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The Impact of Master's Degree Programmes in Logistics on Career Development and Professional Performance

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Abstract: Master's degree programmes in logistics are crucial for undergraduates' career development because they provide valuable skills, knowledge and experience. The objective of this study is to analyse and evaluate the effectiveness of master's degree programmes in logistics by focusing on their correspondence to the requirements of business and their impact on the career development and professional performance of graduates. Seven variables are discussed and analysed: the effectiveness of the programme with respect to career development, the programme's contribution as a factor for employment, the impact of the skills and knowledge obtained on salary, the sufficiency of the practical experience of the programme, the programme's relevance to business, satisfaction with the existing programme and the intensity of the programme updating. The research methodology includes a survey of recent graduates of master's degree programmes in logistics from Nikola Vaptsarov Naval Academy in Bulgaria as well as interviews with industry experts and employers hiring logistics specialists. The results of the factor analysis show a strong positive relationship between most variables, especially between the intensity of the programme updating and the practical orientation of the programme for the career results of graduates.

Keywords: logistics, master's degree programmes, career development, professional performance

1. Introduction

Logistics is a field of crucial importance and a critical component in the management of the multilayered supply chain, which deals with the effective transportation, storage and distribution of goods and services. Several studies have concluded that the increasing growth of global trade has also led to the continued growth of demand for specialists in the field of logistics (Chawla et al. 2023; McKinnon 2021; World Trade Organization 2023). Studying logistics as part of master's degree programmes is important for two primary reasons. First, master's degree programmes provide deeper insight into logistics systems and help students develop their critical thinking and analytical skills for the management of processes that could be beneficial for logistics companies. Second, these programmes can help students develop specialised skills and knowledge in fields such as transport management, stock control and supply chain optimisation (Mentzer et al. 2007). There are two conditions that are of critical importance for realising the potential of master's degree programmes in logistics: they should be linked to practice, and they should be flexible. Practical experience in the form of internships and consultancy projects helps students pursuing a master's degree face real challenges while acquiring essential skills and developing their own professional networks and career paths.

Logistics systems are constantly evolving and changing, and the changes are complex and nonlinear (Bakalov et al. 2018; Dimitrakieva et al. 2022; Gligor and Holcomb 2014; Ivanov and Dolgui 2020; Pettit et al. 2019; Stoyanova and Stavreva 2022). These dynamic changes in the sector and their long-term unpredictability hinder educational institutions from being proactive and anticipating changes by adapting to them in a timely manner and following them by taking the initiative and preparing even before the changes emerge (Nurhas et al. 2022; Pauliková and Chovancová 2022). Due to the conservative nature of university education, however, its basis in the "bachelor's degree – master's degree – work until retirement" model lags dramatically behind the changes, and the distance between these changes and their reflection in teaching programmes is increasing. In higher education, a period of two years is necessary to start a programme, and a period of between two and four years is needed to introduce a programme. For these reasons, the programmes feature beliefs,

understandings, resources and technologies that are already outdated from their introduction. The solution to this problem is to make education in logistics flexible by offering possibilities for continuous upgrading of the content and by allowing graduates to seek professional realisation with skills, knowledge and experience that are adequate for market changes.

Previous research papers have studied the impact of master's degree programmes in logistics on career development and professional performance (Cameron et al. 2013; Baker et al. 2023; Pacher et al. 2022). A study performed by Cebeci et al. (2015) concluded that graduates of master's degree programmes in logistics have higher salaries and higher employment satisfaction than those who do not hold a master's degree. The study also found that master's degree programme graduates are more likely to take senior positions in their organisations. Schoenherr (2022) study examined the impact of knowledge of the supply chain on the career performance of students. The study concluded that master's degree programme graduates are more likely to find a job and more likely to take positions involving greater responsibility and higher salaries. Based on a comparative study of higher education graduates in 13 countries, Støren and Aamodt studied the relationship between the quality of higher education and fitness for employment. The study concluded that the characteristics of the curriculum have a significant impact on graduates' fitness for employment, whereas quality indicators have a minor impact on getting a job but a significant impact on performance at work (Støren and Aamodt 2010). Perez-Encinas and Berbegal-Mirabent (2023) studied the factors that predetermine the time needed by master's programme graduates to find a job by focusing on three dimensions – acquiring competence, teaching methods and the characteristics of the programme.

