
Learning platform for supply chain system optimisation

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Abstract: Fierce competition, dynamic market conditions and resource scarcity pose a constant demand on companies to redefine their business models in order to achieve competitive advantages. The paper offers a review of development trends in modern supply chain management with emphasis on strategic learning partnerships as a means for achieving supply chain competitive advantage. Organisational learning has been proposed as a technology for achieving long-term sustainability in strategic supply chain partnerships. However, in practice supply chain partnerships inadequately exploit established forms of cooperation as vehicles for learning and building knowledge repositories. This can be improved by introducing and optimising the process of organisational learning in every partnership member as well as a joint partnership activity. The study is aimed at proposing a conceptual model of the learning platform for supply chain optimisation. Potentials for its introduction have been estimated by using the case study of Agrokor, Croatian largest food concern.

Keywords: supply chain learning partnerships; organisational learning; logistics system optimisation; Agrokor.

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1 Introduction

In the highly developed countries total logistics costs of physical distribution account for only 8% of sales revenue, while in transition countries those costs account for up to 25% (Sodhi and Son, 2009). These figures suggest the need for constant improvements in the operations of supply chain and logistics management. Changes in purchasing and customer service functions require development of new transportation modes, management methods, and business contexts (Hosie et al., 2012). Companies should simultaneously balance flexibility and efficiency in their supply chains (Viswanadham and Gaonkar, 2009). To achieve this goal companies should rely on outsourcing while focusing on their core competencies, but also carefully manage information streams within established supply chain.

In order to optimise underperforming segments of logistics and supply chain operations, supply chain managers frequently establish different forms of collaborative relations with their partners. It has already been shown that performance improvements are possible through joint efforts of all supply-chain members (Spekman et al., 1998). By implementing the model of integrated logistics, supply chain management as a corporate core competence has the potential to become a source of long term competitive advantages (Gunn, 1993). However, supply chain and logistics management is in practice often considered as an afterthought to top level strategy formation (Drew and Smith, 1998). Following this approach, efficient and effective supply chain can only emerge as a serendipitous outcome. More attention should therefore be given to supply chain management in terms of coordinating interests and activities of supply chain members.

Incremental improvements and breakthrough innovations can only be achieved on the basis of continuous learning, especially inter-organisational learning. Inter-organisational learning has been understood as the process through which one organisation learns from the experience and knowledge of another through knowledge transfers (Easterby-Smith et al., 2008). Its positive influence has already been identified in the field of increased employee productivity (Steensma et al., 2005), high product quality and customer satisfaction (Tsang et al., 2004), new product development (McEvily and Chakravarthy, 2002), improved organisational efficiency (Yli-Renko et al., 2001), and increased joint venture performance (Lane et al., 2001; Sorenson, 2003). Supply chain members should therefore constantly learn and pool knowledge in order to optimise their business operations.

Logistics companies acting jointly should integrate their information and knowledge flows, which is possible only through careful implementation of knowledge management systems. Supply chain participants should therefore excel in reproducing, transferring and implementing knowledge, as well as simultaneously shaping operations and individual and collective behaviour so that it reflects newly gained knowledge and insights (Esper et al., 2007). In other words, supply chain participants operating individually or in a partnership should become learning organisations by optimising processes of organisational learning and knowledge management. Their learning performance can then be defined in terms of the extent and type of the 'new knowledge learned' from partners and classified into five categories: technological expertise, marketing expertise, product development expertise, managerial techniques and manufacturing processes (Lane et al., 2001). However, the right balance between the internal knowledge value assessment and exploitation, and exploration of new (external) knowledge should be stricken (Katila and Ahuja, 2002), which predominantly determines the quality of inter-organisational knowledge transfer and learning.

Supply chain knowledge repositories should be constantly renewed and updated, which can be achieved by implementing the processes of single-, double-, and triple-loop organisational learning. Organisational learning has already been identified as an important factor in achieving supply chain goals, especially innovation (Flint et al., 2005). Organisational learning together with client relationships and logistics service quality have been proposed as crucial parameters in improving corporate performance (Panayides, 2007). Modern integrated supply chain management should therefore embrace the learning orientation in terms of implementing the processes of organisational learning and knowledge management in order to be sustainable.

Many supply chain collaborations do contain the learning dimension. However, it can be identified in terms of incremental improvements based on slow and/or occasional, mostly single-loop learning. Double-loop learning offers far greater opportunities (Drew and Smith, 1998), resulting in increased exploitation of business opportunities due to redesign of mental models and business assumptions. Implementation of triple-loop learning results in modifications of core business assumptions reflected in the mission, leading to business context redesign through remodelling of supply chain elements from organisational, economic and/or legal standpoint. In that way the concept of organisational learning as a process of joint and synergistic action undertaken by all employees and supply chain members, facilitated by participative supply chain and knowledge management, becomes the foundation for sustainable competitiveness of supply chain partnerships, leading to their transformation into true learning supply chain alliances.

In accordance with the propositions stated above the following hypothesis can be established: optimisation of supply chain value added processes as stochastic and dynamic systems can be achieved by the implementation and continuous improvement of the processes of organisational learning and knowledge management, leading to the increased behavioural variety of supply chain's constituents as a means for overcoming uncertainties in the complex supply chain market.

In the next section, a review of recent development trends in the field of supply chain and logistics management is presented, emphasising outsourcing/smartsourcing, third-party logistics providers (3PLs), fourth-party logistics providers (4PLs) and lead logistics providers. Learning supply chain partnerships as cooperative recursive complex

adaptive systems are discussed next. Partnerships have been identified as valuable mechanisms for expanding corporate knowledge repositories by implementing processes of single-, double-, and triple-loop organisational learning. By combining two explorative areas, the field of supply chain management and that of the learning organisation, especially organisational learning, a conceptual model regarding the learning platform for long-term supply chain optimisation is presented. The tenability of the proposed model has been explored using the leading Croatian food-commercial concern Agrokor as a case study.

