A study on the evolution of the main information systems of management in the Spanish hotel sector

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Abstract

Aims: This paper compares two similar studies, run on a sample of Spanish hotel establishments in two different years, 2003 and 2017. The objective was to observe how the two most frequently used information system technologies for companies have evolved over this period: enterprise resource planning (ERP) and E-business systems.

Methodology: To run the study, the ERP/E-business matrix model (Norris, Hurley, Hartley, Dunleavy and Balls, 2001) was adopted as a methodology, setting up a number of different scenarios to explain the transformations that take place in companies when they apply these technologies at different stages of development.

Results: This process was oriented towards developing the two computer systems, prioritizing e-business over ERP and using vertical solutions.

Constraints: The study was run on a discrete sample of Spanish hotels and hotel chains.

Practical implications: The constructs used are limited by the instrument and metrics implemented by the company under study for evaluating the quality of customer interaction when a customer reaches a customer service’s call center.

Practical implications: ICT has become a key factor for the hotel sector, and people who manage the virtualisation of business need to have a business vision aligned with ICT, with continuous improvement in their systems.

Keywords: ERP, e-business, ICT, Hotel Management, B2B.

JEL codes: O14, O33.

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有关西班牙酒店业主要管理信息系统之演变的研究

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文章摘要
研究目的: 本研究对两项过往相似的研究项目进行对比, 研究项目分别在二零零三年及二零一七年对一些西班牙酒店进行了抽样研究。本研究目的为要观察在这段期间两个企业最常用的信息系统之发展, 它们分别为: 企业资源计划(EPR)和电子商务系统(e-business)。分析方法: 为了进行这项研究，我们采用了ERP /电子商务矩阵模型(Norris, Hurley, Hartley, Dunleavy 及 Balls 2001)为分析方法, 建立多个不同场景, 来解释企业在其不同发展阶段应用了上述系统后所产生的演变。研究结论: 演变结果支持两个信息系统的发展, 其中电子商务系统比ERP更为优先, 并使用垂直解决方案。研究局限: 这项研究是在西班牙酒店及连锁酒店有限样本之基础上进行的。实际应用: 信息及通信技术已成为酒店业的一项关键因素，是企业领导人员及其商业虚拟化所需要的工具。此外, 他们需要与信息及通信技术保持一致的业务远景, 并不断改进其系统。关键词: 企业资源计划(ERP)、电子商务系统(e-business)、 信息及通信技术、酒店管理、公对公(B2B)。

JEL 分类号: O14、O33。
1. Introduction

The adoption of digital communication and information technologies (henceforth ICT) in the hotel sector is no longer an option, as the tourism sector is inextricably linked to information systems, since this sector is information intensive due to the characteristics of tourism services: intangibility, inseparability, expiry, seasonality and internationalisation. These characteristics have led the sector to depend largely on ICT, making this a key strategy to achieve competitive advantages, indeed, for the very survival of tourism companies (Medina and Plaza 2015, p. 14).

The reality the hotel sector is well aware of today is that if you are not working in cyberspace, you are not selling (Cristiana, 2008). Destination countries and hotels that want to have a market niche must be present in the cyberworld. The impact of ICT is transforming this sector, and it is presented as something similar to a working network, with dynamic interfaces in which both businesses and consumers are proactively redesigning tourism as a product, with participation being a critical element for the competitiveness of tourist organisations (Buhalis and Law, 2008).

For Crespi, Cladera and Martínez-Ros (2001), the contribution of ICTs in the search for this excellence is fundamental, since their use affects improvements in quality in both aspects: on the one hand, producing cost savings and optimising processes, which results in improved management; and on the other hand, the application of these technologies makes it possible to provide the service in better conditions and incorporate new services, which has the effect of increasing customer satisfaction. For the Spanish hotel sector, this means the challenge of consolidating its leadership, not only as a provider of tourist services but also as a promoter of tourism technology. The survival of accommodation companies in an increasingly global and competitive environment depends on the introduction of some kind of technological innovation, and especially on adapting to the changes imposed by ICT.

