ROČNÍK/YEAR XVI. *ISSN 1335-1745*

1-2/2010 *EV 3722/09*

KVALITA
QUALITY

INOVÁCIA
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TRENČIANSKA UNIVERZITA ALEXANDRA DUBČEKA V TRENČÍNE
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TLAČ / *PRINTING*
MOLIRO, Čajakova 5, 040 01 KOŠICE

OBÁLKA / *COVER PAGE*
JAREMA DESIGN

http://www.qip-journal.eu

ISSN 1335-1745

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MOTTO

Poslaním časopisu „Kvalita Inovácia Prosperita“ je prinášať nové, originálne, redakčnou radou recenzované vedecké články o kvalite práce, produkcie a života zo všetkých spoločenských oblastí pre náročných odborníkov, akademickú verejnosť a postgraduálnych i graduálnych študentov.

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Richard Rorty, Stanford University

The journal will be issued twice a year for the Slovak, Czech and possibly also for a more general European professional communities. This issue was granted by project KEGA 3/6411/08.

ELECTRONIC VERSION

http://www.qip-journal.eu

ISSN 1335-1745

ISSN 1335-1745

CONTENS
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ISSN 1335-1745

ISSN 1335-1745

ABSTRACTS

ANALYSIS OF THE RESULTS OF AUDITS OF QUALITY MANAGEMENT SYSTEM-SALES SERVICE OF CARS

JAROSLAV JAMBOR

Keywords: quality management system, improvement, audit, authorized branded service, the results of QMS, benefits of the QMS.

Abstract: The Author analyses his over years experiences and results with audits in brand car ´s service and sale areas. He acted on behalf of TÜV SÜD Automotive GmbH Munich - Germany. He hits of audit ´s consecution in compliance with ISO 9001 and above standard requirement car ´s producers. He withal adverts to effects implementation the Quality management systems at these services.

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GLOBAL BUSINESS ACTIVITIES IN LIGHT OF THE IMPACTS OF THE ECONOMIC RECESSION

PETER KUZMIŠIN

Keywords: world economy, economic recession, index of investor confidence, European Union, global business environment

Abstract: The paper focuses on the impacts of the economic recession in 2008-2009, which resulted in significant losses in manufacturing, investments, foreign trade and led to a major rise in unemployment and decrease in the standard of living. Based on the assumptions about the growth of global economy, the attention is paid to the activities of business sphere in the area of investments in terms of the Index of investor confidence published in 2010. As the main motive for investments in the forthcoming future, the security of investments has been identified. The turning point is expected to occur in 2011. Nowadays, there is rather a climate of "suspended investments" due to both the insecurity on the markets and problems with acquiring credits.

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EFFECTIVENESS EVALUATION OF SERVICE PROVIDED IN GEOLOGY: INTRODUCTION OF A PILOT PROJECT EES_G

MARKÉTA LAJCZYKOVÁ

Keywords: efficiency, service, CEDAC, project, monitoring, analysis, improvement

Abstract: The paper is focused on providing services, specifically on effectiveness evaluating of services in the field of geology (nicknamed project EES_G), and delivers the performance of a pilot project to establish a general methodology for effectiveness evaluating of services of geology by using several methods for data analyzing in the field of the quality management system, which should be addressed in practice in conditions of a specific organization. Among other things, the article also paid attention to the CEDAC method. The paper based on the importance of effectiveness and benefits from the effectivness evaluation of service as very important decision variables in managing the process, which contributes to so-called operational quality management. Paper also presents the results of some interesting analysis for example an analysis of a competitive advantage thanks to management systems and identification areas for improvement based on analysis of the audits. The paper has been compiled in connection with resolving project KEGA 3/6411/08 Transformation of the already existing study programme Management of production quality to an university-wide bilingual study programme.

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DAIMLER PROCESS AUDIT PREPARATION, EXECUTION AND EVALUATION IN FAURECIA KOSICE

ĽUBOMÍR LENGYEL

Keywords: VDA6.3, Daimler Process Audit, continual improvement

Abstract: This paper is describing process of preparation to successful passing of Daimler Process Audit. From process point of view VDA 6.3 standard has been the base accompanied with Daimler additions, driven by internal Faurecia Audit standard. Continual improvement process based on Deming's cycle has been applied. The paper is intended for all professionals who are concerned with the process and product quality improvement and quality audit in the organization. The paper has been compiled in connection with resolving project KEGA 3/6411/08 Transformation of the already existing study programme Management of production quality to an university-wide bilingual study programme.

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ANALYSIS OF INNOVATION ACTIVITY OF SLOVAK AND CZECH ENTERPRISES

EMÍLIA SPIŠÁKOVÁ

Keywords: innovation activity, product innovation, process innovation, cooperation in innovation activity

Abstract: European innovation scoreboard is used to monitor and compare the innovation performance of European countries, according to which was the Slovak Republic, together with two other V4 countries, i.e. Hungary and Poland, at the time of last available data from this area, classified into the last, fourth group of countries named "catching-up countries". These countries were characterized by the lack of innovation activity, which was well below the EU 27 average. From the V4 countries, Czech Republic achieved the best results, belongs to "moderate innovators" and is the most close to the European average. At a present time all four countries are included in a group of moderate innovators.

The innovation performance of whole country is particularly influenced by innovation activities of enterprises operating in this country. For this reason, the

article deals with the detailed analysis of innovative activity of enterprises by their size and sector of their operation in Czech and Slovak Republic, and also deals with the cooperation of enterprises in these activities in terms of the type of partner and the countries of their interaction.

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OBSERVANCE AND DEVELOPMENT OF SALIENT QUALITY OVERPRINT FOR TABLECLOTHS EMBROIDERY WITH USE OF RFID TECHNOLOGY

JANA STRAUSZOVÁ, KRISTÍNA ZGODAVOVÁ

Keywords: saliency of quality, embroidery, industrial pattern, tablecloths embroidery, RFID technology

Abstract: Mission of this paper is to enable those interested in observance and development quality embroidery typical of the region use with RFID technologies for designing, implementing and providing overprint for tablecloths embroidery. The starting point is present situation and method of observance and development of overprint embroidery. The solution is in scanning of patterns and their saving into database of industrial patterns with implemented RFID tag. This will allow indentifying, evaluating and using overprint for tablecloths embroidery. RFID technology can be applied for observance and development of salient quality any products of individual, organizations and their protected pattern and support creative and innovative acting of individuals and organizations in region. The paper is intended especially for specialists, who are interested in issue observance salient quality in sense of cultural heritage of regions. The paper has been compiled in connection with resolving project KEGA 3/6411/08 Transformation of the already existing study programme Management of production quality to a university-wide bilingual study programme.

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A MATHEMATICAL MODEL FOR PROCESS CYCLE TIME - THEORY AND CASE STUDY

FILIP TOŠENOVSKÝ

Keywords: process cycle time, Box-Cox transformation, exponential regression.

Abstract: The article focuses on derivation of a regression model which describes dependence of process cycle time on relevant factors entering the process. The analyzed processes are typical in that the coefficient of variation of times corresponding to a given level of influential factors remains stable if the level of the factors change. The derived model is subsequently applied to real industrial data which show that such a model is suitable for the description of relations. The paper has been published with support of Slovak Ministry of Education project KEGA 3/6411/08 „Transformation of the already existing study programme Management of production quality to an university-wide bilingual study programme“.

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INNOVATION MANAGER AND HIS POSITION IN COMPANY

KATEŘINA HRAZDILOVÁ BOČKOVÁ

Keywords: innovation, innovation manager, qualities of innovation manager, organization structure, innovation process.

Abstract: The presented paper deals with the importance of innovation manager in company. It analyses the actual state of definition of innovation manager in companies, it is dealing with their qualities and qualities of ideal innovation manager. The paper solves the placement of position of innovation manager into the company organization structure. It recommends the ideal placement of innovation manager position in the organization structure in company working in “Production, sale and operation of amusement and gaming technology”.

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ABSTRAKTY

ANALÝZA VÝSLEDKOV AUDITOV SYSTÉMU MANAŽÉRSTVA KVALITY PREDAJNO-SERVISNÝCH MIEST AUTOMOBILOV

JAROSLAV JAMBOR

Kľúčové slová: systém manažérstva kvality, zlepšovanie, audit, autorizovaný značkový servis, výsledky QMS, výhody QMS.

Abstrakt: Autor vo svojom príspevku analyzuje prínosy zo zavedenia systému manažérstva kvality podľa ISO 9001 do predajno-servisných miest automobilov. V príspevku približuje jeho viacročné skúsenosti s výkonom auditov u servisných miest a predajcov značkových vozidiel SEAT. Audity boli vykonávané v zastúpení certifikačného orgánu TÜV SÜD Automotive GmbH Mníchov. Autor popisuje realizáciu auditu podľa kritérií požiadaviek normy ISO 9001 a podľa nadštandardných požiadaviek výrobcu automobilov. Zároveň poukazuje na dosiahnuté výsledky servisov a predajných miest automobilov po implementácii systému manažérstva kvality.

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GLOBÁLNE PODNIKATEĽSKÉ AKTIVITY VO SVETLE DOPADOV EKONOMICKEJ RECESIE

PETER KUZMIŠIN

Kľúčové slová: svetová ekonomika, ekonomická recesia, index dôvery investorov, Európska únia, globálne podnikateľské prostredie.

Abstrakt: Štúdia sa zaoberá dôsledkami ekonomickej recesie v rokoch 2008 – 2009, ktorá priniesla značné straty vo výrobe, investíciách, zahraničnom obchode, viedla k značnému zvýšeniu nezamestnanosti a zníženiu životnej úrovne. Na základe predpokladov o raste svetovej ekonomiky je venovaná pozornosť aktivitám podnikateľskej sféry v oblasti investícií na základe výsledkov Indexu dôvery investorov publikovaného v roku 2010. Ako hlavný motív investovania v najbližšom období bola identifikovaná bezpečnosť investícií. Prelom v investovaní sa očakáva až v roku 2011. Skôr vládne klíma

„odložených investícií“ a to v dôsledku neistoty na trhoch a problémoch pri získavaní úverov.

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HODNOCENÍ EFEKTIVNOSTI POSKYTOVANÝCH SLUŽEB V OBLASTI GEOLOGIE: ÚVOD DO PILOTNÍHO PROJEKTU HES_G

MARKÉTA LAJCZYKOVÁ

Kľúčové slová: efektivnost, služby, CEDAC, projekt, monitorování, analýza, zlepšování

Abstrakt: Příspěvek je zaměřen na oblast poskytování služeb, konkrétně na hodnocení efektivnosti poskytování služeb v oblasti geologie (zkráceně nazýván projekt HES_G), a přináší představení pilotního projektu pro stanovení obecné metodiky hodnocení efektivnosti poskytování služeb z oboru geologie s využitím několika metod pro analýzu údajů z oblasti systému managementu kvality, jež mají být řešeny v praxi v podmínkách konkrétní organizace. Mimo jiné je v článku pozornost věnována také metodě CEDAC. Příspěvek se opírá o význam efektivnosti a přínosy hodnocení efektivnosti procesu poskytování služeb jako velmi důležité rozhodovací veličiny při řízení procesu, která přispívá tzv. operativnímu managementu kvality. Příspěvek rovněž uvádí výsledky některých zajímavých analýz např.analýzu konkurenční výhody díky systémům managementu a stanovení oblastí ke zlepšování na základě analýzy auditů. Článek byl vydaný s podporou projektu Ministerstva školství Slovenské republiky KEGA 3/6411/08 Transformácia existujúceho študijného programu Manažérstvo kvality produkcie na celouniverzitný, bilingválny študijný program.

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PRÍPRAVA, VYKONANIE A VYHODNOTENIE DAIMLER PROCESS AUDITU VO FAURECII KOŠICE

ĽUBOMÍR LENGYEL

Kľúčové slová: VDA6.3, Daimler Process Audit, neustále zlepšovanie.

Abstrakt: V čánku je popisovaný proces prípravy na úspešné absolvovanie procesného auditu podľa metodiky Daimler. Z procesného hľadiska je základom štandard VDA6.3 doplnený dodatkami spoločnosti Daimler zosúladený s interným štandardom pre vykonávanie auditov spoločnosti Faurecia. V článku je popisovaný proces prípravy pomocou neustáleho zlepšovania postavený na základoch Demingovho kruhu. Článok vznikov s podporou projektu Ministertsva školstva SR KEGA KEGA 3/6411/08 „Transformácia existujúceho študijného programu Manažérstvo kvality produkcie na celouniverzitný, bilingválny študijný program“.

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ANALÝZA INOVAČNEJ AKTIVITY SLOVENSKÝCH A ČESKÝCH PODNIKOV

EMÍLIA SPIŠÁKOVÁ

Kľúčové slová: inovačná aktivita, produktové inovácie, procesné inovácie, spolupráca pri inováciách

Abstrakt: Na sledovanie a porovnanie inovačnej výkonnosti krajín slúži Európsky inovačný rebríček, podľa ktorého bola Slovenská republika spolu s ďalšími dvoma krajinami V4, t.j. Maďarskom a Poľskom, v čase posledných dostupných údajov v tejto oblasti zaradená do poslednej, štvrtej skupiny krajín označenej ako dobiehajúce krajiny. Tieto krajiny sa vyznačovali nedostatočnou inovačnou aktivitou nachádzajúcou sa výrazne pod priemerom EU 27. Najlepšie výsledky z krajín V4 dosahovala Česká republika, ktorá sa najviac približuje európskemu priemeru a ako jediná patrila v tom čase do skupiny miernych inovátorov. V súčasnosti sú už všetky krajiny V4 zaradené do skupiny miernych inovátorov, pričom Česká republika je na čele tejto skupiny.

Inovačná výkonnosť celej krajiny je ovplyvnená predovšetkým inovačnými aktivitami podnikov v nej pôsobiacich. Práve z tohto dôvodu sa príspevok zaoberá podrobnejšou analýzou inovačnej aktivity podnikov podľa veľkosti a

odvetvia ich pôsobenia v Slovenskej a Českej republike, a tiež spoluprácou podnikov pri týchto aktivitách z pohľadu typu partnerov a krajín ich pôsobenia.

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ZACHOVÁVANIE A ROZVÍJANIE PRÍZNAČNEJ KVALITY VYŠÍVANIA S VYUŽITÍM RFID TECHNOLÓGIÍ

JANA STRAUSZOVÁ, KRISTÍNA ZGODAVOVÁ

Kľúčové slová: príznačnosť kvality, výšivka, RFID technológie

Abstrakt: Poslaním článku je umožniť záujemcom o zachovávanie a rozvíjanie príznačnej kvality vyšívania v regióne využívať RFID technológie pri príprave, realizovaní a poskytovaní predtlače vyšívania. Východiskom je súčasný stav a spôsob uchovávania a rozširovania predtlače. Podstatou riešenia je v zoskenovaní vzorov a v ich uložení do databázy priemyselných vzorov s nalepeným RFID čipom, podľa ktorého sa dajú identifikovať, hodnotiť a používať predtlače výšiviek. RFID technológie sa dajú aplikovať na uchovávanie a rozvíjanie príznačnej kvality akýchkoľvek produktov jednotlivcov, organizácií a ich chránených vzorov a podporiť kreatívne a inovatívne konanie jednotlivcov i organizácií v regióne. Príspevok je určený najmä tým odborníkom, ktorí sa zaujímajú o problematiku uchovávania príznačnej kvality v zmysle kultúrneho dedičstva regiónov. Článok vznikol s podporou projektu Ministerstva školstva Slovenskej republiky KEGA 3/6411/ „Transformácia existujúceho študijného programu Manažérstvo kvality produkcie na celouniverzitný, bilingválny študijný program“.

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MATEMATICKÝ MODEL PRO DOBU TRVÁNÍ PROCESU – TEORIE A REÁLNÁ STUDIE

FILIP TOŠENOVSKÝ

Klíčová slova: doba trvání procesu, Boxova-Coxova transformace, exponenciální regrese

Abstrakt: V článku je odvozen regresní model, který vyjadřuje závislost doby trvání pracovního procesu na relevantních faktorech, které do procesu vstupují. Jde o procesy typické tím, že varianční koeficient časů naměřených pro danou úroveň vlivných faktorů zůstává stabilní při změně úrovně těchto faktorů. Odvozený model je následně využit na reálných datech z průmyslu, které ukazují, že takový model je pro popis vztahů vhodným nástrojem. Článek byl vydaný s podporou projektu Ministerstva školství Slovenské republiky KEGA 3/6411/ „Transformácia existujúceho študijného programu Manažérstvo kvality produkcie na celouniverzitný, bilingválny študijný program“.

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MANAŽER INOVACÍ A JEHO POZICE VE SPOLEČNOSTI

KATEŘINA HRAZDILOVÁ BOČKOVÁ

Kľúčové slová: inovace, manažer inovací, vlastnosti manažera inovací, organizační struktura, inovační proces.

Abstrakt: Předkládaný příspěvek pojednává o důležitosti pozice manažera inovací. Analyzuje současný stav pojetí pozice manažera inovací ve společnostech, jejich vlastnosti a vlastnosti ideálního manažera inovací. Zabývá se umístěním pozice manažera inovací do organizační struktury společnosti. Doporučuje ideální umístění pozice manažera inovací v organizační struktuře společnosti působící na trhu „Výroba, prodej a provoz výherní a zábavní techniky“.

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ANALYSIS OF THE RESULTS OF AUDITS OF QUALITY MANAGEMENT SYSTEM-SALES SERVICE OF CARS

JAROSLAV JAMBOR

1 INTRODUCTION

One of the management strategies for business success in the market is a strategy of continuous improvement of production quality through the implementation of quality management and continuous improvement. Improving product quality then affects not only the production processes, but also post-production activities such as selling and servicing vehicles. The new EU regulation on the common exemptions (BER Block Exemption Regulation, Chapter 2.4.1) and strategic considerations developed in the company SEAT has resulted in the implementation of new quality management system on the market service (after sales) services (ServiceQualityManagementSystem SEAT, SSQMS). In this system, were also included qualitative criteria for partners in SEAT-sales business. In practice this means that these quality criteria are required to comply with all authorized service providers SEAT. These criteria are also minimum standards to be met by any new candidate (applicant is a contract service partner SEAT) having the objective of integration into a network of authorized partners SEAT. This system was put into operation in May 2004 for the Slovak Republic and Czech Republic. The quality criteria defined in the SSQMS include requirements for two areas:

- Service Standards and Norms for SEAT Genuine Parts SEAT
- Criteria for ISO 9001

To measure the efficiency and effectiveness of the implemented quality management system called SSQMS were between 2004 and 2008 successfully used third-party audits (external audits SSQMS) through certification company TÜV SÜD Automotive GmbH, Munich. This paper is the desirability of introducing quality management system. This is documented in the analysis and results for a particular sample car dealer network SEAT brand for four years of the existence of the system.

ISSN 1335-1745

2 CONDUCT AUDITS SSQMS

Implementation of standards is verified annually SSQMS audit. To standardize SSQMS audits and to ensure objectivity and unlimited non-discriminatory treatment of all partners SEAT (and all applicants for contract service partner SEAT), the manufacturer decided to leave the implementation of audit procedures independent service provider. Selected the company TÜV SÜD Automotive GmbH, Munich. The audit carried out by three auditors for the Slovak Republic and the Czech Republic. The advantage was that it came from Slovakia, and audits are carried out in Slovak or Czech language. It was dismantled language barrier between the auditors and verification service partners SEAT. Previously, auditors passed the selection procedure in order to represent the company TÜV SÜD Automotive GmbH, Munich. Training course for auditors SSQMS standards and testing took place in the English language in two phases. Initial training was carried out in IVG Praha s.r.o. and other training took place in the parent company in Germany.

Audit activities and the sequence of steps was carried out in accordance with ISO 19011:2002. After a successful audit has been certified service partner of the QMS (Quality Management System) and ISO 9001:2000 certificate as required by the manufacturer, so. SSQMS certificate. SSQMS main tool was a checklist of questions. This list contained all the standards for service partner SEAT and work to simplify these standards as defined by issues.

