

Using of Business Continuity Standards in Agriculture, Industry and ICT

P. Hájek¹, H. Urbancová²

¹ Faculty of Engineering, Czech University of Life Sciences in Prague, Czech Republic

² Faculty of Economics and Management, Czech University of Life Sciences in Prague, Czech Republic

Anotace

Vyhnutí se krizi na základě postupů řízení kontinuity činností lze v dnešním napjatém podnikatelském prostředí považovat za konkurenční výhodu. Eliminování hrozeb vyplývajících z vnitřního i vnějšího prostředí, které se snaží řízení kontinuity činností podporovat, je založeno na postupech, které vznikly z dobrých praxí a organizace je využívají v podobě normativních dokumentů. Hlavním cílem článku je identifikovat, zda je důležité ve vybraných odvětvích využívat standardy v oblasti zabezpečení kontinuity činností a identifikovat výhody a nevýhody plynoucí pro organizaci. Článek vznikl na základě zhodnocení dotazníkového šetření (N=779; n=106) a rozhovorů. Využíváním oficiálních standardů v jednotlivých organizacích zvyšuje efektivitu při nalézání potřebných postupů zabezpečení kontinuity činností při nepříznivých situacích a v neposlední řadě snižuje časovou náročnost při obnově klíčových procesů, které jsou však pro různá odvětví ekonomiky rozdílné. Příspěvek vznikl na základě podpory celouniverzitního grantu (CIGA), číslo 20121001 – Řízení kontinuity činností v organizacích vedoucí k vyšší výkonnosti organizace.

Klíčová slova

Management kontinuity činností, standard, zemědělství, průmysl, ICT, Česká republika, organizace

Abstract

In today's stressful entrepreneurial environment, avoiding crisis by applying business continuity management processes may be considered a competitive advantage. Business continuity management also facilitates the elimination of threats caused by internal and external environments. It is grounded on procedures arising from good practice and organizations use them in the form of normative documents. The main goal of the article is to identify whether it is important to apply business continuity standards in selected sectors and to identify possible advantages and disadvantages for organizations. The article has been drawn up on the basis of the evaluation of a questionnaire survey (N=779; n=106) and interviews. The application of official standards by individual organizations enhances efficiency when determining necessary business continuity management processes in unfavourable situations. Last but not least, it shortens the period of restoration of key processes which, however, differ in individual economic sectors. This contribution is a follow-up to the project of CULS – wide internal grant agency (CIGA), no. 20121001 – Business continuity management contributing to higher performance in organizations.

Key words

Business continuity management, standards, agriculture, industry, ICT, Czech Republic, organizations.

Introduction

Business continuity management (BCM) deals with unexpected situations that arise primarily from organisations' external rather than their internal environment and is targeted at preventing and suitably responding to such situations. However, it is necessary to realise that

in particular organisations' weaknesses intensify the consequences of unfavourable situations. Sharp (2009) states that each organization, regardless of the sector, is obliged to take care of their employees, customers, clients, communities and environment. Therefore standards BS 25999-1, 2 have been established to recommend the right approach (best practice) to organizations to satisfy

the needs of all parties involved (BSIa, 2005; BSIB, 2005). Nevertheless surveys conducted by Järveläinen (2013) show that in the process of business continuity ensuring organizations primarily focus on information systems, which is also confirmed by the research Urbancová, Venclová (2013); Sawalha et al., 2012; Ahmad et al. (2012).

However, in the agrarian sector the preservation of processes is not dependent solely on information systems, but on the continuity of all processes that lead to the fulfilment of the global goal of agriculture, which according to the Ministry of Regional Development encompasses (in Fedyszak-Radziejowska, 2011), among other things, the ensuring of available capital for agricultural area and rural districts, the improvement of outdated technical and technological equipment in agricultural and processing companies and thus the elimination of impacts on the environment and the welfare of animals, dealing with social aspects of rural development by increasing the employment rate, the improvement of age and educational structure, and accessibility and safety of information. The goals laid down by the Ministry of Regional Development (in Fedyszak-Radziejowska, 2011) are in compliance with the agrarian policy of the CR and the EU that is anchored in the 1957 Treaty of Rome (Article 38 (1) to Article 47) which says that it is necessary (1) to increase agricultural productivity by promoting technical progress and by ensuring the rational development of agricultural production and the optimal utilisation of the factors of production, in particular labour; (2) to ensure a fair standard of living or the agricultural community, in particular by increasing the individual earnings of people engaged in agriculture; (3) to stabilise markets; (4) to ensure the availability of supplies and (5) to ensure that supplies reach consumers at reasonable prices. Fedyszak-Radziejowska (2011) states that farmland is a special production factor as it is unallocable and its area may not be increased (without annexation). For its cultural and social context related to property inheritance, land is the base and the condition of continuity, tradition and local identity and it is necessary to take care of it. Today, the specificity of agriculture is broadened by yet another aspect: the difficult choice between the extensification and intensification of agricultural production in relation to its impact on the environment

and the quality of harmless foodstuffs. The comprehension of the complexity of all conditions of agricultural business, i.e. its economic, social, cultural and psychological aspects, helps understand the process of development in agriculture (Fedyszak-Radziejowska, 2011).

