Decision Support Systems 54 (2012) 795–802

Contents lists available at SciVerse ScienceDirect

Decision Support Systems

journal homepage: www.elsevier.com/locate/dss

Assessing the perception of information components in financial decision support systems

Ofir Ben-Assuli *

Faculty of Business Administration, Ono Academic College, Israel

ARTICLE INFO

Article history:
Received 22 February 2012
Received in revised form 25 July 2012
Accepted 17 September 2012
Available online 24 September 2012

Keywords:
Decision making
Investment planning
Financial decision making
Perceived value of information

ABSTRACT

Estimating the contribution of DSS to financial consulting decision-making is attracting considerable interest in the fast-growing field of banking DSS. This study evaluated the perceived role of banking DSS in the decision-making of investment counselors. A questionnaire was submitted to 40 investment counselors to determine the comparative importance of DSS information components. Data were analyzed using two complementary methods (analytical hierarchy processing and Neumann–Segev). The most important information components were customer's and investment risk classification, and customer goals and nature of investment. The results differed across administrative ranks and as a function of the user's experience level.

1. Introduction

In the past few years, information systems have entered the field of investment counseling, where they are used to support the work of bank employees in charge of customer portfolios. These bankers assist customers in making investments in a way that suits their lifestyles and financial goals. Traditionally, bankers simply remembered their customers and their customers' profiles and tried to design investment portfolios adapted to each. This approach may have been appropriate in the past, but is less so in an age in which there are so many financial instruments that befit a far wider classification of customer types and investment types.

Vahidov and Kersten [37] described the major changes in the business environment in the past thirty years and in particular, the globalization of economy and the growing complexity of economic relationships. These in turn contribute to the complexity of the decision problems faced by decision makers [11]. Additionally, important financial decisions require reasonably accurate forecasts based on various probabilistic information components such as forecasting future medical needs and costs [39], household financial planning in years to come [35], etc. It seems virtually impossible for an investor to utilize all the available information in the short time needed to respond to market trends. Therefore, a control mechanism is needed to help bankers equilibrate deliberation and timely decision-making [36]. All the above clearly point to the increasing need for sophisticated decision support tools.

Although a DSS should improve decision quality, research has shown that at times the opposite is true or that implementation of a system has no effect at all [20]. This is not entirely unexpected since multiple variables, issues and contexts are involved. Nonetheless, DSSs have a vast potential for supplying complete, uniform, exact, up to date, accessible and reliable banking information, which can improve decision quality and reduce risks and uncertainties that stem from lack of information [5]. Specifically, information about customers, such as their goals and the nature of their investments, the investment horizon, the customer's risk classification, investment history, etc. can enhance the decision making processes of bankers who deal with investment counseling.

Assessing the value of such information as part of the decision making processes is one of the most important topics in several research fields that deal with organizational information, and has been studied extensively over a wide range of disciplines that deal with information systems in organizations [2]. Components of the system must be examined using variables that relate to the characteristics of the information to best maximize utility. According to Ahituv [1] there are three main characteristics: *time variables*, for instance system response time, frequency of receipt of data, etc., *content variables*, for instance relevancy, precision, suitability of data to what the user wants, aggregation of data, etc., and *format variables* such as visual presentation, interactive visual analytic tools [31], interactive media, arranging data in tables versus graphs, graphic design, etc. Ideally, each variable in the utility function should be clearly defined and possible to measure, and the relationship between the variables in the utility function and the cost variables should be known and mathematically defined. In such a situation, optimization tools help choose the most appropriate system. In reality, however, the maximizing utility method has several shortcomings related to problems of measurement [27].

* 104 Zahal St., Kiryat Ono, Israel. Tel.: +972 3 5311919; fax: +972 3 5311951.
E-mail address: ofir.benassuli@gmail.com.

0167-9236/$ – see front matter
http://dx.doi.org/10.1016/j.dss.2012.09.007

The main purpose of this study was to assess the perceived value of information obtained from a DSS designed to assist the decision-making processes of bankers who deal with customer investment counseling. As officially stated by the bank, the DSS characterizes the customer in terms of purpose of investment and risk classification, takes into account current macroeconomic parameters, and then constructs and presents a documented recommendation for investment.

This paper is organized as follows. The next section reviews the literature regarding user expectations and evaluations of DSSs and a perceived value of information approach, and details the objectives of the present study. Section 3 presents the analysis tools used to assess the perceived value of information; namely, the AHP (analytical hierarchy processing) method [29] and the Neumann–Segev method of analyzing correlations [26]. The results are presented in Section 4, and discussed in Section 5. Section 6 covers limitations and future research directions, and Section 7 presents practical conclusions and recommendations for improvement in the specific DSS surveyed here.

