

**RESEARCH
IN BUSINESS LOGISTICS
AND SUPPLY CHAIN
MANAGEMENT**

**2015 REPORT:
LOGISTICS COMPETENCES
AFFECTING BUSINESS
COMPETITIVE
ADVANTAGE CREATION**



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1. PREFACE

Firms constantly search for ways to create strong and long-term competitive advantage. Among the factors influencing the business competitive advantage creation a very important role is assigned to so called „business logistics potentials“. These potentials comprise: (1) **logistics resources**, (2) **logistics capabilities** and (3) **logistics competences**. It should be noticed that logistics potentials are an important part of „general“ business strategic potentials.

The premises, scope and symptoms of the logistics potentials – and logistics competences in particular – influence on business competitive advantage creation have been presented within several world-wide research projects. Among them the most highlighted are projects conducted by: (1) *Michigan State University* (USA)¹, (2) *European Logistics Association* (ELA) in cooperation with *A.T. Kearney*², (3) *Computer Sciences Corporation*³ and (4) *Capgemini*⁴. The research results have pointed out to

¹ The Global Logistics Research Team at Michigan State University, *World Class Logistics: The Challenge of Managing Continuous Change*, Council of Logistics Management, Oak Brook, IL 1995.

D. J. Bowersox, D. J. Closs, T. P. Stank, *21st Century Logistics: Making Supply Chain Integration a Reality*, Council of Logistics Management, Oak Brook, IL 1999.

² European Logistics Association, A.T. Kearney, *Insight to Impact. Results of the Fourth Quinquennial European Logistics Study*, ELA, Brussels 1999.

³ CSC, *The Fifth Annual Global Survey of Supply Chain Progress. Findings from a Survey Jointly Conducted by Computer Sciences Corporation, Supply Chain Management Review and Michigan State University*, Massachusetts 2007.

CSC, *The Sixth Annual Global Survey of Supply Chain Progress. Findings from a Survey Jointly Conducted by CSC, Supply Chain Management Review (SCMR) Magazine, Michigan State University, Council of Supply Chain Management Professionals (CSCMP) and Supply Chain Europe Magazine*, Massachusetts 2008.

⁴ Capgemini, The University of Tennessee, Georgia Southern University, JDA Software Group Inc., *Drivers of Sustainable Supply Chain Management Practice. 18th Annual Trends and Issues in Logistics and Transportation*, Chicago 2009.

Capgemini, The University of Tennessee, Georgia Southern University, JDA Software Group Inc., *Drivers of Sustainable Supply Chain Management Practice. Adaptability. 18th Annual Trends and Issues in Logistics and Transportation*, Chicago, February 2010.

Capgemini, The University of Tennessee, Georgia Southern University, JDA Software Group Inc., *Drivers of Sustainable Supply Chain Management Practice. Optimization. 18th Annual Trends and Issues in Logistics and Transportation*, Chicago, September 2009.

distinctive symptoms of logistics competences influence on business competitive advantage creation.

This report presents **the original concept of logistics competences**, conducted and developed by **Rafał Matwiejczuk**, who is representing **Opole Logistics Research Team** within the Chair of Logistics and Marketing, Faculty of Economics, Opole University, Poland, EU. In particular, the report presents the results of the empirical research carried out by the author in years 2012-2013, **concerning logistics competences (including detailed logistics capabilities) influence on business competitive advantage creation.**

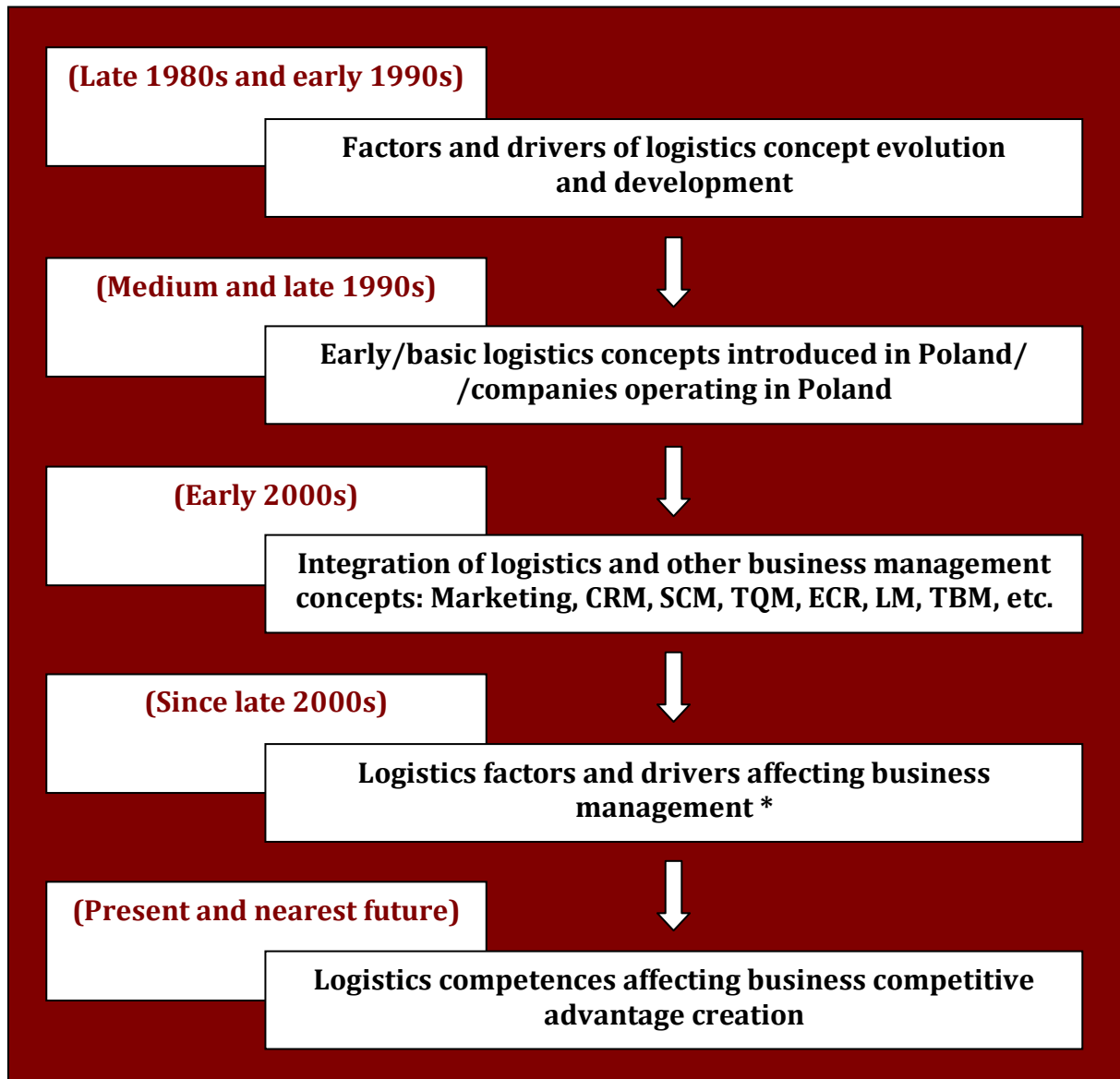
Key words

Logistics, competences, competitive advantage

Capgemini, The University of Tennessee, Georgia Southern University, JDA Software Group Inc., *Drivers of Sustainable Supply Chain Management Practice. Profitability. 18th Annual Trends and Issues in Logistics and Transportation*, Chicago, December 2009.

Capgemini, The University of Tennessee, Georgia Southern University, JDA Software Group Inc., *Drivers of Sustainable Supply Chain Management Practice. Synchronization. 18th Annual Trends and Issues in Logistics and Transportation*, Chicago, October 2009.

2. THE CHAIR OF LOGISTICS AND MARKETING (FACULTY OF ECONOMICS, OPOLE UNIVERSITY, POLAND, EU) RESEARCH PROGRAM: PAST – PRESENT – FUTURE



* The research project *Logistics Determinants of Business Management*, supported and financed by Polish Ministry of Science and Higher Education, performed in years 2009-2011 by *Opole Logistics Research Team* under the supervision of Professor Piotr Blaik in the Chair of Logistics and Marketing, Faculty of Economics, Opole University, Poland, EU.

Figure 1. The Chair of Logistics and Marketing at Opole University research stream.

