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E-Service Impacting Supply Chain Performance

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Outline

II. List of tables

III. Abstract

The beginning of the twenty-first century shows the confluence of two powerful, long-term trends in the business world: the shifting of the economy from goods to services and the rapid expansion of electronic networks. The landscape of organizational service offers is undergoing a fundamental change. New communication technologies, new media, the Internet, and devices carrying new functionalities are shaping services nowadays. The confluence of services and the expanding electronic delivery technology has given rise to the new era of e-service. Companies have adopted new information and communication technology to offer e-services to their customers. However, only few studies are available focusing on the impact that e-service specifically has on supply chain performance. This paper aims at filling this gap. It examines significant opportunities for supply chain improvements that develop along with the growth of e-service. Therefore, the Balanced Scorecard model will be applied. This paper examines the impact of e-service on the two perspectives most relevant for this research. Results show that in the perspective of internal processes, we find potential improvements and challenges in the concepts of multi-channel business, mobile employment, tracking and tracing and e-procurement services. In the perspective of customer performance, organizations benefit from online customer service and self-service technologies. Possible improvements and deficits are reflected in performance metrics.

1 Introduction

1.1 Research Problem

The beginning of the twenty-first century shows the confluence of two powerful, long-term trends in the business world: the shifting of the economy from goods to services and the rapid expansion of electronic networks. New communication technologies, new media, the Internet, and devices carrying new functionalities are changing the landscape of organizational service offers. The confluence of services and the expanding electronic delivery technology has given rise to the new era of e-service. Companies have accepted and adopted new information and communication technology to offer e-services to their customers. Over the past decade, we have seen phenomenal interest in the development of e-service offers.

The new era of e-service generates new business opportunities and challenges for organizations. Advances in information and networking technology do not only facilitate creation, distribution and access of online information, but they also foster conducting business transaction via electronic means. Dealing with such complex business networks raises the need to manage the organization's supply chain more urgently than before. Together with continuous advances in communication and transportation technologies, it has motivated the continuous evolution of supply chain and of effective managing techniques. Organizations focus on monitoring, controlling and managing their supply chains with the help of fundamental performance indicators, which are individually tailored to the respective companies.

There are numerous authors who deal with the effects that e-services have on customer and market behavior and acceptance. How consumers perceive and respond to e-service technologies and the characteristics between different e-customers types have been analyzed in a multitude of studies. However, only few studies are available focusing on the organizational implications related to the deployment of e-service technologies, much less the impact that e-service specifically has on supply chain performance. Very few researches have been conducted to evaluate e-service applications from the view of e-service providers with deep analysis in the relationships between their benefits and challenges on the one side and their impact on supply chain performance on the other side.

This gap in knowledge points to the need for studying and explaining how e-service characteristics may drive performance within an organizational supply chain. For this reason, the aim of this paper is to illustrate the correlation between e-service offers and organization's supply chain performance. The center of this research interest is to provide a consolidated analysis about how e-service activities influences organization's supply chain based on its performance indicators and thus fill the gap. The objective of this paper is to identify the types of changes taking place in the service functions and operations as a result of increased use of e-service.

1.2 Course of Investigation

This paper utilizes prior case study research and empirical data in order to synthesize an entirely new field of study. It will try to explain the impact that e-service has on the organizational supply chain performance. The course of investigation is subdivided into four parts. Part one introduces key terminologies relevant for this paper. This part provides a conceptual overview and at the same time, creates the theoretical core foundation for the remainder of this research. First, a definition of e-service will be elaborated based on earlier definitions. Second, the importance of measuring supply chain performance will be discussed. After that, a number of previous supply chain performance models will be reviewed and assessed based on their today's applicability. The BSC model that has proved itself as a successful performance measuring system over time will form the basis for the analysis part. It contributes to supply chain performance measurement by providing a set of theoretically sound metrics reflecting performances within the BSC framework.

Part two is divided into two chapters and demonstrates the analysis part of this paper. Due to the limited volume of this paper, the analysis part applies two out of four perspectives of the BSC model that are most relevant for this research. The first chapter in the analysis part investigates how e-service impacts the supply chain performance in the perspective of internal business processes. The second chapter examines the impact that e-service has on the perspective of customer performance. The aim is to analyze the impact that e-service directly have on performance indicators, covering the perspective of internal process and customer performance within the BSC framework This will fill the gap between e-service and supply chain performance.

Part three addresses the operationalization of e-service based business. The chapter is introduced by a case study of Amazon. It has been decided on the business case of Amazon, since Amazon as an online retail platform offers in addition to its online sales value-added e-services, which are presented and analyzed in this chapter. Further, fundamental success factors gained from this research and from literature will be presented. Part four, as the final part will capture the main findings of this research in a retrospective view. It will provide a summary, a critical claim and an outlook.

2 Introduction to Key Terminologies

2.1 Definition of E-Service

Based on the evolution of e-service in various sectors and industries, it is important to examine the many definitions and perspectives of e-service that have emerged over the years. Along with the many different approaches to define e-service, the quality of definitions also varies in literature. The objectives of this subchapter are therefore to assess existing definitions of e-service, thereof derive and elaborate on a new definition of e-service relevant to this paper and to finally differentiate between e-service types.

Research has shown a wide degree of variation of defining e-service. E-services were previously defined as “those services that can be delivered electronically” (Javalgi et al., 2004, p. 561) and similarly, as “provision of service over electronic networks” (Rust & Kannan, 2003, p. 38). Boyer et al. (2002) define e-services as “interactive services that are delivered on the Internet using advanced telecommunications, information, and multimedia technologies.” The first two definitions focus on the fact that e-service is delivered through electronic means. The third definition addresses the infrastructure necessary to deliver an e-service. It is sufficiently broad and at the same time, narrow, in the sense that it limits e-service to the delivery sorely through the Internet. Thus it would not include services such as ATM transactions, or TV shopping. Although all three definitions share the characteristic of the electronic delivery, in the end, however, they do not define the actual term.

Würderlich (2009, p. 7) defines e-service as "all services delivered via electronic medium […] and comprising transactions initiated and largely controlled by the customer." Similar to Würderlich, Rust & Roland (2002, p. 6) also implicate customers' redefined role. They both emphasize on the increased customers' control and on self-service as a substantial difference when comparing e-service with traditional service. This is true, particularly for e-services such as interactive online choice boards, where individual customers are able to custom design their own products by choosing from a range of elements, such as attributes, components, prices and delivery options (Bharati & Chaudhury, 2004, p. 1014). Researches have shown that many companies view e-service as a purely IT-driven concept (Rust & Kannan, 2002, p. 5). The notion of e-service in this paper, however, encompasses a much broader concept than those of IT services. In this regard, it is important to note that technology is an enabler in e-service and not an end in itself.

In order to define e-service it is necessary to take a step back and to clarify the term of service, since elements developed for e-service are based on the original term of service. Multiple literatures show that service covers various perspectives and comprises both, the process by which the service is produced and secondly, the outcome, in form of benefits gained by the receiver. These components are covered by the following definition. According to Lovelock & Wirtz (2004, p. 21), service is defined as "an act or performance offered by one party to another […] an economic activity that creates value and provides benefits for customers […] by bringing about a desired change in, or on behalf of the recipient." Closing the gap between service and e-service, the process of service production and the outcomes are also valid in the context of e-service. Therefore, building on the elements of the definitions above, the definition of e-service can be developed individually for this paper:

> *E-service refers to an act or performance offered by one party to another that creates value and provides benefits for customers through a process initiated and controlled by the customer and delivered via the Internet or electronic systems.*

Having elaborated on an e-service definition relevant for this paper, Hofacker et al. (2007, p. 15) identify three prototypes of e-service that have developed over time:

(1) E-services as complements to add value to existing offline services and goods.
(2) E-services as virtual substitutes for traditional offline services.
(3) Uniquely new core e-services such as online computer games. Firms are developing new core e-services in the form of offerings that do not and generally could not exist as offline services.

Complementing an offline service, substituting for an offline service and offering purely virtual core services are all identifiable as e-services. However, it is important to note that, based on the definition developed for this paper these e-service types are not exclusively delivered through the Internet but through all electronic means. All three e-service types will be found in the analysis part as well as in the case study of Amazon.

2.2 Supply Chain Performance

2.2.1 The Importance of Measuring Supply Chain Performance

"If you cannot measure it, you cannot control it. If you cannot control it, you cannot manage it. If you cannot manage it, you cannot improve it." (Harrington, 1991, p. 203). In recent years, organizational performance measurement and metrics have received much attention from researchers and practitioners. The role of measures and metrics in the success of an organization is fundamental because they affect strategic, tactical and operational planning and control. Performance measurement and metrics have an important role to play in setting organizational objectives, evaluating performance, as well as in determining future courses of actions (Gunasekaran et al., 2004, p. 333). For these reasons, the objective of this subchapter is to demonstrate the importance of supply chain performance measurements by providing interfaces to related terms and thus, drawing a terminological distinction.

“If you cannot measure [performance], […] you cannot manage it.” (Harrington, 1991, p. 203). The dependence between supply chain management and supply chain performance is clear: In order for the organization to manage its supply chain, its performance needs to be measured. A supply chain can be defined as the sequence of an organization. The sequence refers to processes, facilities (warehouses, factories, processing centers, distribution centers, retail outlets and offices), functions, relationships and pathways along which products, services, information and financial transactions move within and between companies (Graham, 2013, p. 3). In addition, the sequence of supply chain activities also demonstrates an important element. They refer to activities such as purchasing, forecasting, inventory management, information management, quality assurance, scheduling, production, distribution, delivery, transport, supplier management, and customer management (Liao & Kuo, 2006, p. 538).

Based on the framework of supply chain, supply chain management refers to the management of activity series concerning the planning, coordinating and controlling movement of materials, parts and products from suppliers to end customers (Chandra & Grabis, 2007, p. 20). This includes the management of material, information and financial flows in the supply chain. According to Simchi-Levi et al. (2008, p. 1), supply chain management is defined as “a set of approaches utilized to efficiently integrate suppliers, manufacturers, warehouses, and stores, so that merchandise is produced and distributed at the right quantities, to the right locations, and at the right time, in order to minimize system wide costs while satisfying service level requirements”. The definition focuses on an efficient integration of all participating stakeholders and facilities. Supply chain management is considered as a key to create a sustainable competition through improving inside and outside organizational relations (Gilaninia et al., 2011, p. 490). Enhanced competitiveness requires that companies ceaselessly integrate within a network of organizations. This integration of companies within a network has led to put more emphasis on supply chain management. Mahdavi (2011, p. 348) and Handfield & Nichols (2002, p. 69) are convinced of the integral value of the supply chain management philosophy. According to them, performance of the entire supply chain achieves greater success along with the optimization of all the links in the chain, rather than if each individual link was aiming at optimization.

Supply chain performance measurement is one of the core elements when developing supply chain management. Performance measurement enables evaluation and the control of resource usage, information accessibility for internal needs and external stakeholders' purposes as well as the continuous improvement of the supply chain performance (Carton & Hofer, 2008, p. 3). Neely (1995, p. 80) defines performance measurement as a set of metrics used to quantify both the efficiency and/or the effectiveness of an action. Effectiveness is the amount of meeting customers' needs, whereas efficiency is the rate of the economic usage of a corporation's resources in order to reach a predetermined level of customers' satisfaction. Hence, it can be noted that performance measurement systems are a set of metrics that quantify the effectiveness and efficiency of an action.

