Measuring the effectiveness of marketing information systems
An empirically validated instrument

Spiros P. Gounaris, George G. Panigyrakis and
Kalliopi C. Chatzipanagiotou

Department of Business Administration,
Athens University of Economics and Business, Athens, Greece

Abstract

Purpose – To design and empirically validate an instrument for measuring the effectiveness of a marketing intelligence system (MkIS).

Design/methodology/approach – A thorough review of the literature of IS in general and MkIS in particular was the foundation for a new conceptualisation of MkIS effectiveness, which was developed into a measuring instrument for experimental application to data collected by a pre-tested postal questionnaire from 254 five-star hotels in Greece.

Findings – Exploratory and confirmatory factor analysis show that the proposed measuring instrument meets acceptable criteria of reliability and validity. The effectiveness of MkIS is found to comprise both internal and external components, related on the one hand to the extent to which the user organization improves functional effectiveness and corporate climate and on the other to its adaptability to market conditions and its customer responsiveness. The instrument is capable of integrating these into a holistic measure.

Research limitations/implications – The single-industry, single-country sample limits the scope for generalization. Future research should address this through replication in different contexts.

Practical implications – A validated measure of the effectiveness of MkIS has important implications for both users and providers. Conceptually, it permits improved understanding of the components of effectiveness. Pragmatically, it provides an assessment of the effectiveness of existing or new systems.

Originality/value – Until now, there has been no empirically validated instrument integrating the several dimensions of MkIS effectiveness.

Keywords Marketing information systems, Measuring instruments, Effectiveness, Hotels, Greece

Paper type Research paper

Introduction

Rapid technological evolution, consumerism and the internationalisation of competition are merely some of the market conditions which result in increased levels of competitive intensity. Dealing with such challenges requires that companies become more adaptive to their market environment (Avlonitis and Gounaris, 1999), and IT-based marketing information systems can help towards this direction (Talvinen, 1995).

The first definition of marketing information systems was offered by Cox and Good (1967), who described them as a set of procedures and methods for planning and presenting information required in taking marketing-related decisions. Though the application of information technology in marketing decision making thus dates from

the 1960s, it was during the 1990s that specific applications were applied to specific marketing tasks: for instance, *marketing case-base reasoning systems* (Burke *et al.*, 1990), *marketing expert systems* (Sisodia, 1992), *marketing decision support systems* (Cassie, 1997) and *marketing management support systems* (Wierenga *et al.*, 1999). The purpose of the earliest such systems was to gather, analyse, evaluate, organize and distribute timely, relevant and accurate information for marketing decision makers. Although specifically relating to marketing decisions, they share their basic principles with any other IT-based information system.

The adoption of a marketing intelligence system (MkIS) has various consequences for the company. Many researchers have discussed its impact on decision making (Cassie, 1997; Wierenga and Ophuis, 1997; Raymond *et al.*, 2001) and the designing of formal marketing plans and programmes (Mayros and Dolan, 1988; O'Brien *et al.*, 1995). Also, in line with the market-orientation research stream, there are compelling arguments to explain how the use of MkIS improves the company's ability to align its outcome according to the conditions of its market (Kitchen and Dawes, 1995; Talvinen and Saarinen, 1995; Colgate, 2000) and to become more effective in determining customer's needs and preferences (Burns and Ross, 1991; Sisodia, 1992; Simmons, 1994; Gaskin, 1994), thereby increasing thus the degree to which the company is market oriented. Finally, there is also good evidence to support a significant correlation between the adoption of MkIS systems and the company's profitability (Storbacka, 1997; Van Bruggen *et al.*, 1998; Colgate, 2000) since they help to reduce operational cost by increasing productivity and the efficiency of employees' and managers' use of their time. The major prerequisite for achieving these benefits is to establish an effective system (Talvinen, 1995). Despite this sustained evolution of MkIS, no unanimous definition of their effectiveness has yet been agreed, nor any valid measure of it.

Having identified this significant gap in the literature, this study set out to contribute to its resolution by examining and empirically validating an instrument to capture the notion of effectiveness in an MkIS. As a first step, it thoroughly reviewed the existing literature. It then moved on to the development of an instrument that was applied empirically in the hotel industry. Accordingly, the remainder of this paper first presents the results of the literature review and puts forward the research propositions that drive the study. The methodology of the study is then discussed, the research data are analysed, and the findings presented. The paper concludes with general discussion, consideration of the study's limitations and suggestions for future research.

Literature review
Although the effectiveness of information systems in general is one of the most extensively researched issues in the literature, scholars have not yet arrived at an agreement on a definition of "effectiveness" and its operationalization (Wierenga *et al.*, 1999). Etymologically, according to the *Oxford English Dictionary*, it is "the power or capacity to produce a desired result". This makes it clear that effectiveness is about outcomes, consequences and results, and represents a synonym for success, since being effective means achieving the outcomes and results initially planned for.

Grover *et al.* (1996) suggest that the notion of information-system effectiveness is a construct comprising such facets as, among many other, efficiency, productivity, internal communication, flexibility, control and information management. However, this apparently straightforward construct is in fact fairly complex, because it is

difficult to systematize the effect of the systems on the entity of the organization and its operations (DeLone and McLean, 1992, 2003; O' Brien *et al.*, 1995; Wierenga *et al.*,1999). This is the probable explanation for the fact that an empirically validated instrument to assess the effectiveness of information systems has yet to be derived.

In dealing with this difficulty, the majority of academic studies remain limited in treating the impact of any system on profitability, sales and market share, as proxy measures of effectiveness (Qing and Plant, 2001; Krishnan and Sriram, 2000; Ryan and Harrison, 2000; Thatcher and Oliver, 2001). Clearly, there is merit in considering financial indicators as evidence of effectiveness, but conceptualizing the notion of system effectiveness also requires consideration of the non-financial aspects (Wierenga *et al.*, 1999), since such systems have important strategic implications (O'Brien *et al.*, 1995) that influence both the company's external and internal environment (Xianzhong, 1999).

Pitt *et al.* (1995) were among the first to consider this aspect of MkIS effectiveness, by focusing on the service quality of the system. In doing so, they conceive the department delivering the system as an internal service provider offering support and solutions to the company's other functional units. Hence, in their view, if the service that this department offers is satisfactory, that would manifest itself as information-system effectiveness. Although this a notable study that moves scholarly enquiry towards a conceptualization of IS effectiveness beyond the financial considerations, it is to be noted that organizations typically have many stakeholders, internal and external, with multiple and conflicting objectives and varying time horizons (Cameron and Whetton, 1983). Thus, it is desirable to consider the impact on both these organizational dimensions on effectiveness (Sääksjärvi and Talvinen, 1993).

