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EDUCATION IN SUPPLY CHAIN MANAGEMENT IN EMERGING MARKET ECONOMIES (A CASE STUDY OF POLAND)

Introduction

The world of today, and particularly the emerging markets, is undergoing deep qualitative changes with far-reaching consequences for the global economy as well as for our immediate business environment. The following are just a few of the phenomena that seem to account for the intensity and scale of these changes [see Płoszajski (2000)]:

- transforming political systems,
- emerging virtual networks of global influence,
- growing market competitiveness leading to a surge of company mergers,
- a new quality of customers' expectations,
- shorter life cycles of products,
- rapid development of the service sector, etc.

Management is becoming an increasingly challenging task in the current economic reality subject to a synergetic effect of the simultaneous operation of two factors: growing complexity and rising turbulence. As a result, periodic interruptions to the development process occur, even though the properties of the new social and economic order are not clearly known yet. It is becoming obvious that the future will belong to "lean" organisations: based on team work, flexible, flat-structured, quality-focused, maintaining close links with their customers and suppliers, and operating globally.

Alongside the "lean" concepts, in their strife for survival businesses apply a number of other tools and techniques, such as: strategic reorientation, reengineering, downsizing, outsourcing, lobbying, and many more. Research efforts made by consulting companies indicate that about two-thirds of these actions do not produce the expected results or end up in a failure.[1]

The changing economic conditions and the tightening market competition have led to a situation where companies are ready to abandon the vertical functional organisational structure consisting in the traditional division into procurement, production and distribution activities. Instead, they will introduce horizontal and cross-functional frameworks that are capable of supporting process management. Under such conditions, logistics management seeks to integrate such activities as planning, implementation and products/services flow control into a single process by co-ordinating them throughout the company. More often than

[1] These results were presented by Arthur D. Little on the basis of research in North American companies and also by A.T.Kearney using their analyses of initiatives in Total Quality Management in British companies. A reengineering specialist, M.Hammer, announced such conclusions also. See in Płoszajski (2000).

not, integration goes even beyond the formal company borders, encompassing or forming extended logistics networks, in an attempt to reduce costs and/or improve customer service in the entire chain of organisations. This is known as supply chain management [see Bowersox, D.J. and Closs, D.J. (1996)].

Logistics in general, and supply chain management in particular, are characterised by exceptional dynamics; constant changes are a necessity as the supportive role of supply chain management with respect to a majority of other economy sectors forces it to implement modernising solutions. Another problem that logistics faces in the rapidly evolving supply chain reality is that of a virtual corporation, or e.g. virtual leadership systems. The virtual organisation brings together a "community" of companies and institutions, uniting them on a temporary basis around shared goals, values and/or joint operations only undertaken for the performance of certain tasks. It is anticipated that within the next 10-15 years a majority of businesses will become virtual and that, as an effect, the virtual organisation concept will dominate among the different concepts of structures and management functions [see Bowersox, D.J. and Closs, D.J. (1996), p.33]. The amorphous character of virtual organisations renders the existing analytic methods used for object recognition totally useless, while – at the same time – posing logistics against a new challenge: the necessity to completely alter the approach towards logistics management and towards professional improvement of those individuals who make decisions in that area.

1. Integrative aspects of supply chains

The concept of logistics management has always been focused on the integration of activities relating to the flow of materials and products from their places of origin to their consumption points in an effort to meet the needs and expectations of customers and to contribute to the fulfilment of the company's strategic, tactical and operational goals. The flow chain of raw materials and products, including all of the participating firms and institutions, forms a logistic channel. What the term refers to is, precisely, a stream of goods and materials, flowing through all subsequent stages from the suppliers to the ultimate consumer. The purpose of a logistic channel is to minimise the occurrence of doubled logistics functions. These days, the term "logistic channel" is often replaced by "supply chain". The precise meaning of these two terms is not identical, even though both the structures contain the same elements. The most pronounced

difference between these is in the level of integration within a logistic channel and a supply chain.

There are several groups of supply chain concepts [Betchel, Ch. And Jayaram, J. (1997)]. What they all have in common, though, is that, from the perspective of a supply chain, companies participating in a logistic channel, whether loosely or tightly interlinked, co-ordinate their efforts towards increased efficiency and competitiveness of the product that flows within the channel. In a supply chain, the philosophy of close integration with suppliers and customers dominates, its purpose being to achieve a competitive edge. Basically, in supply chain operations the overall focus is shifted from inventory management problems, as is the case in a single company, to the strategically advantageous location of stocks within the entire supply chain. It is a very difficult task which requires, besides mere knowledge on logistics management in a company or a group of businesses, a decision making ability that will compromise the interests of the different functional groups of companies involved in the process.

International research proves[2] that the "hard" factors of logistics potential are significant from the viewpoint of the efficiency of a supply chain, since chiefly the resources of logistics infrastructure determine them. The "soft" factors, on the other hand, relating to the quality of management and the currently operational macro-economic system of a country, seem to be of lesser importance.[3] As far as the fundamental cause-and-effect relationships in an economy are considered, one can easily come to a conclusion that logistic channels are seldom formed in an accidental or spontaneous manner. Logistic chains are created on the basis of managerial decisions made by individuals or institutions responsible. Such decisions will concern [see Koźmiński, A.K. (1996), p.133-134]:

- setting long-term strategic goals and their fulfilment,
- planning (i.e. describing) a sequence of future actions and the means for their completion,
- comparing actual actions activities against earlier assumptions and projections,
- organising processes, i.e. the proper grouping of material and human resources, and depiction of their mutual relations,
- motivating personnel involved in the processes,
- undertaking activities resulting from globalisation trends in economies and in the operations of businesses and institutions.

[2] Within a framework of that research a model was formulated and its parameters estimated, describing influence of specified factors on efficiency of logistics systems in different countries. That model suggested that 80% of differences in inventory levels between countries could be explained by factors connected to transport, communication and trade. [see Dimitrov, P. and Wandel, S. (1998), p.14].