Taticchi et al. (2010) further elaborated on this definition. They added the concepts of 'balance' and 'dynamicity'. 'Balance' refers to the need of using different measures and perspectives that tied together give a holistic view of the organization. The concept of 'dynamicity' refers instead to the need of developing a system that continuously monitors the internal and external context and reviews objectives and priorities. It provides information for management and decision makers and enables to identify the success and potential of management strategies. All in all, it facilitates the understanding of the business situation. In addition, performance measurement assists in directing management attention, revising company goals, and re-engineering business processes (Khoshsima, 2008, p. 259). As a result, supply chain performance measurement is necessary for the continuous improvement of supply chain management.

2.2.2 Models for Measuring Supply Chain Performance

Research shows that measurement models in the context of supply chain performance have been studied in many perspectives and researchers have developed many approaches in the past decades. Only some of them are accepted by practitioners and implemented to measure supply chain performance. Therefore, this subchapter introduces and critically assesses current approaches for measuring supply chain performance based on their validity and applicability to today's business.

In 1989, Keegan et al. (1989) first-time presented the performance measurement matrix. It is able to integrate different dimensions of performance, and employs generic terms such as internal, external, cost, and non-cost. The strength of the performance measurement matrix lies in the way it seeks to integrate different classes of business performance financial and non-financial, internal and external (Neely et al., 2000, p. 1122). Soon, Fitzgerald et al. (1991) developed modifications for the performance measurement matrix that include the components Results and Determinant. Fitzgerald's alternative tries to overcome the criticism of the matrix that does not explicitly link different dimensions of business performance. The performance measurement matrix from Fitzgerald is based on the key assumption that there are two basic types of performance measure in any organization, those that relate to results, i.e. competitiveness, financial performance, and those that focus on the determinants of the results, i.e. quality, flexibility, resource utilization and innovation. However, based on the two performance types, the measurement lacks the performance dimension of customers and human resource. It does not provide a truly balanced view of performance. Further, the different dimension levels of performance types raise its complexity and difficulty in applying this matrix model (Striteska & Spickova, 2012, p. 6).

Performance prism is a relatively recent performance evaluation mechanism (Haider, 2007, p. 112). The framework of performance prism suggests that a performance measurement system should consist of five interrelated facets: Stakeholder satisfaction, Strategies, Processes, Capabilities and Stakeholder contributions (Buhrymenka, 2012, p. 25). The model follows a linear approach of finding what their stakeholders want; how the business strategy takes care of these requirements; how the business processes contributes towards the success of the strategy; what capabilities does the business have that enable these processes; and finally, what contributions the business stakeholders make in realizing these capabilities. However, a major weakness of performance prism is setting the focus on finding the right strategy for performance evaluation, rather than designing the actual performance measurement systems. It does not addresses performance measures that would enable such a system to achieve the desired objectives. The traditional linear approach neglects the importance of time and does not capture the concept of dynamics. Moreover, the model lacks in future-orientation, such as learning and innovation potential. It also falls short of explaining how gains from performance measurement have to be integrated with continuous improvement of the business (Haider, 2007, p. 113).

Another well-known approach for the supply chain measurement is the Supply Chain Operations Reference (SCOR) model, which is used in various industries around the world. The SCOR model was developed by Supply Chain Council to assist firms in increasing the effectiveness and in measuring supply chain performance. It is an approach that provides standard guidelines for organizations. These standard guidelines help to examine the configuration, identify and measure metrics in the supply chain. The SCOR model achieves this goal by proposing operational and cost indicators for each main manufacturing and logistics process: Plan, Source, Make, Deliver and Return. Although the model is increasingly adopted, it has been criticized for under-emphasizing people issues. The performance model assumes, but not explicitly addresses, the human resource base skill set, notwithstanding the model's reliance on supply chain consolidated knowledge to properly understand the model and its methodology. External expertise is often needed to support the process of measuring performance. This may imply that the SCOR model may be appropriate only for relatively large companies that more likely have the necessary business capabilities to implement the SCOR model. Many small to medium-sized companies may find difficulties in regard of handling full-scale model implementation. Further, some critics would also argue that the model lacks the link to the financial perspective of an organization, making it very difficult to highlight the benefits obtainable, as well as limiting support senior management (Slack et al., 2009, p. 396).

To response to criticisms of traditional performance systems, Kaplan & Norton (1992) have proposed the Balanced Scorecard (BSC) to measure supply chains. Today, the BSC model is the most widely adopted performance measurement system (Striteska & Spickova, 2012, p. 3). The organization performance is measured from four different perspectives: financial, internal processes, customer and innovation and learning. The four perspectives provide a framework to translate a strategy into operational terms. First, financial measures sum up the commonly measured economic effects of organizations' activities and show whether they contribute to the improvement of the firm's economic results (Liu, 2013, p. 21). Second, the customer perspective evaluates on how companies may add value to their customers. The customer's view estimates the value through time, quality, performance, service and cost. It captures the ability of the organization to provide quality goods and services, the effectiveness of their delivery, and overall customer service and satisfaction. This dimension reflects the firm's value for its customers.

Thereby, customer value derives from processes, decisions and actions within an organization. The internal business perspective from the BSC model focuses on these elements. The third perspective concentrates on the internal processes that will have the greatest impact on customer satisfaction and on achieving an organization's financial objectives. Researchers often use productivity, reliability, delivery capability and better service platform to measure internal process performance. The internal business process perspective describes the business processes to which the company has to be particularly adapted in order to satisfy its shareholders and customers (Liu, 2013, p. 22). Finally, the last perspective addresses the innovation and learning perspective. It evaluates on how the company can continue to improve and create the value in the future. It is important to note that all four perspectives act in mutual interdependence with each other and aims at a balanced performance (Schmeisser & Clausen, 2009, p. 207).

According to Ghalayini & Noble (1996), the main weakness of BSC approach is its design that primarily provides senior managers with an overall view of performance. Thus, it is not intended for the factory operations level. Further, Neely et al. (2000) argue that although the BSC is a valuable framework suggesting important areas in which performance measures might be useful, it provides little guidance on how the appropriate measures can be identified, introduced and ultimately used to manage business. They further conclude that the BSC model is missing the competitor perspective. It is thus difficult to make comparisons within and across firms. Nevertheless, the BSC is a tool used for describing, implementing and managing strategy at all levels in the organization (Striteska & Spickova, 2012, p. 4). By giving information from four perspectives, the BSC minimizes information overload by limiting the number of measures used. It also forces managers to focus on the handful of measures that are most critical (Kurien & Qureshi, 2011, p. 25). Different to the performance measurement matrix, BSC makes explicit the links between the different dimensions of business performance, which is arguably one of the greatest strengths of Kaplan & Norton's model (Neely et al., 2000, p. 123).

In order to compensate the argument of missing guidance to identify appropriate measures, Bhagwat & Sharma (2007) have introduced their BSC approach for the supply chain measurement. They have used the original four perspectives for the goal setting. The metrics they proposed for the supply chain measurement are presented in table 1.

Internal business perspective:
• Total supply chain cycle time
• Total cash flow time
• Flexibility of service systems to meet particular customer needs
• Supplier lead time against industry norms
• Level of supplier's defect free deliveries
• Accuracy of forecasting techniques
• Product development cycle time
• Purchase order cycle time
• Planned process cycle time
• Effectiveness of master production schedule
• Capacity utilization
• Total inventory cost as:
  o Incoming stock level
  o Work-in-progress
  o Scrap value
  o Finished goods in transit
• Supplier rejection rate
• Efficiency of purchase order cycle time
• Frequency of delivery
	Customer perspective:
	• Customer query time
	• Level of customer perceived value of product
	• Range of products and services
	• Order lead time
	• Flexibility of service systems to meet particular customer needs
	• Buyer–supplier partnership level
	• Delivery lead time
	• Delivery performance
	• Effectiveness of delivery invoice methods
	• Delivery reliability
	• Responsiveness to urgent deliveries
	• Effectiveness of distribution planning schedule
	• Information carrying cost
	• Quality of delivery documentation
	• Driver reliability for performance
	• Quality of delivered goods
	• Achievement of defect free deliveries

Financial perspective: • Customer query time • Net profit vs. productivity ratio • Rate of return on investment • Variations against budget • Buyer-supplier partnership level • Delivery performance • Supplier cost saving initiatives • Delivery reliability • Cost per operation hour • Information carrying cost • Supplier rejection rate	**Innovation and learning perspective:** • Supplier assistance in solving technical problems • Supplier ability to respond to quality problems • Supplier cost saving initiatives • Supplier's booking in procedures • Capacity utilization • Order entry methods • Accuracy of forecasting techniques • Product development cycle time • Flexibility of service systems to meet • particular customer needs • Buyer–supplier partnership level • Range of products and services • Level of customer perceived value of product

TABLE 1 SUPPLY CHAIN PERFORMANCE METRICS BASED ON BSC BY BHAGWAT & SHARMA (2007)

Storey & Kelly (2001) suggest to include customer satisfaction, perceived product quality, customer acquisition and customer retention in the customer perspective. The performance measurement system may be unique to each individual business or unit in an organization, reflecting its fundamental purpose and its environment (Sarkis, 2012, p. 91). The BSC, despite its weaknesses, which can be neglected for the relevance of this paper, is seen as a suitable universal approach to measure supply chain performance in any organization.

3 E-Service Impacts Internal Business Processes

3.1 Multi-Channel Business Strategies

Based on the previous review of performance measures and taking advantages of the previously obtained results, the following analysis part will apply the BSC framework. In this chapter, specific value of e-service affecting organizations' internal business process linked to supply chain performance will be examined. Since the supply chain is pictured as a sequence of an organization, the following implications of e-service on supply chain performance do not impact key performance indicators exclusively in the perspective of internal processes. As mentioned in the previous chapter, the BSC aims at a balanced performance. To prove this, the BSC metrics elaborated by Bhagwat & Sharma (2007) also show interfaces of metrics between different perspectives, such as flexibility of service systems to meet particular customer needs and buyer-supplier relationship. Therefore, implications of e-service cannot and must not be clearly separated from individual perspectives.

Organizations and customers benefit from multi-channel business strategies. E-services enable established organizations to increasingly approach their customers via multi-channel strategies (Wünderlich, 2009, p. 8). Saarinen, et al. (2006) suggest to define multi-channel by "any device or means by which companies or consumers use the Internet either to provide access services that have traditionally been conducted manually using non-Internet equipment in person or at a shop". Multi-channel information systems provide a way to offer the same service through several channels (Callea et al., 2005, p. 3). It has been predicted that e-service is drastically changing the way business is conducted, in fact, the opposite has occurred.

Instead of replacing earlier traditional business channels, multi-channels are fast becoming an important part of existing organizations' strategies and complementing traditional channels. Indeed, according to a recent Forrester research report on e-service trends, the distinction between traditional service and e-services is disappearing due to increased competitive pressures. The integration of offline and online channels with underlying common business processes and seamless transitioning between customer contact media is becoming the industry norm. Thus, e-services are offered as part of a broader multi-channel service package, combining both online and traditional channels (Sousa & Voss, 2006, p. 357). For instance, airlines offer ticket ordering via their websites, retrieval of flight information via call centers or automated phone systems (APS), and check-in via self-check-in kiosk or traditionally via travel agents located in physical facilities (Lufthansa AG, 2008, p. 113). Offline transactions that require human resource are added by possible online transactions. In this way, the use of e-service can be maximized through the variety of different channels. Taking it to an extreme, customers may decide on a new form or distribution channel for each firm every time they purchase a product or service. This opens up the opportunity for companies to be chosen for different purchase occasion.