With regard to the internal dimension, the two areas of interest are the procedures that the company develops and uses and the climate that characterizes the relationships among its employees. The external dimension, on the other hand, pivots mainly around market performance both in financial and non-financial terms: e.g. market share or customer loyalty.

Internal dimensions of MkIS effectiveness
One of the very first benefits that a company derives from the use of IT-based MkIS is improvements in the reporting system. Information processing becomes faster and the company's management is able to relate pertinent information from different sources within the organization (Van Bruggen *et al.*, 2001). Such information would be almost impossible to bring together in a meaningfully and integrated fashion without the necessary IT infrastructure. The purpose of MkIS applications is to integrate inputs from various organizational functions into a holistic and meaningful map of company's activities, depicting its interactions with suppliers, customers, and so on.

As a result of doing this in a timely fashion, decision making is enhanced by relying more on facts than gut-feeling and intuition (Van Bruggen *et al.*, 1998; Talvinen and Saarinen, 1995). This is a major prerequisite for developing realistic and successful marketing plans (McDonald and Payne, 2005), which in turn affects both the company's marketing planning process and the outcome of this process (Amaravadi *et al.*, 1995; O'Brien *et al.*, 1995). Such improvements in the marketing planning effort have, among many other consequences, a positive direct effect on marketing operations (Baker, 1994). As companies assimilate the IT-based MkIS, they eventually become

capable of transforming marketing intelligence into concrete benefits for their customers (Brady *et al.*, 2002), which in turn allows them to improve their marketing operations. Better forecasting accuracy, coupled with a stronger understanding of customers' needs would allow a bank or a hotel, for instance, to handle customer reception and service-related operations more smoothly and to cope more effectively with peaks and troughs in demand.

Another important aspect of the company's internal strategic capabilities relates to the human factor, and the management of the company's internal relationships. Successful companies differ from less successful ones in their internal climate and the extent to which marketing employees enjoy high levels of job satisfaction. That, in turn, is a function of the job descriptions, personal capacity to comply with job specifications, and inter-personal relationships in the workplace (Garrity and Sanders, 1998).

Research on the impact that MkIS have on a company's human capital is particularly revealing in this respect. Adopting IT-based MkIS can help to improve internal communication between colleagues in the marketing department and other functional units alike, since communication becomes easier and faster (Sääksjärvi and Talvinen, 1993), reducing the scope for conflict between employees and managers. It also grounds decision making in more objective information and data that the system produces. A further important contribution is improvement of job descriptions and the nature of the tasks that marketing employees must accomplish. An efficient IT-based MkIS allows an organization to systematize and, to a greater or lesser extent, automate many of the routine tasks that are part of many jobs (Shaw, 1994; Brady *et al.*, 2002). As a result, employees save time and avoid the execution of routine and tedious tasks (Baker, 1994; Hammer and Mangurian, 1987). Finally, through the integration of pertinent and timely information, such a system allows marketing executives to build a well-defined picture of customer's needs, which in turn allows them to perform better and meet their job requirements, particularly when it comes to such tasks as sales and customer service (Kelley, 1993; Gummesson, 1999).

External dimensions of MkIS effectiveness
The second important benefit of IT-based MkIS is the ability to monitor a company's market environment more effectively, specifically with respect to customer relations, and thus to assist managers and salespeople in meeting their marketing objectives (Speier and Venkatesh, 2002).

In this way, an organization better understands the needs and wants of the customers it targets (Colgate, 2000), which in turn allows it to respond more effectively to their expectations (Nakata and Zhu, 2006). This is because a clear marketing strategy and the necessary intelligence support from IT allows it not simply to monitor transaction but, more importantly, to understand the individual behind the transaction (Davenport *et al.*, 2001). Moreover, decoding consumer behaviour allows the company not only to understand customers' present needs but also to foresee their future needs more clearly. This in turn translates to higher levels of customers' satisfaction and, through that, to gains in market-share.

Equally important is the contribution of MkIS to improving the effectiveness and the efficiency of the marketing and communication efforts (Cassie, 1997; Sääksjärvi and Talvinen, 1993). For instance, the process of developing new products or modifying existing ones can be better aligned with customer needs (Terninko, 1997),

which in turn allows for a higher rate of successful product launches (Cooper *et al.*, 1999) and thereby to increased efficiency of the marketing effort. Similarly, the communication effort also becomes more effective and efficient because the system allows the company to understand consumers' media habits, even at the individual level, permitting enhanced targeting of direct marketing efforts (Baker, 1994) or general marketing communications campaigns. As a result, the company can reduce wastage in media selection or list buying and thereby improve effectiveness and increase the proportion of sales generated through such efforts (Holtz, 1992). The end result from such improvements in the implementation of the marketing strategy is increased company profitability (Colgate, 2000; Van Bruggen *et al.*, 1998).

Interrelationships among internal and external dimensions of MkIS effectiveness
In considering the notion of organizational effectiveness, Quinn and Rohrbaugh (1983) suggest four main factors: stability and employee centricity (internal process dimensions), and flexibility and organizational efficiency (open system dimensions). The prevailing values of the organization condition its priorities, and determine which of the four aspects will be the prevailing one in assessing the degree of effectiveness, since it is difficult for any organization to simultaneously excel under all four headings.

However, a more recent study by Kalliath *et al.* (1999) shows that the expected zero correlation between the open systems and internal process dimensions of effectiveness does not necessarily apply in all circumstances. For instance, under conditions of turbulent, radical change, the company's management becomes proactive in responding to anticipated changes in the environments. As a result, a paradox that arises concerning the coexistence of stability and order (internal process values), since coping with such conditions frequently calls for organizations that are simultaneously stable and dynamic. This possibility that organizations emphasize multiple effectiveness criteria has also found empirical support in the work of Buenger *et al.* (1996).

The situation can be analogous in the implementation of IT-based MkIS, which can potentially change the role of the marketing function radically and help to increase the company's degree of customer orientation (Nakata and Zhu, 2006), enhance its procedures, its customer service and, ultimately, its ability to innovate (Baker, 1994). Implementing such changes requires that the management retains control over the organizational re-engineering that these changes bring about (Sääksjärvi and Talvinen, 1993) while, at the same time, promoting openness and encouraging employees to take initiatives by encouraging decentralized decision making (Kohli and Jaworski, 1990).

