



Service quality management applying the balanced scorecard: an exploratory study

Applying the
balanced
scorecard

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Abstract

Purpose – The purpose of this paper is to examine the role of the balanced scorecard methodology in web services quality. A balanced scorecard framework is developed for web services quality by identifying critical success factors that make up the business objectives, measures, targets, and initiatives.

Design/methodology/approach – The framework of web services quality applying the balanced scorecard methodology is developed by integrating the theory of balanced scorecard and web services. Then, case studies with two organizations in the agricultural industry are deployed to test the framework of the balanced scorecard.

Findings – The findings of the exploratory case studies suggest a cyclic process that was created with the use of the balanced scorecard approach to evaluate the quality of web services applications and in order to integrate quality and to provide a strategic map and indicate how information will be disseminated so that the potential use of web services can be attained.

Practical implications – The study contributes to practitioners as they will have a system which will provide them with timely, cost-effective, scalable, manageable, and reliable feedback on their strategic performance. Further, the balanced scorecard gives a holistic view of the firms by simultaneously examining its performance from four perspectives; namely learning and growth, internal business processes, customer, and financial perspectives.

Originality/value – Unlike previous research that uses the balanced scorecard to measure the economic impact on the firm. This paper discusses the role of the balanced scorecard methodology in improving the service quality of firms using web services. Further, it provides lessons learned, as in measures that firms can be aware of in the quality of the services they provide.

Keywords Internet, Service levels, Quality management, Balanced scorecard

Paper type Research paper

Introduction

The internet has revolutionized the capacity to share information across organizations, resulting in radical transformations of organizational practices for procuring supplies, delivering goods and services, and carrying out financial transactions. Regardless of the size or scope of organizations around the globe, businesses are adopting web services. Over the recent years, a new promise about the potential of the internet has emerged – web services. This promise goes by many different names – IBM touts “Web Services,” Microsoft calls it “.Net,” Oracle refers to “Network Services,” and Sun talks about “Open Network Environment” (Hagel and Brown, 2001). We define web services as “modular internet-based business functions that perform specific business tasks to facilitate business interactions within and beyond the organization.” This study aims to investigate and examine the impact of the balanced scorecard in web services quality.



How does the balanced scorecard methodology impact the quality and usage of web services, thereby influencing its performance outcomes? Previous research focused on technological, operational, and infrastructure capabilities such as reducing the cost of application development, systems integration, and increasing interoperability among heterogeneous software components, applications, and platforms (Astor, 2003; Iyer *et al.*, 2003; Pulier, 2003). However, the need for quality management and performance measurement management is critical especially today due to three reasons. First, the recent corporate accounting scandals have forced organizations to provide greater disclosure. Firms such as Enron, Xerox, and World.com were engaged in unethical accounting practices. Second, the need to rely on financial measures of performance in order to identify success; and lastly, the inability of many organizations to successfully execute their strategies. Only 10 percent of the organizations execute their implementation strategy because they experience barriers in formulating a vision, allocating resources, human resources, and managing change (Niven, 2003). Further, organizations around the globe are adopting the balanced scorecard performance management system. In fact, recent estimates suggest that 50 percent of the Fortune 1000 firms have implemented the balanced scorecard performance management system.

Business managers and other business leaders are often confronted with the reality of their business performance. "If you can't measure it, you can't manage it." In other words, effective performance management requires accurate performance measurement. A balanced scorecard is a set of quantifiable measures that aim to monitor and manage a firm's strategic performance. It is used to communicate to employees and external stakeholders the outcomes and performance drivers by which firms aim to achieve their objectives. The balanced scorecard serves three purposes; first, as a measurement system monitoring performance. Second, as a communication tool providing diagnostic feedback of their performance; and lastly, as a strategic management system focusing on the small business visions. In fact, recent estimates only suggest that 50 percent of the Fortune 1000 firms have implemented the balanced scorecard.