The checklist is divided into individual processes that are defined for an authorized service center SEAT and is divided into the following five areas:

1) Buildings
2) Management, processes, organization and personnel
3) Contact place of customers
4) Spare parts
5) Workshop

This division greatly facilitate the work of service, particularly in introducing SSQMS in practice and in defining the various remedial measures in improving quality. A checklist of questions is also a self-assessment tool for our service partners, as it will allow any time to check compliance with the requirements of quality management system. SSQMS system but serves only to check compliance with prescribed standards, which are given by the manufacturer. It is intended to improve the quality of service provision and therefore are also part SSQMS Phantom test (quality), which are carried out in individual service partners. As mentioned above from the view of these tests are performed by an independent service provider – TÜV SÜD Automotive GmbH. It also contains a checklist of criteria (questions) are not defined as a manufacturer of quality (standards), ie. that service partner in the audit does not meet these criteria. These criteria call or optional recommended. Failure criteria, optional service partner partiall lost competitive advantage in servicing the market (Handbook Service

Organization, 2003). SSQMS main tool is a checklist of questions. This list contained all the standards for service partner for SEAT and simplification of work are defined by standards issues. This checklist is based on individual processes is called the check list. The entire certification process is included in the three-year cycle, see figure. 1st:

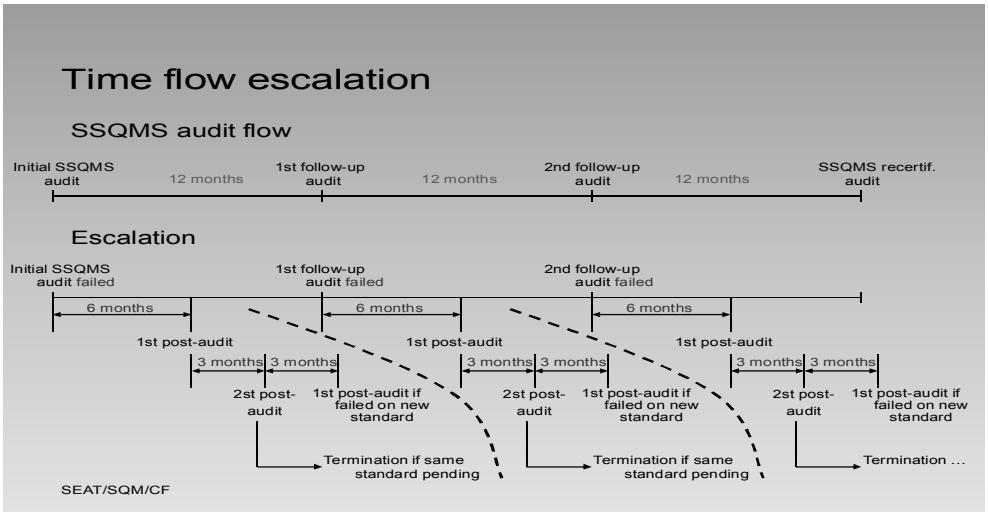


Figure 1 – Three-year audit cycle SSQMS

As shown in Figure No. 1 audits are divided into two types: Certification Audit and Audit Control.

At the beginning of the cycle is performed the certification audit, whose validity is one year. Within one year (+/- 9 weeks) must be executed first control audit, whose validity is again one year. In the next year following the first surveillance audit (+/- 9 weeks) must be conducted the second inspection audit. After this second inspection audit is not yet determined the validity of the audit for one year and the year cycle is closed. After this three-year cycle must be carried out and the new certification audit, the new three-year cycle. In the event of failure of the audit or certification or inspection, the dealer has to make within three months of remedial audit - postaudit. If at this postaudite failed and could not fulfill the conditions of certification, getting one more chance and the next three months must be made postaudit second. In case of failure of the second postaudit is terminated with the dealer service contract and cease to be authorized service SEAT. If you wanted to reconnect to a three-year certification cycle must have a compulsory two-year break. After this period may again register as a new applicant for a contract service partner SEAT. However, if the trader is successful if the first or second postaudit, not shift the date of the next audit review to date from last year postaudit. The term audit is set every year postaudit not affect the deadline. Of course, all audit and financial postaudit is charged and the retailer is also in this form SSQMS motivated to meet the criteria for the first time. Just for illustration is a brief description of the financing described SSQMS

audits of the service partner respectively (Internal materials of SEAT dealer, 2004).

SSQMS cost of the audits and the certification process.

Auditee pay a specific price for a three-year audit period in the company TÜV SÜD Automotive GmbH. The resulting amount is divided into three partial payments. The advantage is that the service is charged at the same time a great partner funding, but the payment is divided into three installments, with no increase.

Price for the audit includes the cost of an audit, the costs associated with the release of ISO 9001:2000 certificate issued by TUV Management Service GmbH and the cost of the certificate SSQMS.

In case of failure to audit the auditor decides whether to take postaudit spot with a service partner, or only made known paper audit of the office. Postaudit spot is always performed if it is a fundamental disagreement on the so-called failure. KO criteria listed in the check register. Paper audit carried out by the auditor only if the failure criteria are not radically so that it sends a specific service partner materials by mail in paper form for subsequent evaluation. Postaudit (amending audit) on the ground is costly because the price is about one third of the total amount for the audit for three years. Each paper is postaudit amount charged 600€.

Workshop equipment and service literature. For each service partner SEAT require workshop equipment, including special equipment, special tools and service literature. These obligations are included in SSQMS standards and are reviewed in the audit. The financial burden of this equipment is not a high amount (about € 3,400).

Programs and Systems SEAT SA Importer and develop programs and systems for communication with service partners to support the SEAT of all business activities. These programs and systems require standardized data availability within a service organization SEAT. Therefore, participation in these programs and systems required for all service partners SEAT. SEAT Service Partner must ensure that information systems are compatible with the programs and systems used by SEAT. Certificate issued by SEAT or service provided by SEAT serve as evidence of the compatibility of information systems service partner SEAT. Also in this case is controlled by system software to connect to the audits SSQMS SEAT.

When all these criteria, the applicant becomes a dealer or an authorized service and SEAT SSQMS the Certificate issued by TÜV Management Service GmbH Munich (Handbook Service Organization, 2003).

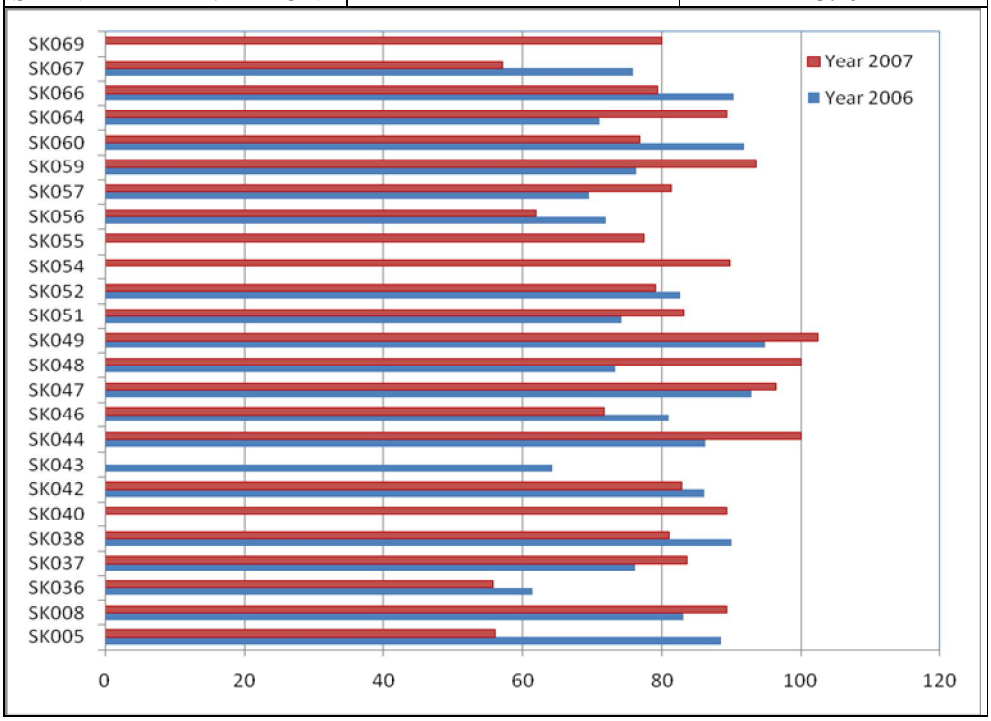
3 PERFORMANCE EVALUATION AUDITS SSQMS

The first positive results from the introduction of SSQMS service partners in the show after two years of operation. Significant improvement in the quality of sales-service posts were seen after four SSQMS existence, which was documented in the results of the evaluation of customer satisfaction CSS (Customer Satisfaction Survay) and the results of the evaluation of satisfaction dealers DSS (Dealer Satisfaction Survay). CSS and DSS are directly linked and related analysis of customer satisfaction and dealers, as if it is satisfied then the ultimate customer satisfaction and dealer of vehicles of a particular brand because it has provided increased sales of its products. The gradual improvement of customer satisfaction are documented after the third and fourth flow there SSQMS (introduced since 2004) in the following Table no. 1 with bar chart.

Table 1 - Slovakia, CSS SEAT, STAGE 2006, before the entire network and 2007, after the entire network

Slovakia SEAT code	Year 2006	Year 2007
SK005	88.6	56.0
SK008	83.1	89.3
SK036	61.4	55.8
SK037	76.1	83.7
SK038	90.0	81.0
SK040	-	89.3
SK042	86.1	82.9
SK043	64.3	-
SK044	86.2	100.0
SK046	81.0	71.8
SK047	92.9	96.4
SK048	73.3	100.0
SK049	94.8	102.5
SK051	74.2	83.2
SK052	82.7	79.1
SK054	-	89.8
SK055	-	77.5
SK056	71.0	62.0
SK057	69.5	81.4
SK059	76.4	93.5
SK060	91.9	76.8
SK064	71.0	89.3
SK066	90.3	79.4
SK067	75.8	57.1
SK069	-	80.0

Slovakia SEAT code	Year 2006	Year 2007
MEAN	80.03	81.58
STANDARD DEVIATION	9.72	13.49



The results show that customer satisfaction grow in the last analyzed in 2007 (results have been comprehensively evaluated in 2008 for the previous year 2007) of 2.7 percent compared with 2006. Overall, the reference years 2004 to 2007 was to increase customer satisfaction by 12.8 percent, a substantial improvement in the quality of products. Those partners who introduced SSQMS not only because of concerns about the withdrawal of licenses for service activities, but also because of the streamlining and simplification activities in service and sales should increase profitability by an average of 3% to 10%. Overall improvement of the system shown in particular:

- Reduction in customer complaints;
- Increase in the number of passage guides through service;
- Increase in the number of vehicle sales, or retaining the original volume of sales in the sharp increase in competition from other brands (Suzuki, Hyundai, Kia, etc.).
- Transparency of the accountability of staff engaged in various activities;
- The clarity of documentation and records the execution of all activities;
- Increase customer satisfaction and trust from customers.

For those service partners, who have not been consistent in implementing SSQMS experienced the following shortcomings:

- Well-documented records of staff training;
- Differences in education planning staff to the standards and importer of SEAT;
- Lack of special tools, fixtures and equipment workshop;
- Not fully implemented activities related to convening and service actions;
- Lack of special preparation and calibration tools;
- Failure of telephone contacts with customers, following receipt of the vehicle from service, or just the formalization of this activity.

Some service partners have tried to introduce SSQMS only paper – certificate. They understand the system and there has been no improvement in them after four years. Losing customers and got into financial problems.

Service partners who have implemented SSQMS not only for its issue, but also to streamline, simplify and streamline the system had the advantage of maintaining the market share or market share, expansion of sales and service vehicles.

4 CONCLUSION

Based on the experience of the audit shows that the quality management system is beneficial only if:

a) practical – is tailor-made and suitable for business managers achieve the intended results (all activities are facilitated, all materials and information can be found immediately, each employee knows what to do, how to do, is set out clearly substitution and competencies .. .)

b) economic – the ultimate aim of introducing a system of quality management and business is to achieve a positive profit (reduce costs, increase sales, increase profitability ...)

c) documented – is processed quality policy, quality objectives, quality manual, card processes, documented procedures, records (each action is recorded and described, signed by the responsible person making the actual performance ...)

d) continuous improvement – the improvement of all activities and everything in the company can improve the ever-changing needs and customer requirements (continuous collection of views of customers regarding their satisfaction and ideas for process improvement.)

If the management of service partners and sales for cars understand interconnection link above, then be motivated to implement quality management

systems not only technically but also from the pragmatic. Finally, SSQMS that is practical, economical, documented, and constantly improving service brings many benefits to partners who can correctly understand and implement (Jambor, 2009).

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GLOBAL BUSINESS ACTIVITIES IN LIGHT OF THE IMPACTS OF THE ECONOMIC RECESSION

PETER KUZMIŠIN

1 INTRODUCTION

Economic recession between the years 2008-2009 has had significant effects on the areas of manufacturing, investments, foreign trade, employment and public finances and many of the impacts can still be seen. It is interesting to observe that the recession has impacted mainly the developed economies. Several indicators in the area of economies' development show, that between 2008-2009, many of the developing as well as developed economies experienced economic growth. The forecasts of the IMF (International Monetary Fund), OECD (Organisation for Economic Co-operation and Development) and European Union (EU) anticipate that in 2010 and 2011 the growth of the World GDP shall be higher than 4%, mainly thanks to the growth rate in developing countries (anticipated growth rate more than 6%). Among the developed countries, the GDP (Gross Domestic Product) growth is expected to be higher than 2%, in the USA almost more than 3%. The risk factor in numerous economies is the development of public finances, characterised by the sharp rise of governmental debts and deficits. Financial stability still remains very fragile. The most adverse impact of the recession is the unemployment with its economic and social manifestations. Due to the increase in unemployment, household incomes have either decreased or disappeared completely, which led to lower consumption, lower GDP, worsening credit repayments, especially with mortgages, which in turn increased bank losses and worsened the situation at the real estate market. After the decrease in inflation in 2009, its slight increase is anticipated in 2010 as a result of the revival in the area of economic activities and demand, rise in prices of energies and commodities. However, the rise of global macroeconomic imbalance still remains a problem: the existence of countries with deficient current account within the balance of payments deepens its deficit and creates problems with financing it. IMF, therefore, emphasizes the importance of economic growth restructuring in the way, that the economies with significant surpluses in current account strengthen their domestic demand and exchange rates, whereas the economies with deficit in current account should focus towards the strengthening of exports through enhancing the structural reforms.

In the EU, the situation is quite difficult. It is the region, which was affected by the recession more strongly and economic revival possibility is lower and insecure. For example, if the economic growth in the world in 2010-2011 is

expected to be slightly above 4%, in the EU as well as the Eurozone the growth expectations are about 1-2%. Among individual countries, the differences in growth potential are very strong. A grave problem in the EU is mainly finding the compromise between the consolidation of public budgets and supporting economic growth. Historical evidence warn that inappropriate orientation away from deficit budgeting and financing, and thus away from budget stimulating measures would mean a real danger of long stagnation for the economy. Therefore, attention needs to be paid towards such public-spending supporting measures that would in the long term increase economic growth, e.g. investments into technologies, infrastructure and education (Kuzmišinová, 2009). The important determinant of decisions in the economic policy with relation to this is mainly the indebtness rate of individual countries and their ability to repay debts. The average indebtness rate (expressed as the ratio of cumulated debt to GDP) in EU27 in 2009 was 74% and between 2010-2011 it is expected to increase to 80-84%. In order to characterise the ability to repay debts, the financial markets use the ratio of paid interests to budget inflows as an indicator. For the group of EU countries, such as Greece, Spain, Portugal, Ireland and Italy, the question of finding the solution to public finances deficit is a priority, even for the price of lower economic growth. Among larger EU countries, more than average growth is expected in Germany and France, and the fastest growth in 2010-2011 is expected in Slovakia and Poland (3-4%). The problem of unemployment belongs to the most pressing issues in relation to the economic recession. If the average of unemployment rate in EU27 countries were less than 10%, several countries, e.g. Spain, Ireland, Greece, or Slovakia would be over the limit (table 2). By the same token, the consolidation of financial system and manifestations of global imbalance that both determine future growth of economies, can be considered very pressing issues.

Table 1- Projection of economic growth according to the IMF (in %)

IMF	2007	2008	2009	2010	2011
GDP – world	5,2	3,0	-0,6	4,2	4,3
USA	2,1	0,4	-2,4	3,1	2,6
EU	3,1	0,9	-4,1	1,0	1,8
Japan	2,3	-1,2	-5,2	1,9	2,0
China	13,0	9,6	8,7	10,0	9,9
India	9,4	7,3	5,7	8,8	8,4
Russia	8,1	5,6	-7,9	4,0	3,6
Developed countries	2,7	0,5	-3,2	2,3	2,4
Developing countries *DC	8,3	6,1	2,4	6,3	6,5
World trade**	7,3	2,8	-10,7	7,0	6,1

Note: Years 2010 and 2011 – April Forecast by IMF
Source: IMF (2010), pp. 2
*DC – developing countries ** Goods and Services

*Table 2 – Selected indicators of economic development in the Eurozone in 2007-2011**

Indicator	2007	2008	2009	2010	2011
GDP	2,8	0,6	-4,1	0-9	1,5
Private consumption	1,6	0,4	-1,1	0,0	1,1
Public consumption	2,3	2,1	2,3	0,9	0,3
Investments	4,8	-0,6	-10,8	-2,6	1,8
Employment	1,7	0,6	-2,1	-1,0	0,1
Unemployment rate **	7,5	7,5	9,4	10,3	10,4
Inflation	2,1	3,3	0,3	1,5	1,7
Balance of public budgets (in % GDP)	-0,6	-2,0	-6,3	-6,6	-6,1
Public deficit (v % GDP)	66,0	69,4	78,7	84,7	88,5
Current account balance (in % GDP)	0,1	-1,1	-0,8	-0,6	-0,5

*Annual growth rates, if not indicated differently
** = from workforce, *** according to harmonised index of consumer prices
Source: ECFIN, Economic Forecast Spring (2010b), p. 16

2 METHODOLOGY

2.1 Index of investor confidence

Up until the beginning of the economic recession, the biggest challenges in the world economy (WE) for global firms have been the threats related to the climate change and natural resources being depleted. From the territorial point of view, it was the onset of new developing markets in Asia and Middle East. As far as capital exporters are concerned, the increase in capital from developing countries has been the most significant.

When different overviews or prognoses for business activities in the segment of foreign direct investments are concerned, the index of investor confidence, which is the result of a survey among the representatives of the biggest world corporations and is published by the world consultancy firm A.T. Karney, is the most respected one. The results of the survey from 2007 showed a continuing growth in global flows of FDI, which according to the qualified estimates on UNCTAD reached a record of $1.5 trillion in 2007. This significant increase is predominantly the result of massive investments into two most populated world economies: China and India. Among other Asian countries, apart from the traditional ones such as Hong Kong and Singapore, Malaysia and Indonesia have been added along with Vietnam, the new target for global investments, which is related to its entry into the WTO, stable political situation and ongoing economic reforms as well as borders with China.

Among the countries around the Gulf of Persia, the United Arab Emirates deserve much attention, mainly thanks to their increasing wealth, population growth as well as diversification of economic activities. Among the countries rich in natural resources, Russia, Brazil, and Canada are dominant, and as the only African country South Africa can be found on the list.

It may be surprising that from the WE point of view, in 2007 the decrease in investor confidence in new EU member states has been detected. In the top 25, only the Czech Republic and Poland can be found. These countries, however, have the trust of the EU15 countries. From the FDI structure point of view, Slovakia and Czech Republic are highly ranked in the area of automobile industry, and the interest in high-tech in increasing as well. In the FDI forecasts, Asian countries were of high interest. A controversial ranking was received by the USA, which can be related to the current economic trends, and in the case of Russia, it may have been the political aspects that were creating ambiguity in the confidence in their economy.

Table 3 - Index of investor confidence (2007)

Country	**Index of investor confidence**
China	2,21
India	2,09
USA	1,86
Great Britain	1,81
Hong Kong	1,78
Brazil	1,78
Singapore	1,75
United Arab Emirates	1,72
Russia	1,70
Germany	1,70
Australia	1,68
Vietnam	1,67
France	1,67
Canada	1,65
Japan	1,63
Malaysia	1,63

Source: A.T. Kearney: Foreign Direct Investment Confidence Index. Vienna (Virginia), 2008

As far as exports are concerned, developing countries are increasingly becoming a competition for developed countries. It is related to the global macroeconomic imbalance in the WE, where there are high deficits in balance of payments on one hand (USA), and on the other hand high surpluses being accumulated in certain developing economics, such as China or oil and gas producers. The example of China points out to the usage of accumulated foreign currency to invest through so-called **sovereign funds**, in the background of which there are

concentrated investments. In the case of China, the majority of investments are directed towards Africa, whereas in the case of India, the investments from private firms are prevailing. As a competition to FDI, **hedge funds** and **private equity funds** are emerging.

To the most significant factors to sustain global economic growth in the next 20 years, according to the A.T. Kearney, belong: The competition in the area of natural resources (66%), Climate change (55%), Competition for non-energetic resources (47%), Pollution from developing countries (44%), Income gap (38%), Increasing prices of primary services (33%), Chronic binary deficit of USA (29%). It is interesting, that 53% of investors invest within the challenge of economic sustainability in ecologically and energy saving products, processes and technologies.

To the most important factors, which according to the A.T. Kearney survey influenced **investors' decision making process**, belonged: Decrease in economic growth rate of the USA (55%), Volatility of USD (45%), Increasing interest rates (39%), Increasing government regulation (38%), and the Volatility of energy prices (37%).

In terms of regions within the WE, to the **main risks of economic development in the USA** belonged: war expenditures in USA (30%), high indebtness (18%), decrease in the highly educated workforce (15%), sustaining binary deficit (15%), protectionism as a reaction to globalisation (15%). On the other hand, investors regarded these as **long-term comparative advantages of the USA**: stable economic environment, wide consumer market, tendency to long-term economic growth, access to excellent research and science, relatively advantageous regulation environment.

Asia is currently undergoing a very successful period, too, mainly in China and India. China is on the first place of investor confidence ranking, whereas its advantage is a fast-growing economy with sufficient cheap labour force, continuing liberalisation of the economy, improving infrastructure and growing middle class. On the other hand, A.T. Kearney considers problems in the institutional environment and, mainly low legal enforcement as risks. In addition to these, the overheating effect of Chinese economy, which is manifested by increasing inflation as well as potential bubbles in the stock market and real estate markets, were considered risky as well. To other risks for investors in China in the next 5 years belong: 1) Danger of losing the intellectual property (50%), 2) Unpredictable institutional environment (44%), 3) Bubbles in the stock market and real estate markets (32%), 4) Overheating of the economy (31%), 5) Protectionism against Chinese goods and services (30%). It is known, that the majority of investments to China flows through Hong Kong. This way, China facilitates the access of firms operating in Hong Kong, which is a challenge mainly for the investors in financial sector. This way, Hong Kong is becoming an increasingly important global financial centre. A favourable environment for investors can be found in Singapore, with quality business environment as well as legal enforcement mechanisms in the area of intellectual property, along with

beneficial strategic location, financial sector support, logistics and strategic services for firms.

