

SYNERGISTIC EFFECTS OF INTERNAL AUDIT AND LEAN-SIX SIGMA CONCEPT ON BUSINESS PROCESS IMPROVEMENT

UDC 657.6+005.6

Milica Đorđević, Bojana Novičević Čečević

University of Niš, Faculty of Economics, Niš, Serbia

Abstract. *Faced with a series of challenges within the environment in which they operate, companies are more than ever aware of the fact that efforts aimed at improving business processes are some of the basic conditions, not only of growth and development, but also of the survival of the company. Only in this way can the opportunities for achieving different dimensions of competitiveness be created (in terms of costs, quality, delivery reliability, speed of monitoring the changes in demand, introduction of new products, etc.). Business process improvement can be implemented with the support of a number of concepts, among them being lean-six sigma. However, the great potential in this regard also lies in internal audit. In this regard, this paper will first discuss the essence and assumptions underlying the internal audit and lean-six sigma concept, and then review the possibilities of their integration in order to achieve better results.*

Key Words: *internal audit, lean-six sigma, process improvement.*

INTRODUCTION

Contemporary environment in which the companies conduct their business activity is characterized by constant and very rapid changes in all segments. In addition to its dynamic character, the environment is becoming increasingly complex, with increased number of components, their internal complexity, and the interaction among them. Under such circumstances, successful business can be realized only by those companies which continually adapt to these changes, not only through the creation of new business systems, but also through the continuous improvement of their existing business processes. Therefore, the guarantee of success presupposes the achievement of higher levels of effectiveness and efficiency of business processes, i.e. the achievement of desired results through the right way of the performance of business processes.

Received August 28, 2014 / Accepted December 17, 2014

Corresponding author: Milica Đorđević

Faculty of Economics, University of Nis, Trg kralja Aleksandra 11, 18000 Niš, Serbia

Tel: +381 18 528 663 • E-mail: milica.djordjevic@eknfak.ni.ac.rs

Approaches to business process improvement, which have been developed in practice, are numerous and their starting points are different. Among other things, internal audit and lean-six sigma concept, which stand for the subject of this paper, have completely different assumptions and methodology for business process improvement. However, despite the significant effects of business process improvement experienced by a number of companies that have implemented some of these approaches, practice has given birth to the idea of their integration. Therefore, in addition to the focus on business process improvement in the company, this could produce significant positive effects on the implementation of the very approaches.

1. INTERNAL AUDIT AND LEAN SIX SIGMA – CONTEMPORARY APPROACHES TO BUSINESS PROCESS IMPROVEMENT

The necessity of continuous business process improvement conditioned the practical development of different methodologies, techniques, tools, and programs. Some of the most famous are JIT and TQM system [more on that in 3]. Moreover, internal audit and lean-six sigma emerged as very useful approaches. Although these approaches have a different starting point, the methodology, the focus and the effects, the fact is that their contribution to the business process improvement is extremely high. The remainder of this paper will briefly reflect on the essence of these approaches.

1.1. Internal audit

The development of internal audit is associated with the development of accounting, when its primary purpose was to reduce errors in bookkeeping, prevent fraud, and misappropriation of assets. However, with the development of companies and the separation of the management from the ownership, its scope of activity, powers, and responsibilities have continuously evolved [5, 126-127]. So, today, internal audit provides the major contribution to the achievement of companies' goals and implementation of strategies for the achievement of these goals [9, 138]. Besides providing assurance that the information contained in the books accurately reflects the facts, internal audit evaluates the policies, procedures, use of authority, management quality, effectiveness of methods, special problems, and other phases of operations [6, 4]. Therefore, in addition to the financial audit (which aims to verify the reliability of accounting and financial statements), internal audit covers the so-called operational audit, which involves evaluation of business processes in general. Operational audit has the 3E characteristics, as it involves "a systematic process of evaluating an organization's effectiveness, efficiency and economy of operations under management's control, and reporting to appropriate persons the results of the evaluation along with recommendations for improvements" [17]. In accordance with this definition, operational audit involves the use of logical, systematized, and organized set of procedures, aimed at determining whether the policies and procedures that the companies apply can produce optimal levels of efficiency, effectiveness, and economy of business processes. In this regard, its scope involves:

- the assessment of whether the business practice (procedure) is suitable, not just the consideration of the extent to which the procedures are carried out, and
- the monitoring and evaluation of the procedures that are not related to accounting, financial, and administrative affairs, as well as the procedures used to conduct operations in the field of production and services [2, 291].

