Time Based Cost Accounting as a Tool for Increasing Regional Competitiveness

Alfreda Sapkauskiene¹, Ruta Adlyte²
¹Kaunas University of Technology, Laisves av. 55 LT-44309 Kaunas, Lithuania
E-mail: alfreda.sapkauskiene@ktu.lt.
²Kaunas University of Technology, Laisves av. 55 LT-44309 Kaunas, Lithuania
E-mail: ruta.adlyte@gmail.com.

Abstract
Regional companies seeking to gain competitive advantage and increase the region’s competitiveness against others must manage time as one of the most important strategic management factors. The main scientific problem is that the information used of cost accounting for management decision making in companies in many cases underestimated the specific data provided by time based management. This article theoretically and practically argues that it is possible to solve the problem of the absence of interaction between time-based management and cost accounting by introducing the system of time-based cost accounting. Time-based cost accounting will allow regional companies to management non-value added time-based costs of activities for increasing regional competitiveness.

Keywords: time based management, cost accounting system, competition and regions.

Introduction
Nowadays is not enough for companies to compete in price, quality or innovation in order to increase regional competitiveness. The scientific literature recognizes that time is one of the most important factors of strategic management. However, it is necessary to admit that the time factor is still rarely used for management-related decision making. Whereas, rapid globalization and fierce competition continue to increasingly emphasize the significance of time management. In order to survive time-based competition, regional companies have to be able respond rapidly to changing consumer needs. Therefore, on a frequent basis the contemporary scientific literature regards time as the strategic management factor that proves to be useful in any management area. In addition, a number of scholars concede that there is no tendency to relate time-based management to cost accounting and to treat cost accounting as something useful. Moreover, in some cases it is considered to be a direct obstacle that impedes management control, fast and timely management decision-making.

Therefore, the most significant obstruction for time-based management is invalidity of information provided by cost accounting systems used in companies, without interfacing costs and time dimensions in the chain of value creation process.

Research subject is time based cost accounting.

Research aim is to integrate time based management and cost accounting for management decision-making to provide new tool for increasing regional company competitiveness.

The research methods applied in this article are the systematic and comparative analysis of scientific literature and the generation of logical conclusions. The experimental research has been performed on the basis of the case analysis.

Research results have shown that the integration of time based management and cost accounting by introducing time based cost accounting system can solve many management problems by identifying and eliminating time and cost of non-value added activities and making fast and timely management decisions for increasing regional company competitiveness.

Literature review
Over the last two decades scientific literature of such areas as social sciences, management and administration has directed a great deal of its attention to time as the strategic management factor. In their advantage, however, the analysis of literature sources shows that there is an obvious misbalance between conceptual scientific papers and empirical research, which support this statement. For example, Kumar and Motwani (1995) examined 32 studies and established that only 8 of them included empirical support. The major part of scientific papers (e.g., Stalk, 1988; Hum, Sim, 1996; Gregory, Rowling, 1997; Daugherty, Pittman, 1999; Mouritsen and Bekke, 1999; Sim and Curatola, 1999) dating back to the nineties of the 20th appears to be of theoretical character.

Meanwhile, the 21st century, by contrast, saw a great deal of empirical research (e.g., Ward, Duray, 2000; Christopher, Towill, 2001; Whipp, Adam, Sabelis, 2002; Nahm, Vonderembse, Koufteros, 2003, 2004; Ceglarek, Huang, Zhou, 2004; Askenazy, The...
A number of scholars also engaged in research of separate time-based management concepts, such as computerized production, the Taguchi method, The Material Requirements Planning System (MRPI, MRPII), economic production, Just in time (JIT), the philosophy of total quality management, the Theory of constraints (TOC) and others, which recognize the significance of time as a restricted resource and its management (e.g., Barker, 2001; Stratton, Mann, 2003; Christensen, Germain, Birou, 2005; Green, Inman, 2005; Li, Rao, Raguch-Nathan, 2005; Nair, 2006; Narasimhan, Swink, Kim, 2006; Ward, Zhou, 2006; Holweg, 2007; Matsui, 2007; Schonberger, 2007; Shah, Ward, 2007; Mia, Winata, 2008).

Over the last two decades the scientific literature has also widely covered management accounting and has been focused on prevailing disadvantages of both traditional cost accounting system (TCA) and modern cost accounting systems (Throughput Accounting, TA; Activity based costing, ABC) (e.g., Mishra, Vaysman 2001; Corbett, 2005; Cohen, Venieris, Kaimenak, 2005; Ning, 2005; Horgren, Datar, Foster, 2006; Krishahnam, 2006; Pierce, 2006; Euske, Alan, 2007; Sartorius, Eitzen, Kamala, 2007; Abu-Salama, 2008; Grondskis, Sapkauskienë, 2011).

