

**KAUNAS UNIVERSITY OF TECHNOLOGY  
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**ELECTRONIC COMMERCE MODELS FOR  
INCREASING BUSINESS EFFECTIVENESS**

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**KAUNO TECHNOLOGIJOS UNIVERSITETAS  
LIETUVOS ENERGETIKOS INSTITUTAS**

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## INTRODUCTION

Economic transformations of global scope during the turn of the millennium have caused scholars and practitioners in economics to direct their attention to changing business processes. The rudiments of an increasing number of business entities, improving methods for business development, rapid dissemination of information technologies, and the forming information society reflect changes in the economy relevant to the greater meaningfulness of information, news, and qualification. Information itself is becoming a serious object of academic research, and its significance is being accented in decision-making.

The tendency towards formation of an information society changes the traditional outlook on business processes and compels a new interpretation of business problems. The most important goal for the modern company becomes an increase in the worth of the business by successful application of competitive means. Nevertheless, the usual methods for forming competitive advantages in today's economy of disseminating information technology and converging technical opportunities does not assure business success for companies. Therefore, companies are forced to seek untraditional means for resolving business problems.

### *Relevancy of the topic*

The resolution of business problems can be linked directly or indirectly to a goal for increasing effectiveness. The areas in which close links can be discovered relevant to the need for increasing effectiveness are in production modernisation, formation of competitive advantages, personnel management, logistics, and resource and finance management. The problem for increasing business effectiveness comes to surface under conditions of modern technology development and intensive competition, which are determinants of decreasing sources for increasing effectiveness and the greater risk involved in their successful adaptation.

Adaptation of electronic commerce systems is one of the possible means in decision-making resolve the problem on increasing effectiveness in an economy, where an information society is the basis on which it operates. This is

directly conditional to the rapid development of information technologies and their penetration in all business sectors. E-commerce models are applied in business in evermore-diverse manners every time, and this reflects a positive outlook by business practitioners regarding the significance of e-commerce to business success. According to W. Baolin (2004), X. Graaf and R. H. Muurling (2003), J. Fraser (2000), and R. Craig (2000), e-commerce in business can be identified with a business philosophy, which is grounded on designing market advantages on a foundation of modern technologies. Such an assessment of opportunities in e-commerce can be considered as an expression of the increasing significance of e-commerce in business, which is conditional to the need for researching e-commerce systems and the opportunities for adapting them in business.

E-commerce is considered a new source for increasing business effectiveness by virtue of its nature and characteristics; however, the shortage of applied and empirical research in this area limits the opportunities for exploiting e-commerce opportunities to increase business effectiveness.

The growth in the significance of e-commerce in business prompts the need for theoretical and practical studies relevant to the benefits, which e-commerce provides for business. Therefore, only comprehensive and efficient studies can provide a sufficient foundation, permitting the handling of e-commerce as a potential base for increasing business effectiveness.

### ***Academic problem***

Currently, the development and adaptation of the e-commerce concept in business is being paid a great deal of attention. However, the theoretical substantiation of the e-commerce concept is notable for the highly various considerations about the concept itself, as well as the different interpretations, regarding the characteristics of e-commerce, including the significance of e-commerce for business effectiveness.

Many authors (Baolin, 2004; Graaf and Muurling, 2003; Zobel and Filo, 2003; Varon, 2002; Coppel, 2000; Brookes and Wahhaj, 2000; and others), who have been analyzing the adaptation of e-commerce in business, accent the positive benefit of e-commerce for business entities. However, their proposals could constitute a subject for various scopes of discussion.

Frequently, studies by different authors condition differing results. Nonetheless, a large number of academic studies have an orientation towards testing the impact of e-commerce on business. Furthermore, business practitioners view the employment of information technologies for executing transactions in a positive light. All this indicates that there is a potential for e-commerce to have a positive impact on business. Such a potential has not been definitively specified and is often criticised (Fensel and Bussler, 2002; Stiroh, 1999; and others).

The first requirement for an effort to assess the effect of e-commerce on business effectiveness is an exhaustive analysis of a theoretical nature on the interconnectedness of e-commerce and effectiveness. Such an analysis needs to define the concept of e-commerce by delineating the sorts of boundaries of the concept, which might substantiate the link between practical e-commerce decisions in business and business effectiveness.

Thus, the academic problem, formulated for this dissertation, considered the aforementioned aspects for adapting e-commerce in business. The problem is thus formulated – *how can the impact of e-commerce adaptation in business on business effectiveness by minimising costs be assessed.*

To resolve this formulated problem, an exhaustive analysis on the concept of e-commerce in the context of increasing effectiveness is required. Such an analysis would make it possible to specify the premises and means for increasing business effectiveness by employing e-commerce.

***Object of the research:*** e-commerce in the context of increasing business effectiveness

***Objective of the research:*** to formulate an e-commerce model, aimed at increasing business effectiveness by minimising costs, which is based on the assessment of the impact of e-commerce on business effectiveness

***Tasks for the research:***

- 1) Perform an analysis on the concepts of e-commerce and effectiveness, and assess their interconnectedness, accenting the role of minimising costs.
- 2) Investigate the academic discussions on the e-commerce

concept, thus forming a personal view on this phenomenon, and more specifically define e-commerce.

- 3) Identify the cost components, conditional to the process of e-commerce, which have an impact on increasing business effectiveness.
- 4) Construct a *business-to-business* model of e-commerce, oriented towards increasing business effectiveness and based on minimising costs.
- 5) Assess the proliferation of e-commerce and its future perspectives for business on a global scale.
- 6) Substantiate the applicability of *business-to-business* e-commerce model in business, based on the results of qualitative empirical research.
- 7) Assess the opportunities for applying the *business-to-business* e-commerce model, formulated for this dissertation, at actual companies, based on the results of the conducted experiment.

#### ***Level of investigation of the problem***

The earliest publications were handling the economics concept of effectiveness, as a category of economics. A. Smith (1776) and D. Ricardo (1817) began deliberating the problematic issue about the effectiveness of an economic entity. Representatives of the marginalist school of thought in economics, such as C. Menger (1871), W. S. Jevons (1871), E. Böhm-Bawerk (1884), and their followers, also paid a great deal of attention to this issue. In economic analysis, effectiveness is generally identified with a base for assessing the results of operations by an economic entity. Such results reflect the positive nature of an economic entity's operations or their changes within a certain context (Schermerhorn, 1989; Shimizu, 2001).

