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Application of information technology in creative economy: Manufacturing vs. creative industries ☆

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ABSTRACT

The primary purpose of this paper is to review the historical development of the application of IT, its relationships with corporate strategy, and its influence on corporate performance. The secondary purposes are to empirically investigate the above relationships and the differences in these relationships between creative and manufacturing industries and to identify the most powerful IT traits for a firm's success in each industry in Korea. The research findings confirmed that application of IT provides several kinds of competitive advantage such as efficiency, threat, functionality, attack, and integration, and that it significantly contributes to corporate performance. Application of IT plays significant roles in mediating between corporate strategy and performance. The research findings indicate that IT traits of efficiency and integration are the two most powerful competitive advantages for corporations. These research results indicate that corporate strategy is essential in delivering high corporate performance in both creative and manufacturing industries. Firms in creative industries should seriously consider IT traits of efficiency and threat, while firms in manufacturing industries should deeply take IT traits of efficiency and integration into account.

1. Introduction

Information technology (IT) is a critical element for today's business. It supports corporate strategy and consumes a significant amount of a corporate's resources. Worldwide IT spending reached $3.7 trillion in 2011, a jump of almost 8% from the previous year, and is projected to continue to increase (Pearson and Saunders, 2013). However, IT represents a significant investment for any corporation in today's business environment and the results can be disastrous if the IT investment does not support the organization in strategically outperforming its competitors. IT has intrinsic traits that can be utilized differently for different contingencies. For example, one of IT traits, efficiency, is a critical component of the corporate's cost leadership strategy (Sethi and King, 1994). Thus a careful evaluation of relationships among application of IT, corporate strategy, and corporate performance is essential for organizational survival and growth.

The term creative economy first coined by Howkins (2001), has attracted worldwide attention. Creative economy may be defined as a policy that aims to generate new growth through economic operations that promote creativity, knowledge convergence, and advanced scientific technology based on coordinate learning, consequently creating a new market and new jobs. This may be inferred as representing a new paradigm in economic development that has evolved out of the chase-and-imitate economic model followed by most developing countries until now (National Information Society Agency, 2013). According to Howkins (2001), creative economy comprises advertising, architecture, art, crafts, design, fashion, film, music, performing arts, publishing, R&D, software, toys and games, TV and radio, and video games. An examination into noticeable differences in the application of IT in creative and manufacturing

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industries promises to be valuable as the results may better elucidate the nature and characteristics of creative economy.

The primary purpose of this paper is to review historical development of the application of IT, its relationships with corporate strategy, and its influence on corporate performance. The secondary purposes are to empirically investigate the above relationships and the differences in these relationships between creative and manufacturing industries and to identify the most powerful IT traits for a firm's success in each industry in Korea.

2. Theoretical background

2.1. Application of information technology (IT)

As early as the late 1970s, information system (IS) researchers recognized the competitive advantage being gained by some firms as they utilized IT and/or IS innovatively to decrease costs and/or increase revenues. Despite being theoretically premature, Gerstein and Reisman (1982) were the first to examine IT traits. Parsons (1983) published the first research on IT framework and proposed a three-level impact of IT on industry, firm, and strategy levels. McFarlan et al. (1983) introduced a strategic grid model to evaluate the strategic importance of existing and target IS. Later, McFarlan (1984) suggested opportunities to build strategically on Porter's (1980) five competitive forces by utilizing IS.

More sophisticated frameworks have been introduced with the progress in IT research. The customer resource life cycle model was developed by Ives and Learmonth (1984) and the strategic opportunity framework was suggested by Benjamin et al. (1984). Porter and Millar (1985) introduced the value chain analysis model, which became the most cited IT framework. More fundamental and theoretical works that began to appear from 1987 expanded the research framework to include field experiments, mathematical models, empirical studies, and in-depth case studies. Bakos and Treacy (1986) developed a causal model of IT traits. Malone et al. (1987) introduced electronic markets and the electronic hierarchy theory. In-depth case studies were reported by Johnston and Carrico (1988). Bakos (1991) and Barua et al. (1991) developed mathematical models to evaluate the economic aspect of IT investments. A new IT-based radical movement, Business Reengineering (BR), began to emerge in the 1990s. Despite the controversies over whether BR could be classified as IT-based methodology, most IS researchers agreed that BR was an important tool possessing strategic traits of IT (Hammer, 1990; Hammer and Champy, 1993; Davenport and Short, 1990; Davenport, 1993).

With the progress in both academic and management sectors, more systematic and theory-building papers were published. Feeny and Ives (1990) presented a framework for evaluating sustainability based on a competitor's anticipated response time, differences among competitors, and the potential of the application to preempt competitive responses. Bergeron et al. (1991) applied and compared two well-known methodologies (Porter's value chain and Wiseman's strategic thrust) for identifying IS traits from the competitive advantage perspective.

Another stream of research investigated the factors in the development of strategic application of ITs (Krcmar and Lucas, 1991; King and Sabherwal, 1992; Teo and King, 1994; King and Teo, 1996). In contrast, real world strategic application cases were well documented by Clemens and Row (1991a) and Kettinger et al. (1994). Clemens and Row (1991b) maintained that firms seeking competitive advantage through innovative application of IT usually rely upon the unique resource strengths of the innovating firm, rather than upon a competitors' difficulty in duplicating technology, in order to protect and sustain this advantage. Similarly, resource-based analysis was attempted by Mata et al. (1995). Neumann et al. (1992) sought to construct a measure capable of allowing an organization to find its position on the strategic grid by analyzing a small number of measurable organizational and IS variables. Regarding risk issues, McGaughey et al. (1994) maintained that the implementation of IT involves significant risks from both external sources and the technology and process of implementation. The appropriate risk management strategy depends on the nature of the risk and other situational variables that influence the organization's range of choice.

Although the aforementioned research identified and analyzed various IT traits, little comprehensive work has been conducted on measuring the impact of application of IT until the 1990s when Sethi and King (1994) published their landmark article. They firstly introduced empirically tested measures to assess the extent to which IT provides competitive advantage and secondly identified the following seven traits of IT dimensions: primary activity efficiency, support activity efficiency, resource management functionality, resource acquisition functionality, threat, preemptiveness, and synergy. These empirically tested measure of IT traits provide a basis for future IT research to justify, evaluate, and verify IT contributions to organizations.