This article analyses the progress of a sample of hotels (both private hotels and chains) in implementing information systems, specifically their enterprise resource planning (ERP) and e-business systems, from 2003 to the present. To this end, in the next section, we construct a theoretical framework which summarises the growth of ERP and e-business technologies, applied to the hotel sector. Section 3 presents the methodology used in the study: the ERP/E-Business Matrix in the Norris model (Norris, Hurley, Hartley, Dunleavy and Balls 2001). Section 4 shows the results of the study and the situation of the hotels analysed in terms of the use of internal business management and e-business systems. After examining the current situation, chapter 5 covers the conclusions and sets out the new trends that the sector will become involved in.
Romani (2011, p. 313) understands ICT as “Technological devices (hardware and software) that can edit, produce, store, exchange and transmit data between different information systems with common protocols. These applications, which integrate computing resources, telecommunications and network media, enable both interpersonal (person-to-person) and multi-directional (one-to-many or many-to-many) communication and collaboration. They play a significant role in the production, exchange, dissemination, management of and access to knowledge”.

Tourism is a very large sector in the Spanish economy, involving a large number of hotel companies and travel agencies, totalling 37,119, according to the e-SME 2016 report on the Sectoral Analysis of implementation of ICT in Spanish companies, of which 24,703 are hotel establishments and 155 are large hotel chains, while the majority are microenterprises (21,585) (Ureña, Ballestero and Prieto, 2017, p. 127).

All these companies, as a whole, have widely adopted the basic ICT infrastructure, understood as the availability of computers for business use and Internet connection. They are also among the most advanced in the use of management tools and Internet presence (corporate and personal websites with portable devices, among others). Ureña et al. (2017, p. 34) carried out a study bringing together more than 70% of companies in 10 sectors, where they showed that the implementation of ICT in the hotel sector was second only to the information and communications sector and the professional, scientific and technical business sector.

The emergence of new information, communication and knowledge technologies from the new global environment of the tourism market, and more specifically the hotel industry, represents an excellent opportunity for hotel entrepreneurs, both for development of their organisational systems, as well as increasing their competitiveness and improving the profitability of their businesses.

The recent technological and strategic changes are not occurring homogeneously in all companies in the tourism sector, an aspect that can be extrapolated to other sectors. On the contrary, there is a digital divide between large companies and SMEs with respect to microenterprises (Medina et al., 2015, p. 9). In this context, the 1st Digital Maturity Index of Spanish hotel companies, belonging to the consulting firm DaemonQuest Deloitte and produced by Abella, Rodríguez, García and Álvarez (2015, p. 5), highlights the fact that 100% of large hotel chains have corporate PPPs while none of the small hotel companies do. Likewise, 70% of the large hotel chains are using digital tools (robots) to personalise content and improve the experience of their guests from the moment of booking. In addition, 60% offer the possibility of booking directly from Google.

Information and communication technology (ICT) applied to the business environment include Internet technologies and management technologies (ERP), along with other types that are not part of this study and are shown in Figure 1.
2. Theoretical framework

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The capacity of the Internet to access, organise and communicate information more efficiently enables new formulas of relationship between consumers and businesses, giving rise to a new technology called e-business (Del Bosque and Crespo, 2008). The concept of e-business refers to reorganising the enterprise to have the ability to exchange goods, services, money and knowledge digitally, using Internet-based ICT. However, this technology is limited and is not sufficient to meet all the business requirements of an organisation, and a management technology is needed to support the Internet technologies (Partearroyo, 2011). The technology that emerged as a solution to manage the organisation’s resources in an integrated manner was Enterprise Resource Planning (ERP).

An ERP is a set of information systems that provides automation of repetitive business processes and produces information on operations in real time for managers, thus avoiding fragmentation of information and making it possible to make decisions easily and conveniently (Azevedo, Romão and Rebelo, 2012, p. 265).

The success in the implementation of an ERP lies in linking up all the internal transactions in an organisation. Simply using a commercial software, most of the company’s business processes can be automated and integrated, exchanging information within one single database. And companies that implement this have the opportunity to redesign their business processes, incorporating industry best practices (Gattiker and Goodhue, 2005).

ICT has transformed tourism since the 1980s and, as a result of this technological evolution, the different distribution and intermediation channels have multiplied. This has produced complex management due to the large number of operations, processes and players involved (Medina et al., 2015, p. 11). The hotel sector, in particular, must face up to the challenge of integrating information from heterogeneous information systems in different companies. This is why the use of ERP/e-business technologies in hotel management is so influential.

In this context, ERP technology, in its early days, concentrated on information flows within the company. The intensive use of ERP systems represents the first step
in automation for a company. But linking such systems with business partners (suppliers, customers, and others), outside corporate barriers, is still a tough hurdle to get over because, in most cases, they will use ERP software from different manufacturers (Azevedo et al., 2014). In this regard, ERP systems development tools are being improved; manufacturers are incorporating flexibility into their ERP systems so that companies themselves can make changes directly to the interface that provides access to ERP software environments (Recuenco 2000).

