

INVESTMENT PROCESSES OR INFORMATION TECHNOLOGIES INVESTMENT EVALUATION. INFORMATION TECHNOLOGY EVALUATION PRACTICES IN THE SME: AN EMPIRICAL STUDY IN ANDALUCÍA

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Abstract

From our point of view, we consider that evaluation is another aspect of the IT implementation process, which permits us to justify the investment to be carried out, to choose between different alternatives, to serve as an instrument of control over the implementation process, over its costs and benefits and, in short, over the success of the project. However, there are in practice some difficulties in evaluating all of the costs and benefits associated to IT investments, and especially in the long term prospect. Moreover, the evaluation constitutes an aspect that, in economic crisis situations and in the context of SMEs, acquires, if one might say so, more importance. Therefore, in this work we intend to find out how Andalusian SMEs carry out their IT investment process, which will permit us to contribute empirical evidence of the evaluation practices of IT projects in this type of enterprises, which haven't been sufficiently researched in the empirical studies carried out concerning the evaluation of the IT investments, where it seems that the evaluation is associated with high IT budgets, large enterprises and large IT investment projects.

KEYWORDS: Evaluation, Information Technology Investments, Small and Medium enterprises.

1 INTRODUCTION

The decisive role played and that will be played by Information Technologies (from now on IT) in the competitiveness of small and medium-sized enterprises (from now on SMEs) is unquestionable. These IT, whose paradigm par excellence is Internet, permit the optimization of business processes, of production processes, management systems, etc., or they can even lead to a reinvention of all of them and, therefore, of the actual business. Moreover, they permit an increase in communication and association capacity, mobility, and field of action of the SMEs.

Nowadays, the main objective of IT investments in organizations is no longer cost reduction, which, though useful at the moment, is insufficient as a support for competitive advantage. Now this objective is accompanied by a wider one: the addition of value to products and processes through integrated management of the own value chain and of those parts which the enterprise is related with, and with a much more strategic character.

In our opinion, IT are a strategic instrument for those SMEs that wish to thrive against their rivals, since, in short, they permit enterprises to obtain the necessary information for decision-making, at less cost and in a shorter time. All of this places the organization in a privileged situation in order to analyse market opportunities, marketing, investment, etc. It also qualifies them to act with quick,

adaptive decision-making mechanisms, which are exhaustive in their analysis and guarantee an effective result (in terms of the achievement of an objective) and an efficient one (in terms of the use of their resources).

Given the above concerns, this paper seeks to provide further insights into Andalusian small business IT evaluation, there being two kinds of reasons that lead us to study IT evaluation processes in the SMEs of Andalusia.

First of all, IT evaluation is a research topic studied by different authors (e.g. Powell, 1992; King and McAulay, 1997), who make clear the difficulty of identifying and quantifying the costs and benefits of this type of investments. In fact, only 20% of IT investment costs is visible (Davis, 1989; Ballantine, Galliers and Stray, 1996). The level of investment, its level of complexity and the high degree of uncertainty associated with the adoption of these technologies have caused different aspects related to the justification of projects to become more important and to demand the necessity of improving evaluation processes (Irani, Sharif, Love, and Kahraman, 2002).

The justification of IT investments is still a complex task due to the intangible and non-financial benefits which are non-inherent to IT implementation (Farbey, Land, and Targett, 1993; Swamidass and Kotha, 1998; Irani, Ezingard, Grieve and Race, 1999; Irani, 1999). Furthermore, according to Gunasekaran, Love, Rahimi and Miele (2001), the managers still have some difficulties in justifying the costs associated to the purchase, development and use of IT in financial terms, so other methods should exist which are not only based on financial criteria, and which take into consideration non-financial and intangible results (performance measures), as well as strategic, organizational, and human aspects.

We agree with Hochstrasser (1992) when he defends that a high failure ratio in IT projects is partially attributed to the non-use of solid and easy-to-use management instruments for evaluation, prioritization, monitoring, and control of IT investments.

Moreover, IT evaluation has to do with one of the issues considered key in information systems management: evaluation of information system effectiveness (Niederman, Branchau, and Wetherbe, 1991; Badri, 1992; Clark, 1992; Kelly, Watson, Galliers and Brancheau, 1994; Galliers, Merali y Spearing, 1994; Wang and Turban, 1994; Pollard and Hayne, 1996).