Research on IT traits and IT competitiveness research have recently emerged. Tanriverdi et al. (2010) studied IT traits and commented on the quest of IS for complex adaptive business. Interestingly, the boundary-spanning role of IT was the main focus of Dewan and Ren's (2011) research, in which they examined the impact of IT on firm risk and return performance. Pavlou and El Sawy (2006) analyzed IT leveraging competence in turbulent environments based on new product development. The strategic value of IT was assessed conceptually and analytically by Oh and Pinsonneault (2007). Dehning et al. (2003) studied the value relevance of transformational IT investments. Wang and Ramiller (2009) focused on learning in IT innovations.

2.2. Alignment with strategy

The first paper relating IS or IT with corporate strategy was published by King (1978), who suggested that management information systems (MIS) strategic planning is the process via which an organization strategy set is converted into an MIS strategy set. This research emphasized the alignment between corporate strategy and MIS strategy. In 1980, Porter's (1980) “competitive strategy” introduced his competitive forces model and suggested three generic strategies, namely overall cost leadership, differentiation, and focus, to successfully defend against five competitive forces: rivals, potential entrants, substitutes, buyers, and suppliers. His book, along with “competitive advantage,” (Porter, 1985) has become the foundation for strategy and IT research.

The alignment between application of IT and corporate strategy has been well documented (Benjamin et al., 1984; Camillus and Lederer, 1985; Bowman et al., 1983; Keen, 1986; Rackoff et al., 1985; Rockart, 1979; Rockart and Scott Morton, 1984; Wiseman and MacMillan, 1984). Despite the considerable research emphasizing the alignment between the application of IT and corporate strategy, cases of misalignment could not be ignored (Floyd and Wooldridge, 1990). Misalignment undermines a firm's strategic position and degrades organizational performance. Warner (1987) used "competitive burden" to describe cases of IT obsolescence. The appropriate strategy today may become inappropriate tomorrow as IT advances provide a continuing source of technological obsolescence (Vitale et al., 1986).

As research on the linkage between strategy and IT progressed in the 1990s, more theoretical and in-depth studies began to emerge. Jarvenpaa and Ives (1990) found that CEOs view IT in significantly different ways across the different industries of banking, publishing, petroleum, and retailing. Implementation issues of IT planning were addressed by Lederer and Sethi (1992). A new line of research in the 1990s was the strategy process approach, as opposed to the traditional "black box" approach. Das et al. (1991) delineated the dimensions of strategic IS planning, by focusing on both content and process issues, and investigated the fit between sets of dimensions and MIS planning and competitive strategy. Prekumar and King presented a more sophisticated description of this issue (Prekumar and King, 1994). They maintained that organizational characteristics may have a significant influence on the quality and effectiveness of the IS planning process.

While earlier academic papers on the strategic implications of IT explicitly adopted a framework recommending that firms adopt a single and simple generic strategy, Clemens and Weber (1994) suggested that IT may enable firms to select from more finely tuned strategic options, which may require them to implement multiple strategies simultaneously. Karami et al. (1996) found that the rank and role of a firm's IT leader must be aligned with the firm's competitive strategy. Reich and Benbasat (1996) described an innovative approach for conceptualizing and measuring the linkage between business and IT objectives and then empirically examined its usefulness. Integration of business and IS planning has been proposed by Teo and King (1996). Lederer and Sethi (1996) found that the fit between IT capabilities and the organizational needs is very critical and that plan implementation remains critical to meeting strategic IS planning objectives. The most comprehensive work on the alignment between strategy and IT was attempted by Chan et al. (1997). They measured business strategic orientation, IS strategic orientation, and the strategic alignment between them. And they investigated their implications for perceived IS effectiveness and business performance through a mail survey of North American financial services and manufacturing firms.

Sabherwal and Chan (2001) studied the alignment between business and IS strategies in terms of prospectors, analyzers, and defenders. Strategic alignment and implementation success were examined by Ravishankar et al. (2011). Chen et al. (2010) comprehensively investigated IS strategy by analyzing concepts, measurements, and implications. The strategic link between IT alignment and organizational agility was examined using the mediation model by Tallon and Pinsonneault (2011). McLaren et al. (2011) attempted to measure the fit between competitive strategies and IS capabilities and suggested a multi-level model. Drnevich and Croson (2013) proposed an integrated theory to explain the linkage between IT and business-level strategy. The influences of competitive environment and digital strategic posture on digital business strategy were examined by Mithas et al. (2013).

2.3. Contribution to performance

IT investments must return value if they are not to be invested elsewhere. Business managers rather than IS specialists decide which activities receive funding, estimate the risk associated with the investment, and develop metrics for evaluating the investment performance. With the fast growth of IT spending top management is wondering whether IT is contributing to corporate performance. CEOs of many companies doubt that their companies are getting the most for their IT investment. CEOs are very concerned about the contribution of IT investment on corporate performance (Weill and Ross, 2009).

Barua et al. (1991) examined competition in markets for electronic services, considering the effects of various factors upon the levels of investment, social welfare, and firm profitability. The principal factors include differential efficiency in the development of IT and levels of customer switching costs. Sethi et al. (1993) carefully examined the ranking criteria and overall effectiveness of the index developed by Computerworld. Organizational strategic and economic performance measures such as sales by employee, return on sales, sales by total assets, return on investment, and market to book value were affected by IT investment measures such as IT budget, revenue percentage, the percentage of IT budget spent on employee training, the number of PCs per employee, and IT value as a percentage of revenue (Mahmood and Mann, 1993). Mukhopadhyay et al. (1995) estimated the EDI-induced dollar benefits of improved information exchanges between Chrysler and its suppliers.

Focusing on result-oriented research, Barua et al. (1995) proposed and tested a new, process-oriented, two-stage methodology for ex post measurement to audit IT impacts on a Strategic Business Unit (SBU) or profit center's performance. Kivijarvi and Saarinen (1995) showed that IS investment is not necessarily related to superior financial performance of the firm in the short term, but is associated with IS maturity, which is in turn related to improved performance. Mitra and Chaya (1996) found that higher IT investments are associated with lower average production costs, lower average total costs, and higher average overhead costs. They found that larger companies spend more on IT as a percentage of their revenues than smaller companies do.

