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Speed of ICT integration strategies in absorptions: Insights from a qualitative study

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Summary A quick replacement of the Information and Communication Technology Systems (ICT) of the target company with the bidder's ICT is expected in absorptions, as the synergies stemming from these deals lie in the rapid integration of the acquired firm within the organizational structure of the bidder. However, the evidence from the literature shows that this is not always the case. In order to analyze and identify the different ICT integration strategies, we conduct a multiple case study featuring five Spanish companies with ample experience in absorptions. Based on this evidence, we construct a typology of ICT integration strategies based on the speed of integration, which is understood as the extent to which the ICT system integration meets or exceeds the minimum technology transfer time due to other organizational requirements.
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Introduction

The integration of Information and Communication Technology (ICT) systems plays a key role in the management of acquisitions because it can delay the integration program and destroy value, as different authors have noted (Brown & Renwick, 1996; Buck-Lew, Pliskin, Shaked, & Wardle, 1992; Giacomazzi, Panella, Pernici, & Sansoni, 1997; Johnston & Yetton, 1996; McKiernan & Merali, 1995; Robbins & Stylianou, 1999; Stylianou, Jeffries, & Robbins, 1996) and firms have recognized after completing a merger or an acquisition (PWC (PriceWaterhouseCoopers), 2004).

This is hardly surprising, given that research on the management of mergers and acquisitions (M&As) has established

that the effective integration of the target and acquiring firms is the key to taking advantage of the synergies stemming from the deal (Henningsson & Carlsson, 2011; Mairea & Collerette, 2011; Ruess & Voelpel, 2012; Tanriverdi & Uysal, 2011). Mergers and acquisitions can be considered as paths to growth and performance improvement (Capron, 1999; Chatzkel & Saint-Onge, 2007) and, more specifically, as a means to leverage organizational learning (Hayward, 2002; Zollo & Singh, 2004), which is generally understood as all of those processes and systems through which a given organization can learn by itself (experience-based learning) and/or with the help of others (vicarious learning) to improve its sources of knowledge creation and knowledge transfer, both internally and/or externally. Unfortunately, because of unrealistic expectations relative to the outcomes of the entire process, the immediate benefits expected from the merger are often not achieved (Robbins & Stylianou, 1999). In this sense, mergers and acquisitions

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may disrupt the operations of the organizations involved, given the need to integrate personnel, business processes, information systems, and diverse information technologies across the merging organizations (Robbins & Stylianou, 1999).

One of the difficulties in capturing the value created with mergers and acquisitions is that there is no universal integration strategy applicable to every single case, because the appropriate integration strategy is contingent on the logic of value creation (or the objective) of the deal. Haspeslagh and Jemison's (1991) work shows that the best integration method will be contingent on the level of strategic interdependence and organizational autonomy targeted by the merging firms. More specifically, they identified three different integration strategies, all valid in several contexts. The first strategy is absorption, which consists of unification in the management of the acquiring firm. The second is symbiosis, a strategy that is based on the cross-transfer of selected resources and capabilities between the firms while maintaining the autonomy of the firms. The third is preservation, a strategy where the bidder seeks to nurture the capabilities of the acquired firm while maintaining its autonomy. ICT can be expected to play a different role in each of these three strategies. The role of ICT integration is most important in absorptions where the complete integration of the ICT systems is required (Wijnhoven, Spil, Stegwee, & Fa, 2006). For this reason, we will focus our research on absorptions and address the following question: What are the key factors that determine the speed of ICT integration in absorptions?

In the literature on mergers and acquisitions, *speed of integration* is understood as the time needed to integrate the systems, structures, activities, and processes of the merging companies (Homburg & Bucerius, 2006) and is an important issue (e.g., Haspeslagh & Jemison, 1991). A rapid integration is generally expected in absorptions (Canella & Hambrick, 1993; Homburg & Bucerius, 2005; Larsson, Brousseau, Driver, & Sweet, 2004; Sirower, 1997). However, evidence suggests that this is not always the case because the relationship between the objective of the deal and the integration strategy is usually far more complex than expected (Wijnhoven et al., 2006).

To clarify the factors that determine the speeds of ICT integration strategies in absorptions, this paper analyzes the experiences of five Spanish companies involved in several intra-industry (horizontal) acquisitions in which the objective of the deal was the absorption of the target by the bidder. We focus exclusively on absorptions where ICT integration is crucial and complete integration is necessary to capture the value created by the deal. We analyze the relationships between the different integration methods and the speed of integration in order to identify four integration strategies for absorptions.

The remainder of this paper is organized as follows. The next section presents a theoretical base that is related to the integration methods, the role of ICT systems integration, and the speed of integration. Methodology describes our methodological approach. The different case studies are described in Empirical evidence. The evidence presented in the case studies and the propositions are discussed in Discussion and propositions and the conclusions are given in Conclusion.

Speed of integration and the role of ICT system integration in absorptions

In the case of horizontal or intra-industry acquisitions, the absorption strategy is the most widely adopted procedure used to manage the integration process. The absorption method entails a high level of strategic interdependence and a low level of organizational autonomy in order to realize greater synergies from the unification of procedures and activities (Haspeslagh & Jemison, 1991).

According to Haspeslagh and Jemison (1991), an absorption-based interorganizational acquisition entails the following steps:

1. Develop a plan to consolidate the businesses
2. Manage the rationalization following the consolidation
3. Promote the diffusion of good practices in all areas of potential complementarities
4. Take maximum advantage of the complementarities existing between the companies

ICT system integration should play a critical role in the management of absorptions because the synergies only emerge after both companies are under the same management. For this reason, the unification of the ICT systems is necessary to effectively integrate absorptions.