Therefore, the operational audit focuses on the future, because its purpose is the improvement of business processes that are carried out every day in the company. It assists all members of the company's management in carrying out their responsibilities, as well as employees at all levels to keep their work and the work of the whole company within the pre-defined limits. Internal auditors perform the assessment in relation to who, how, when, where, and how efficient and effective execution of business processes is achieved. This is primarily achieved through various analyses and assessment of the existing organizational structure, internal control system, the flow of the work process, the management performance, and the like.

The result of the operational audit is the report whose content may vary from the identification of potential "weak" points where there is a need for improvement, making recommendations regarding that improvement, the general recommendations regarding the use of the company's resources, recommendations regarding the training of the staff, reconstruction of the organization, the ways for the achievement of greater efficiency of the internal control systems, improvement of communication, information system, etc., all with the aim of achieving long-term benefits.

1.2. Lean-six sigma business concept

Lean six sigma business concept is a combination of lean and six-sigma concepts, as the two most important processes of improvement of the companies' performance, which have been developed in practice. Combining these procedures results in significant business process improvement, as it involves pooling their advantages with the aim of identification and solving problems in the execution of business processes. In this way, lean-six sigma provides an opportunity for better and faster work. The perception of the impact of lean-six sigma concept in business process improvement involves, above all, understanding of the essence of lean and six-sigma concepts separately.

Lean concept presupposes a philosophy of management that is focused on the elimination of all forms of business process defects. Considering that it was developed at the company Toyota during the nineteen-fifties, with the aim of connecting all elements of the production process in a continuous stream, the most important and most obvious results of the lean concept appear in the process of production (reducing time losses, reducing the binding of assets in various forms of inventories, savings in space, human resources, machines, etc.). For these reasons, lean terminology was at first related to the production only. Indeed, by constant striving for perfection, the establishment of the value stream, search for non-value-added activities and attempts at their elimination, lean manufacturing represents the revolution in the production process of the company [4, 244].

However, in order for the lean to have a full effect, the whole enterprise must adapt to the philosophy of continuous production process improvement and elimination of unnecessary costs. For these reasons, it is necessary that all employees in the company

understand the core of the concept, and to direct their efforts to its adequate implementation. In such situations, the focus is on the lean company that is market-oriented, integrated and flexible, with high level of internal and external coordination of business activities, and the frequency of rapid flow of material resources and information, as well as a comprehensive approach to performance management [12, 145-146].

Lean business involves an integrated approach to efficient value creation by connecting all processes in the company in a continuous flow, while eliminating non-value-added activities, reorganization of work through teams, and constant striving for improvement. In addition, such a comprehensive business system that strives for the acceleration of all processes involves the application of the key principles of lean concepts, namely:

- Recognition of waste, i.e. all processes that do not lead to value creation
- Standardization of processes – defining precise and detailed procedures, which reduces variation,
- Creating a “value stream”, thus eliminating non-value-added activities, reducing defects, interruptions, eliminating waste, etc.,
- Pull system – performing only the necessary processes and only at the moment when there is a need for them,
- Quality at the source – detection of errors in their very creation,
- Continuous improvement – striving for perfection by constant elimination of waste [16, 313].

Therefore, increasing efficiency, which is necessarily associated with the speed and quality of the process implementation, is the main driver of lean concept. Using different instruments and techniques in business processes leads to the achievement of the main goals of implementation of lean concept, which are reflected in the elimination of waste, continuous flow of production, high quality, optimizing the time of process implementation, optimizing human resources, assets, and productivity.

