Research Article

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The Effect of Usability and Information Quality on Decision Support Information System (DSS)

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Abstract

Decision-making is complex process that involves people and information system. A Decision Support Systems (DSS) is a set of specific class of computerized information systems that support decision making activities of businesses and organizations. There are certain factors that affect the performance of DSS such as information quality and usability of these systems. This study aims to introduce the concept of usability and information quality in general and examining their effects on the DSS. The study found that both usability and information quality have strong effect on the output of any information system and in particular DSS. The study recommended that the developers of information systems must pay high attention to develop the content provided by IS before process them by DSS as well as they ensure DSS is easy to use and get required information to support decision making process, for example the developers should focus on easy navigation through the system, good interface and reaching information in proper time.

Keywords: Information quality; Usability; Decision support systems (DSS); Information system (IS)

Introduction

The information technology revolution is booming in most of developing and developed countries, currently there is a vast amount of information because of the development in the internet and information systems that support decision making process all kind of firms, and this has become the production of information and using them properly is the key success factor for countries depend on information systems to manage most of business and government works. Nowadays big organizations do not make random decisions but rely mainly on the vast amount of available information provided by information systems so that the senior managers and board of directors are more capable to take appropriate decisions with high accuracy and less of errors because information systems are highly efficient information producers [1].

This means that the data is the raw material needed for the production of information, and in accordance with the concept of the system so that the data represent. Information is the base of information systems, and most of information systems available in the market manage the usage of stored information to the users in a way it provides benefits to users in their life and business [2].

There are certain factors that affect the perception of information systems (IS) users, one of these factors are information quality and usability of IS. The decision making process is not considered a process that help the users regardless of the ease of use of the system and the quality of information provided by these systems. Therefore, many IS developers pay high attention to the design of the interface and navigations facilities of the system which enable the user to get the necessary information for decision making process. All these aspects are discussed in this paper and set the right recommendations for IS developers.

Purpose of the study

The aim of this study is to introduce the principles of usability and information quality in general and examining the effects of these two factors on the decision making process provided by IS for organizations rely on information system in most of organizational functions. The researcher aims to identify the main effects of usability and information quality on the efficiency of decision support information systems.

Contribution of the study

The main contribution of this study in extending the current knowledge on usability and information quality in decision support information system. The findings of this study will help researchers in the future to understand why usability and information quality are very important elements of IS and why decision makers who rely on these systems need an IS featured with suitable usability and producing high quality information.

Concept of information system

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An information system is any organized system for the collection, organization, storage and communication of information. Such a

system may be as complicated as a multi-node computer database system used to manage vast quantities of related information [3].

Casalino et al. [4] define a computer Information System (IS) is a system composed of people and computers that processes or interprets information.

Information system includes diversity fields such as: the design and analysis of systems, computer networks, information security, and database management and decision support systems [5].

The information system consists of the following elements [6]:

- Environment: It is a set of elements and components, including relationships and elements that are not part of the system.
- Boundary: Represent a scope of work that is required.
- Inputs: They are a group of tasks (data) and the instructions which have got in from outside the system and needs for carrying out operations inside the system.
- Processes: are a set of procedures that govern the relations of specific tasks to carry out a check and that the overall objective of the system.
- Subsystem: Is a system specification and holds regular order, but performs an important part of the process to complete a comprehensive system or largest.
- Relationships: Represent the links between the subsystems and the system or the environment, whereas any sub-system can function independently from others.
- Outputs: It is information obtained from processing the input within the information system; the output may take many forms such as: the form of queries or reports.
- Feedback: Some systems have the factor of control through the feedback which is made to reintroduce outputs as inputs.

Decision Support System

Decision Support Systems (DSS) is a set of specific class of computerized information systems that support decision making activities of businesses and organizations [7]. Typical information that a decision support application might gather and present includes [8]:

- Inventories of information assets (including legacy and relational data sources, cubes, data warehouses, and data marts.
- Comparative sales figures between one period and the next.
- Projected revenue figures based on product sales assumptions.

Based on the above, the study suggests that Information quality is very important factor in DSS because DSS include knowledge-based systems. A properly designed DSS is an interactive software-based system intended to help decision makers compile useful information from a combination of raw data, documents, and personal knowledge, or business models to identify and solve problems and make decisions. That's why the quality of information affects the efficiency of DSS.

Usability

Usability is defined as "the ease of use and learn ability of a human-made object [9]. The IEEE Standard for Information Technology-Software defines usability as "a measure of an executable software unit's or system's functionality, ease of use, and efficiency, it is a measure of the ease with which a user can learn to operate, prepare inputs for, and interpret outputs of a system or component".

