Matching Knowledge Needs in the Industry with the Educational Offer: a Strategic Tool for Regional Competitiveness

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Abstract: The purpose of this research was to understand and identify the industrial knowledge needs in the Leiria Region. This study was developed to help the Polytechnic Institute of Leiria to strategically define their knowledge offer to the industrial market needs. The aim was to identify: a) the qualifications required by individuals from top to bottom in the industry; b) the areas of knowledge required and c) the knowledge required by each professional category. Three hundred and forty-nine questionnaires were collected within the building construction, wood and furniture, moulding, and plastic industries. The results showed that the moulding industry identified the highest need for knowledge. With the exception of Plant managers, Plant workers and Apprentices in the wood and furniture industry that chose technical courses, all the other professional categories in the other industries stated continuous training as the qualification needed. The moulding and the plastic industry showed affinities and both identified the same areas of knowledge for middle managers.

Keywords: Knowledge; areas of knowledge, industry, qualifications

1. Introduction

There is vast literature on knowledge and knowledge management ands its impact or organisational competitiveness. However, little attention has been given to the identification of organisations' knowledge needs specifically for industries with an impact on the added value of a region.

The purpose of this research was to:

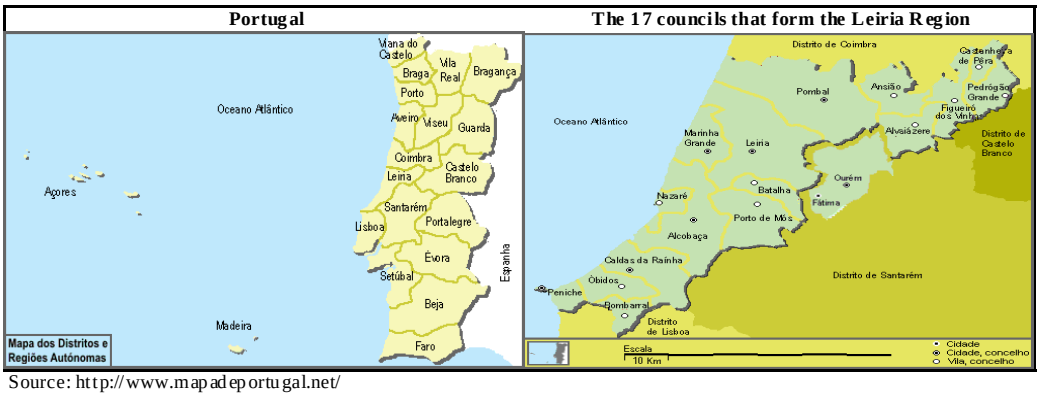
- Comprehend and identify the knowledge needs of the civil construction, wood and furniture, moulding, and plastic industries in the Leiria Region;
- Identify the qualifications needed by individuals;
- Identify the organisational areas in which knowledge was needed;
- Identify for whom in the organisation hierarchy knowledge was needed;
- Draw up a set of suggestions that help the decision makers, namely at the Polytechnic Institute of Leiria, to strategically adequate their educational offer to the market needs.

This study was sponsored by and conducted for the Polytechnic Institute of Leiria, the major educational centre of the Leiria Region. Leiria Region is part of central region of Portugal. This research is part of a broad study of knowledge needs conducted in autarchies, commerce, wood and furniture, moulding, plastics, heath and tourism sectors, based on 123 interviews and over 2050 questionnaires. This research was the first in-depth study of the knowledge needs in the Leiria Region. It is believed that the education offered should match the industry demand. The Polytechnic Institute of Leiria has that responsibility towards the community. It should provide and form individuals with the knowledge and the necessary competences for the enterprise requirements. The identification of the industry' knowledge needs would be most valuable for academics, managers and policy makers dealing with regional and industry policy. The outcome would be an important tool in the process of the education decision-making offer. It allows to fulfil the demand as well as to (re)organise the offer. It would identify the necessary knowledge-based competencies towards the Region's competitiveness. Knowledge is a key element of organisational competitiveness. A conglomerate of competitive organisations centred in one region sustains regional competitiveness. The Polytechnic Institute of Leiria, being a source of knowledge can be a driver of organisational and regional competitiveness.

