

Customer Support Design Considerations for an Information System

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Abstract

The efficiency of an information system could be traced to its design. Typically, information systems are designed with immense focus on the business logic and direct users of such systems, and not the customers who may be the indirect users of the system. The problem associated with such design is that it is not customer inclusive and this deficiency would over time lead to customer dissatisfaction. In safety-critical systems, the users and customers are both taken into account while designing the system. This practice is less pronounced in the design of information systems. This paper identifies the similarities and dissimilarities between a user and a customer, investigates an approach to designing information systems that supports the needs of customers and finally develops an architectural framework in line with a customer-centred design for an information system.

Keywords: customer, information system, system design, safety-critical system

1. Introduction

With the proliferation of advancement in technology, manual processes are continually being replaced by complete automation or some degree of automation. The advancement of technology makes several processes or activities that were once thought infeasible, feasible. For instance, brake-by-wire system, fly-by-wire system, mobile phones as computing devices, mobile enterprise resource planning, etc (Nggada, 2012 and, Gelogo and Kim, 2014). The expanded possibilities sequel to advancement in technology has also created gaps in the way systems are designs. Hence, the use of traditional development patterns may not be sufficient for certain systems as those patterns do not take into account current possibilities. For instance, the design of systems that support people with disability may require new software engineering process model (Nganji and Nggada, 2011).

Some of goals of an information system (IS) include efficient management of business processes and, customer satisfaction. This is in line with the concerns of any software engineer involve in the design of an IS; meeting user requirement and adhering to ethics. Ethics in this context refers to advocating for best implementation techniques that would be environmentally friendly (e.g. using efficient algorithms), transparency, etc. However, a customer to the business should also be considered as part of the system.

In traditional IS development, immense focus is placed on the business logic and the user of such system but not customers. According to Tallon (2010), little is known regarding effective digital business strategies and many large organisations still fail to attach these technologies to enhance their customer service performance. Such concern could be minimised when an information system is designed with the customer in mind. Additionally, Maoz (2010) added that there are greater concerns about the very small improvements (approximately 3 to 5 percent) in customer satisfaction across industries. One of ways to improving customer service is strong competition among businesses within same domain. Increasing competition forces businesses to pay much more attention to satisfying customers, including strong customer service.

Inadequate involvement of users in the design process is cited as a major factor contributing to ISs' shortfall between expectation and reality (Alter, 2012). This is also true of customers. It is important to note that decisions that are made during the design stage can affect both customers and users satisfaction. Failure to correctly understand the requirements of both users and customers can result into products that exclude these parties, and this may cause more frustrating situations, leading to downstream problems such as the drop of customer's level; this can ultimately reduce commercial success. Van Doorn and Verhoef (2008) found that when service failures occurs, the carry-over effect influences customers with high degree of satisfaction more than those with low degree.

This paper investigates who is a user and who is a customer, for the purpose of tailoring designs to the appropriate actor of the system. This is covered in Section 2. Section 3 discusses user and customer inclusiveness in the design of safety-critical systems. A customer-centred IS design is presented in Section 4, thus, the developed framework for customer-centred IS design is presented in section 5. Conclusions are drawn in Section 6.

2. User and Customer of an Information System

As any business depends on functioning infrastructure, most operating companies or organisations in Namibia depend on a comprehensive IS infrastructure to support their business processes and competitive strategy. In many industries, survival and even existence is difficult without extensive use of information technology. Both users and customers have to be thoroughly considered at the design stage of these ISs, as through customers businesses would achieve the greatest returns on their ISs investments. Kotler and Keller (2012) stated that the secret to a successful business is knowing what attracts the customers. This is the reason why customers should be considered during the design of IS.

IS has become a fundamental aspect in conducting business today. Using these ISs, transactions are conducted with ever-increasing amounts of data to be captured, analysed, and stored and most of these activities are accomplished with the involvement of both users and customers. Currently, ISs are designed with the involvement of users and with little or no customer consideration. Despite widespread digitization, leveraging digital technologies in customer-side operations continues to be a challenge for many service organisations (Cisco 2007). ISs are used to coordinate all of the business processes and dealings with customers in sales, marketing and services.

