The connection between IT and learning, and how it affects small company performance

Mr. KONDAVETI RAJA , Mrs. K.JANSI , Mr. RAMA KRISHNA RAJU CHEKURI

Assistant.Professor[1,2,3]

Swarnandhara College of Engineering & Technology, Narsapuram-534275.

Abstract

Knowledge management procedures rely heavily on information technology. But having access to information technology does not ensure that knowledge will be created, distributed, or used. In addition to investing in IT, upper management should foster an atmosphere at work and in the company culture that values and rewards employees for their contributions and for their commitment to lifelong learning. This study offers data from small enterprises on the effects of IT learning and relationships on organizational success. Also considered is the degree of sector knowledge-intensity. The results demonstrate that there is a positive and substantial effect on organizational learning from individual learning in conjunction with individual and collaborative information technology. Contrarily, individual and organizational learning has shown substantial and beneficial impacts on organizational performance, in contrast to collaborative information technology. Thus, in an ideal learning environment, information technology may significantly affect results. Information technology tools and organizational learning methods are more often used by small enterprises in industries with high levels of knowledge intensity.

Keywords: Information technology; Learning; Sector knowledge-intensity; Organisational performance; Small businesses

1. Introduction

An integral part of running a company today is creating new knowledge, whether tacit or explicit. Management can better respond to and even foresee changes in their environments with the use of both types of information when they create new goods and services. Businesses are able to gather, analyze, store, and share data thanks to IT. In addition, IT may facilitate change both within and between tacit and explicit knowledge when used to knowledge management. But having access to information technology does not ensure that knowledge will be created, distributed, or used.
Storey and Barnett (2000) found that more than 80% of knowledge management systems failed, while Schultze and Boland (2000) found that many more had failed. Data science

In organized work settings, the advantages are obvious. Information technology automation may be the way to go if it is possible to map out the workflow in advance, taking into account all the people, processes, and technologies involved. According to Fielder, Grover, and Teng (1994), conventional wisdom held that, presuming the initial process designs were adequate, the safest way to implement IT was to automate preexisting processes inside preexisting functional structures. Difficulties emerge when this cannot be accomplished. The implementation of knowledge management scenarios has shown that to be true. Procedures, standards, and practices that prioritize cooperation and information sharing are essential for maximizing the potential of information technology.
An environment that is conducive to sharing (Davenport, Long, & Beers, 1998) and focused on people are two of the most important factors in determining the IT benefits of knowledge management (Choi & Lee, 2003). Ultimately, it is dependent on the dedication of the staff to the procedures that generate new knowledge (Cross & Baird, 2000). Consequently, it is necessary to establish a culture that places a strong emphasis on learning. It is important to foster an internal setting that supports learning processes (knowledge gathering, dissemination, analysis, action, and reflection) and the use of certain resources (such as metaphor, discourse, interactive systems, and IT).

Some research suggests that knowledge management may positively impact organizational performance, despite the surprising amount of failures in this area. Though there is some empirical studies (e.g., Choi & Lee, 2003; Gold, Malhotra, & Segars, 2001; Lee & Choi, 2003), the data is still lacking, particularly for small enterprises.1 Large corporations have always been the focus of knowledge management studies. However, it's safe to say that tiny enterprises are great at generating new information. They may be able to innovate new information thanks to their organic structure and culture. Their limited resources and unique structural characteristics, however, could make it difficult to gain a lasting competitive edge from these advances (Levy, Loebbecke, & Powell, 2003). The innovative ability of small businesses has the potential to be significantly enhanced by effective knowledge management efforts, leading to long-term improved performance.

In addition, scholars are beginning to question whether management practices are affected by the amount of sector knowledge-intensity (Desnoyers & Lirette, 1999; Smith, 2002). This variable may have an impact on both the information technology sector and the learning process.

This study's overarching goal is to substantiate the hypothesis that small company performance is positively affected by IT-enabled learning and the link between the two. In order to achieve this goal, a multilevel learning model is employed, the sector knowledge-intensity is taken into account, the level of objectives achieved is introduced as a perceptual measure of organizational performance, an empirical study is carried out, and a distinction is made between individual and collaborative technology.

