Abstract. With the adoption of Internet as a prerequisite and enabler of doing business, online services and their quality are directly dependant on ICT and the quality of ICT-based services. Based on the extensive literature that exists for quality of services from several aspects (technology, technical, marketing) and the currently deployed standards and best practices (ISO and ITIL), a unified view should be developed that will correspond to the business and economic environment.

The goal of this paper is to propose an integrated model for Quality Assurance of ICT-based services and to present the status of the research that is in progress.


1. Introduction

Internet technology has become enabling technology [25] and is changing the way business is conducted and people are communicating. To stay competitive, the issue for companies according to Porter [25] is not whether to deploy, but how to deploy Internet technology. Internet must become an integral part of a company’s strategy for competing [28]. The companies compete on the basis of service quality and service companies are defined by their service quality [3].

The question is how to achieve competitive advantage in a highly competitive market that is a consequence of Internet adoption in business. The answer to the previous question is to deliver a unique type of value to customers [25]. One of the values is the quality of the services provided.

The general question of this paper pertains to establishing directions of cross-disciplinary research on the topic of assuring quality of ICT-based services in a knowledge-based economy and in an on-line business environment. To the best knowledge of the authors, in the research practice, Quality Assurance is not considered to be a mediator towards customer satisfaction and customer experience in regards to consuming ICT-based services. The ultimate goal is to provide Quality Assurance on a long-term basis, not on an ad-hoc basis. A good analogy from the strategic management point of view is the focus on sustainable competitive advantage, not competitive advantage on a temporal basis.

This paper is organized as follows: the next section provides a research background for all constitutive parts of the proposed model. After presenting the theory, the model is described and propositions are defined. At the end directions for future research and the status of the current research for Quality Assurance of ICT-based services are indicated.

2. The Research Background

The main goal of ICT is to provide services to the internal and external customers. Two main definitions for service that reflects a cross-discipline approach may be derived: one from IT best practices – ITIL and the other from the marketing discipline. The ITIL definition states that service is “a means of delivering value to customers by facilitating outcomes customers want to achieve without the ownership of specific costs and risks” [21]. From the marketing perspective service is defined as “any activity or benefit that one party can offer to another which is essentially intangible and does not result in the ownership of anything” [17].

According to [13], quality is defined as a degree to which a set of inherent characteristics fulfills requirements (clause 3.1.1). Quality Assurance, the focus of this research, according to ISO is defined as a part of quality management focused on providing confidence that quality requirements will be fulfilled.

This paper considers the quality of ICT-based services and tends to integrate both abovementioned approaches to Quality Assurance. The ISO standard for Quality
Management Systems is adopted as a starting point.

Although the ISO standard suggests a process approach for monitoring and measurement of a Quality Management System, this research is concerned with the outcome of the process, actually opinion of the internal customers of the company where ICT-based services are deployed and external customers that are using services with embedded ICT.

From the literature review and qualitative phase of the research, explained in the third section, it is concluded that Quality Assurance of ICT-based services is dependent on: the Quality Management System, the capabilities developed inside the company, the quality of the ICT-based services, the climate for delivering ICT-based services and finally the alignment between business and IT strategies.

In the next sections, the theoretical background is presented for each recognized component. For each component an existing model or view is considered and included in this research.

2.1. Quality Management System

Quality Management System – QMS is defined in [13] as a “management system to direct and control an organization with regard to quality”. Although the standard presented in [14] proposes monitoring and measurement of the Quality Management System processes, the adopted approach in this research is cross-sectional focusing on QMS usefulness perceived by the direct participants and the users of the QMS.

In the literature Quality Management System is seldom taken as a construct. The interviews with the subject matter experts revealed that the Quality Management System, pertaining to the process to control quality management, is found to be important and to be of value to the companies. For that reason, the Quality Management System is adopted as a construct and the relationship with the other important constructs for assuring quality of ICT-based services shall be determined in the next phase comprising of a quantitative research.

2.2. ICT Capabilities - Resource-Based View

In the literature dominant research is related to the competitive advantage from a strategic management and strategic planning. The relationship between resources and competitive advantage is the basis for Resource-based View [1]. To be a source of sustainable competitive advantage resources must be valuable, rare, imperfectly imitable and non-substitutable [1].

There is a distinction between resources and capabilities. According to [1] “resources are input into the production process”. Resources are skills of the employees, patents, brand names, capital equipment. On the other side, capability is “the capacity for a team of resources to perform some task of activity” [1]. The capabilities build on the top of the existing resources. The competitive advantage on the market is based on a company’s capabilities. Finally, strategy is based on competitive advantage and firm’s resources and capabilities.

The article [2] speaks about internal attributes which are referred as resources and capabilities. Those are strengths and weakness of the firm’s SWOT (strength, weakness, opportunity and threats) analysis. The resources and the capabilities should always add value despite the turbulent competitive environment [2]. This issue must be constantly monitored and evaluated.