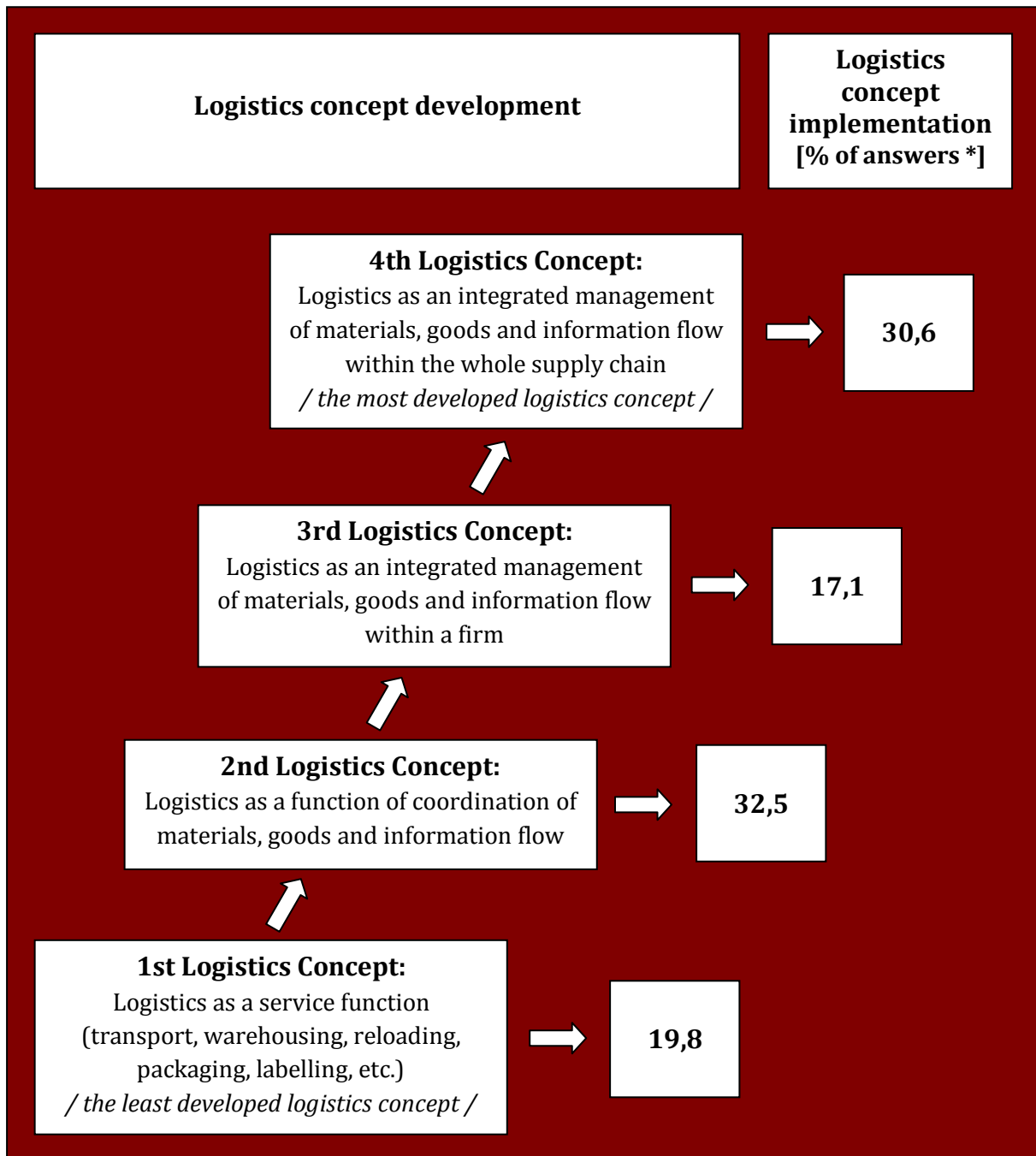
3. LOGISTICS CONCEPT WITHIN THE RESEARCH CARRIED OUT BY *OPOLE LOGISTICS RESEARCH TEAM*

In recent years one may notice the growing importance of strategic decisions related to logistics and supply chain management areas. Such decisions can significantly contribute to the creation and exploration of new premises, opportunities, possibilities, etc. related to business success.

The scope and symptoms of logistics determinants influence on business management system and process have been the subject of the research project named *Logistics Determinants of Business Management*, carried out by *Opole Logistics Research Team* in the Chair of Logistics and Marketing, Faculty of Economics, Opole University, Poland, EU, in years 2009-2011.

The basic objective of the research project was to identify the most important multidimensional relationships between logistics and business management system and process, as well as the possibilities of expected market and economic outcomes achievement.

Within the research project *Logistics Determinants of Business Management* performed by *Opole Logistics Research Team* it was assumed that the development of logistics concept comprises four “stages”. The short description of the following logistics concepts as well as research results concerning logistics concept implementation in firms operating in Poland are presented in figure 2.



* single choice

Figure 2. Logistics concept development and implementation within the research carried out by Opole Logistics Research Team.

4. LOGISTICS DETERMINANTS OF BUSINESS MANAGEMENT WITHIN THE RESEARCH CARRIED OUT BY *OPOLE LOGISTICS* *RESEARCH TEAM*

Within the research project *Logistics Determinants of Business Management* it was also assumed that logistics determinants of business management can be seen as factors related to logistics and supply chain management areas, which may affect the changes within the business management system and process, as well as provide the opportunities for the expected outcomes achievement. As a result of the research, the following **logistics determinants of business management** have been identified:

- 1) **Flow orientation,**
- 2) **Logistics and supply chain competences,**
- 3) **Logistics strategies,**
- 4) **Logistics management tools,**
- 5) **Logistics planning,**
- 6) **Organizational solutions related to logistics and supply chain management,**
- 7) **Logistics controlling.**

The first level within the hierarchy of business management logistics determinants occupies the flow orientation. This orientation not only plays the crucial role in the development of the logistics concept, but is one the most important determinants which influence the changes concerning the business management system and process as well. Within the flow orientation one of the most important aims is to provide the opportunities for continuity, transparency, timeliness, completeness, reliability, etc. of goods and information flow. Efficient and effective implementation of the flow orientation within business management creates the opportunities for achieving beneficial and optimal relationship between the level of customer service and the scope, value and structure of the logistics costs.

The next enumerated above logistics determinants of business management are significantly important symptoms of the flow orientation implementation. These determinants point at further possibilities concerning logistics influence on business management system and process, in relation to expected market and economic outcomes achievement.

The second level within the hierarchy of business management logistics determinants is assigned to logistics competences. Within the research project conducted by *Opole Logistics Research Team* in the Chair of Logistics and Marketing at Opole University, three main areas of logistics competences have been examined:

- 1) Logistics managers' competencies, related to human resources (personal) competencies of people who are responsible for logistics objectives and tasks implementation within the business,
- 2) Logistics competences in the field of logistics goals and strategies positioning within corporate as well as business goals and strategies,
- 3) Logistics competences concerning cooperation and integration with partners (suppliers, distribution companies, wholesalers, retailers, customers, etc.) within the entire supply chain.

Taking into account the formation and development of logistics competences in the context of changes occurring in the business management area, it seems to be particularly important to recognize the competences related to goals and strategies positioning. In general, the positioning means that there are several important links between logistics goals and corporate goals, as well as between logistics strategies and corporate strategy. As a consequence, it is possible to highlight several important relationships between logistics and business management.

An attempt to evaluate the logistics goals positioning within the corporate goals, concerning the research conducted by *Opole Logistics Research Team*, focused primarily on the identification of relations between logistics goals and corporate goals. The research results show that there is still relatively minor importance of logistics goals in relation to corporate goals. In the opinion of almost 37% of the firms taking part in the research, "logistics goals are taken into account during business decisions making",

while according to more than 34% of the firms “logistics goals affect business decisions making”.

Apart from goals positioning, the subject of the research carried out by *Opole Logistics Research Team* was logistics strategies positioning within the corporate strategy. Comparing to the relation between logistics goals and corporate goals, within the area of strategies almost 50% of the surveyed firms indicated that “logistics strategy is taken into consideration in the corporate strategy formulation and development”, while according to more than 25% of the firms “logistics strategy influences the corporate strategy formulation and development”.

On the one hand, logistics goals and strategies are still very often seen in functional terms in the context of business management. On the other hand, it is noticeable that the logistics concept is supposed to become more and more important in the nearest future. The growing logistics importance is closely related to the role and significance of the logistics concept in the context of business management as well as business success and competitive advantage creation. It means that logistics, including logistics potentials: logistics resources, logistics capabilities and logistics competences, is supposed to become more and more “strategic issue”.

5. FOUR GROUPS OF LOGISTICS COMPETENCES AFFECTING BUSINESS COMPETITIVE ADVANTAGE CREATION

Firms constantly aim at gaining and maintaining competitive advantage, which seems to be the central “point of interest” in contemporary strategic management. Within the competitive advantage creation process the key role is assigned to so called “business success potentials”, also referred to as “strategic potentials of business success”, which may be understood as factors influencing business success. The most important symptom of the success is when the firm reaches the expected market outcomes (customer satisfaction, customer loyalty, market share) and the expected economic outcomes (profit, profitability, ROA, ROE, ROI). The outcomes are the basis for business competitive advantage creation.

Many business success potentials are related to logistics area. Among them there are: logistics resources, logistics capabilities and logistics competences, which “rely” on logistics resources and logistics capabilities. The research concerning logistics competences influence on competitive advantage creation has been carried out by the author in years 2012-2013 using CAWI (*Computer Assisted Web Interview*), CATI (*Computer Assisted Telephone Interview*), and CAPI (*Computer Assisted Personal Interview*) methods. The sample comprised 62 firms representing the following lines of business (sectors): mining and extraction mining (1 firm), industrial processing (19), media production and delivery – energy, gas, etc. (2), building engineering (3), commerce (21), transport and warehousing (7), accommodation and catering (2), information and communication (7).

The most significant result of the research has been the original model of business success potentials and symptoms with highlighted role of logistics competences influencing competitive advantage creation (figure 3).