2. Information technology and knowledge management

In this paper we focus on information technology which is different from information system. Essentially, information technology is a generic term for the convergence of computers, hardware, software, telecommunications, Internet, electronics and the resulting technologies. It can be measured through the inventory of applications that organisations have. Whereas, information system is a wider concept, which refers to how information flows are designed within organisations so as to meet organisations information needs (Gunasekaran, Love, Rahimi, & Miele, 2001).

Considering the distinction between information technology and information system, information technology can be conceived as the infrastructure to knowledge management (Chou, 2003), or a knowledge platform (Tiwana, 2002). Some authors, as Choi and Lee (2003) and Gold et al. (2001), with a similar orientation see information technology as an enabler of knowledge management. The role of information technology is to extend human capacity of knowledge creation through the speed, memory extension and communication facilities of technology (Baroni & Araujo, 2001).

Knowledge management tools have been available for quite some time (Davenport & Prusak, 1998). Tyndale (2002) provides a study of technical instruments. One kind of IT relies on tools that have found their way into the knowledge management field from other fields, while the other is based on technologies that were always meant to be used for knowledge management. Tyndale finds that both new and old tools may be used as knowledge management technologies after categorizing them in primary knowledge stages. With an emphasis on software applications, Baroni and Arau' jo (2001) also provide an IT evaluation for the sake of knowledge management.

A differentiation is developed for the purpose of this article and to establish a connection between information technology and learning in organizations. Collaboration technology, in which individuals exchange data, information, and/or expertise, is seen as distinct from individual technology, which pertains to business software characterized by individual usage.

The usage of business software allows for the measurement of individual technologies. The following types of business software were taken into account in this empirical study: software engineering tools, decision support systems, inventory management, sales management, finance and accounting, personnel management, website building and maintenance, and simulation tools for business processes. The uses here are consistent with the IT benefits described by Fielder et al. (1994). The automation of well defined labor processes is a hallmark of individual technology.

Marwick (2001), Alavi and Leidner (1999), and Skyrme (1998) all agree that collaborative technologies are crucial to knowledge management initiatives. Taking cues from Baroni and Arau' ja (2001) and Tyndale (2002), we examine a range of collaborative applications, including newsgroups, shared databases, document repositories, polls, workflow, and shared agendas, just as we would with individual technologies.

3. Learning in organisations

The underlying assumption of this study is that organizational learning occurs when people of an organization and the organization as a whole gain more practical knowledge via the process of interpreting, understanding, and assimilating both explicit and tacit information. The end goal is to provide information that may be formalized into rules of conduct or established procedures for the company.

A four-level learning model is put forth by Nonaka (1991, 1994) and Nonaka and Takeuchi (1995); on the other hand, a three-level model is defined by Bontis, Crossan, and Hulland (2002), Crossan, Lane, and White (1999), and Martınez-Leo' n (2002), with the inter-organizational level not explicitly taken into account. Group learning is not specifically mentioned by Kim (1993), who differentiates between individual and organizational learning. This study is most suited to the two-level model suggested by Kim (1993) since our sample includes a large proportion of enterprises with fewer than 10 workers (72.2%). In large companies, it may be challenging to establish clear boundaries between departments and teams since employees often operate in a variety of roles that are defined by the needs of the market and the company. Since this is the case, we say that group learning is an element of organizational learning.

An individual's tacit and explicit knowledge are constructed via intuition and the interpretation of information throughout the process of individual learning, which may be either conscious or unconscious (Bontis et al., 2002). Therefore, during this stage of learning, people's abilities and habits will change (Garvin, 1993; Fol & Lyles, 1985). Bontis et al. (2002) state that while one's competence, skill, and expertise are necessary for intuition, one also needs motivation, attention, and direction or expertise in order to interpret. In the view of these writers, the trifecta of an individual's capacity, drive, and attention is the key to effective learning. The indicators used to quantify individual learning and their relationship to this level are shown in Table 1.

According to Nonaka and Takeuchi (1995), "organisational learning" refers to the processes where knowledge is created via socialization, externalization, and combination. Here, the organization's strategy, processes, procedures, products, and structures are formed from a common understanding (Bontis et al., 2002). The markers of organizational learning that were used in this study are shown in Table 2.