Although previous research on M&As has yet to provide clear agreement about the speed of post-merger integrations (Homburg & Bucerius, 2006), some researchers have argued that a faster interfirm integration seems to be more advantageous in general because it minimizes the disruption of employees (e.g., Canella & Hambrick, 1993), reduces the time during which competitors may profit from the distraction of the acquirer by integration issues (Homburg & Bucerius, 2005), and improves the acquisition performance by accelerating value creation (Larsson et al., 2004). In the particular case of horizontal acquisitions between companies of the same industry (absorption processes), the rapid unification of the ICT/information systems resources of a target and an acquirer appears to be essential for the success of the merger because it establishes the technological foundations needed to combine their other resources and procedures. The unification of the ICT systems becomes the starting point for fully exploiting all of the potential operational synergies associated with the transference of organizational routines, especially from the acquirer to the target.

According to Wijnhoven et al. (2006), there are four possible ICT integration modes for absorptions: (1) abolish the entire ICT systems of both merger partners and replace it with a completely new ICT (renewal); (2) close down all of the ICT systems of one of the partners and use the ICT of the other partner for both companies (takeover); (3) combine the best parts of both ICT systems as the new standard for the merged organization (standardization); and (4) coexistence, which maintains both ICT systems, although it periodically synchronizes the redundant systems of both merger partners (synchronization). Even though these four options are valid integration modes for acquisitions, not all of them are equally effective for absorptions. As Wijnhoven et al.

(2006) argue, renewal often is not very practical when the available time is insufficient to build a new system from scratch. Likewise, synchronization realizes only marginal ICT integration because it preserves the original ICTs of both organizations and creates software and hardware bridges in order to consolidate data or periodically synchronize different systems (Wijnhoven et al., 2006). Therefore, takeovers and standardizations are expected to be the most frequent modes in absorptions when the bidder has a better ICT system than the target, or both the bidder and the target have appropriate ICT systems.

Even though a rapid ICT integration is desirable in order to fully exploit the synergies between the bidder and the target, implementing any of these integration modes is not always easy. Sometimes, the issues related to ICT integration are not taken into account when planning the deal (Buck-Lew, Pliskin, et al., 1992; Buck-Lew, Wardle, & Pliskin, 1992; Stylianou et al., 1996). However, in other cases, there are issues that can complicate the integration task. Stylianou et al. (1996) identify several factors that can support or impede the successful integration of ICT systems of merging companies. Prior merger experience, ICT participation in merger planning, the quality of merger planning, the criteria used for setting ICT integration priorities, and a high level of data-sharing across applications appear to have a positive influence on the success of the ICT integration. Likewise, the same authors point out that changes that directly affect personnel and programming language incompatibilities may have a negative impact on ICT integration success.

Careful planning of the ICT integration process should help to avoid some of these problems. However, Alaranta and Henningsson (2008) show that there are different ways to plan and implement integration. Although integration is expected to be completed in the shortest time possible (Wijnhoven et al., 2006), sometimes the previously mentioned difficulties (Stylianou et al., 1996) or cultural conflicts (Chao & Lin, 2009) can make a quick integration difficult.

Choosing between the takeover and standardization modes of integration requires a careful analysis of the characteristics of the bidder and the target. Based on the results of previous research (above), it can be expected that when the bidder has a better ICT system than the target, and when language incompatibilities exist between the bidder and the target firms' ICT systems, a takeover might be preferred because it would decrease the amount of time for resolving these incompatibilities. In these cases, looking for a new standard and combining the best of the two (or more) original systems could be a very time-consuming strategy.

In contrast, when the ICT departments of the bidder and target firms participate actively in the merger planning, and/or a high level of data-sharing exists, the option of combining the best parts of the two ICT systems appears to be less time-consuming than a takeover strategy. The takeover option would generate a tense situation that could increase the time needed to complete the integration of the systems.

However, an important issue (not highlighted in previous research) is the extent to which it is necessary to minimize the duration of the ICT integration process in takeovers and standardizations. To bridge this gap, we conducted several case studies to identify the criteria for the strategy and speed of integration in specific cases.

Methodology

Research design

Several different authors encourage qualitative research approaches to studying information technology phenomena (e.g., Romm & Pliskin, 1999; Trauth & Jessup, 2000). Of the qualitative methods that have gained acceptance, field case study research is the most important one (Benbasat, Goldstein, & Mead, 1987; Benbasat & Weber, 1996; Klein & Myers, 1999; Orlikowski & Baroudi, 1991).

Management literature recognizes that case research is useful when a phenomenon is broad and complex, a holistic, in-depth investigation is needed, and a phenomenon cannot be studied outside the context in which it occurs (Benbasat et al., 1987; Bonoma, 1985; Feagin, Orum, & Sjoberg, 1991; Yin, 1994). According to Dubé and Pare (2003), the case research method is particularly well-suited to ICT research for four different reasons: first, because the subject is information systems from an organizational point of view, not purely from the technical perspective. Second, case researchers can capture the rapid changes occurring in the ICT world, as well as in organizations, by accessing and reporting on real-life ICT experiences. Third, a holistic approach (a key characteristic of case-based research) allows researchers to understand the complex interactions among organizations, technologies, and people. Fourth, in-depth case investigations open new lines of reasoning and pinpoint the opportunities, challenges, and issues facing ICT specialists and managers.

As no clear theory currently exists for identifying the key factors that determine the speed of integration of information systems between companies involved in absorption (intra-industry acquisition) processes, a descriptive-exploratory case research approach (Orlikowski & Baroudi, 1991) is implemented in this research. In these types of (multiple) case studies, researchers present what they believe to be straightforward, objective, factual accounts of events in order to illustrate an issue of interest. Taking these methodological characteristics into account, few theories are needed at the very beginning to explain the case research approach, and it is not necessary to make causal links (Dubé & Pare, 2003), although researchers can build theoretical arguments that could constitute research hypotheses to be tested in future stages of the research process using quantitative techniques. However, even under these conditions, showing a logical chain of evidence and judging the reliability of the information become important elements whose omission undermines the credibility of the case studies.