[3] Several earlier studies suggest that differences e.g. in inventory levels in different countries result mainly from different economic policies or management styles. See also Dubois, P. and Lenerius, B. (1983); Kylaheiko, K. and Pirttila, T. (1985)

A survey of the decision types listed above indicates that their quality is strictly dependent on the level of knowledge and skills of the decision-makers. In that sense, the quality of human resources, in relation to logistics operations and management, becomes a very important element of logistics potential on a micro- and macro-scale. In other words, the qualifications of personnel involved in logistics flows, regarded as an indicator of the quality of human resources, is a factor contributing to supply chain potential.

What needs to be stressed when considering the logistics management tasks performed today, is the departure from traditional resource management and simple report generation in favour of seeking improvement in performance by enhancing the actions of company personnel. This increasing trend results from a drive toward the full realisation of logistic strategies in companies and their groups. This calls for the involvement of personnel at all managerial and operational levels, leading to the highly integrative nature of decision-making in a supply chain.

2. The role of logistics qualifications in the integration of supply chain management

The perspective of managing integrated logistics systems brings up the following question: who should be responsible for the efficiency of logistics operations in a company, or – in a supply chain? In this field, structural and organisational solutions alone do not account for the efficiency of materials and products flows. As it has already been said, there is a person, an individual behind each decision made and each specific action taken; it is people who make these decisions and take actions based on their abilities and habits, their motivation and natural talents. Professional qualifications and personal qualities are particularly important for effective logistics operations and supply chain management. Hence, a new profession is emerging in transforming economies, where the efficiency of logistic flows attracts a lot of attention: a logistician, also regarded as the professional profile most adequate for practical supply chain management.[4]

[4] The most common English terms for that profession are *logistician, logistics manager or logistics engineer*. In any of those cases he is a highly specialised manager for supply and distribution management, and sometimes also for material flows management in production. See Fawcett, P., McLeish, R. and Ogden, I (1992).

Without a specific interest in the name of a particular post or its position in the organisational structure of the firm, all persons dealing with a complex management of product flows - from the source of origin of raw materials to finished goods distribution - can be called "logisticians". See Kisperska-Moroń, D. (1993).

Given the wide scope of logistics processes and related problems, one could venture to state that each employee in any business is somewhat of a logistician. However, most personnel are unable to look from the specific perspective of supply chain management. The supply chain manager has to negotiate the often-conflicting interests of the different employees, sections and departments, in the context of an integrated logistic process. In order to do that, he will analyse and present all the true conditions that have, up to this moment, been considered separately and partially only, and thus have formed an unrealistic picture of logistics[see Jedliński, M. (1997)].

The logistician can, having identified the actual cause-and-effect relationships in the logistics system and its environment, develop and propose solutions based on compromise between the conflicting elements. The logistician then has to send the messages (the proposed solutions) to the right address, so that problems are resolved by competent executives. Clearly enough, communication skills are becoming crucial, since supply chain managers have to be very persuasive when announcing their compromise proposals. They have to become members of operating teams and exhibit an exceptional capability of adaptation. In addition, supply chain managers need to acquire the ability of non-standard thinking, and they must be able to critically examine the options for improving their performance. It is for these reasons that the demand for well-educated personnel is still increasing, even at the operational level of order fulfilment.

Well-educated managers at all levels and efficient internal communication, meaning that the personnel are well-informed about whatever happens in the company or in the supply chain it belongs to, are the preconditions for achieving a high degree of effectiveness and efficiency of logistics processes. In any company being part of a supply chain, the management should apply work evaluation systems, recognise qualifications and delegate responsibilities; managerial staff at all levels – according to the *kaizen* principle of constant learning – should organise rotate training in order to obtain an in-depth knowledge of all company departments and of the links in the supply chain.

Logistics management and supply chain management has changed dramatically with advancing computerisation. The computerised processes of product dispatch, satellite systems, radio systems for inventory management, and the Internet, to name just a few technological innovations – all these have emerged recently. There is no doubt that today working in a fully automated logistics requires superstandard skills. In the year 2001, CEOs and other senior executives surveyed on the key qualifications of their personnel attached most importance to communication skills; other critical qualifications included decision-making skills, creation of professional links, and sensitivity to corporate culture.

Even with such clearly outlined job requirements regarding professional qualifications, experience will be found among those assets that are of utmost importance to a logistician. When it comes to making a choice between a very well-prepared recent university graduate with a logistics specialisation and a logistics professional with a highschool diploma but having a many-years' track record with leading logistics companies, reaching any kind of compromise is very difficult. At the moment, the latter candidate would, most probably, be given preference in filling the position. However, it seems unquestionable that in the future companies will put a greater value on an employee's ability to move effectively within networks of virtual organisations than on general skill in managing business operations.

Regardless of job title and description, each logistics manager must perform the role of an integrator for the logistics process [see Heskett, J.L., Glaskowsky, N.A.,Jr. and Ivie, R.M. (1973)]. What are the main characteristics of such an integrator?

It is likely that some very accurate observations concerning such characteristics were made in the "Harvard Business Review" many years ago [see Lawrence, P.R. and Lorsch, J.W. (1967)]. The authors point out that true integrators *pay more attention to the others and their perceptions; constantly try to maintain friendly relationships in their actions; eagerly undertake tasks with various opportunities for all types of interaction. However, if integrators' motivation is too strong, it may reduce their ability to cooperate and solve conflicts, probably due to the fact that in interdepartmental conflicts they rather notice an opportunity to compete instead of that to co-operate.Efficient integrators should influence other people by persuasion or through accepting leadership role in actions. Additionally, they should show aspirations to become managers, thus being able to exercise power, influence and control the others.*

Some behaviour patterns of efficient integrators are also given: e*fficient integrators display great initiative and drive for leadership; they are aggressive, credible, persuasive and fluent in their speech. On the opposite, inefficient integrators withdraw from actions; they are silent and avoid situations that require tension and decision-making. Efficient integrators prefer flexible actions; they thrive for action, are witty and self-assured. Inefficient integrators are very schematic, conservative in action, inflexible and tough.*[see Lawrence, P.R. and Lorsch, J.W. (1967)].

These prerequisites, while required of any integrator, seem to be particularly important in the case of logistics manager and supply chain managers. Listed and published 20 years ago, this description of an efficient integrator is just as valid today as it was at the time.