Table 1
Individual learning indicators

	Indicators	Relationship with learning
What individuals can do?	Polyvalence (Scott & Cockrill, 1997)	Performing different tasks and/or positions will allow individuals to share tacit and explicit knowledge with other employees of different backgrounds thereby increasing their information, experience, and technical and social skills.
	Creativity (Dibella & Nevis, 1998)	It supplies new concepts and work routines to improve the current job context or when unforeseen events happen.
What individuals want to do?	Courage and determination	When employees choose to deal with and resolve problems not only their tacit but also explicit knowledge will increase.
	Openness values (Davenport, Long, & Beers, 1998)	Lack of openness values is an inhibitor of individual learning since employees may hide errors and difficulties. This causes a work environment where employees feel sharing information will reduce their power in the organization.
	Resistance to change (Benoit & Mackenzie, 1994)	When people resist to change and they fight to keep doing things as they have always been done they are rejecting the incorporation of new knowledge.
What individuals need to do?	Definition of goals	When management clearly establishes goals, individuals are more able to optimise their efforts in the process of achieving their targets because they can better assess the value of certain information and knowledge.
	Autonomy and control (Spencer, 1996)	Empowering employees to make decisions and take action in their jobs when facing unforeseen events has a positive effect on learning and in the integration of new knowledge.

Acceptance of failure (Krogh, 1998)	Individual learning is also enhanced if there is an acceptance of failure by management when employees are encouraged to identify and resolve problems.
Reward system (Krogh, 1998)	An incentive reward system fosters the most individual learning.

4. Research model and hypotheses

Figure 1 displays the research model and hypotheses that have been offered. In addition to introducing technology on an individual and collaborative level, learning on an organizational level, sector knowledge-intensity, and organizational performance are all shown in Fig. 1.

There is no agreed-upon way to categorize the level of expertise required in any given field. Capital investment, training, market research for new product development, design, patents, licensing, and research and development spending are all non-R&D innovation expenditures that have been employed as measures of sector knowledge-intensity (Smith, 2002). Desnoyers and Lirette (1999) and Smith (2002) are two examples of studies that examine the relationship between sector knowledge-intensity and several facets of management. In our perspective, the knowledge-intensity of a sector is correlated with the amount of time spent studying and using IT. Consulting and professional service firms are not the only ones that may benefit from knowledge management systems, say Alavi and Leidner (1999). These technologies may help a lot of different types of organizations across different sectors. The final outcomes may be affected, nevertheless, by the sector's knowledge intensity. Current data

Table 2
Organizational learning indicators

Indicators	Relationship with learning
Project-based and teamwork structures (Nevis, DiBella, & Gould, 1995; Leonard-Barton & Sensiper, 1998)	Under the following conditions, individuals will have a higher predisposition to share their knowledge and information: different professional specializations, implementation of employees0 suggestions, team reward systems, trust, dialogue, evident mutual respect and desire to help each other, and high levels of decentralization.
Communication skills and systems (Cohen & Levinthal, 1990)	To achieve effective organizational learning, the majority of the employees should have developed communication skills in order to transmit tacit knowledge. Furthermore, management should build communication systems such as: (1) procedure manuals or data bases in order to boost organizational memory; (2) processes to communicate between departments what they have learned from errors and developments; (3) systematic and regular procedures to collect internal and external information; (4) meetings or presentations to distribute relevant information; and (5) even facilitate social activities.
Experimentation (Slocum, McGill, & Lei, 1994; Fahey & Prusak, 1998; Dibella & Nevis, 1998)	Experimentation implies testing new techniques and methods in specific units or areas before its general implementation in order to create new knowledge or validate existing knowledge.

Training (Lundy & Cowling, 1996)	Training helps to institutionalise expertise, skills and knowledge mainly if it is: (1) continuous; (2) adapted to the specific requirements of the company; and (3) focused not only on technical but also social skills.