2 Development trends in supply chain and logistics management

Supply chain participants and logistics providers often seek opportunities to unite their competencies with those of others in order to manage complex business requirements. Improvements in inter- and intra-organisational communication and cooperation focused on customer-oriented activities have the potential to improve the performance of all supply chain members. Some of the most important reasons for the formation of supply chain partnerships are: long-term business cooperation between independent companies; sharing common goals; sharing positive outcomes emerging from the business cooperation (De Leeuw and Fransoo, 2009); easier approach to distribution channels in foreign markets; access to new technologies; diversification into new logistics activities; reduction and diversification of risks; learning, sharing and internalisation of tacit and collective capabilities; circumvention of regulatory obstacles, development of good relations with foreign authorities (Drew and Smith, 1998), etc. Supply chain cooperation is often transformed into long term partnerships.

Partnership success has many dimensions. Sodhi and Son (2009) have defined five crucial indicators of successful partnerships: information sharing, trust, joint company management, asset sharing, and asymmetry of power. Effective information sharing can be achieved by implementing IC systems, which can help reduce transaction costs and risk. Trust among partners improves the cooperation in three aspects: decreases uncertainty regarding reactions to future events; decreases the probability that one of the partners will take advantage of the weaknesses of the other, and improves control in managing collective contracts while reducing transaction costs. Joint management enables partners to avoid problems of conditional rationality and opportunism. Joint asset management can be executed in the way that buyers invest in advanced technology, while producers finance employee training regarding ICT usage. Such long-term investments help strengthen cooperative relationships. On the other hand, asymmetry of power refers to specific differences between partners, such as cultural differences, asset volume and former alliance experience.

The form of partnership traditionally used in supply chain and logistics management is outsourcing. Its primary goal is to increase performance efficiency and effectiveness by enabling participating companies to compensate for their lack of skills and knowledge in specific segments by using specialised knowledge of logistics service providers. More advanced form of outsourcing is known as *smartsourcing*. *Smartsourcing* creates new value through four crucial areas (Bajec, 2009):

- 1 cost reduction
- 2 increase in innovativeness

- 3 transfer of risk
- 4 risk optimisation.

While outsourcing is focused on cost reduction, smartsourcing is aimed at developing innovative capabilities within the company. It enables companies to focus on their core competencies, while the outsourcing partner accepts the responsibility for innovations and cost control regarding accompanying activities. Savings achieved through cost reductions can then be redirected towards innovation development. In that way cooperative relationships improve from the strategic standpoint, so companies not only reduce their costs, but also increase their level of innovativeness.

Responsibility for meeting requirements of complex distribution and logistics networks is often taken by the so called 3PLs. 3PLs improve the quality of services provided, face the competition more successfully and effectively eliminate redundant inventory costs. Those companies provide a comprehensive set of services based on physical property and information technology, such as storage, transportation, assembling, IT applications, inventory control and consultancy. Resource-based theory identified three crucial indicators of a successful cooperation (Liu and Lyons, 2011):

- 1 rational usage of service capacities
- 2 operative performance
- 3 financial performance.

3PL companies' main feature is a comprehensive supply of services easily adjustable to clients, which is also positively reflected in financial results. 3PL service providers therefore usually acquire a fairly good market share since loyalty is developed through long-term cooperation. Stronger consolidation of supply chain and logistics management motivated 3PL companies to cooperate and merge with their clients, leading to the development of novel forms of cooperation known as logistics integrators or fourth-party logistics. 4PL service providers simultaneously provide activities of planning and coordination of information flows, along with the creation of logistics structures and inter-organisational information systems. Strategic alignment refers to the harmonisation of all elements relevant for service providing that influence individual and group performance of supply chain members. Logistics integrators cannot maintain their long-term competitiveness unless they align their strategies (including logistics), processes, ICT, and human resources. The main purpose of such partnerships is to provide a singular control venue that will enable monitoring of all activities – transportation and logistics, vertical specialisation, sophisticated technology and geographical coverage. O'Reiley (2011) recommends that four control areas should be analysed before arranging a 4PL cooperation:

- 1 locating leading industrial 4PL service providers
- 2 verifying whether 4PL companies have at their disposal the right technology that could support sophisticated planning and forecasting, as well as inventory and customer relationship management
- 3 determining whether 4PL companies can react promptly to market changes
- 4 choosing a 4PL service provider with eligible references.

Apart from 3PL and 4PL service providers, another recent trend in supply chain and logistics management is known under the name of lead logistics provider. Those companies take the responsibility of organising all logistics activities from contracting to delivery realisation, while offering their clients a singular control venue (O'Reiley, 2011). LLP companies are trained to provide their clients with the best solutions in often unpredictable situations. Expected goals to be achieved are: reduction of operative costs; inventory reduction due to increased speed of inventory turnover; fixed cost reduction due to efficient asset usage and variable pricing models; and sustaining service level quality. Contribution to the improvement of supply chain and logistics services can be estimated through the increase in logistics network transparency, optimal supply chain design as well as information and material flow, excellent insight into clients' cost policies, acknowledged standards in service providing and reporting, and integration of processes and systems along the entire supply chain. This form of logistics partnership is usually established for the period of three to five years.

3 The future of supply chain management: learning supply chain partnerships

Due to intensified competition and environmental changes, supply chain processes should be managed according to the principles of cooperative management, with the tendency to develop long-term partner relations with suppliers and other influential stakeholders, especially buyers. Management of integrated supply chains should follow the guidelines of the system approach in order to avoid suboptimisation (Grant et al., 2005) and reduce conflicts and unnecessary costs. Despite the integrative approach, supply chain systems can also be fragmented and optimised as separate entities by using reductionism (Nilsson, 2005). Cooperative logistics management can also help integrate various functional areas such as procurement, production, engineering, R&D, storage and inventory management etc. This leads to the fundamental question: how should integrated supply chains be organised in order to be capable of (self)control and (self)development? It is suggested that supply chain integration follows the principle of recursiveness. It implies that multidimensional supply chains should include autonomous units integrated into more comprehensive autonomous units (Beer, 1984). Modern supply chains should therefore consist of sustainable units integrated into more comprehensive sustainable units.