In the past, logistics management concepts did not pay much attention to personnel management problems. Recently, however, this has begun to change in Poland, in unison with the general European trend to improve employment and competitiveness through better work organisation based on highly qualified workforce, trust and quality.[5] At present, a change in the role of human resources has been emphasised, from a factor similar to capital resources or land area in a traditional economy to a key development factor for any modern economy, which is based on knowledge and information flow.[6] For these reasons, the qualifications of logisticians constitute an extremely important element of the processes shaping modern companies and their environment.

Organisations operating in supply chains require employees who have a profound understanding of integrated processes within a business and between the partners in a supply chain, and who are able to manage them efficiently. A study of companies with world class logistics departments, prepared by a team of researchers from the Michigan State University, indicates that top logistics managers at high organisational hierarchy levels fear a shortage of personnel trained in integrated supply chain operations [see The Global Logistics Team at the Michigan State University (1995); Sheffi, Y. And Klaus, P. (1998), p.1-28].

3. Outline of present qualifications of supply chain managers in Poland

3.1. Description of research and the sample

The first step in designing an efficient system of education in supply chain management was to identify the current average level and structure of qualifications of logistics personnel. It was important because staff qualifications would be a key factor in determining the possibilities of integration within supply chains in which Polish companies are involved (many of them are involved in the international flow of goods, too).

[5] Problems of partnership within a framework of modern forms of organisation of business processes in the context of labour market policy have been discussed in the [*Green Paper* (1997)].

[6] It is worth underlining that logistic processes create work places for 20-30% of the total number of people employed. See Abel I. and Szekely I. (1989).

The bulk of information was collected through a survey designed to identify the skills and qualifications of logistics personnel in an average Polish company.[7] The survey took the form of a questionnaire, which was administered in companies based in a southern region of Poland called Upper Silesia. It can be assumed that the sample examined of 473 respondents was representative of that part of Poland, since the respondents were selected in a random and objective manner. In effect, the survey respondents represented various sectors and branches of Poland's economy. Furthermore, the structure of the sample reflected the characteristic breakdown of the region's economy into industry sectors. Thus the major industry groups represented were: mining (18% of the sample), steel plants (around 15% of the total) and commerce (nearly 13%). The structure of the sample and its professional profile certainly determined the general picture of the qualifications and aspirations of logisticians surveyed.

The survey respondents were employed by different size companies. Traditionally, the largest-sized companies were typical of mining, steel and engineering. Considerably smaller sizes of companies were found among trade companies, in chemical and electrotechnical industry. The diversification of company size within sectors and branches was also significant. Therefore, we can be assured that companies of all sizes were represented in the sample, from very large, through large and medium-sized, down to small companies.

The age characteristics of the respondents allowed their classification into 5-years age brackets, which corresponds to their normal distribution. People within the group of 39-50-year olds, being at the peak of their professional career, constituted more than a half of the sample. Young professionals between 21 and 38 years of age made up 1/3 of the sample, and only a small percentage (around 2%) of the sample consisted of persons at retirement age (57-68 years old). The age distribution varied between and across industry sectors and branches. Special attention should be given to the large proportion of 21-26 years old employees in the electrotechnical industry, in trade, and in some other branches. A considerable percentage of older respondents, above 51 years of age, were found in transport and metal industries. A somewhat smaller concentration of older employees could be observed in the engineering industry. In general, the concentration of respondents in different age groups varied from sector to sector, e.g.:

- 44% of respondents in electronics industry were in the group of 33-38 year olds,

[7] The research was carried out by a team of researchers from the Department of Business Logistics of the University of Economics in Katowice in the years 1997-98.

- 42% of respondents in electrotechnical industry were in the group of 39-44 year olds,
- 55% of respondents in chemical industry and 41% of respondents in steel production were classified in the group of 45-50 year olds.

The flattest distribution within the age structure was found in such industries as metal, car manufacturing, fuel and energy, mining, textile industry, and transport.

Supposedly, the age structure of the sample had much to do with the level of logistics qualifications, as well as of general education, and with the so called "logistics awareness" of personnel who are professionally active in the field of logistics management.

Around 40% of respondents in the sample were managers of logistics departments in companies. This rather low proportion reflects the reality of Polish companies in respect of managing product flows. While in businesses with western partners and/or capital participation, which operate on western management know-how and culture, the operations of a logistics or supply chain department have become a routine thing, in an average Polish company such a department is still far from obvious and, consequently, not very common. Other personnel surveyed were employed as: department managers (e.g. purchasing, sales, etc.) – 16%, experts in various areas of logistics – 14%, section managers within departments – 9%, top experts – 8%, vice-CEOs – 7% and CEOs – 5%.

A hypothesis on a relationship between the age of respondents and their current status in company hierarchy was tested. For that purpose, the following promotion path was assumed: *expert --> top expert --> section manager --> department manager --> branch manager --> vice-CEO --> CEO*. By analysing the successive age groups along this hypothetical career path, a correlation coefficient of 0.730445 was computed. The coefficient indicates that there is a close relationship between the age of respondents and their position in the hierarchical decision making structure of the company. A particularly strong relationship was discovered in the following industries: mining, electrotechnical, fuel and energy, and food processing. In commerce, on the other hand, a distinct inversely proportional relationship was detected (-0,5983). In the chemical industry, no clear relationship was perceived.

It can be expected that, if this trend continues in the future, it will be very difficult for young employees, educated as professional logistics managers and supply chain managers, to fill a position in the company's decision-making process which would allow them to put new concepts into corporate practice. The only exceptions are – as demonstrated by the findings of the research being discussed – to be found in commerce and the electrotechnical industry, where young age is not an obstacle for fast career advancement.

The research showed that persons with university degree (i.e. complete university level education) were the largest group (around 45% of the sample). The second largest group, 26.8%, were persons with highschool education; 10.7% were persons who had completed a university programme but have not earned a degree and, finally, there were a few cases of vocational education. Logistics managers with university degrees were not a majority in the chemical sector, metal industry and in construction business only. An analysis of the respondents' educational background reveals that technical and engineering type of education was dominant, accounting for as much as 57.2% of the sample (with the exception of textile industry). The second largest group (33.6%) consists of economy specialists; the following groups are logistics and transport specialists (5.5%), and managers with general business education (3.7%). The structure of educational background varies widely from industry to industry.