Much scientific research suggests that master's degree programmes in logistics have a positive impact on career development and professional performance. However, there is still a need for additional research and study of the specific skills and knowledge acquired by logistics master's programme graduates in the Bulgarian educational system and how these skills translate into a successful career.

This study aims to analyse and evaluate the effectiveness of master's degree programmes in logistics by focusing on their correspondence to the requirements of business and their impact on the career development and professional performance of graduates. The objective of the study is to answer questions related to students' preparation for entering the work force and the value placed on their education by employers from the logistics industry.

2. Methods

The research methodology included a survey of the ideas and attitudes of different logistics managers and experts about the effectiveness of master's degree programmes in logistics. The analysed data were collected by questionnaires distributed among recent graduates of master's degree programmes in logistics from Nikola Vaptsarov Naval Academy in Bulgaria as well as industry experts and employers hiring logistics specialists. The questionnaire on which the study was based is shown in Table 1.

Table 1. Questionnaire of the study

Based on the scale from 1 to 5, please provide responses to the following questions	
Q1- In your opinion, how effective would the curriculum be for preparing students for career development in the field of logistics? (1 = not effective at all, 5 = extremely effective)	1□ 2□ 3□ 4□ 5□
Q2 - In your opinion, what is the contribution of the education received as a factor for employment and the potential for income from the working salary? (1 = not a factor at all, 5 = main factor)	1□ 2□ 3□ 4□ 5□
Q3 - How useful do you think the skills and knowledge students acquire through education are as a potential for success in the logistics business? (1 = not useful at all, 5 = extremely useful)	1□ 2□ 3□ 4□ 5□
Q4 - How much practical experience do students obtain as part of their logistics education? (1 = very little, 5 = quite a lot)	1□ 2□ 3□ 4□ 5□
Q5 - In your opinion, how relevant is the curriculum to the current needs of the logistics industry? (1 = not relevant at all, 5 = extremely relevant)	1□ 2□ 3□ 4□ 5□
Q6 - How satisfied are you with the logistics higher education programme you graduated from? (1 = very dissatisfied, 5 = very satisfied)	1□ 2□ 3□ 4□ 5□
Q7 - In your opinion, how intensively should higher education programmes in the field of logistics be updated to prepare students for their career development? (1 = they should not be intensively changed – once every 8 years, 5 = extremely intensively – at least once every 2 years)	1□ 2□ 3□ 4□ 5□

The survey contained seven questions with 5 possible answers each based on a Likert scale. The questions concerned problems identified from a preliminary discussion with experts in the field. After the questionnaire

was completed, a discussion was held with the participants in focus groups. Fifty-nine potential participants in the survey were contacted via telephone, and information about the objectives and the methodology of the survey was provided. Preliminary confirmation of agreement was obtained from all participants. The final number of participants in the survey who completed the questionnaire was 50, which was 85% of the total number (59) of participants who completed the survey. Some of the survey participants participated in the focus groups but refused to complete the questionnaire (9 participants). The data collected from the completed responses to the questionnaire were divided into a sample of recent master's programme graduates who took managerial positions in logistics companies before starting their studies (from 1 to 22) and logistics experts (from 23 to 50).

The results from the survey were analysed using the statistics software XLSTAT (Lumivero 2023) with the application of factor analysis. The different aspects of the programme with respect to career development were 7 variables: V1 - effectiveness of the programme with respect to career development, V2 - contribution of the programme as a factor for employment, V3 - impact of the skills and knowledge obtained on salary, V4 - sufficiency of practical experience in the programme, V5 – the programme's relevance to business, V6 - satisfaction with the existing programme, V7 - intensity of the programme updating. The factors constituted several independent measurements that summarised the information obtained from the variables. There were two factors in the data provided: F1 and F2. They were derived by using the primary component analysis (PCA) approach and showed the correlations between the variables and the factors. This method allowed us to identify the models and relationships in a set of factors that predetermined the result from the variable impact by using statistical analysis. In the course of the study, the current curricula of courses in logistics, career paths available to graduates and the impact of the quality of education on success in this field were also analysed.

3. Results

The objective of the master's degree programmes in logistics is to develop the potential of students by providing them with the necessary knowledge and skills to be successful in their future career development. The data collected by filling out the questionnaires are presented in Table 2, which contains the main statistical indicators, such as the minimum and maximum value, the mean value and the standard deviation, for seven variables related to the programme.

