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Agricultural E-Government: Design of Quality Evaluation Method Based on ISO SQuaRE quality Model

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Anotace

Článek stručně popisuje současný stav využití služeb e-governmentu v České republice se zaměřením na elektronické služby v zemědělství. V příspěvku je definován termín zemědělský e-government. Existuje několik metod pro hodnocení kvality služeb a e-služeb, ale nebyla dosud nalezena žádná metoda, která by pracovala s ISO standardy pro hodnocení kvality software. Navržená metodika CABAG (Communication between Agricultural Businesses and Government) umožňuje hodnotit kvalitu zemědělských elektronických služeb prostřednictvím ISO/IEC 25010 modelu kvality užití podle předem daného seznamu charakteristik a podcharakteristik kvality a požadavků na kvalitu. Celková kvalita zemědělských e-služeb je představena agregovaným výsledkem výpočtu rozdílu mezi očekávanou úrovní realizace a skutečnou úrovní realizace jednotlivých požadavků. Metoda může být využita pro koncové uživatele a poskytovale (nebo vlastníky) elektronických služeb. Část poznatků představených v tomto článku byla získána na základě řešení grantu Interní grantové agentury Provozně ekonomické fakulty České zemědělské univerzity v Praze pod evidenčním číslem 20131038 „Analýza a návrh modelu hodnocení kvality e-služeb v sektoru zemědělství".

Klíčová slova

Zemědělský e-government, elektronická služba, veřejná autorita, kvalita užití, ISO SQuaRE, charakteristika kvality, CABAG.

Abstract

The paper briefly describes the current use of e-government services in the Czech Republic with focus on use of e-services in agriculture. The term agricultural e-government is defined here. There are several methods for evaluation of service and e-service quality however, no relevant method based on ISO software quality standards was found yet. Proposed CABAG (Communication between Agricultural Businesses and Government) method enables to evaluate quality of agricultural electronic services by means of ISO/IEC 25010 quality in use model giving list of quality characteristics, sub characteristics and quality requirements. The overall quality of agricultural e-service is represented as an aggregated result of expected level minus actual level of implementation for each particular requirement. The method can be used both for end users and providers (or owners) of e-services. Pieces of knowledge introduced in this paper resulted from solution of Internal Grant Agency (IGA) of the Faculty of Economics and Management, Czech University of Life Sciences in Prague grant number 20131038 "Analýza a návrh modelu hodnocení kvality e-služeb v sektoru zemědělství" (Analysis and design of quality evaluation model of e-services in agriculture).

Key words

Agricultural e-government, electronic service, public authority, quality in use, ISO SQuaRE, quality characteristics, CABAG.

Introduction

Deployment of information and communication technologies (ICT) into communication between government and citizens and enterprises might be called as e-government even there the many various approaches of different authors as Grand and Chau (2005) mention. In general terms, e-government is based on the principle of enabling users to access government information and services, when and

how they want (24/7) through channels including the Internet (OECD, 2005). European Commission sees e-government as an enabler to transform the public sector, significantly changing their relations with citizens and businesses and harvesting the gains in efficiency and effectiveness of the services in the process. The ultimate goal is to get better public outcomes that can be achieved through e-government solutions (EC, 2010). More detailed review of e-government definitions and approaches of scholars can be found in (Špaček, 2012), (Ntaliani, et al., 2010) or (Lee et al., 2008).

E-government in the Czech Republic

The level of e-government in the Czech Republic according to UN E-government Development Database (UNPAN, 2012) was ranked globally on 47th position in 2012 which was a decrease from 33rd position in 2010, however the overall E-government Development Index that aggregates the level of online services, infrastructure, e-participation and human capital was slightly improved in 2012 (0,649) when compared to 2010 (0,606). The UN benchmark is focused on supply side of e-government and does not reveal users' perception of quality of delivered e-services.

The approach of the European Commission to e-government benchmarking is based on measurement of indicators in five areas: ICT sector, broadband and connectivity, ICT usage by individuals, ICT usage by enterprises and e-public services. Summary data can be accessed on the Eurostat web page on Information society (Eurostat, 2012). The percentage of individuals that used Internet for interacting with public authorities in 2012 was around 30 % while the percentage of enterprises (with 10 or more employees) was 94 % in the Czech Republic. The EU-28 averages are 44 % of individuals and 87 % of enterprises using Internet for communication with public authorities (Eurostat, 2012).