Considering the fact that logistics management and supply chain management are part and parcel of the business decision making process, the numbers presented above might lead to the conclusion that adequately qualified personnel constitute just a small proportion of the sample. If this is true, the impact of this fact on the quality of logistics decision making in Polish companies will be obvious to anyone.

Furthermore, the survey demonstrated that nearly 21% of respondents took part in various educational and training programmes, most of which were in the field of logistics or in a similar area. Almost a half of the participants of those programmes sought to upgrade their qualifications in logistics management and/or supply chain management, with a focus on such popular topics as transport, inventory management, logistic strategies, etc. Almost 1/5 of logisticians who had tried to improve their qualifications chose such subjects as general organisation and management, or controlling. By striking the total percentage of respondents in the sample who were improving their qualifications against the proportion of those studying within the field of logistics, the percentage of persons trying to achieve excellence in a field strictly related to their current employment was estimated at not more than 10% of the total. In extreme cases, e.g. in commerce, as many as 9/10 of employees surveyed were not developing their skills in any area.

Suspecting that the direct motivation to improve one's qualifications could be sought in salary levels and structures, we attempted to examine that aspect of logistics careers in Poland. However, the respondents felt that the questions concerning their salaries were "too private to answer", and avoided them: many did not provide any answer, while others supplied very general or evasive answers that did not yield any material for further research. Information collected led us

to believe that salary diversification was truly large. A certain positive correlation was discovered between university education and salary, and a strong negative correlation between salary and highschool education. These correlations can be interpreted as an incentive to upgrade one's qualifications. We found out that salaries rose more sharply in the group of employees with a genuine logistics or transport educational background (a minority among logistics personnel surveyed), and only slightly in the group with general business/economics education.

3.2. The nature of requirements for logistics qualifications in Polish companies

The research discussed in this paper brought us to a tentative conclusion that the level of logistics qualifications in the years 1997-1998 were far from advanced. However, managers of Polish companies only started discovering the importance of logistics management as, toward the end of the 1990-ies, a number of traditional ways of profit building became useless due to the increasing saturation of the market, deep market segmentation and a shortage of simple reserves for further business growth.

The growing "logistics awareness" of operational and managerial staff at the beginning of the 90-ties was, to a large extent, a result of the educational efforts simultaneously undertaken by a number of institutions and, particularly, by academics who created business logistics departments and began delivering regular courses in business logistics. The first group of university and business school graduates professionally trained in business logistics was employed by Polish companies in the years 1994-95. Unfortunately, it was only in the mid-nineties that the proper structuring of logistics education was supported by international projects sponsored by the European Community and the US funding. The research whose findings are reported in this paper was underway precisely at the time that the pioneer groups of university graduates with an adequate logistics education entered the labour market commencing their careers in business logistics management.

The period discussed could be regarded as a wider scale "logistics awakening", during which a growing financial motivation, both at an individual and a corporate level, exerted an intense pressure on the improvement of logistics qualifications of personnel. Very soon it was discovered that a high skill level in logistics management and, even more in supply chain management, which is

a more advanced concept, does not depend merely on the knowledge of the technicalities of logistics flows.

The experience of many Polish companies is made up of frustrating stories of logistics managers who had created elaborate strategic visions in logistics, motivated their personnel toward their fulfilment, and then were confronted with the resistance of lower level staff against changes being introduced. That kind of resistance can be met not only within the company but it could just as well emerge at the suppliers' and/or the customers' end [see Byrnes J.L.S. and Shapiro R.D. (1995), p.805]. The most serious problems result from the presence of medium management levels in the hierarchical structure of the company – the so-called administrative staff. Operational workers (e.g. drivers, warehouse staff, etc.) usually have a positive attitude toward the changes, since they are interested in the efficient organisation of their work.

The following are the causes of predicaments such as the one recapitulated above:

- *The traditional perceptions of responsibility boundaries* by those managers who concentrate their attention on systems reporting task completion and on receiving adequate compensation.
- *Lack of resources of adequate information, as well as lack of knowledge and experience* among a lot of managers. Some managers lack the necessary knowledge and experience to be able to efficiently manage supply chains. Some of them are simply unaware of the most efficient techniques for analysing objects that are so large and so saturated with information as e.g. logistics systems or logistics channels within these systems. Generally oriented programmes of corporate development do not include such information, either.
- *Traditional functional barriers* existing in a vast majority of companies that will effectively halt the process of internal integration of logistics management. Changes in organisational structures affecting the traditional distribution of authority and responsibility tend to cause abrupt conflicts.
- *Short-sightedness of operations planning* and the top managers' focus on generating quick profits; lack of long-term financial policy; avoidance of all sorts of risk in operations; concentration on the realisation of quarterly plans – all these prevent the company from organising an efficient product flow oriented on the quality of customer service.

Most of the attitudes that come in the way of obtaining maximum effect from the co-ordination of product flows, stem from a narrow interpretation of traditional personnel management policies and principles, which are generally

inapplicable to current economic conditions or lag far behind the reality of today's highly competitive markets. The perfect co-ordination and streamlining of logistics processes, in accordance with the definition and the principles of supply chain management, calls for a more extensive application of the concept of Human Resource Management in logistics management. Elements of that concept, i.e. performance measurement and salaries, recruitment and career development, as well as promotion and pension policies, play a fundamental role in the formation of staff's attitudes and abilities. In general, the adoption of the HRM concept should be targeted at increasing "logistics awareness" at all levels of the company's decision-making hierarchy.

In a lot of Polish companies, the senior managers' attitude is a significant factor inhibiting any reform toward the integration of logistics processes. A number of top managers are in need of training that could encourage them to direct their actions toward:

- a realisation that improved co-ordination of product flows might lay foundations for the company's strategic success.
- delegation of a sufficient amount of decision making authority to key logistics or supply chain managers, so they have actual control of company policies and are empowered to create the right conditions for the implementation of future changes.

In other words, the educational systems in emerging market economies should turn toward raising the interest of company managers in unconventional management methods and, particularly, in a vision of supply chain management that would create new development perspectives and lead to improved financial performance.