Weill (1992) conducted a 6-year longitudinal study to empirically test the relationship between IT, perceptually categorized by management objectives (i.e., strategic, informational and transactional), and four measures of performance: sales growth, return on assets, and two measures of labor productivity. Through a 13-year longitudinal study, Brown et al. (1995) found that the stock market reacts favorably to announcements that firms are using strategic IS, and that those firms in subsequent years tend to be more productive and more profitable than firms in their respective industries. Kettinger et al. (1994) evaluated longitudinal changes in the

performance measures of 30 firms that have been cited as "classic" cases of strategic use of IT and found that not all of these classic cases can be touted as "sustained winners."

Most studied organizational level measures have converged into two types: profit (Benbasat and Dexter, 1985, 1986; Benbasat et al., 1981; Cron and Sobol, 1983; Ein-dor et al., 1981; Rivard and Huff, 1984; Yap and Walsham, 1986) and several kinds of ratio, such as return on assets, return on investment, cost/benefit ratio, and internal rate of return (Bender, 1986; Kaspar and Cerveny, 1985; Lincoln, 1986; Miller and Doyle, 1987; Turner, 1982; Vasarhelyi, 1981).

2.4. Hypotheses development

The literature review on the alignment with strategy confirms the importance of positive relationship between application of IT and corporate strategy. The competitive advantage gained with IT can only be sustained if application of IT supports specific corporate strategy type or creates strategic opportunity. IT investment can be justified if top management believes that IT traits contribute to organizational performance. Therefore, application of IT that provides competitive advantage or avoids strategic disadvantage improves corporate performance and competitive position (Teo and King, 1994; Jarvenpaa and Ives, 1990; Clemens and Weber, 1994; Lederer and Sethi, 1996; Chan et al., 1997; Sabherwal and Chan, 2001; Ravishankar et al., 2011; Tallon and Pinsonneault, 2011; McLaren et al., 2011; Drnevich and Croson, 2013; Mithas et al., 2013; Weill and Ross, 2009; Mahmood and Mann, 1993; Mitra and Chaya, 1996). The following three hypotheses are therefore proposed.

Hypothesis 1. Corporate strategy type has a direct relationship with application of IT.

Hypothesis 2. Application of IT has direct effects on corporate performance.

Hypothesis 3. Corporate strategy type indirectly affects corporate performance through its effects on application of IT.

The first two hypotheses suggest direct associations between corporate strategy type and application of IT, as well as between application of IT and corporate performance. The rationale for these two hypotheses has been well documented. The third hypothesis extends prior research by exploring the relationships among corporate strategy type, application of IT, and corporate performance. It is the author's contention that strategy well aligned with application of IT can afford additional positive effects on corporate performance. However, if application of IT is inappropriate to corporate strategy type, the indirect effects on performance may be negative despite the direct effects being positive. Therefore, Hypothesis 3 is concerned with the effects of the strategy — application of IT alignment on corporate performance.

Howkins (2001) maintains that creative industries originating in individual creativity, skill and talent have the potential for wealth and job creation through the generation and exploitation of intellectual property. Following from the recognition that IT is the main driving force for creative economy (National Information Society Agency, 2013), firms in creative industries will utilize IT more creatively and innovatively to maximize the potential for creative economy, which leads to the following hypothesis.

Hypothesis 4. Firms in creative industries show stronger relationships among application of IT, corporate strategy type, and corporate performance.

3. Research methodology

3.1. Sample

Since this study concerns the relationships among corporate strategy, application of IT, and performance, the analysis is conducted at the organizational level. Therefore, Chief Information Officers (CIOs) of corporations were target respondents. Over 1200 manufacturing companies were identified with the help of the Chamber of Commerce. For the sake of convenience, manufacturing firms in the metropolitan area of Seoul were targeted. This pre-screen sampling process produced a sample of 550 firms. After firms with large fluctuations in sales or profits due to mergers and acquisitions, and recently established companies were eliminated to avoid contaminating the sample, 425 manufacturing firms were designated as the target sample.

Debate has continued over which industries belong to creative economy. Howkins (2001) suggests advertising, architecture, art, crafts, design, fashion, film, music, performing arts, publishing, R&D, software, toys and games, TV and radio, and video games as creative industries. In 2006, the Department of Culture, Media, and Sport of the British Government listed 12 creative industries: advertising, architecture, arts and antique markets, crafts, design, designer fashion, film, video and photography, software, computer games and electronic publishing, music and the visual and performing arts, publishing, television, radio (DCMS, 2006). This study adopts their standard since the list is the most recent and authoritative.

Nine hundred and eighty companies in creative industries were identified with the help of the Chamber of Commerce. The same pre-screen sampling process of manufacturing industries was applied and 396 firms in creative industries were designated as the target sample.

3.2. Data collection

A preliminary version of the questionnaire was pilot-tested for accuracy and reliability with three target respondents. Each respondent reviewed the questionnaire in the presence of the researcher and provided feedback regarding the wording, understandability, and applicability of the instrument. As described in the next section, several modifications were made. The original questionnaire utilized a 7-point Likert type scale, but the respondents in the pilot-test expressed a preference for a 5-point scale because they tended to avoid the extremes. Thus, a 5-point Likert type scale was adopted for the study.

The questionnaire was administered to CIOs in the 425 manufacturing companies and the 396 companies in creative industries in the fall of 2013. To increase the response rate, phone calls were made to the CIOs to solicit participation before the actual questionnaire mailing. Two weeks after the mailing,

phone calls were again made to those CIOs who had not responded. Questionnaires were remailed where necessary. Out of 425 questionnaires for the manufacturing companies, 191 were returned and 8 were unusable. The final response rate was 43.06% (183 out of 425). For creative industries, 197 questionnaires were collected and 10 were unusable. The final response rate was 47.22% (187 out of 396). A demographic analysis did not reveal any significance to suspect the sample bias.

3.3. Measures

3.3.1. Corporate strategy

This paper adopted Dess and Davis' (1984) competitive strategy measures based on Porter's (1980) three generic strategy types. Dess and Davis' (1984) original instrument consists of 19 items. The preliminary version of the questionnaire contained all 19 items, but pilot test revealed considerable problems. Some items did not fit the Korean setting and others did not have enough differentiating power for the three generic strategy types. The final survey consisted of the 10 most discriminating items: five for overall cost leadership and five for differentiation (See Table 1).