Although Europe was showing lower economic growth rates, it is a reliable region for FDI. For example, favourite destination for investors investing in services is the Great Britain, which relies heavily on London being the world financial centre. Similar advantageous predispositions can be found in Germany and France. Among the new EU member states were in the forefront of FDI interest V4 as well as Baltic countries, whereas further development will depend on the development of technologically and knowledge intensive activities. An ambiguous evaluation is in the case of Romania and Bulgaria, where an opportunity of cheap, yet highly qualified labour force can be found.

At the edge of investor interest Africa can be found, where the biggest problems are the political instability, weak infrastructure in the area of IKT, low level of education, insufficient public infrastructure and excessive bureaucracy. A better position has the South Africa, some countries rich in natural resources, e.g. Nigeria, Egypt, whereas further development is dependent mainly on the course of reforms as well as sustaining political stability.

The published results of the Index of investor confidence 2010[1] are the reflection of the economic recession after 2008. The current economic climate is not yet consolidated enough to motivate further investment flows. There is rather a climate of "suspended investments", resulting from the insecurity in the markets and problems with acquiring credits. The decisive "post-crisis" factor of FDI is the security of investments. Compared to the previous evaluation, the positions of China, India and Brazil have been re-confirmed, mainly in the area of investments, as for these countries investors have the highest expectations. Turning point is expected to occur in 2011.

The A.T. Kearney report 2010 considers paradox the fact, that the willingness to invest exists for such markets, whose economic growth is debatable. For example, 22% of investors have negative opinion about the future economic growth of the USA and only 17% evaluates this aspect as positive, but in terms of trust USA is ranked right after China. Similar results were found in the case of Canada, Australia or Germany – even despite the expectations of relatively low economic growth, these countries have been considered interesting economies in terms of investment prospects (Figure 2).

[1] See: www.atkearney.com

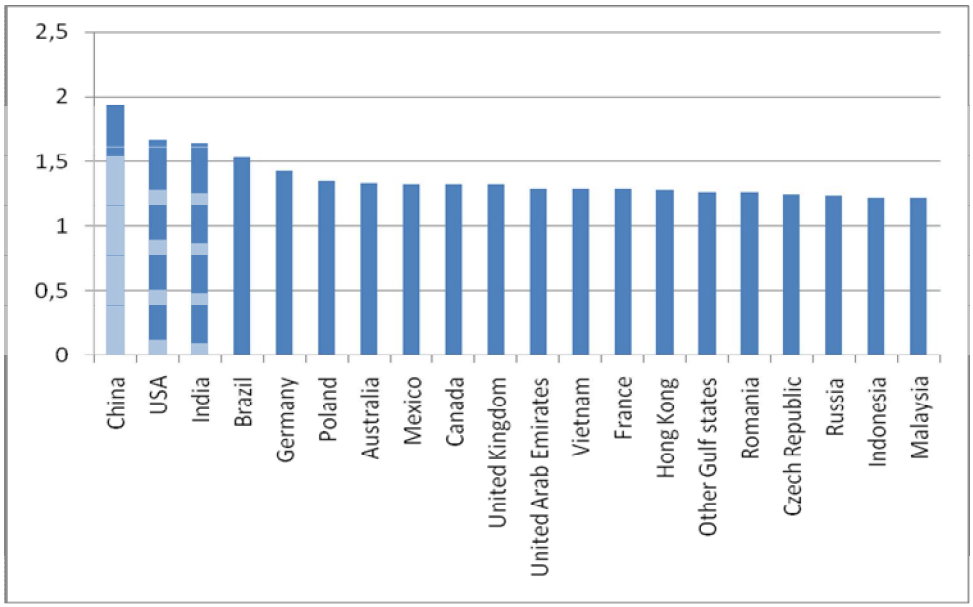

Figure 1 - Index of investor confidence 2010
Note: Other Gulf States: Bahrain, Kuwait, Oman, Qatar
Source: www.atkearney.com

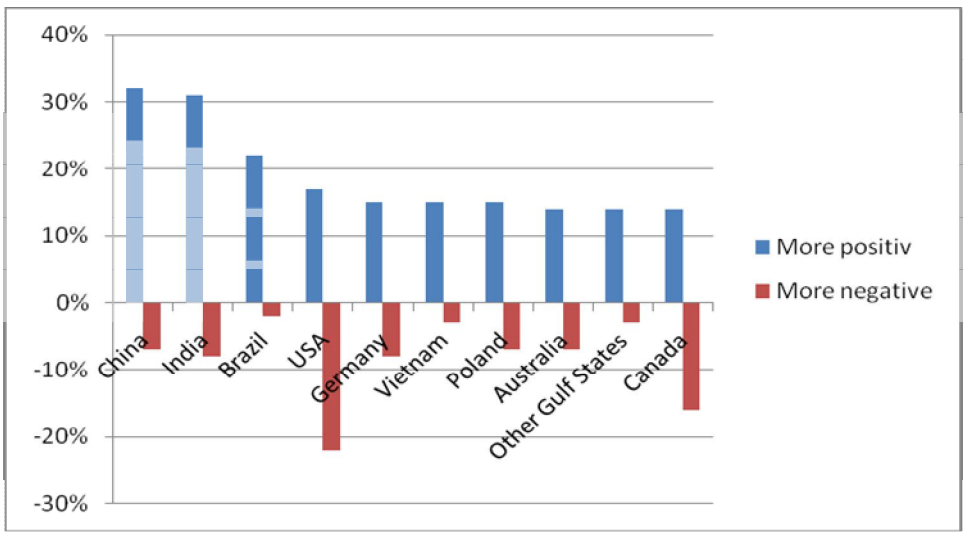

Figure 2 - Change in investor outlook compared to 2007
Source: www.atkearney.com

From the regional point of view, important investors prefer rather geographically near countries (e.g. near abroad). For example, for Asian investors 8 out of 10 cases were located in Asia and from non-Asian countries it was only the USA and Brazil. European investors prefer Europe in 6 out of 10 cases. It is assumed

that orientation towards the security of investments (e.g. escape to the safety area) could have a long-term effect on global business environment (Figure 3).

Asian Investors	European investors	North American investors
1.China	1.China	1.USA
2.Vietnam	2.USA	2.China
3.USA	3.India	3.India
4.India	4.Germany	4.Brazil
5.Hong Kong	5.Brazil	5.Mexico
6.Indonesia	6.Romania	6.Poland
7.Brazil	7.Italy	7.United Kingdom
8.Australia	8.France	8.Canada
9.Thailand	9.Poland	9.Australia
10.UAE	10.Russia	10.Germany

Figure 3 - Investors´ top regional preferences
Note: Colour indicates countries in the same region
Source: www.atkearney.com

In Table 4, we are showing the raking of top 25 countries in terms of attraction and the comparison to their ranking in 2007.

Table 4 – Ranking of TOP25 countries according to the attraction in FDI

Country	**Ranking 2007**	**Ranking 2010**	**Change 2010/2007**
China	1	1	0
USA	3	2	+1
India	2	3	-1
Brazil	6	4	+2
Germany	10	5	+5
Poland	22	6	+16
Australia	11	7	+4
Mexico	19	8	+11
Canada	14	9	+5
Great Britain	4	10	-6
United Arab Emirates	8	11	-3
Vietnam	12	12	0
France	13	13	0
Hong Kong	5	14	-9
Other states in the Gulf of Persia*	17	15	+2
Rumania	-	16	N/A
Czech Republic	25	17	-8
Russia	9	18	-9
Saudi Arabia	-	19	N/A

Indonesia	21	20	+1
Malaysia	16	21	-5
Chile	-	22	N/A
Turkey	20	23	-3
Singapore	7	24	-17
Egypt	-	25	N/A

**Includes: Bahrain, Kuwait, Oman, Qatar*
N/A – country ranked first in 2010
Source: edited according to: www.atkearney.com

2.2 The Ten

The economic recession 2008-2009 changed the shape and dynamics of world economy. Besides the individuality of Chinese economy and in a certain sense of BRIC countries, a group called "The Ten" is being formed. It is the countries, whose economy should be the new engine of WE. Economic potential of these countries is provided in Table 5. Their nominal GDP was in 2008 $5.6billion, in the purchasing power parity (PPP) $8.8billion, which exceed the GDP of Japan and Germany together. The group "The Ten" is the third biggest economic group in the WE after EU and USA. WE thus obtains a new form with five congregations.

Trade type "south-south" is currently the most dynamic part of global economy. This is not only a factor of BRIC country type, Brazil, India and Russia formed only 5.8% of the Chinese trade. The most significant influence of China was on other arising markets. These new arising markets were saved by Chinese economy in 2008 from sharp decline. If we compare inter-year entries about exports in November 2009, Chinese exports to EU fell by 8%, its exports to the USA fell by 1.7%, Chinese exports to the ASEAN countries, however, increased by significant 20.8% and Chinese imports from these countries increased by 45%. The data from this decade, based on current trade trends, indicate that "south-south" trade could overrun the trade among G7 countries, as well as outdo "north-south" trade. Thanks to the increasing population and increased FDI, countries not belonging to G7 shall probably produce more than a half of world GDP in a few years' time. To compare, currently the G7 economies produce 57% of nominal global GDP. Although G7 countries stay richer than other countries, and it is very probable that they will continue exploiting their original advantage of higher education and technological innovations, their long tradition of western cultural dominance and political influence meets new challenges. New world order due to the recession will probably less predictable, more culturally eclectic and potentially containing some features of chaos. The characteristic feature of "The Ten" growth as a new engine for global economy is the combination of various attributes and characteristics: Brazilian music, Mexican singers, Turkish literature, Argentinean dance, Thai sports, Polish architecture, Saudi calligraphy and Indonesian design will compete with each other on the new large market along with the Hollywood movies, Russian space tourism and Chinese products.

The contributions can be expected in the wider variety as well as possible diversion recently probable conflict between China and Western world.

Table 5 - The Aggregation of „The Ten“

	GDP nominal*	2009 estimate	GDP by PPP
European Union	18.4	17.8	15.2
USA	14.4	14.0	14.3
China	4.4	4.7	7.9
BRIC	4.5	4.7	7.5
The Ten	5.6	5.9	8.8
Note: Under ether measurement of GDP, these five groups account for 78 % of global GDP **All sums in USD trillions*			
The Ten	**2008 GDP nominal**	**GDP (PPP)**	**GDP per capita**
1. Mexico*	1.10	1.6	14,500 USD
2. South Korea*	0.93	1.4	27,600 USD
3. Turkey*	0.73	0.9	13,100 USD
4. Poland*	0.51	0.7	17,500 USD
5. Indonesia*	0.47	0.9	4,000 USD
6. Saudi Arabia*	0.40	0.6	23,800 USD
7. Taiwan	0.34	0.7	30,900 USD
8. Iran	0.33	0.8	11,000 USD
9. Argentina*	0.33	0.6	14,400 USD
10. Thailand	0.27	0.6	8,200 USD
TOTAL	**5.60**	**8.8**	---

Source: www.atkearney.com

3 CONCLUSION

Based on the analysis of the impacts of recent economic recession on selected centres of global economy, the aim of this paper was to identify the opportunities for business activities, mainly in the area of investments.

The economic recession of 2008-2009 brought significant losses in manufacturing, investments, foreign trade, it lead to a major increase in unemployment and decrease in the standard of living.

Between 2010-201, the global GDP rise is expected to be above 4%. In the EU and the Eurozone, however, the expected growth rate is to be only about 1-2%.

The primary interest of business environment after economic recession is the security of investments. One of the most respected evaluations in this area is the Index of investor confidence, which is compiled by the consultancy firm A.T. Kearney.

The results of the Index of investor confidence 2010 are the reflections of the economic recession after 2008. Current economic climate is not yet consolidated enough to motivate wide investment flows. There is rather a climate of "suspended investments", mainly due to the insecurity in financial markets and problems with acquiring credits.

Changes is the positions of individual subjects in the global economy were manifested by creation of the new group of countries, called "The Ten" and which are assumed to be the engine of growing global economy in the growing phase. The countries are: Mexico, South Korea, Turkey, Poland, Indonesia, Saudi Arabia, Taiwan, Iran, Argentina, and Thailand.

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EFFECTIVENESS EVALUATION OF SERVICE PROVIDED IN GEOLOGY: INTRODUCTION OF A PILOT PROJECT EES_G

MARKÉTA LAJCZYKOVÁ

1 EFFECTIVENESS AND ITS SIGNIFICANCE

With the development in sphere of quality management of companies have already today recognizes that quality could be considered as a limiting factor for the so-called sustainable development of the organization. It is known, that the problems of productivity are associated with poor quality in most cases. Quality management system is currently applied in many supplier chains and business chains and represents a further limits of competition on the market.

Declaration of the quality importance in a competitive market environment can verify by result of the recent analysis. This analysis was focused on competitive advantage through systems management (SM). The analysis was performed in a specific organization for the period 2006-2009. The analysis was based on dissection of won and not-won orders (contracts), which include the requirement for management systems in tenders. The analysis presented the impact on the final financial volume.

During the period under review was received 498 inquiries. Of these inquiries included the demand for systems management 267 inquiries. Therefore, the SM requirement contains 54% of inquiries.

In appreciation of realized orders with regard to the requirements of their SM and financial volume was found, that 80% of the financial volume of contracts applies to contracts requiring SM, as illustrated in Figure 1.

ISSN 1335-1745

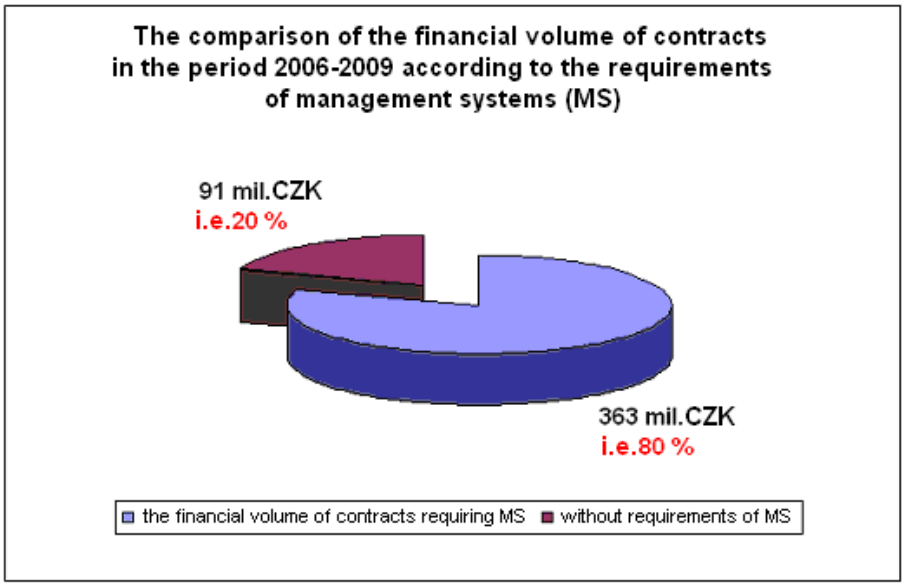

Figure 1- Chart illustrate the financial volume of orders (contracts) in the period 2006-2009 according to the an unspecified SM requirements

The unspecified SM requirement means claim on management system, regardless of the orientation (QMS, EMS or H§SMS). Analysis of the concrete SM requirements is illustrated in Table 1.

Table 1 - Dependence of the contracts financial volume on the specific SM requirements in the period 2007-2009

financial volume	QMS	QMS + EMS	QMS + EMS + H&SMS
to 50 000 CZK	2	1	3
50 000 - 500 000 CZK	3	2	20
500 000 – 1 million CZK	7	4	7
1 - 10 million CZK	10	15	**50**
over 10 million CZK	2	8	**32**

Note: The figures in this table correspond to the number of inquiries with this requirement. Separate EMS requirement, H§SMS requirement, EMS-H§SMS requirement or QMS-H§SMS requirement has not been registered in the period under review.

The number of received inquiries (which contains a SM requirement) shows, that establishing and maintain to management systems mean “half success” for the

organization when entering competitions. The analysis also revealed that more kinds of management system is a “ticket” to financially bulkier and more significant longer-term contracts. The management system is not only an important “plus”, but can be said “a vital factor” in the most competitive in the market.

The quality of the process depends on the resulting customer satisfaction and process performance (Fiala et all, 2008). Turning now to the process performance evaluation, or even closer to the effectiveness evaluation, which includes performance evaluation among others. The phrase “Effectiveness evaluating” presents determining of the extent, where are realized planned activities and achieved planned results (Fiala et all, 2008). It includes quantifiable factors (for example by performance evaluating of the indicators) and unmeasurable factors (for example rated only by the workgroup). Management of organization have to be able to effectiveness evaluate of its processes, to be able to specify the direction of process development to achieve quality improvements and the related productivity improvements.

This paper is focused on providing services, specifically for Effectiveness Evaluating of Services in the Field of Geology (project acronym: EES_G). It delivers the introduction of a pilot project to establish a general methodology for effectiveness evaluating of services in the field of geology. This project use several methods from field of quality management system for analyzing data and is solved in practice in surroudings of a specific organization.

2 PLAN OF THE EFFECTIVENESS EVALUATION OF SERVICE PROVIDED

Effectiveness evaluation of intangible products, specifically the provision of services, can be performed by using methods of quality management system. Effectiveness evaluation of providing services process is a very important factor in deciding in this process control and contributes to the so-called operational quality management, which includes the operating methods and activities aimed at process monitoring and removing the causes of the defective outcomes and weaknesses (Tošenovský et all, 2008). Just as the concept of service is variable, is effectiveness evaluating of the services variable too, such as product of organization.

The product is defined as a result of the process, which means that the product can be both product and service. Intangible result of a process is a "service". This project is focused on the special services in the field of geology and way of the evaluation of their effectiveness. Primary concern is define a clear methodology for effectiveness evaluation of services focusing on geology based on survey methods of data analysis in the quality. Accompanying effect is the research, which goal is improving the way of effectiveness evaluating of the services provided under a certified quality management system based on testing. For the

development of methods for effectiveness evaluating of services in the field of geology could be used familiar tools of quality management.

The basic practical aim is improving of the providing services process control. Foundation of success for determining an appropriate method is its practical application to individual contracts of a specific organization with the aim to effectiveness evaluate of the realization of contracts. Prerequisite for the direct impact of EES_G in practice is processes improving associated with improving of its position in competition in the market. This project should create an environment for continuous improvement and optimizing the process of providing services. Finally, the project should minimize costs associated with this process. Ultimately, you can expect a positive impact on customer satisfaction and loyalty. Because of those impacts this project may be categorized as performance measurement systems in quality management (Nenadál, 2001).

To create the basic parameters for EES_G can use many of the tools of quality management system. In this case could be examined using methods CEDAC (Cause and Effect Diagram with Additional Cards). Application of CEDAC methodology in unknown providing service field in the rank of geology could help in establishing some basics of the methodology EES_G.

3 SERVICES IN THE FIELD OF GEOLOGY

For proper initiation of the project EES_G is important to allocate exact scope of activities for aplication in project EES_G. Those categories of activities and the exact scope of activities should be addressed by negotiation with the leadership of the organization. In this case a scope of activities was solved by workshops and is only informative yet, because project-team is still discussing the breadth of other processes, which can be involved in the project. Workshop was implemented with management of professional Division No.1, and determinined the scope and haromonogram of project progress. Furthermore, is preparing the workshop with a professional Division No. 2, especially the possible applications in geotechnical surveys for construction courses, and study the possibility of involvement of the professional Division No. 3 in the project, particularly in the area of drilling works.

For better clarity and more precise definition the categorization of three ways is chosen.

Description of activities according to product category

Interested organization provide services as a result of at least one activity necessarily performed at the interface between suppliers and customers. Service is in the result a intangible, even though it may include sub-products of mixed character, that is both tangible products and intangible products (Fiala et all,

2008). Many different contracts can in practice include a combination of several categories of activities, as illustrated Table 2.

Table 2 - Description of the activities according to product categories

Category number	Description of the category / list of relevant activities
Category I.	**Activity conducted on the tangible product supplied by the customer**
Remediation of soil or groundwater contaminated especially in the industrial estates (for example hydrogeology and geochemistry).	
Category II.	**Activity conducted on an intangible product shipped by the customer**
Processing and evaluation data of water and soil laboratory analysis.	
Category III.	**Intangible product supplies**
Processing geological projects and final reports, consulting in the field of geology, engineering, etc.	

Description of the activities according to expert fields division

1) Geology
2) Industrial ecology (especially sanitation geology)
3) Experts and assessment activities in the field of geological disciplines

Description of activities under CZ-NACE

Scope of service activities in the field of geology can be defined on the basis of "CZ-NACE", as illustrated Table 3. CZ-NACE categorizes activities according to the data associated with the economic subject - the organization. Classification according to "CZ – NACE" is chosen, because only the "CZ-NACE codes" define the accreditation scope of certification body for certification of management systems in each organization.

Engineering activities and related technical consulting services includes for example: projects related to constructional engineering, water and road structures, water-control projects, designing projects using environmental technology and pollution control, geological surveys, hydrological mapping, etc.