Recursiveness of integrated supply chains can be applied by implementing the principle of modularity. Modular supply chains can be decomposed into operational business units and further recombined according to internal and external environmental conditions (Schilling, 2000). Components or business entities interact and exchange resources, especially information with the aim to fulfil individual but also collectively established goals. Whereas a single supply chain entity can be viewed as a tightly coupled system determined by its strategy, modular recursive systems can be viewed as loosely coupled and flexible regarding internal requirements and environmental demands. In that way modular approach of integrated supply chains reflects the complexity theory and nonlinearity of the logistics system behaviour. Complexity can be interpreted as a state characterised by a multitude of independent agents interacting with each other, producing a plethora of systemic interactions, which lead to a spontaneous self-organisation and learning-based development, taking place through multi-level

feedback [Waldrop, (1992), p.11]. Integrated supply chain systems therefore become complex adaptive systems, consisting of numerous entities or agents acting interdependently with each other (Kauffman, 1995). Agents could be companies, fragmented business units, autonomous business entities, but also machine operators, truck drivers, etc.

It can be noticed that in that way integrated adaptive supply chain systems constantly operate on the edge of chaos and reach the highest creative potentials in the states far from equilibrium (Nilsson and Gammelgaard, 2012). Operating far from equilibrium is considered desirable since it can result in behavioural variety while equilibrium is considered as a precursor to organisational death (Pascale, 1999). In that way, supply chains are in the process of continuous unpredictable self-adjustments and self-organisation or in other words in perpetual construction (Prigogine, 1997). Principles of system dynamics are therefore used with the purpose to achieve system sustainability, which in every moment represents a form of partial system sub-optimisation according to the set of previously determined decision criteria.

The basis for sustainability of integrated supply chains can be achieved by developing creativity and innovation based on knowledge and learning. One of the most cited motives for collaboration is the possibility to acquire new technological skills and capabilities (Mowery et al., 1996). Strategic partnerships therefore depend on buyer-supplier relationship and business to business (B2B) sharing of explicit and tacit knowledge (Yazici, 2013). Integration of codified or explicit knowledge includes both 'declarative' and 'procedural' knowledge components in terms of operating data and information (Kogut and Zander, 1992). Declarative explicit knowledge transfers between organisations include shared inventory and delivery information, while procedural explicit knowledge transfers include joint activities such as planning and forecasting, as well as shared methods such as Kanban. Still, managers are usually more interested in gaining insight into the other party's tacit knowledge, which usually represents the basis for their competitive advantages. Partnerships can be regarded as good sources of tacit knowledge. Equity-based joint ventures have been identified as especially effective vehicles for tacit knowledge transfers among partners (Kogut, 1988). The choice of future partners is therefore strongly influenced by the possibility of interfirm competence and capability transfers.

It can be concluded that behavioural unpredictability of supply chains and their environment underlines the need for implementing the supply chain learning orientation. According to Baker and Sinkula (1999), a learning orientation is conceptualised as a set of values that influence the degree to which an organisation is satisfied with its theories in use, mental models, and dominant logic. Supply chains and partnerships implementing the learning orientation therefore constantly question the implemented procedures, assumptions and courses of action embedded in mental models (Rupčić, 2006). Learning orientation is a mechanism that affects the system's ability to challenge old assumptions and facilitate new techniques and methodologies. The main task of an effective supply chain management is therefore to eliminate obstacles to the development of the learning orientation. Common obstacles can be found in terms of inappropriate organisational culture and structure. Flexible and decentralised organisational structure, accompanied by empowerment and self-managed cross-functional teams, can support knowledge sharing and development of new ideas. Flexible organisation should be supported by the organisational culture which encourages risk-taking and experimenting, celebrates

success but also failures as a means of learning, and encourages re-evaluation of routines embedded in processes, systems and procedures.

Learning orientation is the basis for the development of the supply chain learning capability (LLC). It can be defined as the supply chain's ability to

- 1 effectively maintain and manage learning organisation characteristics
- 2 convert learning outcomes to new supply chain management strategies, tactics and operations (Esper et al., 2007).

Logistics learning capabilities, operationalised in the form of new strategies, tactics, operations, systems, procedures, rules, etc., represent a new form of supply chain knowledge embedded in the knowledge repository. It can be concluded that partnership relationships created with the purpose of achieving supply chain goals serve as a source and channel of learning, and should therefore be transformed into learning supply chain partnerships.

The process of learning should also come under scrutiny. Its success is dependent upon two factors: learning intent and the learning capability. However, the ability to learn and share knowledge on the organisational and inter-organisational level depends on the corporate absorptive capacity as the ability to acquire, assimilate, and commercialise new, external knowledge (Cohen and Levinthal, 1990). It is reflected in the available in-house expertise required for the recognition of the knowledge value and potentials for its implementation in the value creation process. Absorptive capacity, together with new knowledge receptivity and utilisation skills [Lyles, (2001), p.681], is the critical element that determines the extent and quality of the organisational learning process. Absorptive capacity can be improved if knowledge is codified, supported by organisational routines (Cohen and Levinthal, 1990) and adequate transmission channels, as well as the motivation to learn and share knowledge (Gupta and Govindarajan, 2000). Absorptive capacity is therefore dependent upon internal organisational elements such as organisational structure, informal network and internal communication, supported by the incentive system to learn and share knowledge (Volberda et al., 2010).

Organisational design that facilitates learning should be characterised by a lower level of formalisation, increased decentralisation and flexibility, supported by IT. IT solutions should enable that companies within the network are integrated at the business process level, database level and application software level, and ultimately at the organisational and cultural level (Viswanadham and Gaonkar, 2009). Apart from intelligent business systems, which are implemented in specific traffic branches, integrated intelligent logistics systems (IILS) are also frequently used, providing quality logistics solutions for achieving high logistics service levels. Those intelligent systems are comprised of intelligent modules with the capacity for reasoning in each individual case, multiple logic and artificial neural networks, aimed at optimising business performance. Detected problems are solved through the analysis and comparison with similar cases recorded in the past, which can be adjusted to new circumstances.

