Influence of the business technological compatibility on the acceptance of innovations

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Abstract

Purpose – The objective of this study is to analyse the influence exerted by technological compatibility upon the intensity of use of the new online management programs made by information technology (IT) sector (new technology companies).

Design/methodology/approach – The concept of perceived compatibility, first defined by Rogers, has been adapted to the specific characteristics of the company as the user of technology, subsequently testing its dimensionality through confirmatory analyses. Additionally, a causal study was made in order to determine the importance of technological compatibility in the intensity of use of online business management. The statistical techniques employed are based on structural equation methodology.

Findings – The results demonstrate that the concept of technological compatibility is composed of several dimensions, which these differentiate the technologies previously applied by the company on the basis of their level of complexity; the overall concept achieves an explanatory power of 56 per cent with regard to subsequent technological development.

Practical implications – Knowledge derived from technological compatibility permits the correct evaluation of whether to accept a new IT application, providing the company with a series of positive synergies which increase the advantages of its online business management.

Originality/value – The originality of this study stems from its innovative treatment of the company as the IT user, adapting to this end the concept of compatibility hitherto exclusively applied to the analysis of the individual. Similarly, in distinction to the unidimensional approach of other research, this study has taken into account the need to establish different constructs for the measurement of technological compatibility and has demonstrated its importance in company technological development.

Keywords Innovation, Communication technologies, Online operations

Paper type Research paper

Introduction

The development of the new information technologies (IT) has had far-reaching effects upon our society, contributing to its increasing economic progress, the appearance of new sectors of activity and the transformation of the competitive environment. This has led to companies transforming their production systems, their product promotion and their relationships with customers, producing almost constant opportunities for innovation (Kotler, 1987; Quelch and Klein, 1996).

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The adoption of the new technologies, and in particular IT, has been widely analysed in various studies over the years, which have attempted to correctly define the factors which condition a decision of no little importance (Chow, 1967; Bass, 1969; Davis *et al.*, 1989). The majority of such research develops empirically tested models and tries to explain either the intention of the subject or the intensity of use of diverse technologies, such as personal computers (Igbaria *et al.*, 1995), e-commerce (Gefen and Straub, 2000; Childers *et al.*, 2001) or EDI (Angeles and Nath, 2000). Such models are usually based on the essential role played by the subjective element guiding individual decisions, and introduce factors such as perceived usefulness or ease of use by end-users. However, none of them investigate the behaviour of the company as user.

The objective of this study is to analyse the intensity of use of the new online management programs made by a business sector (new technology companies or IT companies) which has, in recent years, become extremely important to the economy as a whole[1] but nevertheless has not yet been analysed from this viewpoint. In order to do this, we analysed the influence of technological compatibility or previous experience in technology use upon the intensity of use of the new applications which appear in the market for the development of business management.

The importance of this analysis lies, firstly, in understanding how companies which have IT as an output use it as simply one more input in their production process, being able to evaluate the synergies derived from its application due to the compatibility generated by the previous employment of other systems. Secondly, it is important to remember that the level of technological development within the IT sector is greater than that of other economic activities; its experience of specific computer-based tools (know-how) may be extrapolated to organisations in other sectors. Consequently, we believe it is important to study this experience in pioneering companies, in order to subsequently understand what difficulties other companies will encounter when they wish to adopt such innovations.

Review of the literature

The implementation of new technological systems related to information has been a key factor in company development in recent years, as businesses have had to respond adequately to the challenge posed by their adoption (Haeckel, 1985). Nevertheless, on the contrary to what might have been expected, such applications have not always produced satisfactory results, and have on occasion resulted in losses which must be assumed by the organisation (Shani and Sena, 1994; Clegg *et al.*, 1997)[2] As a result, and despite the new technological management systems being presented as an attractive opportunity for modern companies, not all of these have chosen to include such applications in the development of their activity; moreover, it is very difficult to predict the degree of rejection or acceptance on the basis of externally visible characteristics.