In fact, the emergence of the Internet channel can be considered to be at the core of the growth of multi-channel services. This growth has been driven by researches, which prove that organizations that complement Internet-based channels with traditional channels tend to be more successful than single-channel companies (Gulati & Garino, 2000; Vishwanath & Mulvin, 2001, p. 26). Recent research has proved the correlation between multi-channel strategies and improvements in customer satisfaction, sales and customer retention. Offering support anytime your customer needs it via multiple channels can greatly increase measured customer-satisfaction levels for customer support. As stated by Sheth & Sharma (2007, p. 17), satisfaction depends on reactions to any experiential aspects of the service delivery process and on the perceived results, as compared to expectations. Customer satisfaction is therefore defined as the gap between expectation and actual experience. As a matter of fact, according to a study of the Web hosting industry, customers reported a 73 percent higher level of satisfaction with their hosting providers who offer online chat in addition to their existing e-mail and telephone-based customer service support (Simms, 2002, p. 80).

According to another study conducted by Sousa & Voss (2012), multi-channel customers exhibit higher level of e-loyalty. E-loyalty means loyalty towards the e-service, rather than the overall loyalty to a certain service provider. The definition of e-loyalty is related to the probability of customer retention, i.e. the likelihood of future reuse of e-service as well as word-of-mouth recommendation.

Multi-channel business strategy can increase the organization's market coverage. Market coverage refers to the share of market volume that is covered by the organization with its product or service (GS1 Germany GmbH, 2008, p. 21). Market coverage rises by building long-lasting customer relationships through e-loyalty and at the same time by gaining new customer groups through customer acquisition. By following single-channels strategies, organizations often reach only a fraction of its potential market coverage. Only through distribution via multiple channels can market potential be reached, increasing the possibility for higher turnover. Further, through open communication, the customer can be directed to different procurement channels and their specific features and advantages (Heinemann & Schwarzl, 2010, p. 216).

Managing multiple distribution channels optimizes the adoption to customer's needs and expectations. Each distribution channel offered by the organization may be more suitable for specific target customer groups than for others. For instance, mobile payment most likely attracts young people who are experienced mobile phone users, teenagers who do not own a debit card, individuals who do not carry much cash with them, and technologically oriented people who may prefer the use of mobile phones, rather than other payment alternatives. McDonald's Slovenia, for instance, recently teamed up with the local Mobitel mobile network operator to increasingly reach and to better serve those customers who prefer non-cash payments (Mallat & Dahlberg, 2006, p. 39). As a result, e-service via multiple channels raises organization's flexibility of service system to meet particular customer needs. For this reason, more and more online customers are frequently engage in multi-channel behavior, since among multiple channels the user can decide on the channel based on the user's current needs. The number of potential customers increases along with the variety of channels.

The distribution of composite e-service through multi-channel systems allows synergy effects. Piccinelli (1999) describes service composition as the ability to take existing services and combine them in order to form new services. Hence, applying this definition to the context of e-service, a composite e-service is an e-service defined by combining other basic or bundled e-services. Larson (2010, p. 4) defines synergy as a gain in performance that is attributable in some way to group interaction. As the e-service paradigm becomes popular and more and more applications are developed or deployed as e-services, the need and opportunity for defining composite service become manifest. For instance, a provider could offer a travel reservation service by composing hotel and flight reservation services, or it could offer an itinerary planning service by composing road map services, weather services, traffic prediction services and "utility" services to collect data from the user via the Web or send e-mail notifications (Casati et al., 2001, pp. 171-172). As a result, organizations benefit from synergy effect when making use of existing resources. They avoid duplicating efforts. Thus, as a consequence, current costs and required start-up capital can be reduced. To demonstrate, an information technology supplier's typical cost structure involves high fixed costs for developing the infrastructure and applications, and very low, sometimes close to zero, marginal costs for actual service provision (Riedl et al., 2010, p. 38).

Once e-service has been developed and the infrastructure is in place, they are almost infinitely scalable with minimal effort (Riedl et al., 2010, p. 5). For instance, using a shared warehouse for different channels allows the organization to operate at full capacity and at the same time to lower fixed costs (Heinemann & Schwarzl, 2010, p. 216). A notably recent venture on the part of multi-channel retailers demonstrates the successful integration of offline and online channel. The introduction of the click and collect service allows retailers, in particular Argos and Comet in the UK, to take advantage of their physical store presence in combination to their online service. Goods purchased online can be collected from a stationary shop of the customer's choosing in as little as 30-minutes after the original order was placed. This option among customers has added benefits to the retailers, as once in-store customers can be encouraged to make supplementary offline purchases. It was found that at peak times, two-thirds of online shoppers decide to click and collect, potentially making this a lucrative sales opportunity for multi-channel retailers (McKinnon et al., 2010, p. 328).

Another popular example used in the literature is the rise of online banking. The importance of online banking as a financial service delivery channel is growing. One fundamental reason is conducting online banking with low cost per transaction (Kardaras & Karakostas, 2012, p. 8). As payment by mobile phones is an enabling technology, the adoption of mobile payment is believed to significantly influence the successful emergence of e-service. In recent years, several mobile payment solutions have been launched, such as the Mobipay in Spain, Moxmo in The Netherlands, M-pay in UK, and Pan-European SimPay. There are several drivers for mobile payment adoption in the perspective of the organization. The introduction of mobile payment creates an additional order and delivery channel. Purchasing becomes independent from time and place (Mallat & Dahlberg, 2006, p. 32). Customers can make decisions free from any location, at any time, and take as long or as short a time as needed to make decisions.

However, even if the service is providing the same functionality and is independent of the actual channel, the quality varies according to the particular devices used by the service consumer. To illustrate, the small sizes of devices and slower wireless network limit data, display, input and transfer (Mallat & Dahlberg, 2006, p. 33). Consequently, organizations may lose e-service quality. If the customer must deal with more than a few items of information simultaneously, a large computer screen might be more suitable than a mobile phone screen or an auditory e-service (Hofacker et al., 2007, p. 19). Multi-channel system are able to provide e-service through different channels, but these channels have different technological characteristics, such as diverse delivery times, responses, or simply different data rendering, depending on the used networks and devices. The suitability of a specific business channel strongly depends on the purpose of the usage. Channels differ in their abilities to support various service outputs, i.e., they do not perform all the same in delivering the different service attributes (Coelho & Easingwood, 2008, p. 1012). A new system has been introduced with the objective to raise dynamic and quality for each purpose. Adaptive system are seen as able to analyze the network and to suggest the user the most convenient way to receive and use e-service, while maintaining an adequate quality level. For instance, it is able to recommend the customer the most suitable receiving device, or the most suitable transmission mode. Within an adaptive multi-channel information system, the system is capable of tuning itself according to the user needs, underlying networking and computing infrastructure (Callea et al., 2005, p. 2).

Regardless of adaptive system, multi-channel requirements in terms of the quality of the delivered e-service must be specifically agreed on and professionally realized. This ensures the user to change the e-service delivery mode without suffering from any performance deficit. Research has shown that customers rank channels differently, namely in their ability to meet their requirements and expectations (Wallace et al., 2004, p. 290). Does e-service quality suffer from the abstinence of human contact? A survey study conducted by Dresner et al. (2001, p. 15) has found that emerging electronic transactions systems have not replaced traditional transactions system, although they have been increasingly used. In general, while virtual channels tend to offer increased convenience, information availability and accessibility, physical channels typically rank higher in terms of the richness of the interaction they allow with the customer, security factors and the ability to touch and to test the product locally (McKnight et al., 2002, p. 336). The advantage of the traditional channel is personal service; it is easy for customers to confirm the reputation of the seller. For this reason, the traditional channel will remain an important channel for many consumer groups.

One significant barrier to the organization of adapting to multi-channel distribution is the perceived incompatibility of multi-channel strategy with existing business practices. For example in the case of mobile payment, while paying via mobile phone is especially suitable for digital content, its applicability in supermarket checkout is less obvious. This may go hand in hand with the problem of few users and the low frequency for certain channels. The high number of channels does not analogical lead to a high number of users or high frequency. Only a large amount of users makes it profitable for organizations to offer service via another way of distribution (Mallat & Dahlberg, 2006, p. 43).

To sum up, organizations increasingly approach their customers through multi-channel strategies. To offer e-service in a broader multi-channel service package, combining both online and traditional channels, can maximize its use. Research has proved that multi-channel business achieve higher degree of success compared to organizations following single-channel strategies. Further, findings prove that there is a positive correlation between multi-channel strategies and customer satisfaction, retention and loyalty. Multi-channel distribution raises organization’s flexibility of service system to meet particular customer needs. It allows the user to decide on the

channel based on the user's current needs. In addition to that, organization can take advantage of synergy effects such as to make use of existing online infrastructure networks to avoid double fixed costs. Despite these benefits, managing multiple channels poses great challenges for the company. Although organizations provide users with the same service function, the service quality may vary between multiple channels. Many organizations are facing the problem of incompatibility. Also, beneath the benefits of virtual channels, customers still value traditional channels with personal service.

3.2 Introduction of Mobile Employment

E-service enables organizations to introduce mobile employment. The growing trend of customers solving problems via online platforms such as on organization's website, leads to a reduction of needed physical customer support. Nowadays, many services do not require the participation of live firm personnel anymore (Evanschitzky & Iyer, 2007, p. 3). For this reason, organizations are facing the choice of turning to mobile employment. The subject of employee mobility takes place in an increasing combination of two formats, namely physical motion and virtual movement. Therefore, a mobile worker is an employee moving physically from place to place, using information and communication technologies in a virtual working space (Andriessen & Vartiainen, 2006, p. 17).

Statistics show that in 2002, over 30 percent of the U.S. workforce or 35.7 million people are out of office traveling, while using mobile devices, such as laptops, media tablets and smartphones (Lemon et al., 2002, p. 200). The data suggested that soon the number of mobile workers would increase immensely. Indeed, the American mobile workers have grown to 182.5 million in 2010 and will even reach 212.1 million in 2015 (Eddy, 2012). The view on mobile employees worldwide, shows, that according to the forecast from IT analyst firm IDC, the world's mobile worker population will reach 1.3 billion by 2015, representing 37.2 percent of the total workforce. That would demonstrate 300 million more mobile workers worldwide compared to 2010 (IDC, 2011).

With mobile working, time spent travelling between locations can be used productively to work via mobile technologies. Especially now that several airlines have renewed the regulation of using electronic devices during flights, mobile workers can enjoy more flexibility while travelling. According to the website of Delta Air Lines (2013), Delta passengers are allowed to be the first to use their portable electronic devices below 10,000 feet on all U.S. domestic flights. Keeping e-readers, tablets, and smartphones in airplane mode from gate to gate, in-flight Wi-Fi will continue to be available for passengers above 10,000 feet. This new regulations provides increased flexibility and mobility for mobile workers.

Another example demonstrates Accenture Norway, a management-consulting firm that has transformed 80 percent of its employees into mobile workers. This action has allowed the organization to drastically cut spending on computers, fixed telephone lines, and other office equipment. If workers need to go to the office, they book a space. All workers are provided with a laptop and have their mobile phone bill paid by the company. This arrangement allows the mobile workers to set up an office virtually anywhere. Even the offices use mobile phones. Executives say the money they save on desk places can be spend on new IT equipment and training for their consultants (Lemon et al., 2002, p. 201). The example of Accenture Norway addresses distinct costs reductions due to savings in office equipment. These savings, in return, can be invested in new more efficient technologies, which help the organization to reduce the cycle time of taking and processing customers' orders and requests.

However, the management's decision to implement e-service solutions does not immediately benefit the organization's supply chain performance and certainly, not in any case. There are numerous factors limiting the broad appeal of wireless computing. Mobile employment may provide great challenges to the whole organization, ranging from non-adaptability to lack of managerial control. This, in turn, weakens the supply chain performance drastically. Geographically fixed office dominates the world of work with its secure accountability and surveillance opportunities for managers. Being a mobile worker imposes considerable discipline issues on individuals. Embracing wireless technology requires some significant but realizable changes in working methods and work organization.