Secondly, our choice of centralizing this study on SMEs is due to the fact that they have a key importance in the development and growth of the economy, since, in our opinion, it is in these SMEs that we can find the base of the business spirit of any type of economy and, especially, in those who are a long way behind, such as the Andalusian economy. To get some idea of its quantitative importance, some global data will be enough: if we consider the USA, Japan and the EU together, SMEs (enterprises with a range of between 0 and 249 salaried workers) represent around 86% of the total registered business. In Spain, by January 1 2003, the number of SMEs totalled 2.809.385, which supposes 99.87% of the Spanish enterprises census, which generate 70% of employment and contribute towards 65% of the gross domestic product (GDP).

If the majority of Spanish SMEs are situated in sectors of low technological level, this is more so in the south, Andalusia, where the enterprises with a higher technological level generally do not have their decisional centres inside the autonomic community. Andalusia is still well below the European average in terms of the computerization of its small and medium-sized enterprises. A generic vision of the applications being used in these enterprises shows us few integrated systems and a few made-to-measure systems, with poor or no communication capacity with other systems belonging to different manufacturers. As for hardware, we can mention that in Andalusia small computer systems prevail, representing 93.9% of all computer systems (Boletín Económico de Andalucía, 2003). According to Castaño and Román (2002) the available IT in Andalusian enterprises are mainly used in the area of accountancy and financial evaluation, and, on a smaller scale, in planning and management tasks, followed by the commercial and sales area. IT are less applied in R+D activities, in the production of goods and services, and in marketing and publicity tasks. Equally striking is the low level of

capitalization presented by the Andalusian SME, in spite of having increased in the last few years. Resources constitute around 32% of liabilities, which significantly determines investment possibilities and the margin within which enterprises can work. Consequently, the level of debt is very high and its quality very low. In this sense, the most worrying piece of data is the quality of the debt, whose origin lies in the difficulties of accessing long term financing, which causes short term financing to be important, having even increased in the last few years (Junta de Andalucía, 2003, 123).

We consider that for a small enterprise to decide to contribute resources to the incorporation of technological applications, it will need to have financial resources and find utility in these applications, evaluating the costs of the new investment and its possible recuperation in the form of new income or reduction of other costs. In short, accessibility and return can be considered as the main factors behind investment decisions in technologies.

Therefore, our intention in this work has been to find out how Andalusian SMEs carry out their IT investment processes, which will permit us to contribute empirical evidence of the evaluation practices of IT projects in this type of enterprise. This is an aspect which is not sufficiently investigated in the empirical studies carried out on IT investment evaluation, where the evaluation seems to be associated with high budgets in IT, large enterprises and large IT investment projects.

2 OBJECTIVE AND HYPOTHESIS OF THE EMPIRICAL STUDY

The empirical research we have developed has the following objective: “to discover how Andalusian SMEs carry out their IT investment processes”, through a survey process carried out on a sample of this type of enterprise within the Comunidad Autónoma Andaluza.

In any research process of this type, once the objectives are fixed, it is necessary to develop a hypothesis to translate the questions to be researched into statements which can be either verified or rejected. For our study, the planned hypothesis is the following: *We wish to elicit the hypothesis that most SMEs do not employ any formal methodology in the evaluation of IT investment projects before carrying them out, and that they are initiated either in order to substitute another technology, or because they are necessary for the survival of the enterprise.*

3 RESEARCH METHODOLOGY

The technical details of the survey are the following:

No. of surveys/response rate	255/52%
No. VARIABLES	50
Hypothetical universe	Consisted in
Target Population	Small and medium enterprises of Andalusia with a staff of less than 500 workers and a level of turnover between 30,000 and 10,517.712 €
Sampling framework	Databases “10.000 Andalusian enterprises. Ardán guide of enterprises”, edited by the Instituto de Fomento Andaluz (organism dependant on the Junta de Andalucía)
Margin of sampling error	+/- 0.06
Level of confidence	96%
Hypothesis parameters	$PQ=0.25$ $N=4631$ $Z \alpha/2= 1.96$
Sample size	133 enterprises
Sampling procedure	Sampling divided up into provinces. To determine the number of enterprises of each province the proportional tuning method was used.
Method of examination	Questionnaire by post, email and telephone.

Table 1. Technical details of the survey.

4 RESEARCH RESULTS

As deduced from the survey model¹, we have structured the survey in three large sections: a) general data from the polled enterprises; b) data about the IT investments carried out by the enterprises; c) data relating to the evaluation process of these IT investment projects. And these are the reasons for which we are going to structure the research results according to the same sections discussed above.