Supply chain absorptive and learning capability is also dependent on the leadership dimension. It can be suggested that the ability to absorb new knowledge and share it with partners can be best developed when supported by the transformational leadership style. Transformational leadership fosters specific individual behaviour characterised by the development of personal vision, mental model reassessment, deepening of personal mastery, individual learning and formal and informal knowledge sharing, accompanied

by communication and dialog. Those processes should be supported by the system thinking discipline. System thinking is a discipline of individual, team and organisational behaviour by which a reductionist, short-run, static view of the world is replaced with a holistic, long-term, dynamic view (Scholz-Reiter and Frazzon, 2008), used to design organisational constituents in accordance with environmental developments. Transformational leadership then becomes a process of managing change based on coordinating individual efforts and learning, leading to knowledge dissemination through wide areas composed of different actors and organisations. Transformational leaders mainly use informal or behavioural coordination mechanisms based on the organic communication process, fostered by trust and driven by common goals. The role of a manager becomes the one of a mentor, motivator and coordinator. Coordination of inter-organisational learning efforts should be more formalised, based on established coordination and communication systems, mechanisms, and processes, but also decision making routines.

Partners' willingness to exchange, share and develop new knowledge is determined by behavioural routines rooted in the organisational culture as a set of shared beliefs. That is especially important for the transfer of tacit, experience-based knowledge. The transfer of tacit knowledge is highly dependent on personal and social processes, especially informal communication between various groups and communities of practice. That is why cultural fit can be identified as the underlying factor contributing to the success or failure of partnership organisational learning and knowledge management. Corporate size also plays a significant role in that process, since larger companies are more likely to possess a more diversified technological and expertise portfolio. It has also been determined that alliance maturity is positively related to the application of informal mechanisms of coordination, which further stimulate learning and knowledge transfer (Aleksić-Mirić et al., 2013).

It should be noted that partnerships can be distinguished according to their nature. Bronder and Pritzl (1992) and Hamel et al. (1989) distinguish between collaborative and cooperative alliances. Collaborations refer to short-term partnerships, while cooperations are established for a longer period of time. Collaborative partnerships operate according to the principles of competition. Partnership entities have clear objectives and are aware that other partner's activities affect their realisation (Morrison and Mezentseff, 1997). Such relationships are a manifestation of inter-organisational cooperative strategies aimed at achieving individual and common goals through pooling resources and skills (Varadjaran and Cunningham, 1995). Collaboration can therefore lead to competition in both learning new skills and development of organisational capabilities. A paradox situation can result: collaborations are usually formed with the purpose to reduce complexity of the environment, but they can lead to new dependency upon partner's skills, which can in turn increase environmental complexity. Increases in complexity can also increase transaction costs, the need to manage bilateral and multilateral relations, and the need to develop new skills (Rupčić, 2011).

On the other hand, cooperative alliances are aimed at obtaining mutual goals and are much more suitable for the fulfilment of supply chain goals in terms of gaining knowledge and competencies. Varadjaran and Cunningham (1995) suggest that these relationships are a manifestation of inter-organisational cooperative strategies and as such entail pooling of resources and skills through the cooperation of organisations aiming to achieve common goals. Since the level of competition is lower, partners may feel more

committed to exchange their knowledge and resources. Organisations that rely on cooperation have been found to maintain lower costs as long as they maintain a high level of trust (Ketelholm, 1993). Due to their nature, such partnerships exhibit better chances for an effective mutual organisational learning and knowledge sharing.

Partnership failure possibilities should also be considered. Two most common reasons why partnerships fail are the wrong choice of partners and wrong partnership management. Selection of an optimal strategic partner consists of four steps:

- 1 alignment of corporate and strategic goals
- 2 development of critical success factors according to which future performance can be evaluated
- 3 mapping of potential cooperative industries, industrial segments and companies
- 4 application of the selection process for choosing optimal partners (Holmberg and Cummings, 2009).

The selection of partners plays a significant role in the positive outcome of intra-organisational learning and knowledge exchange. When an enterprise joins an established partnership, it is likely that it will face a more comprehensive knowledge repository and therefore reap benefits regarding knowledge access possibilities. Partners can also be located in different countries so management has to coordinate and internalise different economic, political, technological, but also socio-cultural aspects of the partnership. Differences in the external environment reflected in diverse perceptions of reality, mirrored in the characteristics of organisational constituents, can represent significant inter-organisational learning barriers. Such differences can however represent an important ground for communication and remodelling of structures, policies, and processes with the possibility to exploit external opportunities in a new way. Frequent communication based on trust and informal relationships can improve cooperation and help avoid conflicts. Participation in a partnership can also prove difficult because companies within the supply chain usually have different processes, policies, practices, capabilities, technologies and supply chain solutions (Viswanadham and Gaonkar, 2009). Partnership members should therefore learn as much as possible about each other's characteristics in order to reengineer their business processes and integrate them by employing supply chain and integration technologies.

3.1 Integrative supply chain management based on the organisational learning process

Modern supply chain management operates in a complex, multicultural environment and encompasses numerous stakeholders via inter-organisational collaborations. Supply chain agents are mutually interdependent (Kauffman, 1995) and operate in a fluctuating manner, with no real centre of control and dominance. Integrated supply chains, as complex adaptive systems, can remain adaptive, proactive, and flexible by implementing the principles of the organisational learning process. According to Huber (1991), the process of organisational learning takes place in four phases: information acquisition, information interpretation, organisational memory and knowledge retrieval. Organisational learning can yield maximum benefits if knowledge is acquired from various sources and shared throughout the organisation. Companies place accent on

obtaining knowledge from external rather than internal sources because external knowledge is considered scarce and unique (Menon and Pfeffer, 2003). External sources of information can be: market research, statistics reports, business intelligence systems, etc. Information distribution is also a vital component of the organisational learning process. The primal focus should be on determining which people would receive what information. To survive in the future, corporations need a knowledge network that captures and stores knowledge, innovations and ideas and distributes them to the right people. Hence, organisational absorptive capacity does not depend solely on its relationships with the environment, but also on the possibilities of transferring information among all organisational units.