To succeed in inclusive system design, it is imperative to understand who is a user and who is a customer, and what role do they play within an organisation. In simple transactions that we encounter every day, such as buying an item from a retailer, the customer and their requirements are very easy to identify. Kettinger and Lee (2005) describe a customer as a party that receives or consumes products (goods or services) and has the ability to choose between different products and suppliers. On the other side of the flip, the user is someone who directly interacts with the ISs (Agerfalk and Cronholm, 2001). In some cases users and customers in the use of ISs are pretty similar, except that one group directly generates revenue by paying for the product while the other uses the system to facilitate revenue generation.

The dissimilarity between a user and a customer is that the customer is the direct supplier of funds (Ad Esse Consulting, 2008) while the user is someone who directly interacts with the IS (Agerfalk and Cronholm, 2001). In certain business areas, users of a system are also customers, for instance users of online shopping websites. Customers are basically users who pay for the value that is created for them in the form of a revenue stream for the company in question.

3. User and Customer Considerations in the Design of Safety-Critical Systems

User consideration is a norm in the design of any system. The consideration or inclusion of customers may be uncommon to certain applications domain; this however, is common in the design of safety-critical systems. For instance, safety-critical systems such as vehicle, train and aircraft consist of user(s) and customers. The users could be seen as the human controller (driver, pilot, etc) of the system while the customers as the passengers. The safety of all actors to such system is paramount and hence, the inclusiveness of the design.

The process of system design begins with translating user requirements into specification. The system is then designed using the specification. The design is analysed iteratively by consideration possible potential hazards that could lead to system failure; infringing on the safety of the users and customers of such system. Additionally, cost and the environmental impact as a result of the occurrence of potential hazards are also considered. Typically, the analysis would employ traditional safety analysis techniques such as failure modes and effects analysis (FMEA) (Nggada, 2012). Conducting the analysis of FMEA enables identification of all potential and known modes of failure occurrences in system assemblies/parts, their causes and evaluation of consequences (Timea, nd).

Although the term customer-centred design is not pronounced in safety-critical systems, the design pattern suggests so. This is imperative since safety is paramount and would likely define the return of customers for the services offered via such systems. This should also be the practice in ISs since customers experience with services rendered shapes the business.

4. Customer-Centred Information System Design

Customer-centred IS design refers to incorporating the needs of both end users and customers of the system. These needs are given extensive attention at each stage of the design process. It also covers end users' needs in the sense that each user could be the middle man between each customer and the system. The British Standards Institute (2005) defines inclusive design as the

design of normal products and/or services that are accessible to, and usable by, as many people as reasonably possible without the need for special adaptation or specialised design. Customer-centred system design is a process focusing on usability throughout the life cycle of the system (Alter, 2012). Customer-centred design also emphasises that the purpose of the system is to serve the customer, not necessarily using specific or most recent technology, and also not to just be an elegant piece of programming.

Poorly designed ISs can lead to products with more features, yet this wealth of features can take focus away from a product that is actually useful and usable. Customer inclusiveness could minimise negative judgements of, or reactions to, the overall product or service. The needs of the end users and customers should dominate the design of the interface. Although the customer may not be the direct user of the system, the interface should consider services that are to be rendered to the customer; for instance a checklist of wrap-up task to perform towards ending a service to the customer. Customer-centred systems design must be defined in terms of end user involvement and services to be rendered to the customer. By providing a more precise definition of customer-centred system design, one can also avoid problems with ambiguity and vagueness, and employ development approaches that are customer-centred.

ISs design team have the potential to include or exclude users and customers. Inclusive design underlines the understanding of the contribution that users and customers make, it covers variation in capabilities, needs and aspirations. Boivie et al (2003) suggested that the consideration of customer-centred information system design is an acceptable process under which designers can be assisted to gather the knowledge of how to develop usable systems. During this process, one can capture commitment of the usability community supports and involve end users and potential customers in system design. The aim is to develop usable systems, which can be achieved through the involvement of all actors of the system. It is important to understand the terms *design* and *inclusive design*, and the way inclusive design contributes to product success. A number of case studies demonstrate how inclusive design can foster innovation and better design, for instance Hutchinson et al (2009) suggested that when customers get expected service quality, it leads to higher satisfaction.