Also, in recent times, the information exchange made possible by these systems is expanding with the latest improvements to ERP packages and is moving from an in-house tool to a web-based model.

A major advance in ERPs was already foreseen in the last century, and improvements are still being proposed. Traditional ERPs will migrate to mobile ERP and cloud ERP systems. Mobile systems will make it possible to obtain company information more easily and quickly, in a context where the use of wireless devices continues to increase. In turn, cloud ERP systems will become popular because of the flexibility they enable. In addition, implementation, electricity and maintenance costs will be reduced (Bahssas, et al., 2015).

The implementation of ICT requires strategies, operational models, structured business methods and trained personnel who can implement it with a guarantee of success. That is why, in many cases, the technological strategy is not properly adopted, and there is a misuse of the tools that are not used in the best possible way, even though they succeed in getting business. On many occasions there has been total implementation of ICT in terms of hardware and Internet, but there has not been much progress in the implementation of software related to management and marketing processes (Medina et al., 2015, p. 8).

The integration of all information related to a corporation is precisely one of the most critical concepts in the context of information systems (Azevedo et al., 2012). If an organisation’s information is not properly integrated, certain disadvantages arise, such as the difficulty in obtaining consolidated information and redundancy.

In addition, Elragal and Haddara (2012), explain other disadvantages of implementing ERP/e-business technology. This implies making critical changes in the organisation through business process reengineering (BPR). In other words, this implies adequate change management so that technologies are implemented within the organisation, taking on board the resistance to change of the organisation’s members, without jeopardizing the transformation of the company. This last aspect is the most complicated task because it is necessary to change the way people think and work.

Nevertheless, the combination of both technologies, ERP and e-business, offers companies the opportunity to improve the efficiency and scope of their business, which drives them to seek effective solutions to match the functionality of these two technologies and thus achieve a strategic advantage.
2.1. ERP technology applied to the hotel sphere

Effectiveness in fundamental areas of the hotel business (such as reservations, reception, room checking, lounges, restaurants and relations with suppliers) has made it necessary to create specific programmes for whose development some computer companies specialised only in this area have emerged since the mid-eighties. Both vertical solutions, designed exclusively for the sector, and customised ERPs based on standard generic ERP solutions, have appeared on the market.

Among the advantages of using an ERP in a hotel company, Negre Buades (2017) points out the following:

1. It integrates systems of operating.
2. It maximizes internal efficiency.
3. It reduces the need for back-office personnel.
4. It reduces the need for front-office personnel.
5. It makes it possible to monitor all areas of the hotel building.
6. It optimizes decision-making through dynamic reports.

2.2. E-business applied to the hotel sector

E-business has led to the emergence of new tourism intermediaries. According to the definition of Rodríguez-Zulaica, Pastor and Ara (2017), tourism intermediaries are those who link up the main tourist agents with consumers, i.e. who transfer the right of use from one to another in exchange for economic profit and assume the risks involved in these sales transactions in the process. Traditionally, tourism intermediaries were mainly travel agencies, with the majority business model being B2C (business to costumer) and the minority model being B2B (business to business), mainly adopted by wholesale travel agencies, also known as tour operators.

The penetration of e-business together with the extensive expansion of the Internet in homes has led to a disintermediation that could be thought of as pushing all types of tourism distribution companies out of the market, however new intermediaries have also appeared: OTAs (online or virtual travel agencies), online auctions, GDSs, CRSs or infomediaries. The trend is for OTAs and other intermediaries to be fully integrated within hotel companies’ ERPs (Medina et al., 2015, p. 11) or for hotels to invest in technology to improve their websites and reduce their dependence on these (Barrio, Ballestero, Domecq and Romero, 2016). Digital consumers buy their trips by improvising and adopting the budget and offers they find on websites. Due to the existing competition in the hotel market, the websites’ homepage has to have a high degree of perceived visual appeal (López & García, 2018).

The added value of online intermediaries lies in the analysis and filtering of the data collected by users, thus providing information that is presented in a personalised format to the customer. Thus, the middlemen that are best able to handle the
enormous amount of information that exists on the web will be those that provide the greatest added value to their customers (Rodríguez-Zulaica et al., 2017).