3.3.2. Application of information technology (IT)

To operationalize application of IT, Sethi and King's (1994) methodology was adopted. They developed and tested seven IT traits to measure application of IT. Out of their seven traits with 45 items, primary activity and secondary activity efficiency were consolidated into efficiency, and resource management and resource acquisition functionality were combined into functionality for the sake of parsimony and following the pilot-test results. Another 18 items were discarded due to low discriminating power. Attack and integration were used instead of preemtiveness and synergy as they seemed to be more understandable to the respondents. Consequently, 27 items were utilized to measure five IT traits: 7 items for efficiency, 6 for threat, 6 for functionality, 4 for attack, and 4 for integration (refer to Table 2).

3.3.3. Performance

Organizational performance is a multi-faced construct that defies measurement by a single item and that therefore warrants further research (Delone and McLean, 1992). Organization level measures tend to be either profit or ratio. In this study, profit growth rate was used based on two considerations. First, profitability is the most frequently used measure in the field of strategy. Second, it is the measure top management pays most attention to.

Table 1
Measures for corporate strategy.

Strategy	Overall cost leadership	Differentiation
Items	Operating efficiency Product quality control Developing/refining existing products Reputation within industry Innovation in manufacturing processes	Brand identification Innovation in marketing techniques Control of channels of distribution Advertising Forecasting market growth

Table 2
Measures for application of information technology.

Traits	Items
Efficiency	–Cost of receiving, storing, and disseminating inputs to the product –Cost of transforming inputs to the final product, –Cost of collecting, storing, and distributing the final product to customers, –Cost of providing service to maintain and enhance the value of the product, –Cost of recruiting, hiring, training, development, and compensation of personnel –Cost of general management activities, e.g., planning, finance, accounting, legal, –Cost of coordinating different activities described above, such as purchasing, sales
Functionality	–Order or put in a request for the resource –Verify that the resource meets specifications –Monitor the use of the resource, i.e., keep the track of the utilization of the resource –Upgrade the resource if necessary, i.e., add to the resource –Transfer or dispose of the resource –Evaluate the overall effectiveness or usefulness of the resource
Threat	–Costs your company would incur if it changed to alternate suppliers –Company's ability to evaluate various suppliers and choose the most appropriate supplier –Company's ability to threaten vertical integration –Company's ability to evaluate various customers and choose the most appropriate customer –Costs which customers would incur if they change to alternate suppliers –Customer's cost of locating alternate supplier
Attack	–The system provides unique access to channels such as brokers, distributors, or retailers –The system's market positioning is such that competitors are forced to adopt less favorable postures. –The system is protected from imitation by institutional barriers such as patents, copyrights, and trade secrets –The system has influenced the development of technical standards and practices in the industry
Integration	–The system is aligned with your organization's business strategy –The system is aligned with your company's marketing policies and practices –Your firm has technical expertise in the area of the system –Top management is involved in and supports the system –Your firm has the capability to continuously innovate and enhance the system

3.4. Reliability and validity

Reliability refers to the stability of measures over a variety of conditions (Nunally, 1978). The amount of error induced by any measure is determined by Cronbach's alpha applied to inter-item scores and to overall measures. The results of this reliability test on corporate strategy types and measures of IT traits are shown in Table 3. Brown (1983) recommends the minimum value of 0.80 for tests measuring attitudes or values. Nunally (1978) argues that the satisfactory level of exploratory study is 0.7 or above. Cronbach's alphas are on the 4th column of Table 3 and all variables meet Nunally's standard and come close to Brown's recommendation. Therefore, the reliability of measures was considered satisfactory.

To test the validity of the measures, factor analysis was performed. Factor analysis revealed low loading for one item in overall cost leadership strategy (developing/refining existing

Table 3
Descriptive Statistics and Pearson Correlation Coefficients.

	Average	Std. dev	Cronbach's α	Cost	Differentiation	Efficiency	Functionality	Integration	Threat	Attack
Cost leadership	3.759	0.590	0.832							
Differentiation	4.156	0.589	0.791	0.087						
Efficiency	3.533	0.588	0.778	0.497**	−0.237*					
Functionality	3.911	0.540	0.832	0.451**	0.021	0.376**				
Integration	3.855	0.454	0.853	0.440**	−0.056	0.226**	0.243**			
Threat	3.507	0.477	0.849	0.165**	0.275**	0.037	0.363**	0.161**		
Attack	3.812	0.468	0.820	0.460**	−0.009	0.264**	0.245**	0.168**	0.168**	
Performance	1.807	0.754	N/A	0.449**	0.280**	0.299**	0.379**	0.237**	0.316**	0.273**

1. N = 370.
2. * and ** denote the 0.05 and 0.01 levels of significance, respectively.

products) and one item in differentiation strategy (forecasting market growth). Therefore, these two items were excluded from future analyses. Also one item (costs your company would incur if it changed to alternate suppliers) in threat IT traits had low loading and were excluded. No extreme cases were detected due to preliminary screening in the sample selection procedure.

4. Research results

4.1. Hypotheses testing

Hypothesis 1 postulates a direct relationship between corporate strategy type and application of IT. The correlation coefficients in column 4 of Table 3 revealed some meaningful relationships. Cost leadership strategy had statistically significant relationships with all five IT traits while differentiation strategy was strongly associated with efficiency and threat IT traits. Therefore, Hypothesis 1 was generally supported. As predicted in Hypothesis 2, application of IT had a strong association with performance (Table 3). All five IT traits showed a statistically significant relationship with profit growth. Thus, Hypothesis 2 was strongly supported.

As Table 4 shows, the sample was divided into two subgroups by each IT trait. Subgroups were categorized by the scores on each of the five IT traits. For example, firms that recorded high scores on efficiency items of the questionnaire were classified as S subgroup (showing strong characteristic of efficiency) whereas firms showing the opposite characteristics were classified as W subgroup (showing weak characteristic of efficiency). This categorization was conducted to eliminate the effect of IT traits on strategy–performance relationship and investigate the indirect effect of IT traits on this relationship. Of the ten combinations for strategy types and performance relationships (two strategy types by five IT traits), seven strategy–performance associations were stronger in the S subgroup than in the W subgroup.

In the case of cost leadership strategy, four out of 5 combinations showed that strategy–performance associations were stronger in the S subgroup than in the W subgroup. Only the efficiency IT trait showed that the association between the two subgroups was statistically different at the significance level of 0.05. This analysis was done by Fisher's Z transformation, which tests the difference of association between the two samples. In case of differentiation strategy, three out of 5 combinations showed that strategy–performance associations were stronger in the S subgroup than in the W subgroup. The threat IT trait showed that the association between the two subgroups was statistically different at the significance level of 0.05. The S subgroup showed much higher association with corporate performance than did the W Subgroup for each IT. Four of 5 IT traits showed statistically significant differences, as indicated in Table 4. This implies that IT offers considerable competitive advantages. All statistics reported significant performance differences between the two subgroups. Therefore, Hypothesis 3 was generally supported.