New technology is being introduced in most business, hospitals and labs at an increasing rate but customer inclusiveness in ISs design is being given less consideration (Cisco 2007). This could be improved if both organisations and designers can come up with ways to create and promote customer inclusiveness during system design stages in order to achieve greater success. According to Dimensional Research (2013), the actions of organisations and stakeholders can have a significant impact on the IS development, hence the advocacy for inclusive design.

5. Framework for Customer-Centred Information System Design

Having established who a user and customer of an IS is, and what customer-centred system design refers to, it is helpful to establish a framework for the design of an IS that is customer inclusive. This is exactly the focus of this section.

The framework is as shown in Figure 1. It basically builds on existing software engineering design paradigms. Hence, it does not substitute any software engineering process model but could compliment such models. The framework begins with an initial phase which does not involve the users and customers of the system. In this phase, the team of systems analysts or software engineers, or their combination, establishes the initial overview of the system which details the functional and non-functional requirements of the system in their own perspective. This is helpful, as it would provide the users and customers with a bird's eye view of the system, from where they could effectively contribute to the evolution of the system starting from the second phase. This phase however, does not involve the intervention of users and customers.

The second phase focuses on gathering the needs of users and customers. This involves a participatory approach to system development where the users and customers are involved in the design and decision making. Participatory design covers phases 2 to 4 of the framework. In phase 2, users and customers submit their needs for the potential system. The needs are implemented in phase 3, should it be essential to revisit the needs, this is possible.

In phase 4, testing of the system is performed. Should there be anomalies, phase 3 or even 4 could be revisited. The system could then be released in phase 5 only when testing is satisfactory.

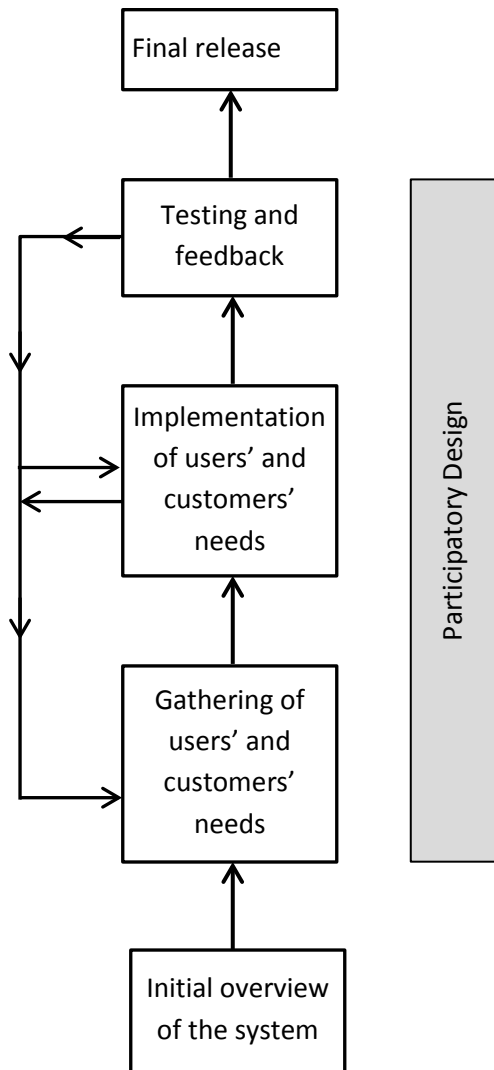


Figure 1 – Customer-centred framework for information system design

6. Conclusions

Information systems are fundamental to modern day businesses. This is because it facilitates the operations of businesses, where some of these directly relate to customers. Hence, the need to consider customer-centred design approach when designing information systems. This paper has established distinction between users and customers of information systems, and also their similarities, and what a customer-centred information system design is about. The paper has also established a framework for customer-centred information system design that could be used when developing an information system. The developed framework is not in any way a software engineering process model but could act as a compliment to a chosen process model for software development.

Thus, one design consideration identified in designing information system is an approach that is customer-inclusive. Further work would be required to investigate considerations within the phases of the developed framework and how the framework could be combined with a given software engineering process model.

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