Some scholars investigated usability of (IS) in by testing interface issues and the type of content and journey that users prefer when deciding to make a purchasing decision. She found poor usability indeed hinders users' overall experience, who also identified those inconsistent navigation structures, product-based navigation menus, hard to understand functionality, and poor presentation of content send negative signs to users of (IS). She suggested that good usability measures enhanced the quality of the overall user experience and increase the intention to use (IS) [10].

Information quality

The term information quality is used to express the quality of content provided by (IS). It is frequently defined as "The fitness to use the information" [11,12]. It is also defined as "the capability of the system to communicate with a user in a method that makes him understand" [13].

DeLone and McLean [14] defined IQ as "the aspects of a system and a measure of the information system outputs". They defined the measure of information quality in the following:

- Accuracy: How accurate is the information within the IS
- Relevance: How relevant is the information within the IS
- Importance: How important is the information within the IS
- Reliability: How reliable (repeatable, stable) is the information within the IS
- Uniqueness: How often does redundant information flow in the IS
- Free from bias, how objective is the information (ie, how often has it passed through interpretations).

Results and Findings

The effect of usability on DSS

Usability of IS play an important role in achieving fast decisions and deliver information in short time for the user. Poor usability is one of the core barriers to adoption and a deterrent to DSS use. It is found that implementation efforts of highly usable IS and collected best available design conventions, procedures, practices and lessons learned in order to provide developers a short compendium of design goals and recommended principles [15]. The function of DSS is to help their users to make more effective decisions by providing information in a way that actively assists the decision process. It concludes that the high usability interface provides a cost-effective and practical means of gathering information through DSS on the decision making, organizing information and using it as the basis for design decisions and could usefully be applied for supporting decision making process [16]. Some researchers claim that an essential part of DSS in interaction design and technology is to make visible data in a user friendly showing of information that support the decision-making process [17].

In the same context a DSS where systems are the interface can provide useful functions such as presentations to match human performances and decision styles, all these features support the decision-making process significantly, and the reasons to use a computer aided DSS are many, one of them is that information can be stored in databases, involve pictures and sound, and can be reachable very quickly which support the decision-making process [18].

Based on the above it is found that usability of IS and in particular DSS is a very important factor that support the decision-making process by easy access to information, and high responsiveness, providing information quickly and without delay and effective feedback that satisfy user inquiry.

The effect of information quality on DSS

The decision quality improves with higher information quality for a decision-maker that has knowledge about the relationships among problem variables. However, the decision quality of a decision-maker that doesn't know these relationships may degrade with higher information quality. Where Simultaneous improvement in information quality will reflect on decision-maker quality and results in higher decision quality [19].

Concludes that if adequate attention and focus on the aspects of information quality then a major step towards the development of effective DSS would be achieved. No DSS can provide excellent performance if it is based on poor quality of information. However, it is not easy to identify what qualities are essential for making information useful for decision-making. There are certain characteristics of information quality that should be provided in DSS. It is proposed by some scholars the list of dimensions or elements used in assessing Information Quality are the following [20]:

- Intrinsic: Accuracy, Objectivity, Believability, Reputation
- Contextual: Relevancy, Value-Added, Timeliness, Completeness, Amount of information
- Representational: Interpretability, Format, Coherence, Compatibility
- Accessibility: Accessibility, Access security

The results of a study conducted by Mouzhi [21] showed that not all the aspects of information quality are equally effective for the improvement of decision making quality of information systems. Decision-makers who rely on DSS before taking a decision associated with their organization could decide to pay attention to the improvement of representational information quality and information consistency. For practical implementations, the results of this study concluded a validated framework that allows software engineers to implement assessment on information quality of DSS.

Based on the above it is found that information quality is one of the main factors that affect the performance of DSS, and since DSS is mainly depend on input of random information and output of useful information for decision makers, then the quality of input and output information are both important to the decision makers. According to that the researchers suggest that the filtration of input information is critical to ensure valued information produced by DSS.

Conclusion

This study introduced the principles of usability and information quality and the decision support systems in general and examining the effects of these two factors on the decision making process provided by DSS for organizations and businesses depends mainly on information system in doing most of organizational functions and activities. The study identifies the main effects of usability and information quality on the efficiency and the performance of decision support information systems. The findings of the study show information quality and usability affect the performance of DSS. Usability represents the ease of use of information system through various dimensions such as interface design, user control, and simplicity of design, navigation, and less advertisements. Information quality is used to express the content's quality for information system. It is frequently practically identified as the fitness to use the information provided by information system.

Recommendation

Based on the findings of this study, the researcher suggests the following recommendations:

- The developers of information systems must pay high attention to the quality of information before using it as an input to DSS
- The developers of DSS should ensure rich information produced by these systems to the users and decision makers.
- The developers of DSS should focus on easy navigation interface and inquiry of information accomplished fast and in proper time.

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