To test Hypothesis 4, the sample was split into two groups: manufacturing and creative. Correlation analysis was performed for each group and the results are summarized in Table 5. On the relationship between corporate strategy and application of IT, both creative and manufacturing industries showed little difference except attack and integration IT traits. Attack had stronger associations with corporate strategy types in creative industries while integration had tighter associations with corporate strategy types in manufacturing industries. On the relationship between application of IT and corporate performance, again neither industry showed statistically significant differences. Thus Hypothesis 4 was partially supported.

Table 4
Pearson correlation of strategy with performance for subgroups.

	Traits of information technology									
	Efficiency		Functionality		Integration		Threat		Attack	
	S	W	S	W	S	W	S	W	S	W
Cost leadership	0.665**	.259** %%	0.383**	0.439**	0.442**	0.395**	0.131	0.111	0.441**	0.436**
Differentiation	−0.272**	−0.320**	−0.003	−0.014	−0.067	−0.127	0.183**	0.315** %	−0.049	−0.045
Performance	0.392**	0.134%%	0.272**	0.228**	0.325**	0.075%%	0.364**	0.235** %	0.304**	0.189* %

1. S denotes subgroup showing strong characteristics of IT traits while W denotes the opposite.
2. * and ** denote that correlation coefficients are significant at 0.05 and 0.01 levels.
3. % and %% indicate two subgroups that are significantly different at 0.05 and 0.01 levels based on Fisher's Z-transformation.

Table 5
Descriptive Statistics and Pearson Correlation Coefficients by Industries.

	Average	Std. dev	Cost	Differentiation	Efficiency	Functionality	Integration	Threat	Attack
Creative									
Cost leadership	3.773	0.598							
Differentiation	4.137	0.610	0.065						
Efficiency	3.535	0.707	0.467**	−0.283**					
Functionality	3.931	0.528	0.424**	0.026	0.285**				
Integration	3.862	0.477	0.282**	−0.185**	0.161*	0.314**			
Threat	3.529	0.480	0.152*	0.309**	−0.021	0.351**	0.229**		
Attack	3.869	0.440	0.662**%%	0.074%%	0.277**	0.069	0.147*	0.052	
Performance	1.808	0.629	0.456**	0.255**	0.260**	0.395**	0.236**	0.368**	0.268**
Manufacturing									
Cost leadership	3.745	0.582							
Differentiation	4.177	0.567	0.114						
Efficiency	3.532	0.569	0.531**	−0.183**					
Functionality	3.891	0.552	0.478**	0.019	0.473**				
Integration	3.847	0.430	0.624** %%	0.103%%	0.306**	0.165*			
Threat	3.485	0.475	0.177**	0.241**	0.101	0.373**	0.081		
Attack	3.755	0.489	0.271**	−0.083	0.257**	0.395**	0.190**	0.269**	
Performance	1.806	0.754	0.447**	0.280**	0.339**	0.368**	0.243**	0.274**	0.281**

1. N = 187 for creative and N = 183 for manufacturing.
2. * and ** denote the 0.05 and 0.01 levels of significance, respectively.
3. % and %% indicate that two subgroups are significantly different at 0.05 and 0.01 levels based on Fisher's Z-transformation.

5. Discussions

The findings leave little doubt that application of IT provides some competitive advantages. All five IT traits significantly contributed to corporate performance and affected the linkage between corporate strategy and performance. This supports a conclusion that Korean firms in both creative and manufacturing industries show considerable success in exploiting IT to enhance corporate performance. This finding is consistent with the fact that business is becoming increasingly concerned with vertical integration, logistics, distribution, channel control, patents, and trade (Cash et al., 1992; Harmon, 1993; Robeson and Copacino, 1984).

To analyze the explanatory power of corporate strategy types and IT traits on performance, regression analysis was performed (refer to Table 6). As Table 6 shows, strategy types and application of IT in total had a very significant explanatory power on performance. Cost leadership strategy, differentiation strategy, efficiency, functionality, and threat were statistically significant at the 0.01 level in explaining corporate performance. This result coincides with the result of correlation analysis shown in Table 3. Therefore, firms should devise appropriate strategy types and apply IT traits that support their chosen strategy types. Variance Inflation Factor (VIF) analysis revealed the absence of any multi-collinearity.

Table 6
Regression analysis on performance.

	Performance			
	Coefficient	t-Value	p-Value	VIF
Cost leadership	0.232	3.186	0.002	5.746
Differentiation	0.297	5.289	0.000	3.765
Efficiency	0.202	3.212	0.001	2.045
Functionality	0.178	2.652	0.008	2.897
Integration	0.089	1.198	0.232	3.229
Threat	0.197	2.781	0.006	4.904
Attack	0.108	1.500	0.135	6.122
R-square	33.59%			
F-statistics	26.162			
Pr<F	0.000			

As expected, cost leadership strategy had strong associations with all five IT traits. Surprisingly, however, differentiation strategy had weak associations with all IT traits except threat. This finding opposed those present in the literature suggestive of an essential alignment between application of IT and corporate strategy. One plausible explanation may lie in the research setting. Even though the strategic impact of IT on corporate strategy is well acknowledged by Korean top management, it is believed that the role of IT or strategic value of IT is not well considered in the actual strategy formulation process in most of Korean firms. Furthermore, since Korean firms long have been focused on cost leadership rather than differentiation (Sung, 1995), companies may overlook strategic opportunities of differentiation provided by IT and, therefore, the effect of IT traits on differentiation strategy has not been fully realized.

To further analyze whether there are differences of explanatory power of corporate strategy and application of IT on corporate performance in creative and manufacturing industries, two separate regression analyses were performed: one for creative and another for manufacturing industries.