Thus, the connection existing between these two areas gives rise to the problem of time-based cost management, which tends to be widely covered in scientific papers written by management scholars all over the world (e.g., Johson, Kaplan, 1987; Fry, Steele, Saladin, 1998; Burrows, Brown, Thom, King, Frearson, 2001; Baines, Langfield-Smith, 2003; Lea, Min, 2003; Zimmerman, 2003; Kaplan, Anderson, 2004; Barber, Dewhurst, Pritchard, 2006; Hutchinson, 2007; Whicker, Bernon, Templar, Mena, 2009; Sapkauskienë, Leitoniënë, 2009).

However, there is only a small number of research projects aimed at proposing the cost accounting system that would join together cost and time dimensions in the chain of activities (e.g., Fry et al., 1998; Lea, Min, 2003; Barber et al., 2006; Hutchinson, 2007; Sapkauskienë, Leitoniënë, 2007, 2010; Whicker et al., 2009). In addition, the existing research cannot satisfy the prevailing need for brand new management accounting systems enabling to assess benefits provided by time-based management systems, since the focus is on finding answers to the question which one of the existing but already criticized accounting systems proves to be more appropriate in the environment of time-based competition, except for some scholars who provided problem solving methods (e.g., Kaplan, Anderson, 2004, 2007; Cleland, 2004; Kokubu, Nakajima, 2004; Barrett, 2005; Major, Hopper, 2005; Cardinaels, Labro, 2008; Jasch, 2008; Katsuhiko, Marcelo, Yoshikuni, Hiroshi, 2009; Nakajima, 2009), by integrating the time factor into cost accounting one way or another.

Academic research and theoretical models prove that there is a connection between company activities and costs that are evaluated on the basis of time; however, this mechanism of interconnections requires thorough explanation and formalization. In the theoretical and practical realms of the management of company activity costs and finances there is a frequent tendency to concede that the value adding time of company activities shows only a small portion of time concerning the product consumption in production or service supply. These appear to be the weak points of investment management and capacity increase, which are also deemed to be the major shortcomings in the financial evaluation of activities. It becomes possible to eliminate most of these disadvantages by integration of time based management and management accounting, which would encompass the entire activity creation process, and singling out value adding and non-value adding time-based costs of activities.
**Environment of Time-Based Competition**

**Time-Based Management**

- VAA
- NVAV
- Incoming
- Outcoming
- Process
- Time

**Time-Based Cost Accounting**

- NVAC
- Accumulated Costs
- Time Allocation Base – Costs of Time Unit

**Management Accounting**

- Traditional cost accounting
  - Costs
  - Time

**ABC**

- Value Chain
- Many cost-allocation bases

**Material Flow Accounting**

- Process
- Costs
- Time Allocation Base – Costs of Time Unit

**Time-Driven ABC**

- Value Chain
- Activities
- Many cost-allocation bases
- Environment – Negative Costs

**Integration of Time-Based Management and Cost Accounting System**

- Assumptions for the integration of time-based management and cost accounting

**Fig. 1.** A Structural Scheme of Integration of Time Based Management and Cost Accounting System

Source: developed by the author Sapkauskiene, A.
Literature review allows singling out assumptions for the integration of time based management and cost accounting system (see fig. 1):

- The management of time as the strategic factor will allow region companies to achieve competitive advantage;
- In order to gain time-based competitive advantage, companies have to reduce the amount of time at all the stages of the value creation process, including research and development, projection, production, marketing and distribution in consideration of consumer needs and expectations;
- Region companies will succeed in gaining competitive advantage after the introduction of time-based management systems (computerized production, the Taguchi method, MRPI, MRPII, economic production, JIT, the philosophy of total quality management, TOC and others);
- Both traditional and modern cost accounting systems provide decision makers with misleading information, which points to the necessity of time-based cost accounting system in time-based management;
- In seeking to deal with the absence of the connection between time-based management and management accounting systems, most of the research concentrated on establishing which one of the existing, though denied, cost accounting systems (TA, ABC) proves to be the most efficient in time-based management;
- In the early 21st century the USA proposed the time-driven activity-based cost accounting system (Time-driven ABC) in order to remove most of disadvantages by using ‘duration’ in cost allocation and evaluating costs of the time unit. However, this system excludes the flow of costs in the chain of value creation. Japan began to use environmental material flow cost accounting system at the same time, which, by contrast, deals with disadvantages of the time-driven ABC system by taking into account the activity-based cost flow. Its main shortcoming appears to be the ABC system used for cost allocation, which is met with widespread criticism in studies of both theoreticians and practitioners.