In the next step, specific meaning is attributed to the accumulated and distributed information. Interpretation is a process of developing a model for understanding specific events. Organisational memory as a structure of knowledge can be divided into two segments: core and peripheral structure. The core structure encompasses broadly accepted knowledge regarding purpose and mission, while the peripheral structure has the purpose to support core structure, but its content does not have to be approved of by consensus (Lyles and Schwenk, 1992). It should be noted that in essence organisational learning corresponds to the process of improving actions or behaviour through improving knowledge and understanding (Fiol and Lyles, 1985). An entity learns if during information processing its potential behaviour changes (Huber, 1991). Therefore, for learning to be truly effective, it should lead to utilitarian results in terms of supply chain behavioural changes. In learning supply chains organisational learning should not be a static activity, but a continuous dynamic process of adjustments and evolution.

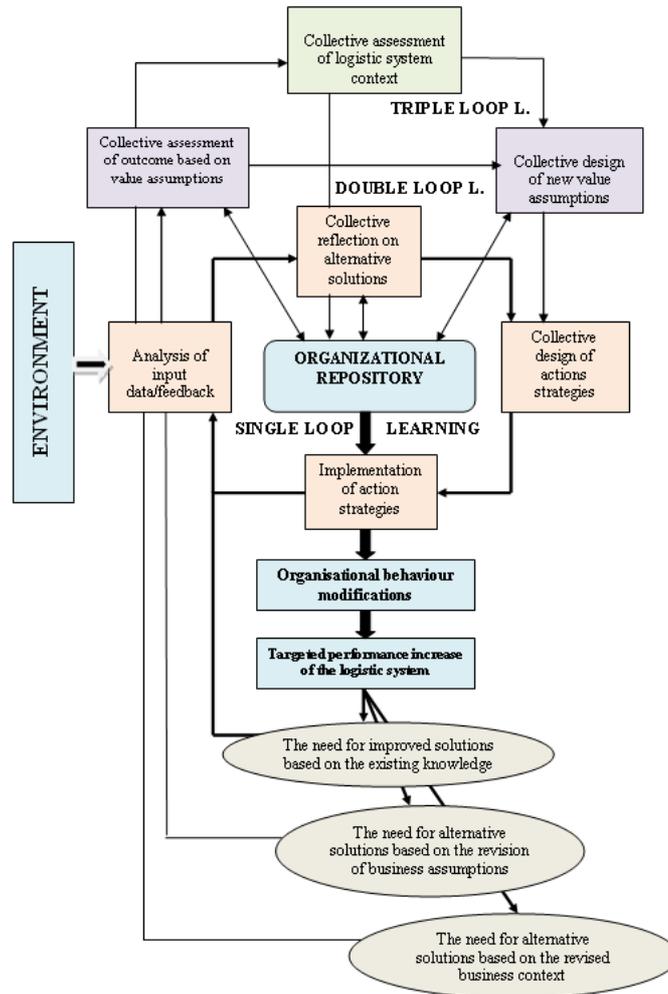
Individuals and groups as agents of integrated supply chains permanently take corrective actions in terms of designing alternative solutions or action strategies to correct detected problems. Solutions and action strategies come from the existing knowledge contained in the organisational repository. Argyris and Schon (1981) named that process single-loop learning or feedback learning. This is the essence of the process of controlling where feedback loops serve to provide information regarding the need for corrections in the transformation process using established goals as benchmarks or standards [Zekić, (2007), p.45]. In that process all tested combinations of routines, skills or approaches for achieving standardised results are documented and organisational memory updated. This form of organisational learning can be regarded as a process of consolidation resulting in no changes in established goals and organisational routines.

However, due to changes in internal and external environment deviations between obtained and preferred results are often enormous. It becomes necessary to establish a new regulation loop by which the legitimacy of the supply chain goals and core value assumptions come under scrutiny. If supply chain goals and core assumptions are changed, double-loop learning occurs. The process of double-loop learning is manifested as the process of transformation, which modifies organisational knowledge and competencies on the basis of developing new policies, goals and mental maps (Snell and Man-Kuen Chack, 1998). It is therefore also named generative learning, resulting in new policies, systems and procedures.

If the supply chain is confronted with a situation in which a certain problem has not been solved, the need for implementing triple-loop learning emerges. Basic assumptions or mental models should be re-evaluated along with problem solving modes and behaviours. Supply chain members should then collectively assess supply chain system

context. This process may indicate the necessity for mission re-evaluation in order to ensure the system’s existence, which can entail structural, economic and/or legal changes. The process of triple-loop learning is dependent on the implementation of the system thinking discipline. Conceptual model of the learning platform for the long-term supply chain optimisation based on the process of organisational learning is shown in Figure 1.

Figure 1 Conceptual model of the learning platform for the long-term supply chain optimisation (see online version for colours)



Source: Authors

The goal of the supply chain organisational learning is reflected in organisational behaviour modifications resulting in the increased supply chain performance. Organisational learning has already been identified as an important prerequisite in the accomplishment of logistics and supply chain goals (Hult et al., 2003), especially logistics innovation (Flint et al., 2005). However, from the system point of view the ultimate goal of learning supply chains is no longer survival, but sustainability.