There was not much attention put so far to e-government and its impacts in agricultural sector (Lee at al., 2008). Both European and national statistics do not include agriculture and forestry businesses in the survey. In the Czech Republic, the only recent information about the level of ICT and public online services use among Czech agricultural enterprises can be obtained from the survey Agrocenzus conducted by the Czech Statistical Office and a complex survey made by Vaněk et al. (2010). Agrocenzus (CZSO, 2011) provides only the information about the number of computers possessed by farmers. Vaněk et al. (2010) provided more detailed outlook of ICT use between agricultural enterprises. The evaluation of use and quality of electronic services among Czech agriculturists was firstly conducted in (Rysová et al. 2013).

The objectives of the Czech e-government have been stated in scattered and not properly actualized national strategies, in accompanying documents and covered by heterogeneous legislation. The recent overview of Czech e-government policies and projects with their links to international and supranational e-government activities are covered in (Špaček, 2012) and (Špaček and Malý, 2010).

Agricultural e-government

E-government services for agriculture should cover the needs and priorities of particular stakeholders, such as farmers and tourists. According Ntaliani et al. (2010) agricultural stakeholders' priorities mainly focus on agricultural emergency management (e. g. for disease outbreak, extreme weather conditions) and expert consulting (e. g. for cultivation techniques, market forecasting, new production standards). Particular attention should be paid to the provision of e-government services by local authorities given that most of agricultural stakeholders' transactions with them take place at local level (Ntaliani, 2010).

Many government agricultural agencies already developed and implemented portals where various electronic services for farmers are provided (Ntaliani, 2010). The portal solution for farmers is also maintained by the Czech Ministry of Agriculture at the website http://www.eagri.cz. But also the effort in providing different type of service than building portal solutions can be observed, particularly in the agricultural sector. Miah (2012) proposes a shift from the traditional information portal process to a new provision where citizens or primary producers can actively contribute in designing their useful services from the relevant government agencies.

The terms "e-government in agriculture" and "e-government services" will be further on called also as "agricultural e-government". Our definition of agricultural e-government is this: *"E-government in agriculture could be understood as a type of e-government that is based on use of information technology by state administration to facilitate reciprocal information exchange between the involved agricultural public authority and agricultural enterprise to improve efficiency*

of its internal use and to provide fast, accessible and quality information services."

Methods of service quality evaluation

The literature and work of other authors has produced plenty of methods of e-service quality evaluation. Papadomichelaki and Mentzas (2012) provided one of the recent overviews of all approaches. They put approaches into two groups: quality of e-government services and quality of e-services. Some of them are intended to be used for website quality evaluation such as SITEQUAL (Webb and Webb, 2004), Portal usage quality (Lin and Wu, 2002), some only for specific country public websites (Quality of Norwegian public websites by Jansen and Ølnes, 2004), or for specific type of websites (e-Commerce website quality by Bessa and Belchior, 2002).

A first attempt to identify service quality characteristics was published by Parasuraman, Zeithaml and Berry (1988) who designed method called SERVQUAL that identifies and measures quality requirements of non-electronic services. The key concept of SERVQUAL is based on comparison of expected service quality and perceived service quality by users of the service. Perceived quality is the consumer's judgment and results from a comparison of expectations with perceptions of performance (Parasuraman, Zeithaml and Berry, 1988). SERVQUAL later laid foundation for E-S-QUAL method for electronic service quality evaluation for private companies such as e-shops (Parasuraman, Zeithaml and Malhotry, 2005). E-S-QUAL provides multiple-item scale for measuring the service quality delivered by Web sites on which customers shop online. The method works with basic scale and contains eleven items grouped in four dimensions of quality: efficiency, fulfilment, reliability, and privacy. The second scale E-RecS-QUAL measures non-routine cases and recovery when using sites and works with eleven items in three dimensions: responsiveness, compensation, and contact. E-S-QUAL was applied by many authors in several different fields, such as travel agency e-commerce websites (Bernardo et al., 2012), evaluation of an e-learning service provided by the city (Pazalos et al., 2012), Internet banking services (Zavareh et al., 2012, Akinci et al., 2010), or evaluation of government tax online service in Ireland (Connolly and Bannister, 2007) among others.