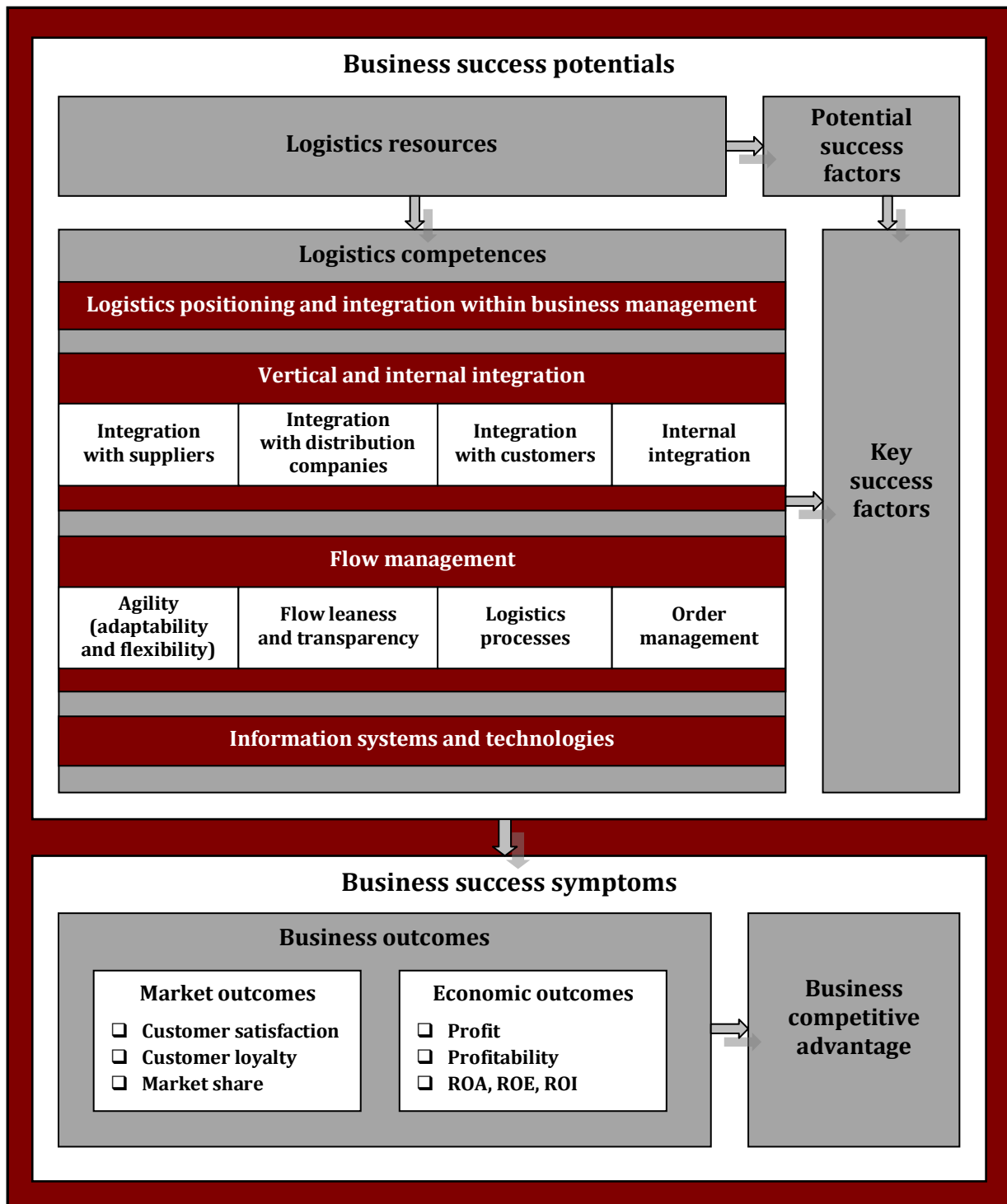


Figure 3. Logistics competences within the model of business success potentials and business success symptoms.

In the first step **four groups of key (superior) logistics competences** have been distinguished:

- 1) Competences concerning the logistics concept embedding within business management, particularly in relation to goals, strategies, operational programs and operational tasks, as well as to planning and organizational structure development – these competences are referred to as **Logistics positioning and integration within business management**,
- 2) Competences concerning the integration seen as an inherent feature of the logistics concept, which can apply to processes carried out within the entire value chain as well as within the firm – these competences are referred to as **Vertical and internal integration**,
- 3) Competences concerning: (a) the adaptability and flexibility regarding relationships with suppliers, distribution companies and customers, (b) the coordination of materials and goods flow, (c) the logistics processes and activities carried out by the firm, as well as (d) the execution of customer orders – these competences are referred to as **Flow management**,
- 4) Competences concerning ERP systems, as well as EDI and RFID technologies – these competences are referred to as **Information systems and technologies**.

Within **logistics competences concerning vertical and internal integration** there are:

- 1) **Integration with suppliers**,
- 2) **Integration with distribution companies**,
- 3) **Integration with customers**,
- 4) **Internal integration (integration within the firm)**.

As to **logistics competences concerning flow management**, the following competences have been specified:

- 1) **Agility, comprising adaptability and flexibility**,
- 2) **Flow leanness and transparency**,
- 3) **Logistics processes**,
- 4) **Order management**.

In the next step, the above logistics competences have been detailed into itemized logistics capabilities affecting business competitive advantage creation (table 1).

Table 1. Structure of logistics competences (detailed logistics capabilities) influencing business competitive advantage creation.

Logistics competences	Detailed logistics capabilities (“bricks” of logistics competences) affecting business competitive advantage creation
1. Logistics positioning and integration within business management	1.1. Logistics integration within corporate mission and strategic trends of business development 1.2. Integration of logistics goals with general corporate goals 1.3. Integration of logistics strategies with general corporate strategy 1.4. Integration of logistics operational tasks with corporate tasks 1.5. Integration of logistics planning with corporate planning 1.6. Logistics as functional area within corporate organizational structure
2. Integration with suppliers	2.1. Suppliers segmentation 2.2. Key suppliers identification 2.3. Business information sharing with suppliers 2.4. Suppliers engagement within product development process 2.5. Revenues, costs and profits sharing with suppliers
3. Integration with distribution companies	3.1. Distribution companies segmentation 3.2. Key distribution companies identification 3.3. Business information sharing with distribution companies 3.4. Distribution companies engagement within product development process 3.5. Revenues, costs and profits sharing with distribution companies
4. Integration with customers	4.1. Customers segmentation 4.2. Key customers identification 4.3. Business information sharing with customers 4.4. Customers engagement within product development process 4.5. Revenues, costs and profits sharing with customers
5. Internal integration	5.1. Logistics and operations management (production) integration 5.2. Logistics and marketing / promotion integration 5.3. Logistics and technology development integration 5.4. Logistics and trade / sales integration 5.5. Logistics and procurement integration

<p align="center">6. Agility (adaptability and flexibility)</p>	<p>6.1. Monitoring / identification of suppliers' needs and expectations 6.2. Monitoring / identification of distribution companies needs and expectations 6.3. Monitoring / identification of customers' needs and expectations 6.4. Suppliers service care 6.5. Distribution companies service care 6.6. Customers service care 6.7. Suppliers' unique order execution 6.8. Distribution companies unique order execution 6.9. Customers' unique order execution</p>
<p align="center">7. Flow leanness and transparency</p>	<p>7.1. Value creation streams flowgistics 7.2. Value creation processes / tasks focusing 7.3. Non-value creation processes / tasks outsourcing 7.4. Raw materials and materials stock monitoring 7.5. Products (finished goods) stock monitoring</p>
<p align="center">8. Logistics processes</p>	<p>8.1. Transportation management (TMS) 8.2. Warehousing management (WMS) 8.3. Handling, packaging and labeling management 8.4. Inventory management 8.5. Raw materials and materials supply management 8.6. Distribution management 8.7. Reverse flow management</p>
<p align="center">9. Order management</p>	<p>9.1. Reliability of supply (delivery) 9.2. On-time supply (delivery) 9.3. Completeness of supply (delivery) 9.4. Accuracy of supply (delivery) 9.5. Flowgistics of supply (delivery) 9.6. Speed of supply (delivery) 9.7. Flexibility of supply (delivery)</p>
<p align="center">10. Information systems and technologies</p>	<p>10.1. Material Requirements Planning (MRP) 10.2. Manufacturing Resource Planning (MRP II) 10.3. Distribution Resource Planning (DRP) 10.4. Enterprise Resource Planning (ERP) 10.5. Electronic Data Interchange (EDI) 10.6. Radio-Frequency Identification (RFID) technology and systems</p>

The aim of the research conducted by the author has been an attempt to evaluate logistics competences significance in business competitive advantage creation. Every time the evaluation has been related to two basic dimensions of business competitive advantage:

- 1) **Competitive advantage achieved through focusing on costs**
(cost leadership),
- 2) **Competitive advantage achieved through focusing on customer service**
(creation and delivering of unique value for customers) (figure 4).

The research results have mostly confirmed the significant importance of logistics competences as potentials of business competitive advantage creation. According to firms/managers which/who took part in the research, logistics competences concerning customers' orders management are the most important factors influencing competitive advantage creation. These competences contribute to both: competitive advantage based on cost leadership, as well as competitive advantage based on customer service.

The following chapters present the details concerning logistics competences listed in figures 3 and 4 influence on business competitive advantage creation.