The Six Sigma concept is based on a detailed analysis of the processes that are focused on creating and delivering value to the end customer, in order to monitor and identify the errors and their causes, as well as on the application of appropriate techniques and tools for eliminating errors and improving quality. Six Sigma can be defined as „as a business process that allows companies to drastically improve their bottom line by designing and monitoring everyday business activities in ways that minimise waste and resources while increasing customer satisfaction by some of its proponents” [Magnusson et al., according to: 11, 693].

Six Sigma involves the use of data and statistical analysis tools for determining average process performance and output quality variations [14, 14]. The concept is based on the hypothesis that the data on the process performance can be represented by normal distribution. By determining deviations of actual process indicators from the normal distribution curve, the quality of the process is evaluated (unit of deviation, in statistical terms, is sigma). Certainly, the lower the value of sigma, the lower the waste and the narrower the distribution curve, i.e., if the process performance is within the established limits of deviation, it is considered that the level of quality of the processes is high.

Implementation of Six Sigma concept implies the five-phase methodology, known as DMAIC (**D**efine, **M**easure, **A**nalyze, **I**mprove, **C**ontrol). The essence of this methodology lies in the preliminary definition of the problem to be addressed, with the aim of bringing the business process performance to the predefined level or within the allowed level of deviation. The next phase involves the use of appropriate metrics, with the aim of quantifying or determining the limits (values) of deviations from the satisfactory level. This sets the basis for the third phase, i.e. the development of analytical tools for their deeper consideration and identification of the causes of deviations. Well-conducted first three stages allow for the proper implementation of the fourth stage, i.e. arrival at the solution focused on removing deviations by influencing key factors identified in the analysis. At the end of this methodology, the focus is on the establishment of control and monitoring of the results from previous phases, all with the aim of maintaining improvement and preventing the recurrence of observed errors.

By rigorous, focused, and effective implementation of proven high quality principles and techniques [15], six sigma contributes to the raising of the level of product quality and customer satisfaction, reducing the number of defects and shortening the production cycle, thereby simultaneously ensuring productivity growth and ultimately increasing profitability and profit.

Based on the foregoing, it can be said that Lean and Six Sigma are certainly concepts that provide the basis for the business process improvement in the company. However, bearing in mind that Six Sigma focuses more on the quality of the processes, rather than the speed of their performance, whereas lean concept is primarily focused on the speed of process realization, their integration into the new so-called lean-six sigma concept leads to significant benefits. Therefore, the lean six sigma concept involves the application of a phased approach DMAIC. In this process, when the optimal “value stream” is determined, lean idea focuses on the identification and determination of additional value, and then six sigma tools are used to help identify and reduce variation. In this way, lean - six sigma provides a disciplined approach to problem solving, which accelerates the implementation of already existing ideas, introduces the standard methods into practice, and brings measurable results.

After consideration of the essence of the internal audit, lean, and six-sigma concept, the presentation of the comparative review of their approach to business process improvement would be significant (Table 1).

The table above clearly shows that internal audit, lean, and six sigma concepts have different starting points in the business process improvement, that they apply different methodology, and achieve different effects. Also, each of these approaches to business process improvement has certain shortcomings, which calls for the need and the perception of opportunities for their integration, in order to achieve synergistic effects.

Table 1 Comparative review of internal audit, lean, and six sigma

Program	Operational audit	Lean	Six Sigma
Theory	Adding value	Remove waste	Reduce variation
Application guidelines	1. Plan 2. Perform 3. Analyze 4. Recommend 5. Follow-up	1. Identify value 2. Identify value stream 3. Flow 4. Pull 5. Perfection	1. Define 2. Measure 3. Analyze 4. Improve 5. Control
Focus	Cross functional business processes	Flow focused	Problem focused
Assumptions	Assessment of organization risk, capability and performance.	Waste removal will improve business performance. Many small improvements are better than systems analysis.	A problem exists. Figures and numbers are valued. System output improves if variation in all processes is reduced
Primary effects	Meeting organizational goals.	Reduced flow time	Uniform process output
Secondary effects	Identify poor work practices in order to improve them. Assist in the evaluation of quality control procedures adopted. Evaluate implementation processes. Improving the efficiency and effectiveness of operations and increasing customer satisfaction.	Less variation. Uniform output. Less inventory. New accounting system. Flow-performans measure for the managers. Improve quality.	Less waste. Fast throughput. Less inventory. Fluctuation – performance measures for managers. Improved quality.
Criticism	Operational auditors more expert in the field of audit than in the field of business.	Statistical or system analysis not valued.	System interaction not considered. Processes improved independently.