Authors that strive for finding public e-services satisfaction criteria and design measuring tools and methods often draw on outputs of research of e-commerce services. Some of the quality evaluation criteria will be generic when measuring e-government services while some may apply to only e-commerce and some may apply only to e-government (Papadomichelaki and Mentzas, 2012). Example of generic criteria evaluation of e-services in the domain of agriculture could be seen in (Rysová et al., 2013) where the rate of use, importance, usefulness and quality of e-services were evaluated from the users' perspective and analysed with basic descriptive statistics and regression analysis. Some of above mentioned e-government services measuring tools are based on SERVQUAL and E-S-QUAL methods (Papadomichelaki and Mentzas, 2012, Špaček, 2012) such as e-GovQual (Papadomichelaki and Mentzas, 2012), e-GovSqual (Kaisara and Pather, 2011). The implementation framework for agricultural e-government services was introduced by Ntaliani et al. (2010), but the method or tool for quality evaluation of agricultural e-government services was not presented yet.

ISO quality model

We suppose that agricultural e-government might become a part of strategic advantage for agricultural enterprises and farmers if it meets certain quality that is perceived as ability of a product, service, system, component, process to meet customer or user needs, expectations, or requirements (ISO, 2008). E-government is also represented by electronic services which quality can be evaluated as any other software product. In product quality evaluation or quality in use evaluation, it is always needed to start from required quality that the person expects from the product. The requirement is specified as a condition or capability that must be met or possessed by a system, system component, product, or service to satisfy an agreement, standard, specification, or other formally imposed documents (ISO, 2008).

ISO software quality models were introduced firstly in international standards ISO/IEC 9126, 14598 and 12119. In mid 2000s, a second generation of software quality models were released as a ISO/IEC 25000 series.

The aim of this article is to design new method of agricultural e-government quality evaluation based on ISO quality model that would identify possible differences between required and actual level of particular quality requirements and that would provide basis for their improvement. The methodology of the article is based on secondary information research. Based

on the theoretical knowledge and results the conclusions and generalization of the concept will be formulated.

Materials and methods

There was a survey among agricultural enterprises and farmers conducted by the Department of Information Engineering and Department of Information Technologies at the Faculty of Economics and Management at Czech University of Life Sciences in Prague in 2012. The results of the survey were as follows:

- Out of the sample (n=119), most of farmers had under 100 hectares of land and employed 10 or less people.
- Most often used electronic services for communication with state authorities were e-mail (79 %) and services provided at eAGRI Portal (more than 50 %) that were also evaluated the best in terms of importance, usefulness and quality.
- Farmers and agricultural businesses are not obliged by any law to use any of electronic services, and they can still opt for traditional paper mail or personal contact.

The main outcome of the survey is that agricultural businesses in the Czech Republic use e-government to various extent and some even do not use it at all (Rysová et al., 2013).

Based on the analysis of current state of e-government in the Czech agricultural sector there are particular relevant research questions:

- What are real benefits of e-government for agriculture?
- What are presumptions of effective electronic communication between the state authorities and agricultural enterprises?
- Is the electronic communication in agricultural enterprises a business process that could be measured and evaluated?
- Are there any basic requirements for quality evaluation of electronic communication between state authorities and agricultural businesses?
- Is it possible to conduct the assessment on the basis of the ISO SQuaRE software quality model?

The use of ISO quality model approach to build a method for e-service quality evaluation has been already used in similar field such as e-business. Behkamal et al. (2009) built a quality evaluation method for B2B application based on ISO 9126 model. We propose to develop a quality evaluation method for agricultural e-government based on ISO SQuaRE 25000 that is a second generation of previous quality model standardized in ISO 9126 and ISO 14598 documents.

To answer aforementioned questions, it is needed to design a new method of quality evaluation of electronic services provided by the Ministry of Agriculture to agricultural enterprises. Reasons for designing such a method are following:

- There is a need to provide a tool to evaluate quality of electronic services maintained by the Ministry of Agriculture to farmers.
- There is an evidence that a tool to evaluate actual level of quality of electronic services in agriculture is needed so that the efficiency and financial costs can be measured and advocated.
- Previous analysis (Rysová et al., 2013) revealed that the electronic communication in agricultural sector lacks standards.