By integrating time-driven ABC and material flow cost accounting systems, it becomes possible to create a new time-based cost accounting system (see fig. 1 and fig. 2) that would relate cost and time dimensions and solve the problem of the absence of the connection between management accounting and time-based management.

Fig. 2. Assumptions for the emergence in time-based cost accounting

Source: developed by the author Sapkauskiene, A.

Results and interpretation

Supporting a structural scheme of integration of time based management and cost accounting system experimental research has been performed on the basis of case study involving sixteen service type objects processes. The main data required for the study were collected from the service company financial statements, information reports and internal company management accounting reports. The rest of the data were collected from direct observation and interviewing.

The study showed, that first of all, the application of the time-based cost accounting system let identify total value-added and non-value added time-based cost of separate objects (see fig. 3).
Fig. 3. Value added and non-value added time based costs structure of the objects

Figures 4 and 5 show the ability to identify and analyze non-value added costs by the costs groups and/or by the activities of the separate objects. According to material flow cost accounting system costs are grouped into direct (materials) cost, operational and energy cost. For example, Figure 4 shows that 35 percent and the major part of object 2 costs are non-value added time-based operational cost. The possibility to identify, eliminate or reduce non-value adding time-based energetic costs will allow companies to contribute to environmental protection problems.

Fig. 4. Costs structure of the objects (object 1 – object 4)
Company’s managers must eliminate or reduce non-value added costs eliminating or reducing non-value adding activities time. Furthermore, a company seeking to increase competitiveness must reduce value-added time-based costs better managing and coordinating value added activities time, too. Calculating company’s activity time-based costs the dimensions of time and costs are joined, by reflecting the costs in the value creation process.

Only having the accumulated objects costs in the value creation chain (see Fig. 6) and joining them with the timetable of value creation process makes it possible to compare time, costs and non-value added time and costs. On the basis of integration of time based management and cost accounting the regio-
nial company has the possibility of planning the time for execution of orders and control the time and costs of execution of order so obtaining a competitive advantage.

**Conclusions**

A systemic and logical analysis of scientific literature showed that:

- the time dimension gains even greater importance, as speed, which is required by business and consumer expectations, continues to increase on a constant basis rather than to decrease. Therefore regional companies seeking to gain competitive advantage and increase the region’s competitiveness against others must manage time as the most important strategic management factor;

- the integration of time-driven activity-based cost accounting system and material flow cost accounting system contributes to the problem-solving of the interaction between time-based management and cost accounting, where both activities and value creation are considered from a time perspective and at the same time, the possibility is offered to solve environmental protection issues that become more and more topical to the regions and all society.

- Companies eliminating or reducing non-value added activities time and cost will achieve competitive advantage. Created time-based cost accounting system can be one more tool for increasing regional competitiveness.

**References**


Šiandieninėje, greitai kintančioje verslo aplinkoje re 
regioninės įmonės siekdamos įgyti konkurencinį prana 
šumą, turi gebėti greitai reaguoti į besikeičiančius 
vartotojų poreikius ir lūkesčius.

Tyrimo tikslas – laikui grįstą valdymo bei kaštų ap 
skaitos integravimas valdymo sprendimų, didinančių regio 
ninių įmonių konkurencingumą, priėmimui.

Tyrimo metodai: sisteminių ir lyginamoji mokslo li 
teratūros analizė bei loginis išvadų generavimas. Eksperi 
mentiniam tyrimui atlikti buvo taikoma atvejo analizė. 

Tyrimo rezultatai parodė, kad integravimas laiku 
grįstos valdymo ir valdymo apskaitos sistemų įspėdžia daugeliu regioninių įmonių valdymo problemų priimant greitus valdymo sprendimus, kartu didina jų konkurencingumą. 

Atlikta ir mokslo tolimos problemas teorinis pagrin 
dimas laiku grįstos konkurencijos kontekste leidžia išskirti 
įmonių greitus valdymo ir valdymo apskaitos ryšį 
būtiniu prieplaukais:

- laiku kaip strateginio veiksno valdymo kūrimui padėti pasiekti konkurencinių pranašumą;
- Įmonės, siekdamos įgyti laikui grįstą konkurencinį pranašumą, siekti su sutrumpinti laikui visuose vertės kūrimo proceso etapo, įskaitant tyrimą ir vystymą, projektavimą, gamybą, marketingą, paskirstymą, projektavimą, atsižvelgiant į pirktų poreikius ir lūkesčius;
- regioninės įmonės įgali konkurencinį pranašumą, įdiegusius laiku įgytas valdymo sistemai (kom 
puterizuotą gamybą, Taguchi metodą, MRPI,

Šapkauskienė A., Adlytė R.

