The overall value of Web-based hybrid models for strategic marketing decision-making: Managers’ responses to the WebIntegrated and WebMarP systems

Shuliang Li
Westminster Business School, University of Westminster, 35 Marylebone Rd, London NW1 5LS, UK
lish@wmin.ac.uk
http://www.westminster.ac.uk/about-us/our-people/directory/li-dr-shuliang

Jim Zheng Li
Deutsche Bank AG, Filiale London, 20 Finsbury Circus, EC2M 1NB London, United Kingdom, UK
jimzhengli@gmail.com

S. L. Li, D. Liu & J. Xu
School of Economics & Management, Southwest Jiaotong University, Sichuan, 610031, China
simonxnjd@gmail.com; newton83@163.com; jinxu@home.swjtu.edu.cn

Abstract: - A Web-enabled hybrid intelligent framework is proposed to combine the powers of analytic hierarchy process, expert system, fuzzy logic and online databases to support the formulation of integrated traditional and digital marketing strategies and aid the evaluation of marketing performance. Two Web-based hybrid intelligent systems, called WebIntegrated and WebMarP, have been created by the authors on the basis of the proposed general framework. Real-world testing has been undertaken. Managers’ responses to the value of the two new systems are reported in the paper. Finally, further work on context-sensitive self-surviving and rapid reaction smart marketing decision-making is envisaged and discussed.

Key-Words: - Web-based hybrid intelligent models; decision support system; analytic hierarchy process; expert system; fuzzy logic; online databases; marketing strategy; digital, mobile and social media marketing strategy; marketing and digital marketing performance evaluation; context-sensitive and rapid reaction smart marketing decision-making

1 Introduction

The emergence and rapid development of electronic, mobile and social media marketing are bringing new opportunities and challenges for strategic marketing planning, and the integration of conventional and digital marketing mix and strategies.

The changing business contexts, globalized digital economy and rivalry in the global settings have also been creating the demands for connecting marketing activities, marketing strategies with effective marketing performance management.

In the past years, effort has been made to develop relevant decision support methods, systems and tools in support of marketing strategy formulation and marketing performance evaluation in the digital age [1, 2, 3, 4, 5].

2 The general framework

We put forward a new framework that aims at dealing with the key facets of integrated marketing planning and consequent marketing performance evaluation: 1) determining and estimating the numerical weights or relative importance for the factors influencing the formulation of integrated marketing strategies and the assessment of marketing performance; 2) simulating and/or estimating the values of the factors or variables affecting strategy-making and related marketing performance appraisal; and 3) performing approximate reasoning under uncertainty, advising strategic alternatives and analysing relevant performance areas. The decision maker may provide judgmental entries to the analysis and simulation of relevant strategic variables. He or she may also apply intuition, experience and personal vision when providing inputs to factors and simulation procedure, making the final choice on digital marketing strategies, and making the final judgement on consequent marketing performance. The general framework is shown in Fig. 1.
3 The WebIntegrated system and managers’ comments

WebIntegrated [1] is a hybrid intelligent system that was designed by J. Z. Li and S. Li to specifically support the conventional, digital, mobile and social media marketing aspects and dimensions of strategy formulation. In particular, the system aims to: 1) simulate and assess variables influencing and determining integrated marketing strategies, and 2) perform approximate reasoning under uncertainty and advise blended conventional, electronic, mobile and social media marketing strategy alternatives or options [1].

The software system was constructed on the basis of the client-server structure, with server-side coding, scripting, programming and software creation. The following open-source tools were employed in this project: MySQL (a Web-based relational database management system), PHP (Hypertext Preprocessor), JSON (JavaScript Object Notation), and HTML (HyperText Markup Language).

The WebIntegrated system was evaluated using real-world business cases with three company directors in the United Kingdom and six senior managers in China, in April, May, September and November of 2012. A data collection questionnaire was designed with a focus on the effectiveness of Web-based support for the planning procedure, system outputs, strategy-making outcomes, decision-making performance, and where to extend. Computerised assistance for the procedure of integrated marketing strategy formulation was perceived to be: “It provides an integrated approach as well as self-contained decisions”; “I would say that WebIntegrated helps in navigating through the variety of option”; “Helping improve strategic thinking framework”; “Helping reinforce informal assessment and check for completeness of options being considered”.

The advice generated by the WebIntegrated system was assessed as: “The output is fast and high quality”; “The recommendations definitely make sense given my background and knowledge in the Web/Internet field as well as digital marketing exposure”; “Arguably, the output is clear enough to allow the manager to implement it in the decision process”.

Improvements on the decision-making outcomes were reported to be: “Proving recommendations which directly affects the outcome of my integrated marketing strategy formulation...”; “Supplement overall marketing strategy preparation contents”; “Improving the efficiency of choosing marketing strategy alternatives”.