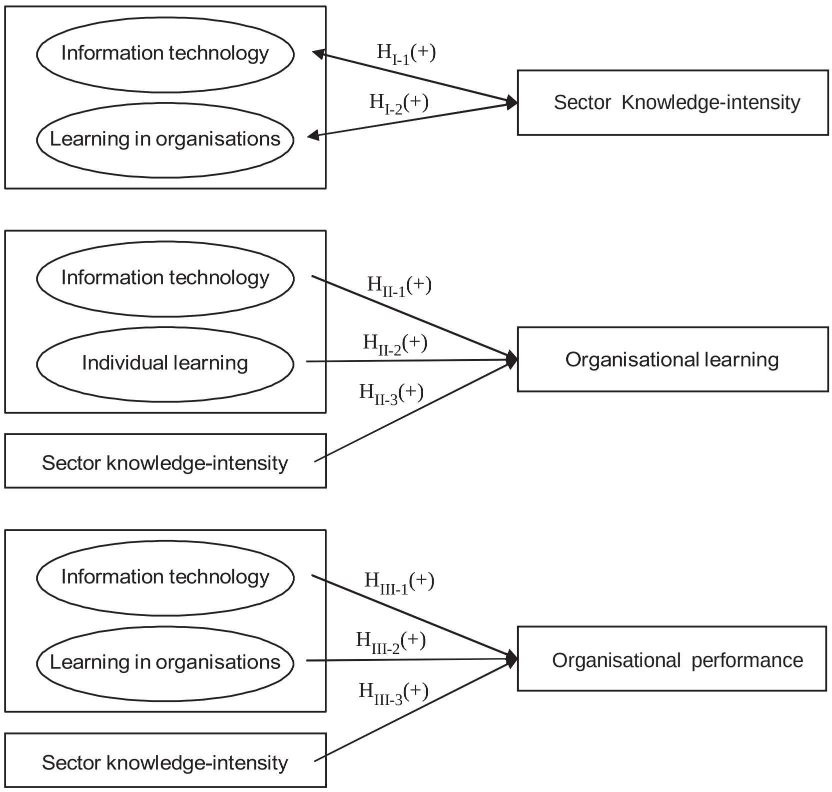

Fig. 1. Research model and hypotheses.

7.4 percent of EU workers were employed in high-tech and medium-high-tech manufacturing in 2002, according to data from the European Communities (2003). In addition, 33.3% of the workforce is engaged in knowledge-intensive services. As a result, in Europe, industries that rely heavily on knowledge and high and medium tech account for over half of all jobs. Because there is more of an expectation that small firms in knowledge-intensive sectors would be more creative, these companies may make greater use of IT technologies and management techniques that promote learning. Hence, from Figure 1 we may deduce the following propositions and hypotheses: First Proposition: There is a correlation between the level of sector knowledge-intensity and the amount of expenditure on IT and education by small firms.

HI-1. Small enterprises in industries with a higher concentration of expertise tend to make greater use of IT.
HI-2: Small enterprises in sectors with a higher concentration of knowledge tend to use learning-promoting strategies more often.
When a company's employees learn from one another and incorporate that knowledge into the company's products, processes, structures, procedures, and strategy, it's called organizational learning. Sharing information and knowledge, both tacit and explicit, via socialization, externalization, and combination processes—as described by Nonaka and Konno (1998)—will expand organizational stocks of knowledge.
According to Robey, Boudreau, and Rose (2000), there are two schools of thought when it comes to the topic of

how IT relates to organizational learning. One school of thought focuses on how IT is used in the implementation and utilization of IT in organizations, while the other school of thought focuses on how IT applications can be designed to facilitate organizational learning. The second one has more to do with knowledge management. The two branches have developed separately. The two are essentially similar, though: organizational learning facilitates the adoption of IT, while IT usage enhances organizational learning capacities.

Due to IT's dual purpose in externalizing tacit information and combining explicit knowledge into more sophisticated sets, organizational learning may benefit from IT's ability to facilitate both processes. To create, codify, store, communicate, analyze, disseminate, and systematize information and knowledge, information technology is an indispensable tool. As an added bonus, "information technology is widely employed to connect people with reusable codified knowledge and it facilitates conversations to create new knowledge." It was stated by Lee and Choi in 2003. In this vein, Marwick (2001) examines the state of the art in knowledge management by looking at the work of Nonaka (1991, 1994) and the model of organizational knowledge generation put forward by Nonaka and Takeuchi (1995). Organizational learning levels will be greater for small firms that utilize information technology more often, both individually and in collaboration.

Having access to reliable information technology does not guarantee that knowledge will flow freely within an organization (Brown & Duguid, 1991). Technology does not alter patterns of information sharing and communication, according to research by Vandenbosch and Ginzberg (1997) on a prominent groupware system. The use of IT improves organizational learning, according to Chou (2003), and this correlation is strengthened in settings where the right culture is present. Businesses take in data from their surroundings, process it into knowledge, and act on it using their own set of rules, values, and experiences (Davenport and Prusak, 1998). Businesses with a strong focus on knowledge management provide work settings and a culture that encourage employees to constantly improve their skills. Crossan et al. (1999), Kim (1993), and Nonaka (1994) are among the writers who have argued that learning at the person level is foundational to learning at the organizational level. Individuals' tacit and explicit knowledge, when combined, will aid in the development of group and organizational knowledge.