We have followed Doz's (1996) methodology and the suggestions provided by Yin (1994) and Dubé and Pare (2003). More specifically, the empirical evidence is based on ICT integration experiences related to the absorption cases of four companies that collaborated in a broader study on the application of ICT by Spanish firms.

Data collection

The companies analyzed in this study are: Banc Sabadell, Ficosa, Fagor-Ederlan and mccgraphics (Table 1).

We selected these companies in order to construct a non-biased sample that covers both industrial companies (mccgraphics, Fagor-Ederlan and Ficosa) and service providers (Banc Sabadell). As Pettigrew (1989) points out, comparisons among sites may help demonstrate the influence of variability in context and, therefore, yield more general research results than would be obtained from a single case (Benbasat et al., 1987; Yin, 1994). All of the analyzed companies are from Spain. We believe that Spain is an excellent research setting for the study of the speed of IT integration in acquisitions. First, Spain is a country where domestic and cross-border acquisition activity has been very intensive during the last 25 years, allowing the formation of important multinationals (Guillén & García-Canal, 2010). In addition, focusing on Spanish companies allowed us to study IT integration in a wide variety of contexts. Spanish companies first grew in the domestic market and then expanded to either more developed or less developed countries. Whereas acquisitions of companies from more developed countries are more aggressive and have some similarities with the expansion of Emerging Market Multinationals (Guillén & García-Canal, 2010; Stucchi, 2012), acquisitions in less developed countries are more closely related to traditional perspectives on cross-border M&As that are related to exploiting competitive advantages (see, for instance, Morck & Yeung, 1992). For this reason we have chosen cases of domestic acquisitions and cross border acquisitions of companies, either from the European Union, Western Europe, or Latin America.

Mccgraphics is a group that is capable of tackling all of its clients' needs in the graphic arts market on a global basis: preprinting processes, as well as printing in finished flat or rotating machines. Fagor-Ederlan is a car components manufacturer, similar to Ficosa. Banc Sabadell occupies the fourth position in the ranks of Spanish banks and operates in the national banking market under the names of Sabadell/Atlántico, Banco Herrero, Solbank, ActivoBank, and Banco Urquijo. Both mccgraphics and Fagor-Ederlan are associated with the Mondragón Corporative Corporation (not analyzed in this study), although both companies are managed independently.

Some data from these firm cases were collected by a research team of three people according to a protocol. Instead of an individual researcher, a team of researchers can capture greater richness and foster greater confidence in the findings (Eisenhardt, 1989; Patton, 1999). Furthermore, multiple researchers can collaborate to maximize the reliability of their results. In this work, all three researchers were involved in all data analysis activities and they were able to reach an agreement whenever there were discrepancies among their findings and/or their interpretations.

Regarding the protocol, one of the tactics proposed by Yin (1994) to ensure reliability contained procedures and general rules for using the instruments and was created prior to the data collection phase. In fact, it was based on a series of questions related to ICT investments within each company (see Appendix A).

In order to collect this dataset, a series of personal interviews with key managers (Table 2) of these companies, who were directly implicated in ICT-related decision-making processes, took place over three months (February through April, 2006). Generally, a two-person team visited the organization and interviewed key players (Eisenhardt, 1989). Different roles were assigned to the researchers participating in the interview (one handled the interview, while another observed and took notes), in order to encourage the development of different views or perspectives that could be contrasted subsequently (Eisenhardt, 1989).

For each particular case, the number of interviews depended upon the match between the information necessities and information processing capabilities, but at least two people in each organization were interviewed. Therefore, a convenient snowball sampling strategy was implemented in each case.

On the other hand, the research team was able to collect other documentation for each case from memories, internal reports, or published news in a dossier so the information was also organized to provide multiple (but dissimilar) datasets regarding the same phenomena (Gallivan, 1997; Jick, 1979; Mingers, 2001). Therefore, for the companies considered, the research team completed a case study database of raw material that included interview transcripts, researchers' field notes, documents gathered during data collection, and other survey material, as well as coded data, coding schemes, memos and other analytic material, and data displays (Mingers, 2001).

Data analysis

Any finding or conclusion in a case study is likely to be much more convincing and accurate if it is based on several different sources of information. In fact, the process of combining multiple data sources is called "triangulation" (Jick,

Table 1   Characteristics of the analyzed companies.[a]

Firm	Foundation date	Size (employees)	Return on total assets (%)
Banc Sabadell	1881	10066	1.48
Ficosa International	1976	162	1.77
Fagor-Ederlan	1963	1375	3.47
Mmc graphics	1967	20	4.62

[a] Information in SABI related to 2006.

Table 2 Managerial staff who were interviewed in the companies that were analyzed.

Name of the company	Position
Fagor-Ederlan	Director of Quality and Systems
	Head of Information Systems
	Director of the Corporate Model of Management and i-mcc Project at MCC (parent company)
Mccgraphics	Director in Charge of Computer Science, Managing director
	Director of the Corporate Model of Management and i-mcc Project at MCC (parent company)
Ficosa	Director of the Department of Information Technologies
	Director of Purchases
	Director of Logistics
Banc Sabadell	Assistant to General Manager
	Director of Banking Operations and Channels
	Director of the Operational Center of Remote Channels
	Director of Architecture and Technological Innovation

1979). In this research, the triangulation of the different sources of information derived from each firm case was developed in the following manner:

1. First, a complete dossier with secondary data for each company, i.e., articles in press, and/or specialized magazines and corporative information, was prepared.
2. Then, an initial interview with the top ICT manager in each company was carried out. During this interview, primary data were collected in order to improve, complete, and/or check the information already obtained from secondary sources. The remainder of the interview made use of a semi-structured questionnaire that developed the aforementioned key points. As already pointed out, at least two members of the research team were present at each interview, and both members prepared a written report of the interview to provide data congruence.
3. After this initial interview, the subject of the interview was asked to recommend other managerial staff within the company who could contribute, complement, or even extend the information that they had provided. Later on, these managers were also interviewed according to the same procedure described above.