The Leiria Region was defined by this study as the Leiria district plus the Ourém council, in a total of 17 councils, i.e. Alcobaça, Alvaiázere, Ansião, Batalha, Bombarral, Caldas da Rainha, Castanheira de Pêra, Figueiró dos Vinhos, Leiria, Marinha Grande, Nazaré, Óbidos, Pedrógão Grande, Peniche,

Pombal, Porto de Mós and Ourém. Those councils were chosen due to their geographic proximity and their historical representativeness as the area of influence of the Polytechnic Institute of Leiria (see Figure 1). According to the National Institute of Statistics, in 2003, Leiria Region represented 22 % of the active population of the Central Regional. The region is known for its significant entrepreneurial capacity, dynamism and by settling people due to its employability capacity.

The civil construction, wood and furniture, moulding, and plastic industries were selected as a result of their economic and social impact and the contribution to the region development.



Source: http://www.mapadeportugal.net/

Figure 1: The geographic representativeness of the Leiria Region

2. Literature review

Knowledge has become the most important economic resource for competitiveness. Hoskinsson, et al., (1999) recognised it as one of the main differentiating factors. The basic economic resource is no longer capital, or natural resources or labour but "knowledge" and what individuals can do with it (Drucker, 1993). Quinn and Rohrbaugh (1983) share this point of view as suggest that the economic power is on the intellectual capacities of the human resources. Knowledge allows companies to innovate and to sustain competitiveness (Grant, 1996). As stated by Stewart, (1997:41), "Knowledge has become the primary ingredient of what we make, do, buy and sell". The literature presents numerous definitions of knowledge (Polanyi, 1966; Nonaka, 1994; Nonaka and Takeuchi, 1995**;** Wiig, 2004). One of the most traditional concepts of knowledge is the distinction between tacit (non-recorded) and explicit (recorded) knowledge. Tacit knowledge is highly nurtured by individual's personality, their feelings, their experiences, their skills, and context-specific (Nonaka and Takeuchi, 1995). As it is embedded in action, is instantaneous – "here and know", it is difficult to systematise and therefore to share. According to Gourlay (2006) tacit knowledge is centred at an individual level. On another hand, explicit knowledge, is objective, rational, formal, and to be learnt and held. The human knowledge is created and expanded through the interaction between tacit knowledge and explicit knowledge. Tacit and explicit knowledge complement each other, as knowledge is a process (Nonaka 1991; Nonaka and Takeuchi 1995). The tacit knowledge becomes explicit (codified), and explicit becomes tacit in a dynamic and interactive form. From these definitions it can be suggested that knowledge is the information used by the human mind that allows the decision-making in a given context. The process of creation and acquisition of knowledge is crucial for the organisation's development (Davenport and Prusak, 1998). As a living organism, the organisation is constantly learning, and managing knowledge (Senge, 1990; Nonaka, 1991; Nonaka et al., 2006 and Sveiby 1997). Successful organisations are continuously involved in the creation and dissemination of new knowledge (Nonaka, 1991). Organisations are constantly abandoning obsolete knowledge and creating new knowledge (Drucker (1993). Managing knowledge involves among other aspects, investing in training and qualification of individuals (Allee, 2003; Swan et al., 2001).

There is a vast literature on knowledge and its importance towards organisational competitiveness. Surprisingly, there is little to none literature in the industrial and regional context, on the identification of the areas of knowledge required by individuals and the qualification searched according to their professional category. This research identifies for the Portuguese building construction, the wood and furniture, the moulding and plastic industries in the Leiria Region, which knowledge areas are needed, and the level of qualifications required by individuals from top to bottom. The acquisition of knowledge allows individuals to respond more efficiently and effectively to the market challenges. Explicit knowledge is an important tool in the acquisition of knowledge, and that due to the dynamic of the

markets, must be done frequently during individuals livelihood. By knowing the knowledge market needs a set of training courses can be offered by educational institutions accordingly.