Source: [11, 696]

2. DIRECT IMPACT OF INTERNAL AUDIT ON THE FUNCTIONING OF LEAN-SIX SIGMA BUSINESS CONCEPT

Today, after acknowledging the experiences of a number of multinational companies, there is no doubt that Lean Six Sigma is a proven and complete concept that, in addition to being aimed at speeding up and improving the quality of business process implementation, at the same time implies the constant improvement of business activities. It is believed that Lean Six Sigma is the perfect concept, as its improvement is not expected from some external experts, but from adequately trained and competent persons who are part of the team that implements lean six sigma concept, monitors the defined processes and their implementation, and sees room for their improvement on the basis of adequate analyses. However, the fact is that it is a relatively complex concept, whose planning, introduction to business, and application can be very costly and even risky if not adequately managed and controlled. The reasons for this standpoint are the following:

- There may be constraints in project management – implementation of lean six sigma concept involves proper setting of goals, planning, and implementation of different activities. Sometimes there may be gaps, especially if the team whose responsibility is the implementation of the concept performs the work along with their regular duties.
- Poor budget controls – focus on the benefits of applying lean six sigma principles ignores the analysis and control of costs that can be very high.
- Limited supporting documentation – although it is always necessary to provide documentation which confirms the implementation and results of the application of the concept, the requirements in this respect are not as rigorous, which is why only minimal supporting documentation is often provided.
- Failures to coordinate six sigma efforts– the implementation of six sigma concept often involves hiring a team of experts from various fields, who carry out their responsibilities in this process in parallel with the everyday job for which they are responsible. Such a situation may be the cause of a number of errors in the coordination of activities, which is why it is appropriate to provide a multidisciplinary management program [10, 718].

Bearing all this in mind, the assessment of the application of lean six sigma concept becomes necessary, especially in the beginning, when the companies are aware that its satisfactory introduction and implementation will require a lot of time and effort.

In this regard, the significant contribution is provided by internal, i.e. operational audit, as its integral part, which controls and assesses the implementation of the entire lean six sigma concept. Its aim is to assess the efficiency, effectiveness, and frugality of implementation of lean six sigma concept, and point out any flaws or omissions that need to be overcome. More specifically, operational audit procedures determine deviations of what “is”, i.e. what has been achieved, from what “should be”, i.e. what has been pre-defined. In this sense, the essence of the assessment of the application of lean six sigma concept can be illustrated as follows (Figure 1).

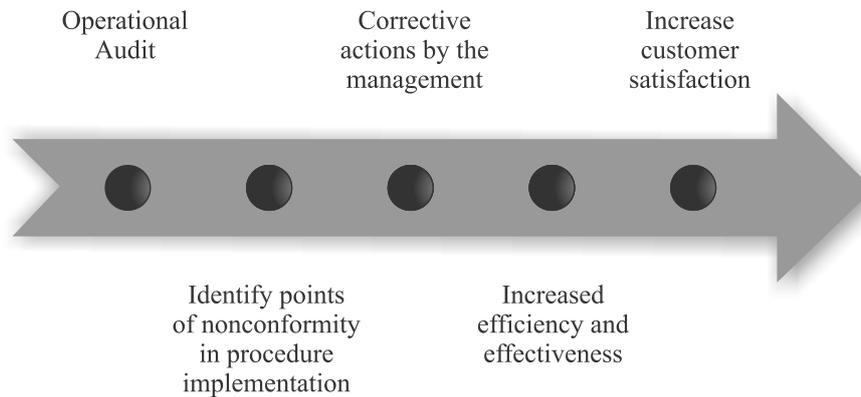


Fig. 1 Impact of operational audit on increasing customer s' satisfaction

Source: [13]