In summary, the attitudes of Polish managers (and probably of many of their western counterparts, too) and their management styles, as applied in the field of logistics, might seem somewhat conservative. This is likely to be the result of instruction received within the framework of classical curricula and training programmes in the area of logistics. The adoption of a new, innovative approach to education in supply chain management in Poland might also entail the emergence of a new quality in advanced market economies and could lead to the creation of extraordinary career opportunities based on promotion onto higher levels of supply chain management hierarchy.[8]

[8] Such an opinion has been confirmed also by the results of research carried out by the Canadian Association of Logistics Managers. See Vermond, K. (1999), p.14-16.

4. Traditional logistics education models in Poland and their weaknesses

Within the system of logistics education that has been functioning in Poland for several years now, two mainstream trends can be distinguished [see Kempny, D. and Kisperska-Moroń, D. (1997)]:

I. A clear distinction into two educational sub-systems, fully independent of each other:
   a) a system of education in technical universities, mostly in such areas as: transport, management and organisation of production process, computing;
   b) a system of business logistics education in universities of economics, business schools and economics departments of traditional universities;
II. Popularisation of "logistics knowledge" in the area of business logistics by non-specialist teaching personnel re-trained in logistics through "train the trainers" programmes.

As regards the first case, education is based on a natural division between engineering and business profiles. What would seem natural, then, is that universities of technology should train engineers for the logistics profession, specialised in industrial logistics (e.g. system designers, operations managers, etc.), transport and warehouse management. However, common practice shows that technical universities do not provide the most demanded technical and engineering knowledge in the field of logistics such as e.g. concurrent engineering, applied systems analysis or logistics information systems management. Instead, at the expense of instruction in technical subjects, they choose to adapt to expediency and teach just elements of business logistics. This occurs, regretfully, even though these institutions are not competent enough, given their educational profile and their teachers' qualifications.

Of course, we do not mean to say that engineers do not need the knowledge of business logistics. The point is that the knowledge should not be limited to pure, or general, logistics and that it should be taught by qualified logistics teachers rather than by engineers or freshly re-trained trainers. It would be just as improper if, say, some economists, obviously unprepared and incompetent, chose to teach their students technical disciplines.

Doubt can also be raised about teaching logistics by persons who have only completed brief programmes of the "train the trainers" type. It is a plain fact that it is virtually impossible to acquire the qualifications of a full-fledged

logistics teacher on a course of this sort. The fact would not probably be worth mentioning if it did not do so much harm to the evolving system of education in supply chain management and if there were a common framework for verifying the qualifications of logistics teachers.

As a result of the increasing complexity of logistics and supply chain management itself, teaching curricula in logistics are becoming more and more complicated. Although university logistics programmes are still quite recent, their further modification is already due. This task requires not only that logistics teachers have a better understanding of the new logistics issues, but also, and even more importantly, that the way logistics and supply chain management are taught be reformed toward compliance with standards adopted world-wide.

The supply of university graduates skilled in supply chain management is very limited, since management and business schools seem to be locked up in the so-called "functional towers". Departments and institutes specialising in procurement, production management or logistics and/or transport operate independently and on an individual basis, often paralleling their educational, research and publication efforts. Those functional "towers" are reinforced by the traditional faculty structures of universities as well as by the traditional systems of study.

Programmes run separately for different study subjects do not help students to understand the mutual interdependencies within supply chains – working on their theses, most of them have only mastered a portion of knowledge on a single subject. An opportunity to truly understand the nature of supply chain management occurs only to those students who study at universities where logistics is a compulsory subject for an entire population of students.

Educational programmes are consistent in teaching functional knowledge in the first place, regardless of the growing popularity of all types of integration concepts in business. Supply chain management, and particularly its essential parts dealing with the decision making process, has a predominantly qualitative character. At the same time, one can take advantage of a wide variety quantitative methods and techniques that are taught in a majority of business school curricula.

Students learn communication skills and group problem solving on a very limited scale only. The organisation of study programmes, as much as the teaching methods and techniques used, are deficient in motivating students toward team work and group work; not enough educational projects are offered whose main objective would be to train them in the skills essential to their functioning in an environment of group efforts, team work and task forces, which is what modern horizontal companies and future virtual businesses are supposed to be like.

In the new, flatter and process-oriented structures, the role of medium management level becomes smaller and smaller. In a business organised around matrix horizontal structures, team leaders and owners of the core processes (including logistics processes) will replace medium level managers. These are completely new managerial occupations, which cannot be learned by attending a traditional university or continuing education programme, since such programmes are more than scarce. Among the prerequisites that would be expected of candidates for these new jobs are likely to be such skills as problem solving and social efficiency. In this area, traditional business programmes are competing with such programmes as sociology, psychology, language studies, etc. That psycho-sociological aspect is particularly important for supply chain management, where the methods of interorganisational management are used (not thoroughly identified and researched yet).

5. Main directions of changes in education for supply chain management

5.1. Proper system of educational institutions

International qualification standards and the generally accepted models of logistics system operation require educational and training programmes of superior quality, thus also significantly raising the skill requirements for teachers. A common paradox in contemporary logistics education is that students have to be taught how to answer questions that will only be asked in the future, in a different reality which is not yet known to teachers themselves. This seems to be the most important problem of contemporary education systems.

As the significance of logistics management in supply chains grows, the approach to educating and training in this area should be reviewed and changed accordingly. It seems that it would be viable to start developing the "logistics awareness" as early as during profiled secondary education, so that the choice of career in logistics could be made early along the study path. In that way, preparation for the logistics profession could be made more extensive and more profound; even though this idea certainly goes at a tangent from the traditional models of education in logistics management.

The first and essential question for an educational system in design should be: whom do we want to educate? Given the expected variety of professional logistics qualifications and the corresponding levels of academic and non-academic education, the questions seems particularly valid in the case of systems designed to train for a career in logistics.

The system of education in logistics and supply chain management should match the hierarchical levels found in supply chain structures, thus addressing the educational effort toward, respectively:

1) strategic managers, entrepreneurs (members of boards of directors, company owners, members of supervisory bodies, etc.), future vocational and academic teachers of logistics and supply chain management;
2) operational and tactical managers (executive level) specialised in the management of deliveries, distribution and customer service, warehousing and transport.

The target skill level will be different for each of the groups, which should be reflected in the form and content of educational programmes available.

Highly qualified entrepreneurs, managers and academic lecturers of logistics and supply chain management have to be recruited from among graduates of full-time study programmes completed at those academic institutions that offer education with the widest scope and the most multidisciplinary profile. The curriculum has to include both relevant specialist subjects (specialised, i.e. area-specific, marketing and logistics) and general business subjects (strategic management, management accounting, history of economics, etc.).