During project implementation can be the scope of activities changed according to the results of further discussions and decision of the management.

Table 3 - Description of the activities according to CZ-NACE.

CZ NACE code	Activities description
39.00	Remediation activities and other activities related with waste
42.91	Construction of water projects
43.13	Prospect drilling operation
71.12	Engineering activities and related technical consultancy
71.12.1	Geological survey
71.12.9	Other engineering activities and related technical consulting services nec.
71.20	Technical testing and analysis
74.90	Other professional, scientific and technical activities nec.

4 EES_G PROJECT

EES_G project (**E**ffectiveness **E**valuation of **S**ervices in the field of **G**eology) involves just developed tool, its prototype will be applied in the real organization.

The general basis for effectiveness evaluation of each process is the identification of indicators for monitoring, measuring and consequently analyzing data about the product (service). Proper identification of indicators is the basis for the final effect. Indicators for monitoring and measurement, thus the quality features, can be determined by using the known methods, such as CEDAC (Cause and Effect Diagram with Additional Cards). CEDAC is transformed (advanced) form of Ishikawa diagram - fishbone diagram. Basic information about CEDAC, see section No.6. This methodology is mainly used by organizations, whose products are tangible (manufacturing organization). In the EES_G project should be CEDAC experimentally applied in the filed of service, which may excite the modification necessity of the procedure in order to meeting project intentions.

In the case of EES_G should be used this method to define indicators, that could lead to the effects of reducing or increasing effectiveness of the process.

With the additionnal cards of CEDAC can not define only the indicators for monitoring and measurement (this means “what to measure”), but also other factors (such as “wherewithall to measure”, “how to measure”, “measurement period”, etc. (Zgodavová et all, 2002). This is essential for building a next step of methodology - the establishment of an “inspection plan”. “Inspection plan” should be established based on specified indicators for measure the product, but can be used for evaluation (monitoring) immeasurable indicators too. “Inspection

plan" exactly defines implementation of monitoring, measurement and evaluation of the contract. On an "Inspection plan" concures so-called "Service effectiveness card" (definition below). By using CEDAC is possible to define the desired outcomes of the "Inspection plan" (strategy management) and monitoring can evaluates differences between the planned execution and final results (it follows from the definition of efficiency). In many cases occure changes in customer requirements during the realization of contract (extra works, etc.). By repeatedly creating of "Inspection plans" for individual contracts can be defined the specific improvement proposals based on previous results.

Before evaluating obtained information is necessary to determine the weight of each indicator, because each indicator has its own specifics and different effect on the final outcome of the process. Weight evaluation of indicators should be part of the so-called "Service efficiency card", which concures the filled "Inspection plan". The card should contain an appropriate function for determining the effectiveness of services, which have to include all the measured or assessed variables and their weight. "Service effectiveness card" should be quantitative characteristics of services provided efficiency on the basis of data from monitoring and measuring according to the "Inspection plan".

"Services efficiency card" is only a partial document for each contract from the cycle of long-term monitoring of contracts and serves as a basis for annual and overall comparison.

5 ANALYSIS OF PROBLEM AREAS

To create an appropriate "Inspection Plan" and "Service effectivenes card" is essential detailed study of processes. The basis is the processes analysis for their involvement in the project and subsequently structures creation of the "Inspection Plan" and "Service effectiveness card". In other words, the essence of the EES_G project is studies of processes, that are interconnected in the system. One of the possibilities for the process analysis according to system-perspective is the analysis of the internal and external audits results of the organization.

For EES_G project was this analysis performed in a concrete organization based on the audits results for the years 2002-2009. The objective is the identification of problem areas within the quality management system of the organization. This analysis is one of the bases and sources of information for creating "Service effectiveness card". Analysis results are internal property of the organization and therefore aren´t presented in this paper in full scope. For the purposes of this paper may be presented the analysis conclusions (analysis was made in an organization, where is the EES_G project implemented), as follows:

The analysis was divided into two evaluation. Frequency analysis represent evaluation of the areas, where are most frequently mistakes and inclinations from the standards. The analysis uses a graphical representation of the frequency of findings according to specific standard requirements (without taking due note of

the weights of findings as the degree of significance). Importance-evaluation uses the so-called index number, this means, that this analysis takes due note of both the frequency and weight of the findings. This analysis focuses more on problem areas related to systemic solutions.

Conclusion of the frequency analysis indicates problematic areas (in relation to areas of the system according to standard ISO 9001:2008), where finely, but most frequently make mistakes ordinary workers.

In the area, with the high frequency of findings, was concluded that the problem is too often repeated controling of reports, which deal with a series of standards requirements (individual standard´s articles). These findings are often caused by a one-off omissions or caused by human error (either ignorance, inconsistency, or lack of practice). The findings occurring in this area deal with those parts of the processes, which involve the largest range of employees and where are generally prescribed the responsibility of type: "everyone have to respect". In the future the removing of this problems can be achieved by increasing awareness of the seriousness in adherence to the internal standards requirements, more frequently staff coaching in different subjects of knowledge, but also the tightening of controls and giving his own example (this means management responsibility), etc. Here is way of the improving clarity. Improvements in this area is neccesary for reinforcement the stability and efficiency of the system.

Conclusion of the importance-evaluation is, that in the identified critical areas is fault more serious and its solution will consist in examining the current system settings and searching new more suitable methods. In presenting the results should be emphasized that importance-evaluation results represent systemic perspective (taking due note of the findings significance).

The critical areas were showing requirements under articles of standard ISO 9001:2008 No. 7.1 "planning of product realization" and No. 8.2.3 "monitoring and measurement of processes". In the article No. 7.1 are especially incorrectness of production plans (worksheets, instructions, etc.) or their absence. The deficiency is serious, because the owner of the process has imperfect or doesn´t have the proper standard. Findings from the article No. 8.2.3 show that once again neglected the basics of monitoring and measurement system. Requirements according to the article No.8.2.3 appear to be difficult to understand in many organizations in practice. One reason is that employees often don´t understand the importance or the process to meet the requirements of article No. 8.2.3. Proper establishment and implementation of this requirements according to this article should be a source of valuable data for improving the QMS in the organization. Therefore they often regards monitoring as "unnecessary" or as a "waste of time".

The importance-evaluation result shows the areas, where should be focus on finding other more appropriate methods for setting these processes. Here should be selected the more complex corrective action. For the eliminate any obstacles during the application of EES_G project, it would be appropriate when selecting

tools to improve focus both on targeted improvements in existing processes and on improvements of the degree of employee involvement. In response to the finding deficiencies according to the article No.8.2.3 is being prepared mentioned EES_G project.

6 CEDAC – APPLICATION, INSPIRATION

In the case of the exercise CEDAC, it is necessary to be well acquainted with the method. The source of information may be, inter alia, Dr. Ryuji Fukuda´s publication "CEDAC a Tool for Continuous Systematic Improvement" (Fucuda, 1989).

CEDAC system (Cause and effect diagram with additional cards) is modified (more advanced) form of Ishikawa diagram - fishbone diagram. Ishikawa diagram is a tool for analyzing the causes of the concequences, which can be a corrective or preventive tool. This method uses a teamwork based on the brainstorming to maximize intellectual potential of employees.

CEDAC system can be applied to any area where are needed improvements, not only to the areas related to quality management. Employee management and employee training can be defined as the two most important factors for the development of an favorable environment conducive to continuous improvement. Favorable environment occurs when are met two conditions: 1. Proper practices (standards) have to be established, respected and practiced, 2. All stakeholders have to understand these procedures and manage them in practice accurately. There is another condition for improving success by Dr.Fukuda, involvement of employees in improvement process, which is (how the analysis of the audits in a specific organization revealed) just one of the identified problems.

CEDAC system structure consists of three processes (stages): Window Analysis, CEDAC diagram and the Window Development.

Window Analysis (1st CEDAC stage) is used for the analysis of specific data on different nonconforming results and for categorization of the data according to their management. Window analysis structure consist of a diagram, in which are compared people, or functional groups that interact on himself daily at work. For categorization of data is used categories "Known", "Unknown", "Practiced", "Unpracticed". According to these categories the data and the related situation are categorizing to the basic categories A - D. With a focus on systemic perspective, the category "known" can be divided on the category "established" (known-established standard) and "known" (employees know the standard - employees are familiar with standard). Each categories presents table 4.

Table 4 - Categorization of situations

Category	Description of undesirable event (situation)	Nature of the situation	Recommended procedure
A	Proper procedures are established and stakeholders know and practice procedures correctly. **ESTABLISHED -KNOWN – PRACTICED**	Ideal situation	Not necessary
B	Procedures aren´t practicing correctly: careless mistakes, lack of skills, lack of time,manpower or financial resources). **ESTABLISHED -KNOWN - UNPRACTICED**	The problem with practice	1. Window Deployment 2. CEDAC Diagram 3. Tools for preventing human errors 4. Tools for improvement employee skills, etc.
C	Procedures are established, but they are unknown for interested employees. **ESTABLISHED -UNKNOWN- UNPRACTICED**	The problem with comunication	1. Window Deployment 2. CEDAC Diagram 3. The visual control systems 4. Daily management system
D	Proper procedures aren´t established. **NOT ESTABLISHED - UNKNOWN-UNPRACTICED**	The problem with standardization	1. CEDAC Diagram

All situations filled into categories B, C and D according to the Window analysis must be transformed into the category A by the appropriate management.

For the purpose of this EES_G project is expected situation in category D, where the correct standard for effectiveness evaluating isn´t established, is unknown and not yet practiced. Therefore may be to develop effectivnes evaluating methods (in the service sector) start from CEDAC diagram.

CEDAC Diagram (2nd CEDAC stage) was created to solving problems in category D (where reliable method has not been established). CEDAC Diagram can be effectively applied also to weaknesses in category B or C. The CEDAC Diagram is a tool aimed at creating "standard". In the case of the EES_G project that means at creating standard for effectiveness evaluating. The basic feature of the diagram is the involvement of employees. To create CEDAC Diagram is essential determination of the working team. Team consists of employees from the different organizational levels (management, technicians, managers, operators, etc.) It means, that in this project work both people, who know the process, and people, who know the theoretical foundations of the methodologies and tools of quality. Of course it has a team named team leader. CEDAC diagram is similar with Ishikawa diagram, but the goal of CEDAC diagram is different. CEDAC Diagram goal is to find an effective system for creating standards, that eliminate the differences caused by the absence of reliable methods and procedures. CEDAC diagram can be interpreted in several steps, which are briefly described below. By CEDAC is determined subject for improvement, are determined his measurable outcomes and is set the time range for data collection. Further is defined the goal of improvement or assumptive benefit after achieving the goal. In the next step the obstacles are defined in achieving the goal. These are written on a so-called "fact cards" and subsequently are submitted the improvement ideas. The improvement ideas are documented on the “improvement cards”, which are further categorized as “unusable”, “of interest”, “under preparation” or “under test”. When are the improvement cards tested, the color description of each card is used, depending on the attached category, as ilustrated Table 5.

Table 5 - CEDAC Diagram Improvement cards categories

Category	Charakteristic of improvement card	Colour description
„unusable“	Improvement idea isn´t sufficient, or is ineffective.	The card doesn´t identify 
„of interest“	Improvement idea cannot be implemented immediately.	The card indicates a red dot 
„under preparation“	Improvement idea will be realized. The tools, equipment, resources etc. ere planning.	The card indicates the two red dots 
„under test“	Improvement ideas are tested and the results monitored.	The card indicates the three dots

This scoring cards in the CEDAC Diagram allows instant overview about the state of improvment ideas during the project. If positive results are confirmed, the improvement idea is put into practice – from "improvement card" has become a "standard card".

The last process in the CEDAC structure is a "window development" (3rd CEDAC stage), which examines the particular steps of a CEDAC Diagram and focuses on compliance with standards. In other words, this tool is designed to ensure, that every employee correctly understands and respects standard. "Window development" using numerical method for effectiveness evaluating of the standard based on classification on points of individual performance of sub-measures corective action.

Posted proper understanding of the methods CEDAC in EES_G project lies in the fact, that by its appropriate use should be properly set the parameters for EES_G and so directly affect the success of EES_G.

CEDAC diagram would be presented in many literature separately. It can be used by using the Six Sigma method – CEDAC is there placed together with other methods as a tool, that examines the impact of inputs variability to outputs variability in the process and divided the various causes generally into several categories. In this case is described only CEDAC Diagram as an alternative approach (without the use of the successive steps according to Dr.Fukuda) and is displayed on a wall or a wide area and staff are encouraged to identify causes for example by using sticky notes. The success of this approach is seen in relation to organizational culture and communication " (Munro, 2007).

Publication "Quality Professional" (Zgodavová et all, 2002) states, that CEDAC is a tool developed to find an effective system of reliable standards and its main purpose is the elimination of serious disagreements caused by the absence of reliable methods.

7 CONCLUSION

Result of the EES_G project should be a simple methodology for monitoring and measuring indicators of services in the field of geology, evaluation of the resulting values of efficiency. Assumed to use a combination of methods relating to the analysis in quality management system, rather than strictly as we know from literature, but adapted to the needs. The output should be the form or set of forms so-called "inspection plans" and "service effectiveness cards" to include both quantitative and qualitative data in the table- or graph forms with a final evaluation of the resulting efficiency. This resulting efficiency designate an area for specifying improvement ideas. Assumed to take corrective action, preventive action and improvement action during detection and evaluation of services. Also is expected visible improvement in the comparison of infra-annual evaluation and overall evaluationt. EES_G project should also contribute to scientific

knowledge by applying the CEDAC methodology (or by inspiring with CEDAC) in services in the field of geology.

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DAIMLER PROCESS AUDIT PREPARATION, EXECUTION AND EVALUATION IN FAURECIA KOSICE

LUBOMIR LENGYEL

1 INTRODUCTION

Faurecia Slovakia, plant Kosice is a part of the company Faurecia which is leading supplier of automotive industry worldwide. Plant Kosice is a part of the Faurecia's business group Interior Systems and is specializing in the leather processing. Kosice plant is delivering Instrument Panels, Door Panels and various interior part of the cars covered with natural or artificial leather to 11 customers in Germany, France, Great Britain, South Africa, Poland and Slovakia. OEM's supplied by Kosice are PSA, Land Rover, Ford, and Volvo.

In order to enlarge portfolio of the supplied OEM's and also enter into the premium luxury segment of the cars it was decided on the group level to enter into the acquisition process of the current Mercedes-Benz S-class car.

S-class doorpanels and central console were in that time supplied by Faurecia's competitor in field of interior systems. An offer was placed to Daimler with intention to insource the production activities from the competitor. This offer was principally accepted by Daimler, so further negotiations with competitor, so as Daimler customer could follow-up.

As the result it was agreed to insource firstly central console of S-Class and based on the result of this insourcing further actions will be decided by Daimler. First and only condition placed by Daimler was to pass the Daimler Process Audit (DPA) on the S-class central console product coded internally by Daimler as W221 program.

2 METHODOLOGY

2.1 Used methodologies

This paper is describing the process of preparation to successful passing DPA. From process point of view VDA 6.3 standard has been the base accompanied with Daimler additions, driven by internal Faurecia Audit standard. Continual improvement process based on Deming's cycle has been applied.

2.2. DPA Preparation process

The planning and preparation for an internal quality management systems audit, for example as specified by ISO 9001:2008, "Quality Management Systems – requirements" is possibly the most important aspect in ensuring the effectiveness of that audit (Nichols, 2010).

Beside production transfer preparation and realization a separate workgroup was established in Faurecia plant Kosice with only target to prepare the plant for successful passing of DPA. Workgroup consist of the Kosice plan management team (plant manager, quality manager, logistic manager, production manager), Faurecia plant Boblingen and Scheuerfeld management team (plant and quality managers) which were in that time already supplying W221 products to Daimler and also development team from Faurecia development center in Hagenbach (program manager, commodity manager, program quality managers). This team was led by Kosice quality manager as the main contact for Daimler in case of W221 insourcing to Kosice. Team members were all specialist in various processes and thus building of such cross sectional team should lead to success based on the knowledge base present.

Regular meeting dates were established (lead time from insourcing to DPA was only 3 months, thus meetings took place on weekly basis).

As first step it was decided to perform a special training for DPA and Daimler customer special requirements for all team members. This training was provided by the representatives of the Boblingen and Scheuerfeld plants.

DPA is based on the VDA 6.3 standard, which is common for German automakers. So far standard for process audits applied in Faurecia was QS 9000 standard for all non-german OEM's and FIEV standard for PSA.

Various differences were identified and discussed their application.

Standard VDA 6.3 process audit consists of 7 chapters

1 - Product development planning

2 - Realizing product development

3 - Process development planning

4 - Realizing process development

5 - Suppliers / Input material

6 - Production process

- 6.1 – Personnel / qualification
- 6.2 – Production material-equipment
- 6.3 – Transport / Parts Handling / Storage / Packaging
- 6.4 – Fault Analysis / Correction / Continual improvement

7 – Customer service-customer satisfaction-service

DPA standard is based on VDA6.3 with additional points/questions in chapters

M1 – Product development planning

M1.6 – Will a fallback solution for product malfunctions or identified risks be elaborated during development?

M1.7 – Is the identification of special characteristics ensured on the basis of requirement and are the requirement regarding the traceability of the products and characteristics safeguarded?

M1.8 Are external development partners integrated and are they

controlled?

M3 – Process development planning

M3.7 – Have the suppliers for procedures, tools, machines, services etc. been integrated in process development?

M4 – Implementing process development

M4.7 – Do the process related obligations of the suppliers for procedures, tools, machines, and services that must be fulfilled at the relevant times comply with the process development plan?

M5 – Suppliers / Input Material

M5.10 – Is a process for monitoring the procurement market in place and are measures derived from market observations and requirements forecasts?

M5.11 – Is the availability of input material (components) ensured in the event of increased demand when series production is launched and after it is complete?

M5.12 – Are the required suppliers integrated in the new product project and are they familiar with the customer requirements?

M5.13 – Have the risks in the supply chain been determined and counteracted by means of suitable measures?

M5.14 – Are process audits in accordance with VDA6.3 or similar method planned and performed during the development phase for suppliers commissioned for new product projects?

M6.2 – Production Material / Equipment

M6.2.8 – Are the machines and equipment serviced and maintained on a preventive basis (e.g. by means of routines) as well as on an anticipatory basis (by means of maintenance schedules) and, in turn, s the availability of the machines improved?

M6.2.9 – Do the recordings made during the processes ensure the required level of traceability?

M6.2.10 – Are legal requirements regarding the handling of waste and hazardous substances fulfilled? (environment)

M6.2.11 – Are the requirements associated with the construction and operations of a plant fulfilled? (environment)

M6.4 – Non conformity analysis / corrective actions / continuous improvement

M6.4.7 – Has a suitable procedure for re-qualifying products on a regular basis been defined and implemented?

M6.4.8 – How are changes to the product or process handled, monitored and documented during series production?

In order to collate the VDA and Daimler standard into one common questionnaire, checklist was prepared cross linking both standards with clear description of the requirements (Figure 1).

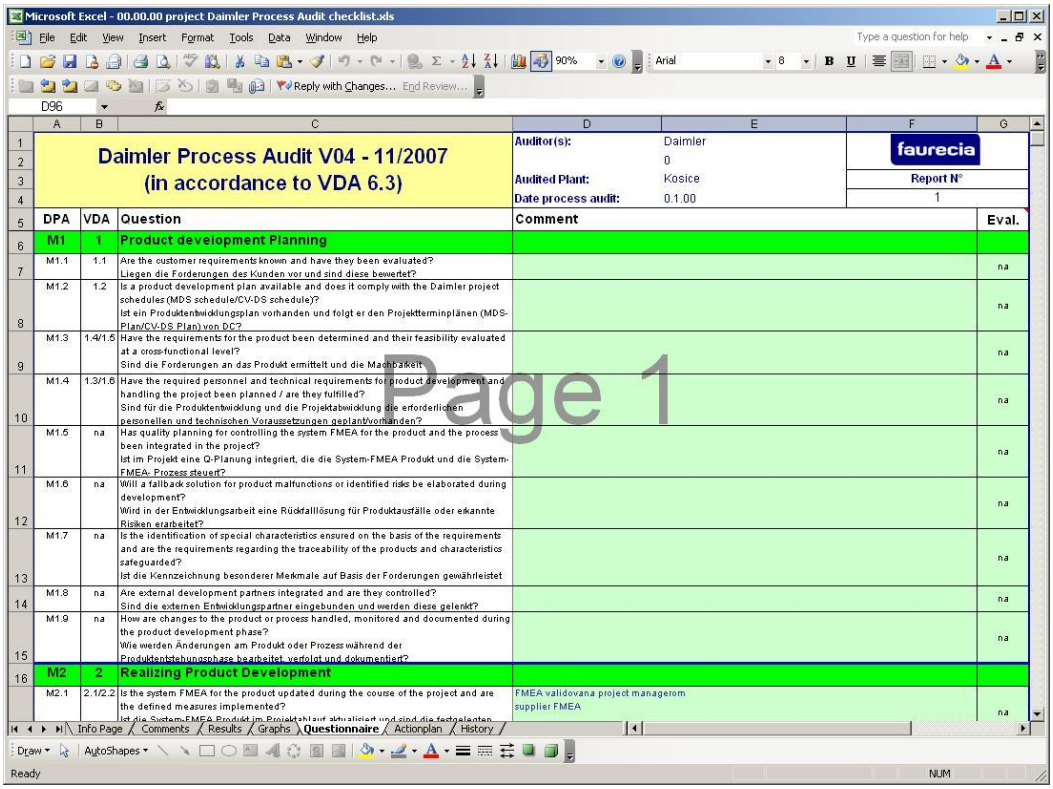

Figure 1 - Process audit questionnaire (Schmidt, 2007)

Main effort was put in preparation of the chapter suppliers – input material. Reason for this was the previous experience with Daimler and their philosophy

of quality. Daimler understanding of the automotive production process is different than other automakers due to the quality expected from Daimler cars and Daimler customer expectations from cars. Thus Daimler philosophy is "how you are able to treat your suppliers, that way at least you will treat your production process and customers".