MkIS and organizational effectiveness: concurrent validity
Having clarified the relevant dimensions of MkIS effectiveness and their interrelationships, it is important to consider the issue of concurrent validity, given that the overall scope of the study is to derive an empirical instrument for its measurement, and to validate it. Concurrent validity is a primary concern because it captures the extent to which "one measure of a variable can be used to estimate the current score on a different measure of a closely related variable" (Tull and Hawkins, 1987). In this respect, assessing an instrument's degree of concurrent validity requires measurement of its ability to explain a significant amount of the variance in a related variable. In the present study, the most relevant variable appears to be the notion of "organizational effectiveness".

Numerous studies reported in the organizational theory literature have focused on understanding the concept of organizational effectiveness. Among several models seeking to capture the construct of the organizational effectiveness (Etzioni, 1960; Yuchtman and Seashore, 1967; Goodman and Pennings, 1977; Scott, 1977; Cameron, 1981), the one proposed by Quinn and Rohrbaugh (1983) has gained the widest acceptance.

It suggests that organizational effectiveness derives from three factors: the organization's primary focus, its structure and, the means-ends that it pursues. The greatest merit of this "competing values" model is its power to simplify the large number of effectiveness criteria and yet synthesize them in a meaningful manner. According to this model, the three facets of organizational effectiveness, when combined, generate four "dimensions":

(1) the human relations dimension, capturing the organization's ability to manage personnel-related issues;

(2) the internal process dimension, capturing its ability to manage its operations;

(3) the open system dimension, capturing its ability to align itself with the environment in which it operates; and

(4) the rational-goal dimension, capturing its ability to attain its goals and objectives.

Quinn and Rohrbaugh (1983) distinguish the first pair from the second in that they have, respectively, internally and externally orientations.

Methodology
Research objectives
Four research propositions can be derived from the foregoing review of the literature.

The studies reviewed in the sub-section "Internal dimensions of MkIS effectiveness" make it clear that systems have the potential to influence many marketing-related aspects of the company's internal operations, meaning that the effectiveness of the system is a function of its actual ability to yield the potential benefits identified by Wierenga *et al.* (1999). On these grounds, the following research proposition is advanced for investigation:

RP1. Two core dimensions of MkIS effectiveness pertain to the system's impact on procedural improvements and the support of marketing staff.

The sub-section "External dimensions of MkIS effectiveness" identifies a second important aspect of MkIS effectiveness: the extent to which the system contributes to the improvement of the company's external operations. Accordingly, a second research proposition is advanced for investigation:

RP2. Two core dimensions of MkIS effectiveness pertain to the system's impact on the achievement of better customer knowledge and market responsiveness.

The literature reviewed in the sub-section "Interrelationships among internal and external dimensions of MkIS effectiveness" shows that management must maintain control over the necessary organizational re-engineering in response to the changes accompanying implementation of the MkIS while concurrently fostering the organizational openness and decentralized decision making that encourage staff to take initiatives. Thus, a third research proposition is advanced for investigation:

RP3 . The internal and external core dimensions of MkIS effectiveness will be
highly interrelated.

Finally, the sub-section of the review relating to concurrent validity suggests that an
effective MkIS will have an impact on all four aspects of organizational effectiveness.
Hence, any measure for assessing the effectiveness of a MkIS should be able to explain
a significant amount of variation in organizational effectiveness. Consequently, a final
research proposition is advanced for investigation:

RP4. The proposed measure of MkIS effectiveness can explain a significant amount
of the variance in organizational effectiveness.

Confirmation of *RP4* will provide evidence of the proposed measuring instrument's
concurrent validity.

Data collection
The data presented and analyzed here form part of a broader study of five-stars hotels
in Greece, investigating their adoption and use of IT-based MkIS. The sampling frame
thus excludes smaller hotels from the lower star categories, even though they represent
the majority of the industry. Desk research prior to design of the study found that those
hotels made minimal use of MkIS, mainly at the operational level (e.g. accounting and
billing modules), and lacked real integration within their information system.
Moreover, they typically did not maintain an autonomous marketing department but
left marketing as the responsibility of the general manager or, in the case of those with
20 beds or fewer, the owner. The findings reported here thus reflect the practice of a
numerically small but operationally important subset of the sampling universe.

To collect the required data, a detailed questionnaire was developed. For the
purposes of this paper, two variables are of relevance: the measures of organizational
effectiveness and of MkIS effectiveness. For the first, we adapted the measuring
instrument developed by Rohrbaugh (1981), on the basis of feedback from a pilot
study, particularly with regard to the length of the questionnaire and the possibility of
confusion caused by negatively worded statements. The resulting 26 scale items,
addressing four dimensions of organizational effectiveness, are shown in Table I.

Since, the literature does not report a validated instrument for measuring the
effectiveness of MkIS, we had to develop one anew. To do so, we followed the advice of
Churchill (1979, p. 66), by first defining the domain of the construct to be measured on
the basis of relevant work, as reported mainly by Sääksjärvi and Talvinen (1993) and
Wierenga and Ophuis (1997). Having done so, we developed a preliminary pool of 31
items, designed to capture the four facets of the MkIS effectiveness construct identified
in the literature review. Content validity was checked by consultation with an expert
panel of 12 colleagues from marketing or business administration departments in
Greek universities. As a result, six items were dropped, of which three were replaced
by versions following the experts' suggestions. Five of the retained items were
rephrased.

The eventual questionnaire asked 15 questions, relating to four components of
effectiveness. The wording took the form:

	Items	Mean	Std. deviation	Cronbach's α coefficient
Internal process model	My co-workers provide me with good, usable information	5.51	1.169	
	Information given me by others staff members is usually very helpful in my work	5.46	1.227	
	It is easy to give a precise explanation of the goals of our organization	5.52	0.804	0.921
	Members of our organization have a clear understanding of its goals	5.59	1.062	
Human relations model	Our work efforts during the date are well organized	5.37	0.988	
	There is a feeling of staff cohesion and team work	5.66	1.152	
	Employees trust each other	5.41	1.141	
	There is an atmosphere of friendship at work	5.19	0.980	
	There is a feeling of staff cohesion and team work	5.18	1.873	0.825
	Employees possess skills adequate to their assignments	4.52	1.619	
	Members of the staff are well qualified for their jobs	5.13	1.288	
	Staff members have the capacity to do their work	5.68	1.036	
Open system model	The size of our office is steadily increasing	5.12	1.771	
	Each year we have a large staff than the year before	4.48	1.817	
	We have improved our customer satisfaction	5.45	1.989	
	In a crisis we are usually able to get our work done	5.71	1.006	0.944
	We are flexible enough to take on new tasks	5.67	1.490	
	Our responses to emergencies are usually adequate	5.43	1.223	
	We adapt well to new demands on our organization	5.79	1.431	
Rational goal model	The organization makes a better use for its resources	5.74	0.917	
	This organization is highly productive	5.68	1.667	
	The volume of work accomplished is quite large	5.43	1.219	
	The work done in the organization is high caliber	5.42	0.974	0.964
	We have acquired competitive advantage	6.05	1.108	
	We have improved our position in the market	5.04	1.794	
	We have decreased our costs	5.51	1.845	

Source: descriptive statistics and reliability coefficient, adapted from Rohrbaugh (1981)

Table I.
Organizational
effectiveness dimensions

Next, we would like you to consider your company's marketing information system, and use the seven-point scale of agreement to indicate the extent to which you agree or disagree with each of the following statements.