If agriculture faces any potential threats that need to be eliminated and organisations are able to eliminate them, it is necessary to take counter-measures. The food-processing industry directly uses, for example, the HACCP certification which is an efficient tool that supports other preventive measures against the spread of bacterial, chemical or physical product contamination and is regulated by legislation in force, similarly to how the application of BCM standards is in the area of insurance and banking services (Hele, 2013; KPMG, 2010). Among common benefits arising from the certification and BCM standards, it is possible to mention the increase of an organization's prestige in the competitive environment that is connected with stronger trust of business partners, regulatory bodies and customers resulting from the demonstration of suitability, efficiency and effectiveness of the developed system of critical points by a third independent party beyond the frame of the minimum requirements laid down in the national legislation (Chin-Sen et al. 2012; Elliott et al., 2010).

Business continuity management requires planning of crucial aspects across the entire organization. For this purpose organizations may use standards issued by standardization institutions (BSIa, 2005; BSIB, 2005). These standards, however, are not identical for all countries around the world. Despite the fact that business continuity development is in progress in all parts of the world, the harmonization of methodology in this area has already taken place (Sharp, 2009).

The main causes of events that determine standards focusing on the area of Business Continuity include (Sharp, 2009; BSIa, 2005; BSIB, 2005) natural disasters and epidemics, unintentional human errors, intentional human errors and technological defects (hardware and software). It is also possible to mention the importance of loss of key employees and knowledge which, however, is not explicitly analysed within the frame of these standards (Venclová, Urbancová, 2012). Organisations that carry out risk analyses will be able to respond to this question (Münstermann et al., 2012; Pitt, Goyal, 2012). This contribution deals with the application of BCM standards or norms in the area

of agriculture by organizations and the advantages and disadvantages that it brings to them.

The main aim of the article is to identify, based on primary research, whether or not it is important to apply BCM standards in agriculture, industry and information and communication technologies and subsequently to determine the advantages and disadvantages arising therefrom. A partial goal of the article is to present the results of the quantitative survey conducted in the area of standard application in the Czech Republic with emphasis on the sectors examined and to provide organisations with recommendations regarding these issues. The article concentrates on agriculture since it is a very specific field and an important sector of the Czech economy; a total of 5-6% residents work in and contribute to the growth of GDP according to CSO (2010). The industry is an important source of the formation of GDP also. CSO (2010) states that there is a total of 2.654.571 organizations in the Czech Republic, small 98.79% (less than 50 employees), medium 1.12% (51 to 249 employees) and large 0.09% (250 and more employees). The Czech economy employs a total of 4.885.200 people, the primary sector employs 4% of people (76% of men and 24% of women), the secondary sector employs 37% of people (74% of men, 26% of women) and the tertiary sector employs 59% of people (46% of men, 54% of women). Based on these findings the use of the standards in the agricultural sector which represents the primary sector, in industry (secondary sector) and in information and communication technology (tertiary sector) is assessed.

The first part of the article presents theoretical background together with comparisons of secondary resources. The chapter Results and Discussion includes an analysis and synthesis of the survey targeted at the application of standards in all economic sectors in the Czech Republic, with special emphasis on agriculture, industry and ICT and identifies the advantages and disadvantages of standard application in agriculture. A comparison of results with results of similar surveys conducted abroad and draft recommendations are also included in this chapter.

Theoretical background of the work

At the beginning of the 21st century BCM was viewed as a blurred and vague field. The year 2006, when the British BS 25999-1 standard was published, was a turning point. The book contained best practices

of business continuity management on the basis of this standard, which helped actively manage risks not only in the banking sector (Siponen, Willison, 2009), but showed all organizations, regardless of the economic sector, how to use BCM as a way of managing organizational risk, disasters and crises, as well as business interruptions (Sawalha et al., 2012). Sawalha et al. (2012) states that the level of BCM in organisations is determined by a number of factors at the organisational level, such as their vision, organisational culture, but also the organization's management (Järveläinen, 2013; Conlon, Smith, 2010), which in turn determines the type of standards or norms applied.

BS 25999 has been developed by a broad based group of world class experts representing a cross-section of industry sectors and the government to establish the process, principles and terminology of BCM. It provides a basis for understanding, developing and implementing business continuity within an organization and give a confidence in business-to-business and business-to-customer dealings (BSIa, 2005; BSIb, 2005). It also contains a comprehensive set of controls based on BCM best practice and covers the whole BCM lifecycle.

Hele (2013) says that the biggest difference between standards BS 25999-1, 2 and ISO (e.g. ISO/PAS 22399 (Societal Security), ISO 27001 Information Security Management System IS-ISMS and ISO 27002) is in structure of the document, which puts a much greater emphasis on planning and risk (Chin-Sen et al., 2012).

Risk Analysis Consultant (2012) officially published that the British Standards Institute (BSI) has published a new standard for ensuring the business continuity PD 25666:2010 - Business continuity management - Guidance on exercising and testing for continuity and contingency Programmes. This is the first standard that is exclusively focused on the BCM program verification and testing related continuity and recovery plans (Risk Analysis Consultant, 2012). The document PD 25666:2010 is intended as a supplement to the BCM(S) standards - BS 25999 and BS 25777 and other existing standards such as ISO / PAS 22399 or BS ISO / IEC 27001 and related documents issued by BSI but they are not the subject of this paper.