Table 2. Summary statistics

Variables	Minimum	Maximum	Mean	Std. deviation
V1 (Effectiveness of the programme with respect to career)	3	5	4.76	0.625
V2 (Contribution of the programme as a factor for employment)	2	5	3.56	1.013
V3 Impact of the skills and knowledge obtained on salary)	3	5	3.96	0.903
V4 (Sufficiency of practical experience in the programme)	3	5	3.80	0.857
V5 (Programme's relevance to the business)	3	5	4.36	0.525
V6 (Satisfaction with the existing programme)	2	5	4.22	0.887
V7 (Intensity of the programme updating)	2	5	4.38	0.945

Table 3 presents a correlation matrix (Pearson (n)) between the seven variables (V1-V7) used in the study of the effectiveness of master's degree programmes in logistics, with indicated Pearson correlation coefficients between them and the values different from 0 with a significance level of alpha = 0.05.

Table 3. Correlation matrix (Pearson (n))

Variable	V1	V2	V3	V4	V5	V6	V7
V1	1	0.539	0.417	-0.130	0.331	0.760	0.849
V2	0.539	1	0.873	0.742	0.879	0.836	0.689
V3	0.417	0.873	1	0.675	0.892	0.699	0.712
V4	-0.130	0.742	0.675	1	0.752	0.435	0.196
V5	0.331	0.879	0.892	0.752	1	0.615	0.541
V6	0.760	0.836	0.699	0.435	0.615	1	0.847
V7	0.849	0.689	0.712	0.196	0.541	0.847	1

Based on the correlation matrix, we can conclude that there are significant positive correlations between several variables. It is clear, for example, that the effectiveness of the programme with respect to career development is positively correlated with satisfaction with the existing programme ($r = 0.760$) and the intensity of programme updating ($r = 0.849$). Based on the same reasoning, the contribution of the programme as a factor for employment is positively correlated with the programme's relevance to business ($r = 0.879$) and satisfaction

with the existing programme (**r = 0.836**). Furthermore, the influence of teaching skills and knowledge on salary is positively correlated with the programme's relevance to business (**r = 0.892**) and satisfaction with the existing programme (**r = 0.699**). The results obtained from the analysis also confirm the negative correlation between the adequacy of practical experience in the programme and the effectiveness of the programme with respect to career development (**r = -0.130**). The presence of correlation does not mean that there is a causal relationship; therefore, it is necessary to perform additional analysis and build a reproduced correlation matrix to determine the causal relationship and the direction of these relationships. The ***reproduced correlation matrix*** shows a somewhat different correlation coefficient compared to the original ***correlation matrix (Pearson (n)) presented in Table 4.***

Table 4. Reproduced correlation matrix.

Variable	V1	V2	V3	V4	V5	V6	V7
V1	0.996	0.521	0.446	-0.127	0.316	0.762	0.853
V2	0.521	0.972	0.891	0.739	0.875	0.819	0.725
V3	0.446	0.891	0.818	0.701	0.809	0.737	0.645
V4	-0.127	0.739	0.701	0.945	0.777	0.387	0.213
V5	0.316	0.875	0.809	0.777	0.820	0.669	0.554
V6	0.762	0.819	0.737	0.387	0.669	0.836	0.820
V7	0.853	0.725	0.645	0.213	0.554	0.820	0.841

Based on the analysis of the data in the reproduced correlation matrix, we can conclude that there are significant positive correlations between several factors. The effectiveness of the programme with respect to career development has a strong positive correlation with satisfaction with the existing programme (r = 0.762) and the intensity of programme updating (r = 0.853). Based on the same reasoning, the contribution of the programme as a factor for employment has a strong positive correlation with the programme's relevance to business (r = 0.875) and satisfaction with the existing programme (r = 0.819). On the other hand, there is a negative correlation between the adequacy of practical experience in the programme and the effectiveness of the programme with respect to career development (r = -0.127).