Therefore, operational audit identifies points of nonconformity of implementation with predefined procedures, reports to the management of the company thereof, which is expected to perform corrective actions with the aim of increasing effectiveness and efficiency, which undoubtedly should lead to increased customer satisfaction. Its significance in the present context lies in the fact that:

- It provides assistance in the evaluation of the mode of application and quality of implementation of lean-six sigma procedures adopted by the company,
- It provides assistance in identifying poorly managed procedures,
- It provides valuable suggestions which create room for improvement,
- It contributes to increased levels of customer satisfaction, and so on.

Certainly, operational audit has highly developed techniques and tools. However, in assessing the application of lean-six sigma concept, special attention must be paid to the adequacy of internal audit procedures that need to be carried out, bearing in mind that lean-six sigma concept is a very sensitive area. It involves:

- Adequate planning and distribution of audit activities (defining a clear goal of review and assessment, confirming the planned operational audit activities with the management and staff responsible for implementing lean six sigma concept, etc.);
- Assessment and understanding of the lean six sigma oriented company (consideration of recent achievements and ongoing projects, consideration of the number and responsibilities of staff involved in the implementation of this concept, review and assessment of the budget allocated to the implementation of lean six sigma concept, determination of the reasons for any deviations, evaluation of the effectiveness of the supporting lean six sigma systems, communication process, etc.);
- Review and assessment of the lean six sigma project management process (review of procedures relating to the concept development, planning, and management, determination of whether the appropriate goals of the concept are established and adequate monitoring, review of the documentation related to the concept implementation through the sampling system, determination of the adequacy of procedures for reporting on the progress and results of the application of the concept, etc.);

- Confirming the consistent application of DMAIC methodology in one of the completed projects;
- Assessment of the adequacy and completeness of the application of the concept (where possible, consideration of the focus of realization of the concept on: improving the use of resources, increase of revenue and profit, improving customer relations and service, new product introduction and process improvement, assessing the results and the level of achieved improvement of the specific project through the method of random sample, etc);
- Identification of whether the communication tools are adequate and whether they provide timely communication of the results of the concept application to interested parties [10, 720].

What is in this place particularly important to emphasize is the fact that the implementation of the above audit procedures should not jeopardize the continuity of implementing lean six-sigma concepts – in terms of its suspension during the audit. In addition, it is a basic condition for ensuring the independence of the audit that, in fact, is its essence.

Also, audit can achieve the full potential in the process of improving the implementation of lean six sigma concept if it fully knows its essence and characteristics. The focus here is on the fact that internal auditors need to be able to identify and focus on high-risk areas of application of the concept and be able to test the established system of performance measures (in the sense whether the performance measurement system is adequate, whether the measures are in line with the strategic objectives of the concept, whether the performance measures are accurately determined, how the reporting on actual performance is done, etc.). Also, internal auditors should compare the realized performance with the best practice or internally established standards, because in this way it is possible to isolate areas where the implementation of lean six sigma concept has flaws, or identify better ways to perform activities in the tradition of other companies [18, 8-10]. It certainly carries with it certain challenges that internal auditors should face: possession of knowledge, skills, and experience in various fields in which the lean six sigma concept is applied.

3. FEEDBACK EFFECT OF LEAN-SIX SIGMA BUSINESS CONCEPT ON INTERNAL AUDIT

By identifying and eliminating non-value-added activities, and then by focusing on quality improvement of the business processes, lean six sigma concept finds its application and contributes to improving not only the production process, but also those processes that are focused on providing services, those in the financial sector, and others. Hence the idea of using this concept, i.e. the incorporation of lean six sigma methodology in internal audit with a view to its improvement seems fully justified.