Many authors have attempted to pinpoint the various explanatory factors which indicate the intention to use and the level of adoption of such technologies. In this field, the pioneering work of Rogers (1983, 1995) is especially important; he proposed a factor he termed "perceived compatibility" which reflects the degree to which the use of an innovation is considered by the individual as consistent with his/her values, sociocultural beliefs and past and present experiences. Perceived compatibility has been viewed as an essential factor in the explanation of behaviour towards IT, and diverse empirical evidence has been found to confirm its influence upon the use of such technologies (Tornatzky and Klein, 1982; Moore and Benbasat, 1991; Agarwal and Karahanna, 1998). Nevertheless, it must be emphasised that most of these studies have focused on analysing the subjective behaviour of the individual (i.e. aspects such as amusement and entertainment), and thus the concept has neglected to take into account the nature of other potential users of such tools, namely companies and public administrations (Fitzpatrick, 1998; Miyazaki and Fernández, 2001).

Similarly, Rogers (1983, 1995) affirms that certain innovations are closely interlinked, and, therefore, there exists a strong correlation between the previous experience of the subject with particular tools and the subsequent use of other applications. This idea leads to the introduction of the concept of "technology clustering" employed by various authors (Leung, 2001; Eastin, 2002) and defined as the set of technologies perceived by the user as interrelated and determinants of the subsequent degree of acceptance of others. Thus, those subjects with greater experience of a particular IT modify positively their perception of other similar technologies and increase their level of use (Dahlen, 2002; Novak *et al.*, 2000; Ward and Lee, 2000), and even come to observe a pattern of conduct differentiated between them (Reed *et al.*, 2000; Shih, 2004).

In this way, the previous experience of the user in the IT field has been considered to be a factor even more important than experience in the offline sphere (Bezos, 1999). Since, Igbaria (1993) demonstrated that previous user experience of IT has a direct effect upon the degree of subsequent acceptance, many authors have introduced this variable into their studies (e.g. Min and Galle, 2003, among others). Some of them affirm that experience, and thus the knowledge acquired regarding the medium, alters the behaviour of the individual and facilitates decision-making in subsequent situations (Venkatesh and Morris, 2000; O'Cass and Fenench, 2003). Similarly, it is indisputable that experience modifies certain perceptions of the individual with respect to the new technologies, such as perceived usefulness or ease of use (Davis *et al.*, 1989; Sadri and Robertson, 1993; Torkzadeh and Koufteros, 1994), while the time and effort invested in their employment simultaneously diminish (Norman, 1998; Haider and Frensch, 1999).

In the business environment, the concept of compatibility, derived from experience, has also been introduced in order to explain the behaviour of companies as users. Consequently, using as a basis the theory of organisational learning, March (1991) considers that experience leads to a wider knowledge base and more solid technological skills, while Barkema and Vermeulen (1998) argue that compatibility increases due to the variety of events a company undergoes.

Shirani *et al.* (1994) establish a series of variables which are relevant for the prediction of company behaviour. The first of these represents experience in the technology field, while the second, called external organisational culture, alludes to the compatibility which must be established between the general structure of a company and the new technological systems which are introduced. On occasions, both variables have been grouped together under the name of intra- and extra-organizational characteristics; these refer to the conditions of the company itself which produce the application of a particular innovation (Igbaria *et al.*, 1997). Equally, what for individuals has been called the ability to manage technological aspects, in the case of the company has been termed cultural capabilities, which permit the adaptation of its activities to the new opportunities provided by technology (Tiessen *et al.*, 2001).

Jiménez and Polo (1998) analyse the diffusion of EDI in companies. Using a model into which they introduce aspects related to the level of technological sophistication, they consider that the development of the new information systems and their ability to manage them have a positive influence upon the diffusion of other more novel tools. Previous experience with fax, e-mail or videotex affects the perception of the complexity of EDI, which encourages its acceptance and the employment of other similar systems (Jiménez and Polo, 1998). Similarly, other authors, such as Arunchalam (1997), observe that the lack of technological skills and non-automation are two key barriers to the implantation of EDI within the company.

When analysing the intensity of company use of various ITs, such as EDI, online data access, e-mail and the internet, Premkumar and Roberts (1999) observe that the degree of compatibility and previous experience differ between adopters and non-adopters, and thus both are considered to be variables which significantly differentiate behaviour. Mirchandani and Motwani (2001) formulate a model which quantifies the technological intensity of the company, and into which they also introduce the compatibility and prior knowledge acquired during the employment of other related tools. Similarly, Grandon and Pearson (2004) undertake a study of the implantation of new systems and, after performing a confirmatory factor analysis, observe that compatibility is a factor independent of organisational preparation, and thus constitutes a defining variable of the model.