We develop a balanced scorecard framework for web services usage and quality in firms by identifying critical success factors that make up the small business objectives, measures, targets, and initiatives. The rest of the paper is structured as follows: in the next section we discuss the theory behind web services and the balanced scorecard leading to the development of the framework. We then test the framework in two case studies in the agricultural industry and report the findings. Finally, we discuss the lessons learned and the contributions of this study. The findings will inform, educate, and promote businesses on the importance of the quality of web services.

Literature review: web services and the balanced scorecard

Web services have become a significant part of small business used to facilitate the seamless flow of business transactions. Web services are known to offer benefits to firms that have adopted their technology. Web services are applicable to any type of web environment, internet, intranet, or extranets. Web services can support B2C, B2B, department-to-department, or peer-to-peer interactions. Web services are unique in the sense that they are independent, can exist on any platforms, communicate seamlessly, and has self-contained and self-describing features that make it easy to use. Through the orchestration of modular, loosely coupled software components, web services enable an "assemble line approach" to software development, resulting in a responsive

IT infrastructure for designing and building faster application development and enterprise applications. However, studies show that the lack of quality and security in web service applications is one of the main reasons why firms fail to realize the full potential of their IT investments (Benko and McFarlan, 2003). It is pertinent that firms focus on the quality of their web services and operations given the extent to which web service applications are used for business processes and the demand for real time information in these fast changing market conditions. Enforcing and maintaining the quality of web services does not only involve a set of security analyses and audit procedures that most firms conduct periodically, but rather it is a continuing process that needs to align with a rigorous methodology which enforces a metric structure. The methodology is called the balanced scorecard. Previous studies applying the balanced scorecard in the context of web services and quality is limited.

We adapt the balanced scorecard of Dr Kaplan and Dr Norton who describe it as a comprehensive strategic performance management system and methodology. It is a set of quantifiable measures used to monitor employees and external stakeholders of the outcomes and performance drivers by which firms aim to achieve their objectives. Businesses need to ask the following questions before implementing a balanced scorecard system to measure the use and quality of web services. Do businesses have a mission or vision? Do businesses have a strategy? Do businesses seek to execute that strategy? Do businesses measure their performance in areas other than financial outcomes? The balanced scorecard for businesses focuses on a system that enforces measurement and feedback thereby imposing quality, continuous improvement, and employee empowerment that aims to sustain the competitive and strategic objectives. We aim to examine the performance of two small businesses from four perspectives: namely, learning and growth, internal business processes, customer, and financial perspectives.

The balanced scorecard deployed to measure the effective use and quality of web services among businesses focuses on a system that enforces measurement and feedback thereby imposing quality, continuous improvement, employee empowerment, and strategic performance that aims to sustain the competitive and strategic objectives. The balanced scorecard measures the performance of web services in firms from four perspectives namely: learning and growth, internal business processes, customer, and financial perspectives are discussed below. Each of these four perspectives is further categorized by their objectives (as in what are their outcomes?), measures (as in how to achieve their outcomes?), targets (as in how do we know that we have achieved it?), i.e. accountability, and initiatives (as in what actions to take?). Further, the balanced scorecard is based on three time dimensional timelines: namely yesterday, today, and tomorrow. The next section discusses the four perspectives of the balanced scorecard:

- (1) *Learning and growth perspective*: aims to measure human, information, and organizational capital. Human capital includes the skills, knowledge, expertise, the extent of training given to employees, and the business cultural attitudes. Do employees have the skills/competencies to operate their internal business processes effectively and meet their customers' objectives? Information capital aims to measure effective communication and information sharing. Do employees possess the information required to achieve objectives? Organizational capital aims to monitor the soft areas of the employees, such as learning and growth, culture, leadership, knowledge sharing, and teamwork. Do businesses have the ability to sustain growth and change?