Software quality evaluation – ISO SQuaRE quality models

Designed method draws on definition of quality requirement stated in ISO 9000 quality management system and further uses quality characteristics introduced in ISO 25000 SQuaRE model. The quality of software can be characterized as a match of explicitly stated requirements for its function and behaviour, explicitly documented development standards and implicit characteristics that are expected from any professionally developed software.

Working group at ISO has developed the series of standards for software product quality requirements and evaluation (SQuaRE) that consists of 14 documents grouped in 5 divisions within SQuaRE model. The model comprises divisions of quality management, quality model, quality measurement, quality requirements and quality evaluation (ISO/IEC 25000:2005).

The quality of system is the degree to which the system satisfies the stated and implied need of its various stakeholders, and thus provides value. Currently there are three quality models: the software product quality model, the system

quality in use model and the data quality model. Among the stakeholders belong: software developers, system integrators, acquirers, owners, maintainers, contractors and end users. Together these models provide a comprehensive set of quality characteristics relevant to a wide range of stakeholders: software developers, system integrators, acquirers, owners, maintainers, contractors and end users. The full set of quality characteristics across these models may not be relevant to all stakeholders. Nonetheless, each stakeholder should review and consider the relevance of the quality characteristics in each model before finalizing the set of quality characteristics that will be used to establish product and system performance requirements or evaluation criteria (ISO/IEC 25010:2011).

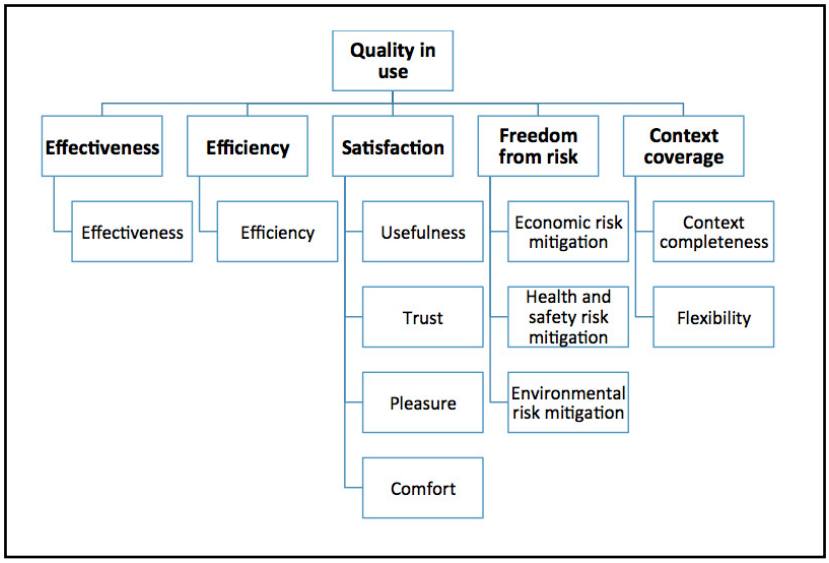
The SQuaRE quality models categorise product quality into characteristics that are further subdivided into sub characteristics composed of attributes. An attribute is an inherent property or characteristic of an entity that can be distinguished quantitatively or qualitatively by human or automated means. Attributes can be measured by quality measure elements (ISO/IEC 25000:2005).

These models are useful for specifying requirements, establishing measures, and performing quality evaluations. The defined quality characteristics can be used as a checklist for ensuring a comprehensive coverage of quality requirements. We will try to propose a set of relevant quality characteristics for the end users of electronic services in agriculture.

The authors of the SQuaRE standards recommend developing the set of quality requirements from the perspective of stakeholders prior to design and implementation of software to gain early insight into software quality. Requirements for quality in use specify the required levels of quality from the users‘ point of view. These requirements are derived from the needs of users and other stakeholders (such as software developers, system integrators, acquirers, or owners). Quality in use requirements are used as the target for validation of the software product by the user (ISO/IEC 25010:2011).

However there is no evidence that these lists of desired quality requirements were developed for agricultural users of electronic services provided by Czech Ministry of Agriculture. Thus we would like to make a pilot list of requirements that could serve as a template for future advancements and development of online services for agriculture. Presented research is focused on quality of use of e-government services for agriculture where main stakeholders are farmers and state officers at the Ministry of Agriculture.