Effectiveness is held to be one of the fundamental categories in economics, inseparable from micro or macro analyses of economic entities. The fathers of economic theories provide sufficient attention to specifying the concept of business effectiveness. They consider business effectiveness to be an innately understood measure of economic activity, proportionate to a ratio between extended efforts and obtained results. Two related concepts were also



used in parallel – productivity (generally in the area of manufacturing) and efficiency.

Effectiveness is generally considered in its broad sense without any specification of its constituent parts. However, such a position is not always applicable to all cases, because it eliminates the possibility for any quantitative assessment. Thereby, various ways of assessing effectiveness exist, depending on the context – effectiveness in financial management can be identified with the profitability of invested capital (Norvaišienė, 2004; Reilly, 2003; Brigham, 1999; and Pinches, 1996), personnel management with the number of employees (labour expenses) (Dessler, 2001; Sakalas, 2001) and production capacities (Bratton and Gold, 2003; Torrington, 1995), and so forth.

Experts on total quality management (Sung, 2003; Shimizu, 2001; Cartin, 1999 and 1989; and Deming, 1986) pay a great deal of attention to the concept of effectiveness. They consider effectiveness (using the concept of effectiveness as much as its synonymous concepts of productivity and efficiency), as a measure for implementing total quality. The measure contains an orientation towards the principles for forming a total quality management concept.

*The concept of e-commerce, which formed due to the rapid development of information technologies, provided a new impulse for assessing business effectiveness.* The e-commerce concept professes to be in the category of competitive advantages. Electronic business or electronic commerce originated during the 1960s, when execution of business operations between financial institutions and corporations began (for example, Electronic Data Interchange – EDI and Electronic Funds Transfer – EFT). At the academic level, the first to attempt studying the opportunities for employing e-commerce in business were R. Kalakota and A. Winston (1996), D. Bollier (1996), E. Swartz (1997), and P. Timmers (1998). H. R. Varian (1999) included e-commerce in a study on microeconomics.

The concept of a “new economy” has formed alongside e-commerce in relation with the proliferation of information technologies. Essentially, the “new economy” is associated with electronic business, as a foundation for company operations, a possibility to function. Proponents of this concept

(Canright, 2004; Kourgiantakis and Petrakis, 2004; Krishnan, 2002; Gordon, 2000; Visco, 2000; and Baily, 2000) emphasise that one of the most important events in economics over the past 20 years is the emergence of information economics. This event is considered to be a technological revolution, and at the same time, a revolution in economics. Meanwhile, e-business or e-commerce is one of the most significant consequences due to the evolvement of information technologies.

E-commerce is described in various ways and for now, has no universally accepted definition (Baolin, 2004; Al-Naeem, 2004; DeLone and McLean, 2004; Coppel, 2000; Mahadevan, 2000; Parker, 2000; Lewis, 2001; and Heffes, 2001). The concepts of “e-business”, “e-commerce”, and “internet commerce” are frequently confused with each other or used as synonyms. In most cases, there is agreement that the primary assignment of e-commerce is to change the traditional means for trade, making it more flexible and more qualitative, and providing participants in the market an opportunity for exchanging information in a place of convenience to them, at an acceptable time, and in an interactive environment. However, there are various views regarding the structure for achieving this assignment.

In discussions on the benefit that e-commerce provides for business, the impact on costs is usually accented (Hawk, 2004; Jennex, 2004; Fodor and Werthner, 2004; Lewis, 2001; Heffes, 2001; Brown, 2001; Kerrigan and Roegner, 2001; Brookes and Wahhaj, 2000; and Baron and Shaw, 2000). This direction dominates in the analysis of e-commerce, which obviously relates to the need for studies of this type. By discussing e-commerce through the prism of company costs, various factors – business effectiveness, competitive advantage, profitability, and the like – can be drawn into the context of an analysis. M. Brookes and Z. Wahhaj (2000) provide an exhaustive study on this issue. They formed a hypothetical economic model, based on the circulation of information flows between those who are involved in generating the value added process and the respective costs. Information, which is often considered a factor of production through the prism of the e-commerce concept, plays the major role in this model (Pušnik, 2003; Nabeth, 2003; Kazanis and Ginige, 2003; Coppel, 2000; Brookes and Wahhaj, 2000; Visco, 2000; and others).

However, a narrow orientation towards the impact of different types of costs on e-commerce limits the possibilities for studies to derive broad-based generalisations in the area of e-commerce and business effectiveness. Thus, studies of this type are less useful in forming a concept of e-commerce, based on increasing business effectiveness.

In Lithuania, discussions on the concept of e-commerce occur episodically. Only the fundamentals of e-commerce are included in analyses without any in-depth interpretations of it. The scholars who have accomplished the most in this area, discussing different aspects of e-commerce are T. Blažauskas (2004), V. Sūdžius (2003), R. Gatautis (2002), M. Kriaučionienė (2002), V. Narbutas (2001), and V. Abraitis (2001).

R. Gatautis made an exceptional contribution in his analysis of e-commerce in the context of forming competitive advantages, which appeared in his dissertation, “Elektroninės komercijos veiksnys formuojant konkurencinius pranašumus ‘The factor of e-commerce in forming competitive advantages’” (2002). In this work, he summarised a singular methodological shortcoming for forming a set of competitive advantages by employing e-commerce.

The level of investigating the problem leads to the conclusion that e-commerce is discussed in literature simply, as a means aimed at optimising different components of business (costs, competitiveness, and the like). However, there are no studies that look at and analyse e-commerce, as a potential base for increasing business effectiveness. This reveals the need for a model for increasing business effectiveness by employing e-commerce.

***Structure of the research.*** The structure of logic for this dissertation study is based on implementing the formulated objective by resolving the sequence of assignments, which are differentiated by the following stages:

- *Part 1 of the work* analyses the understanding of e-commerce, its involvement in a historical context, and types of e-commerce models and their interconnectedness with the business effectiveness category of economics. A precise definition of e-commerce in the context of increasing business effectiveness, differentiating company cost components that are conditional to e-

commerce processes, is presented in this part of the dissertation.