Sharp (2009) states that the British BS 25999 standard has been developed with the aim to lay down a common best practices standard and thus to satisfy the needs of customers, clients,

the government, regulatory bodies and all other parties involved from all economic sectors. It confirms Herbane (2010) who says that in the context of crisis management is already an important event in business history due to its influence on the consolidation of specific business practices within and between organisations across many sectors of the economy, and its basis as the rationale for legislation and regulation during the acceleration and focus phase (Herbane, 2010).

A Study of the Factors Influencing Business Continuity Programs (2008) states that 26% of organizations (n = 800) does not know nor approximate extent of their loss in case of disruption of business caused in the past. This study has come into existence thanks to the cooperation with KPMG (2010) focused on the area of business continuity management according to the standards. The extent of loss was measured in USD in order to the global comparison could be carry out. The most of the respondents (organizations) estimates that they are below 100 000 USD (43%) according to this research. 17% of organizations have subsequently stated that the extent was between 100 000 and 499 000 USD. Research on Factors Influencing Business Continuity Programs (KPMG, 2008) also shows that 87% of organizations does not exceed the investment in individual elements of the BCM amount of 250 000 USD. Overall, 58% of the organizations confirmed that they have a system for BCM, 20% of respondents still developed the plans and only 4.5% of respondents did not introduce any BCM program. Based on the research in the Czech Republic it can be said that only 18.7% of organizations have a system for BCM (Urbancová, Venclová, 2013).

On the results of the Factors Influencing Business Continuity Programs (2008) research in cooperation with KPMG (2010) it can be summarized that BCM based on the BS 25999 – 1 and 2 standards is applied by organizations with global operations, primarily applied by organizations from the financial, insurance, health care and public sectors and BCM is managed by two full-time specialists in organizations.

Comparing the results from the Czech Republic in period 2012-2013 and provided by KPMG (2010), it may be concluded that BCM based on the BS 25999 – 1 and 2 standards and comparable standards is applied by global organizations (30%), 25% of Czech organizations and 20% of foreign organizations apply the BS 25999 – 1 standard,

BCM based on the BS 25999 – 1 and 2 standards and comparable standards is applied in particular by ICT organizations (25%) and insurance companies (5%) and from 2 to 5 full-time specialists are engaged in 40% of foreign organizations and 30% of Czech organizations.

Based on research of Randeree et al. (2012), Low et al. (2010) and Herban (2010) and the Sharp's (2009) recommendations it can be stated that organizations in all sectors of the economy can offer to their customers and clients greater assurance that in the event of disruption they are able to manage and ensure its business continuity due to the application of BCM standards-based. The question is whether it is beneficial to apply this standard as well as in agriculture which is a specific sector. Research questions arisen from the theoretical background are: Q1: How to use organization the standard BS 25999-1 and 2 in the agriculture, industry and ICT in the Czech Republic? Q2: Are these standards effective for all the followed sectors? These research questions are answered on the basis of the evaluation of primary research.

Materials and methods

The article has been drawn up using scientific methods, in particular logical methods, such as analysis, synthesis, induction and deduction. The theoretical background was based on analysis of secondary sources, studying the structure of the standard BS 25999 1 and 2 on the official website of the BSI, Professional Evaluation and Certification Board and Business Continuity Management, Building resilience in public sector entities sheet Better Practice Guide (2009).

The results of primary survey were obtained by using the quantitative research by questionnaire data collection in organizations in the Czech Republic. The survey was answered by 106 organizations from the 779 addressed organizations (the return rate was 13.62%). The organizations which participated in the survey correspond to the percentage representation of organizations in the Czech Republic according to the Czech Statistical Office and all sectors of the economy by CZ-NACE are represented. The largest group of respondents who participated in the research were the organizations from the tertiary sector (73.7%) which is consistent with the statistics of the Czech Statistical Office (2011) about the structure of organizations in this country.

Specialists in the field of BCM and owners of small organizations were addressed. To evaluate the results, methods of descriptive statistics were used (the IBM SPSS Statistics Data Editor, version 20 and Microsoft Excel), absolute and relative frequencies, testing of dependency between set qualitative features and dependency tests. Using extracted data the dependency was tested by applying Pearson's Chi-Square test, a scale according to de Vaus (2002) was used. If the p-value calculated by means of the χ^2 test (Pearson Chi-Square) was lower than the selected level of significance $\alpha = 0.05$, null hypothesis was rejected. The achieved results of the research in the Czech Republic are also compared with the results of similar studies abroad.

In order to verify the outcomes obtained and to gain new practical knowledge the article presents results of an interview taken in the Prischink GmbH company, an Austrian agrarian organization, a holder of the AMA-Gütesiegel certificate. The company is a traditional onion and potato producer and is one of the main suppliers of the Inter/Eurospar Austria GmbH company. Representatives of one organization from the secondary and two organizations from the tertiary sectors were interviewed as well. In total, four interviews were conducted, each of them lasting approx. 40 minutes. Based on direct observation (in AMA-Gütesiegel) a case study was prepared. The following preconditions were set for the realization of the case study:

Case study type: instrumental case (only several subjects of observation).

Phenomenon monitored: the use of BC standards in the area of agriculture in the CR and the Austrian company.