A) General data from the enterprises: The first point we wish to underline is that the majority of the polled enterprises (44%) have a turnover situated between 3 and 6 million euros, with 38% of the enterprises having a staff of between 11-25 people. Furthermore, within the majority group of enterprises, the staff of 15-25 employees is confirmed to be the most numerous at 26%. Moreover, as was naturally expected, enterprises have a larger amount of staff the larger their turnover is. Although these figures may seem far from what we understand as an SME, one must take into account that in the sample selection process the enterprises with a turnover of less than 30,051 euros have been eliminated, because their possible IT investments have been considered poor or of little monetary value.

With reference to their age, though the majority (36%) have an age of between 5-10 years, they are closely followed by enterprises from 10-20 years old (24%) and more than 20 years old (28%).

With regards to the importance of the different functional areas, we have to underline that Production (54%) is the area mostly considered as being the most important, followed by a long way by Distribution and Administration at 20% and 12% respectively, though the latter monopolizes the second place in most important areas at 30% (followed closely by Supply at 24%). We wish to underline that although Finance is not among the principal areas of importance, as one would have thought, we believe that, as a general rule, this is due to the fact that in a SME Finance and Administration areas are integrated in the same department. Nevertheless, we do underline that as a second and third area of importance it reaches levels of 18%.

On the other hand, and also as it has to be supposed inside a SME (due to its size, there is no IT department), the computing area doesn't have a predominant role, but rather secondary, and its highest value is situated in fourth position (20%).

To finalize the subject of the importance of areas, we must underline the poor role assigned to the area of Communications, its highest value being fifth position (14%).

With regard to the type of information managed, the majority of enterprises (74%) manage totally automated information and there are hardly any enterprises using manual information (2%). This fact has surprised us when compared with investment levels (with respect to volume of enterprise investments in the last 5 years), since 42% of enterprises have IT investments situated between 1 and 5% of the total investment carried out by the enterprise, and that 20% of them do not reach 1%. Although it is worth underlining that the rule is not fulfilled in enterprises more than 20 years old, where the volume of majority investment (43%) is situated at a rate of 5-10%, perhaps the technological underdevelopment which is carried by these enterprises could be the reason for its larger volume of investment.

B) Data about IT investment carried out by the enterprises: In this part of the survey, we first asked the polled enterprises to define what they understood about the concept of Information Technology. Though it is an open question, the high level of response has surprised us (42%). Although there were many given definitions, the grand majority have a concept of the term quite equivalent and suited to its real meaning. Next we transcribe some of the definitions offered to us:

¹ For further information on the survey model, contact rios@us.es.

“Computer and telematic instruments that improve and/or hasten the communication, and information process”.

“Communication, computing, and office automation”.

“Those technologies directed at information processing”.

“Techniques related to marketing, computing, communications etc.”

“New technologies derived from computing”.

“The group of tools, computing or not, which produce or facilitate data flow generated in the enterprise and which are also used in decision-making at any level”.

“Everything related to the computing and processed elaboration of any information”.

“The state of technology and knowledge as referred to everything under the denomination of information”.

“Information and internal and external management of the enterprise, concerning the productive sector”.

“All the means directed towards the extraction of information about the environment whether they be clients, suppliers or any other quantity operated in a business relation”.

“Computing, automatic processes, fax, modems, etc.”

“The group of computing-type supports used for the transformation of internal-external, external-internal, or internal-internal data flow of information for decision-making”.

“Science which studies the media of different fields of knowledge”.

“The group of mechanisms used in business control”.

“Equipment for information processing and for communication between different levels, etc.”

“Instant and detailed information through mechanised means”.

Other questions of the survey dealt with technologies in which enterprises have invested and in which they intend to invest; both with the same type of possible answer. As predicted, the technologies in which the enterprises have invested most have been software for general use (82%), and business management software (78%), followed farther back by Internet (44%), e-mail, and local networks (both at 36%). What has surprised us is the analysis of the type of investment in relation to the age of the enterprise, since 100% of enterprises less than 5 years old have not invested in Internet, though 70% of them expect to do so in the following years. We are unable to find the cause for this answer. Perhaps the small number of enterprises of this age that have participated in the survey constitutes a significant piece of data; perhaps, and this is our shared opinion, these enterprises consider that investment in Internet means having web sites and business portals to commercialize on, rather than simply having access to the network (see Table 2).