3. Methodology

To test the research aims, data was collected using a variety of methods. This study with the goal of obtaining a comprehensive understating and a holistic view of the knowledge needs in the Leiria Region has used different information and method sources. It used secondary and primary data (information source triangulation) and qualitative and quantitative data (methodological triangulation). A hybrid research strategy was used to ensure a rigorous methodology.

This research is quantitative in nature. Qualitative data was used only with the purpose of increasing the reliability and the validity of the research findings. Qualitative data was used at the first stage of the primary data collection in the form of interviews. The lack of previous studies in identifying the knowledge needs in the industries and in the Leiria Region compelled the use of interviews. There was a need to understand the phenomena; to comprehend the complexity of the knowledge needs of industrial associations and firms; to understand the motivations and the different expectations of the industrial associations, the firms' managing directors, and its collaborators; to identify the lack of knowledge in the industries; to understand the opportunities and threats of the development of determined knowledge offer. Only the interviews allow capturing the complexity and richness of the information given by individuals. In-depth, face-to-face unstructured and semi-structured interviews with the industrial association's directors, top managers, and firms' collaborators were conducted. The goal was to capture different perspectives as it is believe that the position that individuals occupy in the organisations' hierarchy reflect different knowledge needs. Managing Directors/top managers were selected for interviewing, as a result of their deep understanding of the industry as a whole and its evolution. Due to their position and experience, they hold important information and are able to give a global overview of the industry. The firms' collaborators were interviewed because they feel the problems at the operational level and know which competences area needed for their resolution. They have different points of view from the managing directors that see the organisations from the top and as a whole. Individuals from large, medium, small and micro dimension were inquired. The aim was to register the highest opinion diversity possible. The interviews took place between September 2004 and March 2005. In total 55 interviews were conducted; 13 within the Building construction industry, 16 in the wood and furniture industry, 10 in the mould industry, and 16 within the plastic industry. Qualitative data was assessed through content analyses.

In the second stage of data collection quantitative data was collected in the form of questionnaires. Based on secondary and qualitative primary data collected, a research survey instrument was developed and applied. A highly detailed questionnaire was developed for each industry studied, i.e. civil construction, wood and furniture, moulding, and plastic in order to capture the specificities of each industry namely regarding the organisational categories and the areas of the knowledge needed. Nonetheless a question like, the levels of qualification required by organisational category was transversal to all questionnaires. Before the administration of the survey instrument, the current study pilot tested the questionnaire. The questionnaires were applied in the organisations from top to bottom. They were sent to the mailing list given by each industrial association. Three hundred and forty-nine questionnaires were collected during 2005. The firms contacted in some industries and according to their industrial associations represent 87% of the total sales of the sector. While sales representativeness was not expressive in terms of percentage, the number of questionnaires gathered continued to be significant due to the features of certain industries and comparatively to other previous studies applied in those industries. The SPSS (Statistical Package for Social Sciences) was used for the analysis of the results.

4. Findings and data analysis

As mentioned previously, qualitative data was only used to build up the research survey instrument and to ensure the reliability and the validity of the research findings. Therefore the results of the qualitative data are not to be presented here.

The comments to the results were based on the statistic mean. Using a five-point Likert-style rating scale (1= no need to 5 = strongly need), the following scale of mean was considered:

<2,5 would be considered like slightly needed

2,5 <= e <3,5 needed

3,5 <= e <4,5 much needed

> = 4,5 strongly needed

For the data analysis, only those findings that presented a mean >= 3,5 were considered.

In order to simplify data collection and data analyses, 5 groups of professional categories for each industry were created. In the Building construction the professional categories defined were: 1 - Managing director/Top manager, 2 - Project manager, 3 - Planning and building construction manager, 4 - Building controller and 5 - Building workers; in the wood and furniture industry: 1 - Managing director/Top manager, 2 - Commercials/Sales Assistant/Administratives 3 - Plant manager, 4 - Plant workers, 5 - Apprentices; in the moulding and plastic industry: 1 - Managing director/Top manager, 2 – Middle managers, 3- Plant manager, 4 - Plant workers, and 5 - Apprentices/others.