Regarding the data analysis, it is important to note that different field notes were taken during casual conversations, and these field notes were very complete because they included verbal as well as nonverbal information, and also described the context of the conversations. Likewise, the research team had a shared coding scheme that facilitated its extension to additional cases and avoided bias in the interpretations.

On the other hand, the evidence from the cases, which we present in the next section, allowed us to visualize the maintenance of a logical chain of evidence. In this sense, the use of quotes will help the reader to reach an independent judgment regarding the value of the analysis (Yin, 1994).

Finally, once the information was analyzed and a report on each case was written, it was sent back to the contacts who provided information at each company, giving them the opportunity to review and, if necessary, modify any information that they considered ambiguous or unclear in our preliminary report (Patton, 1999; Yin, 1994).

In Table 3, we summarize the list of attributes presented by Dubé and Pare (2003) regarding research design, data collection, and data analysis. These are presented as the attributes that positivist, state-of-the-art case research deems to be major considerations, with the purpose of providing a developed analysis with strong reliability.

The following sections illustrate the particular case of each company investigated in this work.

Empirical evidence

Banc Sabadell

It is interesting to consider Banc Sabadell and its investment strategy for ICT systems. According to Banc Sabadell's Director of Architecture and Technological Innovation:

> The strategy of investments in ICT systems is formulated considering the possibility of scaling the ICT infrastructure to fully integrate future banks to be absorbed.

The bank had prior experience in acquisitions, as it had bought the Spanish division of NatWest (which included Banco de Asturias). On the basis of that experience, the managers of Banc Sabadell sought other relatively small Spanish banks to absorb quickly. Banc Sabadell upgraded its ICT systems and purchased and integrated Banco Herrero and Banco Atlántico. They undertook the PROTEO project to optimize their internal procedures and systems. As the Director of Architecture and Technological Innovation of Banc Sabadell pointed out:

> The PROTEO (Operational Technological Productivity) program aims at looking for new means to improve the productivity level of the bank offices/branches by transforming them from the present administrative task-centered model to a new one, focusing on commercial tasks' development. In other words, transforming these offices into stores. Accordingly, this plan is conceived as one based upon simplifying the operational tasks of

Table 3 Attributes related to design, data collection, and data analysis.

Area 1: research design

Clear research questions	How were the ICT integration processes of the absorptions? What were the factors influencing the process?
Multiple-case design	Four cases were developed
Nature of single-case design	Descriptive
Replication logic in multiple-case design	Theoretical replication logic (conditions of the case led to predicting contrasting results)
Unit of analysis	Absorptions

Pilot case

Context of the case study	The four cases were from Spain. They were retrospective descriptive cases with different data collection periods. Data collection took place over three months (February through April, 2006) and researchers were able to gain sufficient access to the cases
Team-based research	Team of three researchers
Different roles for multiple investigators	Interviews were developed by at least two members of the research team with different roles

Area 2: Data collection

Elucidation of the data collection process	Interviews as one data collection method. Sampling strategy: convenient and snowball. At least two people from each organization were interviewed
Multiple data collection methods	Interviews and other documentation
Data triangulation	Triangulation of data was done
Case study protocol	The research team prepared a case study protocol
Case study database	A database was developed for each case

Area 3: Data analysis

Field notes	Captured during the interviews
Coding and reliability check	The research team had at their disposal a coding scheme that was also improved with the first case
Flexible & opportunistic process	Data analysis was done and overlapped with data collection
Logical chain of evidence	Evidence presented in the case reports allowed the readers to visualize a logical chain of evidence
Searching for cross-case patterns	The research team looked for between-cases similarities
Quotes (evidence)	Quotes were used to allow the reader to reach an independent judgment regarding the merits of the analysis (Yin 1994)
Project reviews	After the information was and analyzed, a report was written and submitted to the contacts at each company to give them the opportunity to review and, if necessary, modify material that they considered ambiguous or unclear in our preliminary report

the bank offices by relieving them of many low-value and purely administrative tasks (which will be assumed by the bank's central services and/or outsourced), and helping their employees to devote most of their time to conducting high-value commercial tasks, such as customer relationship management.

Banc Sabadell's first target, Banco Herrero, did not have an ICT department because its former owner, La Caixa, managed its ICT systems. As a consequence, the absorption of Banco Herrero did not entail any personnel transfers, employees did not feel uncertain about their future roles, and ICT staff interactions were facile. However, there was a negative aspect: the integration of Herrero's ICT systems into Banc Sabadell's ICT systems was not a priority for the staff of La Caixa. Nevertheless, the ICT system integration was accomplished within 6 months after the La Caixa staff gave higher priority to the integration process.

However, the acquisition of Banco Atlántico, a much larger bank than Banco Herrero, necessitated a complete revision of the ICT systems/department at Banc Sabadell. There were two critical aspects in the integration: (i) an absorption strategy was defined clearly, the business model and ICT infrastructure of Banc Sabadell were selected for the post-integration phase, and the ICT integration was defined as a ''technological migration'' process; (ii) Banco Sabadell clarified the professional future of the employees from the ICT departments of both banks. The assistant to the General Manager of Banc Sabadell commented:

An always latent problem in this type of processes is the management of possible redundancies of personnel in the different departments, and its impact on the morale of the people affected by them, since they may have uncertainty regarding their professional future. This is a crucial problem, as the effective integration of the

ICT departments requires that all staff from both companies put together all of their previously accumulated knowledge. To clarify any type of uncertainty, the organizational structure of the ICT department of the resulting entity (Sabadell-Atlántico) was clearly defined at the beginning of the process, and the redundancies of human resources–which came from the two organizations, not only from the Banco Atlántico [the target]–were solved in a non-traumatic way via early retirements or relocations to other departments of the company.