Another key aspect of e-business lies in alliances with partners in the value chain, so that the customer can contract the hosting service as well as other additional services that they will need during their stay. Thus, different types of relationships can be formed:

- Relationships with airlines: to offer economic transport and accommodation packages on designated dates.
- Relationships with local travel agencies: so that the customer can choose and contract their excursions.
- Relationships with local transport agencies and hotels in other provinces: in case customers wish to move around during their stay and visit other provinces.
- Relationships with museums, and leisure businesses: so that tourists can book and obtain their tickets.
- Other relationships.

Without a doubt, the technology aspect is the engine of e-business and its evolution has given rise to the whole set of standard computer applications today, which can handle operations such as managing reservations, prices, inventories and intermediaries on-line. Many hotel businesses can now contract tailor-made products from consulting companies that provide all the steps that hotels want to handle on internet and interconnect them with their ERP systems.

2.3. The ERP/E-business matrix

Any company that intends to set strategies for implementing ERP or e-business systems needs to be aware of its current situation in order to make rational decisions about how to commit its resources and determine the desired end point by combining the two strategies (Partearroyo, 2007). In the literature we have found a model that explains the different scenarios that a company may experience depending on the stage of ERP and e-business implementation it finds itself in (Norris et al., 2001). The sum of all combinations makes up the ERP/e-business matrix, which can be seen in Table 1. It contains 5 ERP scenarios on its vertical axis and 5 e-business scenarios on its horizontal axis:
Table 1. ERP/ E-business matrix

|                                | No e-business capabilities | Channel improvement | Value chain integration | Industry Transformation | Convergence |
|--------------------------------|-----------------------------|---------------------|-------------------------|-------------------------|-------------|
| From scratch                   |                             |                     |                         |                         |             |
| Non-integrated systems         |                             |                     |                         |                         |             |
| Limited or sole purpose ERP    |                             |                     |                         |                         |             |
| Business Unit ERP              |                             |                     |                         |                         |             |
| ERP in an integrated company   |                             |                     |                         |                         |             |

Source: Norris et al., 2001.

To summarise, the five options of the e-business axis are based on the following descriptions:

- **With no e-business capabilities**: this is where organisations that do not take advantage of any of the possibilities of e-business are. They do not have a corporate website.
- **Channel improvement**: here are all the companies that have adopted e-commerce or channel-marketing improvement, i.e. they sell or buy products and services on the Internet.
- **Value chain integration**: this scenario corresponds to companies that seek more advantages from e-business, in addition to mastering channel improvement, and incorporating customer and supplier operations into their own processes and systems. On the customer side, they create customised web pages and portals to simplify Internet transactions and collect customer information. On the supplier side, they share design, planning and forecasting with suppliers to increase the speed of two-way information flow.
- **Industry Transformation**: This is where the organisations that use e-business to create a transformational business model for the industry come in. The objective is to align their strategies with their suppliers and customers. The dividing line between the different companies forms the value chain and is increasingly smaller, as they join up their systems on the Internet, creating new markets, new opportunities, new customers and new products and services. They become knowledge companies that use the Internet to get rid themselves of the parts of their business that are not core and become leaders in the extended enterprise value chain.
Convergence: consists of the grouping of companies from heterogeneous sectors to provide goods and services to consumers. This convergence depends on the deregulation of the industry, the globalisation of the economy, the evolving demand of customers and new tactics needed to compete. The Internet enables these companies to partner in developing products and services that are offered to the customer in one single store.

The options on the ERP axis are as follows:

- From scratch: this is, by definition, a start-up company.
- Non-integrated systems: these are the companies that have different software packages for each of the business units, which work with no integration. Consequently, interfaces need to be created to overcome data access limitations. In this situation, companies find it extremely difficult make headway in the e-commerce channel, as they lack an enterprise resource planning strategy, and this leads to a disproportionate increase in organisational costs.
- Single function ERP: These are companies that have implemented one or a few basic modules of ERP software, either in a department or throughout the company. Sometimes they have implemented ERP software modules from different manufacturers and for different functional areas. This is a similar scenario to that of non-integrated systems, except that ERPs are more advanced applications than the previous ones. These companies should complete their ERP strategies.
- ERP by business unit – this occurs when processes are integrated within an individual business unit. However, the suppliers, customers, products, and management of each of the units are not linked or integrated with each other, and there are no synergies between them. These companies have the problem of presenting a single face to the customer in e-business. Since they have not implemented an ERP solution that is integrated with all the business units, they will surely achieve a piecemeal approach to e-business, with multiple solutions.
- Integrated ERP for the whole company: the companies that are located in this section are there because they have implemented their ERP system 100% and, consequently, they have an integrating system for the goods or services offered on their web pages. For customers, this means that they have the information they need in real time through the corporate page; for suppliers, this means that the company is able to manage the transit of materials to the manufacturing process with a process that benefits both.