In the course of the study, the goodness of fit test was performed to check whether two common factors were sufficient and adequate to make a conclusion about and explain the main trends and correlations between the variables in the data and to explain whether additional factors were necessary to obtain a more precise illustration of the situation. The goodness of fit test showed that the model used for deriving the factors was statistically significant. The value of the chi-square (observed value) was 90.275, and the critical value of the chi-square (critical value) was 15.507. The test had 8 degrees of freedom, and the p value was lower than 0.0001, which shows that there is a statistically significant relationship between the variables within the model. The null hypothesis (H0) states that two common factors are sufficient, whereas the alternative hypothesis (Ha) assumes that more factors are necessary. The results show that the calculated p value (< 0.0001) is lower than the significance level of alpha = 0.05 (alpha = 0.05), which means that we should reject H0 and accept Ha; more factors are necessary for a more precise description of the dataset. The analysis of the main components of the factor analysis is presented in Figure 1.
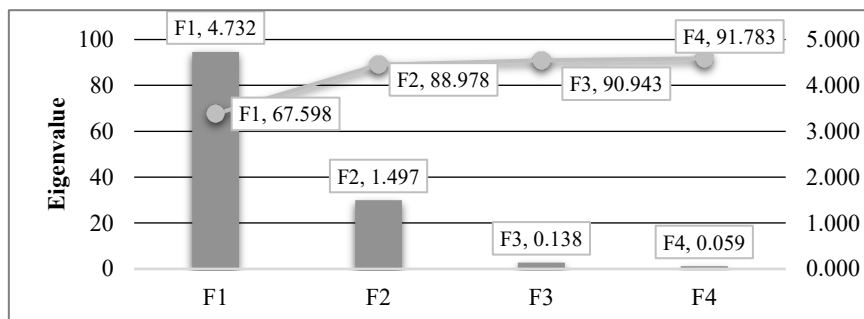

Figure 1. Factor analysis.

The percentage of variance is the percentage of total variance in the data explained by each factor. In this case, F1 explains 67.598% of the total variance, F2 explains 21.380%, and F3 and F4 explain only 1.965% and 0.840%, respectively. The cumulative percentage is the cumulative amount of variance in the data explained by each factor. In this case, F1 and F2 combined explain 88.978% of the total variance, whereas F1 through F4 combined explain 91.783% of the total variance. As a whole, the results show that the first two factors (F1 and

F2) are the most important and represent the larger amount of variance in the data, whereas the third and fourth factors (F3 and F4) only explain a small part of the variance.

The analysis of the results from the survey of recent graduates of master's degree programmes in logistics confirms that the majority of them believe that education in Nikola Vaptsarov Naval Academy has prepared them adequately for the rapid changes in the environment and the requirements of logistics operators. The results from the survey show a strong relationship between the intensity of programme updating and the practical orientation of the programme for the career results of the graduates. It was concluded that employers value and prioritise hiring university graduates who have not only in-depth knowledge but also practical experience and specific skills for solving problems related to the latest management methods in logistics. This means that master's degree programmes need to be reviewed and updated in a timely manner with a higher frequency so that future logistics experts can more successfully realise the rapidly changing business environment. The survey shows that providing students with more opportunities for practical experience and application in the real world of the theories learned during their studies is of crucial importance for their rapid career growth.

The results from the interviews with experts from the industry and employers in the field of logistics supported the results from the survey. Many of them emphasised the importance of practical experience and acquiring problem-solving skills that are adequate to the changing context in preparing students for a career in logistics. These experts also stressed the need for closer cooperation between the academic field and logistics companies to guarantee that the master's degree programmes will be relevant and effective when preparing students to enter the work force. Moreover, the experts stated that the logistics business should be the actual initiator for increasing the qualification of their employees through master's degree programmes. Their concerns were primarily related to the fact that employees who have already been hired and who graduated at an earlier stage are not sufficiently prepared for changes; they need to continuously update and upgrade their knowledge to be competitive in the context of the changing market conditions and development of logistics. The timely updating of master's degree programmes can be a factor in acquiring new knowledge and skills even by hired employees who have already finished their studies and can contribute to their career development and higher salaries in the labour market.

4. Conclusion

This study analysed the impact of master's degree programmes in logistics on the career development of graduates. Based on the summarised results of the study, it can be concluded that these programmes are effective in preparing students for a career in the respective industry. Nevertheless, there is still room for improvement of these programmes by putting effort into the timely updating of the curricula to guarantee that they will correspond to the challenges of the rapidly changing business environment. One of the key recommendations of the study is the significance of practical experience and the application of modern methods and theories in the real economy, not only for recent graduates but also for logistics experts who have already been hired and practice the profession. Therefore, it is important for universities to focus on ensuring the updating of master's degree programmes to attract students without such a degree and without practical experience as well as students who already work as logistics experts so that they do not fall out of the labour market. This can be achieved by maintaining updated curricula that focus more closely on modern industry trends and by encouraging the practical application of theories in real-life situations.