Enhancement on decision-making performance was observed to be: “A rich collection of contemporary business intelligence factors”; “Partly change the way of thinking”; “Helping ensure your personal
knowledge is up-to-date and help make you aware of new areas for applying marketing initiatives”.

Moreover, the involved managers would like the following extensions or changes to be made: “Hyperlinks to training material & tutorial ‘in-situ’; “A comparison interface which provides useful analysis of my input versus industry specific other companies inputs (factors)...”; “I would think of some more visual interface to help the user to navigate through the system.”; and “The system did not include the public relation factors”.

4. The WebMarP system and managers’ responses

A Web-based hybrid intelligent system, called WebMarP [4], was created and developed by J. Z. Li and S. Li to aid the evaluation of marketing and EC site performance. It consists of the following elements: the user interface; Web databases for storing user data entries and calculated results; an external analytic hierarchy process (AHP) [2] component for doing pairwise comparisons and determining the relative importance of relevant metrics or factors that affect performance; an expert system component with fuzzy rules for evaluating marketing performance, financial performance, social media marketing performance, Web analytic key indicators and EC site performance; and an component for graphical displays of the evaluation results. These elements are integrated and linked together using the inter-communication method [2, 3].

The WebMarP system utilises a strategy that begins with known facts and aims to infer and reach the conclusions implied by the facts or user entries. The chaining control is coded by applying the forward reasoning mechanism. The user-inputted data and personal judgements, pre-programmed “if – then” and fuzzy rules are applied in a data-driven forward thinking way for performance evaluation. The fuzzy rules for evaluating performance as “poor”, “good” or “excellent” with certain degrees of truth are based upon trapezoidal membership functions [2].

In April, May and September of 2012, the WebMarP system was tentatively tested with a general director, marketing director, and creative director at three different companies in London, United Kingdom, using real-world business cases. A data collection research questionnaire was designed on the basis of previous work [3], with a focus on the use of Web-enabled intelligent support for evaluating performance and identifying the areas to improve.

Firstly, support for the process of marketing performance evaluation was reported to be: “Helping to understand the importance and value of various factors ...”; “Helping approach the evaluation in a coherent and organised way”.

The advice generated by WebMarP: “Quite accurate”; “Helps to improve decision process in dis-balanced and high-technology oriented environment”.

The system’s help on improving the outcomes: “By focusing more on the factors that the system recommends especially in the first and second priority columns, I noticed an increase in the effectiveness of my overall marketing strategy and performance measurement”; “Checks you haven’t forgotten anything”.

Extensions or changes suggested by the managers: “Results would be presented with priority areas for important and concrete suggestions for how to achieve better performance in priority areas ... the beginning of an action plan”; “Track marketing performances against company’s objective and long term strategies”.

5 Conclusions and further work

In this paper, we have proposed a general framework for Web-based hybrid models for strategic marketing decision-making. Two software systems built on the basis of this framework are evaluated.

The value of WebIntegrated in support of the planning process is considered as “providing an integrated approach as well as self-contained decisions”. It is perceived to “help reinforce informal assessment and check for completeness of options being considered”. The recommendations produced by the WebIntegrated system is reported to be: “very thorough”, “high quality”, and “definitely making sense given my background and knowledge in the Web/Internet field as well as digital marketing exposure”. Improvements on decision-making outcomes are perceived as: “complementing overall marketing strategy preparation contents”; and “more organised and complete.” The augmentation for decision-making performance is described as: “partly change the way of thinking” and “helping make you aware of new areas for applying marketing initiative”. 

The managers involved in case-based evaluation also constructively suggest such extensions as comparisons across the industries, richer graphs, more navigation help, inclusion of public relation factors, and training material in-situ.

Findings on the use of WebMarP suggest that the system is useful and effective in: helping understand the importance of various factors; helping deal with the performance evaluation problem in an organised way; and helping to identify what focus on. The managers participated in business case-based evaluation also make suggestions on how to extend the system. Typically, functions on tracking, monitoring and comparing marketing performance are expected. Achieving better performance in priority areas is also desirable.

The next stage of this study will address managers’ requirements for functional extensions. More effort will also be undertaken to model and deal with environmental changes. Given the complexity of the dynamic business environments and consumer interaction with digital media, integrated marketing planning will require more effective decision support systems through Web-based delivery combined with integration and hybridisation of conventional decision support techniques, intelligent software agents, Web analytics, and circumstance-sensitive features. Such a solution will be essential for the timely and efficient detection and reaction to contextual changes, and thus provide more effective support for strategic marketing decision-making in the digital age.

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Jim Zheng Li (UK) and Shuliang Li designed and created the WebIntegrated system for advising and formulating traditional, digital, mobile and social media marketing strategies. They also developed the WebMarP system for evaluating marketing, social media and EC site performance. Therefore, both of them own the copyrights of the software products.

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