Depending on the 25 options that the ERP/e-business matrix provides, there are 6 main areas where organisations can be found:
Table 2. Segments of the ERP/E-business matrix

| Position | Description | With no e-business capability | Improvement in channel | Value chain integration | Industry transformation | Convergence |
|----------|-------------|-------------------------------|------------------------|------------------------|------------------------|-------------|
| I. Launch | From scratch | I. Launch | II. Limited company growth | IV. High costs in relation to profit | V. Optimisation at Business unit level | VI. Optimisation of the company |
| II. Limited company growth | Limited or sole purpose ERP | III. Limited customer benefits, Less e-business option | | | | |
| III. Limited customer benefits, Less e-business option | ERP in business unit | | | | | |
| IV. High costs in relation to profit | ERP in an integrated company | | | | | |

Source: Norris et al., 2001.

As can be seen in Table 2, the following segments can be identified in the ERP/e-business matrix:

Position I, launch, is the situation of a newly created company, starting up business. It will have to decide which direction to focus its efforts in, as it moves through the e-business environment. This is a decision that will depend to a great extent on the competitive environment where it is located; the business relationships it wants to establish, and its internal capabilities.

Position II, limited growth of the company, is that of a new company with significant technological skills. These companies decide to grow without investing in implementing an ERP system. Determining this strategy lies in the cost and resource savings that come from implementing an ERP system and the total flexibility to use web-based technologies. However, the lack of a technological management infrastructure to support e-business, instead using manual internal processes, stymies internal organisational growth and partner relationships.

Position III, the reduced e-business option, offers hardly any positive aspects. It limits the benefits that could be enjoyed by customers as well as companies’ immersion in e-business.

Position IV, high costs in relation to profits, requires a major effort to extract data, process transactions and improve technology. Even if the efforts made in e-business are successful, the company is obstructed by the many requests received through e-business, with no capacity to control the internal information flows due to not having enabled an ERP.

Position V, business optimisation at the business unit level, and position VI, company optimisation, are the most suitable ones for companies and the ones they want
to achieve as soon as possible. They are companies that have integrated their ERP systems and e-business systems throughout the organisation, consequently, they are efficient companies that have total control of their internal and external processes.

All companies that are in the first categories must migrate to other more advanced matrix scenarios. However, each one of them has the capacity to decide, from among the different possible options, how to move from their respective starting point to their goal. The different alternatives can be seen in Table 3:

Table 3. Migration towards new ERP/e-business scenarios

| No e-business capabilities | Channel improvement | Value chain integration | Industry Transformation | Convergence |
|---------------------------|---------------------|------------------------|------------------------|-------------|
| From scratch              |                     |                        |                        |             |
| Non-integrated systems    |                     |                        |                        |             |
| Limited or sole purpose ERP |                   |                        |                        |             |
| Business Unit ERP         |                     |                        |                        |             |
| ERP in an integrated company |                 |                        |                        |             |

Source: In-house, from Norris et al., 2001.

If the company starts from scratch in both scenarios, it has three possible routes to follow (out of the many there may be) to reach zone five or six. Thus, the company can choose to develop its ERP before e-business or the reverse - or progress with both technologies simultaneously. In theory, there is no one path to choose that might be better than another, although the authors of the model indicate some guidelines for choosing the appropriate steps and guaranteeing the success of the migration: among others, that the chosen scenario must be consistent with the organisation’s business strategy; the migration project must have management leadership; that the company will redesign the current business processes if necessary; and that the migration path will be conditioned preferably by progress in the ERP scenario rather than in e-business.

3. Methodology for the study undertaken

The aim of the study is to weigh up the impact of ICT, and more specifically, the degree of implementation and use of ERP and e-business tools in a sample of hotel
establishments which were consulted over two different time periods. The first was run in 2003 (Partearroyo 2007), while the second, the subject of this paper, was carried out in 2017.

The research has made it possible to establish the ERP/e-business scenarios where the companies are located, and to observe the evolution from 2003 to the present time.