Firstly, the qualification needs by each industry would be presented. Secondly, it would be discussed by professional category, and thirdly the areas of knowledge that individuals require by industry and by professional categories would be shown.

4.1 Identification of qualification needs by industry

The industry respondents were asked to indentify among Ph.D, Masters and Post-graduate, Bachelors, Technical courses (these courses are in between the Bachelors and the vocational/professional courses), Continuous training (short term training), and e-learning, which of those courses they would like to attend to fulfil their knowledge needs. The results showed (Figure 2) that regardless of the industry, continuous training is the most preferred for knowledge qualification, i.e. it was identified as “much needed”, with mean above 3,6. All the other knowledge qualifications in the other industries scored below 3, 5 i.e. “needed”.

The moulding industry presents the highest score in continuous training (4, 06) and the wood and furniture the highest in technical courses (3, 58). The mould industry is well known by “the technological industry”, with constant new equipment. Therefore, individuals may constantly need new skills in order to deal with the latest technology. According to a managing director of the wood and furniture industry, people with bachelors or post-graduate courses would be over qualified for assuming the plant manager job that is currently taken by people with a long experience in the sector. Individuals with bachelors or post graduate courses also uphold higher salaries that those with the technical course. Thus, the industry prefers to have individuals assuming plant managerial responsibilities with technological courses, which are specific for the industry, deliver the knowledge and competences needed, and are affordable.

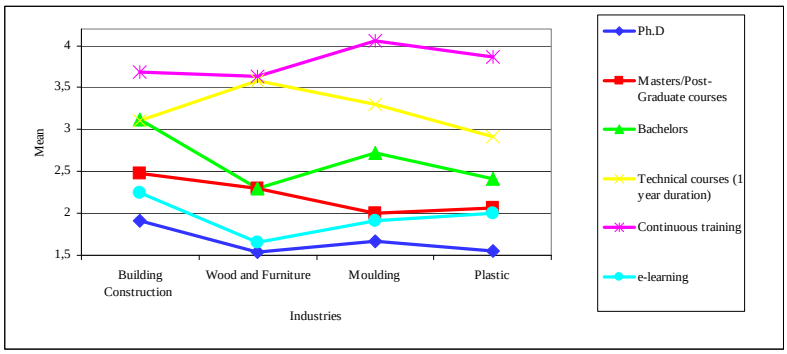


Figure 2: The identification of qualification needs by industry

4.2 Identification of qualification needs, by industry and by professional category

To the previous question the professional category for analyses was added. The research findings revealed (see Table 1, Figure 3) that with the exception of (3) - Plant managers, (4) - Plant workers and (5) - Apprentices in the wood and furniture industry that identified technical courses as their first choice for qualifications surpassing the score of the continuous training, i.e. 3, 97; 3, 89 and 3, 52

respectively, all the other professional categories, from 1 to 5, in the other industries pointed continuous training as the qualification that individuals most wished to undertake, stated as “much needed”, with a mean value of around 4.

It may be suggested that the lack of time that individuals have after work to attend a course may explain their choice. Continuous training is short term training. Another possible explanation is that individual knowledge needs may be too specific, emerging from their daily-base job demand. As a result, they prefer continuous training as it may be customised; chirurgical, fulfilling precisely individual knowledge needs according to their job requirements. Bachelors and postgraduate courses take too long and give a broad view of the subject matter under study. As suggested by a top manager, in most industries the average age of individuals at organisations is high, in some cases above 45 years old. People at that age have progressed in their careers as much as possible. If knowledge is required they would prefer short term training than long term training such as bachelors or post graduated courses.

Within the mould industry, as a second most preferable option, (3) - Plant manager, (4) – Plant workers, and (2) – Middle managers also indentify the technological courses, scoring 3, 85; 3, 76 and 3, 55 respectively. In the Plastic industry, plant managers also choose the technical course (3, 7). It seems that all the (3) - Plant manager of the above industries (wood and furniture, moulding and plastics) take technical courses seriously. A reasonable explanation may be underlined in the fact that they are in charge of the production process, and their tasks involve the application and use of technical, practical knowledge.