Level of organizational learning may vary based on the knowledge-intensity of the industry. Better and more standardized methods of socialization, externalization, and combination may be necessary for small firms operating in industries with a greater knowledge intensity.

In this section, we provide several theories and propositions about organizational learning and how it relates to IT, personal learning, and sector knowledge-intensity (Fig. 1).

Second Proposition: Organizational learning in small firms is associated with IT, individual learning, and sector knowledge-intensity.

HI-1. When it comes to small enterprises, information technology really helps with organizational learning.

HII-2. In small firms, individual learning contributes to organizational learning.

The third hypothesis is that small firms benefit from sector knowledge intensity when it comes to organizational learning.

According to resource and capability-based theory, an organization's competitive advantages are caused by internal variables. However, for these elements to be considered assets and competencies that provide long-term competitive advantages, they must meet certain criteria (Amit & Schoemaker, 1993; Barney, 1991; Grant, 1991; Peteraf, 1993). As a resource, organisational knowledge is the product of several forms of collaborative learning. Therefore, learning is an ever-evolving and unique process that may adapt to new circumstances by integrating and building internal and external skills. Hence, the capacity to learn is a capability. According to Teece (2000), knowledge assets may be seen as a tacit component of information transfer that contributes to a competitive advantage. Featured as a key competency generated via the company's collaborative learning process, it was highlighted by Hamel and Prahalad (1994).

Johannessen, Olaisen, and Olsen (2001) note that society generally is optimistic about the ability of information technology to provide sustained competitive advantage. They do, however, explain how new empirical data casts doubt on the supposed beneficial economic effects of investments in IT, casting doubt on the previous optimism. The productivity paradox in IT describes this situation. While Brynjolfsson (1993) and others provide fair answers, Johannessen et al. (2001) adopt a quite different stance. Both the absence of familiarity with tacit knowledge and its connection to IT are implicated in IT mismanagement, according to their claims. Hence, it's reasonable to assume that investments in conventional or individual IT won't significantly boost competitiveness and, by extension, business results. Collaborative technology, on the other hand, may influence value creation via the administration of tacit knowledge. But other things have to be accomplished before the advantages of information technology may be realized, as was shown before. The success of knowledge management may therefore be facilitated by information technology.

In order to boost their performance, organizations should be able to convert learning processes into management capabilities, as proposed by Hamel and Prahalad (1993). In a study of big corporations, Bontis et al. (2002) found that learning at the individual and organizational levels positively correlated with financial outcomes. In this study, we empirically examine two hypotheses about small-scale firms: one about the link between learning and organizational performance, and the other about the relationship between information technology and organizational success. As a result, we come up with the following proposition and hypotheses (Fig. 1). We have also presented the link between sector knowledge intensity and organizational performance.

Thirdly, there is a correlation between the technological capacity to learn, the sector knowledge-intensity, and the organizational performance of small firms.

HIII-1. Small firms' organizational performance is positively impacted by information technology.

HIII-2. Organizational performance in small enterprises is positively impacted by learning.

The third hypothesis is that small firms benefit from sector knowledge intensity in terms of organizational performance.

5. How It Was Done

5.1. Data gathering and sample

One hundred fifty-three small firms in the IT industry in Spain's Region of Murcia constitute the target demographic. A total of 121 valid replies were received, making the response rate 59.9%. For p ¼ q ¼ 50 and a, the research presumes a 5.1% margin of error.

95.5% degree of confidence. We have created a systematic questionnaire with only closed-ended questions. In June 2001, an in-person survey was administered to the company heads.

Analyzing learning and information systems in small firms is best done in the Information Technology sector. To begin, the vast majority of companies in this industry have fewer than 250 workers (99.6% in the Murcia Region alone). Second, environmental unpredictability is significant, which forces businesses in this sector to innovate both their products and services to stay afloat. Finally, thirdly, individual and collaborative technologies are vital in this area because of the performance character of the activity.