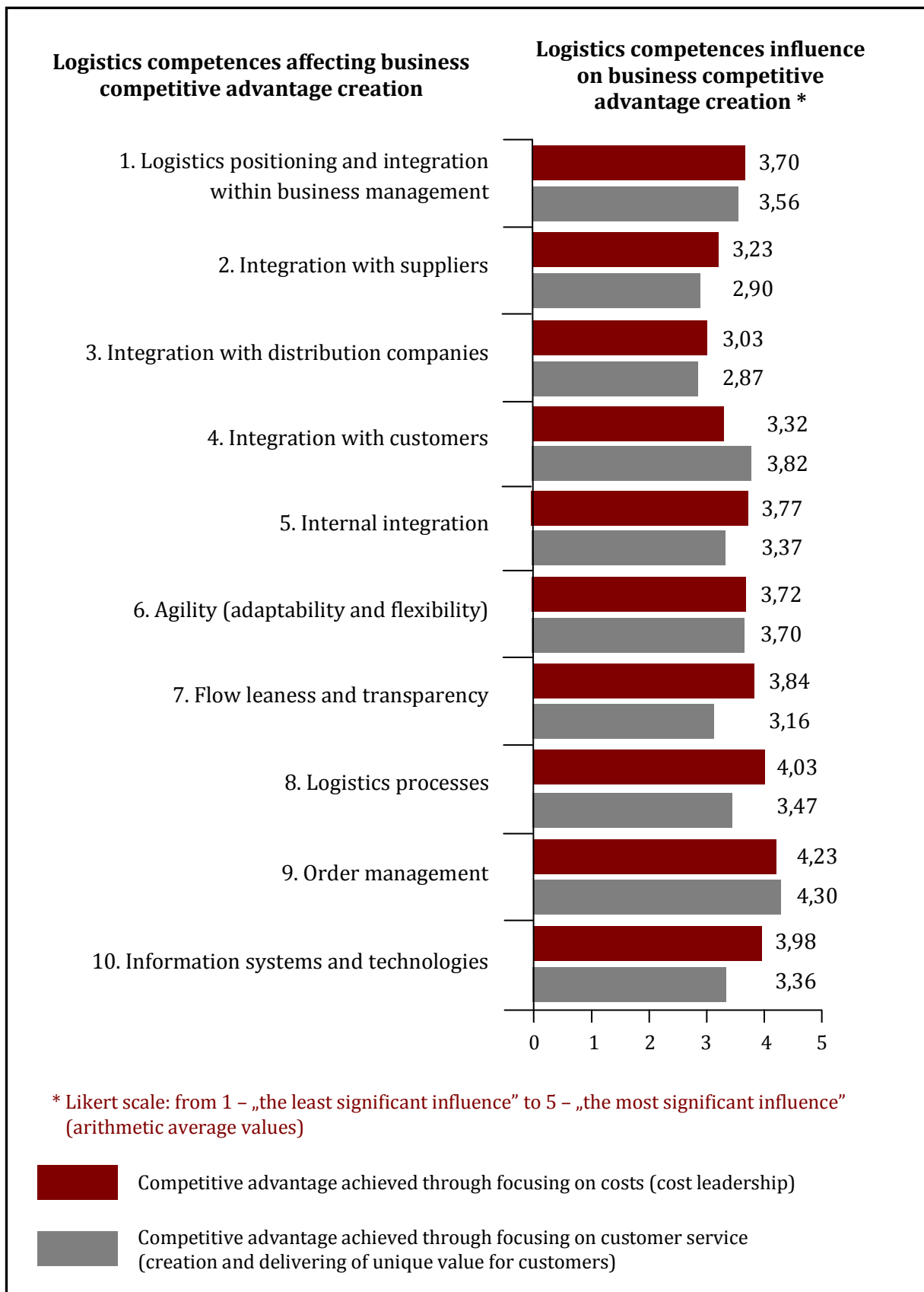


Figure 4. The significance of logistics competences in business competitive advantage creation.

6. LOGISTICS POSITIONING AND INTEGRATION WITHIN BUSINESS MANAGEMENT

Logistics competences in the area of logistics positioning and integration within business management relate to the most important decision problems regarding the relationships between logistics (in particular logistics concept) and business management concept and process.

This group of logistics competences comprises six detailed logistics capabilities:

- 1) Logistics integration within corporate mission and strategic trends of business development,
- 2) Integration of logistics goals with general corporate goals,
- 3) Integration of logistics strategies with general corporate strategy,
- 4) Integration of logistics operational tasks with corporate tasks,
- 5) Integration of logistics planning with corporate planning,
- 6) Logistics as functional area within corporate organizational structure (figure 5).

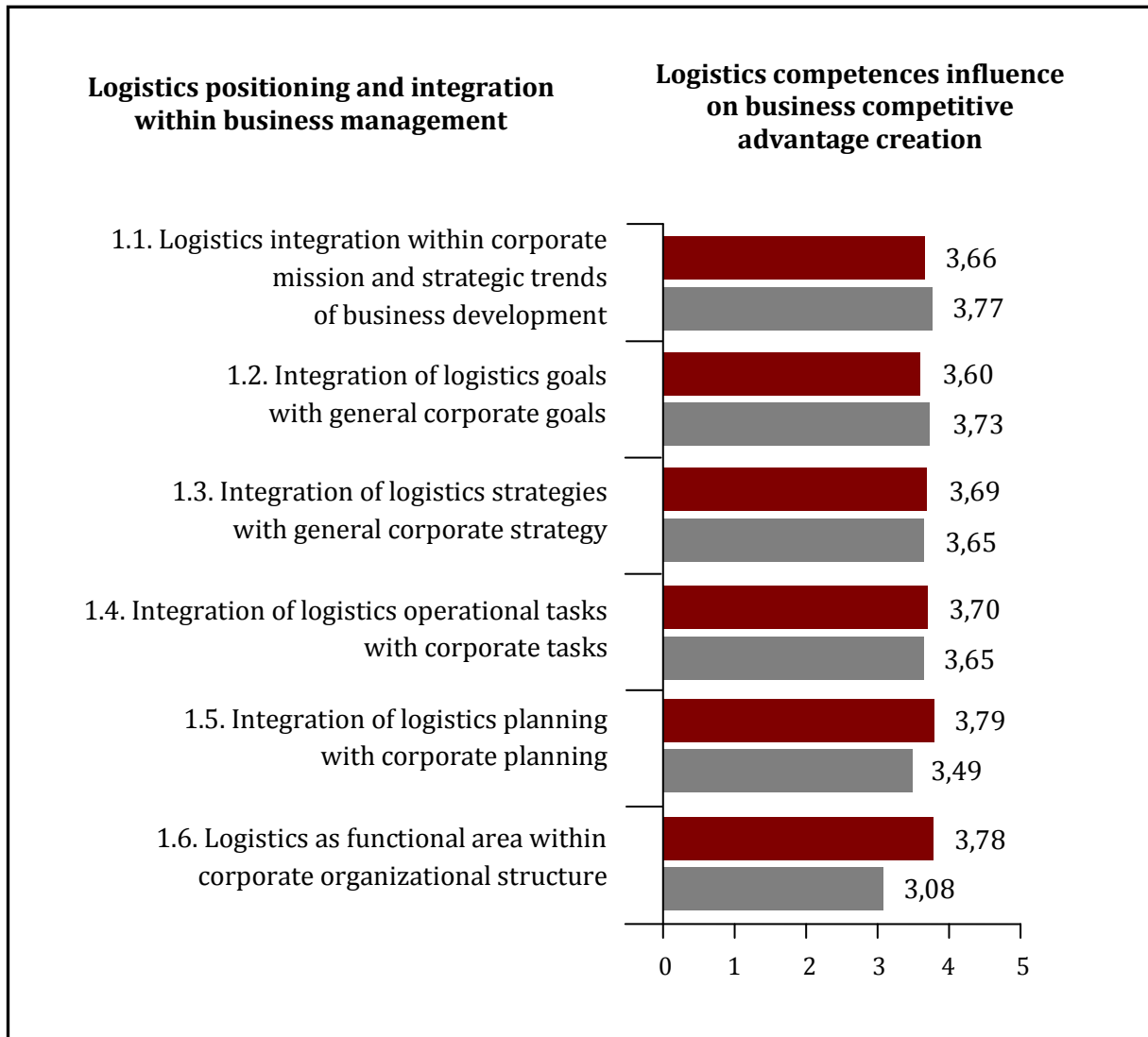


Figure 5. The significance of logistics competences concerning logistics positioning and integration within business management in business competitive advantage creation.

7. VERTICAL AND INTERNAL INTEGRATION

The second group of logistics competences focuses on integration perceived as the “key issue” in the area of logistics concept and logistics management.

Vertical integration concerns the relationships between the firm and: (1) suppliers, (2) distribution companies and (3) customers. In particular, logistics competences regarding vertical integration comprise the following detailed logistics capabilities:

- 1) Suppliers, distribution companies and customers segmentation,
- 2) Key suppliers, key distribution companies and key customers identification,
- 3) Business information sharing with suppliers, distribution companies and customers,
- 4) Suppliers, distribution companies and customers engagement within product development process,
- 5) Revenues, costs and profits sharing with suppliers, distribution companies and customers (figures 6, 7, 8).

In turn, within logistics competences in the area of internal integration the following relations have been taken into consideration:

- 1) Logistics and operations management (production) integration,
- 2) Logistics and marketing / promotion integration,
- 3) Logistics and technology development integration,
- 4) Logistics and trade / sales integration,
- 5) Logistics and procurement integration (figure 9).