Quality in use is the extent to which a product used by specific users meets their needs to achieve specific goals with effectiveness, efficiency, satisfaction, freedom of risk and context coverage (ISO/IEC 25010:2011) - see Fig. 1. Jung (2007) brought evidence that the user satisfaction may be implied by external quality characteristics of executable software (such as web application). The quality



Source: ISO/IEC 25010:2011

Figure 1: Quality in use model according to ISO/IEC 25010:2011.

in use characteristics relate to the effect of the system in use, so are a starting point for requirements, and can be used to measure the impact of the quality of the system on use and maintenance.

The software product quality characteristics can be used to specify and evaluate detailed characteristics of the software product that are prerequisites for achieving desired levels of quality in use. We can conclude that ISO quality in use model is a proper tool to evaluate quality of e-government services in general and also in agriculture domain.

Results and discussion

The suggested method is intended to be used in quality evaluation of electronic services for agricultural enterprises (agricultural e-government). Users are interested mainly in overall benefit of using services therefore the method evaluates the quality in use. We suppose that the quality in use has a direct impact on users. The method is designed for both users and owners of the system, respectively the managers of both private agricultural enterprises and state officers. The new method is called CABAG (Communication between Agricultural Businesses And Government). The method is inspired by the method CBG (Ulman and Havlíček, 2010) and modified for agricultural sector. Original CBG method was previously designed and verified with subjects in industry field.

CABAG method

The following text is a description of steps how CABAG method should be used in evaluating quality of agricultural electronic services (agricultural e-government) - see Fig. 2. The method is designed to be used by independent evaluators such as consulting advisors, ICT auditors or public authority internal IT staff.

1. **Definition of relevant user groups of agricultural electronic services.** The step should be conducted by the evaluator in cooperation with representatives of end users. This could be done through the questionnaire survey and personal consultation.
2. **Identification of users' requirements.** Users's can be asked through a questionnarie or in personal interview or by any similar relevant mean.
3. **Categorization of user's requirements according the quality characteristics**. There will be a list of sorted requirements assigned to particular quality characteristics as a result.
4. **Setting of individual weights for requirements.** Each requirement has different importance for various user groups (agricultural enterprises) while the statement of the importance is very subjective thereofe must be done in a responsible manner. The possible error in estimation must be taken into account. To minimize the error the following scale is suggested for requirement weights: very high importance – 100 %, high importance – 75 %, average importance – 50 %, little or fractional importance – 25 %, no importance – 0 %.
5. **Setting of required level of implementation of quality requirements.** This is done together by the evaluator and the end user representative. The quality measure represents the level of implementation of the given requirement and is evaluated with points according to the following scale: 1 point – fully done, 2 points – done with very good quality, 3 points – done with average quality, 4 points – done with low quality, 5 points – not done at all.
6. **Measurement of actual level of implementation of quality requirements.** Users are asked to evaluate actual level of implementation of given set of requirements on the same scale as in step no. 4. Gathered values are then weighted with values gained in step no. 3
7. **Comparison of required and actual weighted levels of quality requirements.** The difference between weighted required level (wre) and weighted actual level (wa) of particular requirement provides information whether the actual quality is coming near the required quality or is becoming distant from it. Results for each quality characteristic can be agreggated by sum, arithmetic mean and median. After the evaluator can provide overall assessment of quality of the whole system that is an arithmetic average of all characteristics. Because of the ordinal scale, it cannot be assured that the distance between particular classification grades has the same empirical meaning. The only one invariate aggregation is median, but not the arithmetic