A well-defined methodology was defined for the technological migration process, starting with an exhaustive inventory of the products and systems of both parties, an analysis of their convergence, and a proper study of their integration. A dossier was created for each product by using the internal communication tools of the Intranet to evaluate the procedures followed by each bank. The idea was to analyze the functional differences between the formal procedures of the two banks, evaluating the technological, operative, and commercial impact of each one. Where convergence was found, the migration was approved directly. Where there were major divergences, the procedures of Banc Sabadell were maintained or the products and/or procedures of Banco Atlántico were incorporated, provided that they did not already exist at Banc Sabadell or were considered to be more fruitful than those at Banc Sabadell, but only as long as they made an important contribution and did not compromise the established deadlines of the integration process. The integration approach was ''to cut and paste'' without developing any new procedures, so the integration process was a quick standardization that did not extend the deadlines of the process, which were established on the basis of the technical requirements for completing the integration. Since Banco Atlántico was smaller than Banc Sabadell, there were very few cases of incorporations from the former to the latter.

The committee that made the decisions regarding each dossier was composed of representatives from business units (corporate and commercial banking), operations, organization, and the ICT departments that were involved. According to the Director of Architecture and Technological Innovation of Banc Sabadell:

> The committee met weekly and solved 170 dossiers in two and a half months. It was a very demanding process, since it was planned than the new entity had to start functioning with only one ICT platform in a maximum of 9 months; a very challenging goal that was accomplished.

The integration process of the ICT systems of both banks was, obviously, part of the global process of integration of the financial entities. For this global corporate process, an integration committee was formed and chaired by the CEO of the Banc Sabadell. This committee was in charge of supervising the integration of all of the strategic and functional areas of the merged entity.

Ficosa International

In Ficosa International, the absorptions of greater complexity emerged after the process of international expansion had already begun and its ICT management had been centralized to a significant extent. This centralization was possible because the company's international expansion had been based predominantly on the establishment of *greenfield* investments abroad (basically, new operational plants), which shared the same ERP (Enterprise Resource Planning) with the headquarters in Spain. The integration process of the ICT systems was relatively simple and accomplished quickly. The Director of the Department of Information Technologies pointed out that:

> The main idea was to establish and maintain only one ERP in order to benefit from the potential scale economies, in terms of the technological infrastructure and, in this way, to facilitate control of the different branches abroad.

Therefore, to share the same ERP was, and currently is, a strategic priority for this company. When a foreign plant requests an improvement of its information systems, the convenience and suitability of the improvement is studied from the point of view of the company as a whole and, if implemented, becomes part of the common information system of all of the plants. The only exceptions are related to those applications where, owing to very specific requirements of each plant or branch, no synergies appear to motivate their corporate unification and total autonomy is given to each unit to develop the most convenient alternative.

In 2000, Ficosa acquired the rear-view mirrors Division of Magneti-Marelli, a former member of the Fiat Group, which had a physical presence in Italy, France, Spain, Poland, Turkey, Brazil, and Argentina. According to the Director of the Department of Information Technologies:

> One of the objectives with this acquisition was that all these plants were integrated into the Ficosa plants' system. However, when we detected a better procedure in the new plants, we did not want to remove the process and we worked for integrating it into the Ficosa system. It happened, for example, with a code-bar-reader tool in a French plant of Magneti-Marelli. The system implied a double control and we considered it interesting for all of our plants, so we decided to adopt it and integrate it in our system.

Therefore, this absorption was intended to integrate nine operational units that had been owned previously by the Italian group. The acquired division had its own ERP as well as ICT systems that were very similar to those owned by Ficosa. Therefore, as in the cases of Banc Sabadell and Banco Atlántico, the integration of the rear-view mirrors Division of Magneti-Marelli was mainly a standardization that allowed the integration of those procedures that improved Ficosa's standards.

However, given the relevance and complexity of this specific operation, a formal 4-year plan to integrate all of the information systems with their centralized servers and the corporate ERP was designed at the headquarters in Barcelona, Spain. At present, Ficosa Int. applies this widely shared ERP to manage the different industrial and financial business units.

According to the Director of the Department of Information Technologies:

From a technical point of view, it would have been possible to implement the Ficosa's ICT system in the new plants in less time. However, there were other factors that influenced this pace; for example, the scarcity of economical and human resources. Mostly when you decide to develop the integration process with internal employees, you are affecting the work of all the employees of the company. Different organizational aspects/ work processes had to change, the employee structure had to be reorganized, and cultural, legal and language factors; i.e. not all the plants' employees spoke English, so the company decided to translate the systems and menus into local languages.

So, in this case, the time needed to complete the integration process exceeded the required time from a technical point of view, as a result of the human, organizational, cultural, legal, and language aspects.

One of the most interesting issues in this crucial absorption by Ficosa was the establishment of a new corporate service (the Operations Department) to standardize the internal procedures and manufacturing processes worldwide. The main mission of this Department is the normalization of supervision and work processes and the unification of these procedures in all of the operational plants. With this new Operations Department, the company seeks to not only improve the efficiency of its operations, but also to simplify the supervision in a complex industrial group that has undergone dramatic growth and become a top-tier player in the worldwide automotive components industry. The Director of the Department of Information Technologies considered that:

> Operations is the ''police department'' of the group: it guarantees that the same processes and applications are implemented in the group as a whole. They standardize and look for synergies

Thus, the fact that the whole Ficosa group shares the same ERP everywhere allows the corporate managers to have a completely integrated system of indicators and monthly results collected in a single system of *reporting*. This reporting system enormously facilitates supervision, and the managers believe that the reporting system would have been impossible to achieve without these recent investments in ICT and the electronic unification of procedures.

