia in 2014 and 2017. Both these studies used the same methodology of collected, coded and analysed job ads.

Probably the first study of logistics and SCM job ads in the Republic of Serbia was conducted in 2014 (Cvetić et al., 2015; Cvetić, 2016; Cvetić et al., 2017). Then, job ads were collected from the 1st April to the 1st July 2014 on the well-known domestic on-line job portal Infostud (<http://poslovi.infostud.com>) and the total of 35 relevant ads was collected and analysed. The second study of logistics and SCM job ads in the Republic of Serbia was conducted in 2017 (Cvetić et al., 2018). The relevant job ads were collected from the 1st March to the 31st May 2017 on the same job portal Infostud and the total of 65 ads was collected and further analysed.

The content of every job ads was carefully manually coded by using deductive content analysis (e.g. Cvetić, 2016; DeFranco and Laplante, 2017; Cvetić et al., 2017). The ground for analysis was the previously developed competence model for logistics and supply chain managers (described in Cvetić, 2016) and the supporting MS Excel data base. This competence model for logistics and supply chain managers distinguishes the three levels of competences: the level of education and relevant work experience, and the levels of professional and fundamental competences. Additionally, the MS Excel data base is made according to this competence model and was used as a supporting tool for deductive content analysis. This was a way how the qualitative data were transformed into the

quantitative data given through the two quantitative indicators. These quantitative indicators are:

P_k - the percentage of ads in which the specified competence has at least one occurrence [%];

M_k - the average number of occurrences of the specified competence per job ad [1].

The percentage of ads in which the specified competence has at least one occurrence (P_k) represents the relation between the number of ads in which the competence k ($k = 1, \dots, m$) has at least one occurrence (A_k) and the total number of ads (N).

$$P_k = \frac{A_k}{N} \cdot 100 \quad [\%] \quad (1)$$

The average number of occurrences of the specified competence per job ad (M_k) represents the relation between the total number of occurrences of competence k in all ads (C_k) and the total number of ads (N).

$$M_k = \frac{C_k}{N} \quad [1] \quad (2)$$

At the end, the data was used for providing a longitudinal assessment of these two studies of online logistics and SCM job ads conducted in the Republic of Serbia. The aim is to reinforce the results of these studies by searching statistical similarities in professional and fundamental competences of logistics and supply chain managers.

4. RESULTS

The number of logistics and SCM job ads collected in the Republic of Serbia in 2014 was 35, and in 2017 was 65. This can be viewed as some kind of increase in logistics and SCM job offers between the two observed time intervals (Table 1). The international companies that do business in the Republic of Serbia offered higher number of jobs than the domestic companies. These jobs were offered in different sections, mostly in wholesale and retail trade, repair of motor vehicles and motorcycles, manufacturing section and transportation and storage section. The largest number of jobs was offered in Belgrade and Novi Sad. The logistics and SCM job ads were published even equally in English and Serbian language.

The logistics and SCM job ads vary in structure, but generally, they include the data about the job title, job location, job description, required competences and application instructions (Cvetić et al., 2017). The data about salary were not included (Cvetić et al., 2017, Cvetić et al., 2018).

The results about the level of education show that candidates need to have at least a university bachelor's degree. This was requirement in 60% of the observed job offers, interesting, in both these two time intervals (see Cvetić et al., 2017, Cvetić et al., 2018). Usually, the university bachelor's degree from a specific faculty is not required and employers gave attention to the preferred fields of study (e.g. logistics, engineering, technical field, traffic engineering, operations management, economics, business administration, international trade). The possibility of having other school qualification was also sometimes mentioned, but of course, in combination with additional extensive managerial experience (Cvetić et al., 2017, Cvetić et al., 2018). Requirements regarding

previous work experience were very strictly at the first sight to the job offers. Almost, for more than 80% of logistics and SCM jobs, the relevant work experience was obligatory (Cvetić et al., 2017, Cvetić et al., 2018). A lot of job offers were for candidates with at least one/two/three/four years of professional experience. Also, there were job offers for candidates with over eight years of relevant work experience (Cvetić et al., 2018).