If we analyse where enterprises intend to invest, we see that their intentions continue to demonstrate norms more or less similar to investments already carried out: software for general use (46%) and business management software (60%), slightly lower rates, but naturally there are enterprises that have already invested in these technologies, and therefore will opt for others. However, the victor in terms of intentions is Internet at 66%, a fact we expected due to the boom that the "network among networks" has reached in the last five years. Other technologies with important percentages are: e-mail (34%), local networks (24%), and Intranet (22%). We also underline, as technologies in clear decline, videotex (0%) and the traditional EDI (2%), IT that are practically null (see Table 2).

	In which IT the enterprise has invested	In which IT the enterprise intends to invest
Software for general use	82%	46%
Business management software	78%	60%
Internet	44%	68%
E-mail	36%	34%
Local networks	36%	24%
Videotex	16%	0%
TEF	16%	10%
Telework	12%	12%
ISDN	10%	10%
CAD, CAM, CIM	10%	16%
Intranet	8%	22%
Other telematic services	8%	16%
EDI	6%	4%
MISS, DSS, EIS	2%	6%
Videoconference	0%	12%

Table 2. *IT in which enterprises intend to invest.*

Finally, we also wish to mention the poor impact, on both current and intended IT investment, of the acquisition of DSS or EIS applications, at 2% and 6% respectively. We believe that it is a consequence either of the fact that there is actually an ignorance of the meaning of these abbreviations, or that the tools used as DSS or EIS are limited to certain database and spreadsheet managers, and these technologies have already been included as software for general use.

As for the reasons that stimulate investment in IT, we observe that enterprises no longer invest preferentially in mechanizing routine operations or reducing costs (though they have still reached important levels: 48% and 34% respectively), but rather, due to the fact that we are immersed in the age of connectivity, the necessity of having fast and effective communications marks the norm at 58%, followed closely by the availability of key information for enterprise management at 48%. Other important reasons situated however in a secondary position are: the increase of productivity (42%), investment due to business necessity (40%) and technological obsolescence (36%).

With regard to which people actually propose IT investment projects, and due to the fact that we are talking about SMEs, it was natural to suppose that the general manager, as indeed occurred (48%), would be the maximum driving force. In fact, the dominant role of the managing director/owner of the SME in any IT implementation has been confirmed in different researches (Winston and Dologite, 2002; Agarwal and Prasad, 1997; Cragg and King, 1993; Doukidis, Smithson and Lybereas, 1994; Julien and Raymond, 1994; Thong and Yap, 1995). In the background, we find the IT department (22%) and the department affected by technology (18%). Perhaps the fact that the executive committee reaches just 16% is surprising, but if we analyse the responses according to the enterprises' turnover, we observe that though the general manager is still the clear winner, in enterprises with turnovers of more than 3 million euros, the executive committee reaches levels of close to 30%. To a certain extent this is obvious, since the smaller enterprises usually do not have such a committee. However, enterprises do have them when their size reaches higher levels.

To finish this section, in relation to the consideration of the strategic plans used when investing in IT, we can say that there are two opposite poles; those who do not usually take them into account at 40%, and those who always consider them, at 34%. In this sense, it is very important to mention the work

carried out by (Knol and Stroeken, 2001), which collects the different ways of communicating the strategic application of IT to SME employers.

It is even more interesting to discover the advantages stimulated by IT investments (see Table 3), where better client attention reaches the greatest percentage, at 68%, followed closely by the increase in the quality of products and services at 44%. Far from these figures, we can situate new markets (32%) and new ways of making a profit (26%). Survival in the highly competitive world in which we live is a key factor and when current business enters its terminal stage, we have to search for either new markets or new ways to make a profit if we wish to continue participating in the current business environment.

Competitive advantages generated by investment in IT	Percentage
Better client attention	68%
Better quality of products /services	44%
New markets	32%
New ways to make a profit	26%
New products	10%
Differentiation of products	8%
Leadership in costs	6%

Table 3. Advantages searched for when investing in IT

As for the question as to which departments carry out the largest investments in IT, the results have brought no surprise either, administration being the highest at 78%. One must take into account that the majority of SMEs have just this department only. The remainder of the departments have had equal results, 30-40%. These results corroborate the results obtained by Castaño and Román (2002).