Our study takes as its starting point the concept of compatibility initially defined by Rogers (1983, 1995), which has been adapted to the objective characteristics of the company as user, eliminating those aspects of a personal character (beliefs and values) upon which other studies have concentrated. We consider that compatibility, in the case of companies, must take into account the knowledge gained from past and present experiences with technology; these comprise the concept termed technological compatibility. In distinction to other studies (LaRose and Atkín, 1992; Leung, 2001; Eastin, 2002), where experience is introduced in a general and unitary manner, we believe that technological compatibility must distinguish the technologies analysed on the basis of their complexity, including not only basic knowledge considered in the literature as a determinant of the development of the standard company (the internet and e-mail), but also more complex applications, such as EDI (Premkumar and Roberts, 1999; Emmanouilides and Hammond, 2002; Barwise *et al.*, 2002). Their joint effect determines the level of overall technological compatibility of the company, and modifies its conduct with regard to the intensity of use of new systems and its subsequent technological development.

Objectives and hypotheses of the research

The objective of this study was to analyse the intensity of use of online management programs by companies in the IT sector, on the basis of technological compatibility. In order to achieve this objective, two sub-objectives needed to be established as follows:

(1) To analyse the technological compatibility concept, in such a way as to permit the quantification of the effect this construct has upon intensity of use of IT companies. The perspectives analysed were diverse, since both the use of a series of earlier tools and the perceptions derived from their application (ease of use and usefulness) were covered. The introduction of the latter was suggested by other studies which demonstrate that the perceptions associated with a particular technology serve as an indicator for the evaluation of their objective level of

development (Davis *et al.*, 1989; Woszczynski *et al.*, 2002; Amoako-Gyampah and Salam, 2004). Similarly, positive perceptions of a specific system, such as the ease of use and usefulness associated with it, encourage users to employ it more intensively and at the same time predispose them to apply other tools which are related but more sophisticated (Gefen and Straub, 1997, 2000; Igbaria *et al.*, 1997; Lee *et al.*, 2003; Shih, 2004; Shang *et al.*, 2005).

The systems we consider to be compatibility generators are closely interrelated to online management programs, and thus the analysis of the level of development of earlier tools (technology clustering) helps to determine the intensity of use of the new programs. To perform such an analysis, we included aspects previously considered to be determinants of technological experience in traditional companies, such as the internet and e-mail (Emmanouilides and Hammond, 2002; Barwise *et al.*, 2002) and, moreover, more complex tools such as EDI. These technologies had already been included by Premkumar and Roberts (1999) in their analysis of the development of small rural businesses, taking into account that an obvious interaction exists between them; they were, therefore, believed to also be appropriate for the study of the behaviour of the IT sector.

However, in contrast to the majority of earlier research (Etteman, 1984; Leung, 2001; Eastin, 2002), but in the same way as Liaw and Huang (2003) and Liaw *et al.* (2006)[3] this study argues that the two aspects cannot be contained within a single construct, but instead that their effect depends on the levels of complexity faced by the company during the application of earlier technologies, and, therefore, is composed of at least two dimensions (basic and complex):

H1. The technological compatibility of the company is a factor composed of at least two dimensions, which differentiate the use of technologies prior to online management programs on the basis of their level of complexity.

Despite this differentiation, it must not be forgotten that the underlying dimensions reflect a common concept, and thus must converge in a single, non-directly observable construct, called technological compatibility. This latent variable represents the overall influence of the previous application of IT tools upon subsequent technological development:

H2. The dimensions which comprise technological compatibility converge in a single concept which represents the overall importance of the compatibility generated by the set of earlier systems applied in the company.

(2) Once the concept and dimensions of technological compatibility had been studied, the following step was to analyse the relation existing between this concept and the intensity of use of online management programs. Thus, those companies having more experience with earlier technologies (and, therefore, greater knowledge) will make more intensive use of new programs. This objective can be resumed in the following hypothesis:

H3. Those companies which have a greater level of technological compatibility with earlier IT systems display a greater intensity of use of the new online management programs.

The theoretical model is shown in Figure 1.