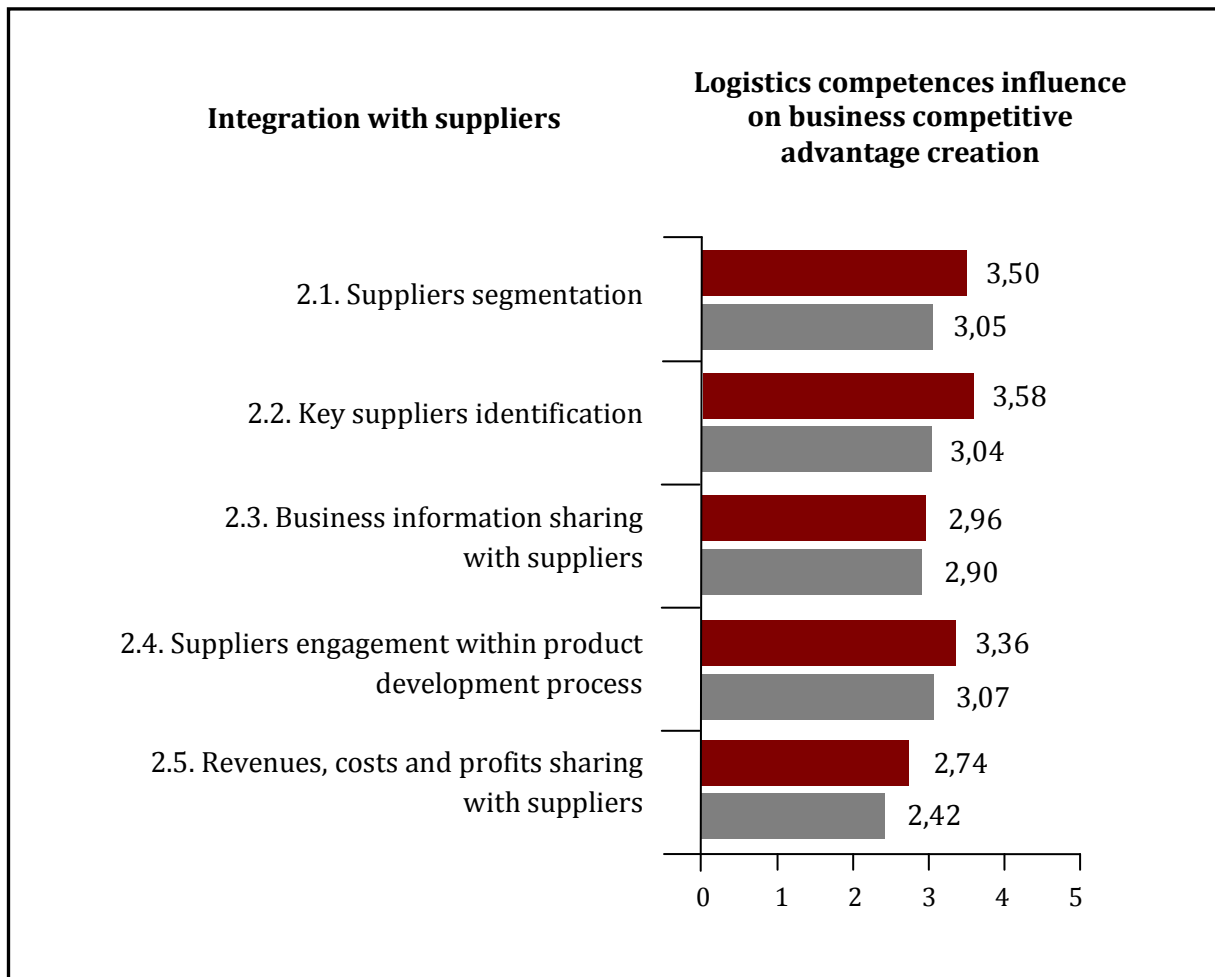


Figure 6. The significance of logistics competences concerning integration with suppliers in business competitive advantage creation.

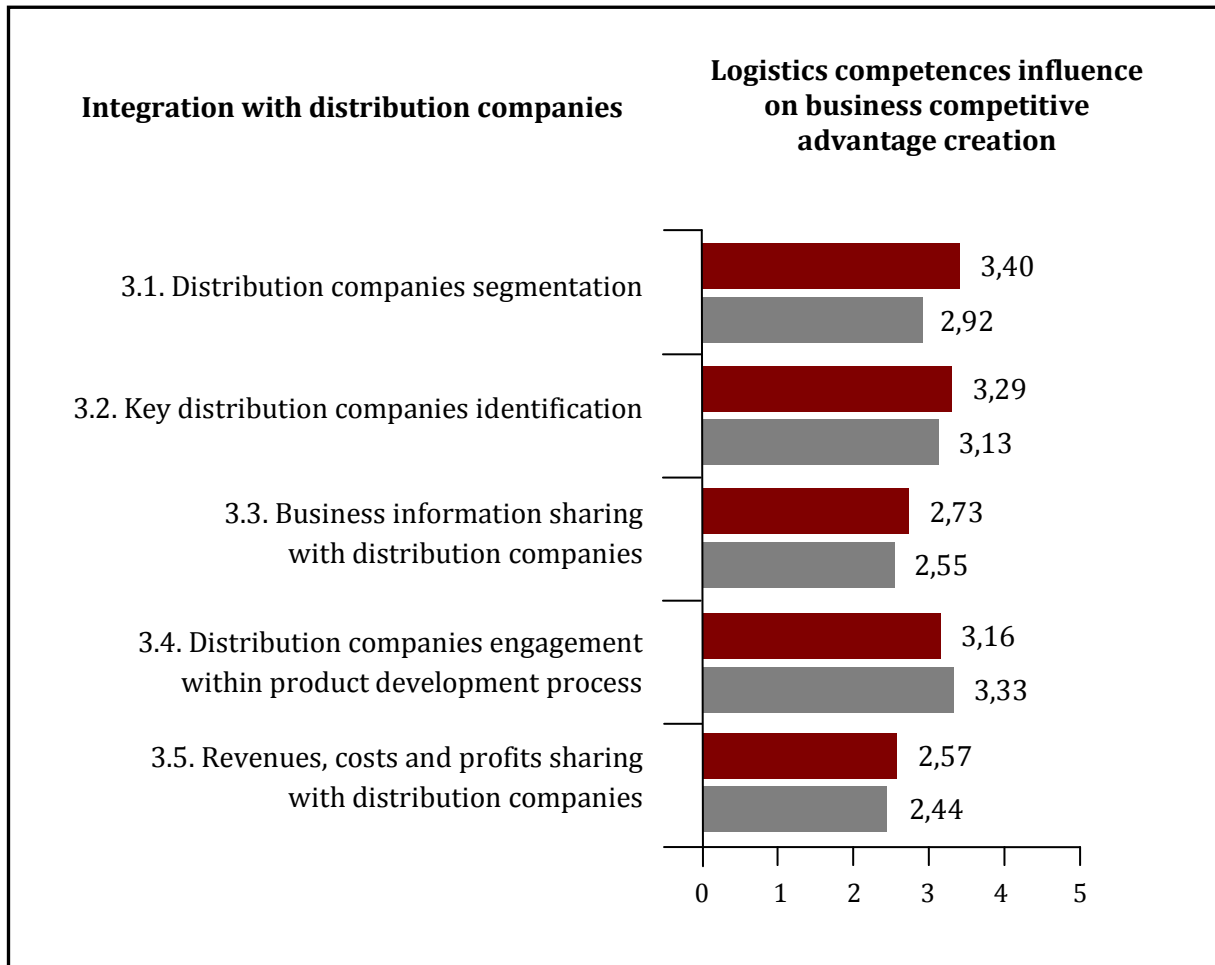


Figure 7. The significance of logistics competences concerning integration with distribution companies in business competitive advantage creation.

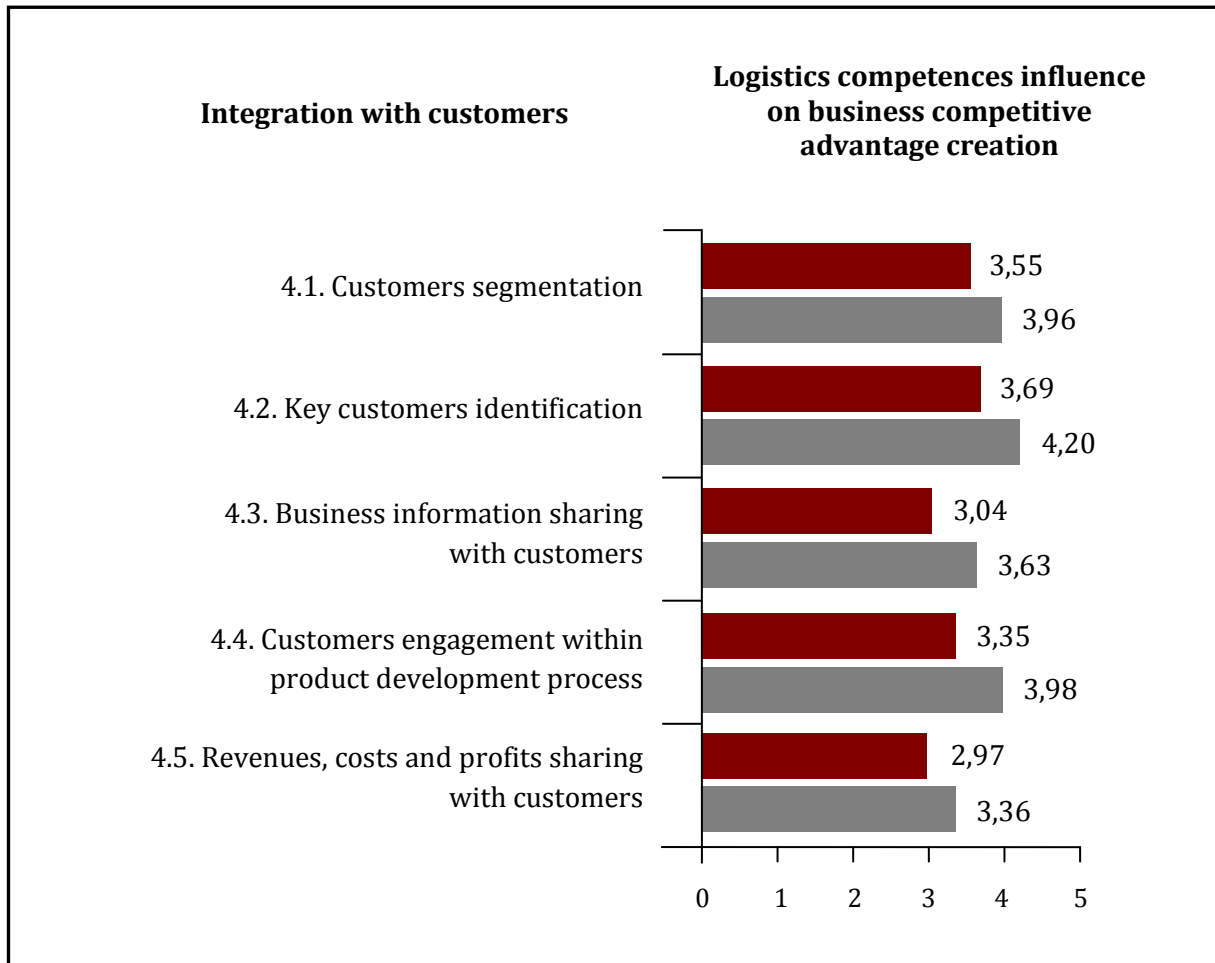


Figure 8. The significance of logistics competences concerning integration with customers in business competitive advantage creation.