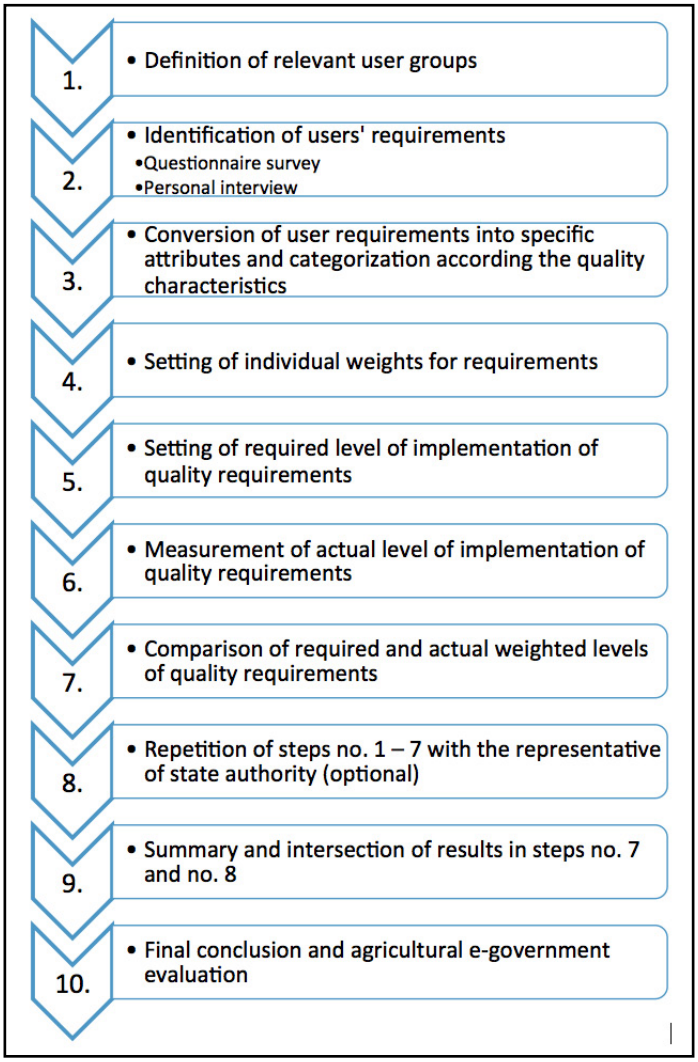
mean. The overall quality assessment of whole system can be done by following scale:

Overall quality	Absolute difference (wre – wa)
Excellent	> 0
Good	> 1
Acceptable	> 2
Not acceptable	> 3

Source: own processing

Table 1: Overall agricultural e-government system quality evaluation scale.

8. **Repetition of steps no. 1 – 7 with the representative of state authority.** This step is optional when the evaluation process should be done also for the state authority, such as the Ministry of Agriculture.
9. **Summary and intersection of results in steps no. 6 and 7.** Here, the results for both end users (farmers) and owners (state officers) can be compared and further analysed (e. g. regression and correlation analysis)
10. **Final conclusion and agricultural e-government evaluation.** Summarization of resuls and formulation of recommendations for the owner (such as the Ministry of Agriculture) in the form of steps how to improve particular services and how to reach required values of electronic services quality.



Source: own processing

Figure 2: Scheme of agricultural e-government services quality evaluation according to CABAG method.

Proposed list of user quality requirements according to ISO SQuaRE quality in use model

In the agriculture domain, we suppose that the level of notion and understanding of users of electronic services will be lower than in several other industries or services. The list was derived from ISO norm and adapted for agricultural users of e-services. That is why we developed and proposed a list of quality requirements sorted in sub characteristics and characteristics according to ISO/IEC 25010:2011. The list will be used to evaluate the actual quality from the users' perspective in the questionnaire. The use of the list for quality evaluation needs to be tested in practice and individual items need to be statistically analysed as to the dependence and reliability.

We suppose that the national agriculture authority perspective (such as Czech Ministry of Agriculture) may differ and in practice the proposed list for evaluation of agricultural e-government services can be different. The common requirements and characteristics from both evaluation processes (users and the owner) can be then compared and final recommendations can be formulated as seen in steps no. 8 and 9 of CABAG method (see above).

An inseparable part of quality evaluation is setting measures. Measures of quality in use measure the extent to which a product meets the needs of specific users with respect to their specific personal or business goals. These measures can only be made in a realistic and operational system environment. Quality in use measures relate to the impact of the system on stakeholders. These measures may be made by user testing, simulation or in actual use (ISO/IEC, 2011). For the use of CABAG we designed plain ordinal scale to evaluate expected and actual level of particular items (requirements) (Table 2). The scale works with five possible values: 1 point – fully done, 2 points – done with very good quality, 3 points – done with average quality, 4 points – done with low quality, 5 points – not done at all (also see above the CABAG method, step no. 5), except the item no. 3 ("How often do you use the service?") where different responses should be offered (such as daily, once a week, once a month, less often, do not use at all). The proposed measure is rather subjective and depending on the respondent's point of view. The development of an exact measure for particular quality requirement such as accuracy of services may become a subject of further research.