Certainly, it is a fact that each application of internal audit has its own peculiarities and differs from others, which is why certain principles of lean six sigma concept can not be strictly embedded and applied in all processes of internal audit [10, 719]. However, the basic principles of lean six sigma concept, which are reflected in the ongoing monitoring of activities and the elimination of errors and shortcomings, are certainly the most important and applicable in internal audit. These activities undoubtedly contribute to the overall quality of the internal audit.

The possibility of incorporating DMAIC methodology in internal audit is shown in Table 2.

Table 2 Five steps of successful internal audit

Lean six sigma phase	Corresponding internal audit phase
Define	Planning
Measure	Performance
Analyze	Analysis
Improve (redesign)	Recommendations
Control	Follow-up

Source: [1, 40]

As already mentioned, the first phase of lean six sigma concept involves defining the problem or problematic process and key factors of the process that needs to be addressed – measure, analyze, improve, and control them. The first phase of internal audit – its planning – should be approached in a similar way. Adequate planning of internal audit should contribute to a proper decision on the implementation of the priorities of the internal audit, and then to the determination of the goals to be achieved. In addition, the internal audit plan should be based on knowledge of the specifics of the company's operations, and it has to support its development strategy. For these reasons, for the proper implementation of the first phase of lean six sigma concept, as well as for internal audit planning, it is advisable to develop a map of the process. Process mapping provides better detection, understanding, and evaluation of potential defects and problems.

Important goals to be achieved at this stage are: [1, 40]

- *Creating project documentation* – the focus is on the formal documentation which defines the purpose of the internal audit activities and its scope, which involves the identification of key activities and areas in the company to be included in the audit, and their prioritizing according to certain criteria. Also, it is important to clearly define the number and qualifications of people who will be involved, to define their powers and responsibilities, to assess the request for resources, and so on.
- *Providing support to the company's management* – in this regard, the company's management perceives the process of internal audit as important for business process improvement. Only in this way, the management will accept the recommendations of the internal audit, focused on removing the shortcomings in processes, and make further efforts to overcome barriers to further improvements.
- *Define project outcomes* – outcomes that are expected from the implementation of the recommendations of the internal audit must be determined and measurable. They can be expressed in increased production of a number of units, cost saving, and the like.

Measurement is the second phase, which involves a number of financial and operational analyses to quantify deviations from preset standards of business process performance. For instance, when assessing the effectiveness of internal control systems and the application of appropriate metrics, internal audit can determine the values of the various risks that companies face every day and that internal control should address. Risk value that ranges from 0 to 5 is determined by the probability of its occurrence and degree

of impact on business operations. Although the risk can virtually never be completely eliminated or reduced to zero, the risk value corresponding to zero is set as a standard to strive for. It follows that the risks of high value, which deviate a lot from zero (the probability of their occurrence and the impact is huge), point out the weakness of internal control in their identification and management.

The next phase involves the analysis, i.e. study of the obtained results, all with the aim of finding the causes of deviations and assessing their impact on process performance. Internal auditors perform tests that enable them to better understand the condition of the existing system. Thus, by testing attributes, in this case, control, the internal auditor identifies areas of internal control systems that are not functioning as planned, or are not in accordance with prescribed policies, procedures, rules, and regulations. Also, by the implementation of quantitative (core) tests, internal auditor is able to determine the effects, i.e. the impact of part of the system of internal control that is not adequately projected at the quality of output. In doing so, the various instruments of data presentation, analysis, and surveys may be used, provided that the commonly applied instruments in the context of lean six sigma are: cause-and-effect diagram, "5 Whys" technique, and the Pareto principle.

After careful implementation of the phases of measurement and analysis, based on the results obtained, in the fourth phase, the auditor should be able to identify opportunities for process improvement and provide recommendations for eliminating deviations (errors, omissions, etc.). These recommendations are contained in the report of the internal auditor and "call for action to correct existing conditions or improve operations and may suggest approaches to correcting or enhancing performance as a guide for management in achieving desired results" (Practice Advisory 2410-1). Recommendations can provide the general course of action and specific suggestions regarding business performance, or may suggest further investigation or conducting special examination. Also, it is very important that the report recommendations are ranked according to their importance, as it will enable the company's management that is responsible for taking corrective actions to identify the most important recommendations that should be implemented first. In any case, lean six sigma orientation implies that the recommendations of the internal auditors are those that involve the minimum cost of their implementation. In addition, shortening the lead time, as the target of the lean concept, points to the fact that the internal auditor's recommendations should focus on the possible elimination of certain steps in the process, while preserving its integrity.