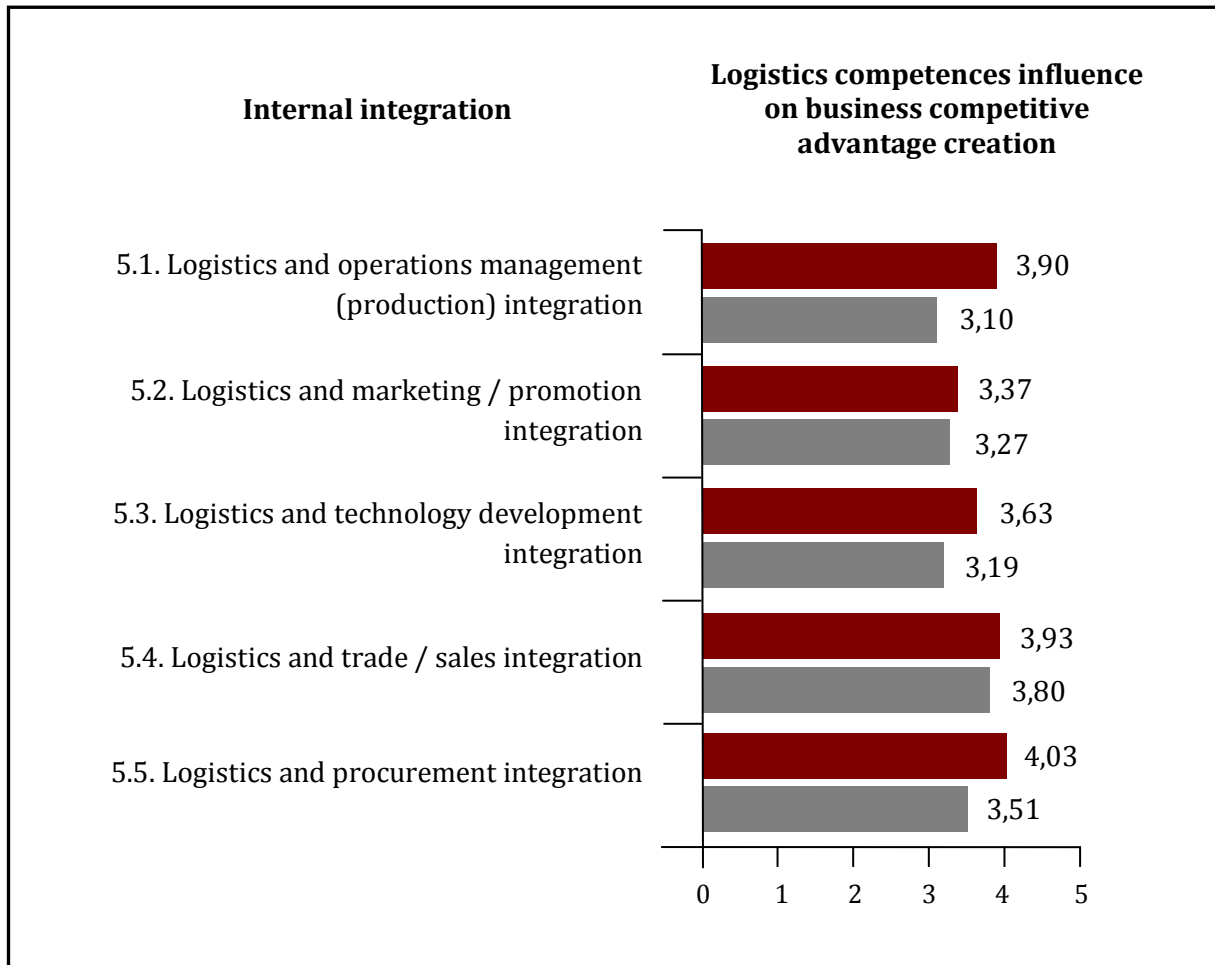


Figure 9. The significance of logistics competences concerning internal integration in business competitive advantage creation.

8. FLOW MANAGEMENT

The third group of logistics competences concerns flow management area. As it was mentioned above, the flow orientation is a basis for logistics concept development not only within the firm, but within the entire supply chain as well.

Flow management area comprises the following logistics competences:

- 1) Agility, including adaptability and flexibility,
- 2) Flow leanness and transparency,
- 3) Logistics processes,
- 4) Order management.

Logistics competences related to agility comprise the following detailed logistics capabilities:

- 1) Monitoring / identification of suppliers', distribution companies and customers' needs and expectations,
- 2) Suppliers, distribution companies and customers service care,
- 3) Suppliers', distribution companies and customers' unique order execution (figure 10).

Logistics competences related to flow leanness and transparency comprise five detailed logistics capabilities:

- 1) Value creation streams flowgistics,
- 2) Value creation processes / tasks focusing,
- 3) Non-value creation processes / tasks outsourcing,
- 4) Raw materials and materials stock monitoring,
- 5) Products (finished goods) stock monitoring (figure 11).

Logistics competences related to logistics processes comprise seven detailed logistics capabilities:

- 1) Transportation management (*TMS*),
- 2) Warehousing management (*WMS*),

- 3) Handling, packaging and labeling management,
- 4) Inventory management,
- 5) Raw materials and materials supply management,
- 6) Distribution management,
- 7) Reverse flow management (figure 12).

Finally, logistics competences related to order management comprise the following detailed logistics capabilities:

- 1) Reliability of supply (delivery),
- 2) On-time supply (delivery),
- 3) Completeness of supply (delivery),
- 4) Accuracy of supply (delivery),
- 5) Flowgistics of supply (delivery),
- 6) Speed of supply (delivery),
- 7) Flexibility of supply (delivery) (figure 13).

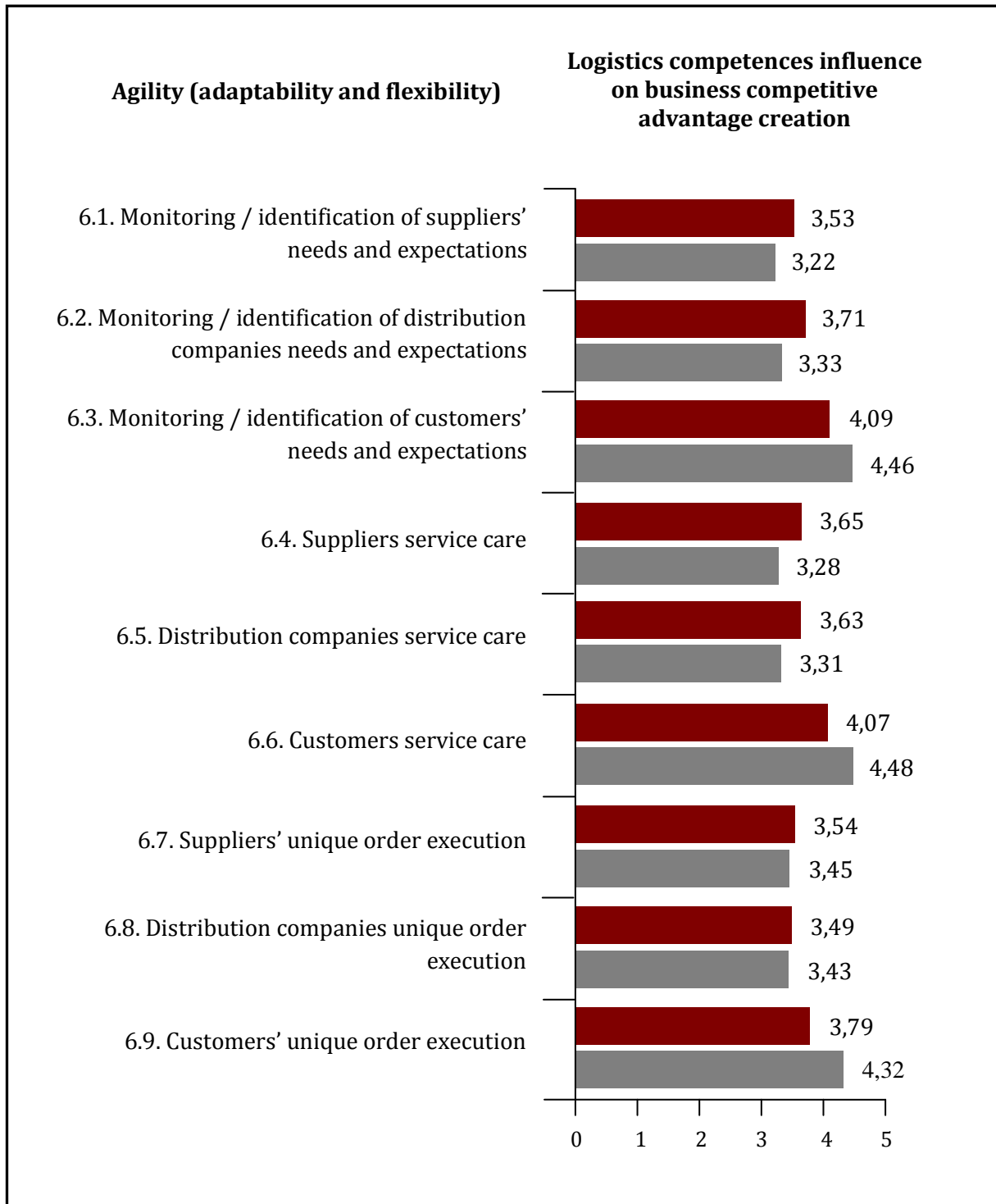


Figure 10. The significance of logistics competences concerning agility (adaptability and flexibility) in business competitive advantage creation.