- *Part 2 of the work* formulates the *business-to-business* model of e-commerce, specifying its environment and structure, involving consideration of the premises for increasing business effectiveness by employing *business-to-business* e-commerce.
- *Part 3 of the work* performs a complex of research on the opportunities for employing the *business-to-business* model of e-commerce, formulated for this dissertation, for increasing business effectiveness. Further, the results of this research provide the basis for the summary on the adaptability of the *business-to-business* e-commerce model.
- *Conclusions part* summarises the results of the research for this dissertation.

***Methods of research:***

1. For analysing the theoretical aspects of increasing business effectiveness by employing e-commerce in this dissertation, research methods that are common across academic disciplines were used – systemic, comparative, and logical analyses of the academic press.
2. For investigating the dissemination of e-commerce and the business perspective on a global scale, quantitative research, secondary data gathering, and analysis methods were used. The results are presented in textual and graphic forms.
3. For conducting the empirical research on implementing the *business-to-business* e-commerce model in business, sociological research methods – open-ended interview and experiment – were used. The results were processed, using statistical data analysis methods, and presented in textual and graphic forms. Representability of the results was assessed, using SPSS (Statistical Package for Social Sciences) and the Microsoft Excel software package.

***Sources for the research:***

1. The works of researchers from Lithuania and abroad provided

reference, both for analysing the comprehensions about e-commerce and business effectiveness as well as the concept of increasing business effectiveness by employing e-commerce. Foremost attention was paid to material from the latest academic conferences in the area of e-commerce.

2. Secondary research, using the statistical data submitted by institutions and organisations involved in market research in the European Union and Lithuania (SIBIS, E-Business Watch, Lithuanian Statistics Department, TNS-Gallup, and others), was used to investigate the significance of e-commerce to business on a global scale.
3. Primary social research data, gathered during the time of the open-ended interviews, were used to analyse the applicability of business-to-business e-commerce in business.
4. Primary and secondary company data, which characterise the management of information flows, supply systems, and resources, were used to investigate the applicability of the formulated model at the selected company.

***Academic originality and significance of the research.*** The results that were gained attest to the academic originality of this dissertation.

- The definition of e-commerce, specified by the author, considers e-commerce, as employment of electronic networks for simplifying and expediting the purchase-sales process of goods with the goal of reaching cost economies, conditional to greater business effectiveness.
- Major models of e-commerce systems have been subclassified according to interactions by economic entities (consumers, companies, and governments). This provides the conditions for specifying the areas and forms for employing e-commerce in business.
- Cost components that are conditional to e-commerce processes and have influence on increasing business effectiveness have been identified. These are raw material procurement costs, raw material

storage costs, and ordering costs.

- A *business-to-business* e-commerce model, specifying an increase in business effectiveness by minimising costs, was formulated. This model differentiates three factors that determine the success of implementing the model in business (company size, branch of industry, and internationalism), and specifies the opportunities for companies to successfully implement e-commerce decisions in business.
- The positive impact of the *business-to-business* e-commerce model on business effectiveness was empirically investigated, which substantiated opportunities for companies to increase business effectiveness by minimising costs, employing e-commerce decisions.
- The *business-to-business* e-commerce model that was formulated for the dissertation was applied at the company, which operate in the area of information technologies.

***Approbation and publication of results of scientific researches on the topic of dissertation:***

**1. Articles in Lithuanian publications included in the list that the Science and Studies Department has approved:**

1. Baršauskas P., Šarapovas T. (2004). “Problems of E-Business Implementation in SMEs”, *Ekonomika*. ISSN 1392-1258. Vilnius: Vilnius University, No. 65, pp. 7-16.
2. Kavaliauskienė V., Šarapovas T. (2003). “Problems of Economic Evaluation of E-commerce”, *Inžinerinė ekonomika*. ISSN 1392-2785. Kaunas: Kaunas University of Technology, No. 4(35), pp. 97-102.
3. Kavaliauskienė V., Šarapovas T. (2002). “Sąvokų ‘e-commerce’ ir ‘elektroninis verslas’ lyginamoji analizė (Comparative Analysis of the ‘e-commerce’ and ‘electronic business’ Concepts)”, *Inžinerinė ekonomika*. ISSN 1392-2785. Kaunas: Kaunas University of Technology, No. 4(30), pp. 91-95.

## **2. Articles in other reviewed international and foreign academic publications:**

1. Šarapovas T. (2003). “Challenges for Economic Assessment of E-commerce”, *Building the Knowledge Economy*. Part 1. ISBN 1-58603-379-4. Netherlands: IOS Press, pp. 261-267.
2. Šarapovas T. (2001). “Economic Influence of E-Commerce: the Pricing Aspect”, *Almanach des praktischen Managements in Mittel- und Ost-Europa*. Band Nr. 3. ISSN: 1439-0833. Stralsund: Nordic Academy of Informatization, pp. 59-64.

### **3. International conference material:**

1. Šarapovas T. (2003). “Business Transformation in New Economy”, *Ekonomika ir vadyba-2003 (Economics and Management-2003)*: Reports presented at the international academic conference, Book 2. Kaunas: Technologija, pp. 120-122.
2. Šarapovas T. (2002). “Growth of E-commerce: Prospects and Challenges”, *Ekonomika ir vadyba-2002 (Economics and Management-2002)*: Reports presented at the international academic conference, Book 2. Kaunas: Technologija, pp. 81-83.
3. Šarapovas T. (2001). “Elektroninės komercijos ekonominiai poveikiai (Economic impacts of e-commerce)”, *Regionų plėtra-2001 (Regional development-2001)*: Reports presented at the international academic conference. Kaunas: Technologija, pp. 268-273.
4. Šarapovas T. (2001). “Analysis of ‘New Economy’ Concept”, *Ekonomika ir vadyba-2001 (Economics and Management-2001)*: Reports presented at the international academic conference, Book 3. Kaunas: Technologija, pp. 283-290.

## DISSERTATION CONTENTS

### Part 1. ELECTRONIC COMMERCE AND BUSINESS EFFECTIVENESS: THEORETICAL CONCEPTS AND MODELS

Part 1 presents the study on the concepts of e-commerce and business effectiveness, accenting their interconnectedness in the context of decision-making to increase business worth.