The study was carried out on a sample of 16 hotel chains and hotels in 2003 and 23 in 2017, with ratings ranging from 3 to 5 stars, located within the Community of Madrid. Although, at first glance, this might seem a small sample, the fact is that the data from hotel chains can be extrapolated to all the hotels in these chains, since the questions have always been related to the management of the remaining hotels in the chain. This case by case basis enables a small sample to be highly representative of hotels across the board because the market share of hotel chains in Spain is 39%, by number of establishments, and 63% by number of rooms.

The data was obtained through personal interviews with the hotel managers, for which no standardised questionnaire was used. Instead, a dialogue was held with the manager interviewed, following a script containing the following points:

– Description of the business management information system and the computerised business functions.
– Degree of satisfaction of the hotel with the current system (what the advantages and disadvantages are whether they think they made a profit on their investment, etc.) and their future prospects (if they plan to implement an ERP system if they do not have one, or to add more modules or change the system, etc.)
– The e-business related operations that the hotel handles and what state of development they are at.
– Future prospects in terms of e-business (which e-business technology tools the hotel or chain plan to incorporate in the future).

One of the objectives of the open interviews was to be able to obtain information to position the hotels in each scenario and to ascertain how the information systems in this study have developed over the last decade. In this sense they have been asked how they have evolved in their ERP and E-business systems, to reach the current situation.

Table 4 shows the indicators used to set the scene.
Table 4. Indicators for ERP/e-business scenarios

| ERP phase               | ERP phase indicators                                                                 |
|------------------------|--------------------------------------------------------------------------------------|
| From scratch           | They do not use business management programmes.                                      |
| Non-integrated systems | They use non-integrated management programmes.                                       |
| Sole purpose ERP       | They use some module of an ERP with other non-integrated systems.                    |
| Business unit ERP      | They use different ERPs for different business units.                                |
| Integrated ERP         | They use the same ERP for the whole chain.                                           |
|                        |                                                                                      |
| E-business phase       |                                                                                      |
| No capacities          | They do no e-business.                                                               |
| Channel improvement    | They run marketing activities, purchasing or selling services on the Internet.       |
| Value chain integration| Integrated electronic value chain with suppliers, intermediaries and customers.      |
| Transformation         | Digital transformation of the value chain and the main business processes (intranets connected through the Internet). |
| Convergence            | Online grouping with other companies in the same sector or another takeaway sector (online agencies, taxis, cleaning services, other chains, platforms, clusters) to provide joint goods and services. |

Source: In house.

The hotel samples are different as, over time, there have been hotels that have disappeared or changed their name and others that did not even exist in 2003. This is why an attempt has been made to use samples with a percentage of similar hotels in order to be able to compare present and future situations. We therefore intend to show two different snapshots in two different time frames and compare them:

- 75% (in 2003) and 70% (in 2017) of the hotels analysed are hotel chains (understood as those with more than two establishments), the rest were privately-owned.
- 62.5% and 60% respectively of the establishments studied had more than 100 rooms.
- 50% and 56% respectively of the hotels surveyed were 4-star hotels.
- The Sol-Meliá, NH and Occidental hotel chains, and the Paradors, were all included in both samples.

4. Results

4.1. Results obtained in 2003

The possible scenarios of the ERP/e-business matrix were analysed from the data obtained from the 2003 sample of hotels, and the results are as shown in table 4.
Table 5. ERP/E-business scenarios in the hotel sector in 2003

| From scratch | With no e-business capability | Improvement in channel | Value chain integration | Industry transformation | Convergence |
|--------------|-------------------------------|------------------------|-------------------------|-------------------------|-------------|
| Non-integrated systems | | | | | III. Limited customer benefits. Reduced e-business option |
| Limited or sole purpose ERP | | | | | V. Optimisation at the business unit level |
| ERP in business unit | | | | | VI. Optimisation of the company |
| ERP in an integrated company | | | | | |

○ Hotel chain  ● Single Hotel

Source: Partearroyo, 2007.

The most important conclusions drawn from the 2003 study were that most hotels were at the e-business stage of improving the channel, as they used their own web page as a marketing element to advertise their services and make reservations, however few provided electronic payment, although they gave the user the option of providing the credit card number to guarantee the reservation. Respondents who found themselves in this scenario justified their position by arguing the distrust and insecurity for customers when paying online. This position, (limited customer benefits, reduced e-business option) offers hardly any advantage, limits the benefits that customers could enjoy and offers little flexibility to move around in the e-business environment.