As before, negative wording was avoided. The statements took the form: "The marketing information system helps us to ..." followed by each of the benefits listed in Table II. The response scale provided was anchored by 1 – I totally disagree and 7 – I totally agree.

The modified questionnaire was then pre-tested on 77 marketing managers from the research population, who had agreed to provide assistance in developing it. The results indicated the need for only minor amendments.

Potential respondents were selected form the *ICAP Greek Financial Directory* (2004), published since 1964 by the largest business information and consultancy organization in Greece, a member of the CreditAlliance global network. The directory contains reliable data on more than 20,000 enterprises, covering the entire Greek domain for all sectors of entrepreneurial activity, including hotels. The sampling frame extracted from the directory comprised 780 hotels classified as five-star. Given the manageable number, we decided upon a census rather than a sample. The questionnaire was duly mailed to "the Marketing Manager" at all 780 hotels. Two waves yielded 254 usable questionnaires, a response rate of 35 per cent. Comparison of the responses from the first and second mailings indicated no statistically significant differences in responses, confirming that non-response is not a concern in this study (Armstrong and Overton, 1977)

Data analysis

The objective of the analysis was to select a set of questions that could be used to assess the performance of a MkIS with respect to the identified effectiveness

Scales	Items (as included in the questionnaire) The MkIS helps us to ...	Mean	Std. deviation
Marketing procedural improvement	Improve control of marketing programs	5.87	1.28
	Improve marketing plan activities	5.61	1.07
	Create efficient marketing reporting	5.98	0.76
	Improve decision making	5.85	0.91
Employees support	Develop efficient marketing activities (time saving and lower level of routine work)	5.83	0.88
	Develop better services to the customer	5.97	1.47
	Get better feedback of the market	5.03	0.96
Customer knowledge	Improve our customer's satisfaction	5.65	1.05
	Increase our sales volume	5.86	0.97
	Improve communication between the marketing department personnel	5.60	1.10
	Reduce cost of marketing program	5.92	1.21
Market responsiveness	Acquire valuable knowledge of our customers needs	5.54	1.57
	Launch more quickly new services in the market	5.13	1.81
	Increase sales promotion activities	5.20	1.94
	Improve our marketing research (i.e. online surveys)	4.84	1.91

Table II.
MkIS effectiveness: items used and descriptive statistics

dimensions, more efficiently than heretofore. Thus, in the absence of any relevant empirical measure already available, the first phase of the analysis involved exploratory factor analysis (EFA), to derive a preliminary factorial structure of the measure (Stevens, 1996), and four confirmatory factor analyses (CFAs) to assess the convergent validity and the unidimensionality of the four partial constructs. The total sample was accordingly divided randomly in half; an EFA was run on the first data subset and CFAs on the second.

As Table III shows, the EFA resulted in a four-factor solution, capturing the four core dimensions proposed earlier: procedural improvements, employee support, customer knowledge, and market responsiveness. Items with factor loadings of less than 0.40 were excluded from the analysis. The four-factor solution was found to explain 82.6 per cent of the total variance in the initial variables.

Having produced an acceptable initial solution, the psychometric attributes of the instrument were assessed by CFA. Table IV summarizes the result from the four analyses, showing a very good fit for the data of the partial constructs (Joreskog and Sorbom, 1993; Sharma, 1996).

In order to examine the internal consistency in each effectiveness dimension, the Cronbach's (1951) α coefficient was calculated. Although several other tests of this value are available, this measure is considered to be the most general form of reliability estimation Nunnally (1988) suggest that, for new scales, an α value of 0.6 or better indicates an internally consistent measure. Table III shows that the four core dimensions all exceed that threshold.

However, in empirically validating any measuring instrument, convergent and discriminant validity of the partial constructs are also important issues. Fornell and Larcker (1981) provide a procedure for assessing those properties, which depends on the average variance extracted (AVE) for each of core dimensions examined in the CFA. The results of this procedure in Tables IV and V provide evidence of both convergent validity (AVE > 0.50 in all cases) and discriminant validity (AVE ≥ 1 in all cases). On the basis of these findings, *RP1* and *RP2* can both be accepted.

RP3. suggests that the "internal"; and "external" core dimensions of MkIS effectiveness will be highly interrelated. To examine the extent to which that was so, we performed the confirmatory factor analysis shown in Figure 1.

In this analysis, we consider all four dimensions of MkIS effectiveness simultaneously. Table V summarizes the results from the analysis, and shows that the goodness-of-fit indices do suggest a good fit for the model. More importantly, the correlations between the latent constructs of the MkIS effectiveness are all significant ant particularly strong, supporting *RP3*.

Finally, in order to examine *RP4* and investigate the concurrent validity of the instrument, we examined the relationship between MkIS effectiveness and organizational effectiveness, as shown in Figure 2.

Table VI summarizes the results from this analysis, and shows that the standardized regression weights are significant in all cases. Moreover, the square multiple correlation of 69.8 per cent suggests that MkIS effectiveness explains about 70 per cent of the variance in organizational effectiveness, thus confirming *RP4* and providing evidence of criterion validity for the proposed MkIS effectiveness measuring instrument.

Factors produced by the analysis (varimax method)	Items loading in each factor	Loadings	Cronbach's α coefficients
Factor 1: procedural improvement (explaining 27 percentage of total variance)	Improved marketing effort control	0.89	
	Improved marketing action planning	0.68	
	Improved marketing reporting	0.89	0.835
	Improved marketing decision making	0.68	
Factor 2: employees support (explaining 26 percentage of total variance)	Time saving, lower level of marketing routine work	0.74	
	Improved sales performance and customer service	0.98	0.831
	Improved internal communication	0.66	
Factor 3: customer knowledge (explaining 22 percentage of total variance)	Improved market sensitivity	0.65	
	Improved customer satisfaction	0.59	
	Improved sales	0.59	0.925
	Improved customer knowledge	0.82	
Factor 4: market responsiveness (explaining 7 percentage of total variance)	Marketing programme cost savings	0.71	
	Quickest development of new services in the market	0.75	
	Improved sales promotion activities	0.79	0.937
	Direct and more effective marketing research	0.86	