References

[1]   Bakalov I, Lutzkanova S, Kalinov K (2018) Applying the augmented reality concept in maritime engineering personnel training. Sci Bull Nav Acad 21:1–5. https://doi.org/10.21279/1454-864X-18-I1-004

[2]   Baker D, Briant S, Hajirasouli A, Yigitcanlar T, Paz A, Bhaskar A, Corry P, Whelan K, Donehue P, Parsons H (2023) Urban freight logistics and land use planning education: trends and gaps through the lens of literature. Transp Res Interdiscip Perspect 17:100731. https://doi.org/10.1016/j.trip.2022.100731

[3]   Cameron C, Freudenberg B, Brimble M (2013) Making economics real—the economics internship. Int Rev Econ Educ 13:10–25. https://doi.org/10.1016/j.iree.2013.04.011

[4]   Cebeci E, Algan N, Cankaya S (2015) The returns of the education in the context of micro-macro analysis. Procedia - Soc Behav Sci 174:916–925. https://doi.org/10.1016/j.sbspro.2015.01.712

[5]   Chawla P, Kumar A, Nayyar A, Naved M (2023) Blockchain, IoT, and AI technologies for supply chain management. CRC Press, Boca Raton, FL

[6]   Dimitrakieva S, Gunes E, Dimitrakiev R, Atanasova C (2022) The role of digitalization in the shipbroking business. Proceedings of the International Association of Maritime Universities Conference, Georgia, 176–181

[7]   Gligor DM, Holcomb M (2014) The road to supply chain agility: an RBV perspective on the role of logistics capabilities. Int J Logist Manag 25:160–179. https://doi.org/10.1108/ijlm-07-2012-0062

[8]   Ivanov D, Dolgui A (2020) Viability of intertwined supply networks: extending the supply chain resilience angles towards survivability. A position paper motivated by COVID-19 outbreak. Int J Prod Res 58:2904–2915. https://doi.org/10.1080/00207543.2020.1750727

[9]   Lumivero (2023) XLSTAT | statistical software for excel. In: XLSTAT, your data analysis solution. https://www.xlstat.com/en/. Accessed 23 April 2023

[10]   McKinnon AC (2021) The influence of logistics management on freight transport research - a short history of a paradigm shift. J Transp Econ Policy (JTEP) 55:104–123

[11]   Mentzer JT, Myers MB, Stank TP (2007) Handbook of Global Supply Chain Management. SAGE Publications, California, US

[12]   Nurhas I, Aditya BR, Jacob DW, Pawlowski JM (2022) Understanding the challenges of rapid digital transformation: the case of COVID-19 pandemic in higher education. Behav Inf Technol 41:2924–2940. https://doi.org/10.1080/0144929X.2021.1962977

[13]   Pacher C, Woschank M, Rauch E, Zunk BM (2022) Systematic development of a competence profile for industrial logistics engineering education. Procedia Comput Sci 200:758–767. https://doi.org/10.1016/j.procs.2022.01.274

[14]   Pauliková A, Chovancová J (2022) Improving energy efficiency through energy management systems implementation - a cluster analysis of ISO 50001. 15th International Scientific Conference WoodEMA 2022 - Crisis Management and Safety Foresight in Forest-Based Sector and SMES Operating in the Global Environment, Trnava, Slovakia, 319–325

[15]   Perez-Encinas A, Berbegal-Mirabent J (2023) Who gets a job sooner? Results from a national survey of master's graduates. Stud High Educ 48:174–188. https://doi.org/10.1080/03075079.2022.2124242

[16]   Pettit TJ, Croxton KL, Fiksel J (2019) The evolution of resilience in supply chain management: a retrospective on ensuring supply chain resilience. J Bus Logist 40:56–65. https://doi.org/10.1111/jbl.12202

[17]   Schoenherr T (2022) The knowledge-based view. In: Tate W, Ellram L, Bals L (eds) Handbook of Theories for Purchasing, Supply Chain and Management Research. Edward Elgar Publishing, Cheltenham, UK, pp 118–139

[18]   Støren LA, Aamodt PO (2010) The quality of higher education and employability of graduates. Qual High Educ 16:297–313. https://doi.org/10.1080/13538322.2010.506726

[19]   Stoyanova A, Stavreva I (2022) Approaches of customs control on cross-border E-commerce of goods. Izv J Union Sci-Varna, Econ Sci Ser 11:64–76

[20]   World Trade Organization (2023) World Trade Statistical Review 2022. WTO, Geneva