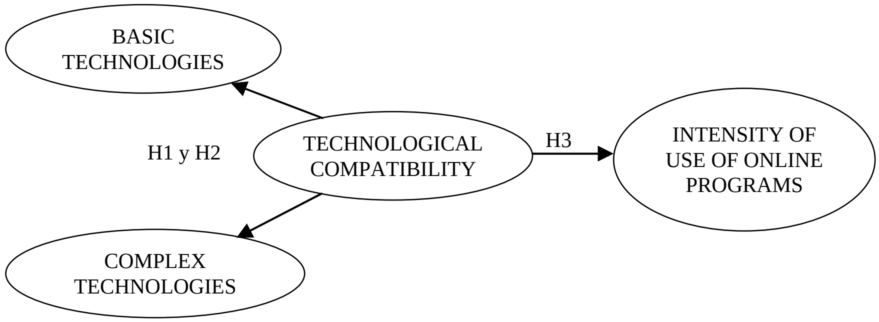

Figure 1.
Proposed model

Methodology

As stated earlier, this study was performed for companies in the IT sector, as their very nature means that, on the one hand, they display a higher level of technological development than traditional companies, while on the other they reflect the situation which other economic sectors will face within a few years.

The technique used was the mail (both traditional and electronic) survey, sent to a sample of 449 IT companies. A total of 114 firms (25.38 per cent) replied and, following the filtering process, a final sample of 109 valid cases was obtained; the fieldwork was performed in November 2004. Although the sample size may be considered somewhat small for studies of consumer behaviour, in the case of research into organizations it is thought to be acceptable, due to the difficulty in obtaining responses (Bennet *et al.*, 2005; Min and Galle, 2003; Baldauf *et al.*, 1999). As in other studies (Lu and Yeh, 1998; Riemneschneider *et al.*, 2003; Grandon and Pearson, 2004), the unit of analysis was the company as a whole, and not its employees, and thus the questionnaires were directed to managers, who responded on behalf of the firm.

Items related to experience with the internet, e-mail and EDI (see Appendix) were initially included. Similarly, the indicators included for each of these technologies were: usefulness, ease of use, and intensity of use, as these reflect the knowledge acquired from previous experiences. All these were obtained from a review of other research in which the adoption and use of technologies, on the basis of these perceptions, were studied (Gefen and Straub, 1997, 2000; Igbaria *et al.*, 1997; Lee *et al.*, 2003; Shih, 2004; Shang *et al.*, 2005).

The endogenous variable, "intensity of use of online programs" was measured using four items which reflect the computerised performance of the principal organisational functions, i.e. commercial management, financial accounting, budgetary management and after-sales service (see Appendix). In order to measure all the variables, 7-point Likert scales were employed, in which 1 indicated "completely disagree" and 7 "completely agree".

With regard to the statistical techniques used, the first step was the performance of various analyses in order to establish dimensionality, refine the scales and test their degree of validity and reliability. Subsequently, the dimensionality of technological compatibility (*H1*) was tested using a rival models technique, while a second-order factor analysis was employed to check its convergence in a single construct (*H2*). Finally, a structural model was performed (*H3*).

Results

Analysis of initial reliability

The first step was to refine the proposed scales; a exploratory factor analyses[4] was performed, using the "principal axis factoring" method[5] and Varimax rotation, as the literature advises (McDonald, 1981; Kaiser, 1970). In this way, three differentiated factors were obtained; the first two dimensions (*F1* and *F2*) refer to the indicators used to measure compatibility, while the third (*F3*) represents items related to the intensity of use of online management programs. With regard to the constructs related to compatibility, the *F1* groups together the indicators linked to the employment of basic technologies (internet and e-mail), while the *F2* represents the items related to the use of complex technologies (EDI). All the loads exceeded the established minimum of 0.5, and the percentage of variance explained was 66.4 per cent for compatibility, and 68 per cent for management programs (Hair *et al.*, 1999).

The following step was to test initial reliability, using Cronbach's α analyses and establishing as reference the surmounting of the recommended value of 0.7 (Nunnally, 1978). It was necessary to eliminate, from factor *F1*, the items related to ease of use (INT_3 y EMA_3) (see Appendix), and the indicator of the computerised after-sales functions of the company (PROG_4) was dropped from construct *F3*. Thus, following this process of initial refinement, the scales of the endogenous variable displayed an α value of 0.785, and those established for the measurement of technological compatibility obtained 0.879 (basic technologies) and 0.863 (complex technologies). With respect to the item-total correlation, in all cases this greatly exceeded the minimum of 0.3 established by Nurosis (1993).

The elimination of these indicators gave rise to the repetition of both exploratory factor analyses, with the result that the remaining indicators were grouped together in the same way and within the same constructs as in the initial analysis. Consequently, the factor loads exceeded 0.5 and the variances explained reached 73 per cent for technological compatibility and 70.1 per cent for the intensity of use of online management programs.