Using the ISO 9000 'normative reference' or vocabulary document, we know that a process is defined as "activities which transform inputs into outputs" and, if we apply this definition to a typical assignment, e.g. a manufacturing process, it might be a reasonable expectation that an auditor should study and understand the defined process inputs, activities and outputs, as described by the organization's quality system documentation (Nichols 2010).

Due to this approach part 3 of VDA is the major one and most of the DPA time is spent there. Additional points of Daimler interest in this point are described in section M5, point M5.10-M5.14.

From this can be seen major Daimler interest into the ability to continuously supply selected products preventing major disturbances of the supply flow by various reasons (quality, delivery, process issues).

In production process part of DPA another approach of Daimler could be seen. According Daimler every automotive supplier should not only be able to prevent delivering NOK parts to the customer, but should be able to produce only OK parts. Other words said, major task for Daimler are not the control and evaluation processes, but the process control and ability to develop and maintain stabile and effective processes.

This approach is similar to the one appliled in Faurecia (layered process audit - LPA). LPA is an ongoing system of process checks that verify proper methods, settings, operator craftsmanship, error proofing devices and other inputs are in place to ensure a defect free product (Risner 2010).

Keeping in mind those major principles of Daimler a first internal DPA was performed in Kosice. All parts and processes were audited by Audit team built of Quality Managers of Boblingen, Scheuerfeld and Kosice. Result of this first pre-audit was 68% status red, not passed. Daimler's evaluation of the process audit is based on percentage of correctly covered questions from DPA and color codex based on the percentage result achieved. Less than 60% status red, ranking C – not passed, 60%-80% status yellow, ranking B – partially passed, 80%-90% status yellow, ranking AB – major compliance, more than 90% status green, ranking A – passed.

Based on this result an action plan based on outcomes of this first pre-audit was established. Countermeasures, improvement actions, responsible and deadlines were defined and agreed (Figure 2).

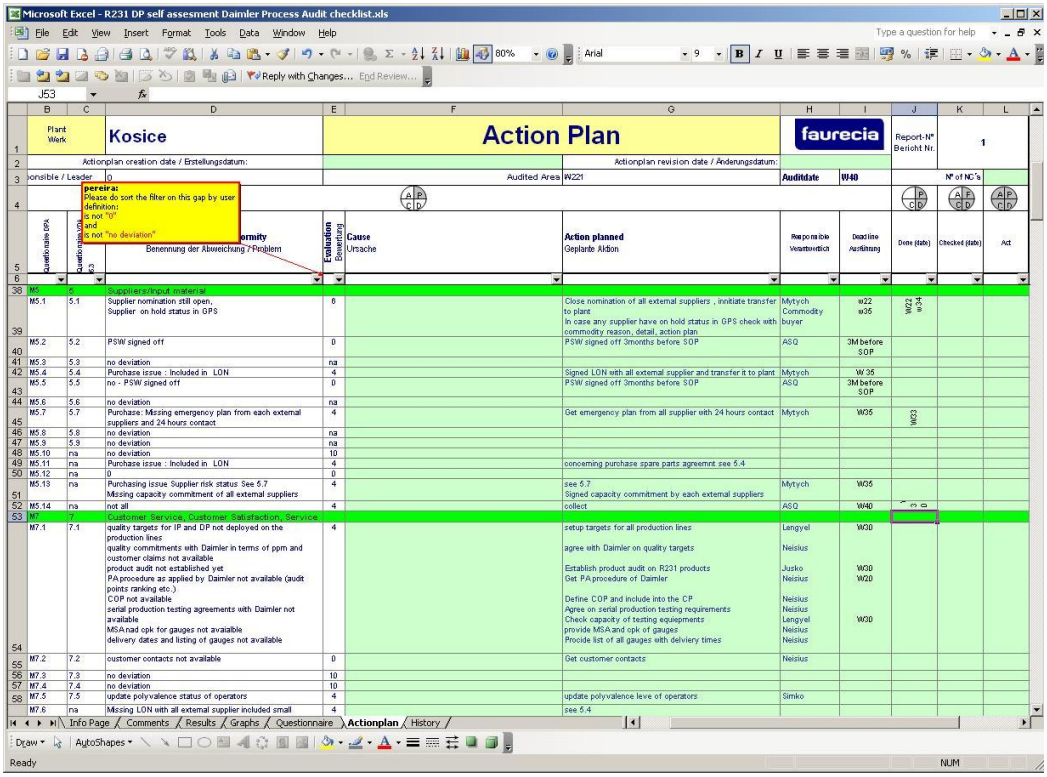

Figure 2 - Action plan from pre-audit

Further it was agreed to perform series of additional re-audits on monthly basis in order to track the follow-up and deal with additional points popped out in the meantime.

To the re-audit which took place exactly 1 month after first audit was invited group audit specialist in order to support the DPA team with additional points of view. Result of this re-audit was 79% status yellow partially passed. Feedback from group specialist was positive in terms of plant preparation regarding expectations of Daimler.

Last audit took place 1 month before official Daimler DPA. Result was 91% status green passed. During the audit it was agreed to closely watch the last outstanding issues and the way of DPA support.

2.3. DPA realization process

As a preparation for the Daimler visit and audit a special committee was held with intention to plan in detail whole visit in terms of transport, arrival, refreshments, presentation of plant, audit planning, debriefing etc.

As the most important point was identified the need of planning the exact way of plant tour in order to show to customer all the processes to be audited in process flow way. This plant tour should show the customer the highlights of the processes, so as to present the plant in best possible picture.

Second important point was the exact planning of the audit schedule with time windows needed for evaluation of each phase and with presence of all necessary personnel in order to decrease the possible delays.

Trial plant tour was organized one day before customer arrival identifying last outstanding issues and clarifying all open points.

During the DPA performed by representatives of quality, engineering and development of Daimler none of the serious issues was identified. Daimler representatives have deeply reviewed all process steps with special attention to the incoming inspection of parts and measurement of the dimensional parameters of parts as delivered to customer.

21 points of improvement summarized in action plan allowed Kosice to improve the processes and be more coherent with expectations of the customer in premium segment of the automotive industry, so as be more competitive in future acquisitions.

Final result of the DPA was 96,6%, status green passed.

This result was a benchmark level all over the Faurecia group as such result was never achieved by any Faurecia supplying Daimler and according information given during the debriefing session, it was the best result achieved worldwide in the interior systems suppliers of Daimler.

3 CONCLUSION

Overall result of the DPA performed on W221 project in Kosice, was an acknowledgement of the preparation process established in the past, thoroughly monitored and evaluated on regular basis and closely followed by whole management team with deep involvement of all Faurecia Kosice plant team members.

By application of such process thoroughly all over projects established in Faurecia Kosice, so as sharing this lessons learned with other Faurecia plants enables Faurecia group to be more competitive in automotive world and be able to offer to customers stat-of-the-art processes with high self-improvement potential improving efficiency of production processes run in series life of various projects

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ANALYSIS OF INNOVATION ACTIVITY OF SLOVAK AND CZECH ENTERPRISES

EMÍLIA SPIŠÁKOVÁ

1 INTRODUCTION

The term *"innovation"* is Latin origin (innovatio, innovare) and means the introduction of new or significantly improved product or service on the market, respectively introduction of new or significantly improved process within the company (Štatistický úrad SR, 2006). Innovation is obtained as a new combination of existing business technologies, new technological developments or use of business skills. Innovation can be developed by the company or other companies, and it should present something new to the company.

The base of innovation is the ability to see the relations, observe and exploit the opportunities. This is relative, radical and revolutionary changes in thinking, products, processes or organizations. In the literature we can find several different approaches to the definition of innovation. For example, European Commission defines innovation as the renewal and extension of scale of products and services and related markets, creating new methods of production, supply and distribution, introduction of changes in management, work organization, working conditions and changes in workforce skills (Klas, 2005).

Luecke and Katz define innovation from the perspective of the organization: *"Innovation ... is generally regarded as the successful introduction of new things or methods ... Innovation is the personification, combination or synthesis of knowledge in original, relevant and valuable new products or services."* (Luecke, Katz, 2003, p.3)

Innovation generally involves also creation. However these two terms can not be considered as synonyms. According to Teresa Amabile the innovation begins with creative idea and a successful implementation of this idea in the organization. Then the creativity of individuals and teams is base of innovation. It is necessary but not sufficient (Amabile, 1996).

Innovation can also be characterized in terms of organizational and management processes. According to Davil, is the innovation, like other business functions, management process requiring specific tools, tasks and discipline (Davila, Epstein, Shelton, 2006).

The term of innovation is often confused with the term of invention. Invention is only the first step in a long process in which a good idea is converted into a

widely usable and effective product or service. Innovation therefore requires more than only come with a new idea, but it is the process of application of the idea in practice.

Current knowledge in the innovation that are reported in literature distinguish four basic types of innovation: product, process, organizational and marketing innovation. Product innovation is the introduction of new or significantly improved product. Process innovation is a new or significantly improved production method or the supply and distribution channel. These two types of innovation are associated with improving of existing or application of new technologies in the production, therefore they are often called *"technological innovation"*.

Organizational innovation are the implementation of new or significant changes in corporate structure and marketing innovation are associated with the introduction of new or significantly improved product design and sales methods in order to increase the attractiveness of products and services or to enter in the new markets. These two types of innovation are also called *"non-technological innovation"*, because they do not require the changes or introduction of new technologies, but they are oriented on the adoption of new business and organizational methods.

2 INNOVATION ACTIVITY OF ENTERPRISES IN SELECTED COUNTRIES

Innovation in the period of economic crisis become an essential assumption for business survival in a strong competitive fight. Information about the creation and implementation of innovation in this period are not yet available, so this article will use the last available data from Eurostat, i.e. data for the year 2006. On the basis of them a comparative analysis of innovation activities of Czech and Slovak enterprises will be realized and the cooperation in the development and implementation of innovation will be described.

In 2006 occurred in European Union 691,735 enterprises, of which only 38.87% were innovation active, i.e. they introduced only product innovation, only process innovation or both product and process innovation. The largest share on the total number of enterprises during the year 2006 had small enterprises with staff from 10 to 49 (544,723 enterprises), from which were only 34.40% innovation active (Figure 1). Followed the medium-sized enterprises with the number of staff from 50 to 249 (120,765 medium-sized enterprises from the total number of enterprises in EU27) and innovation active were 52.27% of medium-sized enterprises.

From the total of 26,237 large enterprises (large enterprises are employing 250 or more employees) introduced during the year 2006 product, process or both product and process innovation 18,385 enterprises, i.e. 70.07%. This reflects:

- higher amount of funds destined for innovation in these enterprises,
- better access to foreign resources that will support innovative activity of enterprises,
- advanced machinery, equipment and software used in the production,
- high intellectual potential and also
- ability to withstand significantly higher risks associated with the introduction of innovation in comparison with small respectively medium-sized enterprises.

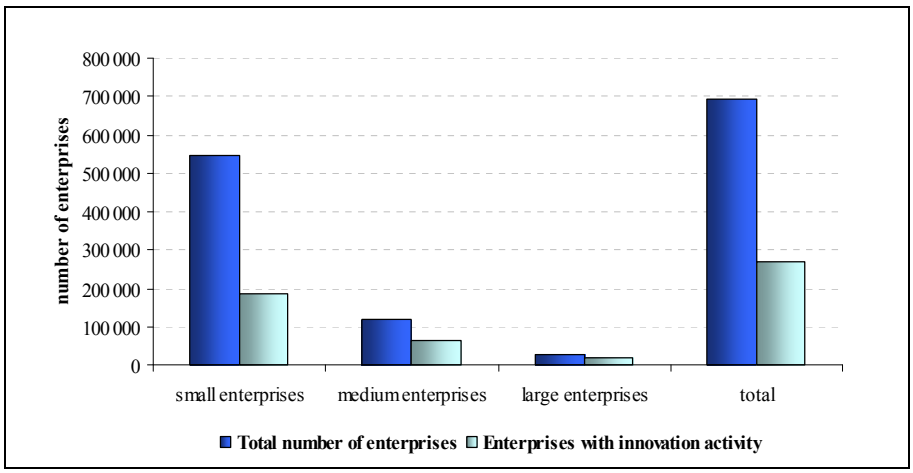

Figure 1 - The number of innovation active enterprises in EU 27 according to their size in 2006

The following parts of article deal with more detailed analysis of innovation activity of enterprises in two neighboring countries. Specifically, it is the analysis of innovation activity of enterprises according to their size, to the type of introduced innovation, according to the sector of their operation, organization which has developed a new product or process. There is also analyzed the cooperation in the development and implementation of innovation in enterprises with domestic institutions, but also with institutions outside the country, i.e. in the European Union, in other European countries or in the U.S., respectively other countries in the World.

We will use here standard methods, like a comparison, spatial and trend analysis, induction, deduction and synthesis.

2.1 The innovation activity of Slovak enterprises

Slovak Republic is the smallest country of V4 countries not only by its extent, but also by the number of the population. Together with the Poland and Hungary belongs country to the group of catching-up countries, whereby its innovation

activity, which is evaluated by the Summary Innovation Index, is higher then the innovation activity of two mentioned countries from this group.

The size of country is also reflected in the number of enterprises in Slovak Republic (the lowest number of enterprises in comparison with the other V4 countries). From the number of 6,465 enterprises only ¼ of enterprises decided to create and implement some type of innovation (Table 1). The most of enterprises still regard this activity as expensive and very risky; therefore they prefer a simple way without the innovation. The most of product and process innovation were in the year 2006 implemented in the small enterprises, the least in large enterprises. Regardless of the size of enterprise, in the country predominated and still dominate the enterprises without the innovation activity.

Table 1 - Enterprises with innovation activity according to their size and the type of implemented innovation in Slovak Republic

Size of enterprise/type of innovation	Total enterprises	Enterprises with innovation activity					Enterprises without innovation activity
		Total	Product and process innovation	Product innovation	Process innovation	Establish innovators, ongoing and/or abandoned only	
Small enterprises	4,575	874	257	218	342	57	3 701
Medium enterprises	1,459	492	217	113	147	16	967
Large enterprises	431	242	148	29	57	7	189

Source: self elaboration according to the data from Eurostat on 13.1.2010

According to the analyze of innovation activity of enterprises by the sector of their operation we can state, that in the year 2006 had the highest share the industrial enterprises, nearly 27% of enterprises innovated their production by the implementation of product, process or both product and process innovation (Figure 2). From the total number of enterprises, 2,828 enterprises didn't realized any innovation activity.

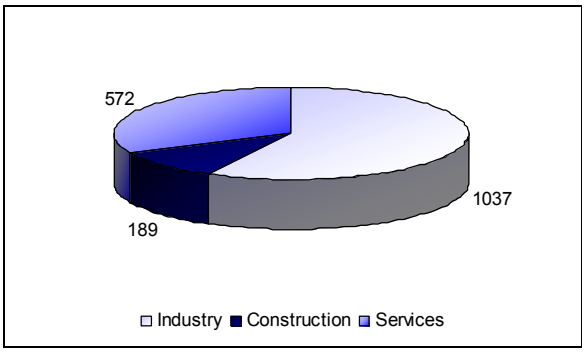

Figure 2 - The number of enterprises with innovation activity according to the sector of their operation in Slovak Republic

The highest innovation activity was recorded in the industrial enterprises in the area of Manufacture of office machinery and computers, where exactly half of the enterprises in the year 2006 introduced some type of innovation. Less than half of innovative enterprises were from all other areas of industry, for example from the area of Manufacture of medical, precision and optical instruments, watches and clocks and Manufacture of electrical machinery and apparatus with the 43% share of enterprises with innovation activity on the total number of enterprises in this area.

On the other hand, the lowest innovation activity was observed in enterprises deals with the Collection, purification and distribution of water (5.88% of enterprises), the Manufacture of wearing apparel, dressing, dyeing of fur clothing production, processing and dyeing of fur, the Manufacture of textiles and textile products, leather and leather products with around 10% share of innovative enterprises on the total number of enterprises in this area.

In the service sector has decided to improve their services or to improve the level of services supplying about half of the number of industrial enterprises (Figure 2), but their share on the total number of enterprises providing services was almost 22%. These enterprises preferred process innovation, not product innovation.

The most of innovative services were provided by the enterprises in the area of Financial intermediation, except insurance and pension funding (62.22% of these enterprises provided new or improved service), also in the area of Research and development, with the 61.36% share of innovative enterprise on the total number of enterprises in this area, and in the area of Post and Telecommunications, where exactly 60% of enterprises decided to innovate providing services.

The lowest innovation activity, but not so much low than in the industrial sector, was in enterprises that realized Supporting and auxiliary transport activities, activities of travel agencies with the 13.48% share of innovative enterprises on the total number of enterprises in this area.

In the year 2006, enterprises in the construction sector were showed the lowest innovation activity. From the total of 1,526 construction enterprises, only 12.39% of enterprises innovated their production mainly by introducing new or significantly improved processes.

According to the analyze of innovation activity of enterprises operating in the different sectors according to their size we can state, that both in industrial and in service sector were the most numerous small enterprises, but the share of small innovative enterprises on the total number of small enterprises in industrial and service sector was the lowest (Figure 3). By contrast to this, the least numerous were large enterprises, of which over half enterprises decided to introduce the innovation in the year 2006.

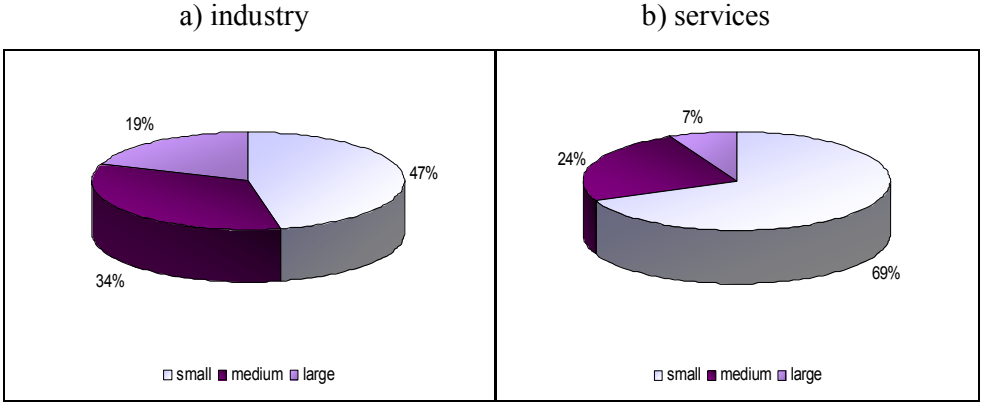

Figure 3 - Percentage share of small, medium and large innovation active enterprises in the total number of innovative enterprises in industry and services sectore in Slovak Republic

2.2 The cooperation in creating and implementing innovation in Slovak Republic

The development of new or significantly improved product and process may be involved in various enterprises, institutions. Innovation may be the result of the enterprise's activity or the activity of the group of enterprises that introduce it, the result of cooperation of particular enterprise with the other enterprises or may be fully developed by other companies, institutions.

According to data available from Eurostat for the period 2004 - 2006 we can state that the most of Slovak enterprises, either alone or in cooperation with the group of enterprises developed product or process innovation. The new product was developed by 733 enterprises and the new process by 580 enterprises. We can also say that in this period were dominant industrial enterprises above the enterprises from the service and construction sector (Table 2).

Table 2 - Product and process innovation according to the developing organization and the sector of its operation in Slovak Republic

Sector of enterprise's operation / developing organization of new products or processes	**Product developed**			**Process developed**		
	mainly by other enterprises or institutions	by enterprise or the group of enterprises	in cooperation with the other enterprises or institutions	mainly by other enterprises or institutions	by enterprise or the group of enterprises	in cooperation with the other enterprises or institutions
Number of enterprises:						
in industry	57	441	138	145	311	282
in construction	17	55	7	65	59	30
in services	35	237	98	94	210	146
Total in all sectors	**109**	**733**	**243**	**304**	**580**	**458**

Source: self elaboration according to the data from Eurostat on 13.1.2010

In the development of new product 243 enterprises cooperated with other enterprises or institutions and in the development of new process that was nearly double number of enterprises. Again, the industrial enterprises dominated in cooperating during the development of new product or process, not enterprises from the sector of services or construction.

In the analyzed period, the enterprises used at least the possibility to develop new product or process entirely by another institution or company.

During the period 2004 – 2006, 574 of Slovak enterprises had decided to cooperate in creation and implementation of innovation with some of institutions or subjects operating in the country. The most important partners were suppliers of equipment, materials, components or software, i.e. 278 of enterprises cooperated with this partner (Table 3). The greatest interest in cooperation had small enterprises and their share on the total small innovative enterprises was 20.48%.

For the cooperation with other enterprises within the group of enterprises had decided 128 enterprises. In this case, mainly large and medium-sized enterprises cooperate. Several enterprises also had an interest to work with a very important group, with clients and customers.