The hotel chains interviewed had an Intranet for B2B while none of the private hotels had this. This is a characteristic that differentiates hotel chains from independent hotels and directly affects investment in ICT. By having more geographically dispersed staff, the chains emphasise that the use of these technologies is an invaluable aid for coordination and information exchange between employees.

The group of hotels that did not present their ERP as a strength because they were in the early stages, said they could not justify the profitability of the investment and very few (only those at advanced stages) linked the need to use these systems together with e-business technology.

From the previous illustration, it seemed that the path that hotel establishments would follow to assimilate the new technologies and move from one area to another would first evolve in the ERP scenario until reaching the ERP stage in a business unit or ERP in an integrated company. Once in this scenario, e-commerce and e-business
applications could be introduced. The prediction made about the development direction, based on the future perspectives obtained from the survey answers (Partearroyo, 2007) is also in line with the opinion of some authors that ERP systems are the architecture of e-business systems (Martín and Del Olmo, 2004). This evolution can be seen graphically in Table 5.

Table 6. Prediction from 2003 on the future development of ERP/e-business scenarios in the hotel sector

| Without e-business capability | Improvement in channel | Value chain integration | Industry transformation | Convergence |
|------------------------------|------------------------|-------------------------|------------------------|-------------|
| From scratch                 |                        |                         |                        |             |
| Non-integrated systems       |                        | III. Limited            | Reduced e-business     |             |
|                              |                        |                          |                         |             |
| Limited or sole purpose ERP  | III. Limited           | Reduced e-business      | Reduced e-business     |             |
|                              |                        |                          |                         |             |
| ERP in business unit         |                        | III. Limited            | Reduced e-business      |             |
|                              |                        |                          |                         |             |
| ERP in an integrated company |                        | III. Limited            | Reduced e-business      | III. Limited|

○ Hotel chain  ○ Single Hotel
Source: Partearroyo (2007).

4.2. Results obtained in 2017

During the 14 years since the study by Partearroyo (2007), there have been fundamental changes and advances in the hotel industry.

Basically, what has evolved most in recent years is the proliferation of different electronic distribution channels, considerably increasing the e-business interactions of hotel establishments, encouraged by the appearance of new intermediaries (Rodríguez-Zulaica, Pastor and Ara, 2017).

The 2007 study, similar to that of 2003, once again provided a representation of the ERP/e-business matrix, as well as a different snapshot, as shown in Table 7.
Table 7. ERP/E-business scenarios in the hotel sector in 2017

| From scratch | With no e-business capability | Improvement in channel | Value chain integration | Industry transformation | Convergence |
|--------------|-------------------------------|------------------------|-------------------------|-------------------------|-------------|
| Non-integrated systems | | | | | |
| Limited or sole purpose ERP | III. Limited customer benefits. Reduced e-business option | | | | IV. High costs in relation to profit |
| ERP in business unit | | | | V. Optimisation at the business unit level | |
| ERP in an integrated company | | | | VI. Optimisation of the company | |

○ Hotel chain  ● Single Hotel

Source: In-house.

In 2017, it was observed that 100% of the sample were using an ERP. From the responses analysed, it could be concluded that hotel chains tended to use ERP solutions already developed on the market for this sector and to make the appropriate changes to adapt them to the hotel’s own management. This was not the case in individual establishments, which were characterised by the use of more diverse and cheaper ERP systems.

The most important advantages of the use of an ERP, as considered by hotel establishments, were the following:

- Reduction in the time needed for tasks.
- Obtaining updated information quickly.
- Ease of use and reliability, reduction in failures and errors.
- Resource optimisation, reducing paperwork and administrative work.
- A good tool for tracking.

The most frequent disadvantages or complaints are:

- The high cost of implementation (installation, maintenance, training, etc.) which makes a return on investment difficult to obtain.
- The scarce flexibility of some software solutions that do not allow modifications in order to adapt them to the specific needs of hotels.

Finally, with regard to the evolution of the four hotel chains that have been assessed in the two scenarios, it should be noted that they have all evolved in the
direction of increasing their e-business through one or two steps. Three of them were already at the integrated ERP stage, thus they could not advance any further in the ERP direction. The other had also moved up to this step from ERP by business unit, and two steps in the e-business direction.