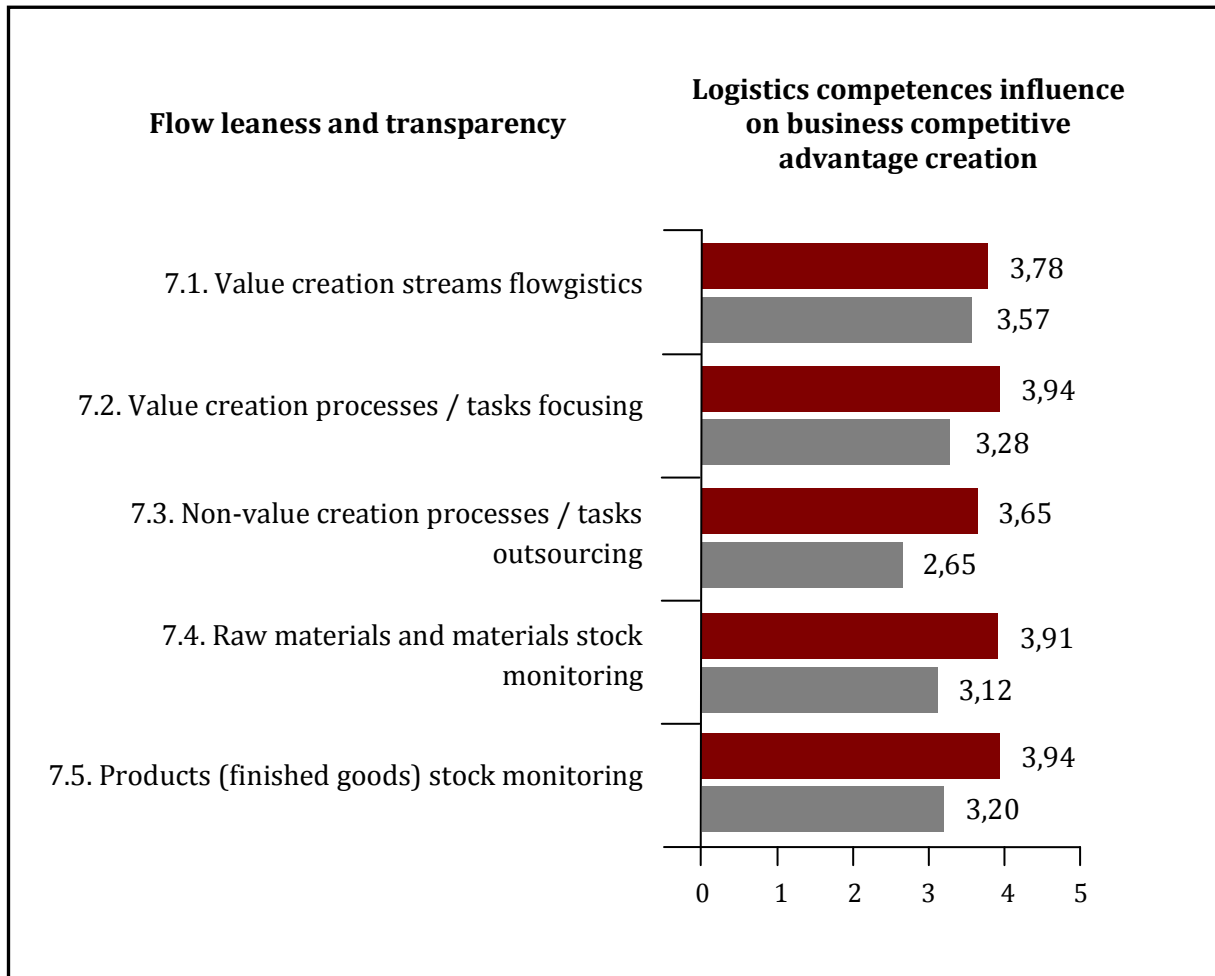


Figure 11. The significance of logistics competences concerning flow leanness and transparency in business competitive advantage creation.

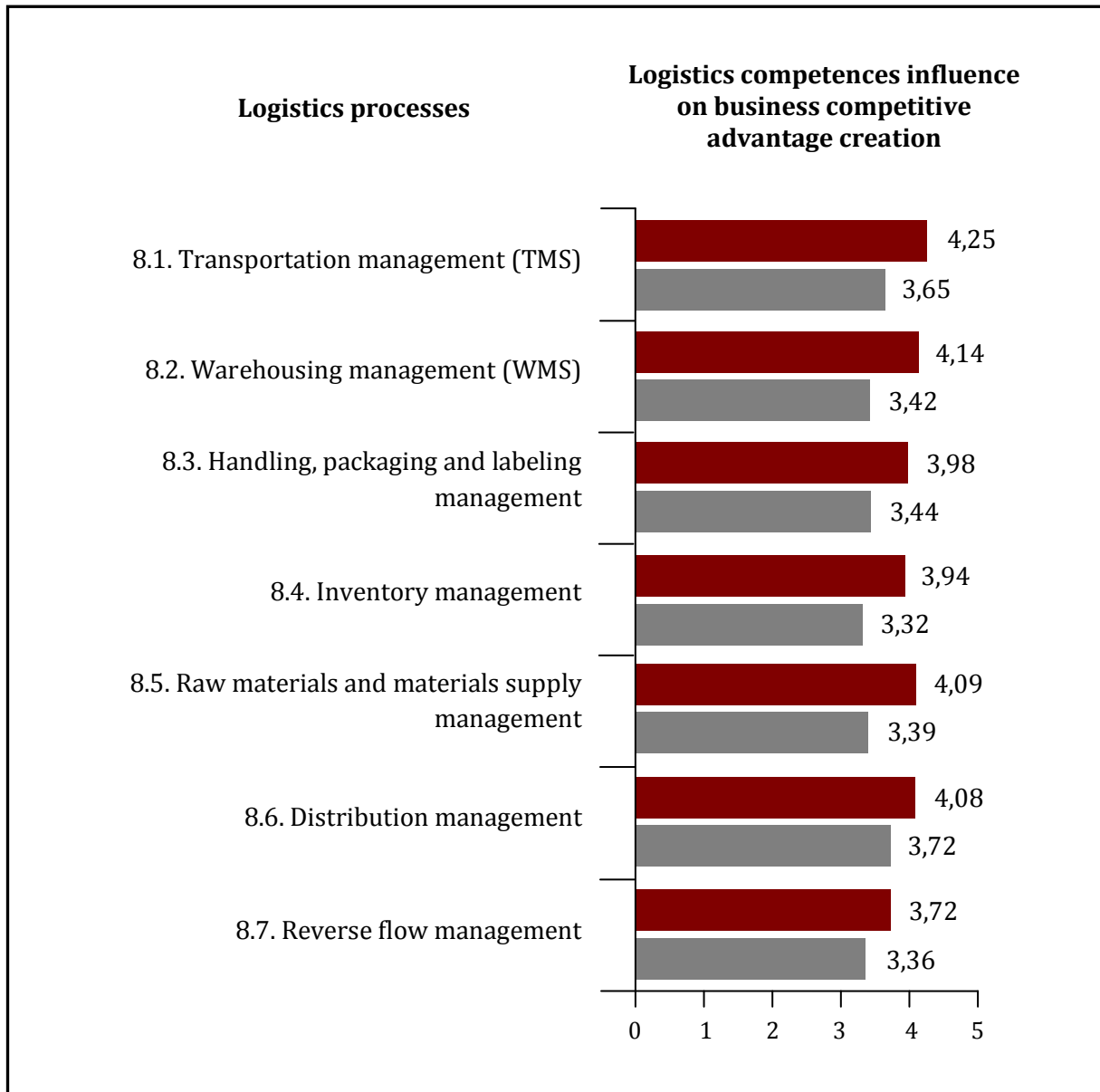


Figure 12. The significance of logistics competences concerning logistics processes in business competitive advantage creation.