**Section 1.1 – Analysis of the e-commerce concept** – analyses and specifies the comprehension of e-commerce and its evolvment, and presents a classification of e-commerce models.

*Subsection 1.1.1 – E-commerce concept* – performs the analysis of the comprehension about e-commerce. The purpose of this analysis is to specify the object of this dissertation research. Definitions of e-commerce, provided by various sources, are classified, according to the characteristic of e-commerce that is accentuated (Table 1).

**Table 1.** E-commerce concepts

<b>Accented aspect</b>	<b>Author/institution</b>
Fundamental of business philosophy	European Commission (2003), M. Kriaučionienė (2002), J. Fraser (2000), R. Craig (2000)
Means for supporting an increase in the effectiveness of business processes and consumer satisfaction	R. Skyrius (2003), R. Gatautis (2002), E. M. Heffes (2001), J. Ah-Wong (2001), I. Lewis (2001), J. Coppel (2000)
A new type of source for commercial transactions	USA Department of Statistics (2004), V. Sūdžius (2003), OECD (2002), Eurostat (2001)

*Subsection 1.1.2 – Evolvment of e-commerce* – investigates trends and perspectives in the development of e-commerce. The performed research differentiates two stages in the development of e-commerce:

1. The first generation attempted to capture as great a share of the



market as possible. Therefore, the primary attention in e-commerce was on business growth.

2. The second generation is concentrating on retention of a segment of the market and research. Greater attention is placed on qualitative market research and business plans in an effort to assess the distinct characteristics of some specific e-commerce company. This would permit selection of a successful strategy and acquisition of competitive advantages.

*Subsection 1.1.3 – E-commerce models* – analyses the forms–models of e-commerce. Based on the works by J. Coppel (2000), D. Menasce and V.Almeida (2000), and S. Korper and J. Ellis (2000), e-commerce models are classified in accordance with the interrelationships between economic entities (Table 2).

**Table 2. E-commerce models**

	Government	Business	Consumer
Government	Government-to-Government	Government-to-Business	Government-to-Consumer
Business	Business-to-Government	Business-to-business	Business-to-Consumer
Consumer	Consumer-to-Government	Consumer-to-Business	Consumer-to-Consumer

**Section 1.2 – Business effectiveness concept and levels of assessment** – performs an analysis of the concept of effectiveness. The goal is to define business effectiveness, as an economic category, and its characteristics and assessment possibilities.

Based on the opinions of various scholars (Christensen and Hansen, 1996; Rutkauskas and Stancikas, 2003; Cartin, 1999; Schermerhorn Jr., 1989; and Sung, 2003), the author of this dissertation concludes that *business effectiveness in the context of company operations may be accurately interpreted as the ratio between added value for a consumer and usage of resources.*

**Section 1.3 – Link between the concepts of e-commerce and business effectiveness** – analyses decision-making possibilities for increasing business

effectiveness by using e-commerce.

*Subsection 1.3.1 – Economic aspects of increasing business effectiveness by developing e-commerce* – investigates the importance of increasing business effectiveness and its significance.

The conclusion drawn after performing this research is that the formation of a medium for e-commerce determined a new impetus for increasing the business effectiveness of company operations. This accentuates the importance of e-commerce in the economy, as viewed from the prism of increasing business effectiveness.

*Subsection 1.3.2 – E-commerce development while increasing business effectiveness by means of cost minimisations* – presents the following specified definition of e-commerce by which e-commerce is linked to increasing business effectiveness.

*E-commerce is the employment of electronic networks for simplifying and expediting the purchase-sales process of goods from product supply to sales and delivery with the goal of reaching certain cost economies, which are conditional to greater business effectiveness.*

The conclusion, drawn after the assessment of possible directions for increasing business effectiveness, was that when analysing the impact of *business-to-business* e-commerce on business effectiveness, an increase in business effectiveness can be accurately linked to cost minimisation.

*Subsection 1.3.3 – Components of company costs conditional to e-commerce processes* – presents a differentiation of the primary cost positions that influence e-commerce decisions at a company:

- intermediary chain
- costs for the process of order provision
- raw material inventories.

*Subsection 1.3.4 – Premises for increasing business effectiveness by developing business-to-business e-commerce* – investigates the premises for assuring an increase business effectiveness by using *business-to-business* e-commerce. The research that was performed led to the following conclusions:

1. The companies, having the greatest opportunities for cost economies, are those, which purchase different components of goods from

- suppliers and create added value by considering buyer needs.
2. Companies can implement realistic cost economies by selecting one of the following alternatives:
    - Decrease the number of intermediaries.
    - Lower supply costs in the positions of inventory control and the ordering process.

## **Part 2. ANALYSIS OF THE OPPORTUNITIES FOR INCREASING BUSINESS EFFECTIVENESS BY EMPLOYING THE BUSINESS-TO-BUSINESS E-COMMERCE MODEL**

The *business-to-business* e-commerce model is formulated in this part. Its designation is benefit maximisation from e-commerce decisions in business.

**Section 2.1 – Characterisation analysis of the *business-to-business* e-commerce model** – analyses of the characterisation of *business-to-business* e-commerce, which bases the formulation of a new *business-to-business* e-commerce model.