C) Data relating to the evaluation process of IT investment projects: In the final part of the survey, what we have asked first is whether the IT investments are subject to some type of evaluation process. The results have been favourable in 90% of the cases. We consider this percentage non-consistent with reality if we consider that investments are submitted to a process of valuation in order to undertake them. But if we take into account the fact that when we invest in any technology, even by a small amount, we will at least submit it to some type of evaluation, even if it is very superficial (e.g., analysis of requirements and prices), then we can consider the obtained result as perfectly valid.

Next, we asked the question of who carries out the evaluation process and who is consulted during the same.

In the first case, and insisting upon what we have discussed in previous paragraphs when talking about the character of SMEs, it is the upper level of management or the general manager who is responsible for all that takes place in the enterprise, and therefore is the one who usually carries out this evaluation. This is corroborated by the data of the survey, which puts them at 58%, compared to the responsible parties in the affected department (36%) and the financial department (28%). We observe that the IT department (20%) still has little relevance in these aspects, either because in most enterprises this department does not exist as an independent unit and computing matters are the responsibility of whoever knows more about computing among the administration staff; or because their role in the evaluation process is limited to the consideration of strictly technological aspects.

In the second case, the results have been similar in most of the possible answers to the question. Thus, and in order of obtained importance, the most consulted parties have been: general manager (36%), final users of the technology (36%), technical team working on the project (32%), IT department (27%), and financing department (24%). It is worth underlining the 4% obtained by external consultants. The enterprises consider themselves valid to carry out the evaluation process. This has

also been confirmed by the results concerning who carries out the evaluation, where external consultants succeeded in obtaining just 16% of positive responses.

As we predicted that the upper levels of management and the general manager were going to be most responsible in the evaluation of investment projects, we asked the question: What is the role played by executives in the selection, valuation, acquisition, and implantation process in IT? As expected, their main mission has been the valuation of costs and returns (58%). Other executive tasks of importance have obtained similar results: identification of information requirements (36%), responsibility for choice of the most appropriate technology (32%), analysis of information flow in the enterprise (28%), planning and coordination of the IT with the enterprise's strategic plan (26%) and follow-up of what is expected and what is obtained (24%). We also see that the role of mere project approval has obtained only 4%, a natural result, since in a SME the general manager is often the owner, and therefore responsible for everything which happens in the enterprise, so it would not be logical that he or she should leave evaluation tasks to be managed by other workers and only dedicate him or herself to mere approval.

We have to underline that the results show that 50%, that is, half of the polled enterprises, do not always submit their projects to evaluation, while the other half always does. If this is compared with the turnover, we observe that the larger the enterprise's turnover, the larger the percentage of enterprises that evaluate their projects.

Those SMEs that answered that they do not submit all their projects to evaluation underlined two types of projects that were not evaluated: those destined to the replacement of other technologies (36%) and those considered as a necessary investment for the operation of the enterprise (32%). Although in both cases the investment is necessary, we think that, even under these premises, it would be necessary to carry out some sort of evaluation, even if of an informal type, and allowing to at least choose the most suitable project from among the different alternatives.

As for the evaluation methods used, the first consideration to note is that not all the enterprises have answered this question (30% have not), either because they actually do not use any methodology, or because they do not know any of them. Among those who have answered the question, the vast majority still base their evaluations on strictly financial methods (net current asset value 44%, period of reimbursement 24%), though they frequently use them together with others of an informal type and of a more subjective nature, confirming the role of these informal evaluation methods in IT investment decisions (Farbey, Land, and Targett, 1992; Ballantine, Galliers and Stray, 1996).

Still very important is the search for investment return and good business management and efficacy. Thus, we see that the following methods have obtained important values: return index (32%), return-on management (22%), and return-on investment (20%) (see Table 4).

Immersed as we are in an economy with important budgetary limits, we have not been surprised to find 28% usage of the budgetary restriction method. When somebody responds that there is no money to invest with, how is the project going to be launched? 90% of enterprises have stated that the evaluation methods employed are always the same, irrespective of the nature of the project to be evaluated. Moreover, the other 10%, corresponding to the enterprises who answered that they do not always use the same methods, do not explain why, so we do not know the reasons for the change. As for whether the methods used are revised over time, 70% state that they do not do it, compared to 30% that do. In the same way as the previous question, they hardly explain what these changes consist of, and the few that do, appeal to reasons deriving from project nature, economical reasons, and reasons relating to adaptation to new technologies.