- The subject of the survey: an unnamed Czech company operating in agriculture and the Prischink GmbH company. The overall number of employees: 13. The area of fields annually cultivated: approx. 220 ha. The organization was founded in 2003, but it had operated as a family business since the 1970s. Their goal is a high-quality plant production. This requirement is also laid down in the Spar GmbH internal regulations in which specific features of individual kinds of potato and onion are defined (e.g. size or nutrient content).
- Research questions: How often does your organization face problems, such as natural

disasters and epidemics, unintentional human errors, intentional human errors and technological defects (of hardware and software)? Is it realistic for organizations in agriculture to ensure BC according to standards? Why is it/is it not important to deal with this? What advantages and disadvantages do agricultural organizations see in the application of BCM according to standards?

Based on the outcomes of the quantitative research (questionnaire survey) and the qualitative research (interviews, direct observation, case study), the practical advantages and disadvantages of BC standards were determined and recommendations for organizations primarily operating in the area of agriculture were formulated.

The following acronyms are used in the paper: BS = British Standards; BC = Business Continuity, BCM = Business Continuity Management, CSO = Czech Statistical Office, ICT = Information and Communication Technologies; R = respondent.

Results and discussion

This chapter contains evaluation of the data, their interpretation and recommendations. It is structured into the two sub-sections; the assessment of the current situation of BCM in the Czech organizations with emphasis on agriculture, industry and ICT and advantages and disadvantages in these sectors. The section "Results" is followed by the discussion and conclusions which summarize the most important recommendations from the evaluated results.

1. Results of the survey in the Czech Republic with emphasis on agriculture, industry and ICT

The results of a university-wide grant show that only 18.9% of the surveyed organizations have used the BCM according to standards (Venclová, Urbancová, 2012). The research focused on BCM ensuring was determined using the standards by standard BS 25999-1 (BS - Code of practice) and BS 25999-2 (BS - Specifications) then BS 25777:2008 (ICT Continuity Management) and ISO/PAS 22399 (Societal security). Among the surveyed standards which included in the research were ISO 27001 (Information Security Management System - ISMS), ISO 27002 (Information Security Implementation), COBIT and ITIL. The most commonly applied standard in the Czech Republic is BS 25999-1, followed

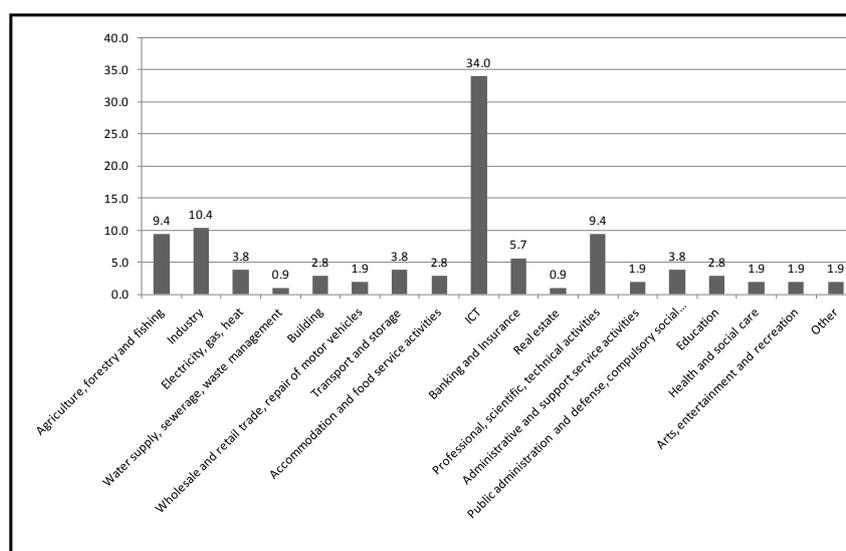
by BS 25999-1 and 2. Other BCM related norms and standards used in the territory of the Czech Republic are ISO 27001 (ISMS) applied by all organisations, CobIT used by 16% of organisations and ITIL by 53% of organisations who applied of BCM (Urbancová, Urbanec, 2013).

With respect to the fact that the sector classification according to CZ-NACE has been used, it is possible to present the outcomes in percentage points according to the sector of organizations involved and to evaluate the application of standards. The structure of organizations addressed is shown in Graph 1.

According to the Graph, it is possible to state that in total 10 organizations from the agrarian sector completed the questionnaire (9.4%). Only one of these organizations applies Business Continuity Management according to a standard. Within the frame of BCM standards, this organization focuses on IT and business processes. The organization examined does not have the BS 25999- 1 and 2 standards in place, but applies the ISO/PAS 22399 standard, ISO 27001 IS-ISMS Security Management Systems and ISO 27002 – Information Security Implementation. The reason of non-application of BCM according to BS 25999-1, 2 is the lack of support on the part of the organization’s management. The remaining 8 organizations from the agrarian sector stated that they did not find the application of BCM according to standards in agriculture important. Pursuant to BSI (2010) BCM concentrates on four main risks

(natural disasters and epidemics, unintentional human errors, intentional human errors and technological defects (of hardware and software)). The results show that in organizations examined, regardless of the sector they operate in, primarily mentioned the threat of natural disasters, however, the representatives of agrarian organizations did not mention this fact. It is necessary to realize that this threat should not be underestimated by organizations in the agricultural sector since it is a danger that would significantly impact the agricultural sector in the given country. Therefore it is important to state that these risks need to be monitored and eliminated in this business sector. This is also confirmed by Chin-Sen et al. (2012). The results of the research also reveal another interesting finding that only one organization in the agrarian sector that applies BCM according to the ISO standard mentioned technological defects of hardware and software as the major impact. This fact may be explained by high complexity of technology (machinery, equipment) currently used in modern agriculture. When compared to other organizations involved in the research and applying BCM standards, it is possible to say that other 25% of companies gave the same answer. This was followed by the loss of key employees (20%) and unintentional human errors (10%) and intentional human errors (10%).