The smallest interest had Slovak enterprises in cooperation with the government or public research institutions, where only one medium-sized enterprise, two large and six small enterprises preferred this type of cooperation.

Table 3 - Number of enterprises in Slovak Republic cooperating with other institutions in regard to creation and implementation of innovation

Cooperative institution / size of enterprises	Total number of cooperative enterprises	Number of cooperative enterprises according to their size		
		small	medium	large
The cooperation of enterprises with:				
consultants, commercial labs, or private R&D institutes	37	7	16	13
government or public research institutes	9	6	1	2
universities or other higher education institutions	20	7	6	7
suppliers of equipment, materials, components or software	278	179	61	38
clients or customers	89	31	38	20
competitors or other enterprises of the same sector	12	2	6	4
other enterprises within your enterprise group	128	26	49	53

Source: self elaboration according to the data from Eurostat on 13.1.2010

If we want to evaluate the cooperation of Slovak enterprises in the period 2004 – 2006 with other enterprises by the country of their operation we find out that unlike the other V4 countries, Slovak enterprises preferred the cooperation with enterprises operating in various European countries. But the difference is not

significant (Table 4). During this period the cooperation with European countries was preferred by 489 enterprises and the cooperation with enterprises operating in the Slovak Republic was preferred by 478 enterprises. These cooperations preferred about 50% of large enterprises on the total number of innovative enterprises, followed medium-sized enterprises with approximately 30.5% share and small businesses with an average 24% share.

The cooperation with the enterprises in U.S. or in other countries was preferred by 143 Slovak enterprises, whereby dominated large enterprises.

Table 4 - Number of enterprises in Slovak Republic cooperating in creation and implementation of innovation according to the country of the partner

Cooperative institution / size of enterprises	Total number of cooperative enterprises	Number of cooperative enterprises according to their size		
		small	medium	large
Enterprise engaged in any type of innovation cooperation:				
within United States and other countries	143	42	39	63
national	478	205	152	121
within other Europe	489	214	151	125

Source: self elaboration according to the data from Eurostat on 13.1.2010

2.3 The innovation activity of Czech enterprises

According to data available from Eurostat were in 2006 in the Czech Republic 23,337 enterprises, of which 8,164 were innovation active (Table 5). In absolute number was the largest group the group of small enterprises, in which dominated the product and process innovation, but only 28.90% of all small enterprises decided to introduce some type on innovation. The biggest contribution to innovation performance in the country had large enterprises, of which 70.41% introduced product, process or both product and process innovation. In the group of medium-sized enterprises was the number of innovative and non-innovative enterprises almost the same.

The Czech enterprises, regardless of their size, preferred in the year 2006 a combination of product and process innovations, not only product or only process innovation.

Table 5 - Enterprises with innovation activity according to their size and the type of implemented innovation in Czech Republic

Size of enterprise/type of innovation	Total enterprises	Enterprises with innovation activity					Enterprises without innovation activity
		Total	Product and process innovation	Product innovation	Process innovation	Establish innovators, ongoing and/or abandoned only	
Small enterprises	17,362	5,018	2,156	1,042	1,594	226	12,344
Medium enterprises	4,853	2,356	1,405	391	514	45	2,497
Large enterprises	1,122	790	556	93	131	11	332

Source: self elaboration according to the data from Eurostat on 13.1.2010

Figure 4 shows the number of innovative enterprises in different sectors. According to this we can state that the highest share had in 2006 the industrial enterprises – from the total number 13,682 industrial enterprises 5,005 of them decided to innovate their production.

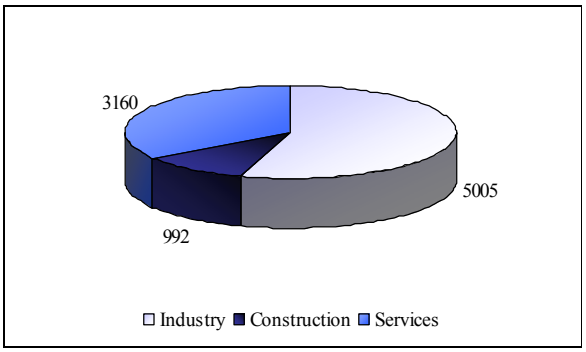

Figure 4 - The number of enterprises with innovation activity according to the sector of their operation in Czech Republic

According to the data available from Eurostat for individual sectors we can state that the largest share of industrial innovative enterprises on the total number of enterprises (75%) was observed in Manufacture of coke, refined petroleum products and nuclear fuel. This was followed by the Production of chemicals and chemical products and Manufacture of other transport equipment, in which more than 50% of enterprises have introduced at least one of the types of innovations.

The lowest innovation activity was observed in enterprises from the sectors Mining and quarrying and Manufacture of wearing apparel; dressing; dyeing of fur. In these sectors only 20% of enterprises decided to innovate their production.

Even in the service sector dominated the enterprises without innovation activity. From the total of 9,656 enterprises in service sector were innovation active only

3,160 enterprises. The highest activity showed the enterprises in the sector of Research and development, where even 68% of enterprises have developed and implemented some type of innovation. Then followed the enterprises dealing with Computer and related activities with 60% share on the total number of enterprises in this sector, enterprises in the Financial intermediation, except insurance and pension funds with a 55% share, Insurance and pension funds, except compulsory social security, and also Post and telecommunications with around 53% share of innovation active enterprises on the total number of enterprises in the sector.

The lowest innovation activity was observed in the sector Real estate activities (only 16.13% of companies innovated providing services), Retail trade, except of motor vehicles, motorcycles; repair of personal and household goods. Then followed Hotels and restaurants, and the enterprises from the sector Land transport; transport via pipelines; water transport; air transport. Almost 80% of enterprises didn't introduce any type of innovation in the sector Transport, storage and communication, and in Supporting and auxiliary transport activities; activities of travel agencies.

In the year 2006 were in the construction sector 5,439 enterprises, of which only 922 have introduced either product, process or both product and process innovation. Even 81.76% of enterprises in the construction sector decided not to take the high risk associated with innovation, so they didn't implement any type of innovation. Data about enterprises according to their size and innovation, respectively non-innovation activity in construction sector are not available; therefore they will not be analyzed.

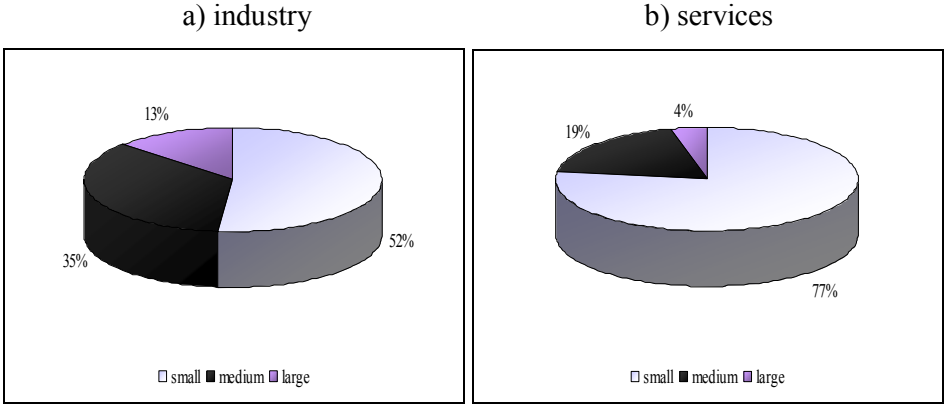

Figure 5 – Percentage share of small, medium and large innovation active enterprises in the total number of innovative enterprises in industry and services sectore in Czech Republic

In total it can be stated that during the year 2006, the most innovation in all three sectors have introduced large enterprises, although their share on the total number of enterprises was the lowest. On the contrary, the most numerous group of enterprises (small enterprises) showed the lowest innovation activity, where from the total number of enterprises decided to take risks and spend money on product or process innovation only one third of enterprises (Figure 5).

2.4 The cooperation in creating and implementing innovation in Czech Republic

During the period 2004 – 2006 participated on the development of new or significantly improved product and process in the Czech Republic various institutions. Enterprises preferred the use of their own in-house capacity, respectively the cooperation with a group of member companies. 4,972 enterprises developed itself product innovation and 4,400 enterprises process innovation (Table 6). It can be said, that in the development of new product dominated industries enterprises and in the development of new process were most innovation active the enterprises providing services.

Table 6 - Product and process innovation according to the developing organization and the sector of its operation in Czech Republic

Sector of enterprise's operation / developing organization of new products or processes	**Product developed**			**Process developed**		
	mainly by other enterprises or institutions	by enterprise or the group of enterprises	in cooperation with the other enterprises or institutions	mainly by other enterprises or institutions	by enterprise or the group of enterprises	in cooperation with the other enterprises or institutions
Number of enterprises:						
in industry	323	2,564	725	576	1,971	1,318
in construction	147	221	160	131	346	259
in services	394	2 187	720	579	2,083	1,553
Total in all sectors	**864**	**4,972**	**1,605**	**1,286**	**4,400**	**3,130**

Source: self elaboration according to the data from Eurostat on 13.1.2010

After development of new product by the enterprise itself or by other enterprises within the group, followed the cooperation with other enterprises or institutions in creation and implementation of innovative products or processes. Also in this case, the industrial enterprises most cooperate with other enterprises in the development of new product and in the development of new process dominated the enterprises from the service sector.

As the least attractive alternative for Czech enterprises was considered the alternative when the innovative product or process is developed by another

enterprise or institution and subsequently bought by the original enterprise. The highest interest in this type on innovation had the enterprises providing services.

From the total number of innovation active enterprises operating in the Czech Republic during the years 2004 – 2006 3,122 enterprises decided to cooperate in the process of innovation creation and implementation with various domestic institutions. The innovative enterprises preferred the cooperation with clients and customers (almost 13% of innovation active enterprises), because this group is in the process of development of new products or processes the most important (Table 7). Adapting of innovative products or processes to their requirements and ideas creates an assumption for the increased interest in these products after their introduction on the market in the future. The cooperation with suppliers of equipment, materials, components or software preferred in the development of new products or processes 976 enterprises. Then followed the cooperation with other enterprises within the group. In all three cases, the largest group of cooperating and innovative enterprises was group of small enterprises, but their share on the total number of innovative small enterprises was the lowest. The least numerous group was group of large enterprises.

The cooperation with consultants, commercial labs or private research and development institutions was preferred in the development of new products or processes during the period by 177 enterprises, including 87 medium-sized enterprises, 69 small and 21 large enterprises.

The least interest had the innovation active enterprises in cooperation with the government and public research institutions. From 61 enterprises that decided for this type of cooperation were only eight large enterprises.

Table 7 - Number of enterprises in Czech Republic cooperating with other institutions in regard to creation and implementation of innovation

Cooperative institution / size of enterprises	Total number of cooperative enterprises	Number of cooperative enterprises according to their size		
		small	medium	large
The cooperation of enterprises with:				
consultants, commercial labs, or private R&D institutes	177	69	87	21
government or public research institutes	61	31	22	8
universities or other higher education institutions	122	31	49	43
suppliers of equipment, materials, components or software	976	538	318	120
clients or customers	1,060	552	361	147
competitors or other enterprises of the same sector	133	72	40	21
other enterprises within your enterprise group	593	250	181	161

Source: self elaboration according to the data from Eurostat on 13.1.2010

The cooperation of enterprises and institutions in developing and introducing innovation can be observed also in geographical terms. During the period 2004 –

2006 most Czech enterprises cooperated mainly at the national level (Table 8). In developing and introducing innovative products or processes, 2,719 enterprises decided to cooperate with domestic enterprises operating in the Czech Republic. From the total number of innovation active large enterprises cooperated at national level 459 enterprises, i.e. 58.10%. Small cooperating enterprises were three times more than large enterprises, but their share on the total number of small innovating enterprises was only 28.06%.

Some enterprises during the period decided to use the cooperation with other enterprises and institutions operating outside the Czech Republic. From the total number of innovative enterprises cooperated with the enterprises in other European countries 1,934 enterprises, i.e. 23.7%, and 604 enterprises decided to cooperate with enterprises operating in the U.S. and other countries of the World.

Table 8 - Number of enterprises in Czech Republic cooperating in creation and implementation of innovation according to the country of the partner

Cooperative institution / size of enterprises	**Total number of cooperative enterprises**	**Number of cooperative enterprises according to their size**		
		small	medium	large
Enterprise engaged in any type of innovation cooperation:				
within United States and other countries	604	286	190	128
national	2,719	1,408	852	459
within other Europe	1,934	859	674	401

Source: self elaboration according to the data from Eurostat on 13.1.2010

In terms of size of enterprises was the most numerous group of cooperating enterprises group of small enterprises, but their share on the total number of innovation active enterprises was the lowest. 28.06% of small enterprises cooperated with other enterprises in the area of innovation at national level, 17.12% of enterprises cooperated with enterprises in other European countries and only 5.70% of small enterprises decided for cooperation with the enterprises in the U.S. or in other countries of the World. On the contrary, the least numerous group of enterprises was group of large enterprises, of which only 58.10% cooperated with other enterprises at the national level, 50.76% cooperated with other European enterprises and 16.20% of enterprises preferred cooperation in developing and implementing innovation with enterprises that operate in other countries of the World.

3 CONCLUSION

The article deals with the theoretical definition of innovation by different authors and with the short defining different types of innovation. The analytical part of this paper describes the innovation activities of Slovak and Czech enterprises, in

which in 2006 was dominated an interest in introducing both product and process innovation, not only product or only process innovation. In absolute values was the largest group of enterprises introducing some type of innovation in both countries the group of small enterprises. From the perspective of the sector of operation of these enterprises in 2006 were the most innovation active industrial enterprises. The least innovation introduced enterprises from the construction sector.

On the development of new or significantly improved product or process in the period 2004 – 2006 have participated various institutions. The enterprises in all three sectors preferred development of product or process by their own enterprise or within the enterprise group before the cooperation with other enterprises or institutions.

From the perspective of the cooperating enterprises or institutions, Slovak enterprises cooperated in creation and implementation of innovation mainly with the suppliers of equipment, materials, components or software. Czech enterprises preferred cooperation with clients and customers. The least interest had innovative enterprises in both analyzed countries in cooperation with the government or public research institutions.

The last part of the analysis is focused on the cooperation of enterprises from the national point of view. During the period 2004 – 2006 Slovak enterprises preferred cooperation with enterprises in other European countries and Czech enterprises preferred cooperation with enterprises at national level. The lowest interest of innovation active enterprises was observed in cooperation with enterprises operating in the U.S. or in other countries of the World.

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OBSERVANCE AND DEVELOPMENT OF SALIENT QUALITY OVERPRINT FOR TABLECLOTHS EMBROIDERY WITH USE OF RFID TECHNOLOGY

JANA STRAUSZOVÁ, KRISTÍNA ZGODAVOVÁ

1 INTRODUCTION

Heritage for the Future 'Quality' will be the main topic of 54th EOQ congress in Izmir, Turkey. Tahir Büyükhelvacigil – president of The Standards Turkish Institution in his speech underlined that: "Quality is the best heritage we can pass on to the future generation. Quality is a value that would nbever run its course and that could be enriched through continuous improvement, change and novelties, and in this respects, it bridges the present and the past in the most reliable way. Quality enables each generation to pass on the future generation better living condition".

The property ream for chosen regions of Slovak Republic was in past time a flat stitch by accentuation, filling big ornamental plant, fill whole areas intended for decoration up. The original material was wool, later cotton in red or green (sadness) tones. The embroidering into frame at predraw pattern and estetic embroidery was developed later, also embroidery in seam, bonnets, sails and tablecloths (Liptovské Revúce, 2010). The embroidery at the utility textil and clothes, which were in time of production considered like esthetic element and it has in present time relatively great artistic value for future generation.

Mission of paper is to enable those interested in observance and development quality embroidery typical of the region use with RDIF technologies for designing, implementing and providing overprint for tablecloths embroidery.

2 SALIENT AND COMPLEXITY ENTITY OF EMBROIDERY

Quality from basic philosophical perspective can be defined also like summary of entity property manifestativ in surrounding and time their characteristic functions. (Zgodavová et al., 2002). By properties operate one object to another and we understand by functions how operate one object to another in given surrounding and time.

In the field of study programmes 'Quality of Production', 'Quality Management' and 'Quality Engineering' is wider used terminology allowing to study any production i.e. any processes and products (hardware, software, service and

processed materials), whether in real or virtual form. This fact leads to the use of basic term of scholastics as an entity (Zgodavová, 2010).

Entity are differentiated by salient properties and functions – by quality and explore on them:

- robustness, and gradation of properties and functions – level of quality entity;
- multiplicity, quantity – quantity of entity.

Depth, detail and thoroughness of the research of properties and functions of entities in relation with the depth – detail and thoroughness of knowledge of their internal environment, external environment, calendar and process time leads to a large number of difficulty clear situations and so from saliency of entities come to their complexity and in this article also to the questions of saliency and complexity of embroidery entities for observance their quality as cultural heritage of region (Zgodavová, 2010).

Saliency is rate of conspicuity, speed with which stimuli attracts to attention of our senses and continuously and then penetrate into the consciousness (Salience, 2010) and can be obtained by direct sighting or device measurement.

By the phrase saliency of embroidery entity means generalized knowledge obtained by modelling, measuring and simulating of the developing process, realizations and providing overprint for tablecloths embroidery on the level of individuals, organizations and protected patterns.

In surrounding is the most attracted for our attention which is by common standard different by colour, size, contrast, strength, rarity or rate of movement, that is what somehow capture. For observance and improvement of properties and functions of products are important about which we know, that for prepare targeted interventions. Final quality of the product will be markedly better (Zgodavová, 2010).

Saliency is depending on our senses and we can say about saliency for our hearing, sighting, tactile, taste and scent sensation and their device measurement.

Helping to individuals (as human, also animals) align senses under the importance. The more has individual developed some senses, the more has on detail level known sense saliences. The more is some sense difference from normal – common standard, the more attract and more important. We can say about complexity, respectively detail saliency.

The simplest understanding of complexity is description of properties and functions of entities and their interactions in changing surround in the time. Complexity is currently much frequented term, which is addicted to few research workstations also, magazines, for example: Journal of Complexity. Complexity: Relation and material diversity: geometric, colour, mechanical, electrical, chemic

also in various combination and forms in common surround and in time coming properties.

3 STATE OF ART OF PREPARATION, REALIZATION AND PRODUCTON OF OVERPRINT FOR TABLECLOTHS EMBROIDERY

Overprint for tablecloths embroidery was developed not only in Slovakia, but also in surround countries already several decades ago. Pattern which is overprinted on cloth, whether canvas, currently more used white or beige tesilan, which is later embroidered. This hobby is requested again by people who found it again in countries Austria or Switzerland, where were developed small commercial fabrics for this production and final embroidering.

The first condition before start with digitization is necessary to know preparing, realization and providing of overprint for tablecloths embroidery these days. Because more tasks can be make in duplicate.

Patterns are obtained especially from magazines, whether changing with another, or traced by fences or formers. Paper is necessary grip on base and prevents displacement. This pattern is repainted in thin tracing-paper, which has to be on base of polystyrene over punched by hole punch, or thin needle. Currently this phase of preparation is the most time and human energy consuming. Average length of one pattern production in size 50x50 cm is approximately 10 – 15 hours. The aim of the digitization is to reduce this time aprox.1 hour/whole production and less. It also depends by the machine production rate. In the next step is over punched pattern by technical petrol and blue ultramarine pro-chafe on based cloth ’tesilan’.

Selecting concepts for a historical event ontology (Kuittinen, et al., 2008) is a frequent task in archiving and also for semantic web applications. For example (Sinkkilä, et al 2008), in semantic indexing, concepts describing the item to be indexed must be located from domain ontologies. Many semantic search systems also require the user to create search patterns by picking up concepts and relations to be matched against the instance database.

The purpose of digitization and location of RFID tags on the based pattern is as short as possible to cut down the time of overprint for tablecloth embroidery production and also to observe its quality heritage and improve process of preparation.

For globally digitization is a necessary scanning already existing patterns. Because already scanned data is necessary save on adequate class of ’non-aging’ memory medium.

4 METHODOLOGY OF PREPARING DIGITIZATION, REALIZATION AND PROVIDING OVERPRINT FOR TABLECLOTHS EMBROIDERY

Digitization of process preparing, realization and providing overprint for tablecloths embroidery consist in scanning of patterns from magazines, the following „cleaning“ of needless lines, mistakes and errors of image case for example printing of magazine, or paper error etc.

Became a cases when on one page is draw more different overlapping patterns and these are colour different. In this case should be scanned pattern edit by deleting unneeded colour level and then complete all missing places in pattern. By the deleting colour level in pattern create white positions. If this position were crossing two or more lines of patterns, the line in the right pattern stay interrupted and is needed to complete this position. Decisive parameters are:

1) Parameter of scanning space: is given by size of scanning pattern. This can often reached size to format A0, therefore would be appropriate choose large format scanner to format A0. Also can be used smaller scanner and then individual spaces complete, this variant is deliberate just as side solution, because is very difficult and incorrect.

2) Parameter resolution scanning space: usually given in dpi (dots per inch). It is explaining how many points should be scanned on space of one square inch (2,57 cm^2). In case that choose smaller resolution, for example 100 dpi, result point will have space $\frac{25,7^2}{100} = \frac{660,49}{100} = 6,6mm^2$.