- (2) *Internal business process perspective*: aims to measure performance that permits businesses to be aware of the quality of their products and services. Does it conform to the mission of the firms? Does the internal business processes meet their customer requirements? There are two types of processes under strategic management. First, mission oriented process which focuses on the strategic goals of businesses, and, second, the support processes that are more repetitive used in their daily operations that in turn enforces benchmarking. The balanced scorecard provides a diagnostic feedback into the various internal processes, thereby guiding and improving the business processes on a continuous basis. What must businesses do well internally in order to achieve the objectives they set forth in the customer perspective? Where does the “process” start, and where does it end?
- (3) *Customer perspective*: focuses on meeting the needs of the customers, retaining existing customers, and gaining customer satisfaction. What do customers expect or demand from firms using web services? Dimensions of customers experience include time, quality, price, or cost, accessibility, reputation, and relationship. Who do we define as our customers? How do customers see us? How do businesses create value for their customers?
- (4) *Financial perspective*: aims to provide timely and accurate financial information. By implementing a centralized database, it is hoped that processing can be standardized and automated. Further, both risk assessment and cost benefit analysis can be easily conducted in order to ensure that the bottom line of the business is achieved. What accountability do businesses that use web services have to financial stakeholders? In many respects, the financial perspective represents “end in mind” of the business strategic vision. Business managers are able to examine the outcomes of the metrics and track their results that in turn will provide strategic financial feedback, and show the trends of their business performance using web services overtime.

Framework of web services quality applying the balanced scorecard

The framework of web services quality applying the balanced scorecard methodology was developed by integrating the theory of balanced scorecard and web services. The framework consists of critical success factors or indicators that make up the objectives, measures, targets, and initiatives. The goal of these critical success factors is to evaluate the effective use and quality of web service applications. Table I illustrates the framework of web services quality applying the balanced scorecard which serves as a measurement tool thereby ensuring the quality of web services.

Research method

Case studies were chosen as an appropriate method to examine web services quality in two small businesses as it elicited subtle and rich data needed, thereby increasing our understanding of web services applying the balanced scorecard methodology (Yin, 1994). In this study, we interviewed the managers of the firms in the agricultural and other industries. Evidence for the case studies data came from handwritten notes taken during the interviews and the tape recorded data. In addition, analysis of existing documents relating to web services, day to day interactions, operating procedures, web sites, and internal security policies were analyzed.

Balanced scorecard perspectives	Relationship to effective use and quality of web services via the critical success factors (or indicators)
<p><i>(1) Learning and growth perspective</i> How can we continue to improve and create value in the use of web services?</p> <p><i>(2) Internal business process perspective</i> What processes do we need to excel further when using web services?</p> <p><i>(3) Customer perspective</i> How can we enhance our business reputation with our customers via web services?</p> <p><i>(4) Financial perspective</i> How are we perceived by our shareholders and other stakeholders invested in our firm?</p>	<p><i>Objectives:</i> provides training for employees in order to enhance the performance of their day to day business operations applying web services <i>Measures:</i> provides online training, user manuals, standard operating procedures, help desk, reward employees with high productivity <i>Targets:</i> aims to receive fewer customers and stakeholder complaints <i>Initiatives:</i> undertakes ongoing monitoring of employees performance, focus on the culture, climate, and commitment of the organization <i>Objectives:</i> maintains high quality and productivity of the services provided via web services <i>Measures:</i> applies best business practices, and provides reliable, accurate, and timely information. Focuses on the usability, and inter-operability of the system <i>Targets:</i> increases profit and aims to receive fewer customers and stakeholders complaints <i>Initiatives:</i> conducts ongoing audit and applies the quality assurance plan on a regular basis <i>Objectives:</i> aims to satisfy customers and stakeholders, increases reputation of the firm and the quality of their products and services <i>Measures:</i> maintains open, frequent communications, provides excellent quality services, provides value for money, and reliable operations <i>Targets:</i> increases profit and sales <i>Initiatives:</i> trains employees, conducts ongoing weekly meetings with employees. Maintains regular reviews and reflects on the goals and mission of the company <i>Objectives:</i> aims to increase in profits and rate of return <i>Measures:</i> increases productivity, increase quality of services provided, applies the return on capital employed, economic value added and free cash flow <i>Targets:</i> maintains profit figures, increased shareholders value <i>Initiatives:</i> advertises company products, attend trade shows, business conferences and seminars, word of mouth, controls operating costs, and maximizes potential use of web services</p>