This can require adaptation time or could lead to many users not adopting mobile working and finally result in failure of mobile working projects (Shah, 2014, p. 14). Apart from changes in working pattern, user trustworthiness is another main concern. A research conducted by Truste & Harris Interactive reveal the concerns when users try to apply mobile applications on smartphones. Consumers' hesitancy acts as a blockage to the usage of application on smartphones. The study suggests that privacy is the biggest concern when using a mobile device: consumers expect more transparency and control over what personal information is collected and how it is shared. 38 percent of the investigated suggest privacy is the most important concern when applying mobile applications, followed by security (26 percent), identity tracking (19%), and the sharing of information with or without permission (14 percent) (Shah, 2014, p. 15).

Additionally, not only do consumers need to trust smartphone applications, but also do managers need to trust their mobile employees. Managers are often hostile to mobile working because they may perceive it as a possible cause of loss of control over what is going on within an organization. A survey carried out by the Wireless Networks magazine found that one-fifth of managers think managing mobile employees is just too difficult. The reason may be the lack of understanding mobile working and could be enhanced with trainings (Shah, 2014, p. 16). Further limitations of mobile technologies that negatively impact performance are limited battery life, portability, processing power, display capabilities of most mobile devices, concern about location discovery, unreliable network connections, volatile access points and risk of data loss. Dead spots, such as in rural areas, parking garages, elevators, inside large manufacturing may lead to service and connectivity interruptions and finally, cause performance deficits (Shah, 2014, p. 17). These limitations are one of the biggest barriers in the adoption of mobile working (Shah, 2014, p. 15). Moreover, with falling prices of mobile devices, one may perceive that mobile working is cheap to implement and result in savings in office equipment. However, it is important to notice that technology costs are only a small proportion of the likely total costs. This implies that the real cost of working, different to the example of Accenture Norway, could be much greater than promised savings.

Mobile employment comprises essential benefits as well as serious drawbacks for supply chain performance. Most of the drawbacks mirror benefits (Shah, 2014, p. 18). By doing so, in some situations mobile working is perceived to reach higher productivity, especially when working during travelling hours. However, in some other situations, it is perceived as a cause of productivity loss due to situational and environmental interruptions. Furthermore, on the one hand, managers may enjoy high flexibility and availability of their mobile workers, location-independent. Nevertheless, on the other hand, managers feel the loss of control with the workers' abstinence. This implies that benefits may be realized when an organization establishes a clear need for mobile employment. The organization is urges to plan and implement mobile employment in a holistic manner, while taking most technological, organizational and social factors into consideration. This is fundamental for a successful implementation; otherwise, in the absence of a realistic and systematic approach, an organization may experience some of the drawbacks as discussed above.

To sum it up, organizations that introduce mobile employment aim at increasing flexibility such as to work during time spent travelling. The number of mobile workers is increasing more and more and so is the number of organizations that employ mobile workers. According to IDC, the number of the world's mobile worker will reach 1.3 billion by 2015. It allows them to set up an office virtually anywhere they need and at the same time to save office equipment costs. However, mobile employment can pose challenge of worker's non-adaptability to organizations. Physical office facilities still offer high secure accountability and surveillance opportunities for managers. Mobil employment challenges workers to adapt to new working patterns and requires trust of respective managers, as they often feel a lack of managerial control. Further, the performance of mobile workers is limited by the performance of mobile devices. Organizations are highly dependent on well performing devices and environmental conditions. Investing in high performing mobile devices is often underestimated. The sum may exceed those costs of office workers. The decision to introduce mobile employment should arise from a holistic organizational analysis and should conclude whether benefits may exceed potential weaknesses for the specific organization.

3.3 Information System: Tracking and Tracing

E-service enables supply chain track- and traceability. An important function of the information system is its ability to provide tracking and tracing across network boundaries. First, trackability is the monitoring of computer-assisted consignments along the transportation. Physical material is tracked working downstream through value-added information, manufacturing, and fulfillment (Walker, 2005, p. 154). Responsible workers log the location, quality and quantity of items at predefined key points in the supply chain. They can use mobile camera phones to scan product barcodes, providing details and then sending the information to a central system. Different stakeholders, such as retailers, exporters or distributors can then use the information for a detailed view by entering the parcel number (Shah, 2014, p. 10). For instance, Delta Air Lines is the first airline that offers real-time baggage tracking on its website (Delta AirLines, 2013).

Second, traceability addresses the ability to trace back the route goods have gone through after their arrival at their destination. Physical goods are traced working upstream through fulfillment, manufacture, and transformation to the source of its raw materials. Therefore, tracing upstream is the opposite of tracking downstream from an information perspective (Walker, 2005, p. 154). Both functions, tracking as well as tracing goods, provide the benefit of increased data transparency and information flow in supply chains to the end customer in business-to-customer as well as to the organization in business-to-business industries. Due to the subsequent tracing of consignments, customers and organizations are able to determine actual deviations from plan dates very easily. It allows them to systematically and actively optimize either their schedule or their major transportation route (Reindl & Oberniedermaier, 2002, p. 281). As a result, problem spots at specific key points can be easily discovered and be effectively improved.

The tracking ability enables the organization to schedule outbound shipments from private and public distribution centers on a 24-hourbasis. For example, General Electric uses the Internet to schedule shipments out of centrally located warehouses in metropolitan areas. The aim is to allow the company more accurately and cost effectively product delivery on time. As a consequence, delivery frequency per hour has increased significantly while transportation costs per order have dropped dramatically for the company (Lancioni et al., 2000, p. 47).

Furthermore, the ability to track and trace orders has positive effects on forecast accuracy and inventory costs of an organization. An increased information infrastructure throughout supply chain operations raises the quality of delivery documentation and therefore raises its transparency. If trading partners have reliable, accurate information about the quantity and location of every raw material and return, every component and return, every product and return, and every SKU and return in real-time, then the organization may be able to operate with fewer inventories. The reason is due to increased accurate information flow that facilitates organizational planning schedule and provide more accurate forecasting. The trading partners do not need to invest in just-in-case inventory, i.e. they can lower their safety stock, because the actual inventory profile is known with a higher level of certainty throughout the supply chain. According to Walker (2005, p. 154), this is called "trading information for inventory". To demonstrate, Fisher Scientific effectively uses e-service in its supply chain to focus on build-to-order production. The firm is experiencing lower inventory costs and higher production costs. With the use of the Internet to more track inventory with an increased accuracy, Fisher Scientific follows build-to-order and configure-to-order strategy all of the products it sells to its customers (Lancioni et al., 2000, p. 47). In addition to that, improved information systems help firms to schedule the use of machineries for various requests more efficiently, consequently, avoiding machines in idle mode and reducing cycle time of orders (Walker, 2005, p. 155).

Moreover, tracking system cannot only be applied on physical goods but also on people. Mobile workers can make use of tracking systems as well, such as Global Positioning System (GPS) to locate the precise position of the user, customer or other stakeholder. The Global Positioning System is a satellite-based navigation system made up of a network of 24 satellites placed in earth's orbit. It can be accessed almost anywhere in the world at any time and in any whether condition. For example, a report by Vodafone regarding mobile and agriculture value chain shows that African farmers applied mobile phone technology extensively to increase agricultural income and productivity. Most of the African farmers need to deal with large networks of small-scale farms, retailers, aggregators, distributers and exporters. The innovation of tracking system helps farmers to locate their suppliers and customers more effectively in terms of product delivery (Shah, 2014, pp. 9-10).

Improved organizational information infrastructure increases supply chain agility. Supply chain agility has been increasingly recognized and defined as a pivotal capability for organizations to adapt to changing market demands. In the literature, supply chain agility is described as the ability of a firm to react quickly to changing market circumstances and at the same time to realize market opportunities. Information technology is highly recognized as an important element in the context of supply chain agility. Breu et al. (2001, p. 21) argue that information systems were seen to assume a fundamental role in developing agility. From a technical perspective, supply chain agility focuses on the extension of a company's resources in terms of its flexibility to adjust capacity and to reach cost effectiveness (Tai et al., 2010, p. 60). Based on this perspective, agility refers to the extrinsic capability, deriving from a firm's intrinsic core competence. Therefore, an IT-based information infrastructure builds "inter-organizational" information processes in order to adapt more quickly to changing business environments.

On the one hand, process and knowledge gain can increase the organizational ex ante information processing capacities, because information raise supply chain process integrity. This again enables the firm to spend less efforts adjusting to changed environments. On the other hand, process and knowledge richness can increase the organizational ex post information processing capacities, since highly integrated business processes and improved capacity to customer-specific knowledge create high-quality information availability. This, in return, provides the firm with the capability of greater sensibility in terms of environmental changes and facilitates timely, accurate and customized adjustments in their supply chain operations (Tai et al., 2010, p. 61). Since the improved ex ante and ex post information processing capacities increase flexibility of a supplier's supply chain process, developed e-services, such as tracking and tracing, can facilitate the firm to achieve greater supply chain flexibility and responsiveness. Thus, an important difference between e-service and offline services is that e-service technologies are dynamically created in response to events that may not be predictable. Consequently, the organizational risk of uncertainty will be diminished accordingly.

This chapter shows that tracking and tracing add high value to organization's supply chain performance. Tracking goods along the transportation enables organizations e.g. to monitor the current location and status of goods in transit as well as relevant stakeholders via GPS. High

quality of delivery documentation raises the organization's forecast accuracy and at the same time reduces its inventory costs. This is because sophisticated information infrastructure delivers accurate information supports the planning schedule of further deliveries or machine running time. It may avoid machineries in idle mode. Tracing back the good along the transportation route provides information about potential or acute problem spots. The ability of tracking and tracing goods provides transparency throughout the organizational supply chain, which, in return, drives supply chain agility, i.e. the ability of the firm to react quickly to changing market circumstances and at the same time to take market opportunities. Forecast techniques may be improved according to enhanced information infrastructure and may diminish firm's risk of non-fulfillment.

3.4 E-Procurement Services

The electronic markets, exchanges, and online procurement services have created new forms of e-service that did not exist before. E-service creates e-marketplaces and allows organizations as well as customers to purchase products and services via virtual marketplaces. E-service enables an entire new channel that has emerged in the area of procurement – the electronic marketplace of exchange. The emergence of e-service technologies has provided alternative channels for organizations to conduct their procurement. This exchange supports the virtual integration with short- and long-term suppliers as well as price, availability, and quality objectives (Rust & Kannan, 2002, p. 16).

The introduction of online vendor catalogues enable buyers to find, select, and order items from suppliers without direct human contact. The use of the Internet in managing purchasing in the supply chains has developed rapidly over the years. According to a survey conducted in 1998 by Lancioni et al. (2000) in Los Angeles, California, the Internet is utilized in a variety of procurement service applications including the communication with vendors, checking vendor price quotes, and making purchases from vendor catalogues (Lancioni et al., 2000, pp. 46-47). The survey involved a four-page research questionnaire and was sent out to one thousand CLM conference attendees via E-mail. It can be argued that the research only shows a response rate of 18,1 percent. The number of returns, however, may be compensated by the extreme heterogeneity of the industries and companies represented by the respondents. Therefore, this survey might not be quantitative but qualitative defensible.

The purchasing function in U.S. firms has been streamlined through the use of the Internet. General Electric, for instance, has reduced its purchasing staff by more than 50 percent and allows online purchasing from vendor catalogues by each department. The paper-work flows have been reduced, and the order-cycle times – the point in time from when the order is purchased to the time it is delivered to the company – has decreased by 40 percent. General Electric annually saves 600 million dollars because 30 percent of procurement processes is conducted via online marketplace (Wannenwetsch & Nicolai, 2004, p. 92). Vendor negotiation has been redefined by the use of the Internet. Face-to-face negotiations are not used as frequently because negotiations can be conducted via the Internet. This also includes bargaining, renegotiation, pricing, and settlement of term agreements.

