Logistics and Supply Chain Personnel – Surveying the Market

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Abstract

The survey used two kinds of questionnaires applied to professionals and companies about skills in logistics and supply chain in Brazil. Professionals informed their actual skills and the complementary ones needed. The companies informed the managerial and operational skills needed, and the actual levels of competence of professionals currently employed.

Keywords: professional competencies, logistics, supply chain

Introduction

There is a significant lack of reliable information on logistics and supply chain professional in the Brazilian market, which are being increasingly demanded because of the importance logistics and supply chain are taking on the companies competitiveness. The results of this Phase 1 of the research Professional Logistics and Supply Chain – Surveying Market, allowed a comprehensive understanding of the real situation of this market, information that once published, will give businesses and government agencies the ability to plan more accurately their recruitment and management of those professionals. Will also allow educational entities to suit their programs in the areas of logistics and supply chain in the undergraduate and graduate levels.

The research questions below were mostly answered, requiring further research to complement the findings.

1) What are the desirable skills for professionals in logistics and supply chain in Brazil in the opinion of businesses and professionals?
2) What skills and competencies are not available?
3) Is there consistency between the views of businesses and professionals? If not, where and why?

Results include.

- Mapping of the skills needed to logistics and supply chain professionals in Brazil and their relative importance.
- Mapping of available skills, including the ones totally unavailable.
- Mapping of the major businesses concerns about logistics and supply chain professionals.
- Mapping of the main points raised by professionals concerning their training and relationships with companies.
- Crossing of the businesses and professionals information, enabling the assessment of the consistency between the two views and the possible reasons for any inconsistencies.

Methodology

The methodology used in developing the survey included:

- Literature search to identify studies conducted to evaluate professionals in various industries, including market needs and vision of the professionals themselves, in Brazil and abroad.
- Preparation of two questionnaires, one aimed at companies and other at professionals with questions using a Likert scale with 5 possible answers and open questions.
- Preparation of a list of companies and professionals to be consulted.
- Holding a workshop with businesses and professionals to discuss research, validate the questionnaire and reformulate it as needed.
- Apply questionnaires to businesses and professionals via SurveyMonkey.
- Information processing.

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- ey Report preparation.

This Phase 1 will allow the preparation of articles for submission to events in the area of operations as SIMPOI, POMS and ENANPAD. Continued research proposal for 2013 will allow the writing of articles to be submitted to publications such as:

- National Journal (RAE - B2)
- International Journal (Career Development International - A2)

Previous to the preparation of the two questionnaires it was necessary to obtain the necessary skills for logistics and supply chain professionals to act in the market.

The questionnaire for companies aimed to identify the desired skills for professionals and their relative value, the main factors considered in the hiring process, and lacking skills in the Brazilian labor market. This questionnaire was sent to managers of different size and segment companies that have already coordinated logistics professionals and / or supply chain.

The second questionnaire was designed for professionals in logistics and supply chain with experience in the topics on the agenda, with questions on how they assess their skills and what they miss in their training. The questionnaire was sent to the market and experienced professionals already working in logistics and / or supply chain.

Before the final application of the questionnaires, we conducted a pretest with some experienced professionals, which provided feedback and suggested improvements. Questionnaires were also subjected to some FGV Production Department Professors. The questionnaires were then revised.

A screening was performed in the Gvcelog - Center for Logistics and Supply Chain Studies database to determine, based on the position held, o determine if the professional had an acceptable level of expertise in the field and if it had a managerial or operational level, to determine what questionnaire he would answer.

Through e-mails, professionals were asked to response to one of the questionnaires, with a follow-up by phone, seeking to highlight the purpose and the importance of the survey.

The figures for the questionnaire sent and answered are in the table below.

Table: Figures of the Survey

Number of questionnaires sent	188
Number of outgoing calls	165
Number of answered questionnaires	55
Number of valid questionnaires	38

Data Treatment and Analysis

The 55 answered questionnaires represent 29,3% and the 38 valid ones, 20,2% of the total sent. Fifteen were discarded for being incomplete, with less than 40% of the questions answered and for lack of variability among answers, showing standard deviation lower than 0,5. Of the 38 valid responses 18 were from companies and 20 from professionals.

The data were submitted to three reviews. First, each variable was assessed by its normality using the Kolmogorov-Smirnov test (Hair et al, 1998, p.76). The distributions of variables related to the profile of the companies and professionals were significantly (alpha <5%) of a different standard. However, variables related to the skills required at the operational level and at the management level and skills of the professionals had different results. Without a logical pattern between the three types of variables, some distributions were significantly (alpha <5%) different from a normal and others not. Then, the averages, standard deviations, obliquity and kurtosis of all variables were calculated. This analyzes showed similar results to the Kolmogorov-Smirnov test. Thus, in most cases, the variables were not normally distributed.