Fagor-Ederlan

In the case of Fagor-Ederlan, the corporative management process must be analyzed in the context of a large company with highly decentralized business groups. Today, Fagor-Ederlan S. Coop owns several other companies that include: Victorio Luzuriaga Tafalla, FagorEderlan Brasileira (Brazil), and Fagor-Ederlan Slovensko (Slovakia). Several cases can be analyzed with respect to the unification of ICT systems in an effort to improve performance.

In the case of the acquisition of the Victorio Luzuriaga Tafalla Company, the absorption operation was characterized by the size of a target (almost equal in size to the acquirer) that had its own very firmly rooted culture and a well-established, successful ERP. The acquisition process, which was gradual, converted Fagor-Ederlan from a minor-ity partner into a majority partner. The convergence of the information systems proceeded rather slowly over more than a year, not only because of the gradual acquisition process, but also as a result of the satisfactory operation of the target's ERP, and the traditional decentralization policy of the purchaser. However, the ERP of Victorio Luzuriaga was replaced subsequently by Ederlan's system. Fagor Ederland regarded this ICT integration as a takeover. The time required to complete the process was significantly longer than the time needed from a technical point of view, mainly due to the large size, strong culture, and previous ERP implementation of the acquired company.

In Slovakia, Fagor-Ederlan acquired a local company with very little ICT infrastructure. The highly developed information systems of Fagor-Ederlan could be incorporated rapidly into this foreign investment in order to improve the productivity level of this Slovakian plant and to facilitate its control. Therefore, this ICT integration was also a takeover. The process of technically integrating Fagor Ederlan's ERP at Fagor-Ederlan Eslovensko took approximately one year (2006), and was based upon the migration of an older corporate-level ERP version to a newer one, still currently in operation, which allows the company to function in multilingual environments.

Fagor-Ederlan also acquired a local Brazilian company that had recently installed an ERP based on a system (Logix) that differed from Fagor Ederlan's system. However, it was highly advantageous to allow the target company to maintain its own ERP system until the target underwent the cultural changes associated with the implementation of the acquirer's ERP system. The corporate Fagor-Ederlan ERP will likely be adopted when the local organization recognizes the positive aspects of working under the restrictions associated with an integrated system of resource management. The Director of Quality and Systems at Fagor explained this decision in the following way:

> We considered that it was more preferable that the Brazilian plant firstly got used to the radical cultural change underlying the adoption of a ERP system, because its immediate substitution by the information systems of Fagor-Ederlan could make it even more difficult to achieve such an efficient establishment of this new culture of work. Logically, the objective in the mid-term was to implement the corporate ERP system developed for the entire group.

Therefore, in this case, the integration time was clearly longer than the time needed to complete the technology integration due to cultural and organizational learning factors. More recently, Fagor-Ederlan has decided that the integrated resource planning platform, to be implemented progressively in all companies of the Ederlan group through processes of incremental technological development, will include the same ERP system for every single unit of the corporation, and that it will be developed in a parallel process of integration of all managerial procedures.

Mccgraphics

Mccgraphics was created in 1996 from the merger of Graphical Lithography Danona, S. Coop and Artes Elkar, S. Coop,

both located in the Basque Country in Spain. Until the merger, both organizations were independent cooperatives. The mccgraphics group expanded with the creation of Rotok Industria Gráfica, S.A., an investment undertaken as a route for growth owing to the saturation of the domestic market for flat-leaf printing. The shareholders of this company are: Lithography Graphical Danona, S. Coop and Artes Elkar, S. Coop, MCC-investments, and Vocento. After the merger, one of the first decisions made by the CEO of mccgraphics was to integrate all of the ICT systems.

At mccgraphics, a truly relevant absorption took place when another cooperative, Evagraf, S. Coop, asked to integrate into this larger business group in the graphic arts industry. Despite the fact that Evagraf, the target, already had a highly personalized information platform that was operating at a very high level of satisfaction, the acquiring group, mccgraphics, forced Evagraf to adopt its own ICT systems and procedures within six months (less than the time needed for technology transfer). The Director in charge of Computer Science explained this takeover as follows:

> Elkar and Danona have 2 ERPs: ''optimus'', focused on production, and ''geminis'' focusing on the financial part. Evagraph had its system, but as part of mccgraphics, it had to adopt ''optimus''.

Once again, the joint management of ICT went beyond cost efficiency requirements and became a strategic instrument of supervision and control at the service of the joint management of the company that resulted from a horizontal acquisition.

Discussion and propositions

Figure 1 shows four ICT implementation strategies based on two dimensions: the integration mode and the pace of integration. Regarding integration modes, our fieldwork confirms that takeovers and standardizations are the most suitable modes for absorptions (as anticipated in Speed of integration and the role of ICT system integration in absorptions), given the absence of renewals and synchronizations in the analyzed firms. Regarding the pace of integration, we also consider two options: quick or slow. To clarify our definitions of quick of slow, we reviewed all the evidence related to time of integration and found a relevant specific comment made by the Director of the Department of Information Technologies from Ficosa. On the basis of this comment, we distinguish clearly between the quick or slow speed of an integration by considering the time required for technology transfer to integrate two or more ICT systems. Therefore, we consider an absorption-based integration to be ''quick'' when its duration equals the time required for IT technology transfer, and ''slow'' when it is longer.

This case-based analysis shows that not all of the ICT integration processes in corporate absorptions have always followed the integration method of takeover with a sequence of rapid consolidation as expected. In fact, the global analysis of the different types of evidence revealed an important insight regarding the pace of integration. It is difficult to specify the meaning of quick or slow in terms of time periods because, as we have seen, different firms' characteristics-for example, the level of ICT implementation, size, age, organization, culture, language or experience in acquisitions-affect, either by accelerating or slowing down, the pace of the unification process of different technological procedures and the co-ordination of ICT investments. Furthermore, the structure of the acquirer's industry is another factor influencing the pace of the integration. In this sense, and considering the evidence presented in this study, the ICT integration process between Banco Atlántico and Banc Sabadell is truly different from the ICT integration process among the rear-view mirrors division of Magneti-Marelli, with plants in different countries, and Ficosa. In the case of Banco Atlántico and Banc Sabadell, the prediction was 9 months, while in the case of Ficosa the expectation was a 4-year plan to integrate all of the information systems with centralized servers. In this last case, a 4-year process can be understood as a slow process, but if the number of countries where the integration process has to be developed is considered, the process actually proceeded relatively quickly. So, the suggestion to use the technology transfer time needed for integrating ICT systems to distinguish between quick or slow integration processes could dilute the difficulties of heterogeneous situations.