Online procurement services can overcome geographical barriers and provide significant cost savings (Palmer, 2006, pp. 328-329). A case study in the context of electronic marketplaces demonstrates a holistic procedure of possible services when purchasing online. The study shows that a registered customer who announced to buy combat sports equipment received about 20 offers via e-mail. Thereof, the final choice of the supplier was based on several assessment criteria: good communication, good assortment, convenient prices, and no request for minimum quantity. The customer also checked the supplier's reputation through online discussion groups. An online forum which discusses dishonest suppliers of combat sports equipment helped the customer to reduce the perceived risk. A trial order sent by the final supplier reassured the customer to order the first bulk of combat sport equipment in the form of airplane delivery (Pejic-Bach & Pejic-Bach, 2009, pp. 81-82).

The case study shows that the interaction with electronic marketplaces induces three fundamental benefits. Firstly, value added online service such as reviews from former customers help to filter between honest and dishonest suppliers. At the same time it reduces the risk of default and online fraud. Reducing risk, in return, may decrease the supplier rejection rate. Secondly, electronic marketplaces have great potential of promoting disintermediation. It is possible to directly connect buyers and suppliers worldwide who would otherwise have never get in touch with each other due to geographical barriers (Pejic-Bach & Pejic-Bach, 2009, p. 81). The organization is able to save up high intermediary fee. Thirdly, electronic marketplaces create broader supplier

networks, which, in return, increase supplier partnerships possibilities for organizations. To illustrate, for Rollins Leasing Inc., the Internet has helped to reduce its supply chain costs by 5% to 15% through increased partnering with its suppliers. The partnership made implementing an automated routing system faster and easier and led to a routing system that would save money and time while increasing asset utilization (Lancioni et al., 2000, p. 48).

E-service effects traditional procurement. The Internet provides the means for information transaction in regard to procurement services. An example demonstrates the company of GE Supply that offers the opportunity to obtain pricing information from vendors on the Internet. In the past, pricing information was obtained through telephone negotiations with multiple vendors. SourceBid is the name of the program that replaced this manual effort. SourceBid events are known as reverse electronic auctions. The event coordinator invites suppliers to bid on a certain quantity of a given commodity the company would like to purchase. Based on the bids submitted and other factors such as service and payment terms a winner is selected. EBay demonstrates a popular example of a forward electronic auction. The event coordinator puts material on the web site that they wish to sell. Then, people from all over the globe can submit bids on that item. However, purchasing via electronic auctions may involve high efforts, high involvement as well as high risk of losing auctions. Therefore, this way of purchasing is less suitable for organizations with high-risk avoidance (Palmer, 2006, p. 330).

The Federal Supply Service (FSS) is an intermediary agency between federal government consumers and supplying vendors. The FSS provides supply and procurement service for more than two million products. The FSS encompasses both products procured by traditional systems and those by electronic procurement systems. According to the FSS, the organization experiences an increase in performance in terms of cycle time and completes shipments through the use of the Internet to transact purchases (Palmer, 2006, pp. 330-331). Customers who shop online expect extremely high availability of goods and comparably fast delivery times. E-service cannot impact the traditional channel of transporting goods to end customers, but it may enable the automation of the ordering process without cross-channel breaks (Heinemann & Schwarzl, 2010, p. 218).

The following case demonstrates one out of many successful examples that has transformed its sales from traditional physical to online sales. The chemical industry has long been accustomed to maintain large stocks and plenty of inventories in the pipeline. At Dow Corning Corporation, a manufacturer of silicone-based products, 95 percent of its product line – 60,000 unique stock keeping units – was make-to-stock. As Dow Corning start to analyze each of its process elements, including inventory levels, materials, distribution channels, and customer ordering patterns, the company decided not to only change their production strategy from make-to-stock to assemble-to-order, but also to allow customers to order products directly via the Internet. Today, around one-third of the company's business success is generated by self-service model, which has encouraged Dow Corning to offer more of its product lines via its online retail platform. Delivery lead times to supply chain partners using the self-service model are guaranteed; if a customer needs a delivery faster than stated, the system will offer special options as well as the costs for expedited service (Blanchard, 2010, pp. 17-18). This allows the organization to create a high level of responsiveness to urgent deliveries, and thus, developing competitive advantage. Face-to-face negotiation in case of urgent deliveries is not a current issue anymore. The self-service model includes competitive prices that are updated several times a day.

To summarize, e-procurement services open up opportunities for organizations to build short- and long-term relationships with suppliers on virtual marketplaces. Research has proved that online purchasing reduces paper-work flows and order-cycles time, while reducing purchasing staff. Further, terms of sales are presented and negotiated on virtual platforms. E-procurement services diminish geographical barriers when purchasing. Neither organizations nor customers are dependent on local shops. The case study about purchasing combat sport equipment online demonstrates that online customers are offered a greater product variety and supplier alternatives. Communities where customers exchange their experiences enable customers to distinguish between trustworthy suppliers and fraudster, which has positive effects on the rate of non-fulfillment. In addition to that, virtual marketplaces enable organizations to get in touch with suppliers directly without any intermediary. This offers the opportunity for organizations to build long relationships as well as to focus on extending their supplier network. Research proves that this may lead to supply chain cost reductions. Online transaction purchases are proved to increase supply chain performance in terms of cycle time due to automated ordering processes.

4 E-Service Impacts Customer Performance

4.1 Online Customer Service

E-service extends customer service of the organization. According to Nemati (2012, p. 728), customer service is determined by the interaction of all those factors affecting the process of making products and/or services available to the customer. The Internet has become a prominent means of providing customer service. Today, more customers are seeking information online. One of the objectives of e-service is to give customers around-the-clock access to easy, cost-effective online (self-) service worldwide. Waste Management, Inc. is an example that uses the Internet to expand its customer service center. Customers can register complaints and can ask for product update information through the company's website by means of E-mail or an online form. The company has found that customers who once would only talk to a Waste Management service representative are now happy with the information and problem resolutions they receive through the Web. This proves that the online platform enhances the interaction and the relationship between organization and customer, since the organization is able to be more responsive to customer service problems (Lancioni et al., 2000, p. 48).

High satisfaction leads to increased loyalty. While the cost benefits of e-service can be significant, the big win is in keeping customers loyal to your company. An online survey of CRM Guru from 2002 found that business managers believe productivity and cost savings are important, but they see more value in customer relationships and improved competitiveness (Thompson, 2002, p. 164). To illustrate, Mercedes-Benz's "teleweb" technology allows customers to submit questions online, which are then immediately responded to by a customer service agent. During the ensuing conversation, both the customer and agent are able to simultaneously view the same web pages as the agent seeks to respond to the specific customer request, and if required, the agent is able to temporarily remotely control the customer's browser (Kelleher & Peppard, 2009, p. 4). Internet Relay Chat (IRC) is another interesting form of moderated group chat, which allows customers and companies to interact in real-time with each other. For example, customers of the catalogue retailer Lands' End (www.landsend.com) can chat with service representatives online regarding the products and services on offer, delivery terms and conditions or any other customer queries or requests (Van Dolen & De Ruyter, 2002).

Online customer service creates the ability to notify vendors of short-term changes in product configurations that are make-to-order. Also, organizations benefit from paperless processing of requests that leads to a reduction of service costs and response time. On top of that, e-procurement services enable the contact of vendors or buyers regarding customer service problems from late deliveries, stock-outs to alterations in scheduled shipment dates. Huffy Service, a technical service company, uses the Internet to keep in touch with its field technicians. The firm has learned to use the data it obtains from the Internet to more efficiently schedule its field personnel and to be more responsive to customer needs (Lancioni et al., 2000, p. 48). Again, Delta Air Lines is the first U.S. airline with real-time customer service through Twitter @DeltaAssist (Delta AirLines, 2013). Indeed, airline passengers are strongly dependent on fast responsiveness of their airline in case of uncertainty concerning their flight information. E-service enables the airline to spread short-time notice within seconds to affected passengers.

Along with the technology advancement, customers' expectations in regard to customer service have drastically changed. Germans have invested immensely in mobile equipment in the last years. In average each household owns 5.3 mobile devices (van Eimeren, 2013, p. 386). What does that mean for e-service? This mobility trend leads to changing expectations on customers' side. Increasingly, customers expect a rapid response to enquiries, complaints and other concerns. The transformation to e-service reinforces the impact of customer expectations. As organizations start using e-service as leverage for competitive advantage, it also raises the bar for other organizations with increasing customer expectations regarding the possibilities and quality of e-service (Kelleher & Peppard, 2009, p. 5). Customers expect firms to be able to interact with them and to provide service for and to them anywhere, anytime, and on any device. This, in turn, has led to increased customer service expectations before, during and after interacting electronically with the service organization (Microsoft, 2014). For this reason, nowadays, firms do not have the option but are forced to provide high quality customer service within a multi-channel strategy. For instance, Finland's largest bank, MeritaNordbanken, makes it possible for its e-banking customers to access their accounts via automatic teller machines (ATMs), telephone, global system for mobile communication (GSM), personal computer, Internet TV, and wireless application protocol (WAP) phones, making its access mix one of the richest worldwide (Lemon et al., 2002, p. 202). This ensures to reach and to be reached by customers by any device.

Business does not need to be limited geographically. Since online services are continuously accessible, time and geographic differences no longer hinder the interaction between organizations and customers abroad. An E-services platform allows organizations to reach customers who may not be accessible due to temporal and location limitations of existing distribution channels. The customer can easily compare different prices and gain knowledge about products and destinations, and thus the price becomes the most important decision criterion. Thus, e-services can develop interdisciplinary knowledge to facilitate global product and information flow. Extending organization's e-service availability to more customers generates additional revenue streams (Microsoft, 2003).

However, Internet access is limited worldwide (Sheth & Sharma, 2007, p. 11). The first challenge and primary obstacle to the e-services platform will be penetration of the Internet. In some developing countries, the access to the Internet and its speed are limited. In these cases, firms and customers have no choice but to continue to use traditional platforms.

In summary, virtual platforms may enhance the interaction and the relationship between organization and customer, since the organization is able to be more responsive to customer service problems. Customers can send complaints, ideas and pose questions via online forms on organizations' websites. Paperless processing of requests reduces service costs and response time. Studies have shown that organizations realize the high potential of customer service performance with the objective of satisfied and loyal customers. For this reason, organizations focus on new e-services such as "teleweb" from Mercedes-Benz and Internet Relay Chat (IRC) to perform customer service in real time. Real time e-service is especially necessary in urgent cases such as short-term changes in flight information. However, due to the emergence of technology customers' expectations in regard of customer service have significantly changed. As a consequence, organizations are often forced to invest in high performing customer service that provides reliable, accessible and real time information. Furthermore, online customer service frees customer from temporal and location limitations. However, organizations are dependent on traditional channels of customer service where Internet access is still limited.

4.2 Self-Service Technology

The last decades have witnessed an explosive growth in customers' interaction with electronic interfaces. The evolution of information technology applications has changed the landscape of the service industry offering the possibility to customer empowerment through self-service applications. The introduction of self-service technology has created new service channels and procedures for organizations and customers (Gurău, 2009, p. 49). According to Ostrom et al. (2002, p. 46), self-service technologies are defined as any technology interface that enables a customer to produce and consume services without direct assistance from firm employees. Nowadays, clients can conduct bank transactions through automated teller machines (ATM), which has become one of the most successful self-service technologies, or on the Internet (online banking), make reservations or purchase tickets through online kiosks, check-in automated hotels, or use self-scanning systems in retail stores (Bobbit & Dabholkar, 2001, p. 424). Consequently, self-service technologies redefine the role of organizations and customers.