As Table 7 shows, corporate strategy types and application of IT in total had very significant explanatory power (36.44% and 33.49%, respectively) for corporate performance in both creative and manufacturing industries. Creative industries showed slightly higher explanatory power than manufacturing industries did. In creative industries, cost leadership and differentiation strategies as well as IT traits of efficiency and threat were statistically significant at the alpha level of 0.05 in explaining corporate performance. Functionality was statistically significant at the alpha level of 0.10. In manufacturing industries, cost leadership and differentiation strategies as well as IT traits of efficiency and integration were statistically significant at the alpha level of 0.05 in explaining corporate performance. These research results demonstrated the importance of corporate

Table 7
Regression analysis on performance by creative and manufacturing industries.

	Creative			Manufacturing		
	Coefficient	t-Value	p-Value	Coefficient	t-Value	p-Value
Cost leadership	0.254	2.446	0.015	0.334	2.681	0.008
Differentiation	0.247	3.446	0.001	0.375	4.170	0.000
Efficiency	0.165	2.193	0.030	0.252	2.390	0.018
Functionality	0.170	1.918	0.057	0.095	0.846	0.399
Integration	0.128	1.442	0.151	0.226	2.110	0.036
Threat	0.245	2.716	0.007	0.127	1.146	0.253
Attack	0.017	0.144	0.886	−0.089	−0.626	0.532
R-square	36.44%			33.49%		
F-statistics	14.663			12.588		
Pr<F	0.0000			0.0000		

strategy in delivering high level of corporate performance in both creative and manufacturing industries. Firms in creative industries should consider IT traits of efficiency and threat more seriously, while firms in manufacturing industries should deeply take IT traits of efficiency and integration into account.

6. Conclusion

The primary purpose of this paper is to review historical development of the application of IT, its relationships with corporate strategy, and its influence on corporate performance. The secondary purposes are to empirically investigate the above relationships and the differences in these relationships between creative and manufacturing industries and to identify the most powerful IT traits for a firm's success in each industry in Korea.

The research findings confirmed that application of IT provides several kinds of competitive advantage such as efficiency, threat, functionality, attack, and integration, and that it significantly contributes to corporate performance. Application of IT plays significant roles in mediating between corporate strategy and performance. The research findings indicate that IT traits of efficiency and integration are the two most powerful competitive advantages for corporations. Corporate strategy types have indirect effects on corporate performance through application of IT. Cost leadership strategy shows a stronger association with application of IT than differentiation strategy does. Korean top managers may not sufficiently value the strategic role or potential of IT for it to be considered in corporate strategy formulation. These research results indicate that corporate strategy is essential in delivering high corporate performance in both creative and manufacturing industries. Firms in creative industries should seriously consider IT traits of efficiency and threat, while firms in manufacturing industries should deeply take IT traits of efficiency and integration into account.

This research suffered several limitations. First, the research setting was limited. The restriction to the metropolitan area of Seoul may have inhibited the generalization of the study findings. Furthermore, controversy has raged over the true definition of a creative industry. Depending upon the definition of creative economy industries, the research results may vary considerably, thereby restricting the generalizability of the research findings. Second, this study excluded the "focus" strategy. Even though this exclusion was necessary due to its low differentiating power, this omission may have distorted the research findings. Third, profit growth rate may not adequately represent corporate performance. Furthermore, the time lag between corporate strategy/application of IT and actual realization on corporate performance was not considered. As Delone and McLean (Dess and Davis, 1984) pointed out, organizational level performance measures need to be refined.

This research can be extended in several directions. One suggestion for future study is to replicate this research with a larger population setting, including a variety of industries, to consider environmental uncertainty which necessitates the strategic effort of top managers. The second research direction is to comprehensively examine several strategy types and investigate the relationship between corporate strategy and IT traits in details. Although the MIS literature emphasizes the alignment between corporate strategy and application of IT, few empirical measures examining this alignment have been reported. The third direction concerns the dependent variable. In the Theoretical background section, the author cites Keen's (1980) concern. More reliable and valid organizational level performance measures should be devised and empirically tested. Finally, there is no substitute for painstaking longitudinal analysis to explore the dynamic relationship among corporate strategy, application of IT, and performance.

References

Bakos, Y., 1991. A strategic analysis of electronic marketplaces. MIS Q. 15 (3), 295–312.
Bakos, Y.J., Treacy, M.E., 1986. Information technology and corporate strategy: a research perspective. MIS Q. 10 (2), 107–119.
Barua, A., Kriebel, C.H., Mukhopadhyay, T., 1991. An economic analysis of strategic information technology investments. MIS Q. 15 (3), 313–331.
Barua, A., Kriebel, C.H., Mukhopadhyay, T., 1995. Information technologies and business value: an analytic and empirical investigation. Inf. Syst. Res. 6 (1), 3–23.
Benbasat, I., Dexter, A., 1985. An experimental evaluation of graphical and color-enhanced information presentation. Manag. Sci. 31 (1), 1348–1364.
Benbasat, I., Dexter, A., 1986. An investigation of the effectiveness of color and graphical information presentation under varying time constraints. MIS Q. 10 (1), 59–83.
Benbasat, I., Dexter, A., Masulis, P., 1981. An experimental study of the human/computer interface. Commun. ACM 24 (11), 752–762.
Bender, D.H., 1986. Financial impact of information processing. J. Manag. Inf. Syst. 3 (2), 22–32.
Benjamin, R.I., Rockart, J.F., Scott Morton, M.S., Wyman, J., 1984. Information technology: a strategic opportunity. Sloan Manag. Rev. 25 (3), 3–10.
Bergeron, F., Beteau, C., Raymond, L., 1991. Identification of strategic information systems opportunities: applying and comparing two methodologies. MIS Q. 15 (1), 89–103.