Notes: Kaiser-Meyer-Olkin measure of sampling adequacy: 0.896, Bartlett's test of sphericity: $\chi^2 = 421,084$ significant 0.000, Total variance explained: 83 per cent

Table III.
Exploratory factor analysis of the MkIS effectiveness scale

MkIS Effectiveness partial constructs	Goodness of fit measures	Standardized regression weights	AVE	Convergent validity
Marketing procedural improvement				
Improved marketing effort control	GFI = 0.99; AGFI = 0.94; CFI = 0.99; RMSEA = 0.02	0.81	0.66	Yes
Improved marketing action planning		0.60		
Improved marketing reporting		0.63		
Improved marketing decision making		0.62		
Employees support				
Time saving, lower level of routine work	GFI = 0.99; AGFI = 0.98; CFI = 0.99; RMSEA = 0.06	0.85	0.70	Yes
Improved sales and customer service		0.68		
Improved internal communication		0.84		
Customer knowledge				
Improved market sensitivity	GFI = 0.98; AGFI = 0.96; CFI = 0.99; RMSEA = 0.01	0.86	0.80	Yes
Improved customer satisfaction		0.85		
Improved sales		0.92		
Improved customer knowledge		0.87		
Market responsiveness				
Marketing programme cost savings	GFI = 0.98; AGFI = 0.92; CFI = 0.99; RMSEA = 0.04	0.81		
Quickest development of new services in the market		0.97		
Improved sales promotion activities		0.93		
Direct and more effective marketing research		0.89	0.82	Yes

Notes: Abbreviations: AVE = average variance extracted = Σ(standard loadings)^2/Σ(standard loadings)^2 + $\Sigma\varepsilon_{ij}$; Conv = convergent validity (AVE > 0.50)

Table IV.
MkIS effectiveness core dimensions: results of four confirmatory factor analyses

Table V.
MkIS effectiveness
instrument: confirmatory
factor analysis

Goodness of fit measures: GFI = 0.913; AGFI = 0.901; CFI = 0.971; RMSEA = 0.076

	Standardized regression weights	AVE	Convergent validity	(Corr)^2	Discriminant validity
Procedural improvements					
Improved marketing efforts control	0.887*				
Improved marketing actions planning	0.957*				
Improved marketing reporting	0.546*				
Improved marketing decision making	0.614*	0.644	Yes	0.467	Yes
Employee support					
Time saving, lower level of marketing routine work	0.797*				
Improved sales work and customer service	0.915*				
Improved internal communication	0.807*	0.658	Yes	0.646	Yes
Customer knowledge					
Improved market sensitivity	0.898*				
Improved customer satisfaction	0.799*				
Improved sales	0.910*				
Improved customer knowledge	0.867*	0.727	Yes	0.547	Yes
Market responsiveness					
Marketing programmes cost savings	0.807*				
Quickest development of new services in the market	0.958*				
Improved sales promotion activities	0.939*				
Direct and more effective marketing research	0.879*	0.734	Yes	0.614	Yes
Marketing procedural improvements ↔ employee support	0.624*				
Marketing procedural improvements ↔ customer knowledge	0.684*				
Marketing procedural improvements ↔ market responsiveness	0.639*				
Employee support ↔ customer knowledge	0.804*				
Employee support ↔ market responsiveness	0.740*				
Customer knowledge ↔ market responsiveness	0.784*				

Notes: Abbreviations: AVE = average variance extracted = Σ(standard loadings)2/Σ(standard loadings)2 + $\Sigma\varepsilon_{ij}$; Conv = convergent validity (AVE > 0.50); Discriminant validity = AVE/(Corr)^2 > 1. (Corr)^2 = highest correlation between the examined factor and the rests of factors; *sig $p = 0.000$
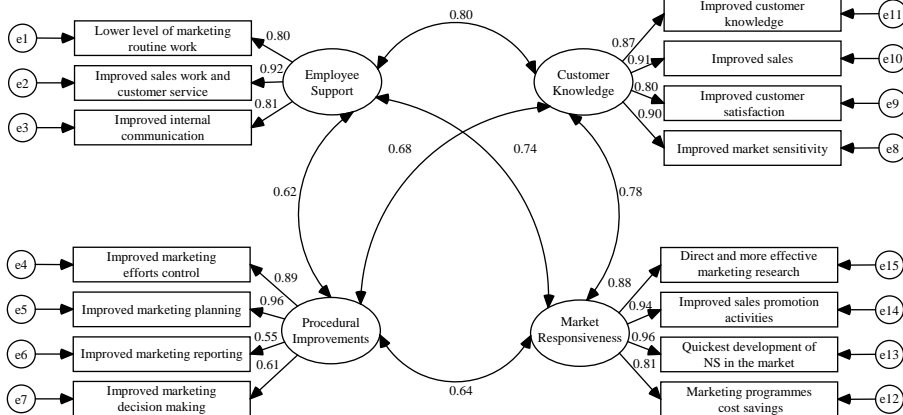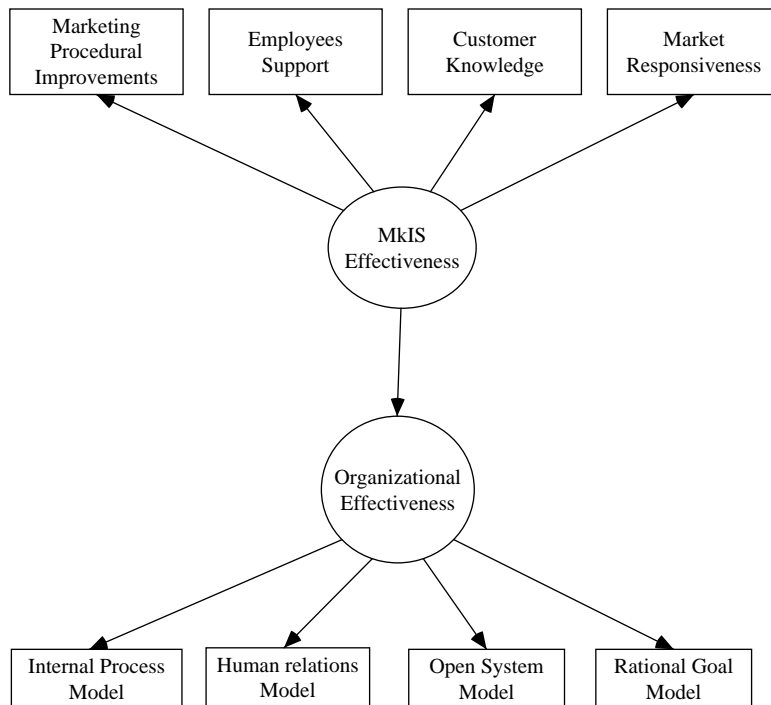
Figure 1.
MkIS effectiveness
measurement model