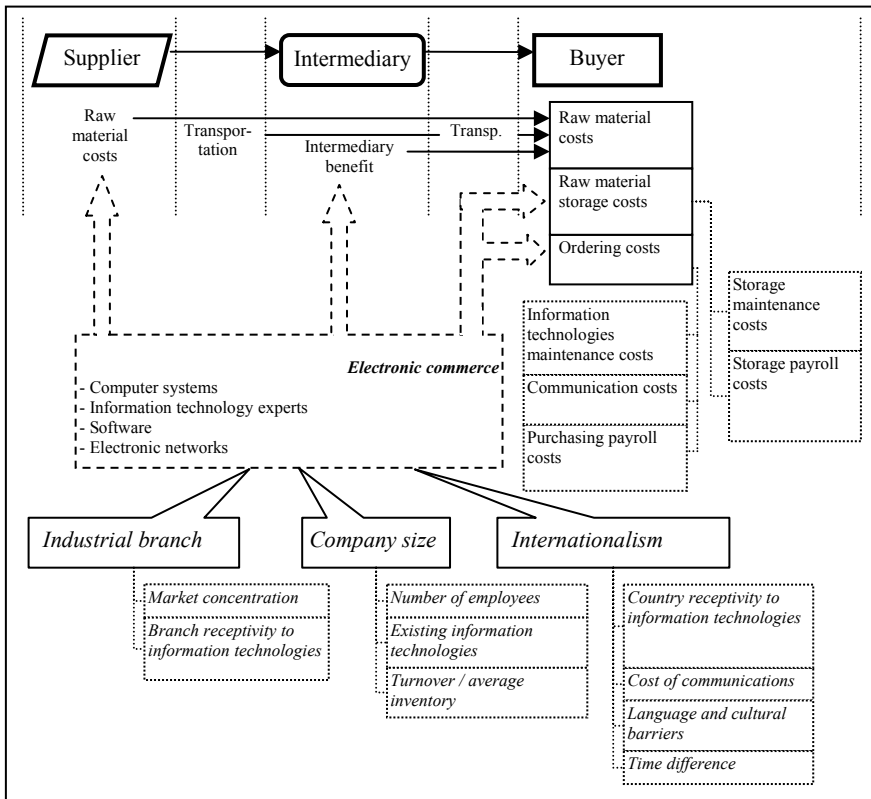
During the investigation on the characteristics of e-commerce, much attention was paid to the factor of *information*. This analysis highlights the essential characterisation of the *business-to-business* e-commerce model – the breakdown of the asymmetry in information and increase in the quantity of information, necessary for producers, to the potential for an ideal level of utility.

**Section 2.2 – Analysis of the environment in which the *business-to-business* e-commerce model operates** – analyses the environment that assures the functioning of the newly formulated *business-to-business* e-commerce model. In accordance with the results of this analysis, three environmental factors, having the greatest impact on the success of implementing e-commerce in business, are differentiated:

- branch of industry
- company size
- internationalism.

**Section 2.3 – Opportunity analysis for increasing business effectiveness, based on cost minimisation, by developing the *business-to-business* e-commerce model** – presents the newly formulated *business-to-business* e-commerce model, which is oriented towards increasing business effectiveness on the basis of cost minimisation (Figure 1). *Three company cost positions are differentiated in this model*, which can provide cost economies by implementing e-commerce decisions:

- raw material costs
- raw material storage costs
- ordering costs.



**Figure 1 . Structure of increasing business effectiveness by minimising costs with the support of the *business-to-business* e-commerce model**

Two aspects express the uniqueness of the formulated *business-to-business* e-commerce model:

- The strength of the e-commerce impact with the main elements that characterise a company (company size, branch of industry, and internationalism).
- The detailed company cost components, dependant on e-commerce processes.

### **Part 3. EMPIRICAL RESEARCH ON THE DEVELOPMENT AND EXPLOITATION OF THE *BUSINESS-TO-BUSINESS* E-COMMERCE MODEL FOR INCREASING BUSINESS EFFECTIVENESS**

This section contains the opportunity analysis for applying the *business-to-business* e-commerce model in company operations; it employs empirical research.

**Section 3.1 – Methodology for research on the *business-to-business* e-commerce model** – presents the methodology and logical sequence for performing the opportunities analysis of applying the *business-to-business* e-commerce model in business.

*Objective of the research* – to assess the opportunities for increasing business effectiveness by implementing the *business-to-business* e-commerce model.

This research is in two parts: 1) an analysis of secondary statistical data, and 2) the opportunities analysis for applying the *business-to-business* e-commerce model in companies, performed by employing an open-ended interview with experts and an experiment.

*Analysis of secondary statistical data* was employed in the effort to assess the dissemination of e-commerce on a global scale. Secondary statistical data, characterising the dissemination of e-commerce and its importance in Europe and other areas of the world, were employed.

*Open-ended interview* purpose was to examine the views of experts in Lithuania on e-commerce and its impact on business effectiveness. Questioned

were 32 e-commerce experts by means of an open-ended interview.

*Experiment* was employed to investigate the impact of the *business-to-business* e-commerce model on business effectiveness. This experiment was performed at a company, operating in the branch of information technologies.

**Section 3.2 – Study on the dissemination of *business-to-business* e-commerce in practice** – analyses of trends in e-commerce development on a global scale. The research results indicate that e-commerce is developing the most rapidly in countries, which are most economically developed, where business entities face limits on forming competitive advantages, and most end-users of goods have access to the required technology, as well as have the psychological maturity to make use of the opportunities that e-commerce provides.

**Section 3.3 – Empirical research on the opportunities for practical application of the *business-to-business* e-commerce model in the business of information technologies** –investigates the opportunities for exploitation of the formulated *business-to-business* e-commerce model in company operations by employing qualitative research methods.

*Subsection 3.3.1 – Qualitative research on the business-to-business e-commerce model in increasing the effectiveness of company operations* – examines the views of e-commerce experts towards e-commerce opportunities for increasing business effectiveness.

The open-ended interview substantiated the hypothesis that e-commerce has a positive impact on business effectiveness, expressed through the prism of cost economies in the areas of managing raw materials costs, inventories, and ordering. However, the results from the open-ended interview indicated that the impact of *business-to-business* e-commerce on the number of suppliers is minimal. Furthermore, some of the factors, associated with application of the model for international transactions, are not considered to be of much importance.

*Subsection 3.3.2 – Research on the opportunities for adapting the business-to-business e-commerce model* – presents the results of the experiment, which was conducted at one of the companies, operating in the branch of information technologies. These results characterise the opportunities

for adapting the *business-to-business* e-commerce model in company operations.

The comparison of the supply and resource management systems at Company X, prior to and following the performance of the experiment, differentiated the following fundamental changes:

- A decrease in the volume of communications by telephone and fax, which causes lower communications costs
- A decrease in the number of supply and sales employees
- An increase in the amount of information that can be dispensed, as much for Company X as for its buyers
- A decrease in average inventories
- A shorter time inventory deliveries
- Appearance of costs for the maintenance of information technologies

The results of the experiment substantiated the suitability of the *business-to-business* e-commerce model for increasing business effectiveness by means of cost minimisations.