In the Building construction, bachelors are pointed by (1) - Managing director/Top manager and (3) – Planning and building construction managers, scoring (3, 54) and (3, 68) respectively. In the moulding industry bachelors are indicated by (2) - Middle managers accounting for a mean 3, 69. The results suggest that tasks that imply managing may require further knowledge in management and therefore the bachelor with a longer duration and broader knowledge in management is pointed as the right qualification to obtain.

Table 1: The identification of qualification needs by industry and by professional category.

	Industries																			
	Building Construction					Wood and Furniture					Moulding					Plastic				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Ph.D	2,33	1,93	2,12	1,73	1,43	2,21	1,90	1,28	1,16	1,17	2,35	1,90	1,52	1,22	1,33	2,05	1,78	1,44	1,22	1,28
Masters/Post-Graduate courses	2,81	2,69	2,77	2,36	1,73	3,00	2,43	1,60	1,40	1,26	2,60	2,80	1,71	1,43	1,44	3,07	2,93	1,68	1,32	1,33
Bachelors	3,54	3,37	3,68	2,93	2,11	3,37	3,12	1,98	1,53	1,46	3,08	3,69	3,15	1,96	1,75	3,17	3,40	2,55	1,69	1,28
Technical courses (1 year duration)	2,92	3,00	3,16	3,38	3,06	3,04	3,48	3,97	3,89	3,52	2,64	3,55	3,85	3,76	2,73	2,68	3,38	3,70	3,05	1,75
Continuous training	3,69	3,85	3,84	3,36	3,66	3,66	3,85	3,74	3,58	3,31	3,97	4,21	4,12	4,38	3,60	3,94	4,07	3,93	4,02	3,35
e-learning	2,41	2,14	2,03	2,38	2,25	2,00	1,84	1,63	1,42	1,41	1,74	2,00	2,15	1,93	1,76	2,00	2,18	1,97	2,00	1,88

Note: 1, 2, 3, 4 and 5 correspond to the different professional categories in each industry studied:
Building Construction: 1 - Managing director/Top manager, 2 - Project manager, 3 - Planning and building construction manager, 4 - Building controller and 5 - Building workers;
Wood and Furniture: 1 - Managing director/Top manager, 2 – Commercials/ Sales Assistant/ Administratives, 3- Plant manager, 4 – Plant workers, 5 – Apprentices;
Moulding and Plastic: 1 - Managing director/Top manager, 2 – Middle managers, 3- Plant manager/Chief section, 4 – Plant workers, 5 - Apprentices/others.

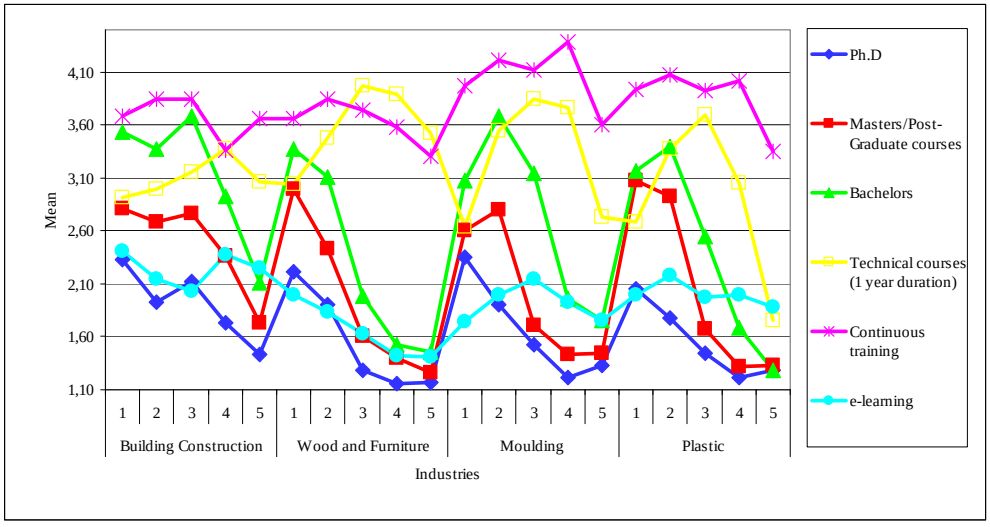


Figure 3: The identification of qualification needs by industry and by professional category