The majority of organizations in the CR that ensure BC according to standards are large organizations active in the tertiary sector (75%) and



Source: own survey

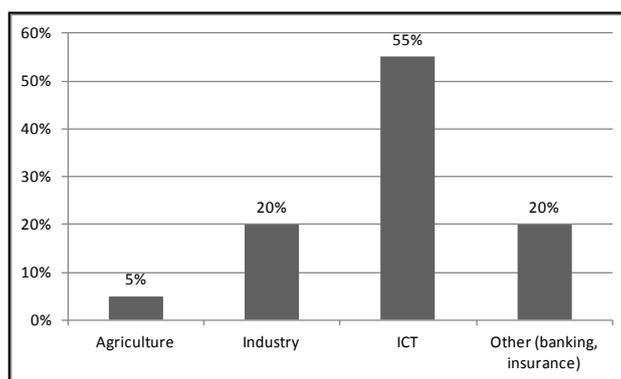
Graph 1: The percentage of organizations by business sector in research.

within this sector in the area of ICT (55%) and banking and insurance services. This large proportion may be explained by the legislative obligation to ensure and maintain business continuity in these organizations. BCM is a common requirement in regulated industries, such as the financial sector or critical public infrastructure (see Graph 2).

These standards are used only occasionally in the area of industry and agriculture (see Graph 3).

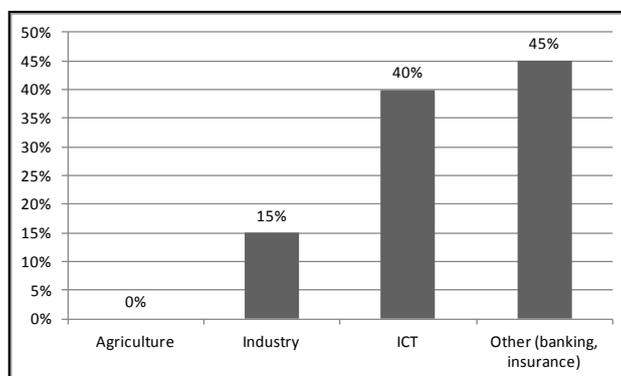
The above said might be supported by the outcomes of the interviews in which the respondents from the tertiary sector unambiguously stated that they were satisfied with the application of BCM according to standards. It was also examined why they thought the majority of organizations did not ensure BCM. Respondents agreed that it was due to the lack of financial means to conduct all activities necessary for BCM certification, the lack of their own human resources, the shortage of knowledge (people), and know-how. R1 stated that smaller mid-size organizations did not need to have

a standard, as they might use consultation services to introduce BCM procedures. R2 mentioned that organizations primarily needed to realize all possible risks and consequences. Organizations were not sufficiently prudent in this respect, they thought it was costly and such costs needed to be justified and therefore it was easier to reject the whole idea at the very beginning (R2). Within the frame of statistical testing the dependencies of two features examined were statistically verified – i.e. the dependency between the application of a specific standard and an organization's size and sector. The research, however, only proved the dependency between the organization's size and BCM ensuring according to standards without any differentiation (p-value = 0.000; Cramer's V = 0.485, the moderate dependency). Subsequently a statistical dependency between the application of the ISO 27001 standard and an organization's size was proven (p-value = 0.003; Cramer's V = 0.329, the moderate dependency). For other standards the dependency between the application of standards and an organization's size was not confirmed.



Source: authors

Graph 2: BCM ensuring in examined organizations.



Source: authors

Graph 3: BCM ensuring according to BS 25999-1, 2.

The same applies for the testing of dependencies in relation to individual sectors of economy. Despite the fact that it was impossible to statistically prove the dependency between BCM and an economic sector in the sample group of organizations, it is possible to say – taking into account other surveys (Münstermann et al. 2012; Pitt, Goyal, 2012) – that BCM ensuring (of certain extent) is beneficial for all organizations regardless of their size or sector.

2. The advantage and disadvantage using the BCM standards in agriculture

Critical factors in agriculture include minor or major disasters in agricultural production. Fedyszak-Radziejowska (2011) states that due to this fact the system of commercial insurance policies defines such premiums for agricultural businesses that the majority of Union agrarian companies cannot afford. The production cycle in agriculture is determined by factors that are difficult to control by humans and therefore the pressures of market mechanisms sometimes force organizations to produce “for their own use”, which means a kind of escape from the market. A family farm is able to survive despite losses and even despite the threat of bankruptcy because it maintains its business activities for its own use and searches for additional sources of income outside their business. Radical market liberalism in the approach to family agrarian companies (that represent a major part of businesses in the EU) therefore does not help understand processes that take place in these organizations. Based on the interviews taken, it is possible to determine the advantages and disadvantages that agrarian businesses see in the application of BCM according to standards.