Creating a streamlined, effective process for customers, self-service also required that organizations carry out a careful review of their internal workflow. Cronin argues that (2010) passing over the work to the customers allowed a company to process more transactions with far fewer staff and at a higher level of customer satisfaction. Self-service releases the number of required manpower in customer service and the pressure of short response time. It lowered overhead costs and made internal infrastructure significantly more efficient and productive. According to Cronin (2010) and Thompson (2002), the majority of customers have come to prefer the self-service option if it is designed and implemented to give them a sense of control and to create genuine savings in time and effort for them as well as for the service provider. The question about reaching a higher degree of efficiency in self-technologies is, however, debatable as shown by the following example of self-checkout terminals.

The emergence of e-service has also impacted technologies in supermarkets (Hoffmeister, 2013, p. 8). The implementation of express self-checkout systems leads to significant financial and customer relationship changes. Self-checkout terminals allow customers to scan their own purchase guided by an electronic interface. As soon as customers scan their goods, these

interfaces receive relevant information about each product purchased. Finally, customers can pay by cash or credit card. According to an international study conducted by International Data Corporation, more than 90% of retailers expect to gain competitive advantages by the implementation of self-checkout systems (Krafft & Mantrala, 2010, p. 197). In contrast to traditional corner shops, supermarkets nowadays, experience a convergence of technologies. That means that customers are able to pay their purchase at a self-checkout terminal by electronic means. At the same time, the scanning of products will automatically change the organization's stock balance accordingly. More and more supermarkets follow this trend of introducing self-checkout systems. They believe that these self-checkout systems will especially ensure improved customer service and processing time, as well as reducing labor costs (Hoffmeister, 2013, p. 197). Especially, this electronic interface highly attracts customers who purchase a minimum of items. It is highly visible that preferences and demand change in respect of the buying process. Customers strive for an accurate, high-speed and simplified purchase. Self-checkout system may raise customer satisfaction for many reasons, such as the chance to purchase goods anonymously.

Despite the benefits that organizations and customers enjoy because of self-checkout machines, it is, however, debatable whether the process in case of self-checkout systems is faster or more accurate than lanes with professional checkers. Greg Buzek, president of retail technology consulting group IHL in Franklin, Tenessee, is convinced that "There is no question that, one-to-one, a staff checkout is faster than self-checkout. It's not perceived to be slower because there is usually nobody in line for the self-checkout, whereas there are people in line for the manned checkout. If you are the only person in line at both, the staff checkout will beat you every time because staffs know how to use the system. In addition, there are security features built into the self-checkout device that cause a delay. You scan an item, you put it in a bag, and then you wait for it to be weighed. Normal checkout doesn't have to do that. The staff can scan two or three items in the time it take you to scan one on a self-checkout." (Spector, 2005, p. 64).

Technology development, including the Internet, is contributing to the importance of e-service by creating new opportunities. For instance, speech recognition systems, natural language parsers, and user-friendly interfaces, combined with developments in database technology, allow organizations to provide personalized, self-help systems to customer to enable rapid response,

real-time and remote interaction possibilities (Rust & Kannan, 2002, p. 9). The introduction of effective self-service systems allows companies to automate the repetitive elements of services. As a result, organizations can concentrate their resources and personnel on more personalized aspects of the company–customer relationship, and thus providing more added values to their clients. Cisco System demonstrates an example, as it moved routine interactions online, therefore it saves nearly $270 million annually and at the same time customer satisfaction is enhanced. Today, over 80 percent of all Cisco customer support questions are answered by self-service via the Internet, avoiding an estimated 75,000 phone calls per month. Cisco offers technical support and other after-purchase services on its website. Customers can even take delivery of software online (Thompson, 2002, p. 164). Value flows both ways, customers get what they want faster, and Cisco saves money as its people are freed up for more valuable activities.

Self-service technologies do not only necessarily incorporate interface transactions by customers. Self-service begins at information seeking. In 1999, Remington Arms served 2,000 daily Web site visitors and received more than 100 emails. Today, the company receives 35,000 site visitors but the email volume has increased to only 200 per day. That's because 10,000 to 15,000 people visit the online knowledge base each week, solving most of their problems without any human assistance (Thompson, 2002, p. 166). Hence, it can be concluded that the integration of self-service technology with Internet applications has increased even more the convenience of information-rich services; customers can now access the service from their homes or offices, 24 hours a day, without geographical limitations.

Self-services change the way in which companies relate to their customers. Instead of interacting face-to-face with service representatives, customers of e-services interact with a user interface. This new technology eliminates firm's personnel interaction from the service interface, replacing it with software applications that can be accessed through real-time Internet connection. According to McCormick (2013, p. 48), depending on the level of self-service, service provider and user relationship may be enhanced though. Co-creation enables the sharing of innovation and development activities in a close partnership between end-users and service providers. This partnership is enhanced through the innovative use of information technology by creating new interfaces, which facilitate the interactions required for the effective co-creation of e-services.

Furthermore, the self-service system passes additional responsibilities to the customer, who will initiate, generate, and consume the service interacting directly with software applications. However, the involved customers do not necessarily perceive this additional responsibility as negative. In fact, many studies have shown that customers, and especially online service users, much enjoy having a greater degree of control over the service they require online (Gurău, 2009, p. 48). With the emergence of the Internet, many PC-based self-service technologies incorporate personalization and customization features (Rust & Kannan, 2002, p. 14). The self-service systems might permit a better customization of the online service, resulting in improved satisfaction for the service user (Gurău, 2009, p. 48). Hofacker (2007, p. 15) supports this and argues that customization strategies are typically implemented more efficiently online than in person. They can generate significant competitive advantage both through lower cost and increased customer benefits.

For instance, the emerging technology of choice boards is an interactive, online system that enables customers to individually design their own products by choosing from a range of attributes, components, prices and delivery options. The customer's selections immediately send signals to the company's operational system, which initiates the process of procurement, assembly, and delivery. Choice-boards are becoming popular in various industries. Choice-boards offer many advantages to customers and businesses. They are being used in industries as varied as toys, recruitment, finance, wireless phones, travel, apparel and telecommunication gear. Dell.com demonstrates one popular and successful example where customers start with a basic configuration defined by a processor model and speed, and then continue to specify the full configuration of a personal computer with their choice of hard-drive size, memory, and add-ons. Businesses make use of this e-service to differentiate themselves from high competitors on the market. At the same time, customers differentiate themselves from the crowded market place by customized products. Online choice-boards allow customers to step into the role of designing and equipping their own product. Customers feel empowered when moving from former product-takers to product-makers (Bharati & Chaudhury, 2004, p. 1014).

In the perspective of organizations, this positively affects the rate of product failures. Dell, for example, is able to capture buying patterns in real time. An organization based on this pull system eliminates the risk of making the best guess as in a push system. Organizations based on a push system, plan on delivery the merchandise months ahead of the actual sale. Forecasting sales are therefore connected to high risk of stock out or overstock. The change from push to pull systems shifts the service model from supplier-provided service to self-service. Choice-boards save labor and transaction costs (Bharati & Chaudhury, 2004, p. 1014). By following the strategy of pull systems, the organization benefits from the build-to-order principle. An organization that follows an entirely demand-driven production approach where a product is scheduled and built in response to a confirmed order, can reach low costs than traditional mass-production business because it allows the firm to see the customer's actual order and avoid huge inventory costs in building to stock. At the same time, the organization achieves high order fulfillment rates without worrying about the typical inventory trade-off, such as inventory costs vs. out-of-stock (Anderson, 2004, p. 454).

Customers who are engaged in various interactions on company's website enable customer profiling. Customer profiling also known as customer behavior model (CBM) is a suitable method used to capture information about individual customers. Information within the profile is usually used to deliver content, products, or services customized to specific customer needs (Kardaras & Karakostas, 2012, p. 24). Consumer profiles are, by definition, generalizations; although there are differences within the groups, the purpose is to characterize each group with regard to its user habits and preferences across different channels (Bharati & Chaudhury, 2004, p. 1014). The use of direct channels allows organizations to unobtrusively collect information about their customers, which in return, permits service improvements based on customer knowledge and directing their service to appropriate customer segment (Hofacker et al., 2007, p. 15). Customer profiling can help organizations to build and maintain long-term customer relationships. It is therefore a valuable technique for obtaining customers personal information and buying behavior patterns. It assists companies to get a better understanding of customers and their motivations for purchasing what companies offer. Customer profiling gives an organization the opportunity to communicate and interact with existing customers in order to deliver tailored content, product or service (Kardaras & Karakostas, 2012, p. 25).

For businesses, choice-boards are becoming a source of accurate and real-time data on consumer preferences. Since the configurator records every customer's preferences, Dell, for example, is able to capture buying patterns in real time. The basis of decision-making at Dell moves away from speculating to actually knowing what the customer wants. The choice-board system allows the firm to manufacture against an actual order, vis-à-vis other PC suppliers who manufacture to forecasts, which are apt to be inaccurate (Bharati & Chaudhury, 2004, p. 1014).

On the other hand, the lack of a direct relationship with an employee might represent a disadvantage for customers that prefer direct human interactions. The need for a personal contact is greater among the more insecure customers. An insecure customer finds the human element reassuring (Colby, 2002, p. 31). The dialogue with an employee might add a personal quality to the service provided, and can provide quick and flexible solutions when things do not go as planned. All these factors, together with the propensity of customers to adopt a new technology, can significantly influence the adoption and frequency of use of a specific online self-service (Gurău, 2009, pp. 48-49).

Moreover, there are more serious risks and barriers when implementing self-service technologies, which cause deficits in supply chain performance. Since the electronic user interface determines how services are delivered to customers, the way of delivery impacts customers' evaluation on e-service. Research has shown that if a website cannot be accessed, or if pages load slowly, customers may not have the patience to wait or try again later. An e-service outcome may be measured in the traditional way relative to customer expectations. However, the customer expectations of e-service and traditional services are based on different assessment criteria. Since customers cannot evaluate online services with respect to the furniture, or the cleanliness of the surroundings, online providers need other elements to signal the quality category of the service, or the target audience (Liljander et al., 2002, pp. 411-412).

In this regard, the concept of e-service quality has become an increasing important issue in research (Li & Suomi, 2009, p. 1). Service quality is an elusive and abstract construct that is difficult to explain and measure. Zeithaml et al. (2002, p. 362) developed the e-SERVQUAL measure of e-service quality. The e-SERVQUAL model is based on the customer perspective and

studies how customers judge e-service quality. It is therefore a modern technique for measuring e-service quality in different organizations. It serves the development of a truly customer-focused management and culture (Nemati et al., 2012, p. 727). Therefore, many organizations extremely consider e-service quality to obtain their customers' satisfaction and loyalty. In order to contextualize e-service quality, an examination of the SERVQUAL scale is required since most of the current e-service quality scales are developed based on the SERVQUAL instrument. The SERVQUAL method is aiming at providing a generic instrument for measuring service quality across broad range of service categories (Li & Suomi, 2009, p. 2). Understanding customers' expectation is the necessary step in defining and delivering the high-quality service. Expectations play important role to determine the consumer's service quality perception. The model encompasses seven dimensions. The first four dimensions are classified as the core service scale; the latter three dimensions are regarded as a recovery scale, since they are only necessary when online customers are facing problems. The explanation of each dimension is shown in table 2.