Figure 2.
The relationship between
MkIS effectiveness and
organizational
effectiveness: concurrent
validity

Discussion

Theoretical implications

As markets become increasingly competitive and volatile, organizations rely more and more for competitive advantage on their ability to understand their markets better, while simultaneously improving their internal operations. As one means to that end, they invest significant resources in developing their IT infrastructure. Assessing the

Goodness of fit measures	GFI = 993; CFI = 978; AGFI = 0.900; RMSEA = 0.06	Standardized regression weights	Squared multiple correlations
MkIS effectiveness → organizational effectiveness		0.836[*]	0.698
Marketing procedural improvements → MkIS effectiveness		0.895[*]	0.845
Employee support → MkIS effectiveness		0.897[*]	0.251
Customer knowledge → MkIS effectiveness		0.928[*]	0.827
Market responsiveness → MkIS effectiveness		0.966[*]	0.869
IPM → organizational effectiveness		0.919[*]	0.800
HRM → organizational effectiveness		0.501[*]	0.804
OSM → organizational effectiveness		0.909[*]	0.861
RGM → organizational effectiveness		0.932[*]	0.890

Note: [*]Sig $p = 0.000$

Table VI.
Goodness of fit measures between MkIS effectiveness and organizational effectiveness

effectiveness of MkIS thereby becomes a crucial issue. However, relevant empirical research remains surprisingly sparse, and its output tends to focus on financial aspects of effectiveness despite calls for the adoption of a more holistic view of the effectiveness of MkIS (Wierenga *et al.*, 1999).

Accordingly, the study reported here adopted an integrated view of the MkIS effectiveness. It tested four research propositions, three addressing the concept of effectiveness itself in this context and the fourth examining the impact that MkIS can have on organizational effectiveness as a whole. The outcomes are an empirically validated instrument for assessing the effectiveness of an organization's MkIS, plus some interesting insights into the very construct of MkIS effectiveness and the interrelations between the various dimensions that comprise it.

With regard to the validation of the proposed instrument, the tests of the first three research propositions provide evidence of the psychometric attributes that a standard validation procedure requires. The implication is twofold: not only can practitioners use a reliable instrument for assessing the effectiveness of a given system but theoreticians can also gain a move towards a structuring of the various core dimensions of MkIS in practice into a single, integrated construct.

This integration explicitly demonstrates the need to consider various elements of effectiveness when measuring the effectiveness of a system. Moreover, it can help explain the benefits to the marketing function of developing and using MkIS strategically and to show those interrelate sequentially. For instance, an effective system can improve an organization's ability to process information in a more timely fashion and from various internal sources (Van Bruggen *et al.*, 2001). This facilitates management decision making (Talvinen and Saarinen,1995), while at the same time allowing marketing staff to derive a clearer picture of customers' needs and expectations, and thereby respond to customers' needs faster and more precisely (Kelley, 1993). The improvement in responsiveness to customers' not only translates into more efficient operations but also reduces the friction between "front-desk" and "back-office" service providers (Gummesson, 1987). Taken together, these findings explain the impact that MkIS can ultimately have in improving employee job satisfaction and thereby the internal corporate climate (Zeithaml and Bitner, 1996),

while at the same time advancing market performance by facilitating responsiveness to customer needs (Colgate, 2000; Hee and Kyenog, 1998).

In addition, our study includes an interesting finding concerning the interrelationships among the distinct dimensions of an MkIS. The confirmation of the third research proposition shows that it can have an impact on both the internal and external environments. Such systems, when effective, deliver stability of internal operations and dynamism in dealing with external market-specific issues. Hence, contrary to the prevailing position that effectiveness generally incorporates contrasting and mutually exclusive dimensions, our study has shown that, when it comes to the effectiveness of such technology-intensive applications, the dimensions in fact operate synergistically in promoting stability and dynamism simultaneously.

Managerial implications

The findings of our study have important implications for marketing managers who implement IT-based systems, and for those who design and supply them. They can help users to approach the specification and effectiveness of their MkIS in a more specific and more holistic manner. Specifically, our findings demonstrate the need to consider both the internal and externally dimensions of effectiveness. They also show that managers contemplating changes, upgrades or new systems need to take into account how those will fit with the present system, so that the overall effectiveness of the system is at least sustained if not improved.

For instance, customer relationship management (CRM) systems can have a positive impact on an organization's ability to target its marketing communications campaigns more effectively at reduced cost, and to improve responsiveness to customer demands. However, middle managers and front-line employees alike may see CRM as a threat or an additional burden in their day-to-day routine (Tornow and Wiley, 1991; Harris and Ogbonna, 2000). Consequently, though externally-oriented effectiveness may improve, the internal climate may deteriorate as a result of tension and friction between departments or across hierarchical levels of management. Our study clearly demonstrates that this does not have to happen, and that management has to take steps to ensure that neither the internal nor the external dimensions of effectiveness will be adversely affected by changes to the MkIS.

A second important implication for users of IT-based MkIS is the strategic importance of such systems. Since, they can potentially have a significant impact on various aspects of overall effectiveness, decisions pertaining to the information infrastructure should be holistic. This means that both users and other functional managers, as appropriate, should be involved in the decision-making process. Management needs to consider how a decision to invest in a certain technology might influence the operations and the priorities of different departments, including those that will not directly use the specific information technology.

Continuing the previous example, the decision to adopt CRM could affect the priorities of the human resources function, since it may be necessary to accompany its implementation with specific staff training in the new customer-oriented philosophy and culture. For that reason, human resources specialists must participate in decisions regarding the adoption of CRM.

There are parallel implications for companies offering IT solutions and services. Comprehension of the strategic impact that IT-based MkIS can have on their

customers' operations will allow them to increase the value of their products and services, and their ability to differentiate their offering from the competition. The imperative is to develop an integrated value proposition, and to be able to explain how it can contribute to the overall competitiveness of a potential customer. For instance, added-value services such as system maintenance or upgrades not only provide technical assistance to the client but also, equally importantly, affect its ability to act promptly and in a customer-focused way, potentially positively.

Limitations of the study and future research directions
Clearly, this study has not been free of limitations. We do not consider that they diminish its contribution significantly, however, because future research can easily tackle them.

Specifically, two issues are a concern. The first is the focus of the study on the hotel industry. While the decision to do so reflects the widespread adoption and application of IT at the top end of this sector, it does limit the generalization of our findings to other sectors. Hence, a first direction for further research is to examine the structure and psychometric properties of the proposed measuring instrument in other sectors. Also, the Greek context of the study may constrain the generalizibility of our findings.