The second analysis aimed to identify the profile of businesses and professionals who participated in the research. Due to violation of the normality assumption in these variables, the

profiles of the companies and professionals were evaluated through analysis of the frequency distributions of the variables.

The third and final analysis evaluated the influence of the sector variable in all the variables of analysis, to identify whether the industry in which the companies or professional act would influence results in any way. No variables showed significant difference (alpha <5%) indicating that the sector did not influence the results.

After the initial evaluation of the data, the analysis aimed to answer to the research questions could be conducted. To answer the research questions, it was necessary to make comparisons between variables that measure skills desirable by business in the management and operational levels and skills presented by professionals. Due to violation of the normality assumption of many of these variables, nonparametric tests were used to compare variables. Basically, nonparametric tests compare probability distributions and not defined parameters, such as average. So they are indicated when there is violation of the assumption of normality in the distribution of variables. (MCCLAVE, BENSON, Sincich, 2001, p 903). The following are the results of analyzes.

Presentation of Results

This subsection presents the profile of businesses and professionals surveyed and the result of analyzes to answer the three research questions.

All analyzes were performed using SPSS version 21 for MAC. The level of significance was the alpha equal to or less than 5%.

Profile of Companies and Professionals

To evaluate the profile of businesses and professionals, the frequency distributions of profile variables were analyzed one by one. For variables in which the scale had a maximum limit (percentage of professionals working in logistics, age and compensation of professionals in managerial and operational), the mean and distributions were also calculated. The number of observations in each analysis varied. Some issues were present in both questionnaires (businesses and professionals), and in these cases, the analysis was carried out with 38 data. This was the case of the variables for industry, frequency with which the company offers courses in logistics and supply chain, and the existence or not of the logistics and supply chain sectors. Some issues were present only in the questionnaire to companies (number of employees, the company revenues, percentage of professionals working in logistics and supply chain and mean time professionals remained in the company) and, therefore, the analysis was performed with 18 data. Other variables were only present in the questionnaire for professionals (gender, type of degree, completion of extension courses, time of work in logistics and supply chain). In this case, the analysis was performed using 20 data. Finally, the variables of age and wage of professionals working in management positions (the survey of companies) were considered together with the

responses of professionals with managerial positions (the questionnaire professionals) and thus the analysis was performed with 28 data. The same was done for the variables of age and wage of professionals working in operational positions. The number of observations available for each variable and the corresponding frequency distributions for the responses from companies are shown in Table 1 and for professionals in Table 2.

Table 1 – Frequency Distribution of Profile Variables – Companies

Parameter	Option	Frequency	% of Total	Cumulative %
Sector (n*=38)	Industry	20	0.53	0.53
	Services	11	0.29	0.82
	Commerce	6	0.16	0.97
	Government	1	0.03	1.00
N° of Professionals (n=18)	50 a 100	2	0.11	0.11
	300 a 500	1	0.06	0.17
	Above 500	15	0.83	1.00
Monthly Income (R$) (n=18)	Up to 500 thousand	1	0.06	0.06
	500 thousand to 5 million	2	0.11	0.39
	5 a 20 million	2	0.11	0.17
	20 to 50 million	2	0.11	0.28
	Above de 50 million	11	0.61	1.00
% of Employees Logistics activities (n=18)	< 5%	3	0.17	0.17
	5 a 15%	8	0.44	0.61
	15 a 25%	4	0.22	0.83
	25 a 35%	1	0.06	0.89
	> 35%	2	0.11	1.00
Dwell Time Employment	1 to 2 years	7	0.39	0.39
	3 to 4 yars	8	0.44	0.83
	5 to 6 years	2	0.11	0.94
	> 6 years	1	0.06	1.00
Frequency Range of Courses and Training (n=38)	Never	10	0.26	0.26
	Rarely	14	0.37	0.63
	Annually	8	0.21	0.84
	Semiannually	5	0.13	0.97
	Monthly	1	0.03	1.00
Has Logistics Sector (n=38)	No	5	0.13	0.13
	Yes	33	0.87	1.00
Has SCM Sector (n=38)	No	10	0.26	0.26
	Yes	28	0.74	1.00