Core service scale	Efficiency	The capability of customers to access the website, finding their appropriate product and information related to preserving minimum effort.
	Fulfillment	Accuracy of service requirements, availability of the product in storage, and delivering the products on time.
	Reliability	The technical function of the site, particularly the extent to which it is available and properly functioning.
	Privacy	The assurance that shopping behavior data are not open and that credit card information are secured.
Recovery service scale	Responsiveness	Compares the capability of e-retailers to give appropriate data to customers when a problem happens, having mechanisms for handling returns, and giving online guarantees.
	Compensation	Consists receiving money back and returning shipping and handling expenditures.
	Contact	The requirement of customers to speak to a living customer service agent online or on the phone.

TABLE 2 SERVICE SCALES IN E-SERVQUAL

Customers monitor the service quality by determining whether there is any gap between their expectations and perceptions. E-service quality has been regarded as having the potential not only to deliver strategic benefits, but also to enhance operational efficiency and profitability. E-service is becoming even more critical for companies to retain and attract customers. What brings online customers back to company's websites is a sense of loyalty that comes from good services offered by companies. Companies can achieve competitive capabilities by offering good e-services to customers. Service quality has strong impacts on customer satisfaction on the performance of companies. Improving e-service quality to satisfy and retain customers is still and will be a greater challenging issue (Nemati et al., 2012, p. 728).

Despite organizational proactive motives to constantly introduce new service offers, innovations also arise from the urgency of reactive motives. The permanent advancement of technology, followed by innovative e-services empowers customers. As a consequence, customers are offered greater choices in relation to when and how they interact with the service provider, as well as greater control of the service outcomes. In addition, electronic medium leads to low switching costs (Simms, 2002, p. 66), which puts more pressure on organizations in retaining their customers. Switching costs refer to the costs that tie a buyer to a seller (Zelkowitz, 2005, p. 164). These factors, in turn, highly affect customers' expectations preferences, which require constant innovations to meet them in order to exits on the marketplace. In fact, research has proved that organizations that show a relative high rate of online interactions are able to offer customers more innovations. To provide evidence to this argument, according to a BITKOM survey in 2011, innovation is driven by Internet-based organizations. Results show that 60% of web-based organizations develop innovative products and services; almost 40% are running their own research department. In less web-based organizations, only 50% come up with innovations and only 24% own an R&D department (Keuper et al., 2013, p. 12).

E-services, in particularly, self-service types require customers' trust. Trust is considered to be one oft the most important drivers of e-service satisfaction (Bruhn & Strauss, 2002, p. 415). Grandison & Sloman (2003) define trust in the context of e-service as "the quantified belief by a trustor with respect to the competence, honesty, security and dependability of a trustee within a specific context". Therefore, trust derives from characteristics of competence, honesty, security

and dependability. It is often treated as a one-dimensional construct that is affected by past experiences of service based on the above-mentioned characteristics. Four types of trust have been identified: process-based (based on past interactions), generalized (based on norms), system-based and personality-based (some people have more faith than others) (Bruhn & Strauss, 2002, p. 415). Research proves that personalization and customization via self-service systems are challenging to implement successfully. The reason is that e-channel lack the human touch to build relationship, as is evidenced in other offline service settings. While many businesses view these initiatives as good substitutes for human relationships, it is important to understand that the success of these initiatives depends on good, reliable information from customers themselves, which can happen if customers trust the online businesses in the first place. If personalization and customization initiatives are based on unreliable information, they could be perceived as gimmicks or tricks. Further, if they are based in information collected without the knowledge of customers, they could lead to distrust. According to a survey conducted by Mallat & Dahlberg (2006), in mobile payment services, consumers are likely to rely on traditional financial institutions. The results also show that consumers perceived risks within a total of six categories: unauthorized use of the payment instrument, transaction errors, lack of transaction record and documentation, vagueness of the transaction verification, privacy concerns and device and mobile network reliability. All may be relevant subject to factors that have direct effect on e-service and consequently, customer satisfaction.

In addition to that, recent studies have also shown that personalization/customization initiatives could lead to higher overall perceived risks in conducting online transactions with online customers, especially in high-involvement services. Thus, the challenge for businesses in the era of e-service will be how to derive the benefits of personalization and customization technologies without the serious fallout that could accompany them. Self-service systems need to be tied-in with employee-related policies and procedures. These internal procedures must insure that the customer can rely on virtual assistance when using a self-service interface and that can feel comfortable in a range of transactions without human intervention (Rust & Kannan, 2002, p. 10).

Fraud reduces the Internet interactions. The second issue of concern is fraud on the Internet. It is anticipated that the fraud on the e-commerce Internet space costs $2.8 billion. Possibility of fraud will continue to reduce the utilization of the Internet. Due to both spyware and security holes in operating systems, there is concern that the transaction that consumers undertake have privacy limitations. For example, by stealthily following online activities, firms can develop fairly accurate descriptions of customer profiles. Therefore, possibility of privacy violations will reduce the utilization of the Internet. E-services can also become intrusive as they reduce time and location barriers of other forms of contact. For example, firms can contact people through mobile devices at any time and at any place. Customers do not like the intrusive behavior and may not use the e-services platform (Sheth & Sharma, 2007, p. 11).

Insecurity is perhaps the biggest barrier on advancement of e-services today. Privacy and security risks are emerging as serious concerns in the era of e-service, and if they are not properly managed, they could pose a threat to the viability of e-service. Privacy, on the one hand, is defined as a consumer's concern that information that he/she has willingly provided about himself/herself to an organization, through conducting a transaction, answering surveys, or surfing the company's Web site, could be misused by the organization. Security risk, on the other hand, refers to a consumer's concern that an unknown third party will obtain the consumer's personal or financial information without his knowledge while he is transacting business online or the third party will disrupt his transactions online (Rust & Kannan, 2002, p. 11). In the online environment, privacy and security risks cause the most concern of all risks for not only consumers but also for organizations. Thus, they influence not only the acceptance of e-service by customers, but also the design of e-service by organizations. Security concerns play an important role in whether a customer will adopt the e-channel for transaction. Additionally, many consumers still feel discomfort with technology in general and some degree of insecurity regarding specific online transactions. The publicity regarding credit-card information theft, "denial-of-service" hacker attacks, and misuse of private information by high-profile marketers has increased consumers' awareness and concern regarding these risks.

To sum up this chapter, self-service technology redefines the role of organizations and customers. It creates new service channels. Following a self-service strategy, organizations are mainly aiming at the benefits of co-creation. Many organizations achieve to realize an improved performance indicator in customer satisfaction, while reducing overhead costs due to the employment of fewer staffs. Customers have learned and developed a preference for self-service systems because they enjoy customer empowerment and control. The integration of self-service technology with Internet applications has increased convenience of information-rich services; customers can now access the service from their homes or offices, 24 hours a day, without geographical limitations. The idea of co-creation increases the benefits of pull systems. As a result, organizations enjoy an improved rate of product failures, since products are tailored according to customers' creations. At the same time, the principle of build-to-order avoids high inventory costs and improves organizational forecast accuracy.

Furthermore, due to high customer self-service interactions, organizations may benefit from customer profiling by collecting and analyzing customers' activities. This allows organizations to group their target customers and to address specific segments. However, self-service systems also exhibit many serious challenges for organizations and customers. First, it is debatable whether all types of self-service technologies exhibit time saving and more efficient procedures, when passing work over to inexperienced customers. Second, compared to traditional service, customer satisfaction of e-service is evaluated based on different dimensions. The concept of e-SERVQUAL helps organizations to gradually analyze customers' perception of their e-service quality. Third, trust is seen as the most important driver of e-service satisfaction, whereby insecurity and the possibility of fraudsters are posing serious barriers for e-service operations.

5 Operationalization of E-Service Based Business

5.1 The Future of Retail Supply Chain – A Case Study of Amazon.com

Amazon (www.amazon.com) is the largest e-retailer in the world and is considered as the pioneer of online retail. Amazon sells an extensive range of goods from non-perishable groceries to gardening equipment and books. Amazon as the pioneer etailer conducts its business exclusively on e-service platforms leaving only the physical distribution (Sheth & Sharma, 2007, p. 11). Therefore, this chapter presents and examines value-added online services of Amazon in the context of the aim of this paper.

In 2008, Amazon succeeded to increase its sales to more than 19.2 billion dollars, thus raising its sales more than 29 percent. Its profit increased 36 percent to 645 million dollars (Heinemann, 2010, p. 190). Sophisticated inventory management, fulfillment, and managing product information are cost-intensive. In 2002, Bezos spent more than 800 million dollars in his computer infrastructure to handle all these activities. At that time, some analysts have criticized Amazon for overspending on its infrastructure. They viewed Amazon as a retailer, but Amazon saw itself differently. It saw a potential future as a provider of a wide range of products and services, and this large investment was one of the necessary steps (Chesbrough, 2011, p. 164).

Today, Amazon has designed its own virtual marketplace in which it cooperates with numerous of suppliers. The growth and success of Amazon are largely built on its syndication strategy through aggressively expanding its extensive networks and e-partnerships (Zhao, 2004, p. 113). In fact, by now, Amazon's largest part of sales growth results from its virtual partnerships. If it does not stock a particular item, it acts as a service provider to other retailers, thus enabling the customer to buy a number of goods from different retailers through one site in one transaction. Hence, Amazon set itself up as an information intermediary, forwarding customer requests directly to the manufacturer to fulfill orders.

Amazon's extensive partnering with third-party merchants, combined with its own relentless expansion into new categories of merchandise, creates tremendous economies of scope for the company (Chesbrough, 2011, p. 166). In this regard, Amazon saves its costs of inventories through its e-partnerships. This does not only encourage repeat business from customers, but also establishes customer loyalty. According to the American Customer Satisfaction Index (ASCI), Amazon maintains the lead in the performance indicator of customer satisfaction in the USA, " (Sir Varney, 2006, p. 47).

Amazon is focusing on extending its business system to a cooperating Internet portal and a broader partnership network. Amazon's investment in new infrastructure technology is increasing. Early on in 1996, Jeff Bezos recognized the high potential of the Internet as a retail platform and focused on selling books and media products in the beginning. The benefits back in those days were based on economies of scale on a worldwide scale rather than selling other product groups (Heinemann, 2010, p. 191). In 1999, the company initiated its zShops program with third-party merchants, whereby these merchants were given a separate part of the Amazon site to display their own goods. Amazon initially let the merchants handle the purchase and fulfillment of these items. But the increased rate of customer complaints led Amazon to gradually take over more and more of the payment procedure from the merchants. Later, Amazon took over the display and merchandising of the third-party merchants. These external merchants' items now have access to the same product pages on the Amazon website as Amazon's own merchandise (Chesbrough, 2011, p. 165).

Amazon continues to invest in their product portfolio. Today, every third product, sold by Amazon, stems from the 1.2 million online retailers, who offer their product through Amazon's website. Consequently, the share of books and media products was reduced to less than 50 percent. For this reason, Jeff Bezos CEO of Amazon, have invested in new technologies in the last years. In 2007, he invested around 800 million dollars in new technology systems, compared to 600 million dollars in 2006. The purpose of these investments is to grow Amazon to a universal purchasing platform that offers all possible products. According to Diego Piacentini, Amazon's senior vice president of world-wide retail, the only way to achieve the mission is to host as many products as possible through its webpage (Zhao, 2004, p. 113).