4.3 Identification of the areas of knowledge needs by professional category

Individuals were asked to indentify the areas in which they needed knowledge. As the previous results indicated, the highest mean by knowledge qualification was obtained in:

- the moulding industry by (4) - Plant works for continuous training,(4,38);
- the plastic industry by (2) - Middle managers for continuous training, (4,07);
- the wood and furniture industry by (3) - Plant manager for technical course, (3,97) and;
- the building construction industry by (2) - Project manager for continuous training (3,85).

In order to identify and compare whether different professional categories in the same industry have different areas of knowledge needs, the second highest score was also analysed. The second highest mean by knowledge qualification was obtained in:

- the moulding industry by (2) - Middle managers for continuous training, (4,21);
- the plastic industry by (5) - Apprentices for continuous training (4,02);
- the wood and furniture industry by the (4) - Plant workers for technical course, (3,89) and;
- the building construction industry by (3) - Planning and building construction manager for continuous training (3,84).

The following tables were built (Table 2 and Table 3) to illustrate the areas of knowledge by professional category.

Table 2: The identification of the areas of knowledge needs by professional category, the highest mean

Moulding industry		**Plastic industry**		**Wood and furniture industry**		**Building construction**	
Plant workers	**Mean**	**Middle managers**	**Mean**	**Plant managers**	**Mean**	**Project manager**	**Mean**
Quality control	3,53	Planning and production control	3,88	Planning and production control	4,02	Integrated management systems of quality, environment, safety and heath	3,74
Work organisation and harmonisation	3,47	Optimisation of the production process	3,99	Optimisation of the production process	4,13	Project and building management	3,61
Hygiene and work safety	3,64	Costs analyses of the production process	3,89	Quality control	4,12	Legislation analyses and rules application	4,03
Mould project	3,84	Value analyses and gap analyses	3,81	Quality management	3,98	Art pieces	3,48
Product design	3,45	Industrial logistics	3,45	Environmental management	3,53	Environmental impact	3,47
CAM/CAE	3,89	Costs of no quality	3,85	Organisation and management	3,87	Urbanisation	3,53
Product development	3,63	Quality control	3,98	Hygiene and work safety	3,77	Building projects	3,79
Mould manufacturing	4,24	Quality management	3,98	Wood engeneering	3,79	Foundations	3,74
Electro erosion	4,16	Environmental management	3,66	Raw materials	3,85	Computer assisted project	4,00
Milling	4,21	Organisation and management	3,9	Recycling and materials value	3,77	Buildings thermo behaviour	3,52
Quality of the mould	4,11	Work organisation and harmonisation procedures	3,83			Reinforced concrete and reinforced concrete pre-effort	3,74
Mould finishing	4,40	Hygiene and work safety	3,88			Safety management in building	3,72
Mould testing	4,07	Strategic management	3,5			Quality in buildings and projects	3,76
Mould maintenance	3,91	Tools for strategic management evaluation	3,52			Planning, and management of buildings and work yard	3,83
Reading and interpretation of the technical draw	4,27	Techniques for problems solutions	4,1			Management techniques of contracted work	3,63
Injection process and equipment	4,08	Customer management	3,94			Technical draw	3,75
		Technical English	3,97			Project and draw interpretation	3,82
		Communication, image and industrial marketing for the industry	3,52			Measurement and budgeting	3,60
		Human resources and work legislation	3,72			Building life cycle management	3,48
		Productivity and project management	3,69			Draw and management of intelligence	3,47
		Mould project	3,63			Energetic management and renew energy in buildings	3,68
		Product design	3,74				
		CAM/CAE	3,55				
		Product design	3,57				
		Product development	3,59				
		Quality of the mould	3,88				
		Mould finishing	3,75				
		Mould testing	3,81				
		Mould maintenance	3,69				
		Reading and interpretation of the technical draw	3,76				
		SMED - Single Minute Exchange Die	3,65				
		MRP - Material Requirement Planning	3,59				
		ERP - Enterprise Resource Planning	3,48				
		Time and work methods analyses	3,85				
		Process statistical control	3,72				
		Layout's analyses	3,81				
		Sequential operations	3,85				
		Balanced of the assembling lines	3,6				
		Injection process and equipment control	3,63				
		Plastic finishing	3,59				
		Metallic materials	3,78				
		Material recycling	3,79				
		Rapid manufacturing technologies	3,69				
		Advance techniques for plastics processing	3,85				
		Automation and robotic	3,47				