## **CONCLUSIONS**

The study on the theoretical concepts and models of e-commerce and the analysis of their connectedness with business effectiveness, which provided the bases for formulating the *business-to-business* e-commerce model that was substantiated by a set of empirical investigations, determined the following conclusions:

1. The variety of e-commerce concepts in literature and the differing interpretations of the e-commerce concept gave rise to the need for an exhaustive study on the understanding of e-commerce. The analysis, performed on the academic works by e-commerce researchers, indicates that the two following aspects are key to the interpretation of e-commerce:
  - As a means for increasing business effectiveness, which forms conditions for minimising costs relevant to the management of company information flows, and resource and supply systems
  - As a potential competitive advantage of a company, formed on the

basis of modern information technologies and oriented towards cost advantages.

2. The analysis of the comprehension of e-commerce, considering the works by academic scholars, the following aspects, essential to forming e-commerce, were differentiated: 1) specificity relevant to the product and branch of industry, 2) logistical attributes, 3) importance of transactions as an essential technical part, and 4) conditions for satisfying consumer demands.
3. The analysis of the research on adaptations of e-commerce in business indicates that most such studies are oriented to analysing the opportunities for lowering costs in certain areas. This work differentiates the following cost positions, which can achieve cost economies by implementing e-commerce decisions:
  - Raw material costs
  - Raw material storage costs
  - Order delivery process costs
4. A *business-to-business* e-commerce model was formulated in consideration of the premises for employing e-commerce in business. The three entities, conditional to creating added value, that comprise the structure of this model, are the supplier, intermediary, and buyer. The following conclusions can be drawn from the assessment of opportunities for employing the formulated model to increase business effectiveness by minimising costs:
  - The analysis of the importance of information, as a factor of production, in economic processes best reveals the impact of e-commerce on company costs. The impact of e-commerce in the chain for creating added value materialises due to the breakdown of the asymmetry of information.
  - An assessment of unavoidable material investments in the base of technology for the functioning of e-commerce is required, when implementing the *business-to-business* e-commerce model in a company.
  - Three primary factors, which determine the success of employing the



*business-to-business* e-commerce model, must be considered, when assessing the possibilities for implementing this model in company operations. These are:

- branch of industry in which the company operates
  - company size
  - internationalism
- In deliberating the impact of e-commerce on business effectiveness through the prism of cost economies, the impact of e-commerce on the end-user of the product must also be assessed. The most important change in the relationship with product users is the greater amount of information, provided to the user, which is considered one of the company's competitive advantages.
5. According to the analysis of *business-to-business* e-commerce development on a global scale, the importance of e-commerce in business can be accentuated by a noticeable increase in potential, indicated by the following factors:
- the sufficiently high number of companies that employ e-commerce in their operations (the penetration of e-commerce in the European Union reaches 19%),
  - the comparatively low e-commerce use capacities in terms of different companies (in most cases – up to 5%),
  - the large proportion of companies (33.2% on average for all branches of industry) that have declared their plans for investing in the development of e-commerce in the near future (within 12 months).
6. The following results were gained from performing the empirical research, employing the open-ended interview for which the purpose was an assessment of business opportunities for increasing business effectiveness by implementing the *business-to-business* e-commerce model:
- The *business-to-business* e-commerce model predominates at 77% of the companies, which employ e-commerce.
  - The greater proportion of increased business effectiveness by employing the *business-to-business* e-commerce model can be linked to an optimisation of information flow management and an increase in

the amount of information that can be processed.

- The major motives for implementing e-commerce in business are a need to increase business effectiveness (61% of respondents), and the use of e-commerce by suppliers and competitors (accordingly 15% and 10% of respondents).
  - According to expert assessments, the cost economies, generated by the *business-to-business* e-commerce model, primarily influence a decrease in purchasing payroll and communications costs. The importance of this was assessed by 1.31 points (on an assessment scale from -2 to 2 points).
  - In literature, the impact of e-commerce on the number of suppliers is often accented. However, the sum of the results from the empirical research that was performed does not substantiate such an assessment.
  - The following factors, accented in the *business-to-business* e-commerce model, have a significant impact in the success of implementing this model in business: 1) characteristics of the branch of industry, particularly the receptivity of the branch to information technologies – 4.28 points, 2) company size – 3.28 points, and 3) aspect of internationalism, especially the receptivity of the country to information technologies – 4.09 points (on an assessment scale from 1 to 5 points).
7. The experiment, which was formulated for this dissertation, on the integration of the *business-to-business* e-commerce model into the operations of the company, operating in the branch of information technologies in Lithuania, determined the following fundamental changes therein:
- The intensity of use of the traditional means of communication (telephone, fax) with suppliers and buyers decreased 5 times after employing the e-commerce system. This determined a decrease in communications costs.
  - Once the accumulation of information flows and some analytical functions were automated, the number of supply and sales employees

- decreased by 40% (thus, payroll costs decreased by 38.4%), and the amount of information that could be dispensed increased several times.
- Once the tempo in ordering management increased, average inventories decreased, and the time for inventory deliveries shortened by up to one to two days. Therefore, the expenses relevant to inventory management (including funds for inventory turnover) decreased by 42.9%.
  - The negative change, established by the integration of the *business-to-business* e-commerce model into company operations, was the increased costs for the maintenance of information technologies (from 200 LTL/month to 10,000 LTL/month).
  - Without consideration of extraneous factors, unrelated to this experiment, which determined changes in the company's cost structure, the increase in the business effectiveness of the company that participated in the experiment was 9.6%.
8. The *business-to-business* e-commerce model, formulated for this dissertation, can be considered an adequate means for increasing business effectiveness, which can generate a solid competitive advantage in the market. However, conditions for applying e-commerce in business must be assessed prior to adopting this model in a company. Such are the conditions that could influence an evaluation regarding the place and significance of e-commerce in company operations.