The advantages of the application of BCM according to standards in the area of agriculture may include elimination of employee turnover, elimination of technological and technical problems, elimination of damage caused by force majeure and strengthening of financial independence based on risk reduction.

The disadvantages of the application of BCM according to standards in the area of agriculture may include high expenses for agricultural businesses, lack of employees specialising in these issues, lack of experience in the agrarian sector, lack of theoretical background with good knowledge in the area of practical application or no model businesses with a clearly defined system of functioning.

One of the main benefits of BCM application in organizations regardless of the sector is that standards contain instructions „what to do when“, which is one of the purposes of BCM documentation. This documentation specifies what to do to mitigate the consequences (remedial activities following an event). However, it is more appropriate to view BCM as a preventive function, i.e. to prevent critical situations or to deal with them as quickly as possible. Other benefits include the ability to present themselves and qualify in the competitive market, to improve their state compared to the past (the environment is evolving), to strengthen awareness, and to find solution taking into account its costs. It is possible to say that BCM is no longer a new phenomenon; organizations, in particular those in the tertiary sector, are aware of it and they realise that the preset solutions work.

3. Discussion

With respect to the above said, it may be stated that at present organizations in the agrarian sector in the Czech Republic are not interested in applying BCM according to standards. This disinterest may be supported by the outcomes of the interview with the representatives of the farm in Austria specialising in potato and onion growing and selling its products to the Austrian Inter/Eurospar chain.

At present the company does not apply BCM either randomly or accordingly to standards and norms and according to the results of the interview (qualitative research conducted) it is possible to state that pursuant to its representatives BCM in the agrarian sector is not important since it depends on the type of activities that are primarily carried out by the company in question. In the tertiary sector it is important to apply BCM according to standards because of the highly qualified work that is required in this sector. In agriculture the share of highly qualified work is still rather low with low- and mid-qualified work prevailing. People can learn processes more easily and the continuity of processes is relatively easy to achieve. Natural disasters are viewed by respondents as a risk that is preventable only to a certain extent. At present they accept risks endangering critical processes that would jeopardise the business or processes whose restoration to the original state would require too much time (e.g. natural disasters, inability to grow crops) and plan, for example, to rotate fields they farm and they also accept the risk that they would not be able to run their business for a certain period of time while the disaster lasts (burned down crops, etc.).

In agriculture the most common problems are associated with natural disasters and epidemics that the organization in question cannot control. In industry and ICT it is connected primarily with technological defects, which is confirmed by surveys conducted by Doucek, Novák (2010) and Chow, Ha (2009). Using the results it is possible to answer the research questions (Q1) and state that the BS 25999-1 and 2 standards are most frequently used in the tertiary sector (ICT), followed by the secondary sector (industry) and then by the primary sector (agriculture). BC standards prevail in organizations in the ICT area, the situation in industry and agriculture is

different, norms are more widespread there and it is possible to conclude that ensuring BC according to the BS 25999-1 and 2 standards is not efficient due to the above-mentioned reasons (Q2).

In relation to the above said it is also possible, for the purposes of organizations in agriculture, industry and ICT, to modify documents that present Business Continuity Management, Building Resilience in Public Sector Entities, and Better Practice Guide (2009) that will facilitate the decision of companies whether or not to deal with these issues (Table 1). Organizations are recommended to use the following documents

Undertaking a business impact analysis tasks	Completed YES/NO
Gather relevant existing information, such as: <ul style="list-style-type: none"> ▪ disruption scenarios, ▪ emergency response management plan, ▪ incident management plan, ▪ pandemic plan ▪ IT disaster recovery plan. 	YES/NO
Consult key personal and business units. consider: <ul style="list-style-type: none"> ▪ internal audit, ▪ business areas, ▪ emergency response management, ▪ finance (and insurance), ▪ external entities and organizations (for example, service providers, interdependencies, and unions), ▪ information technology, ▪ risk management, ▪ building and facilities, ▪ occupational health and safety. 	YES/NO
Evaluate the impacts of a loss of each critical process from the perspective of the entity's objectives. consider: <ul style="list-style-type: none"> ▪ financial, ▪ reputation, ▪ regulation, ▪ health and safety, ▪ third party relationships and interdependencies, ▪ customer service, ▪ legal/contractual, ▪ work backlog, ▪ environmental, ▪ other categories (determined by the entity). 	YES/NO
Identify interim processing procedures (alternative or manual processing) techniques to be adopted during the recovery phase.	YES/NO
Determine the maximum tolerable period of disruption for each critical process.	YES/NO
Determine internal and external critical interdependencies.	YES/NO
Identify vital records.	YES/NO
Determine the recovery time objective for each critical business process and it system/application.	YES/NO
Determine the recovery point objective electronic data.	YES/NO
Estimate the time to overcome the backlog of work accumulated during a business disruption event.	YES/NO
Obtain executive endorsement of the business impact analysis.	YES/NO

Source: Business Continuity Management, Building resilience in public sector entities, Better Practice Guide (2009), adjusted by authors

Table 1: Undertaking a business impact analysis checklist.

that may help them solve problems occurring in connection with business continuity ensuring.