Table 1. Logistics and SCM Job Offers Profile

Empirical study	2014.	2017.
Number of logistics and SCM jobs offers	35	65
Job offers by companies		
Domestic companies	31.43 [%]	40.00 [%]
International companies	68.57 [%]	60.00 [%]
Job offers by industry		
Wholesale and retail trade; repair of motor vehicles and motorcycles	17.14 [%]	36.92 [%]
Manufacturing	57.14 [%]	35.38 [%]
Transportation and storage	17.14 [%]	12.31 [%]
Information and communication	0	6.15 [%]
Administrative and support service activities	0	6.15 [%]
Professional, scientific and technical activities	0	3.08 [%]
Construction	5.71 [%]	0
Agriculture, forestry and fishing	2.86 [%]	0
Job offers by town		
Belgrade	51.43 [%]	60.00 [%]
Novi Sad	11.43 [%]	13.85 [%]
Subotica	2.86 [%]	6.15 [%]
Indjija	2.86 [%]	3.08 [%]
Sabac	0	3.08 [%]
Vrbas	0	3.08 [%]
Kikinda	0	1.54 [%]
Kladovo	0	1.54 [%]
Leskovac	0	1.54 [%]
Ruma	11.43 [%]	1.54 [%]
Senta	0	1.54 [%]
Smederevo	0	1.54 [%]
Zajecar	0	1.54 [%]
Kragujevac	5.71 [%]	0
Aleksinac	2.86 [%]	0
Backa Palanka	2.86 [%]	0
Gornji Milanovac	2.86 [%]	0
Nis	2.86 [%]	0
Zrenjanin	2.86 [%]	0
Job offers by language		
Serbian	54.29 [%]	47.69 [%]
English	45.71 [%]	52.31 [%]

When it comes to the professional and fundamental competences of logistics and supply chain managers, two quantitative indicators were calculated and used, as previously mentioned. These are the percentage of ads in which the specified competence has at least one occurrence (P_k); and the average number of occurrences of the specified competence per job ad (M_k) (Tables 2 and 3). It can be concluded that the seven most required

professional competences of logistics and supply chain manager in the Republic of Serbia are: performance management, customer relationship management, demand forecasting and inventory management, warehouse management, supplier relationship management, transportation management, and distribution management (Table 2). On the other side, the two least required professional competences are: product introduction into the market, and designing supply chain. The statistically significant difference was found between the percentages of ads in which the specified professional competence has at least one occurrence in 2014 and 2017 (Wilcoxon signed-rank test: $N=15$; $Z=-1.988$; $p=0.047$). Positive ranks (12) outnumbered negative ranks (3), which mean that between the two observed time intervals from 2014 and 2017 the indicator P_k has grown. The statistically significant difference was not found between the average numbers of occurrences of the specified professional competence per job ad in 2014 and 2017 (Wilcoxon signed-rank test: $N=15$; $Z=-1.712$; $p=0.087$).

Table 2. Indicators of professional competences of logistics and supply chain manager

Professional competences	P_k [%]		M_k [1]	
	2014.	2017.	2014.	2017.
Empirical study				
Performance management	74.29	80.00	2.23	3.17
Customer relationship management	68.57	73.85	1.54	1.78
Demand forecasting and inventory management	71.43	69.23	2.20	2.14
Warehouse management	40.00	61.54	1.09	1.74
Supplier relationship management	48.57	60.00	1.51	1.95
Transportation management	37.14	56.92	0.77	1.89
Distribution management	34.29	50.77	0.94	1.26
International logistics	22.86	46.15	0.31	0.89
IST as a function of logistics support	34.29	38.46	0.71	0.66
Manufacturing management	45.71	33.85	1.49	1.29
Lean management	31.43	21.54	1.23	0.51
Maintenance management	17.14	18.46	0.29	0.58
Reverse and green logistics	11.43	12.31	0.17	0.17
Product introduction into the market	5.71	6.15	0.14	0.06
Designing supply chain	2.86	3.08	0.03	0.03

The seven most required fundamental competences of logistics and supply chain manager in the Republic of Serbia are: basics of information systems and technologies (IST) with special focus on spreadsheets and data bases, communication, planning and organizing of tasks, foreign languages, team work, solving problems and continuous learning (Table 3). The least required fundamental competence is math and statistics, according to data. The statistically significant difference was not found between the percentages of ads in which the specified fundamental competence has at least one occurrence in 2014 and 2017 (Wilcoxon signed-rank test: $N=14$; $Z=-0.94$; $p=0.925$). Also, the difference was not found in relation with indicator M_k of fundamental competences of logistics and supply chain manager (Wilcoxon signed-rank test: $N=14$; $Z=-0.944$; $p=0.345$).

Table 3. Indicators of fundamental competences of logistics and supply chain manager

Fundamental competences	P_k [%]		M_k [1]	
	2014.	2017.	2014.	2017.
Empirical study				
Basics of IST (special focus on spreadsheets and data bases)	80.00	93.85	0.91	1.40
Communication	88.57	92.31	2.00	2.63
Planning and organizing of tasks	82.86	89.23	2.14	3.15
Foreign languages	82.86	89.23	1.09	1.26
Team work	77.14	80.00	1.17	1.32
Solving problems	62.86	63.08	0.91	1.09
Continuous learning	45.71	52.31	0.97	0.86
Leadership	34.29	49.23	0.71	0.86
Interpersonal skills	77.14	49.23	1.66	0.83
Decisions making	42.86	30.77	0.49	0.49
Business management	57.14	23.08	0.71	0.31
Integrity	22.86	23.08	0.31	0.23
Project management	22.86	21.54	0.31	0.42
Math and statistics	22.86	4.62	0.23	0.05