Strategic managers are supposed to demonstrate a creative and visionary approach to business as well as an ability to cope with risk, creative thinking and strategic decision-making skills (concerning the implementation of logistics systems, the formulation and implementation of strategies, the building of strategic structures for supply chain management, etc.). Therefore, their education should be as complete and thorough as possible, proceeding along three paths simultaneously: firstly, they must necessarily be equipped with the most up-to-date knowledge on strategic management; secondly, they have to acquainted with all the key issues of logistics and proficient in the state of the art of supply chain management; on top of these, each would-be strategic manager must become an expert in a specialised area that he/she will research and study in his/her university classes, in the course of his/her master thesis project and on professional training courses. It is from this group, it should be expected, that will come forth a new generation of supply chain co-ordinators, leaders, designers, advisors to designers, as well as international and domestic promoters of modern concepts in supply chain management.

At the same time, the dissemination of knowledge on supply chains and supply chain management should definitely remain the domain of business schools and strategic management experts. Specialised departments and institutes of business logistics play a central part in stimulating the trend of integrative thinking about supply chains, which aims to produce a similarly integrated educational programme centred on horizontal management of marketing, procurement, production and the related logistics processes.

Operational and tactical managers, on the other hand, could be prepared for their professions in secondary schools and post-secondary education programmes, and then all the way up to the first academic degree (bachelor, licentiate) within a curriculum including logistic subjects but focused on a technical or economic qualification. Technical universities should become important educational destinations for operational managers (transport, warehousing, production management, and information technology), concentrating on the education of logisticians and academic teachers of the highly demanded technical profile.

In any modern company, and in supply chains in particular, professional development should be a natural tendency and a continuous process. Research proves that the principle of constant learning is commonly followed in Polish businesses, and is realised through a number of more or less formalised forms of education, starting from habitual reading of professional publications, through participation in one-day seminars, to part-time studies at business schools and universities. In addition, the following options should be considered:

1. Managers who are well into their professional careers but intend to change their main qualification, obtain an additional one, or simply upgrade/update their knowledge; they can do so on training courses in logistics, at a basic or advanced level (including special training for operations managers), or in a part-time or evening study university programme. It seems that a crucial point in this area would be to ensure the availability of neatly organised training programmes suited to the current requirements of the business community.
2. Managers of other professions who need to acquire the so called "logistics awareness"; no matter how high their rank and position in corporate hierarchy is, they should not afford themselves to lack such awareness, since their logistics education can enable them to prevent conflicts caused by the dispersion of decision making power and competencies, such as often will often arise in the implementation of logistics projects, in the co-ordination of supply chains or even in the introduction of small scale logistics solutions (e.g. changes in order processing, etc.).

3. Non-academic and academic teachers who wish to upgrade their knowledge of the logistics area; their instruction should, preferably, take place at technical and economics universities that have included the subject of logistics and supply chain management (at either basic or advanced/specialised level) in their curricula.

It is important to note that logistics education should be based on certain quality standards, to ensure the correct interpretation and implementation of business logistics and supply chain management concepts. Each of the educational institutions mentioned above should therefore challenge itself to adopt a consistent teaching curriculum in logistics and supply chain management adequate to international standards.

A professional examination that would specifically attest individual skill and knowledge could serve as a hallmark of the profession of a logistician and represent an attempt to standardise each of the many varieties of logistics qualifications. A certification for ELA logistics diploma is an example of a solution which relies on an individual decision to undergo verification, and is addressed to logistics professionals who, for this reason or another, require a formal stamp or a certificate of achievement. The ELA system of certification has been adapted and successfully implemented in Poland by the Institute of Logistics and Warehousing in Poznan.

The quality of Polish university logistics programmes has been verified by the labour market in which their graduates find employment. In the mid-nineties it was common for Polish divisions of international companies to hire foreign logistics specialists. In the second half of the nineties, however, Polish university graduates started to recover ground, eventually becoming quite successful in applying for jobs of logistics managers in both Polish and multinational companies. This is best illustrated by the fact that the total annual output of around 40 new logistics and supply chain managers having completed the full-time study programme at the Department of Business Logistics of the Katowice University of Economics has so far been fully absorbed by the labour market, year by year, clearly defying the steadily rising trend of the unemployment rate. The same is true about other business schools and universities running business logistics programmes.

The qualifications of specialists in supply chain management also need to be standardised to meet the requirements of international labour markets. An international system of professional certification, e.g. such as the one offered by the European Logistics Association, is a good example of an international standard that is recognised by employers world-wide as a warrant of world-class qualifications in supply chain management.

The Polish system of education in business logistics has been verified not only via domestic and international companies operating in the Polish market but also through other kinds of international exposure. Several Polish universities participated in PHARE-Tempus joint European projects aiming at the enhancement of logistics programmes offered by the Polish participants. One of the projects involved the business logistics departments of three Polish universities: Katowice University of Economics, University of Gdansk and the Warsaw Business School. Our observations were rather surprising. Within the project's framework, groups of students were given an opportunity to attend logistics programmes offered by Arnhem Business School, Holland, and to be placed for work experience in British companies. In Holland, Polish students were able to demonstrate that their level was relatively good compared with that of other international students, both in terms of general business skills and in terms of logistics knowledge acquired in Poland. Several students of the Katowice University of Economics received credits for examinations taken in Poland and were allowed to extend their period of study in order to graduate from the Dutch school with the bachelor degree. The placements in British companies, arranged by Bradford College, proved successful as well: it was found that the businesses could really benefit from the Polish students' work, and that the advice they provided was genuinely helpful, too.

Several years of work within an international framework proved that the courses and programmes in logistics and supply chain management delivered by logistics departments of Polish higher education institutions are not inferior in quality or much different from programmes offered by leading logistics education centres in Europe. Moreover, it turned out that, in terms of teaching techniques and methodology, Polish universities have achieved a high degree of compatibility with international standards. Weaknesses were discovered in the following areas:

1) the limited number of case studies available to illustrate Polish supply chain practices,
2) relatively low accessibility of Polish logistics programmes for foreign students, due to a language barrier posed by the use of the Polish language throughout the course.