Finally, this study has adopted a subjective assessment of MkIS effectiveness. While there is general evidence for a good correlation between subjective and objective assessment of effectiveness, it would be advisable to replicate the study in other national contexts and different industry sectors, for a clear picture, particularly with respect to the structure of the measuring instrument that we have proposed for the assessment of MkIS effectiveness.

References

Amaravadi, C.S., Samaddar, S. and Dutta, S. (1995), "Intelligent marketing information systems: computerized intelligence for marketing decision making", *Marketing Intelligence & Planning*, Vol. 13 No. 2, pp. 4-13.

Armstrong, S.J. and Overton, T.S. (1977), "Estimating nonresponse bias in mail surveys", *Journal of Marketing Research*, Vol. 14 No. 3, pp. 396-402.

Avlonitis, G.J. and Gounaris, S.P. (1999), "Marketing orientation and its determinants: an empirical analysis", *European Journal of Marketing*, Vol. 33 Nos 11/12, pp. 1003-37.

Baker, M.J. (1994), "Marketing intelligence for intelligent marketing", in Chapman, J. and Holtham, C. (Eds), *IT in Marketing*, Alfred Waller in association with UNICOM, Henley on Thames, pp. 25-39.

Brady, M., Saren, M. and Tzokas, N. (2002), "Integrating information technology into marketing practice – the IT reality of contemporary marketing practice", *Journal of Marketing Management*, Vol. 18 Nos 5/6, pp. 555-77.

Buenger, V., Daft, R.L., Conlon, E.J. and Austin, J. (1996), "Competing values in organizations: contextual influences and structural consequences", *Organization Science*, Vol. 7, pp. 57-576.

Burke, R.R., Rangaswamy, A., Wind, J. and Eliashberg, J. (1990), "A knowledge-based system for advertising design", *Marketing Science*, Vol. 9 No. 3, pp. 212-29.

Burns, D.H. and Ross, E.R. (1991), "Developing data bases", *Bank Management*, Vol. 67 No. 12, pp. 49-51.

Cameron, K. (1981), "Domains of organizational effectiveness in colleges and universities", *Academy of Management Journal*, Vol. 24 No. 1, pp. 25-47.

Cameron, K.S. and Whetton, D.A. (1983), *Organizational Effectiveness: A Comparison of Multiple Models*, Academic Press, New York, NY.

Cassie, C. (1997), "Marketing decision support systems", *Industrial Management & Data Systems*, Vol. 97 Nos 7/8, pp. 293-7.

Churchill, G. (1979), "A paradigm for developing better measures of marketing constructs", *Journal of Marketing Research*, Vol. 16 No. 1, pp. 64-73.

Colgate, M. (2000), "Marketing and marketing information system sophistication in retail banking", *Service Industries Journal*, Vol. 20 No. 1, pp. 139-52.

Cooper, R.G., Scott, E. and Kleinschmidt, E.J. (1999), "New product portfolio management: practices and performance", *Journal of Product Innovation Management*, Vol. 16 No. 4, pp. 333-50.

Cox, D.F. and Good, R.E. (1967), "How to build a marketing information system", *Harvard Business Review*, Vol. 45 No. 3, pp. 145-54.

Cronbach, L.J. (1951), "Coefficient alpha and the internal structure of tests", *Psychometrika*, Vol. 16, pp. 297-334.

Davenport, T.H., Harris, J.G. and Kohli, A.K. (2001), "How do they know their customers so well?", *Sloan Management Review*, Vol. 42 No. 2, pp. 63-73.

DeLone, W.H. and McLean, E.R. (1992), "Information systems success: the quest for the dependent variable", *Information Systems Research*, Vol. 3 No. 1, pp. 60-95.

DeLone, W.H. and McLean, E.R. (2003), "The DeLone and McLean model of information systems success: a ten-year update", *Journal of Management Information Systems*, Vol. 19 No. 4, pp. 9-22.

Etzioni, A. (1960), "Two approaches to organizational analysis: a critique and a suggestion", *Administrative Science Quarterly*, Vol. 5 No. 2, pp. 257-78.

Fornell, C. and Larcker, D.F. (1981), "Evaluating structural equation models with unobservable variables and measurement error", *Journal of Marketing Research*, Vol. 18 No. 1, pp. 39-50.

Garrity, E.J. and Sanders, G.L. (1998), *Information Systems Success Measurement*, Idea Group Publishing, Hershey, PA.

Gaskin, B. (1994), "Using DSS to boost sales and marketing", *CMA, The Management Accounting Magazine*, pp. 13-16.

Goodman, P.S. and Pennings, J.M. (1977), *New Perspectives on Organizational Effectiveness*, Josey-Bass, San Francisco, CA.

Grover, V., Jeong, S.R. and Segars, A.H. (1996), "Information systems effectiveness: the construct space and patterns of application", *Information & Management*, Vol. 31 No. 4, pp. 177-91.

Gummesson, E. (1987), "Lip service – a neglected area in service marketing", *Journal of Services Marketing*, Vol. 1 No. 1, pp. 19-24.

Gummesson, E. (1999), *Total Relationship Marketing: Rethinking Marketing Management: from 4Ps to 30Rs*, Butterworth-Heinemann, Oxford.

Hammer, M. and Mangurian, G.E. (1987), "The changing value of communications technology", *Sloan Management Review*, Winter, pp. 65-71.

Harris, L.C. and Ogbonna, E. (2000), "The responses of front line employees to market-oriented culture change", *European Journal of Marketing*, Vol. 34 Nos 3/4, pp. 318-40.

Hee, C.H. and Kyenog, K.J. (1998), "Determination of information system development priority using quality function development", *Computers & Industrial Engineering*, Vol. 35 Nos 1/2, pp. 241-4.

Holtz, H. (1992), *Data-Based Marketing*, Wiley, New York, NY.

ICAP Greek Financial Directory (2004), "Tourism", *ICAP*, available at: www.icap.com

Joreskog, K.G. and Sorbom, D. (1993), *LISREL 8: Structural Equation Modelling with the Simplis Command Language*, Lawrence Erlbaum Associates, Hillsdale, NJ.

Kalliath, T.J., Bluedorn, A.C. and Gillespie, D.F. (1999), "A confirmatory factor analysis of the competing values instrument", *Educational and Psychological Measurement*, Vol. 59 No. 1, pp. 143-58.

Kelley, S.W. (1993), "Discretion and the service employee", *Journal of Retailing*, Vol. 69 No. 1, pp. 104-26.