*n = number elements of the sample

Table 2 – Frequency Distribution of Profile Variables – Professionals

Parameter	Option	Frequency	% of Total	Cumulative %
Gender (n=20)	Female	4	0.20	0.20
	Male	16	0.80	0.80
Age in the Management Level (n=28)	< 30 years	3	0.11	0.11
	30 t 40 years	16	0.57	0.68
	40 to 50 Years	9	0.32	1.00
Age in the Operational Level ** **(n=28)**	< 20 years	1	0.04	0.04
	< 30 years	5	0.18	0.21
	20 to 30 years	14	0.50	0.71
	30 to 40 years	8	0.29	1.00
Time in Logistics and SCM Activities(n=20)	< 3 years	2	0.10	0.10
	3 to 5 years	8	0.40	0.50
	5 to 7 years	2	0.10	0.60
	7 to 10 years	1	0.05	0.65
	> 10 years	7	0.35	1.00
Undergraduate Course (n=20)	Management	9	0.45	0.45
	Two Courses	6	0.30	0.75
	Engineering	3	0.15	0.90
	Economy	2	0.10	1.00
Extension Courses (n=20)	None	6	0.30	0.30
	MBA	9	0.45	0.75
	MBA and Specialization	2	0.10	0.85
	Continuing Education	2	0.10	0.95
	Pos-doc	1	0.05	1.00
Monthly Wage in Management Level (R$) (n=28)	< 5 thousand	2	0.07	0.07
	5 to 10 thousand	8	0.29	0.36
	10 to 20 thousand	15	0.54	0.89
	20 to 30 thousand	3	0.11	1.00
**Monthly Wage in Operational Level (n=28) ** **	Up to 1 thousand	4	0.14	0.14
	1 to 3 thousand	10	0.36	0.50
	< 5 mil	7	0.25	0.75
	3 a 7 mil	4	0.14	0.89
	5 a 10 mil	3	0.11	1.00

*n = number elements of the sample

** Scales differ because the variables used in the questionnaires of companies and professionals differ.

Regarding the profile of companies, Table 1 reveals that the majority of respondents to the questionnaire belong to the industrial sector (52%). Companies also are mostly large, because 83% of them have more than 500 employees and 61% have revenues exceeding $ 50 million monthly. Companies on average, employ 18% of its employees in positions associated with functions of logistics and supply chain, and 87% of the companies surveyed have a logistics sector and 74%, a sector of supply chain management. Companies also indicated that most of the professionals remain around 4 years in office. Finally, most companies seem not to invest in continuous training of its professionals, since 63% of them indicated that they never or rarely offer courses and training update in logistics and supply chain for its professionals.

The data on the profile of professionals, shown in Table 2 indicate that 80% of respondents were male. About 60% of respondents who work with professional logistics and supply chain is no more than 7 years. Generally, professionals have graduate courses, most of them in management (45%). The professionals also indicated they seek to specialize mainly doing MBA courses (45%). The average age of management level is 36.07 years (SD = 8.75) and the average wage of these is 13,030 reais (SD 5.64). In the operational level, the average age is 25.5 years (SD = 7.36) and average pay R$ 2820 (CD 2.2). These data point to the discrepancy between the management and operational levels.

Answers to Research Questions

The data obtained allowed to answer the research questions, as shown below.

Research Question 1 – *What are the desirable skills for professionals in logistics and supply chain in Brazil in the opinion of businesses and professionals*?

To answer this research question, Kruskal-Wallis H for comparison of multiple independent variables were performed. Only data from the questionnaires regarding companies were used in this analysis (n = 18). The questionnaire had three types of competencies: core competencies in logistics and supply chain, advanced skills in logistics and supply chain skills and knowledge in fundamentals. The responsibilities of each group were ranked in descending order. Then for each skill group, the Kruskal-Wallis H were performed to identify where the differences between the variables of that group were statistically significant at the 5% level.

For the core competencies needed at the management level, the Kruskal-Wallis H indicated two groups. Thus, one can say that the skills of group 1 are equally important to each other and more important for companies in the core competencies of group 2. The same analysis can be extended to the advanced skills and knowledge of fundamentals.

For the core competencies required and advanced at the operational level, the Kruskal-Wallis H also indicated two groups. In the case of knowledge on fundamentals, tests showed no significant differences, suggesting that all knowledge about fundamentals have the same relevance.

Finally, to ensure that businesses are differences between what is needed at the management level and at the operational level, Mann-Whitney U test to compare two

independent samples were performed. The skills were compared one by one and, in general, companies believe that the skills required are different from those at the management level required at the operational level. A significance level of 5%, companies consider that only six skills are equally relevant at both levels. They are: knowledge of distribution, aggregation of orders, inventory management, internal public relations, relationships with external audiences and knowledge of information technology.

There is an obvious difference between the expectation of companies managerial and operational levels, far superior to the managerial level, which makes sense.

Research Question 2 – *What skills and competencies are not available?*

This stage sought to identify in what competencies professionals had more skills. Again, Kruskal-Wallis H for comparison of multiple independent variables were performed to compare the different skills of the professionals.