4.1 Discussion of results

This is probably the first longitudinal study of logistics and SCM job ads which is conducted in the Republic of Serbia. Results of this study are attractive because they are derived from the real requirements of employers for the logistics and SCM professionals. However, some of the limitations of this longitudinal study should be noted. First, this study is limited to one developing country – the Republic of Serbia. Second, the study is limited to the two time intervals in 2014 and 2017, and one source of logistics and SCM job ads. Another limitation of this study is that all logistics and SCM job ads are considered without making difference between entry-level logistics jobs, senior logistics managers, supply chain managers, procurement managers, supply chain planners and analysts, and humanitarian logisticians (see e.g. Murphy and Poist, 1991, Giunipero and Percy, 2000, Gammelgaard and Larson, 2001, Razzaque and Sirat, 2001, Murphy and Poist, 2006, Flöthmann et al., 2018). Also, in this study the difference regarding size of companies was not considered (see e.g. Wagner et al. 2018).

The results show that employers expect candidates with university bachelor's degree and relevant work experience. In some cases, they are open for candidates with other school qualification and extensive relevant work experience (Cvetić et al., 2017, Cvetić et al., 2018). Several other studies done in the United Kingdom and Germany, which have similar scope, also emphasize the importance of relevant work experience and the ability of fast understanding processes in supply chain (Cacciolatti and Molinero, 2013; Kotzab and Wünsche, 2015). Derwik et al. (2016) indicated that work experience is very important for logistics and SCM professionals (p. 4824). Kotzab et al. (2018) pointed out that work experience was required for almost all logistics and SCM job open positions in Germany. Kotzab and Wünsche (2015) went further and emphasized that relevant work experience is 'the most important qualifier for an employment position in logistics' and supply chain management field (p. 517).

The most required professional competences of logistics and supply chain manager in the Republic of Serbia are: performance management, customer relationship management, demand forecasting and inventory management, warehouse management, supplier

relationship management, transportation management, and distribution management (Table 2). These outcomes might be compared with findings of two studies done in the US and Brazil (Sodhi et al., 2008; Campos et al., 2019). Thus, Sodhi et al. (2008) found that sourcing and supplier management, inventory and forecasting, marketing and channel restructuring, and metrics and performance (that can be related to supplier relationship management, demand forecasting and inventory management, customer relationship management and performance management) are very important skills to US employers. On the other side, these researchers found that product design and new product introduction, and location and supply chain design (that can be related to product introduction into the market and designing supply chain) are among the least demanded competences. Furthermore, Campos et al. (2019) indicated that very important specific competences for SCM professionals in Brazil are: purchasing, inventory management, storage and handling, and demand and order processing.

As regards fundamental competences, a number of these competences are expected from logistics and SCM professionals (e.g. Cvetić et al., 2017, Cvetić et al., 2018; Bak et al., 2019). The fundamental competences, such as basics of IST, communication, planning and organizing of tasks, foreign languages (particularly knowledge of English), team work, solving problems and continuous learning, are among the most demanded from candidates in the Republic of Serbia. One of studies done in the US by Radovilsky and Hegde (2012) also put attention to basics of IST and communication, as the most demanded competences. Bak et al. (2019) put attention to soft skills of SCM professionals, and among others, found that communication, planning, initiative and negotiation are clearly quite important soft skills. Campos et al. (2019) indicated that the most important general competences for SCM professionals in Brazil are: ethical and moral posture, creative problem-solving, leadership, relationships, communication, budget and cost control, and information technology. A difference exists in the importance of foreign languages between Serbian, US and Brazilian employers. Employers in the US and Brazil don't see the importance of foreign languages (Murphy & Poist, 2006; Radovilsky & Hegde, 2012; Campos et al., 2019). The reasons are different. The US employers implied communication in English by default. The authors Campos et al. (2019) pointed out the importance of knowledge English language and find some kind of justification for their results, such as minimal international transactions in the case of mid-sized supermarkets in Brazil. The importance of foreign languages was also recognized by one study from Germany (Kotzab et al., 2018).

5. CONCLUSION

This longitudinal study tries to reinforce the outcomes of the two previous studies of logistics and SCM job ads conducted in the Republic of Serbia. The results are based on empirical data and reveal what competences logistics and SCM professionals need to have, develop and continually improve. The most required professional and fundamental competences of logistics and supply chain manager in the Republic of Serbia are identified. Although this study has some limitations it can be a good starting point for improving programmes, courses, trainings, certifications, occupational standards in the logistics and SCM field in the Republic of Serbia. In future, the empirical studies of this type should be repeated to make generalization of findings.

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