Kitchen, P.J. and Dawes, J. (1995), "Marketing information systems in smaller building societies", *International Journal of Bank Marketing*, Vol. 13 No. 8, pp. 3-9.

Kohli, A. and Jaworski, B. (1990), "Market orientation: the construct, research propositions, and managerial implications", *Journal of Marketing*, Vol. 5, pp. 1-18.

Krishnan, G.V. and Sriram, R.S. (2000), "An examination of the effect of IT investments on firm value: the case of Y2K-compliance costs", *Journal of Information Systems*, Vol. 14 No. 2, pp. 95-109.

McDonald, M. and Payne, A. (2005), *Marketing Plans for Service Businesses: A Complete Guide*, 2nd ed., Butterworth-Heinemann, Oxford.

Mayros, V. and Dolan, D.J. (1988), "Hefting the data load: how to design the MkIS that works for you", *Business Marketing*, Vol. 73 No. 3, pp. 47-69.

Nakata, C. and Zhu, Z. (2006), "Information technology and customer orientation: a study of direct, mediated, and interactive linkages", *Journal of Marketing Management*, Vol. 22, pp. 319-54.

Nunnally, J.C. (1988), *Psychometric Theory*, McGraw-Hill, Englewood-Cliffs, NJ.

O'Brien, V.T., Schoenbachler, D.D. and Gordon, G.L. (1995), "Marketing information systems for consumer products companies: a management overview", *Journal of Consumer Marketing*, Vol. 12 No. 5, pp. 16-36.

Pitt, L.F., Watson, R.T. and Kavan, C.B. (1995), "Service quality: a measure of information systems effectiveness", *MIS Quarterly*, Vol. 19 No. 2, pp. 173-87.

Qing, H. and Plant, R. (2001), "An empirical study of the causal relationship between IT investment and firm performance", *Information Resources Management Journal*, Vol. 14 No. 3, pp. 15-27.

Quinn, R.E. and Rohrbaugh, J. (1983), "A spatial model of effectiveness criteria: towards a competing values approach to organizational analysis", *Management Science*, Vol. 29 No. 3, pp. 363-77.

Raymond, L., Julien, P.A. and Ramangalahy, C. (2001), "Technological scanning by small Canadian manufacturers", *Journal of Small Business Management*, Vol. 39 No. 2, pp. 123-38.

Rohrbaugh, J. (1981), "Operationalizing the competing values approach: measuring performance in the employment services", *Public Productivity Review*, Vol. 5 No. 2, pp. 141-59.

Ryan, S.D. and Harrison, D.A. (2000), "Considering social subsystem costs and benefits in information technology investment decisions: a view from the field on anticipated payoffs", *Journal of MIS*, Vol. 16 No. 4, pp. 11-30.

Sääksjärvi, M.V.T. and Talvinen, J.M. (1993), "Integration and effectiveness of marketing information systems", *European Journal of Marketing*, Vol. 27 No. 1, pp. 64-77.

Scott, W.R. (1977), "Effectiveness of organizational effectiveness studies", in Goodman, P.S. and Pennings, J.M. (Eds), *New Perspectives on Organizational Effectiveness*, Josey-Bass Inc, San Francisco, CA, pp. 63-95.

Sharma, S. (1996), *Applied Multivariate Techniques*, Wiley, New York, NY.

Shaw, R. (1994), *How to Transform Marketing trough IT*, Business Intelligence, London.

Simmons, P. (1994), "Measurement and evaluation of IT investments", *Proceedings of the Second International Software Metrics Symposium, London, UK*, pp. 74-83.

Sisodia, R.S. (1992), "Marketing information and decision support systems for services", *The Journal of Services Marketing*, Vol. 6 No. 1, pp. 51-64.

Speier, C. and Venkatesh, V. (2002), "The hidden minefields in the adoption of sales force automation technologies", *Journal of Marketing*, Vol. 66 No. 3, pp. 98-111.

Stevens, J. (1996), *Applied Multivariate Statistics for the Social Sciences*, 3rd ed., Lawrence Erlbaum Associates, Mahwah, NJ.

Storbacka, K. (1997), "Segmentation based on customer profitability retrospective analysis of retail bank customer bases", *Journal of Marketing Management*, Vol. 13 No. 5, pp. 479-92.

Talvinen, J.M. (1995), "Information systems in marketing. Identifying opportunities for new applications", *European Journal of Marketing*, Vol. 29 No. 1, pp. 8-26.

Talvinen, J.M. and Saarinen, T. (1995), "MkIS support for the marketing management process: perceived improvements for marketing management", *Marketing Intelligence & Planning*, Vol. 13 No. 1, pp. 18-27.

Terninko, J. (1997), *Step-by-Step QFD: Customer-driven Product Design*, 2nd ed., CRC Press LLC, Boca Raton, FL.

Thatcher, M.E. and Oliver, J.R. (2001), "The impact of technology investments on a firm's production efficiency, product quality, and productivity", *Journal of MIS*, Vol. 18 No. 2, pp. 17-46.

Tornow, W.W. and Wiley, J.W. (1991), "Service quality and management practices: a look at employee attitudes, customer satisfaction, and bottom-line consequences", *Human Resource Planning*, Vol. 14 No. 2, pp. 105-15.

Tull, D.S. and Hawkins, D.I. (1987), *Marketing Research: Measurement and Method a Text with Cases*, 4th ed., Maxwell Macmillan International, New York, NY.

Van Bruggen, G., Smidts, H. and Wierenga, B. (1998), "Improving decision making by means of a marketing decision support system", *Management Science*, Vol. 44 No. 5, pp. 614-45.

Van Bruggen, G., Smidts, H. and Wierenga, B. (2001), "The powerful triangle of marketing data, managerial judgment, and marketing management support systems", *European Journal of Marketing*, Vol. 35 Nos 7/8, pp. 796-816.

Wierenga, B. and Ophuis, O.P. (1997), "Marketing decision support systems: adoption, use, and satisfaction", *International Journal of Research in Marketing*, Vol. 14 No. 3, pp. 275-90.

Wierenga, B., Van Bruggen, G.H. and Staelin, R. (1999), "The success of marketing management support systems", *Marketing Science*, Vol. 18 No. 3, pp. 196-207.

Xianzhong, M.X. (1999), "The strategic orientation of marketing information systems – an empirical study", *Marketing Intelligence & Planning*, Vol. 17 No. 6, pp. 262-71.

Yuchtman, E. and Seashore, E.S. (1967), "A system resource approach to organizational effectiveness", *American Sociological Review*, Vol. 32, pp. 891-903.

Zeithaml, V.A. and Bitner, M.J. (1996), *Services Marketing*, McGraw-Hill, New York, NY.

www.manaraa.com