Table I.
Framework of the web services quality applying the balanced scorecard

Findings: background information of the firms

Firm A is a seed manufacturer and seller of wildflower and bird seeds located in Kingsville. It is a family owned business with ten employees and the owner has been in this business for 23 years. They sell a variety of wildflowers seeds including the annual mix, shade, and suns. They also supply bird seeds to regular stores, residential customers, and fulfill large bids from the government for beautifying the land such as the city of Blue Springs and the Tiffany Springs highway. Their main form of web services applications include their business to consumer web site implemented in 2003, e-mail, and fax.

Firm B is a retail store that sells bird seeds, backyard birding supplies, accessories, and gifts located in Independence. They have four employees and use an internet enabled intranet system called the “Top Flight” implemented by their head office located in Maryland which served as web services. The system assists them to track inventory, sales, and conduct transactions via their shopping cart. The owner bought over an existing franchise in the past two years and they serve the customers locally in Independence, Lee Summit, and the Blue Springs area. Their business documents included purchase orders, invoices, and packing slips. They also use the fax and telephone extensively. Table II presents the background information of both firms that participated in this study.

In this section, we report the findings of the two case studies from the handwritten notes taken during the face to face interview with the managers of both firms.

Web services quality in the learning and growth perspective

Firm A found that the learning capability in applying best business practices was important for their business performance. Although only six employees were assigned to operate on their computer systems, they had to abide by their best business practices

Background characteristics	Firm A	Firm B
Type of industry	Agricultural industry	Agricultural industry
Type of ownership	Family owned	Family owned – bought over an existing franchise – head office in Maryland
Number of employees	10	4
Type of e-commerce system	B2C web site and embedded IT solutions that serve as web services	Intranets via IT software solutions “Top Flight” and other IT solutions that serve as web services
Type and number of customers/business partners	Regular store customers, government bid contracts, web customers	Regular customers who visit their store
Annual revenue in US\$	\$1.5 million	\$400,000
How long have they being in business?	23 years	2 years
Mode of attracting customers	Advertise in the local newspaper, web page	Advertise in the local newspaper, direct mail, web page and the head office send out a franchise newsletter six times a year

Table II.
Background information of the firms

that included changing their passwords every ten days and not disclosing pricing information to any other employees other than the manager and two other employees in the accounts department. Each employee was given limited access rights and was unable to see the detail information of the transaction.

The managers noted: “We continually improve our employee skills by providing training to our employees in order to increase the potential use of web services.”

Web services were deployed to facilitate information sharing and collaboration among employees and business units.

Web services quality in improving internal business processes

The internal business process perspective focused on the quality and use of web services in activities such as supply chain management, customer relationship management, and research and development. The balanced scorecard provided a systemic quality approach to assess web services as it allowed the software processes to be efficiently and effectively balanced. The manager of Firm B noted:

We applied the quality assurance plan which included the following critical success factors: timeliness of obtaining information or processing the transaction, accuracy as in achieving integrity in the content of the message, confidentiality, access rights, non-repudiation, reusability, portability, reliability, security, and efficiency of the web service applications were considered in this perspective.

The manager of Firm B indicated that:

Further, with industry-accepted standards and protocols, web services provided a standard interface allowing integration among heterogeneous platforms, thus facilitating efficient and effective collaboration between departments that use different IT systems. Finally, web services’ service-oriented architecture allows firms to build a flexible IT infrastructure that enables faster decision-making and response to market changes.

Hence, through the orchestration of modular, loosely coupled software components, web services enable an “assemble line approach” to software development, resulting in a responsive IT infrastructure for designing and building faster application development and enterprise applications.

We argue that web services technology, with its industry-accepted standards and protocols, can enhance internal business operations by enabling process automation, increasing interoperability and reducing integration complexity, and improving process design.