What seems clear is that when no ICT systems exist in the company being absorbed, the technological unification process can be faster, in order to improve resource productivity more quickly. The cases of the horizontal acquisition made by Fagor-Ederlan in Slovakia, mccgraphics, and Banc Sabadell with Banco Herrero reflect this assumption with clarity. Therefore, our first proposition is as follows:

Proposition 1. a quick takeover of the ICT system, just meeting technology transfer time requirements, can be expected when no ICT systems currently exist in the company being absorbed.

However, if we consider that the firms involved in the absorption process have their own ICT systems, it becomes apparent that other factors could be affecting the pace of the integration. In this sense, differences in size and technological development become relevant. The acquiring company usually tends to be larger and more technologically advanced or sophisticated than the target. The acquirer has a synergy-seeking exploitation orientation, an

Pace of integration	Integration mode	
	Takeover	Standardization
Quick	**Quick takeover**	**Quick Standardization**
Slow	**Slow Takeover**	**Slow Standardization**

Figure 1 A typology of ICT integration strategies for absorptions (horizontal acquisitions).

absorption operation, and a considerable level of accumulated knowledge in managing this complex type of operation (largely as a result of its previous experience in conducting other horizontal acquisitions). In such situations, there is a stage of optimization where even new combinations of products and/or processes might also appear, as in the case of Banc Sabadell's absorption of Banco Atlántico. Likewise, it seems obvious that when synergies come not only from sharing the same ICT platform, but also from possibly supporting other resource synergies, the speed of integration increases. The case of the absorption of Banco Atlántico by Banc Sabadell illustrates this quite well. Taking all of these aspects into account, we establish our second proposition as follows:

Proposition 2. a quick standardization of the ICT system, just meeting technology transfer time requirements, can be expected when the acquiring company has great experience in absorption processes, and the ICT platform levers other synergies.

However, this case-based analysis has shown that some ICT integration processes in absorptions have used a slower integration mode based on the organizational learning process. One type of organizational learning, usually called ''one-loop learning'', consists of simply learning by means of improving the way of doing things, but with former methods of working and without changing the basic assumptions under which operations are developed. In contrast, another type of learning, the so-called ''double-loop learning'', means essentially learning by doing things in a completely new manner and usually requires the unlearning of old and obsolete systems and practices and the learning of totally new ones. As a consequence, this type of learning generates completely new routines by confronting new situations in unknown environments that are aimed at improving organizational efficacy in the long run. This type of learning challenges the current objectives, values, and beliefs that are traditionally held by an organization and thus affects dramatically, if not necessarily changes, the organizational culture (Fiol & Lyles, 1985; Slater & Narver, 1995).

The learning capability of an organization is related directly to its ability to generate and generalize new ideas. Accordingly, a learning organization is one that is able to generate, acquire, and transfer knowledge and to adapt to changing or new conditions or circumstances (Garvin, 1993; Lin & Lee, 2005), such as those that accompany an acquisition. New methods of working, in which ICT currently plays a key role, must be introduced or changed in the post-acquisition stage in order to coordinate sooner the different organizational systems, procedures, and learning processes. In this situation, both the unlearning and the relearning of processes are necessary to allow the companies involved in horizontal acquisitions to jointly acquire new knowledge and eliminate the obsolete. More precisely, the implementation of more or less rapidly unified ICT-based systems has to be rethought or designed around this totally new context in order to attain any benefit and avoid potential misdirection from the knowledge provided by the acquiring and acquired firms (Papadakis, 2005).

As the cases of Fagor-Ederlan (in Brazil and with Victorio Luzuriaga Tafalla) and Ficosa (with the acquisition of the rear-view mirror division of Magneti-Marelli) illustrate, it is not desirable to risk the process of organizational change associated with a highly relevant technological implantation. In both situations, the acquirer's operations tend to manifest a double-loop organizational learning approach (Fiol & Lyles, 1985; Hayward, 2002; Slater & Narver, 1995; Zollo & Singh, 2004). In this context, both the unlearning and the relearning of processes are needed simultaneously in order to allow the companies involved in the acquisition operation to jointly acquire and develop new knowledge, and eliminate obsolete knowledge. Radically new methods of working need to be applied in the post-acquisition stage in order to adapt and coordinate different systems, procedures, and learning processes. Accordingly, the implementation of highly unified ICT-based platforms between the acquiring and the acquired firms, must be delayed for reasons of convenience versus purely technical standards.

However, owing to the level of ICT systems in the acquired companies, the integration mode differs: in the case of Ederlan, a takeover mode was chosen, but only after the target company in Brazil had gained some experience with their previous ICT system that was still undergoing the process of implementation. Therefore, our third proposition is as follows:

Proposition 3. a slow takeover of the ICT system, exceeding the technology transfer time requirements, can be expected when a former ICT implantation in the target company, which differs from the bidder's ICT system, has not been fully completed.

In the case of Ficosa/Magnetti-Marelli, the company decided for standardization because Magnetti-Marelli wanted to take advantage of the valuables processes in their system. However, as the system was functioning properly and a quick integration required an excessive amount of resources owing to the size of the target, the company opted for a slow integration. Therefore, our fourth proposition is as follows:

Proposition 4. a slow standardization of the ICT system, surpassing the technology transfer time requirements, can be expected when the absorbed company is larger than the bidder and its previously established ICT infrastructure has been functioning properly.