5.1. Measures of variables

There are two sub-scales that assess IT: individual tech and collaborative tech. The questionnaire has nine things for one of them and six items for the other. Chief executive officers are required to evaluate their companies' existence of each item using a dichotomous scale. The "individual technology index" and the "collaborative technology index" are calculated by adding up the values assigned to the elements in separate categories. Comparing solo and collaborative technologies, the internal reliability Cronbach's alpha test for the former is poorer at 0.568 compared to 0.722. Although the individual technology index value of 0.568 is lower than the threshold deemed acceptable by Nunnally (1978), it is nonetheless used due to its near proximity.

Learning: A sub-scale is created for both individual and organizational learning. When CEOs rate 17 things, the resulting Individual Learning Index is the total of those ratings. The theoretical features of workers' 0 polyvalence and inventiveness, 0 resistance to change, 0 autonomy, 0 goal definition level, 0 acceptance of failure, 0 incentive system, and 0 openness to new ideas are captured by these items. All items are rated on a seven-point Likert scale, with "1" being the lowest degree of individual learning and "7" representing the greatest level. A reliability test using the individual learning index yielded a Cronbach's alpha of 0.722, indicating that the scale is reliable. The organizational learning index follows the same procedure but uses 27 categories including training, experimentation, project-based and collaboration structures, communication abilities, and systems. This instance has a Cronbach's alpha of 0.889. Area of expertise-focused pursuits: Separating businesses into two distinct categories based on their "percentage of sale of each product over the overall sales" is the goal of K-means cluster analysis. There is a subset of 69 firms that are clearly classified as software companies. "Consulting," "bespoke software development and modifications," "telecommunication advanced services," and "training" are their primary offerings. The second set of firms is called "Hardware businesses," and it includes eighty-two of them. These enterprises mostly deal with "hardware and its maintenance." To study the impact of the "sector knowledge-intensity" variable, we collect data from the Software and Hardware sub-sectors. Krajewski and Ritzman (2000) define "flexible flow" as follows: a diverse range of products or services made in small batches, a variety of machines or employees grouped to handle all products or services requiring a specific function, and products or services moving from one process to another. Software products and services cannot be described in this way. Conversely, hardware companies fall into what the authors call the "intermediate flow" category: they produce a number of goods and services at a relatively high volume, their employees and equipment are typically structured according to the process, and materials and information are grouped according to the existing routes. According *to our findings, this is true. Using the w2 Pearson test over the variables of "product standardisation level" and "strategy," significant differences were identified between sub-sectors. The chief executive officers of various companies are asked to rate the degree of standardization for their respective goods and services using a seven-point Likert scale. In contrast to hardware firms, software companies generate 61.9% of their revenue from bespoke goods and services, whereas hardware companies generate just 32.8% (po.001). In keeping with Porter's (1980) orientations, the poll also includes a question to assess the company's strategy: overall cost leadership, distinctiveness, or emphasis. In contrast to 50.0% of hardware firms, 73.9% of software companies use a differentiation strategy (po.001). According to Kim (1993), the software sub-sector requires a greater degree of research and development, training, market research, design, patents and licensing, and capital expenditure compared to the hardware sub-sector. This is because software development involves creating new goods. Software was coded as 1 and Hardware as 0 in the introduction of the dummy variable.*

Perceived organizational performance is measured by the degree to which goals are met. Dess and Robinson (1984) argue that subjective evaluations of performance may stand in for more rigorously established quantitative metrics. Research in the fields of information technology (Wang, 2003) and organizational learning (Bontis et al., 2002) has also presented this kind of organizational performance. Various writers, such as Gadenne (1998) and Beal (2000), have introduced the concept of objectives attainment to small firms (2000). To measure the success or failure of the organization, we used the following metrics: cash flow, expenses, market share, quality, new technology introduction, staff satisfaction, customer satisfaction, and organizational reputation.2 Organizational performance indexes are weighted according to a seven-point Likert scale. The "importance" and "level of achievement" of each goal must be specified by the CEO. With these two questions multiplied by each target, an index is created for every organization. With a Cronbach's alpha of.83, the results of the internal reliability test are good.