4.3. Discussion of results

From the results obtained, it can be deduced that the hotels and hotel chains represented have evolved in both directions, prioritising progress in e-business scenarios rather than ERP scenarios.

In fact, all the hotel establishments interviewed had their own websites where online reservations could be made and were present in various online intermediaries (such as www.expedia.com, www.booking.com, www.rumbo.com) and in global distribution systems, thus increasing their global presence. Another noteworthy fact is the disappearance of distrust in the use of the Internet for making payments and other types of transactions.

It should be noted that most of the hotels interviewed have also oriented their e-business activities towards e-procurement, making purchases electronically, either directly or through vertical supplier portals.

In 2017, all the hotels were satisfied with their respective ERPs, although it should be noted that many of them had changed their ERPs relatively recently, and now have more complete and advanced ERP management solutions.

On the other hand, in the 2017 matrix there are companies in new scenarios:

In scenario IV (high costs in relation to profits), there are hotels that have evolved in the e-business area but nevertheless continue to use non-integrated management systems; this can mean great complexity in handling the information flows that come from e-business through the e-business front end. With this, these companies are not making their information systems profitable.

In scenarios V and VI, the hotels were companies with efficient systems that provided great profitability for the companies that adopted these scenarios.

As regards the evolution of the ERP/E-business matrix, it is true that the final objective has borne out the predictions made when commenting on the results obtained in 2003, shown in table 5, since the immense majority of establishments are positioned in scenarios V and VI. Based on the information gathered in the interviews conducted, we have seen that the way to reach this situation was the reverse, moving forward first in the e-business scenarios and then in ERP. The following table illustrates how this evolution would work.
Table 8. Current evolution of the ERP/e-business matrix from 2003 to 2017

| From scratch | With no e-business capability | Improvement in channel | Value chain integration | Industry transformation | Convergence |
|--------------|-------------------------------|------------------------|------------------------|------------------------|-------------|
| Non-integrated systems | | | | | |
| Limited or sole purpose ERP | III. Limited customer benefits. Reduced e-business option | | | | |
| ERP in business unit | | | | | |
| ERP in an integrated company | | VI. Optimisation of the company | | | |

○ Hotel chain  ● Single Hotel

Source: In-house.

5. Conclusions and new trends

In this paper, two similar studies were run in two different years, 2003 and 2017, on the evolution of the Information Systems in our study, centring on the following aspects:

The hotel sector in general, and the large hotel chains in particular, were the most proactive in using ICT in the Spanish context (Urueña et al., 2017).

Due to the peculiarities of the hotel sector, the trend is to use mostly enterprise resource planning (ERP) software, developed specifically for the management of hotels, although managers of the establishments or chains prefer to include changes to adapt their functionality to the organisation of each particular hotel.

In 2003, we found that very little e-business was done in the hotel sector. Websites were used as an advertising element and sometimes to make reservations, without exploiting their potential. The industry’s inclination seemed to be towards improving internal and management processes, which meant investing in ERP software, leaving e-business to one side.

This whole context changed during the period studied: 2003-2017, as this was characterised by a recession that led to a serious economic and financial crisis, affecting all sectors. Companies were forced to reduce costs and study and select their investments skilfully. This had an impact on ICT investments (Estébanez, 2012). In fact, the investments that were maintained were aimed at improving e-business since,
compared to ERP, this is a more economic technology capable of producing profit in the short term, while management technologies need more time to be profitable, through efficiency and not through direct sales, as is the case with e-business.

The economic situation has been the main factor in investment decisions in the sector. In 2003, the incorporation of ERP systems was relatively recent, as it had been implemented in companies from the 90s onwards, coinciding with the change of currency (the euro), the new millennium in 2000, and all the IT problems that went with it. Many hotels took advantage of the need to make changes to their computer systems to carry out major restructuring in the management of their business, incorporating new business application information and communication technologies. After these years, investment in ERP was paralysed by the economic crisis and became obsolete in comparison with the e-business technologies adopted.

The virtualisation of companies provides flexibility, capacity and speed of response within a strategy aimed at satisfying the consumer. Those who manage companies need to have a business vision aligned with ICT (Rada, 2009; Slusarczyk Antosz and Morales Merchán, 2016) and continuously improve their systems. ICT has become a key factor for their businesses and prepares them to face the future with greater guarantees.

In recent years, the hotel sector has visualised another advantage on the Internet, which is participation in social networks (Rivero and Rangel, 2016) to make itself known, advertise its products and approach customers more directly.

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