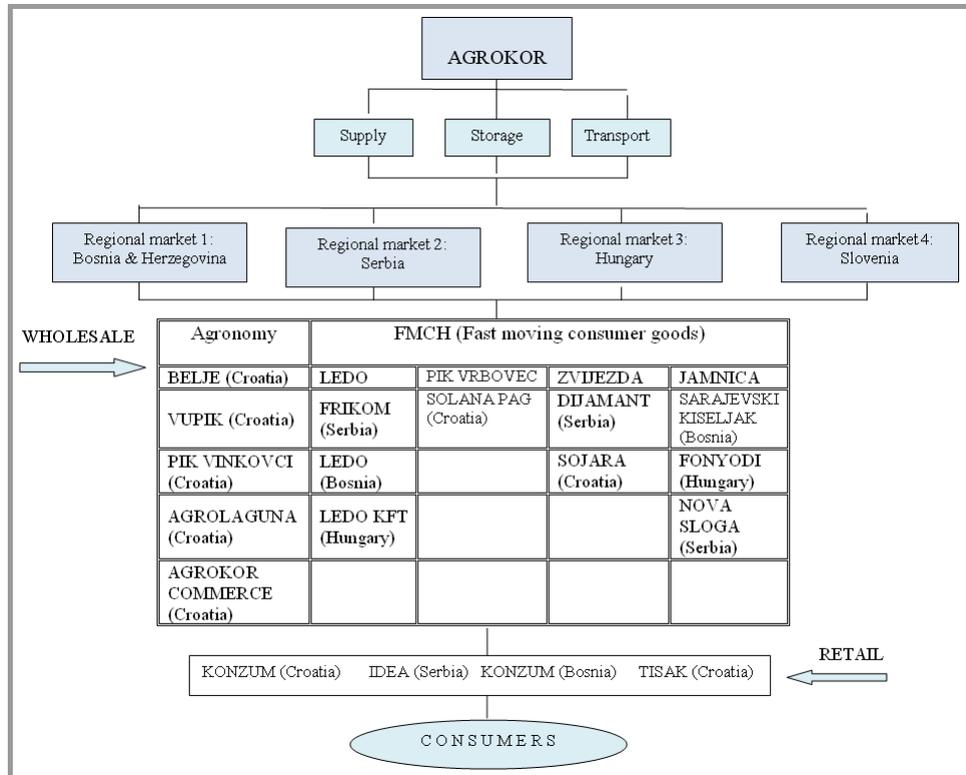
Development can hence be marked as a higher goal. If development is defined as the organisational capacity to grow together with the intent to fulfil its goals and the goals of others, then the fundamental transformation of a supply chain becomes an imperative. Supply chains whose organisational members engage in triple-loop learning more frequently, have a higher probability of discovering new possibilities of organisational redefinition, leading to new forms of collaborative networks.

Knowledge developed as a result of organisational learning will cause corporate changes, which will have a reflection on the operative, tactic and/or strategic level. Regardless of the types of changes executed in supply chains, they should not be implemented without a prior analysis of their implications in the wider context. Supply chain management model should therefore consist of three basic elements (Drew and Smith, 1995): focus, will and capability. Focus refers to a clear image of the supply chain's direction and vision. Focus is developed through strategic thinking, knowledge and communication which results are subsequently compiled into a strategic plan. The will intensifies strategic intention. Capability to change refers to a limited number of absorbed competencies unique to a supply chain in a given moment. This capability can also be manifested as freedom with which an organisation experiments with new, unfamiliar methods. Supply chains which can successfully balance those three elements will also acquire optimal conditions for the strategic success based on the processes of continuous organisational learning and development.

The elements indicated above represent strategic management behavioural model of a supply chain learning system, with the goal to strengthen its competitive base through enhancing the supply chain's learning orientation. Learning orientation is directed at stimulating adaptive and generative learning as corporate core competencies. It accentuates the propensity to generate intelligence and knowledge and ensures its organisation-wide understanding and implementation. It has been proven that learning orientation generally and in a partnership leads to increased performance through enhanced market oriented processes such as customer orientation and relationship commitment (Hult et al., 2000), reflected in the new product success and increased market share (Baker and Sinkula, 1999; Day, 1994; Hunt and Morgan, 1996).

3.2 Case study: implementation of organisational learning principles in the concern Agrokor

Concern Agrokor is the largest private company in the Republic of Croatia and one of the most influential companies in the South East Europe. In the first nine months of 2012 Agrokor's net totalled almost 27 million Euros, whereas its total revenues increased to nearly 3 billion Euros. Company employs app. 40,000 employees. During 30 years of its existence, Agrokor has grown from a small family business specialised in the production and distribution of flowers to the leading food-retail concern in the regional market. After the company has confirmed its leadership position in the Croatian market, it continued to spread its business beyond national borders. The last step in spreading its international network was the acquisition of Slovenian Mercator. In that way Agrokor has additionally strengthen its market position in the region. Figure 2 displays a conceptual model of Agrokor's organisational structure giving emphasis on its connections with the most important strategic partners.

Figure 2 Conceptual model of Agrokor's organisational structure (see online version for colours)

Source: Modified by authors based on: <http://www.zelenaslovenija.si/revija-eol/-aktualna-stevilka/logistika/1642-moznosti-ucinkovitejsiga-ravnanja-z-odpadno-embalazo-eol-68>

Agrokor's vision for the period up to 2020 is to transform the entire company into an intelligent business system completely based on ICT. Some of the ICT solutions that have already been successfully implemented are (Knez, 2011):

- 1 enterprise resource planning which enabled automation of the liquidation process up to 41%, while 30% of employees in accounting were reassigned to other positions
- 2 transportation management system which helped to decrease the number of operating vehicles by 19%, increase the volume of deliveries by 27%, and increase the share of central distributions from 50% to 70%
- 3 automatic order due to which costs of redundant inventory decreased from 14% to 4%, along with 20% less manipulation of goods
- 4 human resource management system which cut costs of transportation for 10%, increased turnover of products/services for 10% with the same number of employees and better usage of holidays, while 50% of employees from personnel were reassigned to other positions
- 5 warehouse management system which increased productivity for 49% and delivery accuracy for 99% with the maximum delivery deadline reduced from 72 to 24 hours

Agrokor's ICT department, supporting one of the biggest affiliations in Middle and Eastern Europe, had to provide a 'virtual' support to the company's accelerated growth by offering prime IT services. At the beginning of 2009 Agrokor initiated a project of establishing service organisation to backup existing and future SAP computer interfaces. Each step of implementing ICT solutions has been documented in a way that all configuration data were saved in the Solution Manager system. Already in February 2010 more than 1,000 employees used the SAP system with financial savings justifying project costs within only a year.