Laiko kaštų apskaita regiono konkurencingumo didinimui

Santrauka

Šiandieninėje, greitai kintančioje verslo aplinkoje re 
regioninės įmonės neužtenka konkuruoja mažinant kaš 
tus, gerinant paslaugų / produktų kokybę ar diegiant ino 
vacijas. Mokslinė literatūrė labai dažnai pateikia kaip 
agaus į besikeičiančius vartotojų poreikius. Todėl laikas 
laiku grįsto konkurencijos kovoje, turi gebėti greitai re 
agūti į besikeičiančius vartotojų poreikius. Todėl laikas 
laiku grįsto valdymo sistemos

Tyrimo objekta – laikui grįstų kaštų apskaitos siste 


128
MRPII, taupią gamybą, JIT, visuotinos kokybės vadybos filosofiją, TOC ir kt.);

• tiek tradicinės, tiek modernios valdymo apskaitos sistemos teikia klaidinančią informaciją sprendimų priėmėjams, o tai išryškina laikų grįstos kaštų apskaitos sistemų poreikį laikų grįstame valdyme;

• daugelyje atlktų tyrimų, siekiant išspręsti laiku grįsto valdymo bei valdymo apskaitos sistemų ryšio nebuvimą, nustatyta, kuri iš egzistuojančių, nors ir paneigtų, valdymo apskaitos sistemų labiausia tinkama laiku grįstame valdyme;

• daugelyje atliktų tyrimų, siekiant išspręsti laiku grįsto valdymo bei valdymo apskaitos sistemų ryšio nebuvimą, nustatyta, kuri iš egzistuojančių, nors ir paneigtų, valdymo apskaitos sistemų labiausia tinkama laiku grįstame valdyme;

• XXI a. pradžioje JAV pasiūlyta laiko veiklų kaštų apskaitos sistema stengiamasi pašalinti daugelį trūkumų, paskirstant kaštus naudojant „trukmės“ paskirstymo bazes bei įvertinant laiko vieneto kaštus, tačiau ši sistema nevertina kaštų veiksenos vertės kūrimo procese. Priešingu atveju, XXI a. pradžioje pradėta naudoti aplinkosauginę medžiagų srauto apskaitos sistema kaip tik sprendžia laiko ABC sistemos trūkumus, vertindama veiklų kaštų srautą. Tačiau pagrindinis jos trūkumas – ji kaštams paskirstyti naudojant ABC sistemą, kuri plačiai kritikuojama tiek mokslininkų, tiek praktikų darbuose;

• integruojant šias dvi naudas, mažai išplėtotas kaštų apskaitos sistemas, kurios vertina laiko veiks

į (laiko veiklų kaštų apskaita, siūlanti kaštus skirstyti pasirenkant trukmės paskirstymo bazes bei aplinkosauginė medžiagų srauto apskaita), galima sudaryti naują laikų grįstą kaštų apskaitos sistemą, siejantį kaštų ir laiko dimensijas bei sprendžiant klaidinančią valdymo apskaitos ir laikų grįsto valdymo ryšio nebuvo problemą.

Eksperimentinio tyrimo metu buvo nustatyta, kad:

• sudaryta laiko kaštų apskaitos sistema leidžia identifikuoti ir analizuoti vertę suteikiančius bei vertės nesuteikiančius objektų / paslaugų laiko kaštus, siekiant eliminuoti ar sutrumpinti vertės nesuteikiančius veiklų laiką ir eliminuoti ar sumažinti vertės nesuteikiančius laiko kaštus;

• sklaidant įmonės veiklų laiko kaštus, siejamos laiko ir kaštų dimensijos atspindint kaštus vertės kūrimo procese;

• tik turint akumuluotus paslaugų kaštus, vertės kūrimo proceso grandinėje ir jungiant juos su vertės kūrimo proceso laiko grafiku, atsiranda galimybė palyginti laiką, kaštus bei vertės nesuteikiančią laiką ir kaštus;

• integravus laikų grįstą valdymą ir valdymo apskaitą, regioninė įmonė galimybė planuoti bei realiai laikose kontroliuoti užsakymų vykdymo laiką ir kaštus įgydant konkurencinį pranašumą.

Pagrindiniai žodžiai: laikų grįstas valdymas, kaštų apskaitos sistema, konkurencija ir regionai.