Age and size of the company are examples of control variables. Murphy, Trailer, and Hill (1996) as well as Bontis et al. (2002) and Martınez-León (2002) included these two variables as control variables in their analyses of organizational learning, as well as in their study on evaluating performance in entrepreneurship research. One measure of a company's longevity is the number of years it has been in business. Employed people as a whole in the year 2000 is a good proxy for size.

5.2. *Statistical analysis*

Two separate samples (Hardware and Software) are used to evaluate the hypotheses from Proposition 1. As for the other assertions, they are tested using hierarchical regression analysis. The first model for Proposition 2 only uses control variables to regression the organizational learning index. Personal learning indices, group learning indices, and individual technology are all part of the second model. The impact of knowledge intensity on organizational learning is accounted for in the third model. Identical control variables are included in the first model of Proposition 3. In the second, it uses indices of individual and group learning, collaborative technology, and overall organizational performance to predict how well goals will be met. The third model takes into account how sector knowledge-intensity impacts the performance of organizations. A final sample size of 149 firms was obtained by excluding cases with missing or unsuitable data on critical factors. The assumptions that underpin the regression analysis are verified by the completion of tests.

5. Results

Both the one-sided Pearson correlations and the descriptive statistics are included in Table 3. When estimating the regression equations, there shouldn't be any major issues with multicollinearity since none of the correlation coefficients are big enough.

We summarized the outcomes from testing our hypothesis in Fig. 2. Contacting the appropriate author will provide you the whole set of findings.

In light of Proposition 1, Hypotheses HI-1 and HI-2 propose that, across all four dimensions (individual technology, collaborative technology, individual learning, and organisational learning), the Software group should have higher mean responses than the Hardware group. With the exception of individual learning, all t-tests have p-values that are less than or equal to 0.05. Across the three dimensions of technology—individual, collaborative, and organizational—the mean response values for software are much greater than those for hardware. That is why we can say that HI-1 is correct (small businesses in sectors with higher levels of knowledge intensity use IT more frequently) and that HI-2 is partially correct (small businesses in these sectors use organisational learning more frequently, but there is no significant difference when it comes to individual learning).

Table 3
Descriptive statistics and two-sided pearson correlations [a]

	Mean	SD	1	2	3	4	5	6	7	8
1. Age	7.516	6.122	1							
2. Size	12.846	31.915	0.138*	1						
3. Sub-sector[b]	0.463	0.500	−.017	.180**	1					
4. Individual technology	4.557	1.783	0.099	0.283***	0.239***	(0.568)				
5. Collaborative technology	1.678	1.508	0.103	0.268***	0.360***	0.366***	(0.722)			
6. Individual learning	86.664	11.067	−0.271***	−0.101	0.000	−0.041	−0.076	(0.722)		
7. Organisational learning	96.812	31.492	0.071	0.225***	0.333***	0.315***	0.278***	0.210***	(0.889)	
8. Objectives achievement	34.453	7.056	0.181**	0.063	−0.090	0.078	−0.115	0.307***	0.252***	(0.825)

*po0.1; **po0.05; ***po0.01. When appropriate Cronbach alpha estimates are listed on the diagonal.
[a]n ¼ 149.
[b]Dichotomous variable: 0 ¼ Hardware and 1 ¼ Software.