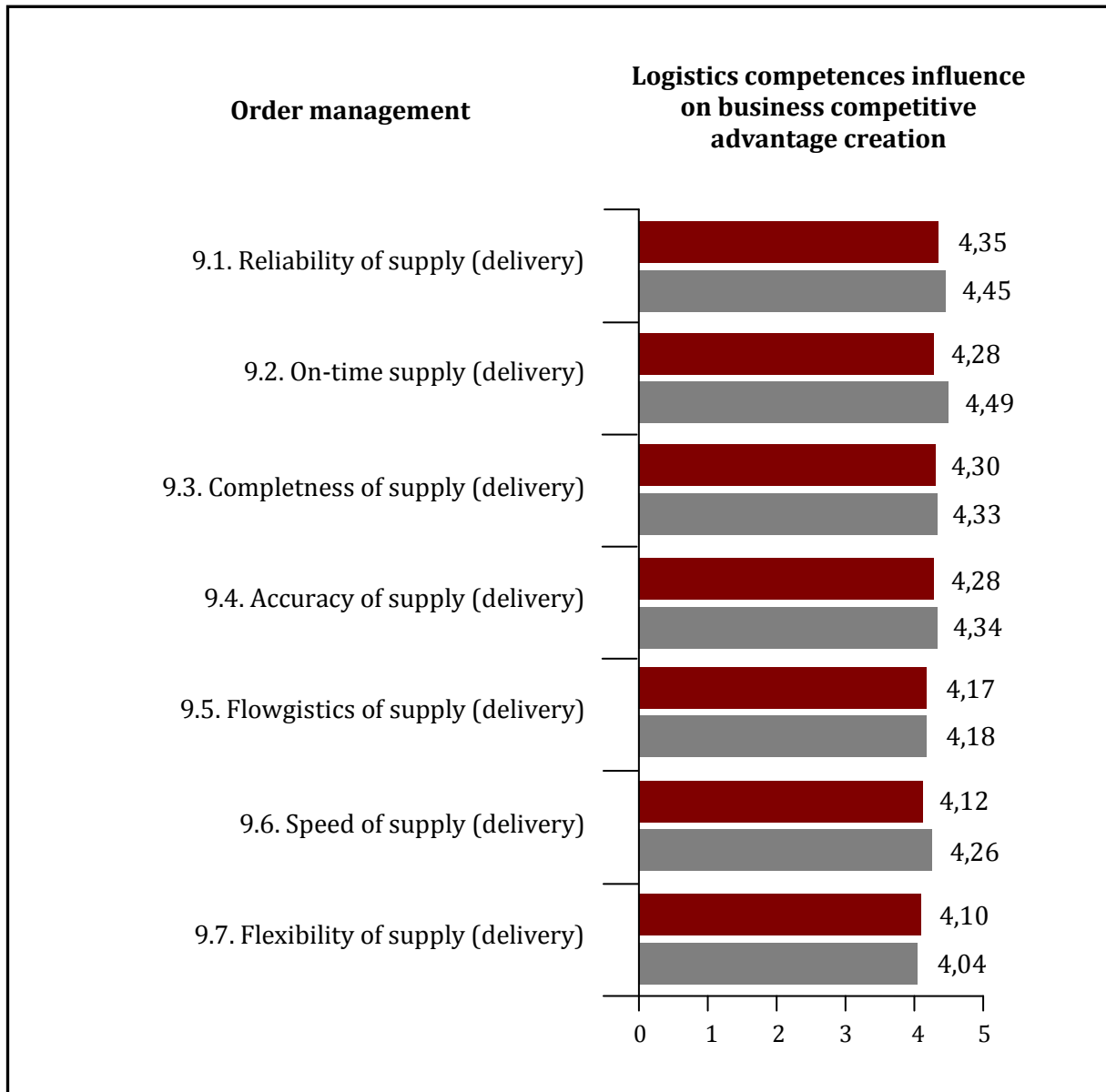


Figure 13. The significance of logistics competences concerning order management in business competitive advantage creation.

9. INFORMATION SYSTEMS AND TECHNOLOGIES

The last, fourth group of logistics competences concerns information systems and technologies, comprising the following detailed logistics capabilities:

- 1) Material Requirements Planning (*MRP*),
- 2) Manufacturing Resource Planning (*MRP II*),
- 3) Distribution Resource Planning (*DRP*),
- 4) Enterprise Resource Planning (*ERP*),
- 5) Electronic Data Interchange (*EDI*),
- 6) Radio-Frequency Identification (*RFID*) technology and systems (figure 14).

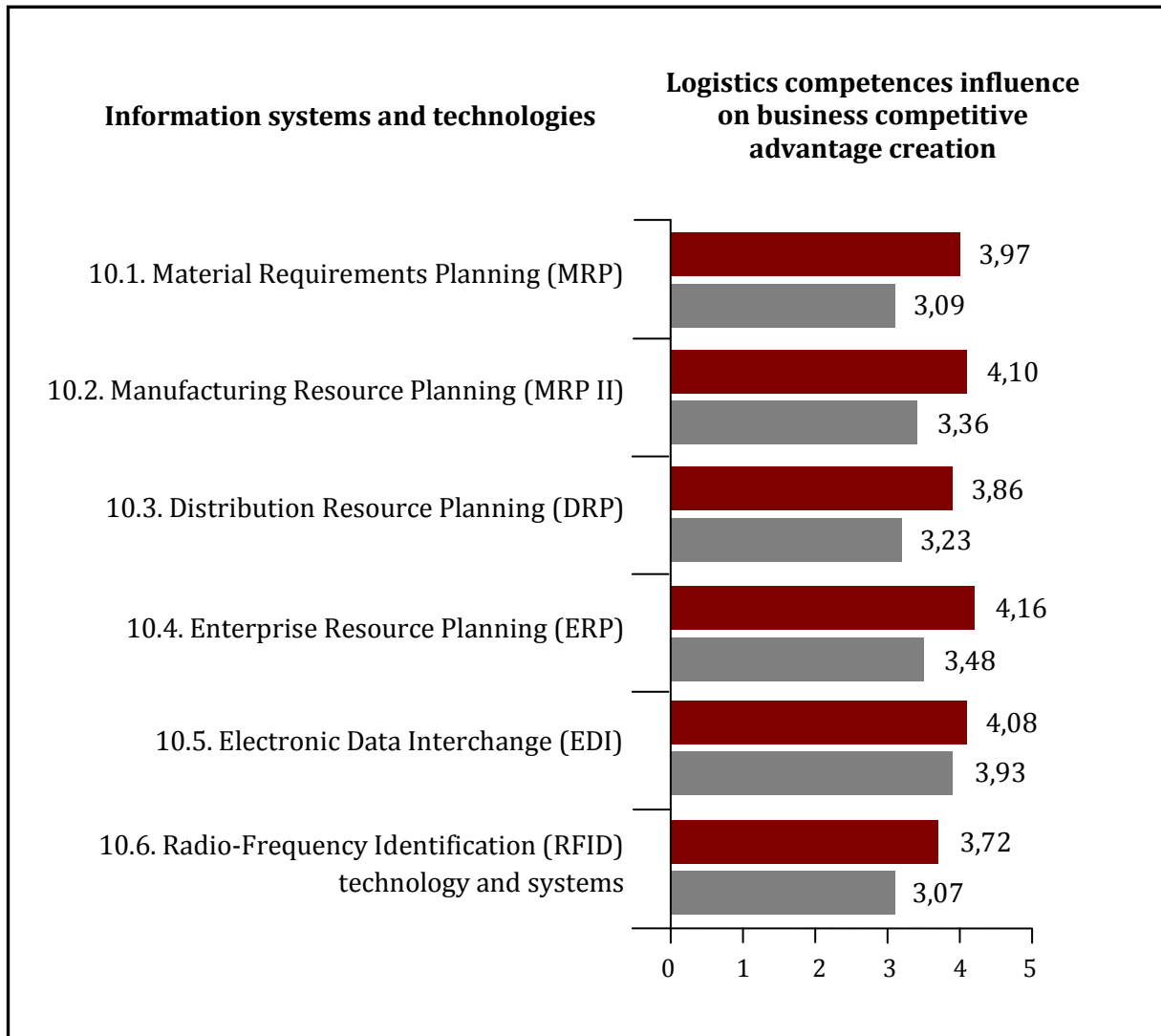


Figure 14. The significance of logistics competences concerning information systems and technologies in business competitive advantage creation.

10. CONCLUSION AND FURTHER RESEARCH

In recent years, within strategic management field one may notice an increasing importance of the business success potentials in achieving the expected market outcomes and economic outcomes by the firm. These potentials include resources, capabilities and competences, whereas market outcomes and economic outcomes are related to several changes within business management, as well as to business success and business competitive advantage.

Within strategic management area an increasing role is often assigned to business logistics concept. Similarly, among the success potentials an important role is often played by logistics potentials, which comprise: logistics resources, logistics capabilities and logistics competences. Such potentials may significantly contribute to the expected market outcomes and economic outcomes achievement by the firm, and – as a consequence – to business competitive advantage creation.

Logistics competences are the key (superior) type of business success potentials influencing competitive advantage creation. The results of the empirical studies, conducted both within the world as well as in Poland, show differentiated, but at the same time high or even very high degree of logistics competences impact on business competitive advantage creation.

The further research should be concentrated on more detailed identification of premises and possibilities concerning logistics competences influence on business competitive advantage creation. Logistics competences as the key (superior) business success potentials require deeper and more comprehensive assessment. Such assessment could lead to better embedding of logistics potentials (i.e. resources, capabilities and competences) within strategic management area, and especially within competitive advantage creation problems.

11. LIST OF FIGURES AND TABLES

Figure 1. The Chair of Logistics and Marketing at Opole University research stream.

Figure 2. Logistics concept development and implementation within the research carried out by *Opole Logistics Research Team*.

Figure 3. Logistics competences within the model of business success potentials and business success symptoms.

Figure 4. The significance of logistics competences in business competitive advantage creation.

Figure 5. The significance of logistics competences concerning logistics positioning and integration within business management in business competitive advantage creation.

Figure 6. The significance of logistics competences concerning integration with suppliers in business competitive advantage creation.

Figure 7. The significance of logistics competences concerning integration with distribution companies in business competitive advantage creation.

Figure 8. The significance of logistics competences concerning integration with customers in business competitive advantage creation.

Figure 9. The significance of logistics competences concerning internal integration in business competitive advantage creation.

Figure 10. The significance of logistics competences concerning agility (adaptability and flexibility) in business competitive advantage creation.

Figure 11. The significance of logistics competences concerning flow leanness and transparency in business competitive advantage creation.

Figure 12. The significance of logistics competences concerning logistics processes in business competitive advantage creation.

Figure 13. The significance of logistics competences concerning order management in business competitive advantage creation.

Figure 14. The significance of logistics competences concerning information systems and technologies in business competitive advantage creation.

Table 1. Structure of logistics competences (detailed logistics capabilities) influencing business competitive advantage creation.

12. LIST OF PUBLICATIONS CONCERNING THE RESEARCH CARRIED OUT BY *OPOLE LOGISTICS RESEARCH TEAM*

BASIC READING (ENGLISH)

P. Blaik, R. Matwiejczuk, *Logistic Processes and Potentials in A Value Chain*, „LogForum. Electronic Scientific Journal of Logistics” 2009, Wyższa Szkoła Logistyki w Poznaniu, Poznań, Vol. 5, Issue 2, No. 2, pp. 1-8.

http://www.logforum.net/pdf/5_2_2_09.pdf

R. Matwiejczuk, *The Meaning of Logistics Capabilities in Achieving the Market Success by A Company*, „LogForum. Scientific Journal of Logistics” 2011, Wyższa Szkoła Logistyki w Poznaniu, Poznań, Vol. 7, Issue 4, No. 4, pp. 41-48.

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R. Matwiejczuk, *The Influence of Logistics Potentials on Business Management*, „LogForum. Scientific Journal of Logistics” 2012, Wyższa Szkoła Logistyki w Poznaniu, Poznań, Vol. 8, Issue 3, No. 3, pp. 201-216.

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