Bowman, B., Davis, G.B., Wetherbe, J., 1983. Three stage of MIS planning. Inf. Manag. 6 (1), 11–25.
Brown, F.G., 1983. Principles of Educational and Psychological Testing. Holt, Rinehart & Winston, New York.
Brown, R.M., Gatian, A.W., Hicks, J.O., 1995. Strategic information systems and financial performance. J. Manag. Inf. Syst. 11 (4), 215–248.
Camillus, J.C., Lederer, A.L., 1985. Corporate strategy and the design of computerized information systems. Sloan Manag. Rev. 26 (3), 35–42.
Cash, J.I., McFarlan, F.W., McKenney, J.L., Applegate, L.M., 1992. Corporate Information Systems Management: Text and Cases. IRWIN, Homewood, IL.
Chan, Y.E., Huff, S., Barclay, D.W., Copeland, D.G., 1997. Business strategic orientation, information systems strategic orientation, and strategic alignment. Inf. Syst. Res. 8 (2), 125–150.
Chen, D.Q., Mocker, M., Preston, D.S., Teubner, A., 2010. Information systems strategy: reconceptualization, measurement, and implications. MIS Q. 34 (2), 233–259.
Clemens, E.K., Row, Michael C., 1991a. Information technology at Rosenbluth Travel: competitive advantage in a rapidly growing global service industry. J. Manag. Inf. Syst. 8 (2), 53–80.
Clemens, E.K., Row, Michael C., 1991b. Sustaining IT advantage: the role of structural differences. MIS Q. 15 (3), 275–294.
Clemens, Eric K., Weber, B.W., 1994. Segmentation, differentiation, and flexible pricing: experiences with information technology and segment-tailored strategies. J. Manag. Inf. Syst. 11 (2), 9–36.
Cron, W.L., Sobol, M.G., 1983. The relationship between computerization and performance: a strategy for maximizing economic benefits of computerization. Inf. Manag. 6, 171–181.
Das, S.R., Zahra, S.A., Warkentin, M.E., 1991. Integrating the content and process of strategic MIS planning with corporate strategy. Decis. Sci. 22, 953–984.
Davenport, T.H., 1993. Process Innovations. Harvard Business School Press.
Davenport, T.H., Short, J.E., 1990. The new industrial engineering: information technology and business process redesign. Sloan Manag. Rev. 31 (4), 11–27.
DCMS, 2006. Creative Industries Statistical Estimates Statistical Bulletin. Department of Culture, Media and Sport, London, UK.
Dehning, B., Richardson, V.J., Zmud, R.W., 2003. The value relevance of announcements of transformational information technology investments. MIS Q. 27 (4), 637–656.
Delone, W.H., McLean, E.R., 1992. Information systems success: the quest for the dependent variable. Inf. Syst. Res. 3 (1), 60–95.
Dess, G., Davis, P.S., 1984. Porter's (1980) generic strategies as determinants of strategic group membership and organizational performance. Acad. Manag. J. 27 (3), 467–488.
Dewan, S., Ren, F., 2011. Information technology and firm boundaries: impact on firm risk and return performance. Inf. Syst. Res. 22 (2), 369–388.
Drnevich, P.L., Croson, D.C., 2013. Information technology and business-level strategy: toward an integrated theoretical perspective. MIS Q. 37 (2), 483–509.
Ein-dor, P., Segev, E., Steinfeld, A., 1981. Use of management information systems: an experimental study. Proceedings of the 2nd International Conference on, Information Systems, pp. 215–228.
Feeny, D.F., Ives, B., 1990. In search of sustainability: reaping long-term advantage from investments in information technology. J. Manag. Inf. Syst. 7 (1), 27–46.
Floyd, S.W., Wooldridge, B., 1990. Path analysis of the relationship between competitive strategy, information technology, and financial performance. J. Manag. Inf. Syst. 7 (1), 47–64.
Gerstein, M., Reisman, H., 1982. Creating competitive advantage with computer technology. J. Bus. Strateg. 16 (1), 53–60.
Hammer, M., 1990. Reengineering work: don't automate, obliterate. Harv. Bus. Rev. 104–112 (July–August).
Hammer, M., Champy, J., 1993. Reengineering the Corporation. Harper Business.
Harmon, R.L., 1993. Reinventing the Warehouse. The Free Press.
Howkins, John, 2001. The Creative Economy: How People Make Money From Ideas. Penguin.
Ives, B., Learmonth, G.P., 1984. The information systems as a competitive weapon. Commun. ACM 27 (12), 1193–1201.
Jarvenpaa, S.L., Ives, N., 1990. Information technology and corporate strategy. Inf. Syst. Res. 1 (4), 351–415.
Johnston, H.R., Carrico, S.R., 1988. Developing capabilities to use information strategically. MIS Q. 12 (1), 37–48.
Karami, J., Gupta, Y.P., Somers, T.M., 1996. The congruence between a firm's competitive strategy and information technology leader's rank and role. J. Manag. Inf. Syst. 13 (1), 63–88.
Kaspar, G.M., Cerveny, P., 1985. A laboratory study of user characteristics and decision-making performance in experimental setting. Inf. Manag. 9 (2), 87–96.
Keen, P.G.W., 1980. MIS research: reference disciplines and a cumulative tradition. Proceedings of the First International Conference on Information Systems, Philadelphia, PA, pp. 9–18.
Keen, P.G.W., 1986. Competing in Time. ICIT Press, Washington, D. C.
Kettinger, W.J., Grover, V., Guha, S., Sefars, A.H., 1994. Strategic information systems revisited: a study of sustainability and performance. MIS Q. 18 (1), 31–58.
King, W.R., 1978. Strategic planning for management information systems. MIS Q. 2 (1), 27–37.
King, W.R., Sabherwal, R., 1992. The factors affecting strategic information systems applications. Inf. Manag. 23 (4), 217–235.
King, W.R., Teo, T.H., 1996. Key dimensions of facilitators and inhibitors for the strategic use of information technology. J. Manag. Inf. Syst. 12 (4), 35–54.
Kivijarvi, H., Saarinen, T., 1995. Investment in information systems and the financial performance of the firm. Inf. Manag. 28 (2), 143–163.
Krcmar, H., Lucas Jr., H.C., 1991. Success factors for strategic information systems. Inf. Manag. 21 (3), 137–145.
Lederer, A.L., Sethi, V., 1992. Root causes of strategic information systems planning implementation problems. J. Manag. Inf. Syst. 9 (1), 25–46.
Lederer, A.L., Sethi, V., 1996. Key prescriptions for strategic information systems planning. J. Manag. Inf. Syst. 13 (1), 35–62.
Lincoln, T., 1986. Do computer systems really pay-off. Inf. Manag. 11 (1), 25–34.
Mahmood, M.A., Mann, G.J., 1993. Measuring the organizational impact of information technology investment: an exploratory study. J. Manag. Inf. Syst. 10 (1), 97–122.
Malone, T.W., Yates, J., Benjamin, R.I., 1987. Electronic markets and electronic hierarchies. Commun. ACM 30 (6), 484–497.
Mata, F.J., Fuerst, W.L., Barney, J.B., 1995. Information technology and sustained competitive advantage: a resource-based analysis. MIS Q. 19 (4), 487–506.
McFarlan, W.F., 1984. Information technology changes the way you compete. Harv. Bus. Rev. 98–103 (May–June).
McFarlan, W.F., McKenney, J.L., Pyburn, P., 1983. The information archipelago — plotting a course. Harv. Bus. Rev. 145–156 (January-February).
McGaughey Jr., R., Snyder, C.A., Carr, H.H., 1994. Implementing information technology for competitive advantage: risk management issues. Inf. Manag. 26 (5), 273–280.
McLaren, T.S., Head, M.M., Yuan, Y., Chan, Y.E., 2011. A multilevel model for measuring fit between a firm's competitive strategies and information systems capabilities. MIS Q. 35 (4), 909–929.
Miller, J., Doyle, B.A., 1987. Measuring effectiveness of computer based information systems in the financial services sector. MIS Q. 11 (1), 107–124.
Mithas, S., Tafti, A., Mitchell, W., 2013. How a firm's competitive environment and digital strategic posture influence digital business strategy. MIS Q. 37 (2), 511–536.
Mitra, S., Chaya, A.K., 1996. Analyzing cost-effectiveness of organizations: the impact of information technology spending. J. Manag. Inf. Syst. 13 (2), 29–58.
Mukhopadhyay, T., Kekre, S., Kalathur, S., 1995. Business value of information technology: a study of electronic data interchange. MIS Q. 19 (2), 137–156.
National Information Society Agency, 2013. National Informatization White Paper. NIA.
Neumann, S., Ahituv, N., Zviran, M., 1992. A Measure for determining the strategic relevance of IS to the organization. Inf. Manag. 22 (5), 281–299.
Nunally, J.C., 1978. Psychometric Theory. McGraw-Hill, New York.
Oh, W., Pinsonneault, A., 2007. On the assessment of the strategic value of information technologies: conceptual and analytical approaches. MIS Q. 31 (2), 239–265.
Parsons, G.L., 1983. Information technology: a new competitive weapon. Sloan Manag. Rev. 25 (1), 3–14.
Pavlou, P.A., El Sawy, O.A., 2006. From IT leveraging competence to competitive advantage in turbulent environments: the case of new product development. Inf. Syst. Res. 17 (3), 198–227.
Pearson, K.E., Saunders, C.S., 2013. Strategic Management of Information Systems. John Wily & Sons, Singapore.
Porter, M.E., 1980. Competitive Strategy. Free Press, New York.
Porter, M.E., 1985. Competitive Advantage. Free Press, New York.
Porter, M.E., Millar, V.E., 1985. How information gives you competitive advantage. Harv. Bus. Rev. 149–160 (July–August).
Prekumar, G., King, W.R., 1994. Organizational characteristics and information systems planning: an empirical study. Inf. Syst. Res. 5 (2), 75–109.
Rackoff, N., Wisemanm, C., Ullrich, A., 1985. Information systems for competitive advantage: implementation of a planning process. MIS Q. 9 (4), 285–294.
Ravishankar, M.N., Pan, S.L., Leidner, D.E., 2011. Examining the strategic alignment and implementation success of a KMS: a subculture-based multilevel analysis. Inf. Syst. Res. 22 (1), 39–59.
Reich, B.H., Benbasat, I., 1996. Measuring the linkage between business and information technology objectives. MIS Q. 20 (1), 55–82.
Rivard, S., Huff, S.L., 1984. User developed applications: evaluation of success from the DP department perspective. MIS Q. 8 (1), 39–50.
Robeson, J.F., Copacino, W.C., 1984. The Logistics Handbook. Anderson Consulting.