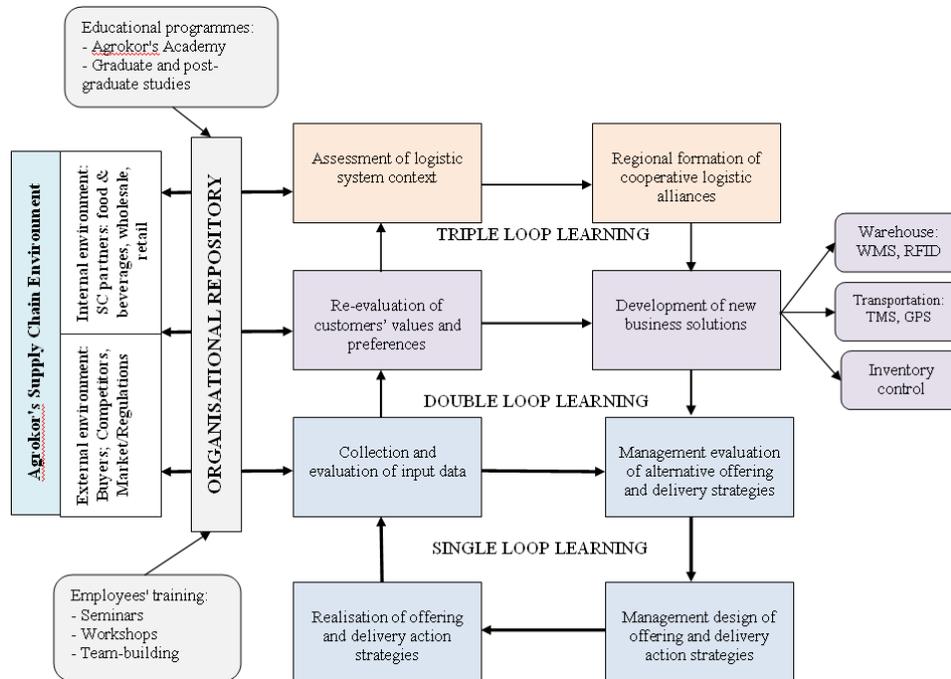
Concern Agrokor has recognised the importance of learning and knowledge. It supports lifelong learning by offering its employees numerous career development options. Agrokor Academy as a centre of excellence was established with the purpose to organise educational and training programmes. The underlying idea is that by offering the opportunity of lifelong learning the company will develop skilful and competent employees. Agrokor supports open communication not only among employees in the same unit, but also in different corporate functional units, and units of supply chain partners. Continuous flow of knowledge into organisational repository originates from two basic sources:

- 1 training and educational programmes held outside the company (Agrokor Academy, graduate/postgraduate study programmes)
- 2 seminars and practical workshops.

Business making of Agrokor is further evaluated on the basis of the proposed model. Prior and current business making of Agrokor indicates that the company values knowledge management process and has intuitively followed some of the proposed model guidelines. It is therefore suggested that the company would strongly benefit from the methodical implementation of the organisational learning process. Figure 3 displays a conceptual model of the organisational learning process in Agrokor constructed on the basis of its past business operations with suggestions for its optimisation.

Agrokor management evaluates, designs and implements improved offering and delivery action strategies based on the knowledge already existing in the corporate repository. The process of single-loop learning is therefore executed periodically based on the process of controlling and feedback information system. After detecting market challenges in terms of changing customer preferences and demands for service quality improvement (shorter delivery time, faster transportation of goods from warehouses to selling points and the like), strategic supply chain management started to re-evaluate core business assumptions and developed new operative solutions (such as WMS and RFID in storage department and TMS and GPS in transportation department). It has also undertaken necessary investments that technologically support the realisation of new business solutions. By evaluating and modifying core business assumptions, which resulted in new operational and strategic business solutions, the company has applied the principles of double-loop learning, without its direct intention to do so.

Figure 3 Suggested organisational learning model for the partnership supply chain optimisation in Agrokor (see online version for colours)



Source: Authors

The need for performing triple-loop learning is relatively rare in practice. However, based on its history, it can be concluded that Agrokor has applied triple-loop learning already in the past, when it performed radical redesign of its activities in order to expand its business from flower cultivation to food industry. This was an enormous strategic project, which entailed radical changes of company's core assumptions and mental models, followed by redesign of its business context. Similar processes based on triple-loop learning were in place when management crafted strategies to infiltrate foreign markets. When entering the Serbian market, Agrokor initially bought Frikom, which specialises in the production of ice creams and distribution of frozen food, by which it strengthened market position of its company Ledo. Afterwards, Agrokor also acquired Serbian Dijamant, specialised in the production of oil and butter, due to which it strengthened market position of its company Zvijezda. Concern Agrokor strategically targets companies that specialise in the production and distribution of processed food already offered by the concern itself. The process offers several benefits for Agrokor: it expands its range of products; helps gain new customers and strengthens its position with the existing customers; expands organisational repository by accumulating new knowledge and skills through partner companies; eases entry to foreign markets, etc.

Even though business operations of Agrokor were not conducted methodically on the premises of the organisational learning process, its contours can be traced nonetheless, granting the company a significant level of flexibility and adaptability. However, results of the single-, double-, and triple-loop learning were predominantly based on the managerial decision making, with little or no employee participation. Since employees

have the most complete insight into daily routines and operations, their increased participation should be encouraged in terms of their contribution in the development of alternative solutions. Dynamic supply chain operations require daily communication and developed feedback loop between supply chain members and clients horizontally, as well as vertically between the operative and strategic level. However, Agrokor has implemented relatively rigid hierarchical structures, which actually inhibit the processes of individual, team, organisational and inter organisational learning.

All the people involved in the supply chain need to have adequate knowledge in order to be able to understand how internal and external events affect supply chain operations. On the basis of knowledge gained through the process of continuous learning, employees should continuously assess and redesign their role to be able to contribute to the supply chain dynamic optimisation through steps of the single-, double- and triple-organisational learning. In that way supply chain ceases to be a static formation and starts to resemble a living, complex organism that is continually being disrupted by human behaviour and seemingly random external events (Williams, 2013).