Figure 1 – scanned overprint – pattern is scanned in resolution 200 dpi and result page in format A4, size 68 kB

Figure 2 – scanned overprint – pattern is scanned in resolution 2400 dpi, and the result page in format A4, size 68 MB, then aprox. 1000 times more

This resolution is deficient for this kind of detailed images. Used is resolution 600 dpi, 800 dpi and more. Resolution is not depend the size scanning space.

3) Another parameter is possible colour of scanning picture. If there are any patterns in black and white, should suffice black-and-white scanner. Cases, when is on one page more patterns and they are colour different, in this case is multicolour scanner necessary. Of these parameters is resulting backup and storage of scanned pictures. The mentioned file sizes were shown for black-white pictures, if there will be progressive number of pages is also progressive scanned file until several GB.

4) Also must be take aspect to hardware, which will realize whole scanning process. Necessary is to select efficient computer with large RAM and fast data transfer device between scanner and computer. Necessary is to prevent scanning in a few minutes and computer data processing in hours.

5) File backup is realized by saving on memory medium as DVD, Blue Ray discs, which providing available capacity 25 GB in base settlement (one page, single layer), instead 18 GB in maximum use double layer DVD discs in the same memory. DVD is also sufficient medium, from the side of price. In this case one damaged DVD will not be as waste able as damaged Blue Ray discs and also DVD price and memorable memories is much lower. Blue Ray memory devices can record also DVD, or CD discs.

6) Production scanned and archived overprints for tablecloths embroidery is realized by printing on large format plotter. Practically almost all of large format plotters are able also scan, so can obtain two devices in one multi device for whole production. On the base of this chosen parameters hardware should be appropriate fully eliminate phase of over punch tracking-paper by needle as in case of manual production, but patterns place in computer on cloth in required format, which will be printed by plotter and then cut single patterns on cloth (size of one packet of tesilan – 30 x 1,4 m). By this concept can be added one final product as colour parts of pattern, which will be like colour model for embroidery. Colour on cloths has to be washable (by washing), so it will not be problem if there stay any different colours as is the embroidered part. It should be some kind of "colour legend".

5 PROCESS OF SCANNING AND SAVING ON RFID MEDIAS

If patterns pass scanning process will be saved in deposit, where allocated by serial number. These numbers will be the same as serial numbers of pattern in database. At the scanned patterns is need to place RFID tags with serial number. For this purpose can be used RFID serial number and set new serial number or combination of two alternatives. The optimal is combination of numbers because patterns are separated to seasonal, yearly-round patterns, Richelieu and cross-stitch embroidery. The first could mark the type or seasonality and second part the concrete pattern (for example: 001 – 987 654 / 90x90 → pattern in Christmas

section – number of tag and number of pattern/ size – the pattern can have more size which are placed at the another templates).

Scanned items will be deposit in internal database of industrial patterns with added RFID tag accordance to which is possible to indentify and choose by scanner or another device. The device for transfer information must have a reader. This reader will receive, keep and in case of need send them to another process device. For this reason is not necessary to keep all information in the reader permanently in continuously communicate with computer and plotter.

Plotter will print by pattern on cloth. The aim of this stage is speed the production process up and also overall efficiency of production. This method of production can be implemented as well in area of SMEs as in large industrial processing. As well by keeping the patterns will avoid loose and abuse. If there will happened any degradation of database source is possible to renew by RFID serial number (Lahiri, 2006).

6 FUTURE DEVELOPMENT

With digitizing of the whole production process, the patterns can be archived on digital media as DVD, Blue Ray Disc and many others as the technology are rapidly improving. By detailed editing of the scanned picture, even the biggest patterns can be saved as small bitmaps (bmp). Using the vector logic there will be enough to save only one file of the same pattern for different dimensions without any lost of quality, which will allow developing new patterns much faster and more flexible according to customer needs.

By preparing of worldwide database of such patterns, there will be the possibility to compare the styles of the patterns from different areas of the world in time, which might be useful for historians to compare 'life style' and its improvement based on living conditions in that area. If such database will be supplemented by mathematic control algorithm, which will count unique control string for each RFID tag (pattern) individually based on pattern structure can ensure, that no pattern was changed and it is unique. Such system can be then used for any database based on pictures, for example archives and many others.

7 CONCLUSION

The main aim of this paper was to summarize state of art and procedure of the production and point to possible improvements in this field. By digitizing of the procedure there is possibility to make the whole process more efficient with possibility to place the patterns to the tesilan regarding to required dimension of the pattern. Also to control whole production process by computer technologies, and increase the quality of the patterns with more accurate placed points, even using different colours, which is not unable to be done by hand, but require very accurate handling and repeating of the procedure for several times. Using of

computer technologies will also release the needle punch process, as there is no need to have the patterns punched anymore.

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A MATHEMATICAL MODEL FOR PROCESS CYCLE TIME - THEORY AND CASE STUDY

FILIP TOŠENOVSKÝ

1 INTRODUCTION

It is a common practice to carry out an economic analysis, using mathematical model of the form $y_i = \beta_0 + \beta_1 x_{i1} + \cdots + \beta_k x_{ik} + \varepsilon_i$. The relation is an expression of dependence of the *i*-th level of random variable y on the *i*-th level of variables $x_1, \dots, x_k$ that represent the most influential factors, and also its dependence on the random variable ε which represents the remaining factors. It is assumed that variables ε_i have zero expected value, they are uncorrelated and have a constant variance, i.e. $E(\varepsilon_i) = 0$ for any *i*, $var(\varepsilon_i) = \sigma^2$ for any *i* and $cor(\varepsilon_i, \varepsilon_j) = 0$ for $i \neq j$. The least squares method and a data sample $(y_1, \dots, y_n)$, $(x_{i1}, \dots, x_{ik})$, $i = 1,2, \dots, n$, are used to estimate the unknown parameters β_i. If the conditions imposed on ε_i hold, the least squares method yields the best linear unbiased estimates of the coefficients β_i. From a practical point of view, however, it is more important that we get estimates that do not differ much from the unknown coefficients β_i, with a probability that increases as the size of the data sample n increases (Greene, 1990). The importance of this statistical property lies in the fact that the estimates have this characteristic when any single data sample of size n is used, whereas the property of being an unbiased estimate relates to an average estimate computed from at least a large number of generally different data samples of size n, and theoretically from an infinite number of such data samples. Given that meeting the condition $E(\varepsilon_i) = 0$ is assumed a priori, it is obvious that no correlation, or more generally statistical independence, and the constant variance of the variables y_i is what we are interested in when building a model. If $var(y_i)$ depends on *i*, we may try to find a transformation *T* such that variance of the transformed variable $var(T(y_i))$ will be stable. Using the Box-Cox transformation is one of the ways how to find the function *T*. The Box-Cox transformation is useful in that it may also bring the probability distribution of y_i closer to normal distribution, apart from stabilizing the variance (Box, Cox 1964). The additional prerequisite of normality then ensures estimates of β_i are the best unbiased estimates of all conceivable estimates, not only of those that are linear in its nature.

In this article, we derive a suitable transformation *T*, and thus a regression model as well, to describe a dependence of working process cycle time y on relevant factors $x_1, \dots, x_k$ that enter the process. We specifically deal with processes that are stable in a certain sense. At the end of the article, we also present a real

industrial case study in which the derived model was used. Since we model process cycle time, we may assume that the variable y we work with is positive.

2 BOX-COX TRANSFORMATION

We use the Box-Cox transformation to find an appropriate function T that stabilizes the variance of a positive random variable y, and which may also bring the distribution of y closer to normality. The Box-Cox transformation is defined as

$$y_i^{(\lambda)} = \frac{y_i^{\lambda} - 1}{\lambda} \text{ for } \lambda \neq 0,$$

where y_i is the *i*-th value of the original variable and $y_i^{(\lambda)}$ is the *i*-th value of the transformed variable. The transformation depends on parameter lambda. If the parameter is close to zero, the transformation $y_i^{(\lambda)} = ln(y_i)$ is used as $\lim_{\lambda \to 0}\{(y_i^{\lambda} - 1)/\lambda\} = ln(y_i)$. We set the following objective: finding lambda which stabilizes the variance $var(y_i^{(\lambda)})$, i.e. finding lambda such that the variance of the transformed variable is constant regardless of *i*. We shall find the lambda for a working process that is characterized by the fact that the expression $var(y_i)/E(y_i)^2$, or the squared coefficient of variation of y_i, is constant regardless of *i*.

3 LAMBDA

It is suitable to express $var(y_i^{(\lambda)})$ as a function of lambda if we are to find the lambda stabilizing $var(y_i^{(\lambda)})$. However, such an expression is unknown exactly due to the fact that $y_i^{(\lambda)}$ is a nonlinear function of lambda. Therefore, we shall first approximate linearly y_i^{λ}, using the Taylor polynomial function of the first order (Jarník, 1984). Doing so from a positive point a, we get for $i = 1,2,\ldots,n$ an approximation

$$y_i^{\lambda} \cong a^{\lambda} + \lambda a^{\lambda-1}(y_i - a), \tag{1}$$

so that

$$var(y_i^{\lambda}) \cong var\{a^{\lambda} + \lambda a^{\lambda-1}(y_i - a)\} = \left(\lambda a^{\lambda-1}\right)^2 var(y_i). \tag{2}$$

Altogether, we have for $\lambda \neq 0$

$$var(y_i^{(\lambda)}) = var\left(\frac{y_i^{\lambda} - 1}{\lambda}\right) \cong \frac{1}{\lambda^2}\lambda^2 a^{2\lambda-2} var(y_i) = a^{2\lambda-2} var(y_i). \tag{3}$$

Approximation (1) can be used whenever the right-hand side and the left-hand side of the expression (1) make sense. This is certainly the case when the values y_i, a are positive as is our case in which the variables y_i represent a working process cycle time. There is no other problem in expression (1). The question is how accurate the approximation is. If the values y_i are close to the point a, the approximation is acceptable, otherwise it doesn't have to be acceptable. Since the variables y_i may come from probability distributions that have different parameters, it is not wise to approximate them from a single point a. It is more natural to use expected values $E(y_i)$ which characterize the location of y_i (Rényi, 1970). If we use the expected values, we get for i =1,2,…,n an approximation

$$var(y_i^{(\lambda)}) \cong E(y_i)^{2\lambda-2} var(y_i) = E(y_i)^{2\lambda} \frac{var(y_i)}{E(y_i)^2}. \quad (4)$$

If the ratio $var(y_i)/E(y_i)^2$ doesn't change too much with respect to i, then (4) implies that the variance of the transformed variables will be stable if lambda is close to zero. If the ratio is more or less equal to a constant C, we have for a very small lambda

$$var(y_i^{(\lambda)}) \cong E(y_i)^{2\lambda} \frac{var(y_i)}{E(y_i)^2} \cong E(y_i)^0 . C = C. \quad (5)$$

Thus, a very small lambda used in the Box-Cox transformation stabilizes variance provided the second power of the coefficient of variation is stable. This, however, means logarithmic transformation is the transformation we were looking for. This leads to a model

$$y_i^{(\lambda)} = ln(y_i) = \beta_0 + \beta_1 x_{i1} + \cdots + \beta_k x_{ik} + \varepsilon_{i,} \quad (6)$$

or

$$E\{ln(y_i)\} = \beta_0 + \beta_1 x_{i1} + \cdots + \beta_k x_{ik}, \quad (7)$$

where on the right-hand side we may as well work with a more general expression, but preferably with the one linear in parameters, i.e. with an expression of the form $\beta_0 + \beta_1 f_1(x_{i1}, \dots, x_{ik}) + \cdots + \beta_k f_k(x_{i1}, \dots, x_{ik})$. It is known that the statistical properties of coefficient estimates resulting from the least squares method hold for the more complex functional form as well.

4 MODEL

It would be better if we worked with the model $ln(E(y_i)) = \beta_0 + \beta_1 x_{i1} + \cdots + \beta_k x_{ik}$, which leads to equation $E(y_i) = \exp(\beta_0 + \beta_1 x_{i1} + \cdots + \beta_k x_{ik})$, instead of (7). Expected value of logarithm is not equal to logarithm of expected value, but under certain conditions we may still perform this substitution (see below). The

conclusion then is: if $var(y_i)/E(y_i)^2$ shows stability, a suitable model is of the form

$$E(y_i) = \exp(\beta_0 + \beta_1 x_{i1} + \cdots + \beta_k x_{ik}) \quad (8)$$

It is obvious from the described procedure that we may restrict ourselves to a positive and small lambda as it has the same effect on variance as a negative and small lambda. Let us examine now the approximations we used in the process of deriving the model:

a) approximation (1);
b) approximation $E(y_i)^{2\lambda} \cong 1$ for a very small (and positive) lambda;
c) approximation $ln\{E(y_i)\} \cong E\{ln(y_i)\}$.

Approximation b) is apparently of no harm given the continuity of exponential function. If lambda is small and y_i is not too small, approximation a) is of no harm either because x^λ as a function of x has the derivative $dx^\lambda/dx = (1/x)\,\lambda x^\lambda$, and this derivative will be close to zero for a small lambda and not too small x. Thus, the function x^λ will be very flat (see an example of such a function in figure 1). In this case, approximation of such a function by a line will be suitable. Approximation c) will be the major source of inaccuracy. Using the Taylor polynomial function of the first order, we have for the third approximation $E\{ln(y_i)\} = ln\{E(y_i)\} - (1/2\xi^2)var(y_i)$, where $E(y_i) < \xi < y_i$, or $E(y_i) > \xi > y_i$. This implies that approximation c) will be more accurate in case variables y_i achieve higher values and/or have a small variance.

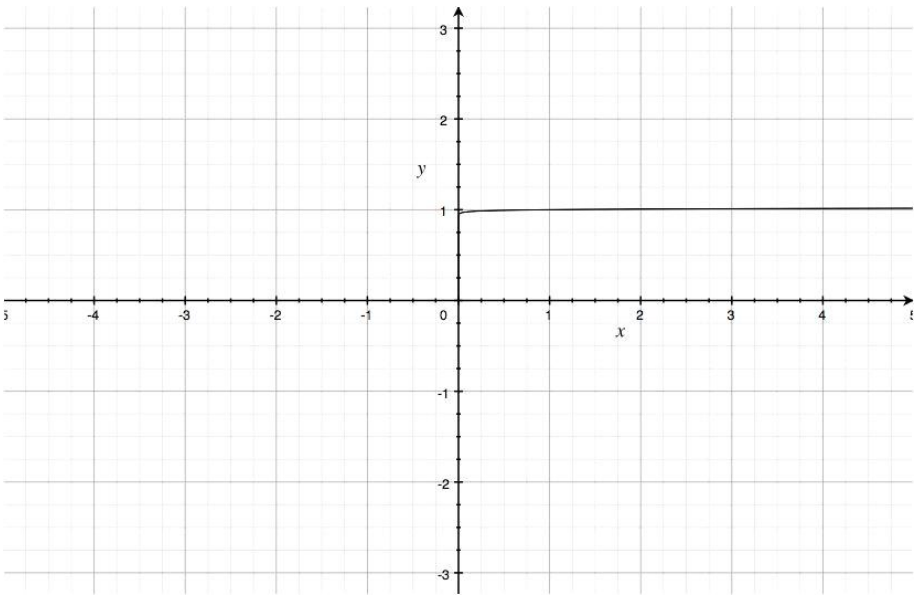

Figure 1- function $h(x) = x^{0,01}$

5 A CASE STUDY FROM THE CZECH REPUBLIC

In 2009 a working process in the testing laboratory of a major Moravia-based ironmaker was scrutinized. The laboratory struggled to perform its tests of quality of the ironmaker's products in the shortest time possible, which is a distinctive feature of testing laboratories in general. The reason is that the ironmaker, a part of which the laboratory is, funds its activities in part through bank credits just like any other bigger company. Thus, it has to pay off debts and interests, and so it tries to function as fast as possible so that the interests do not accumulate over time. The time factor also plays its role due to the fact that the ironmaker pays České dráhy railway company for expedition of iron products. Any delays on the rail track are therefore unwanted. The reality is that situations occur when the final product is more or less loaded up on train wagons, and the ironmaker awaits only the results of laboratory tests. In such cases, the laboratory is perceived as a hurdle by the ironmaker, although a necessary one. Therefore it was an imperative to solve the problem of process cycle time in the laboratory. The analysis of the problem focused on finding a suitable mathematical model which would express dependence of the working process cycle time of a problematic laboratory test on relevant factors. Conceivable factors were the number of technicians working in the laboratory and amount of work of different kind in the lab. However, since the number of technicians was constant during the time period of the analysis, it was not placed in the model as a variable, and so the factor influencing the process cycle time was the number of raw material samples the laboratory had to test. Specifically, there were two types of raw material samples that had the influence on the problematic test, so two independent variables occurred in the model. All the data required for finding the model were available as the laboratory recorded everything it did in its own computer system, including completed tests, results of the tests, names of technicians who carried out the tests, and the time it took them to perform the tests. The original data are shown in table 1. The data include working process cycle times for the problematic test (in hours), depending on the amount of raw material samples of two kinds x_1, x_2 that were used during the test. Different combinations of x_1, x_2 that ocurred in the test are recorded at the top of table 1. Table 2 contains sample characteristics obtained from table 1. These are: average process cycle times $\bar{x}$ of the problematic test, sample variances of these times s^2, coefficients of variation $s/\bar{x}$, and a comparison of the values $\overline{ln(y)}$ and $ln(\bar{y})$, which points to the extent of inaccuracy embedded in the approximation c).

[0,1]	[1,3]	[2,4]	[5,5]	[13,3]	[12,8]
22,9681	67,0595	71,84	81,1366	164,951	139,581
21,2965	50,5145	48,86	131,786	108,723	134,005
13,9083	69,324	48,95	95,7887	113,281	156,931
26,7113	80,4345	61,29	79,1434	151,387	186,156
28,5072	58,7454	52,26	104,573	104,73	148,873
26,4103	50,4678	51,92	72,6111	142,309	138,589

28,1765	59,906	57,02	86,2439	152,438	177,769
27,5524	53,4843	54,5	80,9638	145,522	158,37
32,9603	55,65	52,22	94,0361	104,289	159,901
20,193	57,9979	47,57	67,6957	144,329	148,341
30,3088	66,5641	40,19	82,4358	126,033	187,887
22,2892	60,757	34,52	80,433	154,254	165,222
36,7975	65,6812	69,09	82,4811	131,847	138,204
27,4256	57,5055	52,34	76,0038	80,529	166,423
32,5214	73,9333	62,08	92,8184	155,013	148,945
22,4586	98,9978	41,33	67,2483	116,453	229,357
19,0731	87,9221	43,18	63,9346	99,3141	146,857
22,3774	66,2063	41,5	83,145	91,4711	230,198
30,7776	49,6289	50,48	131,054	142,426	173,117
33,5733	67,7669	46,56	80,7934	114,519	212,137
25,4427	71,8023	-	-	129,325	226,896
30,4058	70,8647	-	-	113,367	158,778
23,0087	81,1306	-	-	-	118,447
-	51,6516	-	-	-	123,431
-	78,7595	-	-	-	161,073
-	-	-	-	-	185,652
-	-	-	-	-	202,319

Table 1 - Lab test times for a given number of testing samples

x_1	x_2	$\bar{x}$	s^2	$s/\bar{x}$	$\overline{ln(y)}$	$ln(\overline{y})$
0	1	26,31	29,43	0,21	3,248	3,233
1	3	66,11	154,92	0,19	4,175	4,191
2	4	51,39	90,28	0,18	3,923	3,894
5	5	86,72	332,00	0,21	4,444	4,416
13	3	126,66	548,94	0,18	4,824	4,799
12	8	166,20	999,98	0,19	5,105	5,113

Table 2 - Statistical characteristics calculated from the data in table 1

Characteristics in table 2 suggest the coefficient of variation is rather stable across the groups of process cycle times, and it is close to 0,2. The last two columns of table 2 also imply that the inaccuracy of approximation c) is not significant. Therefore the equation (8) was used as a model describing dependence of working process cycle time of the problematic laboratory test on the amount of work the laboratory was burdened with.

Using the least squares method to estimate the parameters of model (8), the resulting regression model is

$$\hat{y} = \exp(3{,}44 + 0{,}075x_1 + 0{,}11x_2). \qquad (9)$$

Figure 2 compares empirical data from table 1 and theoretical values resulting from (9).

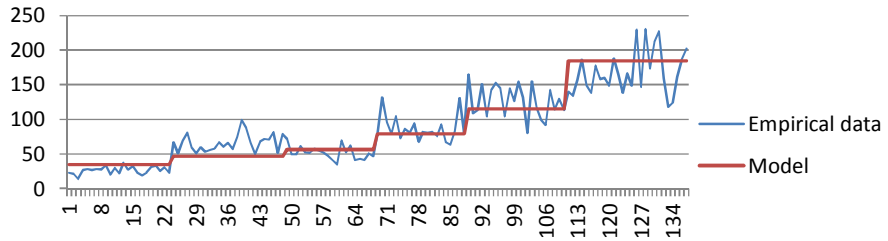

Figure 2-Model (9)

We may improve the model a bit as it doesn't fit well enough empirical values in the range of 20 to 45 and 109 to 134. If we use the polynomial function of the second order on the right-hand side of (8): $E(y_i) = \exp(\beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + \beta_3 x_{i1} x_{i2} + \beta_4 x_{i1}^2 + \beta_5 x_{i2}^2)$, the least squares method gives a model

$$\hat{y} = \exp(1{,}66 - 0{,}36x_1 + 2x_2 + 0{,}22x_1x_2 - 0{,}017x_1^2 - 0{,}42x_2^2). \qquad (10)$$

Figure 3 indicates that model (10) fits the data better than model (9).