Despite the benefits of a broader product portfolio and supplier network, e-partnerships can also create serious risks and challenges. To ensure superb customer service, safe transactions and to go against fraud on its virtual marketplace, Amazon has instituted fundamental internal safeguards. First, Amazon enables its customers to rate their experience with online merchants. Value-added information provided by experienced customers affects Amazon and future customers. Due to the increased rate and relevance of online communication, online reviews of other users have become one of trust worthiest sources for customers nowadays (Vasquez, 2014, p. 2). Second, merchants who sell through Amazon have to use an e-mail service on the Amazon's website to communicate with customers. This allows Amazon to monitor ongoing conversations and to actively go against violations. Third, Amazon actively excludes bad performing merchants from its purchasing platform by using metrics. These performance metrics include how frequently customers complain about a merchant and how often a merchant cancels an order because of stock-out. Hence, merchants who have problems with more than one percent of their orders may be actively removed from Amazon's website (Rainer & Cegielski, 2010, p. 314). For this reason, Amazon ensures its rate of order fulfillment.

Amazon aims at raising its customer service quality by introducing the service of personalized recommendations. Amazon has effectively implemented in its e-services for buying its products such as books. A well-known online service by Amazon is the offer of personalized recommendation based on a customer's past purchase and interests, and on the preferences of similar customers. Customers visiting the user interface of Amazon will find that when the user searches for a book on customer experience management, the books with similar titles or "contents" are also displayed waiting for visits and access (Lu et al., 2007, p. 376). Amazon's personalized recommendation is based on collaborate filtering. Collaborative filtering is the most extensive and most successful recommendation technique (Zhang, 2011, p. 279). This technique could show site visitors for instance that "60 percent of the people who bought X also bought Y." (Chesbrough, 2011, p. 164).

The employment of personalized recommendation technology solves an increasingly important problem of nowadays business, namely to filter items relevant for individuals within a gigantic pool of offers. The ability to reflect choices of its past customers to its next customers grows

better and better as more customers are involved in transactions with Amazon (Chesbrough, 2011, p. 164). Consequently, the more transactions made, the more valuable is the deployment of personalized recommendation. Recommendation is similar to the customization strategy and so are the benefits. Like customization, recommendation strategies are proved to be more efficiently in online implementation than pursuit by manual work. Significant competitive advantage both through lower cost and increased customer benefits can be generated (Hofacker et al., 2007, p. 15). As a result, high quality of this personalized recommendation may lead to increased customer satisfaction and loyalty, as well as increased sales.

More recently, Amazon has created yet another electronic service that exploits its knowledge. It offers its Elastic Cloud Services to potential customers. This service addresses companies that are much smaller than Amazon and lack the volume of business and the expertise to develop and manage their own IT equipment and people. Amazon will help these third-party retailers and will host the company's IT function and charge only for those services actually consumed. By augmenting its own extensive transactions with those transactions of third parties, Amazon's infrastructure gets used more and more. Although this infrastructure has very high fixed costs to establish, the marginal costs of using the infrastructure are quite minimal. The key is to use the infrastructure at a high level of frequency (Chesbrough, 2011, p. 166). Amazon gets the best prices on IT equipment among all Internet retailers. It knows the best locations for server farms and can attract and keep the best IT management talent. This is why Amazon gains a high margin on its infrastructure while providing a very good deal for its customers of that infrastructure.

The secret of Amazon's supply chain performance is carefully designed agility, flexibility and real options and an organization with the antennae to detect and adapt to shifts. Software that can reallocate order and effectively estimate delivery performance, decision processes that can identify how best to use available delivery choices to provide promised performance at low cost, all combined to synchronize supply chain performance with business expectations. Through the implementation of innovative supply chain strategies, the organization is able to redefine the market and therefore declass competitors (Lawrenz et al., 2001, p. 21). To illustrate, Amazon as an originally online bookstore redefined the whole book supply chain from publisher to end customer and forced its competitors to also join electronic distribution channels.

To sum it up, Amazon's extensive partnering with third-party merchants, combined with its own relentless expansion into new categories of merchandise, creates tremendous economies of scope for the company. Amazon actively fights fraud on its virtual marketplace. Online customer merchant rates, monitoring ongoing conversations and banishing bad performance merchants from any activities help Amazon to secure its customer performance. Further, Amazon's introduction of personalized recommendation solves the problem of information overflow. Hosting other retailers' websites and offering Elastic Cloud Computing Services demonstrate the value businesses can realize from harnessing economies of scale. By augmenting its own extensive transactions with those transactions of third parties, Amazon's infrastructure gets used more and more and a broader supplier network is developed. High agility, flexibility and real options are defining Amazon's supply chain.

5.2 Success Factors in E-Service Operations

This subchapter briefly outlines important success factors in e-service operations that derive from findings in this paper and from prior research. The most important success factor for organizations is to clearly define which service to transform to e-service and which are kept traditionally. A clear goal of which process to move online, which to improve and how these process improvements can facilitate superior e-service provisions need to be defined. Firms have to consider what role the customer will play in the e-service encounter (Rowley, 2006, p. 341). This paper has proved that traditional services are still prominent nowadays. In some cases, organizations have no choice but to deliver services through traditional channels. This is because, on the one hand, customers still value the benefits of former services, such as face-to-face and individual interactions. On the other hand, changing from location-dependent service delivery to service delivery via electronic channels requires high capital investment. Many organizations are not able to afford this. It is therefore necessary to clearly predefine and balance great benefits against serious risks for each individual company, since each firm and its customers may react differently to the implementation of e-service.

In this regard, Colby (2002, p. 27) introduces the concept of “technology readiness” in his studies. He defines technology readiness as the ”propensity of an individual to adopt and embrace new technology for personal use or at work.” This concept applies to both, organization and consumer. It influences not only the adoption of technology but also the degree to which one embraces a new technology, making full use of its capabilities. Therefore, it is important to analyze the firm’s technology readiness before transforming to e-services.

Nevertheless, while e-services provide an organization with tremendous opportunities to interact with customers and to solicit customer relevant information to improve the service encounter, the organization requires appropriate processes to manage and coordinate such customer information across all channels in a timely manner (Kelleher & Peppard, 2009, p. 2). Especially, for e-service business delivered on the Internet, the Internet has proved to be a speed task in the first place. Thus, organizations gain crucial comparative advantage by taking quick actions. According to committee of Bertelsmann, three months of presence on the Internet are seen as more than one year in real life (Hoffmeister, 2013, p. 18). Thus, e-service leads to an increase in speed, which affects every supply chain process and at the same time raises the competitive pressure on a global scale.

Organizations should incorporate mechanism processes into their online channels, which collect customers’ feedback and independent evaluation of the service levels actually provided. The feedback provided through customer complaint system enables the organization or designated customer service agents to learn from complaints, respond to customer needs in real-time and finally, raise performance levels (Bollettin, 2002, p. 280). While customers tend to evaluate the e-service encounter by assessing how responsive the company is to their online query or request, together with the degree of personalization experienced, recent research has shown that, while many organizations are good at responding to simple questions from customers online, the more complex the requests or complaints received, the poorer organizations are at responding satisfactorily. Therefore, e-service providers must enhance the ease-of-use of e-services, as well as be more responsive to customer requests and feedback received electronically. Organizations need to facilitate more personalization of e-services for more complex customer requests, complaints or less typical situations.

6 Conclusion

6.1 Summary

This paper shows that the growth of e-service has presented supply chains with many significant opportunities for internal process and customer performance improvements. For internal process improvements this paper analyzes the concepts of multi-channel business, mobile employment, tracking and tracing and e-procurement services. For the second perspective of the customer performance this paper has provided an examination about online customer service and self-service technology. Both perspectives have aimed at filling the gap between e-service and supply chain performance.

Results have shown that e-service allows organizations to raise frequency of use by adding virtual channels to their existing traditional channels. Research has proved that multi-channel business achieve higher degree of success compared to firms following single-channel strategies. The success is reflected in greater customer satisfaction, retention and loyalty. In addition to that, multi-channel distribution drives synergy effects and the firm's flexibility of service system to meet particular customer needs. However, challenges such as the gap of service quality between various channels determine this strategy. Mobile employment aims at increasing organizational flexibility. It allows mobile workers to set up an office virtually anywhere they need and at the same time to save office equipment costs. Worker's non-adaptability, office high secure accountability, the lack of surveillance for managers and performance limitations of mobile devices, however, hinder the implementation in many organizations. The analysis of tracking and tracing demonstrates that high quality information systems add high value to organization's supply chain performance. Tracking benefits the organization in a way that it increases firm's quality of delivery documentation and its forecast accuracy; it leads to an improved planning schedule and it reduces inventory costs. Tracing provides information about potential or acute problem spots that can be actively solved. The ability of tracking and tracing goods provides transparency throughout the organizational supply chain, which, in return, drives supply chain agility.

Finally, examining e-procurement services has revealed that that purchasing via virtual marketplaces opens up opportunities for organizations to build short- and long-term relationships to suppliers on virtual marketplaces. Research has proved that online purchasing reduces paper-work flows and order-cycles time, while reducing purchasing staff. E-procurement services provide a significant benefit of overcoming geographical barriers when purchasing. Communities where customers exchange their experiences enable customers to distinguish between trustworthy suppliers and fraudster, which has positive effects on the rate of non-fulfillment. The elimination of procurement intermediaries enables organizations to build long relationships as well as to focus on extending their supplier network. It is evident that online procurement services increase supply chain performance in terms of cycle time due to automated ordering processes.

The analysis for customer performance shows that virtual platforms may enhance the relationship between organization and customer, due to increased organizational responsiveness to customer service complaints, ideas and questions. Paperless processing of requests reduces service costs and response time. Organizations realize the high potential of customer service performance to reach satisfied and loyal customers. Real time e-service is especially necessary in urgent cases such as short-term changes. However, expectations in regard of customer service have significantly changed. Consequently, organizations have no choice but to invest in high performing customer service that provides reliable, accessible and real time information.

This paper shows that self-service technology redefines the role of organizations and customers. Customers enjoy empowerment and control of product creation. The benefits of following a self-service strategy include improved customer satisfaction, while reducing costs, information-rich services and freedom of geographical limitations. The idea of co-creation improves the rate of product failures, whereby the principle of build-to-order avoids high inventory costs and improves organizational forecast accuracy. Further, customer profiling allows organizations to group their target customers and to address specific segments. However, in the context of self-service systems organizations face challenges such as customer inexperience, new evaluation criteria for customer satisfaction and building trust.

6.2 Critical Acclaim

The term e-service as well as supply chain performance hold a great challenge in terms of their definitions. This is because these terms have close interfaces to many other terminologies. Along with the many different definition approaches, the quality of definitions also varies in literature. In particular, due to various dimensions of e-service, people urge to simplify the term by unconsciously associating e-service with web-services or IT services. Expertise must be considered, when it comes to questioning worth adaptation. Regarding the supply chain performance measurement, the BSC model has been applied in the analysis part. Due to the limited scope of this paper, the perspectives were limited to two out of four total perspectives. The internal processes as well as customer performance are seen as the two most relevant perspectives in regard to the aim of this paper. However, interfaces to the perspectives of finance and learning and growth are visible in the analysis, since all four perspectives are in mutual interdependence. Also, the BSC performance model was not sorely applied on one company, but on the whole industry. Based on these arguments, findings of this paper do not lose their significance or validity.

6.3 Outlook

E-service provides many perspectives to approach this business area. This is because of its great dynamic and innovations. Nevertheless, as mentioned in the chapter of success factors, it is important for firms to define which processes or specific services to be transformed into the world of electronics. Many organizations fail to judge which process or service to turn to e-services and which to keep delivering through traditional channels. Organizations underestimate the risk of incompatibility of services and processes. There are several researches in the literature that have developed analytic frameworks with the aim to propose which particular business industry will experience high market penetration, when introducing e-services and which are still dependent on manual work.

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V. Declaration of Originality

I hereby declare that this thesis and the work reported herein was composed by and originated entirely from me. Information derived from the published and unpublished work of others has been acknowledged in the text and references are given in the list of sources.

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