Table 2 can be used to identification of the possible scenarios and determination the frequency of occurrence and potential impact on the business.

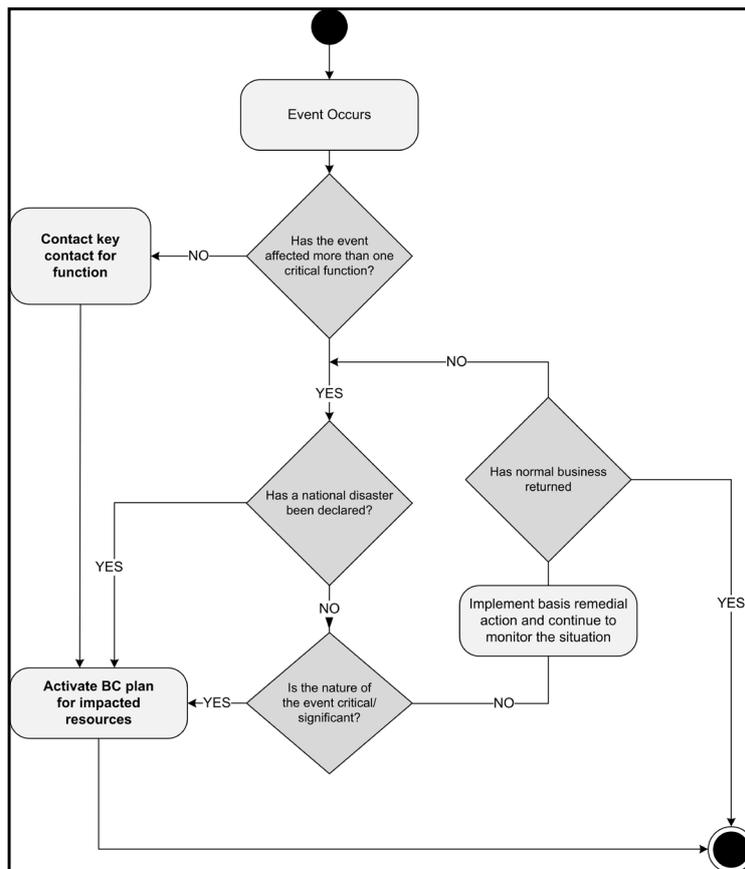
The flowchart of process steps (Figure 1) can be used for the needs of organizations by which it can be proceed in risk situation. An organization can adjust the individual steps according to their requirements.

Keeping in mind the above said it is possible

Scenario	Likelihood [%]	Consequence	Impact [low, middle, high]
Natural hazards. For example: <ul style="list-style-type: none"> ▪ Fire ▪ Flood ▪ Pandemic 			
Generics scenarios. For example: <ul style="list-style-type: none"> ▪ Loss of building ▪ Loss of people ▪ Loss of knowledge ▪ Loss of IT systems ▪ Loss of telecommunications ▪ Loss of water, electricity, gas, sewage ▪ Other hazards 			

Source: Business Continuity Management, Building resilience in public sector entities, Better Practice Guide (2009), adjusted by authors

Table 2: Likelihood of Scenario.



Source: Business Continuity Management, Building resilience in public sector entities, Better Practice Guide (2009), adjusted by authors

Figure 1: The flowchart of process of BC plan.

to state that at present organizations in the agrarian sector do not pay attention to BCM according to standards. Potato and onion growing and harvesting is labour-intensive, time-consuming and costly. This is caused primarily by the continuously growing demands of customers for quality and also by the use of very specific agricultural machinery. We can say that with the growing pressure on agrarian basic production and specialisation, the above areas are becoming more and more important.

Based on the results of comparison, the outcomes of the quantitative research as well as the additional qualitative research it may be summarized that organizations in the agrarian sector are not interested in the application of BCM according to standards and their use in agrarian businesses is an exception. The BS 25999 1 and 2 standards and norms examined are applied in particular in the tertiary sector, predominantly in the banking, financial, energy, ICT and similar sectors that focus, according to the research by Venclová, Urbancová (2012), primarily on IT and organizational processes.

Conclusion

The BS 25999 1 and 2 standards that represent the major groups of standards used by European countries do not display significant differences as they are based on the same conception and it depends on the organization which standard or norm it finds more appropriate (lower acquisition costs, faster implementation, etc.). In the Czech Republic BC standards are most frequently applied by organizations with foreign participation operating in the tertiary sector, predominantly in ICT. BCM standard application is not common in the agrarian sector yet. Agrarian organization are not interested in applying BCM according to standards; they would rather implement accompanying ISO norms, such as ISO/PAS

22399 and ISO 27031 whose introduction is less costly compared to BC standards. ISO norms are in the majority of cases introduced in order to ensure the continuity of operation, to resist disasters and to maintain supply chains. These standards are primarily applied by the tertiary sector (ICT), less in industry. If organizations identify their key elements and introduce norms or standards to ensure BCM according to their needs, it will help them eliminate risks.