Rockart, J.F., 1979. Chief executives define their own data needs. Harv. Bus. Rev. 81–93 (March–April).
Rockart, J.F., Scott Morton, M.S., 1984. Implications of changes in information technology for corporate strategy. Interfaces 17 (2), 84–95.
Sabherwal, R., Chan, Y.E., 2001. Alignment between business and IS strategies: a study of prospectors, analyzers, and defenders. Inf. Syst. Res. 12 (1), 11–33.
Sethi, V., King, W.R., 1994. Development of measures to assess the extent to which an information technology application provides competitive advantage. Manag. Sci. 40 (12), 1601–1627.
Sethi, V., Hwang, K.T., Pegels, C., 1993. Information technology and organizational performance. Inf. Manag. 25 (4), 193–205.
Sung, T.K., 1995. Rethinking information technology—organizational structure relationship. Asia Pac. J. Inf. Syst. 5 (1), 129–163.
Tallon, P.P., Pinsonneault, A., 2011. Competing perspectives on the link between strategic information technology alignment and organizational agility: insights from a mediation model. MIS Q. 35 (2), 463–486.
Tanriverdi, H., Arun, R., Venkatraman, N., 2010. Research commentary — reframing the dominant quests of information systems strategy research for complex adaptive business. Inf. Syst. Res. 21 (4), 822–834.
Teo, T.S.H., King, W.R., 1994. Facilitators and inhibitors for the strategic use of information technology. Inf. Manag. 27 (2), 71–87.
Teo, T.S.H., King, W.R., 1996. Assessing the impact of integrating business planning and IS planning. Inf. Manag. 30 (6), 309–321.
Turner, J.A., 1982. Firm size, performance, and computer use. Proceedings of the Third International Conference on Information Systems, pp. 109–120.
Vasarhelyi, M.A., 1981. Information processing in a simulated stock market environment. Proceedings of the 2nd International Conference on, Information Systems, pp. 267–274.
Vitale, M., Ives, B., Beath, C., 1986. Identifying strategic information systems: finding a process or building an organization? The 1986 NYU Symposium. Information Technology and Management Strategy, pp. 111–135
Wang, P., Ramiller, N.C., 2009. Community learning in information technology innovation. MIS Q. 33 (4), 709–734.
Warner, T.N., 1987. Information technology as a competitive burden. Sloan Manag. Rev. 29 (1), 55–61.
Weill, P., 1992. The relationship between investment in information technology and firm performance: a study of the valve manufacturing sector. Inf. Syst. Res. 3 (4), 307–333.
Weill, P., Ross, J.W., 2009. IT Savvy. Harvard Business Press.
Wiseman, C., MacMillan, I., 1984. Creating competitive weapons from information systems. J. Bus. Strateg. 5 (2), 42–49.
Yap, C.S., Walsham, G., 1986. A survey of information technology in the U.K. service sector. Inf. Manag. 10 (5), 267–274.

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