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- 2000 – 2005 Economics doctorate, Kaunas University of Technology, Faculty of Economics and Management, Dept. of Corporate Economics
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- 1997 – 1998 Public Relations Coordinator, Kaunas University of Technology, Municipal Training Centre

### *Participation in Conferences and Seminars*

2004-04-20 Delivered report, “Opportunities for Company Cost Minimisation by Applying the *business to business* e-commerce model,” at Economics and Management-2004 Conference

2003-11-16 Delivered report, “Challenges for Economic evaluation of E-commerce”, e-Challenges 2003 at Conference in Italy

2003-04-25 Delivered report, “Relevance of Economic Theory and Practical Reality,” at Economics and Management 2003, an international conference at the Economics and Management Faculty of the Kaunas University of Technology

2002-09-24 Delivered report, “Management of electronic information for PfP countries”, Conference at the Kaunas University of Technology Distance Teaching Centre, organised by NATO RTO and Lithuanian Ministry of Defence

2003-04-25 Delivered report, “Challenges of Lifelong Learning at European Universities: THENUCE and EULLearn Projects Analyses”, at European Union-2004: challenges, processes, and European studies, an international conference at Kaunas University of Technology

2002-10-16 Delivered report, “E-business and E-work“ at an international conference in Prague, Czech Republic

2002-04-18 Economics and management – 2002 International Conference at Kaunas University of Technology

2001-10-11 Seminar “E-business Challenges in the Context of Globalization” at Aarhus, Denmark

2001-12-7 Seminar “Current Trends for Business Expansion: E and M Commerce”, at ISM – International School of Management

### *Publication of Academic Research Results*

Six articles are published in Lithuanian publications, which are included in the list, approved by the Science and Studies Department. Ten articles are published in academic conference collections of reports. Four publications appear in a reviewed, periodically issued academic journal. Ten reports were read at international academic conferences.

## REZIUMÉ

**Temos aktualumas.** Verslo problemų sprendimą tiesiogiai ar netiesiogiai galima susieti su verslo efektyvumo didinimo siekiu: glaudžių sąsajų su efektyvumo didinimo poreikiu galima rasti gamybos modernizavimo, konkurencinių pranašumų formavimo, personalo valdymo, logistikos, išteklių ir finansų valdymo srityse. Verslo efektyvumo didinimo problema išryškėja modernių technologijų plėtros ir intensyvios konkurencijos sąlygomis, lemiančiomis mažėjančius verslo efektyvumo didinimo šaltinius ir rizikingesnę jų adaptavimo sėkmę.

Elektroninė komercija savo prigimtimi ir savybėmis yra vertinama kaip naujas verslo efektyvumo didinimo šaltinis, tačiau dėl šios krypties taikomųjų ir empirinių tyrimų stokos panaudojamos ne visos elektroninės komercijos galimybės didinti verslo efektyvumą.

Didėjant elektroninės komercijos reikšmei, reikalingi teorinio ir praktinio lygmens tyrimai, susiję su elektroninės komercijos teikiama nauda verslui. Todėl tik išsamūs ir rezultatyvūs tyrimai gali būti pakankamas pagrindas elektroninę komerciją traktuoti kaip potencialią verslo efektyvumo didinimo bazę.

**Mokslinė problema:** kaip galima vertinti elektroninės komercijos adaptacijos versle poveikį verslo efektyvumui minimizuojant kaštus.

**Tyrimo objektas:** elektroninė komercija verslo efektyvumo didinimo plotmėje.

**Tyrimo tikslas** – remiantis elektroninės komercijos įtakos verslo efektyvumui vertinimu, suformuoti elektroninės komercijos modelį, skirtą verslo efektyvumui didinti minimizuojant kaštus.

**Tyrimo uždaviniai:**

- 1) Atlikti elektroninės komercijos ir verslo efektyvumo sampratų analizę ir įvertinti jų tarpusavio sąryšį, akcentuojant kaštų minimizavimo vaidmenį.
- 2) Išnagrinėti mokslines diskusijas dėl elektroninės komercijos sampratos

ir suformuoti asmeninį požiūrį į šį fenomeną bei patikslinti elektroninės komercijos apibrėžimą.

- 3) Identifikuoti kaštų komponentus, sąlygojamus elektroninės komercijos procesų ir turinčius įtakos verslo efektyvumo didinimui.
- 4) Sudaryti *verslas-verslui* elektroninės komercijos modelį, orientuotą į verslo efektyvumo didinimą minimizuojant kaštus.
- 5) Įvertinti elektroninės komercijos paplitimą ir perspektyvas versle tarptautiniu mastu.
- 6) Pagrįsti *verslas-verslui* elektroninės komercijos modelio pritaikomumą versle, remiantis empirinių kokybinių tyrimų rezultatais.
- 7) Įvertinti disertaciniame darbe suformuoto *verslas-verslui* elektroninės komercijos modelio taikymo galimybes įmonėse, remiantis atlikto eksperimento rezultatais.

#### ***Tyrimo mokslinis naujumas ir reikšmė:***

- Patikslinta elektroninės komercijos sąvoka, elektroninę komerciją traktuojant kaip elektroninių tinklų naudojimą prekių pirkimo ir pardavimo procesui supaprastinti ir paspartinti, siekiant kaštų ekonomijos, didinančios verslo efektyvumą.
- Suklasifikuoti pagrindiniai elektroninės komercijos sistemų modeliai pagal ekonomikos subjektų (vartotojų, įmonių ir vyriausybės) tarpusavio santykius. Tai sudaro sąlygas konkretizuoti elektroninės komercijos naudojimo versle sritis ir formas.
- Identifikuoti kaštų komponentai, sąlygojami elektroninės komercijos procesų ir turintys įtakos verslo efektyvumo didinimui: žaliavų įsigijimo kaštai, žaliavų sandėliavimo kaštai ir užsakymo pateikimo kaštai.
- Suformuotas *verslas-verslui* elektroninės komercijos modelis, konkretizuojantis verslo efektyvumo didinimo, minimizuojant kaštus, sritis, išskiriant tris modelio diegimo versle sėkmę lemiančius veiksnius (įmonės dydį, pramonės sektorių ir tarptautiškumą), konkretizuoja įmonių galimybes sėkmingai diegti elektroninės komercijos sprendimus versle.
- Empiriškai patikrintas *verslas-verslui* elektroninės komercijos modelio

teigiamas poveikis verslo efektyvumui patvirtina įmonių galimybes didinti verslo efektyvumą kaštų minimizavimo pagrindu, naudojant elektroninės komercijos sprendimus.

- Disertaciniame darbe suformuotas *verslas-verslui* elektroninės komercijos modelis pritaikytas įmonėje, veikiančioje informacinių technologijų sektoriuje.