Further improvement of educational systems toward eliminating such shortcomings is taking place on a permanent basis, and the growing involvement in international exchange programmes strengthens the commitment to offer logistics programmes taught in the English language. Most universities intend to get more involved in student exchange programmes and are building systems to allow for recognition of course credits and diplomas earned at partner institutions.

5.2. Teachers of logistics and supply chain management

We will now direct our attention to two of the issues relating to the system of education in supply chain management discussed earlier in this chapter:

1. What kind of knowledge sources should be used and how should teaching curricula be structured?
2. What requirement teachers of business logistics and supply chain management should meet?

One has to realise that the academic teacher's role is that of a recipient, or a consumer, and, occasionally, that of a designer whose job is to structure the knowledge acquired by logistics practitioners. The academic teacher's job is, in principle, to select, transform and disseminate logistics knowledge. In this role, either logistics executives or creators of original logistics concepts cannot replace them. However, logistics teachers can be supported by supply chain management practitioners, who have the means to provide ample training opportunities for young students and trainees in business logistics.

The teaching staff of Polish educational institutions involved in the dissemination of logistics knowledge largely vary in the amount of experience, the degree of specialisation and the level of logistics knowledge; additionally, some of them come from very remote professional backgrounds, still suffering from the intellectual relics of their past careers. Some of them started teaching logistics just a couple of years ago. In a number of cases, their background does pose a barrier to a successful teaching career. Some of the recently re-trained academic teachers misinterpret the concepts of supply chain management, since their background and their original education compromise their understanding. To make things worse, such teachers tend to tailor logistics curricula to their own taste and interest by shifting their stress, altering the proportions and omitting some elements, or they retrieve information from unreliable or accidentally procured sources. In some cases, this may eventually lead to a deviation from, or misrepresentation of, the classical tenets of supply chain management.

It seems that the onus of former education and the troublesome diversity of approaches to supply chain management can be overcome or minimised in two ways:

1) by pointing out the sources of original logistics knowledge,
2) by adopting a common logistics terminology – standardising the basic terms used throughout the field.

The theory of supply chain management is of American origin. Similarly, educational programmes are based primarily on the American models. This is the original and true source, because it is the USA where business logistics and sup-

ply chain concepts were born. For most modern logistics ideas, therefore, as well as for massive research in that field, we are indebted to American researchers, teachers and practitioners. We need not be ashamed, then, of the fact that a lot of European authors produce "secondary", or "processed", knowledge, simply adapting the original American concepts to the conditions and requirements of a given country and its economy. Incidentally, some of these "second-hand" products have not gone far beyond a mere distortion of the original. A similar trend is also observable in Poland.

In an attempt to advertise European achievements and practices, it would be very interesting to publish case studies for studying all of the different aspects of European supply chain management. Such case studies have been published in most European countries and, at the moment, much of Polish supply chain practice has also been documented in this way, which helps to tailor foreign logistic concepts to Poland's economic conditions, allowing for both the differences and similarities. In logistics education, the possibility to study successful applications and projects is of great educational value (e.g. distribution centres, logistics operators, etc.). And this opportunity comes in the form of case studies, study visits and all kinds of practical training events. However, case studies should be used as model problem solutions in a very cautious manner. The nature of supply chain management encourages the use of methods and techniques of creative problem solving rather than copying other companies' experience.

Obtaining contact with business practice has been rather difficult in Poland, since a lot of Polish companies, fearing their competitors, used to keep all their activities confidential and shut themselves off from the eye of an inquisitive student. However, this is now changing, and so are the attitudes adopted by companies in recruiting staff from among the best university graduates: more and more of them are willing to abandon strict confidentiality in favour of an open and creative approach.

The question of language used for the dissemination of logistics knowledge has an important educational dimension. Supply chain management problems are complex enough as they are, so our textbooks definitely do not need extra complexities arising from the language used. In textbooks, it is recommended to use simple, clear and coherent writing styles and accurate, explicit terminology. In some cases, it is just a matter of the way certain terms are translated. New terms may well be adopted for common usage, which is where the author's responsibility is the greatest. It is very important to consistently use terms that are accepted internationally and conform to common language standards. What is at stake here is the "culture" of the entire discipline of science, its research and educational profile. Most Polish logistics and supply chain management textbooks have been written in Polish by authors with different professional background. The quality of these textbooks varies and is known to have

raised doubt or professional disputes. Fortunately, original Polish textbooks are backed up by the translations of such classics of logistics literature as H.Ch Pfohl, M.Christopher and J.J Coyle, J.Bardi and C.Langley. However, there is still a lot of room for truly valuable, consistently written textbooks on supply chain management.

Supply chain management issues are scattered across a vast field of knowledge. First-rate education in that area requires the involvement of a well-structured team of teachers, consisting of professionals representing a number of specialisation areas. The core team should include experts in all major areas of logistics management (Figure 1), yet it has to be born in mind that supply chain management extends far beyond logistics itself. Therefore, the teaching team should always consider the possibility of obtaining the involvement or co-operation of experts in other areas (e.g. marketing, strategic management, finance, accounting, etc.).

As the leader is the most important person in a team, he/she must be characterised by outstanding logistics and educational qualifications, as well as by extensive interdisciplinary knowledge and professional expertise. Team members (both engineers and management experts) should represent a wide array of logistics specialisations, such as information systems, transport, warehousing, packaging, return logistics, operations management, customer service, etc. Both the leader and the specialists can resort to the assistance of highly qualified trainers when in need of training in support methods and techniques for management and decision making.

However, it must be strongly emphasised that the continued development of logistics teachers' qualifications largely depends on their participation in research projects, especially within international frameworks. It seems that a closer co-operation between research institutions on a domestic and international scale could be a major factor in upgrading the qualifications that are critical to the efficient performance of an educational system.

6. Profession: Logistician (conclusions)

The profession of "logistician" has not yet been recognised by the governmental classification of professions and specialists [see Chylak, E. (1997)].[9] It a real being, though, in a real world where companies recruit personnel for the jobs of logisticians where universities and other educational institutions concen-

[9] It is an government regulation introduced by the Enactment of the Ministry of Labour and Social Policy of 20 April, 1995 (Dziennik Ustaw no. 48, art.253).

trate their effort on training logistics staff for Poland's economy. A majority of education centres in logistics and supply chain management maintain close links with European and/or American logistics. Pending integration with the European Union, it seems to be the right moment to include logisticians in that official classification. In the past, individuals dealing with the different parts of the logistics process used to have different professional profiles and designations. Nowadays, the number of logistics professionals specifically educated in the field of logistics and supply chain management is rapidly increasing.