Reliability, dimensionality and validity of scales

Following the explanatory analysis, confirmatory analyses were performed; these allowed the continuation of the process of refining and validation of the scales, and also the evaluation of the reliability and validity of the proposed dimensions. To this end, structural equation methods (SEMs) were applied, using the statistical software EQS 5.7b, and resorting to the method of maximum likelihood estimation, since our data did not fulfil the hypothesis of normality (Bentler, 1995).

Firstly, those items which did not meet one or more of the three criteria (weak convergence, strong convergence and explanatory coefficient) proposed by Jöreskog and Sörbom (1993)[6] were eliminated. As a result, the item related to the usefulness of internet (INT_2) (see Appendix) did not attain a sufficiently high R^2 and was, therefore, excluded. Subsequently, the analysis for the resulting variables was repeated, producing results which were favourable in each case with regard to the three criteria described.

Once the scales were refined a test was performed to decide if it would be convenient to establish a bidimensional structure for the technological compatibility concept, employing the rival models technique proposed by Anderson and Gerbing (1988) and Hair *et al.* (1999). This analysis consists of comparing two alternative models; in the first of these the dimensions obtained in the exploratory analysis for that factor are differentiated, while the second establishes a unidimensional model, in which all the indicators are grouped within a single construct.

As Table I shows, the establishment of bidimensionality considerably improves the goodness-of-fit of a single underlying factor for technological compatibility. We, therefore, chose to respect the structure proposed in the initial hypotheses of the current study.

Similarly, once the model to be studied was determined and its component dimensions verified, the following step was to test its psychometric properties (Gerbing and Anderson, 1988).

With regard to reliability, due to the elimination of items having modified the initial structure analysed, the scales were subjected once again to the criteria of Cronbach's α and item-total correlation; in both cases adequate results were achieved. Additionally, verification was made of the fulfilment of other reliability indicators, such as the composite reliability coefficient (CRC) proposed by Jöreskog (1971), and the average variance extracted (AVE) (Fornell and Larcker, 1981). The results exceed in all cases the, respectively, recommended values of 0.6 and 0.5 (Bagozzi and Yi, 1988) (Table II).

Lastly, the validity of the scales as a measurement instrument for the concept they represent, was verified, by studying both content validity and construct validity. With regard to content validity, this was derived from the bibliographical review outlined in earlier sections, which presented the references for the studies which we have used as the basis for the definition of technological compatibility. It must be remembered that the specific nature of the company as user required the addition of elements which are not found in studies of individual users; similarly, it was necessary to eliminate other variables which were not appropriate when analysing the organization as a whole, in distinction to each of its workers.

Construct validity is comprised of convergent validity and discriminant validity. In the case of the unidimensional factor (intensity of use of online programs), the former tests the convergence between the set of explanatory variables of a scale and its corresponding construct; the confirmatory analysis, therefore, needed to obtain values for the standardised loads greater than 0.5 (Steenkamp and Van Trijp, 1991). If bidimensionality existed (technological compatibility), then in addition to verifying the earlier criteria for all the indicators of each factor, the correlations between the two dimensions obtained were required to be significant at a level of 99 per cent.

		Unidimensional	Bidimensional
Absolute fit			
Index		Valor	Valor
p de X^2	$p > 0.05$	0.000	0.456
GFI	>0.9	0.698	0.977
MFI	>0.9	0.427	0.998
RMSR	<0.08	0.210	0.031
RMSEA	<0.08	0.259	0.000
Incremental fit			
Index		*Valor*	*Valor*
NFI	>0.9	0.575	0.982
NNFI	>0.9	0.425	0.999
AGFI	>0.9	0.478	0.940

Table I.
Goodness-of-fit indices of the rival models

Table II. Analysis of the reliability and validity of the model

	ÍTEM	CRC	AVE	R^2	λ^a	Factors	Interval
Basic technologies (*F1*)	PROG_1			0.949	0.974		
	PROG_2	0.904	0.763	0.882	0.939	*F1-F2*	(0.043-0.227)
	UTIL_2			0.459	0.677		
Complex technologies (*F2*)	PROG_3			0.708	0.842		
	UTIL_3	0.871	0.692	0.669	0.818	*F2-F3*	(0.234-0.582)
	FÁCIL_3			0.7	0.836		
Intensity of use (*F3*)	PROG_4			0.489	0.7		
	PROG_5	0.787	0.553	0.616	0.785	*F3-F1*	(−0.015-0.361)
	PROG_6			0.552	0.743		
	GFI = 0.959		p de $X^2 = 0.503$		NNFI = 0.998	RMSEA = 0.000	
	MFI = 0.999		NFI = 0.961		RMSR = 0.036	AGFI = 0.922	