Although the Resource-based View originates from a strategic management focusing on a sustainable competitive advantage, we claim that it is important ingredient directly influencing the Quality Assurance and Quality of ICT-based services.

As a result of her research, [4] proposes and suggests focus for future research to be on developing better metrics for evaluating IT resources. She proposes, among other things, to implement SERVQUAL as an instrument to help determine the quality of Information System and the IT effectiveness.

2.3. Quality of ICT-based Services - SERVQUAL

Since the focus of this paper pertains to the quality of ICT-based services, an issue becomes how to measure the quality of these specific services. Defining quality has a long history and a lot of efforts are made in this direction in several disciplines. One of the most prominent approaches is defined in [22] and is called SERVQUAL. SERVQUAL consists of five dimensions: tangibles, reliability, responsiveness, assurance and empathy. Behind these five
dimensions is a 22-item scale that reflects thoroughly corresponding dimensions. The items should be modified accordingly to the context in which SERVQUAL is being implemented.

But, the SERVQUAL instrument is designed to assess services provided by people. Questionable is the level of applicability of the SERVQUAL instrument in on-line services. This is rationale behind introduction of the E-SQUAL [23] instrument consisting of the 22-item scale and four dimensions: efficiency, fulfillment, system availability and privacy. Another scale E-RecS-QUAL is developed consisting of three dimensions: responsiveness, compensation and contact, and relates to quality of service in the case of problem with web service and its recovery.

The SERVQUAL instrument is based on the difference between the perceptions and the expectations of the services provided. This method experienced a lot of critics and problems [5;7;27]. The most problematic item is conceptualization and definition of the perception. A new scale SERVPERF is proposed that includes only the performance side [8;9].

Although there is a discussion about the quality of the instrument, generally the SERVQUAL is considered as a good starting point and the instrument should be adapted and modified according to the industry and the environment. For this research only perceived quality is considered.

2.4. Service ICT Climate

According to [26] the climate is defined “as the shared perception of employees concerning the practices, procedures, and kinds of behavior that get rewarded and supported in a particular setting”. The climate for service according to the same author is climate “with regards to customer services and customer service quality”. Three scales are developed: Customer orientation scale that measures meeting customer needs and expectations for service quality, Managerial practices scales that measures managers’ support and reward for service quality, and Customer feedback regarding service quality.

The Service Climate is researched in the context of IT [16]. The authors proposed theoretical framework and four-dimension climate model. Four IT Service Climate Dimensions are Service leadership, Service vision, Customer feedback and Customer communication. Service leadership is defined as extent to which IT managers guide and reward the delivery of quality service. Service vision is extent to which IT professionals view them as having service-oriented role. Customer Feedback is related to feedback from clients regarding service quality and its importance. Customer Communication is related to openness and frequency of communication with the customers. Outcome variable is IT Service Quality.

In this research the IT Service Climate is defined as a construct that directly influences the Quality Assurance and the quality of ICT-based services.

2.5. Business / IT Alignment

The Business / IT Alignment is defined as an alignment of the company’s IT resources with the objectives of the business units [20].

The role of IT and more generally ICT has evolved during the last decade [12], from a back office to a strategic role. But, the problem is recognized that an ICT investment cannot yield to the anticipated values. The reason for this, according to [12] is a lack of alignment between the business strategy and the IT strategy in the companies. The model is proposed in [12] for aligning IT with business strategy consisting of four domains, two internal and two external. The two external domains, referred to as a Strategy domains, are Business strategy domain and IT Strategy domain. The two Internal domains are Business infrastructure and IT Infrastructure domain. The strategic alignment is based on two building blocks: strategic fit and functional integration. Four alignment perspectives are defined: Business strategy taken as the driver - strategy execution and technology transformation, and IT strategy as the enabler - competitive potential and service level.

Six most important enablers and inhibitors related to applying IT in a harmony with business strategy, goals and needs are defined [18;19]. The six most important enablers are: senior executive support for IT, IT involved in strategy development, IT understanding of the business, business/IT partnership, well prioritized projects and demonstrated IT leadership. The six most important inhibitors are: lack of IT/business close relationship, IT does not prioritize well, IT fails to meet its commitments, IT does not understand the business, the senior executives do not support IT and the IT management lacks leadership.
According to [6] good strategic alignment leads to a better customer service quality.

In this research Business / IT Alignment is taken to influence the Quality Assurance.

2.6. Summary

In the previous section, the background for the research is provided. Each subsection, namely, Quality Management System, ICT Capabilities, SERVQUAL, IT Service Climate and Business / ICT Alignment, are related to the Service Quality Assurance. We argue that there is a Quality Assurance construct that can better capture all presented concepts and can act as an antecedent of the customer satisfaction and customer experience. Based on the previous, a model for the Quality Assurance is proposed.

The proposed model is presented in the next section.

3. Proposed Model

The conceptual model for Quality Assurance of ICT-Based Services is presented in Fig. 1.