The last phase, the phase of control, is carried out with the aim of maintaining changes in the inputs of the process, in order to maintain and improve the outputs that have been achieved in this regard. Corresponding phase of internal audit in this stage is the follow-up, where "internal auditors evaluate the adequacy, effectiveness, and timeliness of actions taken by management on reported observations and recommendations" (Practice Advisory 2500.A1-1). In doing so, the auditors can in various ways collect and analyze data that indicate the acceptance and implementation of recommendations by the management: interviewing staff responsible for implementing the recommendations, review of supporting documentation, conducting tests to determine the effectiveness of the actions taken, and the like [7].

Applying lean six sigma principles in the process of internal audit is undoubtedly of great importance for raising its effectiveness, as it allows it to acquire better insight and

understanding of the processes in the company, as well as identify opportunities for improvement. This importance has been recognized by the Institute of Internal Auditors, an international association that has the strongest impact on the permanent development of theory and practice of internal auditing. In this regard, the Institute has initiated the organization of various courses and trainings, with the purpose of presenting the basis of lean six sigma methodology and instruments that can be used in planning and performing the audit. The aim of the trainings is to explain the relationship of lean six sigma methodology and internal auditing standards, connect the DMAIC methodology with the five stages of internal auditing, highlight the need and importance of the process mapping in the company, explain the purpose and method of application of the various instruments of analysis, and the like (www.theiia.org). Participants have the opportunity to put their knowledge and skills through a variety of case studies and exercises, thus becoming able to integrate techniques and tools of Lean Six Sigma concept into the specific audit activities.

CONCLUSION

Internal audit, lean, and six sigma undoubtedly represent some of the most important approaches to business process improvement of modern companies. Specifically, focusing on the overall business process, i.e. its efficiency, effectiveness, and frugality, internal audit assesses risks, identifies weaknesses in the process, and makes recommendations for its improvement. In this way, it contributes to the realization of the company's goals, by adding value and long-term benefits. On the other hand, the lean concept is based on the principle of creating more value for customers with less work, focusing on the process flow, i.e. its shortening, by eliminating non-value-added activities. Six sigma involves a detailed analysis of the process, identification of flaws, and making proposals for their elimination. In this way, by using different instruments, six sigma contributes to continuous quality improvement of all processes. Moreover, the companies' need to shorten the flow of the process by applying lean concept is at the same time accompanied by the need to improve its quality, which is why the practice has developed lean six sigma concept.

Benefits that companies can achieve by applying lean six sigma concept are certainly conditioned by the manner and quality of introduction, planning, and implementation of this concept. Through the control and assessment of lean-six sigma concept, internal audit can provide maximum support, reflected in the identification of possible areas where the application of the concept is not compatible with pre-defined procedures, and the provision of valuable suggestions which create space for business process improvement.

On the other hand, internal audit can provide the maximum effect only if it is properly planned and executed. In this sense, there are possibilities of integrating lean six sigma concept in the entire internal audit process. By applying methodologies, techniques, and tools of lean six sigma concepts, internal auditors gain better and deeper understanding of the business processes in the company, where they get the opportunity to provide adequate recommendations for continuous improvement.

By recognizing and exploiting the potential of internal audit and lean-six sigma concept, as well as their integration, many companies today experience significant improvement of their processes, which consequently contributes to the achievement of competitive advantage and overall business performance.