*Pirmojoje darbo dalyje* pateikiama elektroninės komercijos ir verslo efektyvumo koncepcijų studija, akcentuojant jų tarpusavio sąryšį verslo vertės didinimo sprendimų kontekste. Atlikta elektroninės komercijos tyrėjų mokslinių darbų analizė parodė, jog elektroninė komercija yra vienareikšmiškai traktuotina kaip sudėtinė elektroninio verslo dalis, apimanti transakcijų su suinteresuotomis įmonės veikla grupėmis palaikymu ir sąlygojanti galimybę padidinti verslo efektyvumą, mažinant kaštus. Verslo efektyvumas šiuo atveju traktuotinas kaip sukurtos vertės vartotojui ir sunaudotų išteklių santykis. Įvertinus esminius elektroninės komercijos formavimosi aspektus pateikiamas patikslintas elektroninės komercijos apibrėžimas: elektroninė komercija – tai elektroninių tinklų naudojimas prekių pirkimo-pardavimo procesui – nuo produkto pateikimo iki pardavimo ir pristatymo – supaprastinti ir pagreitinti, siekiant tam tikrų kaštų ekonomijos, sąlygojančios didesnę verslo efektyvumą.

*Antrojoje darbo dalyje* pateikiamas naujas *verslas-verslui* elektroninės komercijos modelis, kurio paskirtis – elektroninės komercijos sprendimų versle naudos maksimizavimas. Esminė *verslas-verslui* elektroninės komercijos modelio charakteristika – informacijos asimetrijos išardymas ir gamintojams reikalingos informacijos kiekio padidinimas iki idealaus naudingumo lygio galimybę. Remiantis *verslas-verslui* elektroninės komercijos aplinkos analizės rezultatais, išskirti trys aplinkos veiksniai, turintys daugiausiai įtakos elektroninės komercijos sėkmei, diegiant ją versle: 1) pramonės sektorius, 2) įmonės dydis ir 3) tarptautinis aspektas. Suformuotas *verslas-verslui* elektroninės komercijos modelis orientuotas į verslo efektyvumo didinimą kaštų minimizavimo pagrindu. Modelyje išskiriamos trys įmonės kaštų pozicijos, kuriose galima pasiekti kaštų ekonomiją, įdiegus elektroninės komercijos sprendimus: 1) žaliavų kaštai, 2) žaliavų sandėliavimo kaštai ir 3) užsakymo pateikimo kaštai. Suformuoto *verslas-verslui* elektroninės



komercijos modelio savitumas pasireiškia dviem aspektais: 1) per elektroninės komercijos poveikio stiprumo sąsajas su pagrindiniais įmonę charakterizuojančiais elementais (įmonės dydžiu, pramonės sektoriumi ir tarptautiškumu); 2) per detalizuotus įmonės kaštų komponentus, priklausomus nuo elektroninės komercijos procesų.

*Trečiojoje darbo dalyje atliekama verslas-verslui elektroninės komercijos modelio taikymo įmonės veikloje galimybių analizė, naudojant empirinius tyrimus. Tyrimo tikslas – įvertinti efektyvumo didinimo galimybes versle diegiant verslas-verslui elektroninės komercijos modelį. Apibendrinus atliktų tyrimų rezultatus konstatuota, jog didžiausią teigiamą įtaką verslas-verslui elektroninės komercijos modelio adaptavimas versle turi kaštams, susijusiems su išteklių ir tiekimo sistemos valdymu, kas tiesiogiai lemia didėjančių verslo efektyvumą. Tačiau praktinis modelio adaptavimas ir išplėstinis interviu parodė, jog verslas-verslui elektroninės komercijos modelio diegimo versle sėkmei įtakos turi modelyje akcentuojami veiksniai: pramonės sektoriaus charakteristikos, įmonės dydis ir tarptautinis aspektas. Tyrimo rezultatai lėmė išvadą, jog disertaciniame darbe suformuotas naujas verslas-verslui elektroninės komercijos modelis gali būti traktuojamas kaip tinkama priemonė verslo efektyvumui didinti, galinti suteikti įmonei svarų konkurencinį pranašumą rinkoje, tačiau prieš įdiegiant šį modelį įmonėje, būtina įvertinti elektroninės komercijos taikymo versle sąlygas, galinčias turėti įtakos vertinant elektroninės komercijos reikšmę įmonės veikloje.*

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### *Dalyvavimas konferencijose ir seminaruose*

2004-04-20 Konferencija „Ekonomika ir vadyba-2004“, Pranešimo tema: „Firmos kaštų minimizavimo galimybės pritaikant elektroninės komercijos modelį verslas-verslui“

2003-11-16 Konferencija „e-Challenges 2003“, Italijoje. Pranešimo tema: „Challenges for Economic evaluation of E-commerce“

2003-04-25 „Ekonomika ir vadyba 2003. Ekonomikos teorijos aktualijos ir praktikos realijos“ - tarptautinė konferencija KTU Ekonomikos ir vadybos fakultete. Skaitytas pranešimas tema: „Verslo transformacija naujojoje ekonomikoje“

2002-09-24 „Elektroninės informacijos vadyba PFP tautoms“ NATO RTO ir Lietuvos krašto apsaugos ministerijos organizuota konferencija, vykusį KTU Distancinio mokymo centre

2003-04-25 „Europos Sąjunga-2004: iššūkiai, procesai ir Europos studijos“ - tarptautinė konferencija KTU. Skaitytas pranešimas tema: „Mokymosi visą gyvenimą iššūkiai Europos universitetuose: THENUCE ir EULLearnN projektų analizė“

2002-10-16 „E-business and E-work“ - tarptautinė konferencija Prahoje, Čekijos Respublikoje

2002-04-18 Tarptautinė konferencija: „Ekonomika ir vadyba – 2002“, Kauno technologijos universitete

2001-10-11 Seminaras „E-business Challenges in Context of Globalization“ Danijoje, Aarhus mieste,

2001-12-7 Tarptautinės aukštosios vadybos mokyklos (ISM) seminaras: „Šiuolaikinės verslo plėtros tendencijos: E ir M komercija“

### *Mokslinių tyrimų rezultatų publikavimas*

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