![Conceptual model](image)

**Figure 1. Conceptual model**

The proposed model consists of a measurement model and a structural model. During the process of developing the model, special attention is given to the distinction between reflexive and formative constructs [10;15;24].

The measurement model consists of the following constructs and indicators: exogenous latent constructs (Quality Management System - E1, ICT Capabilities – E2, Quality of ICT-based Services -E3, Service ICT Climate – E4 and Business / IT Alignment – E5), exogenous indicators that represent measures of the exogenous latent constructs and endogenous indicators that measure endogenous latent construct. These indicators and questions related to them shall be a part of the questionnaire for quantitative research, planned for the second phase. The structural model consists of the two endogenous latent constructs: Quality Assurance of ICT-based Services and Customer Satisfaction and Experience.

The ISO 9001 [14] standard defines four items to measure: customer satisfaction, internal audit, monitoring and measurement of processes, and monitoring and measurement of product. In this particular research „product“ relates to service. The internal audit and monitoring and measurement of processes are included in the construct E1 – Quality Management System. Monitoring and measurement of the product/service are included in the construct E3 – Quality of ICT-based Services. Customer satisfaction is included in Customer Satisfaction and Experience as a consequence of Quality Assurance.

The proposed model is an outcome of the qualitative research based on interviews with subject matter experts, consisting of: ICT managers, managers of business units that are embedding ICT services inside their own services and offering their services to the external customers, and external customers that are using ICT-based services. The industry that is focus of this research is the banking industry.

The research consisted of face-to-face semi-structured interviews. The main themes were oriented towards components of the proposed model, each component represented by a cluster of questions. The validity of the model and its coverage of the domain was the focus of the general part of the discussion.

![Opinions for the model](image)

**Figure 2. Opinions for the model**

3.1. Propositions

The following propositions are presented that are outcome of the conceptual model (Fig. 1).

P1: The existing and implemented Quality Management System positively influences the Quality Assurance of ICT-based Services.

P2: The ICT Capabilities, developed inside the company, are positively influencing the Quality of ICT-based services.
P3: The ICT Capabilities, developed inside the companies are influencing directly quality of the ICT-based services.
P4: The Quality of ICT-based services is directly influencing the Quality Assurance; high quality of service on a long-run satisfies the Quality Assurance.
P5: The level of the Service ICT Climate is positively related to the quality of ICT-based services.
P6: The level of the Service ICT Climate is positively influencing Quality Assurance.
P7: The Business / IT Alignment is related to the Quality Assurance in a positive manner.
P8: Providing Quality Assurance of ICT-based services has as outcome high customer satisfaction and positive customer experience.

4. Discussion

The Quality Assurance of ICT-based service is considered as a formative construct. As such, its main concern is whether the proposed model captures the entire domain of Quality Assurance. The model is affirmed by the extensive literature review and the experts through qualitative research, i.e. interviews. The interviews with experts engender high confidence that content validity is on a satisfactory level. The expert data approval is presented in Fig. 2. Also, in the process of defining the model, common sense is applied and should be accounted for in this type of research.

The second most important aspect of the research is the relationship between Quality Assurance and Customer Satisfaction and Customer Experience. The quantitative research, planned for the second phase, shall provide evidence whether causal effect exists between them.

Some level of overlap is detected and causes concern for the research process. The SERVQUAL model, and the model for Service Climate proposed in [26] and accepted in this research appear to relate to the same construct domain of service quality. For this research, clear distinction is made between the two models. SERVQUAL defines the instrument specifically pertaining to the measurement of the level of perceived service quality. The Service ICT Climate relates to the environmental factors. For example, Service ICT Climate asks whether and how often customer feedback is collected, whereby SERVQUAL is concerned with the content of the feedback, such as the level of quality for a particular measurement (reliability, responsiveness etc.). This issue is very important during the scale development and definition of the questions.

5. Future research

The goal of the next phase is to check proposed relationships and/or to establish new ones between constructs and to create measurement scale. An quantitative research is planned and will be conducted in the banking industry in Republic of Macedonia. According to the National bank of the Republic of Macedonia, 19 banks currently are operating in the country. Due to the relatively small industry relating to the number of employees in the banking industry, an issue will be the sample size. To mitigate and overcome this problem, a strategy will be developed and additional human resources and funding will be deployed.

6. Conclusion

This paper conveys the perceived need to mix approaches in the research with the goal of providing more holistic and objective estimation of ICT-based services. Such methodology would strongly corroborate findings of a cross-disciplinary scrutiny.

The conclusion of the above presented literature review and conducted research is that the object of the research, Quality Assurance of ICT-based services, can be approached by several disciplines: the first one is marketing, because services are integral part of it; the second is the strategic management aspect and fitness within business strategies and objectives; the third aspect is compliance with best practices and standards.

This complexity presents a challenge in the effort to find a model that will satisfy and coexist within all aspects of ICT-based services, is holistic on one side and from the other side is focused and adapted towards some specific industry. This paper acknowledges and tackles the stated challenge.

9. References