Note: [a]All of them are significant at $\alpha = 0.01$ level

All the variables of the model displayed these properties, and thus convergent validity was proved (Table II). With regard to discriminant validity, this was confirmed using three criteria (Anderson and Gerbing, 1988). Firstly, the correlations between the various factors which comprise the model must not have exceeded 0.8, since that would have indicated low discriminant validity (Bagozzi, 1994). Subsequently, the intervals of the correlations were estimated for the different latent variables, checking that none of them contained the value 1. Finally, the AVE by the underlying construct is greater than the shared variance with other latent constructs (Dholakia *et al.*, 2004).

The fulfilment of the totality of the criteria applied, together with appropriate goodness-of-fit indices (Table II), permitted us to validate the scales and the proposed measurement model.

Thus, *H1* was proved, since technological compatibility is composed of two constructs which measure company experience in the use of IT. The *F1* gathers together the indicators linked to the employment of internet and e-mail, and is, therefore, termed "Compatibility with basic technologies" while the second (*F2*) represents items related to EDI, an application which requires more sophisticated training and is consequently called "compatibility with complex technologies".

The following step was to test, using a second order factor analysis, whether both factors converge in a single construct, which would corroborate *H2*.

Second order confirmatory factor analysis

Having tested the psychometric properties of the first order factors which comprise the model, the next test was of the confluence of the constructs which comprise compatibility in one single factor; this encapsulates the joint effect of basic and complex tools upon the subsequent technological development of the company. The results of the analysis and of the goodness-of-fit indices are shown in Figure 2.

It can be observed that both factors are significant at a level of 0.05, the effect exercised by the experience gained in the use of EDI ("compatibility with complex technologies") acquires greater weight in the determination of technological compatibility. The explanation for this resides in the intrinsic nature of the sector under analysis; since IT companies are organizations inextricably linked to

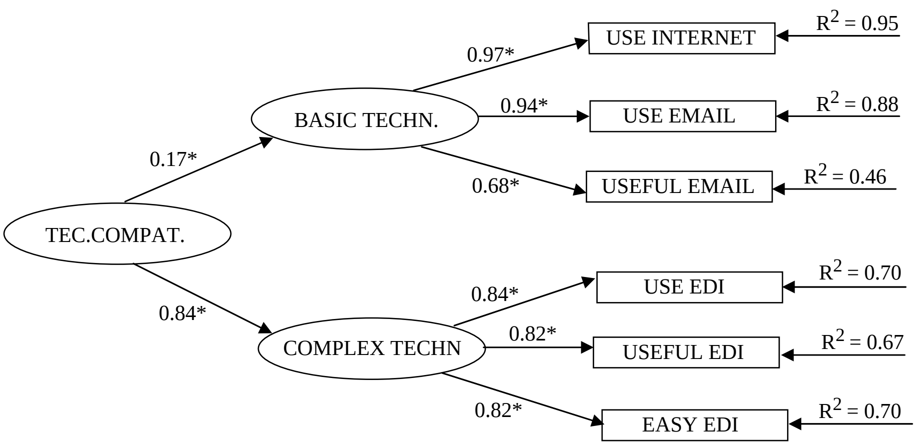

Figure 2.
Technological compatibility factor

communication technologies, and thus the use of internet and e-mail are considered to be basic and is widespread in the general performance of its activity. As a result, although they influence company behaviour, they do not produce differences as notable as those derived from other more sophisticated tools (EDI).

In view of the results obtained *H2* is fulfilled, since there exists a single concept regarding technological compatibility that groups together two dimensions, which distinguish between the use of basic technologies and the use of complex technologies. This factor represents the joint effect of the knowledge acquired from previous experience with technology, which has an overall influence upon the behaviour of the company as user.

Structural model analysis (SEM)

Having verified the existence of a second order factor and validated the measurement model, the final objective of this study was to estimate, using structural equation models, the relationship which exists between technological compatibility and intensity of use of other more complicated computer-based systems. Goodness-of-fit indices exceeded in all cases the recommended limits (Hair *et al.*, 1999) (Table III).