Table 3: The identification of the areas of knowledge needs by professional category, the second highest mean

Molding industry		**Plastic industry**		**Wood and furniture industry**		**Building construction**	
Middle managers	Mean	**Apprentices**	Mean	**Plant workers**	Mean	**Planning and building construction manager**	Mean
Planning and production control	3,99	Costs of no quality	3,45	Quality control	3,68	Finance and management control	3,49
Optimization of the production process	4,18	Quality control	3,72	Maintenance and equipment repair	3,89	Integrated management systems of quality, environment, safety and heath	3,64
Costs analyzes of the production process	3,88	Hygiene and work safety	3,79	Tools preparation	3,89	Legislation analyses and rules application	3,54
Value analyses and gap analyzes	3,66	Injection process and equipment control	3,59	Selection, cut and good use of wood	4,21	Computer assisted project	3,45
Information and communication technology systems	3,57	Plastic finishing	3,55	Saw and pare timber, drill, press	3,92	Building materials	3,54
Costs of no quality	3,96			Seasoning and wood treatment	3,77	Reinforced concrete and reinforced concrete pre-effort	3,7
Quality control	3,86			Carpentry	3,50	Safety management in building	4,06
Quality management	3,93			Varnishing	3,97	Quality in buildings and projects	3,71
Environmental management	3,68			Wood and furniture finishing	3,94	Planning, and management of buildings and work yard	3,98
Organization and management maintenance	3,64			Packaging, stocking and delivery	3,59	Management techniques of contracted work	4,04
Work organization and harmonization procedures	4,03					General processes and building special techniques	3,53
Hygiene and work safety	3,72					Project and draw interpretation	3,79
Strategic management	3,6					Measurement and budgeting	3,78
Benchmarking	3,54					Draw and management of intelligence buildings	3,51
Tools for Strategic management evaluation	3,59					Energetic management and renew energy in buildings	3,55
Techniques for problems solutions	3,97					Recycling and environment management	3,6
Customer management	3,89						
Technical English	4,06						
Communication, image and industrial marketing for the industry	3,8						
Human resources and work legislation	3,82						
Productivity and project management	4,14						
Bata Base	3,47						
Mould project	4						
Product design	3,67						
CAM/CAE	3,65						
Product design	3,84						
Product development	3,71						
Quality of the mould	3,8						
Mould testing	3,6						
Reading and interpretation of the technical draw	3,75						
SMED - Single Minute Exchange Die	3,57						
JIT - Just in Time	3,83						
Kanban	3,5						
MRP - Material Requirement Planning	3,56						
ERP - Enterprise Resource Planning	3,65						
Time and work methods analyses	3,83						
Process statistical control	3,78						
Layout's analyzes	3,48						
Sequential operations	3,77						
Injection process and equipment control	3,46						
Plastic finishing	3,54						
Metallic materials	3,47						
Rapid manufacturing technologies	3,87						
Assisted computer technologies	3,66						

The results showed that:

- Overall different industries have different areas of knowledge needs;
- Overall different professional categories in the same industry have different knowledge needs. Although, a small number of knowledge commonalities needs within each industry can be identified;
- Different industries and different professional categories have common knowledge needs, namely within the moulding and plastic industries and between (4) - Plant workers, (4) - Apprentices, and (2) - Middle managers;
- Different industries and common professional categories, have common knowledge needs, namely within the moulding and plastic industries for (2) - Middle managers. In about 45 knowledge needs identified, 36 are common, i.e. 80% of the knowledge needs pointed out by (2) - Middle managers are the same in both industries;
- The higher professional category in the organisation hierarchy, the higher the knowledge needs identified.