Acknowledgement. *This paper is part of the results of the research on Project III 47023 supported by the Ministry of Education, Science and Technological development of the Republic of Serbia*

REFERENCES

1. Aghili, S., (2009) The Six Sigma Approach to Internal Audits, Strategic Finance, Vol. 90, Issue 8: 38-43
2. Andrić, M., Kršmanović, B., Jakšić, D., (2009), Revizija – teorija i praksa, Subotica, Ekonomski fakultet
3. Antić, Lj., Novičević, B., (2012) Just in Time and Total Quality Management for Need of Achieving Competitive Advantages of Companies, Facta Universitatis, Series: Economics and Organization, Vol. 9, No2: 193-204
4. Antić, Lj., Novičević, B. (2013) Activity based management in lean production environment, Improving the competitiveness of enterprises and national economies – factors and strategies, Faculty of Economics Niš: 241-258
5. Bonić, Lj, Đorđević, M., (2012) Potentials of internal auditing in enterprise risk management, Facta Universitatis, Series:Economics and Organization, Vol. 9, No1: 123-137
6. Chambers, A., Rand, G., (2010), Operational Audit Handbook – Auditing Business and IT Processes, second edition, John Wiley & Sons, Ltd
7. Foreign Affairs, Trade and Development Canada, <http://www.international.gc.ca> (12.07.2014)
8. Institut of Internal Auditors, International Professional Practices Framework (IPPF), Edition 2011
9. Ljubisavljević, S., Jovanović, D., (2011) Empirical research on the internal audit position in companies in Serbia, Ekonomski anali, Vol. 56, No 191: 123-141
10. Moeller, B., (2009), Brink's Modern Internal Auditing, a Common Body of Knowledge, 7th Edition, John Wiley & Sons, Inc
11. Mustapha, M., Muda, M., (2012) Lean Six Sigma and Operational Audit as a New Paradigm for Improvement, The 2012 International Conference on Business and Management, Phuket – Thailand: 690-699
12. Novičević, B., Antić, Lj., Stevanović, T., (2013) Koncepti upravljanja troškovima u funkciji realizacije konkurentskih strategija, Niš, Ekonomski fakultet
13. Operational Audit Best Practice, A methodology to Conduct Operational Audit in Public, USAID from the american people
14. O'Rourke, Peter, (2005) A multiple-case comparison of lean Six Sigma deployment and implementation strategies, ASQ World Conference on Quality and Improvement Proceedings 59: 581-592.
15. Pyzdek, T., (2003), The Six Sigma Handbook, Revised and expanded, McGraw-Hill
16. Shetty, D., Cummings, R., (2010) Survey-based spreadsheet model on lean implementation, International Journal of Lean Six Sigma, Vol. 1, No.4: 310-334
17. The Institut of Internal Auditors, www.theiia.org (05.07.2014.)
18. Warren, P., Hannan, J., Youngberg, P., (2011) Internal Audit Leads the Way to Performance Improvement, Crowe Horwath LLP.

SINERGIJSKI EFEKTI INTERNE REVIZIJE I LEAN-SIX SIGMA KONCEPTA NA UNAPREĐENJE POSLOVNIH PROCESA

Suočena sa nizom izazova iz okruženja u kojem posluju, preduzeća su više nego ikad svesna činjenice da naponi usmereni na unapređenje poslovnih procesa predstavljaju jedan od osnovnih uslova, ne samo rasta i razvoja, već i opstanka preduzeća. Jedino na taj način stvaraju se mogućnosti za postizanje konkurentnosti po različitim dimenzijama (u troškovima, kvalitetu, pouzdanosti isporuke, brzini praćenja promene u tražnji, uvođenje novih proizvoda i sl.). Unapređenje poslovnih procesa je moguće realizovati uz podršku brojnih koncepata među kojima se posebno ističe lean-six sigma. Međutim, veoma veliki potencijal u tom smislu poseduje i interna revizija. S tim u vezi, u radu će najpre biti reči o suštini i pretpostavkama na kojima se temelje interna revizija i lean-six sigma koncept, a zatim će se sagledati mogućnosti njihovog intergrisanja sa ciljem postizanja boljih rezultata.

Ključne reči: *interna revizija, lean-six sigma, unapređenje poslovnih procesa.*