Only data from questionnaires for professionals were used in this analysis and, therefore, the sample size was 20. Similar to the process used in the previous analysis, the skills of each group (core, advanced and foundations) were prioritized in descending order and the Kruskal-Wallis H were performed to identify where the differences between the variables of that group were statistically significant at 5%.

The core competencies are divided into six groups. The variables of knowledge in transportation, public relationship with internal and external public relations are the most relevant and statistically differ from each other (alpha <5%) and groups 5 and 6. Group 5 includes a number of equally relevant skills among themselves, indicating that professionals have similar knowledge about all these topics. Knowledge of trade promotions on the tax system and proved the weakest. There was no significant difference between the professionals' knowledge regarding advanced skills and knowledge regarding the fundamentals.

Questionnaires have also identified additional qualifications necessary from the point of view of professionals, and enterprises.

Research Question 3 – *Is there consistency between the views of businesses and professionals? If not, where and why?*

This last analysis compared the variables that mediate the companies wanted to variables that mediate the skills of professionals. Mann-Whitney U test to compare two independent samples were used to serve this purpose. The variables that mediate what companies want to managerial level were compared to the skills of professionals at the management level (n = 10). The variables that mediate what companies wishing to operational level were compared to the skills of professionals at the operational level (n = 10). Tests comparing the skills of the operational level showed no significant difference between what the companies expect and what

professionals can provide. This indicates that companies, at the operational level, they can get what they expect from their professionals. The same does not occur at the management level.

This analysis showed that, on several skills at managerial level, professionals are not able to meet the expectations of the companies. This is the case, for example, the need for relationship with internal and external audiences, knowledge about the distribution and the ability to make strategic decisions. In these cases, it seems particularly critical, since these constitute core competencies among the most relevant companies. In the case of advanced skills, companies have not met their expectations with respect to knowledge on integrated planning and inventory management of multiple products. Finally, with respect to knowledge of fundamentals, professionals are only able to meet the demands of companies with their knowledge of probability and statistics and operational research on. Bext are presented the about the results.

Conclusions

Even with a valid response rate to the questionnaires below expectations, 20 professionals and 18 companies, it was possible to answer the research questions and to characterize the profile of businesses and professionals.

About 52% of companies responding to the questionnaire pertain to industrial sectors (52%), 83% have more than 500 employees and 61% have revenues exceeding $ 50 million per month, on average, 18% of employees of companies have offices associated functions of logistics and supply chain, 87% of companies have a logistics industry and 74% of an industry supply chain management. The companies point out, too, that most professionals remain around 4 years in office. Finally, most companies seem not to invest in continuous training of its professionals, pending on which 63% of them indicated that they never or rarely offer courses and training update in logistics and supply chain for its professionals.

With regard to professionals, 80% are male, 60% work with logistics and supply chain for 7 years or less, 45% have a degree in Administration and 45% seek to specialize mainly doing MBA. At the managerial level, the average age of management level is 36 years and the pay is around £ 13,000. Already in operational level, the average age is 25.5 years and the average wage is R $ 2,820 thousand.

Comments about the research questions comments follow.

Research Question 1 – What are the desirable skills for professionals in logistics and supply chain in Brazil in the opinion of businesses and professionals?

The questionnaire looked three types of competencies in logistics and supply chain: core competencies, advanced skills and skills in fundamentals.

In this analysis we used only the data of the companies, and the results shown in Tables 4 and 5 show the hierarchy of skills for each of the classes mentioned above.

Research Question 2 – What skills and competencies are not available?

In this case, the analysis aimed to compare the different skills of professionals, so we used only data from the questionnaires for professionals.

The skills were divided to 6 groups, as shown in Table 5, and for the core competencies, the most relevant are knowledge in transportation, relationships with internal stakeholders and external relationship with the public.

The advanced skills and knowledge in fundamentals obtained similar results, with no substantial differences between their relative importance.

Tables 6, 7 and 8 show the additional skills necessary in the companies and the desired level of detail expressed by professionals and companies, in this case for operational and managerial levels. It is a wide range of factors that merit further analysis.

Research Question 3 – Is there consistency between the views of businesses and professionals? If not, where and why?

The results indicate that in various skills, professionals at managerial level are not able to meet the expectations of the companies. This is the case, for example, for the need for relationship with internal and external audiences, knowledge about the distribution and the ability to make strategic decisions, which are critical because these are among the core competencies most relevant to businesses . For advanced skills, companies have not met their expectations with respect to knowledge on integrated planning and inventory management of multiple products. Finally, with respect to knowledge of fundamentals, professionals are only able to meet the demands of companies with their knowledge of probability and statistics and operational research on.

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