The theoretical contribution of the article is the verification of theoretical suppositions from the literature examined regarding the suitability of standards for all economic sectors. The results show that not all sectors view BCM according to standards as justified. The practical benefit of the article is the presentation and evaluation of data obtained in the area of BCM, the evaluation of advantages and disadvantages that arise from the application of BCM according to standards in the areas examined and the proposal of possible documentation for better orientation in the given area. The results presented in the article are limited by the low number of organizations in the Czech Republic that manage process continuity according to the standards monitored. Future research may be extended to include neighbouring states (Slovakia, Poland, etc.) that co-operate with the Czech University of Life Sciences Prague on a long-term basis and to compare the obtained results in the areas of interest.

Acknowledgements

This contribution is a follow-up to the project of the Czech University of Life Sciences Prague, University – wide internal grant agency (CIGA), number 20121001 – Business continuity management contributing to higher performance in organizations.

Corresponding author:

Ing. Petr Hájek

Faculty of Engineering, Czech University of Life Sciences in Prague,

Kamýcká 129, 165 21 Prague 6, Czech Republic

Phone: +02 22438 3140, E-mail: hajekp@tf.czu.cz

References

- [1] Ahmad, A., Hadgkiss, J., Ruighaver, A. B. Incident response teams – Challenges in supporting the organisational security function. *Computers & Security*, 2012, 31, No. 5, p. 643–652, ISSN 0167-4048.
- [2] BSIa: BS25999-1:2005 Business Continuity Management. Code of Practice. 1st Ed. British Standards Institution, 2005, United Kingdom.
- [3] BSIb: BS25999-2:2005 Business Continuity Management. Specification. 1st Ed. British Standards Institution. 2005, United Kingdom.
- [4] Chin-Sen, L., Sunny K., Long-Sheng Ch. A. Proactive Operational Framework for Business Continuity in the Semiconductor Industry, John Wiley & Sons, Ltd. *Quality and Reliability Engineering International*, 2012, 28, Issue 3, p. 307-320, ISSN 1099-1638.
- [5] Conlon, R., Smith, R. V. The role of the board and the CEO in ensuring business continuity. *Financial Executive*, 2010, 26, No. 9, p. 52–55, ISSN 8756-7113.
- [6] Chow, W. S., Ha, W. O. Determinants of the critical success factor of disaster recovery planning for information systems, *Information Management & Computer Security*, 2009, 17, No. 3, p. 248–275, ISSN: 0968-5227.
- [7] Czech Statistical Office [Online] Available: <http://www.czso.cz/> [Accessed: 18 Jun. 2013].
- [8] De Vaus, D. *Surveys in Social Research*. Routledge/Taylor and Francis, London. 2002, ISBN 0415268575.
- [9] Doucek, P., Novak, L. When ICT do not work – Business Continuity Management. (Czech - Když ICT nefungují – řízení kontinuity činností organizace), *Systémová integrace*, 2010, 2, p. 43–52, ISSN 1210-9479.
- [10] Elliott, D., Swartz, E., Herbane, B. *Business continuity management: A crisis management approach* (2nd ed.). NY, USA: Routledge. 2010, ISBN 0-11-330675-X.
- [11] Fedyszak-Radziejowska, B. Společná zemědělská politika EU: co a jak měnit po roce 2013? 2011 [Online] Available: <http://www.revuepolitika.cz/clanky/1583/> [Accessed: 18 Jun. 2013].
- [12] Hele, J. *Management Systems Tutor*, BSI. 2013 [Online] Available: <http://www.bcifiles.com/IS022301QAFinal.pdf>. [Accessed: 18 Jun. 2013].
- [13] Järveläinen, J. IT incidents and business impacts: Validating a framework for continuity management in information systems, *International Journal of Information Management*. 2013, 33, p. 583– 590, ISBN 0378-7206.
- [14] KPMG. The risks threaten the prosperity of the company they can prepare (in Czech), 2010. [Online]. Available: <http://www.ictsecurity.cz/security-bezpecnost/rizika-ohrozujici-prosperitu-firmy-se-na-ne-mohou-pripravit.html>. [Accessed: 18 Jun. 2013].
- [15] Münstermann, B., Eckhardt, A., Weitzel, T. The performance impact of business process standardization, *Business Process Management Journal*, 2012, 16 (1), p. 29–56, ISSN 1463-7154.
- [16] Pitt, M., Goyal, S. Business continuity planning as a facilities management tool. *Facilities*. 2012, 22 (3), p. 87–99, ISSN 0263-2772.
- [17] Sawalha, I. H. S., Anchor, J. R., Meaton, J. Business continuity management in Jordanian banks: Some cultural considerations. *Risk Management - an international Journal*. 2012, 14, Issue 4, p. 301-324, ISSN 1460-3799.
- [18] Siponen, M., Willison, R. Information security management standards: Problems and solutions, *Information & Management*, 2009, 46, No. 5, p. 267–270, ISSN 0378-7206.

- [19] Urbancova, H., Urbanec, J. Knowledge Continuity as a part of Business Continuity Management, 2013, p. 255-259, Venice, ISBN 2010-376X.
- [20] Venclova, K., Urbancova, H. Role of knowledge continuity ensuring of key staff in the concept of Business Continuity Management, 20th Annual Conference on Business and Marketing Strategies in Central and Eastern Europe, 2012, Vienna, p. 321–330, ISBN 978-3-9503290-1-8.