By undertaking horizontal integration Agrokor tries to strengthen its market power and gain domination on the regional market. The company should therefore continuously evaluate and update its knowledge to be able to recognise new opportunities based on the process of organisational learning and wider employee participation. It is also suggested that Agrokor serves as integrated knowledge-based logistics (IKL) provider – a company that manages the partnership and takes control of the decision making process within the supply chain sub-networks of demand, supply and service (Viswanadham and Gaonkar, 2009). Apart from the process of organisational learning, the company's ability to adapt to changing environmental conditions is based on its efforts to continuously improve and develop its tacit knowledge. Tacit knowledge can be improved and shared in the process of mentoring but also teamwork, so Agrokor should pay special attention to team and inter-organisation learning by creating cross-functional teams from different departments but also partnering companies. Agrokor should therefore create value in the supply chain network by selecting effective supply chain partners according to their competencies and manage information and knowledge flows to coordinate and synchronise member operations.

By implementing the proposed model of organisational learning methodically the company would be more prone to questioning dominant mental models and core assumptions leading to better harvesting of business opportunities in the current as well as changed business context. It is therefore suggested that Agrokor and its supply chain partners implement the learning orientation and transform themselves according to the principles of the learning organisation, with the process of organisational learning as its centre point.

4 Conclusions and recommendations for further research

Increased business integration due to globalisation has led to the increase of specialisation and geographical divergence of corporate activities. Long-term competitive advantages in supply chains can hardly be achieved individually. That is why companies are forming strategic partnerships in order to strengthen their market position and jointly approach the market. Besides outsourcing as a way of compensating for the lacking

organisational capabilities, *smartsourcing* was developed to simultaneously cut costs and increase innovativeness. With intensified globalisation, supply chains try to improve their distribution and logistics networks, so they use services of 3PLs or 3PL. 3PLs improve the quality of service by making it more flexible and adjustable to customers, while eliminating redundant inventory costs. Nevertheless, this still was not sufficient to harmonise all supply chain activities supporting information and product/service flows. The main purpose of logistics integrators or 4PL service providers was to integrate activities of planning and coordination of information flows, along with the creation of logistics structures and inter-organisational information systems. This is possible only through providing a singular control venue from which all supply chain activities can be monitored. Similar service is offered by lead logistics providers, which are also characterised by a singular control venue, intended to improve logistics network transparency, optimise logistics design, information and material flows, and integrate all processes and systems along the entire supply chain.

External and internal influences perceived through the lens of established goals often urge for the redesign of organisational systems and processes. However, these changes are usually executed in accordance with pre-established business assumptions or mental models, which are rarely evaluated for accuracy. This system fallacy calls for the introduction of the organisational learning principles as a means for ensuring sustainability of modern supply chains integrated on the principles of recursiveness and modularity. It can be concluded that partnership relationships created with the purpose of achieving supply chain goals should serve as a source and channel of organisational learning, and should hence be transformed into learning supply chain partnerships. Transformation towards learning supply chains and partnerships is reflected in the development of a learning orientation and environment, aimed at optimising the practice of organisational learning and knowledge management. Implementation and continuous improvement of the processes of organisational learning and knowledge management lead to the increased behavioural variety of supply chain's constituents as a means for overcoming uncertainties in the complex supply chain environment.

The process, in which a system responds to internal and external changes in order to achieve predetermined results on the basis of the available knowledge, without changing organisational norms, is known as single-loop learning. In single-loop learning all tested combinations of routines, skills and processes are documented and stored in the organisational repository. Increased variability in the external and internal environment reflected in deviations between preferred and actual outcomes place the need for establishing another management loop. The learning process where organisational core value assumptions are being examined and eventually modified is known as double-loop learning. If a supply chain operates within circumstances where it is impossible to solve a certain problem based on currently held assumptions and within the present context, the need for triple-loop learning emerges. Company's mission is being re-evaluated and the system continues to exist within a modified organisational, economic or legal context.

Conceptual model of the learning platform for the long-term supply chain optimisation based on the process of organisational learning has been proposed. Concern Agrokor was used as a case study to estimate potentials for its introduction. Prior and current business making of Agrokor indicates that the company has intuitively followed some of the proposed model guidelines. Current activities are continuously modified and improved, which is realised through the implementation of single-loop learning. After market challenges in terms of the demand for improvements regarding service quality

were detected, supply chain strategic management started to re-evaluate core business assumptions and developed new operative solutions based on double-loop learning. Agrokor has applied triple-loop learning when it performed radical redesign of its activities in order to expand its business from flower cultivation to food industry. Similar processes based on triple-loop learning and changing business context were in place when Agrokor prepared strategies to infiltrate foreign markets.

However, results of the single-, double-, and triple-loop learning were predominantly based on the managerial decision making, with little or no employee participation. Since employees have the most accurate insight into daily operations, their increased participation in those processes should be encouraged in terms of their wider contribution in the development of alternative solutions. Rigid hierarchical structures should be transformed into organic organisational forms based on network relations, and supported by cross-functional teamwork and learning.

Agrokor's long-term goal is to ensure strong position on the regional market, which can be achieved only if supply chain management strives to continuously expand and update the organisational knowledge base. That can be done by stimulating processes of double- and triple-loop learning on the individual, team, organisational and inter organizational level, which would enable timely readjustments of core business assumptions along with occasional modifications of the business context in order to increase its competitive position by acquisitions and formation of new partnerships. Even though business operations of Agrokor were not conducted methodically on the premises of the organisational learning process, its contours can be traced, leading to the conclusion that the company would strongly benefit from the methodical implementation of the proposed model.

The purpose of the supply chain organisational learning lies in organisational behaviour modifications resulting in the increased supply chain performance. However, the ultimate goal of learning supply chains from the system point of view is no longer survival, but sustainability, which exceeds the necessity to sustain the system's identity. If the development is defined as the organisational capacity to grow together with the intent to fulfil its goals and the goals of its stakeholders, then the fundamental transformation of the supply chain becomes an imperative when that goal is no longer achievable within a certain identity or structure. Supply chains whose organisational members engage in triple-loop learning more frequently have a higher probability of discovering new possibilities of organisational redefinition, leading to new forms of collaborative networks. However, modern supply chains have not yet fully recognised the importance of the organisational learning process as well as potentials of the learning organisation concept. Since both literature and practical sources are scarce, it is recommended that this approach is further studied both theoretically and empirically. The present study therefore serves as an incentive in that direction.

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