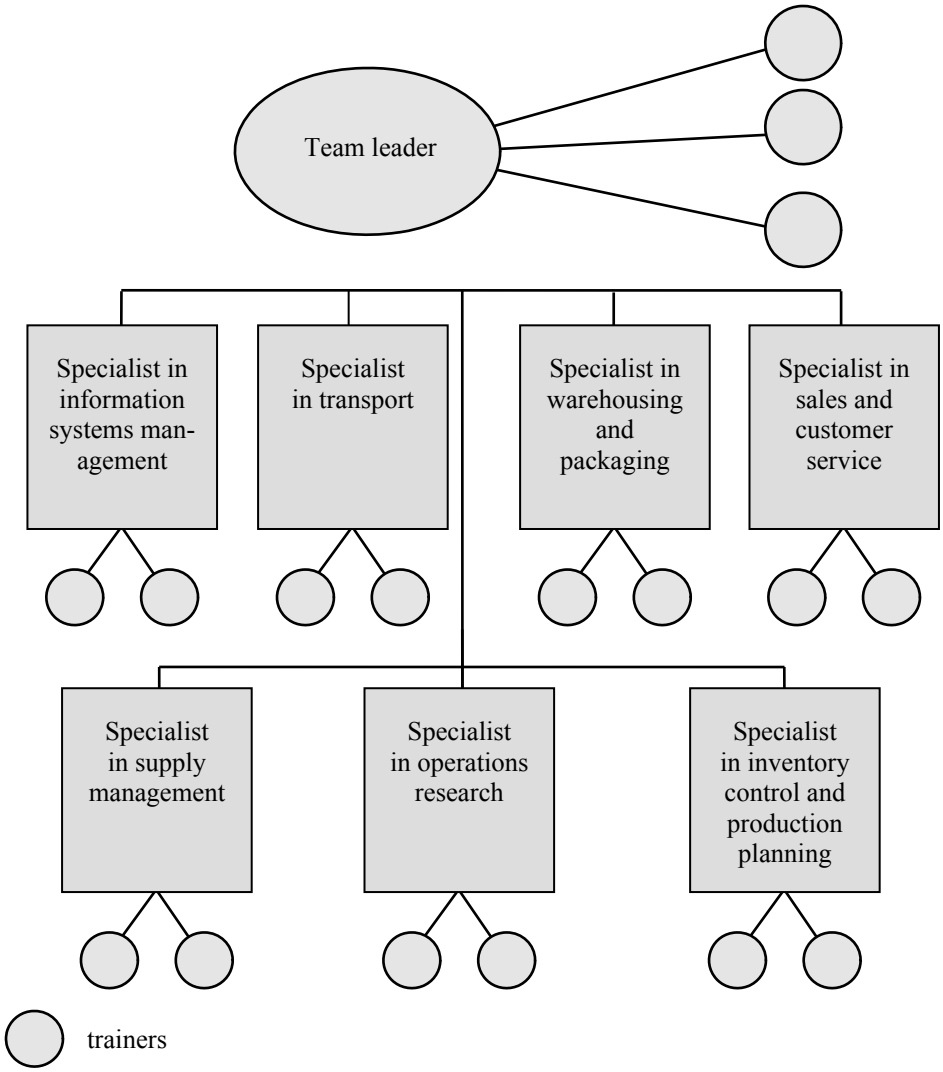

Figure 1. Structure of an educational team for supply chain management (a model)

While the necessity to formally isolate the logistics profession seems to be commonly recognised, we should use caution when doing so, trying to act without excess enthusiasm and avoid calling each employee engaged in the process of products flow a "logistician".

Narrow specialists in the vast area of supply chain management should be described in the traditional way, as managers of transport, supply, inventory and production, sales, etc. The term "logistician" (from the formal point of view) should be reserved for those persons who have received proper instruction from a university or equivalent institution. A logistician would then denote a co-ordinator of logistics processes at operational level as well as an integrator of strategic supply chain management at the top of company hierarchy.

The main criteria for the distinction of professional logisticians should be based on their formal education, professional qualifications and practical skills. In particular, the logistics professional should possess the following:

- interfunctional knowledge of all logistics processes in a supply chain combined with an insightful awareness of the complete spectrum of decision making problems;
- ability to use the most applicable methods to support the decision making process and to ensure an integrative approach to supply chain management;
- ability to use adequate management methods and techniques in the process of implementation and control of projects aiming at the co-ordination and integration of logistics in a single company as well as in a supply chain.

In keeping with what has been said above, logisticians are not only formed in the natural process of professional skill development (e.g. in transport, warehousing, supply or sales) or exclusively by obtaining practical experience. Logistics professionals should be well prepared in terms of knowledge and methodology, preferably with a formal qualification and/or a certification of his/her status. A formal distinction of the logistics profession should create a new quality, different from the traditional descriptions of professions contained in formal classifications.

The new quality arising from the emergence of "logistician" as an individual profession is in that the "logistician's" knowledge transcends a single logistics process. The profession should not therefore be divided into functional specialisations such as: logistics of transport, logistics of warehousing, logistics of distribution. Such terms, representing a wrong approach, which ignores the integrative aspects of logistics, seem to be widespread in Polish reality. As there is only one logistics process including different stages of supply, production and distribution, the only specialisation level in the logistics profession should ad-

dress the character of a logistics system, e.g. industrial logistics, service industry logistics, hospital logistics, school logistics, etc.

Besides, lower and higher levels of logistics qualifications could be distinguished, each of them suitable for jobs at a different decision-making level: operational, tactical or strategic. Again, this is the approach used by the certification system of logistics qualifications adopted by the European Logistics Association. In the opinion of the author, from the viewpoint of formalisation, it is the only correct approach towards "logistician" as a profession. Further fragmentation of that concept into logistics specialisations would lead to inevitable devaluation of the scope and ethos of the new profession: logistician.

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