Consequently, goodness-of-fit indices derived from the model were found; these exceeded, in all cases, the recommended limits (Hair *et al.*, 1999) (Table III). Equally, the R^2 of the endogenous variables displays a value of 0.56, which represents an extremely high explanatory index, if we take into consideration that the model only represents the effect of one concept.

With regard to the third hypothesis posed, it can be observed that technological compatibility has a positive affect upon the intensity use of online management programs, as shown by the standardized parameter of the relationship (+0.75); this means that the greater the previous experience in the use of such technologies in the day-to-day activity of the company, the greater will be technological development through the employment of business management systems.

Conclusions and managerial implications

The objective of this study was to analyse the relationship between technological compatibility and the intensity of use of other more sophisticated IT. Thus, the study has attempted to test the validity of experience with basic and complex applications as an indicator of the use and future development of technologies for online business management.

In order to do this, we focused on a business sector inextricably linked to technology, namely IT companies. This choice was due, firstly, to the importance which this activity has acquired for the countries' GNP in recent years and, secondly, to the sector's close relationship to various aspects of computerisation, which cause it to display a high level of technological development (and one which will probably be experienced by all other companies in the future). These characteristics have

H3	TC → IPROG	Technological compatibility → intensity of use		
MFI = 0.999	p de X^2 = 0.489	NNFI = 0.999	RMSEA = 0.000	RMSR = 0.05
$R^2 = 0.56$	$\beta = 0.75$	$t = 4.021$	$p < 0.01$	
GFI = 0.956	AGFI = 0.922		NFI = 0.959	

Table III.
Causal analysis

repercussions upon the empirical analysis, since the use of the internet and e-mail are intrinsic to such companies, given the nature of their activity; this leads them to obtain extremely high average values for the indicators related to usefulness and perceived ease of use (internet ease of use = 6.678; internet usefulness = 6.806; E-mail usefulness = 6.761), meaning they must finally be eliminated. Probably, if the model was to be extended to other sectors of the economy, the lower level of development and familiarity which exists with regard to the new ITs would mean that such concepts were not generalised, and thus their averages would not attain such high values and they would form part of the technological compatibility concept.

The initial contribution of the current study has been to adapt the concept of perceived compatibility to the characteristics of companies as users of IT and the new computer-based systems. The effect of this factor upon the behaviour of the individual end-user had already been analysed in earlier studies (Miyazaki and Fernández, 2001); nevertheless, the employment of an approach founded principally upon beliefs, values and feelings obliged us to restrict it to the past experiences of the company as the user of new technologies, labelling it technological compatibility.

The results show that in the study of company behaviour, such a concept cannot be analysed in conjunction with others; the sheer variety of tools familiar to and employed by the company requires their differentiation. Consequently, the second contribution of this study has been to demonstrate the bidimensionality of the technological compatibility construct, and additionally to verify that both dimensions converge in a single concept which encapsulates the overall influence of the systems used. Similarly, the current environment obliges companies to undertake their activity against a continuously changing economic background, in which there exist many varied technologies; moreover, knowledge within the IT sphere, encompasses many diverse aspects. Thus, the knowledge acquired by a company cannot be restricted to the confines of a single construct, which would group together indicators of contrasting types that cannot be analysed in conjunction with each other; instead, a distinction must be made between technologies which form part of day-to-day company activity, and are consequently called basic (internet and e-mail), and those which, due to their complexity, require a prolonged learning process (EDI).

Finally, the causal relationship established between such a construct and corporate technological development was tested, by analysing the intensity of use of online management programs. It is clear that greater compatibility leads to greater acceptance and application of new technological systems, and thus it can be affirmed that the experience accumulated by the employment of other earlier tools, linked to the new systems, facilitates the intensity of use of computer-based instruments.

The conclusions reached have important implications for the business world. On the one hand, companies should be aware that interrelationships exist among the various ITs, and thus investment in a specific tool related to IT may facilitate the acceptance and subsequent performance of other related applications. Similarly, the development of compatibility produces a series of synergies derived from the application of mutually complementary systems, allowing companies to improve their results by computerising their business management. These synergies must be exploited by companies which wish to invest in technology, thereby encouraging the acquisition of knowledge which will prove profitable in a multitude of future activities and increasing the efficiency achieved (Kaefer and Bendoly, 2004). In this way, the learning process undergone will diminish the perception of risk associated with the implementation of a new programme, creating overall compatibility which will significantly affect the degree of future development. This technical aptitude will allow companies to correctly evaluate subsequent related projects, assessing the true value of an investment in technology and avoiding the potential risk of economic losses.