It was expected that different industries would have different areas of knowledge needs as their specificities compel to different knowledge requirements. As expected, individuals identify their areas of knowledge needs according to their job task demands. Within the same industry, managers identify management related knowledge needs and plant managers stated more technical areas of

knowledge. Even though, as both are deeply rooted in the same industry, between them there are few knowledge areas in common. The moulding and the plastic industries are complementary. In the Portuguese mould industry 95% of the moulds manufactured are for plastics. The mould industry needs to understand the plastic behaviour and vice-versa. So, the affinities in terms of the areas of knowledge were not surprising. More responsibilities in the company hierarchy may mean more awareness of the lack of knowledge.

5. Conclusions

This paper seek to explore and develop an in-depth understanding of the organisations' knowledge needs in the Leiria Region, namely within the building construction, wood and furniture, moulding, and plastic industries.

By identifying the qualification required by individuals within organisations from top to bottom and the areas of knowledge that they need, this research provides important insight to educational decision makers as well as to academics. The results would help to strategically adequate the educational offer to the market demand. It would help to target and communicate correctly for the potential market and learners. The implementation of training courses according to the organisation's needs and the collaborators expectations provide the industry with the necessary knowledge-based competencies. Those competences would foster Regional competitiveness. The affinities founded between the moulding and the plastic industry in terms of the knowledge areas and the qualification required suggest the development of short packs of training targeting both middle managers. For further research it would be interesting to apply this study to a different country and analyse whether qualifications and the areas of knowledge by professional category would be the same.

References

Allee, V. (2003) The Future of Knowledge: Increasing Prosperity through Value Networks. Elsevier. Massachusetts.

Brown, J. S. and Duguid, P. (1998) California Management Review, No. 40, pp. 90-111.

Davenport, T. and Prusak, L. (1998), "Working Knowledge: How Organizations Manage What They Know", Harvard Business School Press.

Drucker, Peter F. (1993) Post-Capitalist Society, Harper Collins Publishers, New York.

Gourlay, Stephen (2006) Towards conceptual clarity for 'tacit knowledge': a review of empirical studies. Knowledge Management Research and Practice, Vol. 4, No. 1, pp. 60-69.

Grant, R.M. (1996) Toward a knowledge-based theory of the firm, Strategic Management Journal 17 (Winter special issue) pp. 109-22.

Hoskisson, Robert E., Hitt, Michael A., and Wan, William P. (1999) Theory and Research in Strategic Management: Swings of a Pendulum, Journal of Management, Vol.25, No 3, pp. 417-456.

Nonaka, I, Krogh G and Voelpel S. (2006) "Organizational Knowledge Creation Theory: Evolutionary Paths and Future Advances" Organization Studies, Vol. 27, No. 8, pp. 1179-1208.

Nonaka, I. (1991) The Knowledge Creating Company, Harvard Business Review, 69(6), pp 96-104.

Nonaka, I. (1994) Organization Science, Vol. 5, pp. 14-37.

Nonaka, I. and Takeuchi, H. (1995) The Knowledge-Creating Company – How Japanese Companies Create the Dynamics of Innovation, Oxford University Press, Oxford.

Polanyi, M. (1966) The tacit dimension, Doubleday and Company Inc., New York.

Quinn, Robert E.; Rohrbaugh, John (1983) A spatial model of effectiveness criteria: Towards a competing values approach to organizational analysis. Management Science, Vol. 29, No 3, pp. 363-377.

Senge, Peter M. (1990) The fifth discipline, the art and practice of the learning organisation. Doubleday Currency, London.

Stewart, T (1997) Intellectual Capital – The New Wealth of Organizations, Doubleday, New York.

Swan, J., Robertson, M. & Newell, S. (2001) "Knowledge Management: The next fad to forget people?". In: Barnes, S.(Ed.), Knowledge Management Systems: Theory and Practice. International Thomson Business Press. London.