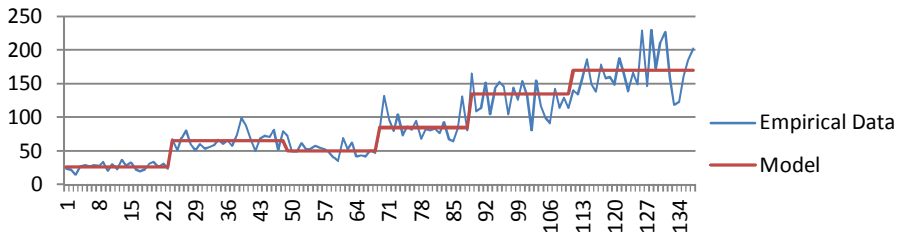

Figure 3-Model (10)

Model of the form (9) can be used, for instance, for the following purposes:

To monitor work productivity as the model shows how long it should approximately take to test two kinds of raw material samples sized x_1 and x_2.

To establish how many workers are necessary so that all the samples were tested in time. This use of the model is valid in case one of the variables x_i in the model represents the number of employees.

Since the model is exponential, we may assume that it is more convenient to process a greater number of batches containing a smaller number of raw material samples rather than the opposite. In the latter case, the time to process the samples increases disproportionately – by $exp(b_1)$ if the number of samples of one kind x_1 rises by a single unit (ceteris paribus), or by $exp(b_2)$ if the number of samples of the second kind x_2 rises by one unit.

To establish the amount of work the lab is able to accept if it is to handle the work by the time T at the latest. The requirement means that the acceptable raw material sample sizes x_1, x_2 must satisfy the inequality
$\exp(\hat{\beta}_0 + \hat{\beta}_1 x_1 + \hat{\beta}_2 x_2) \leq T$.

6 CONCLUSION

The article dealt with a regression model that would describe dependence of working process cycle time on a group of relevant factors $x_1, \ldots, x_k$. The analyzed working process was specific in that groups of cycle times corresponding to concrete levels of the factors $x_1, \ldots, x_k$ had the same coefficients of variation. The Box-Cox transformation then implies that exponential model is a suitable regression model for such a situation. The reason behind it is the fact that taking a logarithm of measured times stabilizes their variance, and thus ensures that the least squares method gives estimates of the regression model with good statistical properties. Logarithm may also bring the probability distribution of times closer to normal distribution. The derived exponential model was applied to real-life data which showed that such a model is reasonable (the last two columns of table 2 and figure 3).

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INNOVATION MANAGER AND HIS POSITION IN COMPANY

KATEŘINA HRAZDILOVÁ BOČKOVÁ

1 INTRODUCTION

Innovation is the magic word in business and public administration. However, huge potential for improvement has only minimal use, even in companies where ideas and suggestions are more or less systematically collected and implemented and some authors rewarded.

While domestic companies often do not pay sufficient attention to innovation management, this area has been gaining a key role in corporate strategy abroad. Czech top managers should therefore master the principles of innovation.

At the moment, the personality is no longer seen as a labour force only to perform specific commands within the given time span, but it is treated in qualitatively higher form of leadership and human potential is utilized in more meaningful way. More space is devoted to professional as well as personal development of personality. Greater emphasis is placed on personal experience, skills, will and discretion of employees. Creative skills are becoming building stones to implement and solve changes, so much needed in this millennium. The value of the human factor increases significantly. If managers want to be successful, they must understand the staff not only as an entity with its intellectual capital, but also the adaptation to the group and sense of interpersonal relations. Human resource management is subject to very high new claims, which should ensure the company's competitiveness.

The innovation process in the firm covers a wide range of activities undertaken from the very initial idea to putting them in life. It thus includes research and development, industrial-legal protection, the establishment of production and final application of innovations in practice. Innovation and innovation policy in the company is not something that would be widely extended, what would be a normal part of the organization and functioning of the company. The problem is already in the beginning, when the fact is concerned that not all entrepreneurs and managers are interested in new theories, practices and requirements. Among them are many who have ingrown their managerial roots in the former industrial period, regardless of age. An essential characteristic of such people is the idea that for successful business a person needs to work a lot and deliver an honest product. This is now of course no longer true (Christensen, 1997).

The current innovation management system is shown in Figure 1.

Qualifications and personal skills of innovation managers are one of the main conditions for further development of the company. It is clear that successful business strategy is built on the so-called evolutionary management, the managers who are oriented to deal with situations and have the ability to create and develop visions with appropriate time horizon.

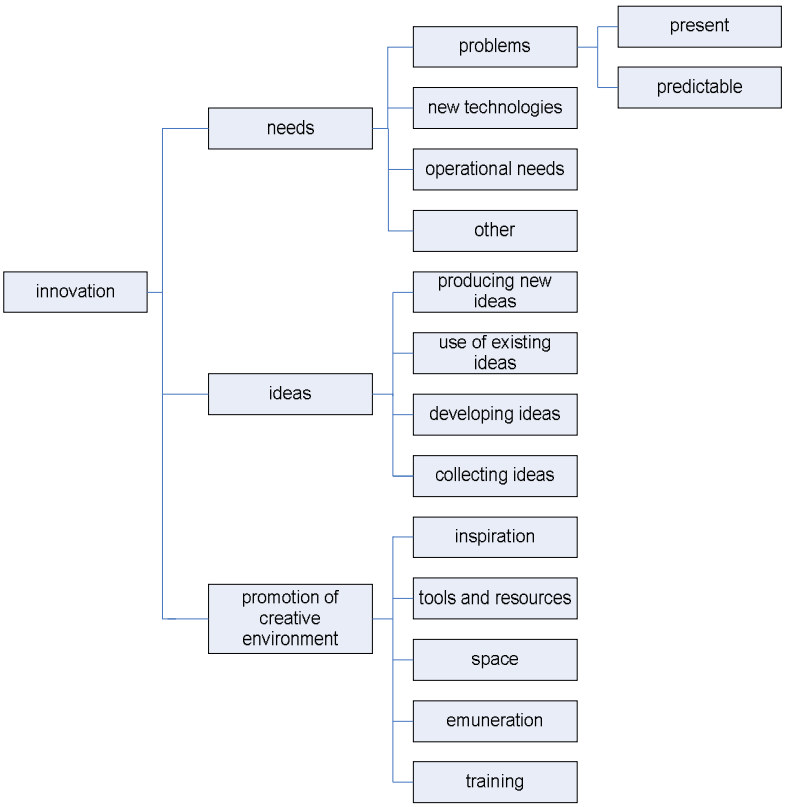

Figure 1 – Innovation management system (Christensen, 1997)

2 METHODOLOGY

An innovation manager should be equipped with comprehensive knowledge of the structure and dynamics of company systems, he should have an overview of the key causes and factors creating an innovative environment, both to be an expert in the field of processes for managing the entire life cycle of innovation and determination of their priorities, particularly in terms of value added and reusability as written in (Hofbruckerová, 2010).

The main task of innovation managers should consist of managing and controlling changes in the organization based on the responses to internal and external stimuli of environment, in which the organization operates, familiarization with a new look at the organization from the perspective of the

processes. The process view should enable to assure the flexibility and effectiveness of organization responding to changes and thus survive in this hyper-competitive information age, where success of both individuals and organizations depends on important measures such as availability, management and proper communication as well as information sharing. In entrepreneurship where an amount of knowledge and information needed to ensure business is increasing, the transition to a process-managed organization is essential for the coming millennium (Jaterková, 2008).

Each company is interested in improving the way is conducts its business, wants to produce goods and services more efficiently and thus increase its profits. Each manager should be aware that meeting these goals is part of his work.

The primary aim of the paper is to analyze the characteristics of innovation manager in the market section focused on "Production, sale and operation of amusement and gaming technology".

Secondary aims are:

- analysis of the qualities of innovation manager from the perspective of his own personality assessment,
- definition of ideal qualities of innovation manager,
- definition of the position of innovation manager in company.

A questionnaire survey was used to explore the qualities of innovation manager working in "Production, sale and operation of amusement and gaming technology". A scale questionnaire was chosen for this purpose. The spectrum represents the degree of agreement expressed by the evaluation scale. Its various levels are coded and can be summarized and averaged in the end. The simplicity of filling scale questions and easy workability of results were decisive factors for selecting this form of data survey.

The selected questionnaire consists of evaluation scale ranging from 1 to 6. One indicates the highest and six the lowest (unimportance) importance of qualities. The evaluation is processed in a graphical form.

The assessment of qualities of innovation manager takes place in three steps:

- analysis of the qualities of present innovation managers,
- definition of ideal qualities of innovation manager,
- summary and synthesis of results.

The values acquired are evaluated by the arithmetic average rounding to two significant figures. The observed data is compiled into a spider graph for qualities of innovation manager, and a bar graph for an ideal innovation manager.

The questionnaires were sent to 30 representatives of companies operating in "Production, sale and operation of amusement and gaming technology" in the

Czech Republic. 3 companies are engaged in production and sale of amusement and gaming technology, 27 companies are only providers of amusement and gaming technology.

The representatives were asked to distribute the questionnaires to innovation managers and to send them back in sealed envelopes (to protect anonymity and evaluation views). There were 7 questionnaires distributed to define ideal qualities of innovation manager, and 3 questionnaires to determine the qualities of present innovation managers in each company.

To define the position of innovation manager in company, literature search was used, in particular web links. It was proposed to involve an innovation manager into the organizational structure of companies operating in "Production, sale and operation of amusement and gaming technology".

3 RESULTS

A high-quality innovation manager must have in his team greater specialists than he is. He has to be a good negotiator and leader, which is basically more demanding than being an expert. Several studies, e.g. (Newton, 2008), (Němec, 2002), (Gido,Clements, 2003), (Taylor,2007), (McAvoy, 2008) and (Jaterková, 2008), have shown that many recognized experts have failed in this function. Their weakness is the excessive individualism, lack of interest in associates, lack of tact in the argumentation or hesitation. In other words, although they had the authority of an expert, they did not gain the authority of a leader. The innovation manager should have the following personal skills:

- Technical skills: These are technical skills, or the ability to use methods, knowledge and techniques of theoretical and practical disciplines, to use specialized personnel; a manager must have the specific skills of a technical nature the same as people he manages. Hence, he must be able to ensure the implementation of the work.
- Human skills: Ability to collaborate, understand and effectively communicate and motivate other staff.
- Conceptual skills: Ability to manage, integrate and mutually reconcile interests and activities taking place within the enterprise.
- Ability to empathize: To be able to feel with the position of the other, to know how to guess other person's needs. People are not machines. They have their opinions and concerns to be addressed. If we do not want to understand the other, nor we can not wonder that he does not understand us. Even the busiest innovation manager should make the time to speak to his people. A manager who is able to lower from his boss position and follow his personnel into the field, shows his friendliness and is much better perceived. Communication with employees at such tour should not

go without recognition. Praise, if justified, is not only a recognition of the preceding, but motivates to meet the next challenge.

The qualities of ideal innovation manager are a very generic concept, because each company has different requirements of their leader. Most of them are still unaware, which of many qualities are just the most essential, and which should be favoured in their managers.

The survey of companies showed that of those evaluated qualities is **independence** currently the most necessary for an innovation manager (Figure 2). The **independence** was very closely followed by **teamwork**, which means that managers are both separate units and able to give good performance in teamwork as well. **Communication with people** placed as next. **Economic knowledge** is not felt as actual by managers at the moment. Other qualities ranked in the middle of an evaluation field in the following order: **time independence, technical knowledge, management skills, readiness and flexibility in the end.**

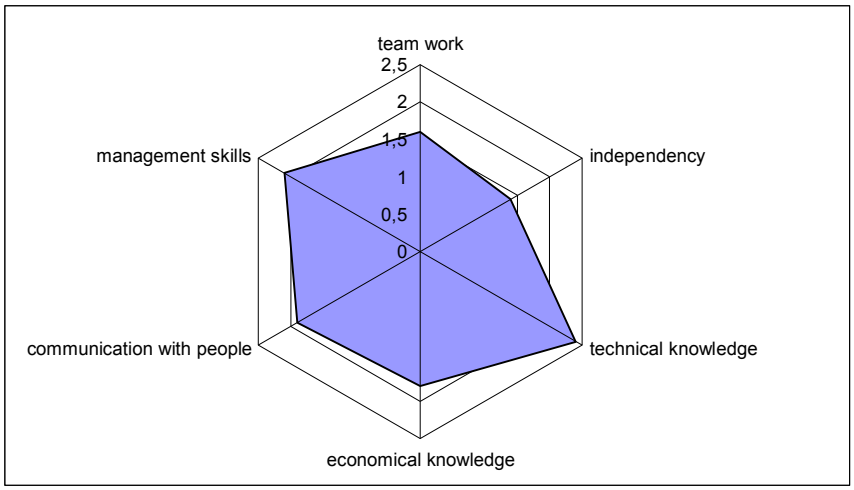

Figure 2 – Qualities of innovation manager

It is now evident what qualities are for future innovation managers of addressed companies indispensable, and which, on the contrary, are currently considered to be less important. Now we can order values according to importance:

- organizational skills,
- communicative,
- punctual,
- decisive,
- flexible,
- systematic,

- thoughtful,
- expert in a given topic,
- optimistic,
- self-critical.

Graphic illustration of the ideal qualities of innovation manager (Figure 3) shows the necessary qualities for companies operating in "Production, sale and operation of amusement and gaming technology". Qualities that should an ideal innovation manager have at this moment are primarily "higher education, flexibility, organizational skills, orderliness, diligence and punctuality". Qualities such as "optimism, gender, or marital status" are for companies not so important.

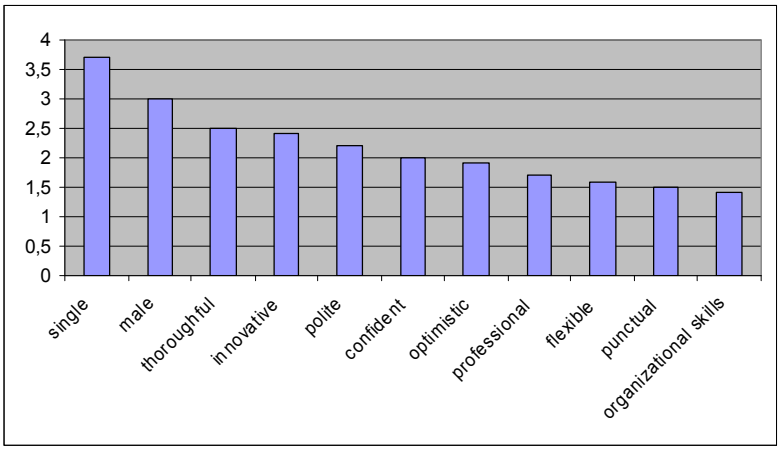

Figure 3 – Ideal qualities of innovation manager

4 DISCUSSION

4. 1 Qualities of Innovation Manager

Whatever work a manager does, he is always viewed as a leader. An innovation manager has only a different job content and skills from other managers, but the basis is always the same. Manager's greatest weapon is his intelligence and intellectual powers, through which he dominates and controls his subordinates.

Each innovation manager should have in his set of skills organizational and strategic thinking, must be able to plan several weeks in advance and must know what and how to plan. Must also be able to professionally and properly lead and motivate people in their work, so that all the objectives are met. He must properly organize his work as well as the work of others and not only work but also his time. Among the essential skills are also a high degree of communicability and negotiation skills.

Lately it is proven as very convenient to also invite customers to the innovation process. This step has undoubtedly its logic – innovations are provided mainly for customers. However, not in all cases is such initiative necessary and desirable – while making changes to internal communication in a company, the presence of our customers will prove as useless.

An innovation manager is not just a person who invents something new, it's the person who leads a team of creative people, it is up to him to combine and lead his team. The creative process is very complicated and it is necessary that a person in a managerial position is able to understand the long path to the desired innovation.

A successful innovation manager, whom his subordinates respect and at the same time are not intimidated by him, should be an emotionally balanced person with a certain degree of empathy. He should be also responsible, persistent and consistent, able to lead his team without any undue problems.

An innovation manager should have a creative personality. But not everyone is the right to invent new and new ways. There are people who do not have such thinking at all.

The creative personality is characterized by qualities such as activity, intuition, finding associations, the art of working with metaphors and inspiration, logic, energy, knowledge of the area in which the person operates and many others. Creative people can often exceed the rules and limits and are willing to take risks. They tend to be stubborn and persistent if they feel that what can not be achieved is actually achievable.

4.2 Position of Innovation Manager in Company

It should be noted that innovators are not only employees in research and development department. Yes, the representation of innovation and creative personalities is quite certainly greater than in other departments. Still, we may assume that inventions are not strictly defined to only a few chosen ones, any staff member can get an original and feasible idea, which will contribute to achieving the company goals (Chesbrough, 2006).

But we can not say that each manager of each department is an innovation manager. The innovation manager should be at the forefront of research and development department, because this is exactly the place where creativity is mostly concentrated. The innovation manager should be right there to acquire inventions of his team and be able to assert them at the top management.

The fundamental prerequisite for successful innovation management is his anchoring in the organizational structure. From a mere glance at the nature of innovation is clear that while most of the tasks and roles in the enterprise has its exact recipient, innovations are in this respect to some extent Cinderella who lacks her "assertor". Therefore, it is necessary to "artificially" create one. The

question we must ask in such a thought is not " Create?" but "How to create it the most effectively?"

An interesting insight could be into the organizational structure of the ten largest innovative companies in global market. To compare them we will use a chart compiled by American magazine Fast Company, published in February 2010. The sequence is as follows according to (Fast Company, 2010):

- Facebook – a well known company providing a world-famous social network project. Recently it has broken the limit of 400 million users worldwide. Currently, the most widespread social network in the world with great influence.
- Amazon – a worldwide provider of Internet commerce in the world.
- Apple - a company operating in the field of computer technology. Led by charismatic Steve Jobs, considered to be one of the greatest innovators of the turn of the 20th and 21st century and innovation guru.
- Google – a provider of the world's most successful search engine google.com, beside search is involved in streaming video - Youtube.com server and many other services.
- Huawei - the largest provider of mobile communications services in Southeast Asia, slowly comes in on to Europe - awarded the contract to build 4G network in Norway. Was given precedence over giants such as Nokia or Ericsson.
- First Solar - the company is a leader in reducing the cost of generating electricity from solar energy. First it managed to reduce the price below $1 per watt and anchored the price at $0.85.
- PG&E - a big energy company in the U.S.A. Produces electricity from all types of energy and is innovative in the view at the new possibilities of obtaining electricity. Has a contract for placement of panels into orbit and supply of electricity on Earth.
- Novartis – a Swiss manufacturer of medicines, the third largest company engaged in the manufacturing of drugs. Recently has come to market with several drugs to treat rare diseases and diseases difficult to cure.
- Walmart - the largest retail chain in the world. Started mainly in the U.S.A. Currently focusing on areas such as environmentally friendly light bulbs, reusable bags, better design of business places, or improving the supply chain.
- HP - a company famous mainly for computer and printing techniques.

All these companies are highly recognized innovators in their field. Their organizational structure is certainly adapted to the innovation process. An interesting fact is that all the above mentioned companies have a line structure.

Its advantage is undoubtedly a clear definition of superiority and subordination. Mostly it involves firms founded by one or a few people who have undergone a very dynamic growth within a few years. As the most illustrious example we can mention Facebook, founded only in 2004, or Amazon and Google, founded in 1995 (Amazon) or 1998 (Google).

Only one of the above leaders in innovation has at the top a person in charge of innovation or development. We can therefore assume that the integration of an innovation manager to company top management is not appropriate and desirable. On the other hand, he should be equipped with a wide variety of competences and opportunities to work with people on both higher and lower positions in the company.

As the most suitable seems to be the separation from the company structure, to avoid pressure from both above and beneath. He should have clear authority to require and reward or punish the performance or non-performance of innovations or tasks that individual workers undertook (or which was imposed on them).

An innovation manager on the lowest level of management has a long way above to realize his job description. Suggestions for improvement will therefore have a long way to persons who will assess them and thus it will lead to their delay and lack of penetration in the onset of innovation process, which could competitors due to bureaucratic process implement much faster.

As a good opportunity I see the location of an innovative team in "Production, sale and operation of amusement and gaming technology" to the staff position. There is a clear possibility of integration into the structure and no need to worry about complex organizational structures, or lengthy process of his proposals for changes, as well as separation from the reality of company operation. Unfortunately, this type is not used by any companies mentioned above.

5 CONCLUSION

As current trends indicate, the world of productivity will be gradually replaced by the world of creativity to support newly emerging professions such as innovative engineer, creativity and innovation manager, etc. It is also necessary to realize that the problems of today are completely different, and for their solution is usually far less time than in the past.

The field surveys during the last period among the top managers of Czech companies have shown that the position of innovation manager is offered by approximately a quarter of firms only. While the vast majority representatives of the companies in the survey confirmed that their company has a processed innovation strategy. Quite logically, the question is who are the implementers, while innovation managers held accountable are in this direction a unique phenomenon indeed. Targeted training for this function is still completely lacking, which can result in our slow pace of innovation. In more than half of

firms, by contrast, are in charge of innovation management several departments at once. Most often it is top management and engineering department. Solutions must be realistically applicable, as short time for implementation as possible and multiplying effect of the expected benefits. The journey from a generated idea to innovation realization is not easy. Still, time is a crucial factor of market success.

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ISSN 1335-1745

ISSN 1335-1745