Web services quality in improving customer retention and relationships

The customer perspective is the core of the business strategy. The managers of both firms noted: “Our web services and IT solutions offered us with unique business processes and customer value propositions that determined the correct business processes thereby creating better customer relationships.”

Both managers noted:

We have key attributes of web services that create customer value propositions such as enhanced customer intimacy via open communications, improved customer retention, and better customer value. Beyond the quality and specifications of its products and services we try to satisfy our customers by meeting their needs and offer quality goods and services.

These attributes that serve as critical success factors were derived from the balanced scorecard methodology which comprises of objectives, measures, targets, and initiatives.

The manager of Firm B indicated: "Web services made our firm's IT infrastructure more flexible and adaptable, affording the organizational agility to meet the ongoing customers' changing requirements."

Web services quality in improving financial position

The use of the balanced scorecard methodology allowed for improved capability of learning and innovation, better internal business processes, and the enhanced customer value that in turn served as performance drivers for increased financial returns for both firms.

Both managers noted:

Web services has directly influenced our shareholder value as it influenced our firms' financial strategy, productivity and revenue growth. For example, in the financial perspective we aimed to create value for the shareholders and there is a balance between growth and productivity. Further, return on capital employed and economic value indicators were added.

Lessons learned

The findings of the exploratory study suggested a cyclic process that was created with the use of the balanced scorecard approach to evaluate the quality of web services applications and in order to integrate quality, provide a strategic map and indicate how information will be disseminated so that the potential use of web services can be attained. The processes adapted from Kaplan and Norton (2000) that served as measures to manage the quality of web services included:

- *Analysing the sector, its development, and role of company*: referred to the identifications of the key goals in the use of web services and establishing the characteristics and requirements for the industry.
- *Establishing or confirming the company's strategic plan*: referred to the establishment or confirmation of a strategic plan, intensifying the internal and external analysis of the earlier processes and ensuring that agreements are arrived towards the quality of web services.
- *Translating the strategy into operational terms*: referred to the actual actions taken to ensure that best business practices, standards, and quality procedures that were followed in the use of web services. For example, in the financial perspective they aim to create value for the shareholders and there is a balance between growth and productivity. Return on capital employed and economic value indicators were added. Likewise, in the customers' perspective the growths in terms of volume generated from customers were examined. Further, segments that value quality and innovation were emphasized. In the internal business process perspective we tried to differentiate between basic operating processes and operating excellence in the support services via the use of web services. The product and service quality were measured through the product quality index indicator using the market share in order to gain profit from the investment in the financial perspective. Finally, in the learning and growth perspective three strategic objectives were identified: namely basic competencies and skills (referring to the skills expected of the employees), technology (referring to the web services applications used in the

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- value chain), and climate for action (referring to organization commitments that must be implemented by the human resources department).
- *Aligning the organization with the strategy*: referred to the alignment of business unit goals with the organization's goal in the use of web services.
 - *Making the strategy everyone's daily job*: referred to the linking of the employees with the business unit and the organization's strategy.
 - *Making the strategy an ongoing process*: referred to proposing a process for managing the strategy by integrating the tactical management and the strategic management in the use of web services.
 - *Promoting change through management leadership*: referred to the involvement of the management team in the change process.

Conclusions

This study examined the usage and quality of web services applying the balanced scorecard methodology. We developed a framework and tested it as an exploratory case study in two small business firms within the agricultural industry. The findings suggested that the lessons learned evolved over a set of processes that were aimed at integrating quality in the potential use of web services.

The business issues including: effective organizational performance and successful strategy implementation will be greatly enhanced. This study contributes to theory of web services as it provides a methodology to evaluate the quality of web services via the balanced scorecard. Further, it contributes to practitioners as they will have a system which will provide them with timely, cost-effective, scalable, manageable, and reliable feedback on their strategic performance. The balanced scorecard gives a holistic view of the firms by simultaneously examining its performance from four perspectives namely: learning and growth, internal business processes, customer, and financial perspectives. Future research should apply this framework to test the quality of web services or any other system on a wider scale in order to derive at meaningful generalizations.

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