In Figure 2, which is based on the framework presented in Fig. 1, we summarize the different evidence analyzed in this work.

6. Conclusions

Based on the analysis of the absorption experiences of four Spanish companies, this study argues that a rapid unification of ICT systems among different firms (at minimum, the time required for technology transfer), is not always the best option. The main purpose of this research was to show evidence regarding the various conditions under which the speed of unification of the usually diverse ICT platforms of the acquiring and target firms could be faster or slower.

Our results show that, depending on the levels of introduction and the sophistication of the ICT systems and the

Pace of integration	Integration mode	
	Takeover	Standardization
Quick	**Banco Sabadell-Banco Herrero Ederlan in Slovakia Mccgraphics – Evagraf**	**Banc Sabadell- Banco Atlántico**
Slow	**Fagor-Victorio Luzuriaga Ederlan in Brazil**	**Ficosa-Magneti Marelli**

Figure 2   A typology of ICT integration strategies for absorptions (horizontal acquisitions).

sizes of the companies involved, a relatively slow speed of ICT integration is sometimes more advisable. Therefore, and along the same line as previous results, the internal relatedness of ICT systems affects the speed of integration of the companies. Our research also confirms that, in the case of absorptions, the best integration strategies are takeovers and standardizations.

Undoubtedly, the phenomenon studied here could be analyzed better if the researcher/s were involved in the activities of the case organizations. In fact, there are good examples in the literature of papers implementing action research (see, for example, Bose, Pal, & Ye, 2008, and Peffers & Tuunanen, 2005). However, recognizing this limitation in our research, the results suggest a very interesting research implication: further research should be devoted to analyzing, in more detail, and most likely by means of quantitative approaches, the significance of organizational learning cycles within ICT consolidation procedures during mergers and acquisitions.

Therefore, we suggest explanatory quantitative techniques, for example, multiple regression analysis. For the dependent variable, researchers should obtain information about the time required for unification from a technical point of view. Likewise, as possible independent variables, we suggest the following: level of introduction of ICT in the companies (this could be linked to organizational learning cycles and aspects showing cultural changes), level of sophistication of the company's ICT, and sizes of the companies.

In this sense, for measuring the level of introduction of ICT and considering that new technologies change the occupational structure within firms, worker flows, or training (Behaghel, Caroliy, & Walkowiakz, 2012), some proxies could be the proportion of workers using the Intranet and the Internet as well as the number of trainees (per worker) and the training hours per worker.

Regarding the level of sophistication of the ICT of the company, we believe that it is important to consider the industry because the industry type is an important factor affecting firms' decisions to invest in IT (Neirotti & Paolucci, 2011). The IT expenditure should be also considered, and it could be measured as the IT expenditure per employee. And, finally, a list of different types of IT could be prepared (for example, enterprise systems used to support value chain activities -ERP, CRM, SCM, and PLM/PDM- and infrastructure resources -EDI, Intranet, Extranet, e-learning platforms, business continuity systems, and data warehousing technologies) and then used in a survey of managers regarding their use.

Finally, due to the fact that variations in firms' IT adoption and assimilation could be associated with the size of the resources available for IT investment, we suggest considering the firm's size (that could be measured as the logarithm of the number of employees) and some of the typical performance measures (e.g., EBITDA). Due to the nature of some of these variables, it is difficult to find existing databases containing this information. So, researchers should obtain first-hand information for performing the suggested analysis.

The main implication from this study is the crucial necessity of aligning the speed of integration of potentially diverse information systems between the companies involved in absorption operations with the processes of strategic and cultural change that are usually associated with such ICT investments. The main argument for this managerial implication is related to the diverse ICT investment conditions in which the participating companies can find themselves during the post-acquisition stage. Therefore, ICT management in horizontal acquisitions requires, firstly, proper accommodation of the pace required to unify the potentially diverse ICT resources of the two companies before proceeding with their further development into the usually larger merged entity. In this sense, it is important to point out that ICT systems integration is a means to a major end (the integration of the acquiring and target firms), and not an end in itself.

Appendix A. Interview protocol

- The situation the company was in when it started ICT implementation, detailing, for example, the different investments each company had made related to ICT. Chronological information related to these ICT investments was asked for explicitly, as well as factors that motivated these investments, who proposed them and how, who approved the corresponding investments, and by what means this was done.
- Changes at the strategic management level, as well as organizational or structural levels-for example, whether a specialized department had been constituted to centralize the management of the ICT implementation-and changes affecting employees motivated by ICT-related investments. Interviewees were also asked which aspects had made the implementation of the ICT investments difficult and/or had facilitated them (for example, those related to the organizational structure, organizational culture and/or the behavior of the employees, the strategic management of human resources, and specific investments in other types of assets). Also, special emphasis was given to asking about the experience accu-

mulated by the company in the integration of ICT platforms during in the horizontal acquisitions in which they had participated.

- Elements that had intervened to develop ICT investments at a strategic (corporative and/or business strategy), tactical, or more operative level (for example, interaction with clients-orders, delivery of orders, management of the website content, management of claims, etc., as well as with suppliers-planning of orders and replacement, supply-chain management, and electronic payment), and also a general assessment of the effect that such ICT investments had had, mostly in terms of improving margins, income, costs, profitability, competitiveness, and productivity (i.e., whether there were some explicit procedures available to evaluate the real impact of these technological investments on different performance measures). Additionally, the approximate time frame that had been estimated by each firm's decision-makers in order to determine the results associated with any ICT investment was also included in the analysis.
- Finally, the company was asked for a sort of roadmap related to future ICT investments such as future ICT investment decisions and the specific reasons for making them.

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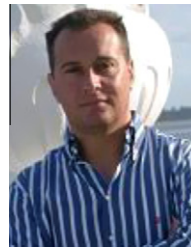
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