Knowing that intangible benefits are usually present in every IT investment and that their weight or importance increases more frequently as technology develops, we wanted to discover what incidence they had on the evaluation process. We see that enterprises realize their importance, since just 12% of them point out that it doesn't take them into account, although 42% do take them into account but, due to their nature, do not quantify them economically. Among the enterprises that evaluate them

economically, 28% take into account the possible associated benefits (e.g., better client attention, better product quality) and 16% take into account the opinions of the enterprise workers, 4% use limit estimates and 6% use other alternative methods of evaluation (incremental analysis, profile of benefits, analysis of value, etc.). We underline that 10% of the enterprises don't consider this type of benefit as they regard them as being normal implications of the investment, and therefore, they cease to be an incentive to it.

Used methods of evaluation	Percentage
Net current asset value (NCAV)	44%
Return index	32%
Budgetary restriction	28%
Period of reimbursement	24%
Return-on management (ROM)	22%
Return-on-investment (ROI)	20%
Score-Card approach	18%
Subjective estimate	16%
Analysis of value	12%
S.E.S.A.M.E. of IBM	8%
Internal rate of return (IRR)	6%
Accounting rate of return (ARR)	6%
Average return rate	4%
Analysis of the value chain	4%
Boundary values	2%
Information economy	2%
Empirical methods	2%
Methods of operative research	0%

Table 4. *Used evaluation methods*

When evaluating an investment project and although a certain methodology of evaluation is used, together with the result that this provides, enterprises usually use other criteria or parameters, and with the knowledge obtained through both, they will make their definitive decisions. The results obtained in this aspect consider the price (52%) as the main parameter taken into account in investment. However good a technology may be, if its price is exorbitant, the most natural course is to seek a more suitable alternative for the capabilities of the enterprise. Other main criteria taken into account have been: whether they improve the current systems, whether they improve decision-making and the difficulty of learning.

When all the information as to each possibility of investment is obtained, it is time to make the decision of which to choose. The results have demonstrated once again that the general manager (62%) is the most responsible party for what goes on in the enterprise. In the background, and normally in conjunction with the general manager, the financial department (26%), the department affected by the technology (22%), the executive committee (18%), the IT department (10%), the final users of the technology (4%), the project team (2%), and others (2%) also have decisive power.

To end, the last question we asked was with the intention of discovering the way in which SMEs act after having made the investment, whether there was some kind of follow-up between what was obtained and what was expected. 70% point out that they don't do any kind of follow-up compared with 30% that state that they do. However, the same as in previous questions, only a few enterprises explain the type of follow-up carried out. Anyway, the result obtained surprises us in a way, since when the question was asked about the role played by the executives, 24% of the enterprises pointed out that their mission (or one of them) was the follow-up of what was expected with what was obtained.

5 CONCLUSIONS

The main conclusion we have reached after analysing the survey results is that the hypothesis we wanted to elicit, which was: the majority of the enterprises in this sector do not use any formal methodology in the evaluation of IT investment projects before carrying them out, and they are initiated either in order to substitute another technology, or because they are necessary for the survival of the enterprise, has been partly fulfilled.

On the one hand, (the non-use of some methodology in the evaluation) it has not been fulfilled, due to the fact that in view of the obtained results, the enterprises usually employ a methodology that permits them to evaluate their IT investment projects before being carried out, limiting this process, in most cases, to a cost (price) study of the investment and whether it is adequate for the requirements, more commercial than strategic, of the enterprise, or even just for its administrative requirements. We know that when enterprises, even if they are very small, undertake an IT investment, they always carry out some previous evaluation process that at least permits them to select the most favourable project for their interests, allowing justification of the cost of the investment, which in most enterprises is more than sufficient, due to the fact that the volume of their investment is usually small.

The second part of the hypothesis (they invest in order to substitute another technology, or for the survival of the enterprise) has been fulfilled, since, though the main reason for investment is to improve the internal and external communication processes, investment in technologies that are indispensable to the operation of the enterprise has reached high levels. Furthermore, when investing in technologies whose mission is to substitute others that already exist in the enterprise, previous investment projects are not usually evaluated.

These results confirm our initial hypothesis, namely, the incipient state of development of IT in Andalusian SMEs. At present, the Andalusian government is implementing different projects of technological updating in this sector whose results we expect to analyze in a future research project, now in progress.

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