CABAG method contributions and comparison

The CABAG method was proposed with the following expected contributions:

1. Enables evaluation of the quality of agricultural e-government services

No.	*Characteristics*	*Sub characteristics*	*Quality requirements*
1	Effectiveness	Accuracy	How accurately the service works? Eg. Data precision, correct computation, land parcel display, etc.
2	Efficiency	Competitiveness	How big advantages are brought to you by the service? Eg. Faster dispatch, access to funds, more precise information about economics, better information about competition, etc.)
3		Frequency of use	How often do you use the service? (Daily, once a week, once a month, less often, not use at all)
4		Latency	How fast response does the service provide?
5	Satisfaction	Usefulness	How well does the service meet your requirements? Ie. It allows you to do what you need.
6		Comfort	To what extent is the service web site user friendly? Eg. Re-sizable font, colour contrast on the screen, comprehensible page navigation, easy to open, etc.
7		Pleasure	How are you satisfied with service functions?
8	Freedom from risk	Economic risk mitigation	To what extent is the use of service safe for you? Eg. The risk of loss of data, leakage or loss of sensitive figures, etc.
9	Context coverage	Information structure	How well are information organized on the website?
10		Navigation	How easy is to navigate on the page?
11		Learnability	To what extent does the page help you to understand its control? Eg. Such as user help, manual, guidelines, etc.

Source: own processing

Table 2: Agricultural e-government services quality requirements according to ISO/IEC 25010 quality in use model and own proposal.

that are provided by state authorities (e. g. The Ministry of Agriculture) and used by agricultural enterprises (or farmers). The method is based on the ISO model that provides five basic quality characteristics for quality of use of services.

2. Gives the opportunity to evaluate the agricultural e-government from the perspective of different stakeholders such as end users (state authority staff and farmers), owners (state authorities), developers, and independent evaluators.
3. The CABAG method aspires to become a tool for both sides of agricultural e-communication: agricultural enterprises (or farmers) and state authority officials (namely the Ministry of Agriculture).
4. Developers can use the CABAG method to better identify new ways of ICT utilization for communication between state authorities and agricultural enterprises.
5. Managers of state authorities will get a tool to analyse problems in communication and further enhancements in provision of electronic services. In the Czech Republic, when used in agricultural state administration, it can also provide a feedback for national e-government projects such as Czech POINT, information system of data boxes and information system of basic registers.

While CABAG is compared with other e-government service evaluation tools, it could be seen that the service with excellent quality is that where the difference between expected quality (w_{re}) and perceived quality (w_a) is equal or close to zero. e-GovSqual method declares a high quality service when the perception of quality (of particular website) is greater than expectation of quality of an ideal website (Kaisara and Pather, 2011, p.219). Questionnaire built according CABAG is based on assessment of services with ordinal classification scale, but e-GovSqual and e-GovQual methods work with statements that are evaluated by users on a Likert scale. Perceptions-expectations gap was suggested to determine the importance of each dimension and item (Parasuraman et al., 1988).

Numbers of dimensions and items that are evaluated are also different: CABAG (5 characteristics/ dimensions and 11 items), e-GovSqual (6 dimensions and 31 items) vs. e-GovQual (4 dimensions and 21 items).

While CABAG is based on ISO software quality models that were firstly introduced in mid 1980´s and upgraded in 2000s (ISO SQuaRE), the e-GovSqual and similar methods are grounded in marketing research methods from 1980s. However, both service evaluation methods measure quality from the service user perspective and are intended to be used for decision-makers.

Conclusion

Our conclusion about agricultural e-government is that it is a type of e-government that is based on use of information technology by state administration (such as the Ministry of Agriculture), to facilitate reciprocal information exchange between the state authority and involved agricultural enterprises. The purpose of the agricultural e-government is to improve efficiency of state administration by its internal use and to provide fast, accessible and quality information services. E-government defined in such a way can be taken as a mean to qualitative enhancement of productivity of agricultural enterprises. It is needed to consider that implementation of new e-government tools brings certain requirements not only for legislation but also for private companies that will use them.

The CABAG method that was introduced in this paper is intended to become an empirical tool to evaluate agricultural e-government services quality and to contribute to their improvement. The CABAG method stems from user-centric approach to e-government where the demand side of services (end users) are taken into consideration and can participate in their design (Miah, 2012) and maintenance. The method needs to be tested in practice by using real users' data survey that is currently being conducted in the Czech Republic by our research team. We plan to publish the first results of the survey in the coming months.

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