Nevertheless, it must be remembered that the technological environment is constantly developing, and thus the interrelationship which exists between systems varies according to its level of complexity or innovation. The life cycle of IT is ever shorter, meaning it is essential to understand which part of the investment will continue in use and which will become obsolete. As this takes place, it is crucial for the company to accumulate intangible benefits derived from knowledge, as these may be reused for the implementation of new applications and, in addition, they maintain the current value of the technology. In order not to lose the competitive advantage acquired, companies must continually invest in this field, concentrating especially on the most important aspects and increasing the efficiency of their management. Our general recommendation would be, therefore, to encourage investment in basic technologies before implementing other more sophisticated tools, in order to provide staff with experience and, at the same time, create a corporate culture based on IT, which would permit the company to develop in line with successive technological advances. Thus, ITs must be considered to be not only a tool for today, but also as an investment for the future which increases company competitiveness in the market.

It must be acknowledged that the current study presents certain limitations which should be taken into account when applying the results obtained. The first such shortcoming is the nature of the transversal data, which analysed the importance of technological compatibility in company development but did not clarify the evolution of their dimensions. Earlier studies, such as those by Venkatesh and Morris (2000), considered it important to analyse the influence of experience over a prolonged period of time, and consequently performed longitudinal studies using different analyses of TAM models. A future extension of our study would be the analysis over time of the variation in the importance of each of the constructs which comprise the concept of company technological compatibility, i.e. basic technologies and complex technologies, observing the importance they acquire.

Another possible extension of this study would be to test the model on a sample of organizations belonging to other economic sectors whose productive activities are not related to IT; this would provide the proposed model with wide-reaching validation. Similarly, the technological compatibility common to all companies would be obtained, testing the importance of those systems commonly accepted in the case of the IT sector, but which for other economic sectors are not necessarily of great priority.

Notes

1. In 2004, according to the Spanish Ministry of Science and Technology, 6 per cent of the EU's GDP, 9.4 per cent of America's GDP, and 7.8 per cent of Japan's GDP corresponded to the IT sector.
2. It is possible to talk, even at macreconomic level, of Solow's (1987) paradox: "you can see the computer age everywhere but in the productivity statistics".
3. This study distinguishes four types of experience which may explain the intention to use for navigators.

4. The statistical package used was SPSS/PC, version 12.0 for Windows.
5. We thereby avoid the assumptions of principal components model, which calculates the sample correlation matrix, including the specificity of the model, causing the resulting matrix to be contaminated.
6. The criterion of weak convergence, according to Steenkamp and Van Trijp (1991), eliminates indicators which not have significant factor regression coefficient (*t*-student $>2{,}58$; $p = 0{,}01$). The criterion of strong convergence implies the elimination of nonsignificant indicators, i.e. those whose standardised coefficient is lower than 0.5 (Hildebrant, 1987). The explanatory coefficient of the indicator must exceed a 0.3.

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Appendix. Measuring scales

Technological compatibility	ITEM	EMP. analysis[a]
Basic technologies		
The use of internet in the performance of the activity is intense	INT_1	Accepted
I consider that internet is useful for the performance of the activity	INT_2	*Rejected*
Internet is easy of use in the performance of the activity	INT_3	*Rejected*
The use of e-mail in the performance of the activity is intense	EMA_1	Accepted
I consider that e-mail is useful for the performance of the activity	EMA_2	Accepted
E-mail is easy of use in the performance of the activity	EMA_3	*Rejected*
Complex technologies		
The use of EDI in the performance of the activity is intense	EDI_1	Accepted
I consider that EDI is useful for the performance of the activity	EDI_2	Accepted
EDI is easy of use in the performance of the activity	EDI_3	Accepted
intensity of use		
Commercial online management programs are intensively applied in the performance of the activity	USE_1	Accepted
Financial accounting online programs are intensively applied in the performance of the activity	USE_2	Accepted
Budgetary online management programs are intensively applied in the performance of the activity	USE_3	Accepted
After-sales service online programs are intensively applied in the performance of the activity	USE_4	*Rejected*

Note: [a]Results obtained from the empirical analysis

Table AI.

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