2. Background and research approach

2.1. Background and literature review

The goal of investment decision-making is to select an optimal portfolio that satisfies the investor's objective to maximize investment returns under given constraints and limitations [28,30]. This, for instance, can be addressed through value of information analysis that assesses the benefits of additional information to reduce uncertainties [14,42]. Applied information economics can also be used to make cost/benefit optimization analyses regarding IT investments, which involve extensive mathematical models [34].

However, as Ahituv, Munro and Wand [4] pointed out, decision makers seek satisfaction and not necessarily optimization (which derives from utility theory), and tend to adopt the first solution that fits their expectations. For instance, individuals may stick to a certain known profit (from a specific investment fund), which is not necessarily the maximal profit, because that maximum is not known (see also [27] for more examples). Rafaeli and Raban [28] used the perceived "willingness to pay" method to show that people's use of information is irrational and apparently derives from the need to avoid risks. For instance, they noted that simply having the information "just in case" was an important thing for the users. It is a plausible that irrational thinking should be taken into account in most decision making processes [8], especially when the decision involves conditions of uncertainty, risk [19] or extensive psychological involvement [6].

The concept of evaluating DSS through its users is based on Mason and Mitroff's [23] accepted definition: "An information system consists of, at least, a person of a certain psychological type dealing with a problem located in an organizational context, which the person needs evidence to solve, with the evidence being presented to her in a particular manner of presentation". This definition makes it clear that the user is the deciding factor in planning the system, since if the system does not fit the user's needs, she will simply not use it. Hence, a vital measure of the system's success is the extent of use of the information system and the user's satisfaction. These factors were shown to be related to preliminary as well as ongoing training, especially at the managerial level. [20].

Users' ability to experience the positive outcomes of the system has also been identified as a crucial factor for system satisfaction and usage. [20,22]. Lilien et al. (2004) showed that even when a high quality DSS is used, where results may thus be substantially improved, its perceived quality may not be commensurate.

2.2. Estimating the value of information

Ahituv [2] and Ahituv and Neumann [5] defined three key approaches to evaluation of the value of information, which they termed Perceived, Realistic and Normative. The perceived value of information reflects the user's viewpoint and understanding of how she or he sees the advantages and disadvantages that derive from using the IS. The realistic value of information is the difference in performance (of organizations or individuals) before and after obtaining information. This is basically an empirical approach that reflects the organization's actual performance. The normative value of information predicts the system's value based on a theoretical model derived from normative models and from the predicted behavior of the decision maker. Under the assumption that the decision maker behaves rationally, the expected utility or expected profit can be calculated.

Each approach has plus sides and shortcomings and the optimal approach to a given situation depends on the information to be assessed and the parameters of the situation. A perceived evaluation of a DSS is usually undertaken when the information quality cannot be entirely objectively measured; for instance, when the reliability of the information is difficult to evaluate objectively [38]. The more strategic or unstructured the decision is, the more difficult it is to measure the value of information. Such decisions are usually non-repetitive, involve numerous unknowns that are external to the organization, and may involve extensive creativity as well; altogether this can make it rather difficult to assess the quality of the decision process [17]. For instance, at senior management levels only a measure of the perceived value of information can absorb real world issues such as competitive power, people skills, organization politics, etc. [2,7,15].

This is also true in the case of investment counseling, where the decision is fairly amorphous and usually extremely complex, and there is no way to work out "the best answers". Therefore, perceived assessment of information is considered the most potent and reliable indicator and was adopted here.

Assessing the perceived value of information is feasible once the DSS is up and running since it is especially difficult to carry out measures like these on planned systems that are not part of the users' or decision makers' environment. Nonetheless, with or without an existing IS, assessing the perceived value of information is not an easy task. A number of methods have been developed to measure the perceived value of information, two of which were used here. The first is the AHP, that utilizes a hierarchic analytical process [29]. The second is the Neumann–Segev semantic scale (commonly employed as an odd Likert scale [14]). In both methods, the users are asked to indicate their responses to characteristics or properties of the system on a questionnaire. These methods do not yield an exact monetary value, and it is practically impossible to conduct cost/benefit analyses. These methods are explained in detail in Section 3.

2.3. Objectives of this study

The objective was to quantify the perceived impact of various information components of financial DSS on the decision making processes of investment counselors. The first goal was to hierarchize the contribution of a set of components of information to the decision making process. This was done by analyzing a questionnaire submitted to investment counselors in a leading bank in Israel that assessed the perceived value of information obtained by using financial DSSs in the decision making process. The second goal was to determine the factors that affect the use of financial DSSs. Specifically, (a) the effect of seniority (see also [3]), and, (b) the effect of the administrative rank of the investment counselors (Investment Counselor, Team Leader, Branch Manager, etc.) were analyzed.

3. Material and methods

In this study, two complementary methods were chosen: the AHP method [29] and the semantic scale as used by Neumann–Segev in their method of analyzing correlations [26].