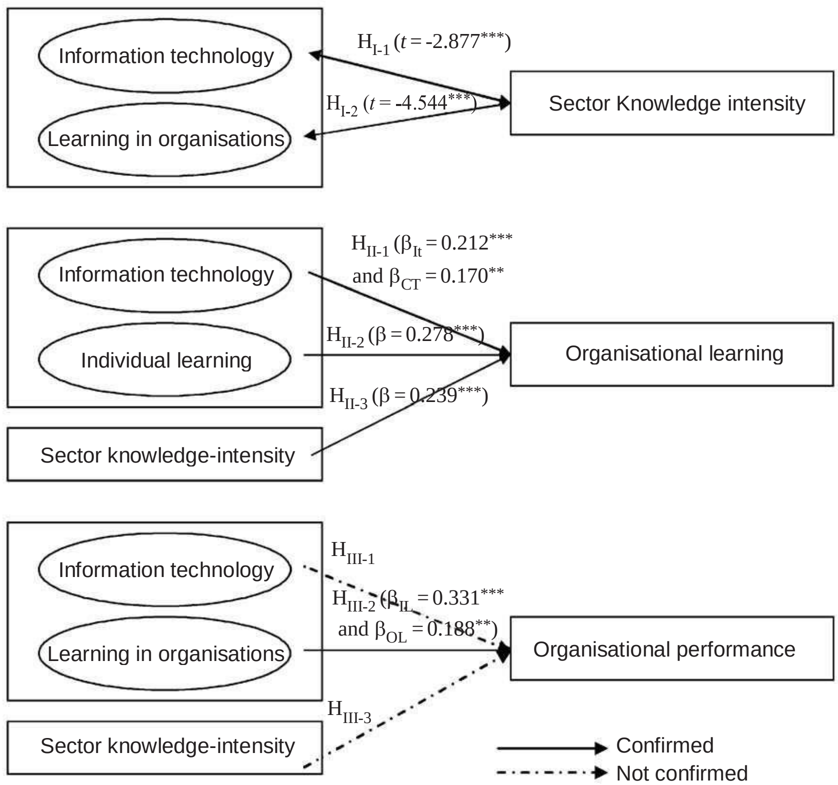

Fig. 2. Support to hypotheses. *po0.1; **po0.05; ***po0.01.

Model 1 investigates the connection between organizational learning and the two independent variables in respect to Proposition 2. Organizational learning is positively and significantly correlated with firm size. When it comes to creating and preserving information, larger organizations have a more formalized system in place than smaller ones. Both of the control variables are part of Model 2, which also contains IT and individualized learning indices. When compared to model 1, model 2 provides far better explanations. In model 2, there is a notable beneficial impact on organizational learning from individual learning, collaborative technology, and technology. This data provide credence to both hypothesis HII-1 and hypothesis HII-2. After factoring in the sector knowledge-intensity impact (Model 3 in Table 3), a notable enhanced version of Model 2. Organizational learning is more prevalent in software sector small enterprises, lending credence to HII-3 (a positive and statistically significant association exists between sector knowledge-intensity and organizational learning in software sector small businesses). When looking at the results of Proposition 3, Model 1 finds that smaller IT companies with greater experience have a better chance of reaching their goals. Model 2 displays the outcomes for hypotheses HIII-1 and HIII-2. The results do not support hypothesis HIII-1 since group technology had a negative influence on goal attainment while individual technology had no discernible effect on this performance indicator of the organization. The results support Hypothesis HIII-2, which states that learning improves small company performance. Organizational learning and the attainment of goals are positively and significantly correlated with one another. We reject hypothesis HIII-3 because Model 3 (Table 3) demonstrates that sector knowledge-intensity does not significantly affect the attainment of goals.

6. Conclusions

When implementing IT in unstructured settings, the ability of the organization to learn is crucial to gaining a competitive edge that will last. Knowledge management is a common area where tacit transfer is important for differentiating between various approaches. This paper's overarching goal is to prove, using data analysis, that tiny firms may benefit from integrating IT with learning and how it might improve their overall performance. To round up our theoretical model, we include sector knowledge-intensity.

The work done by small enterprises in sectors with a high concentration of knowledge (software companies in our research) necessitated a greater reliance on IT and a more extensive adoption of methods that enhanced organizational learning. Whatever the amount of knowledge-intensity in a given industry, small firms consistently rank individual learning as a critical aspect. Organizational learning is positively and significantly impacted by learning at this level. Because of this, small firms can achieve a synergistic effect when they make effective use of tools like polyvalence, openness values, or a high degree of autonomy. This is because the knowledge held by both individuals and the organization's systems and infrastructure will grow. Organizational learning has a favorable effect on small company performance, while individual learning has an even greater beneficial effect. Contrary to what Bontis et al. (2002) found, these findings apply to small firms. Using a sample comprised mostly of major organizations, these authors discovered that organizational learning had a stronger correlation to organizational success than either individual or group learning. Due to the inherent difficulty in allocating resources to more costly and sophisticated methods like as communication systems, experimentation, or continuous and scheduled training, small organizations tend to concentrate on building and establishing individual learning. On top of that, management had to formalize and prepare ahead for organizational learning in huge firms because of how big they were. It is more important for them to find out how the company keeps track of employees' individual learning. This level of education may take place in a less formal setting in small enterprises. Investing in IT and promoting personal development are two ways to improve organizational learning. Organizational learning and individual learning, on the other hand, may boost performance, whereas IT alone won't cut it. Through organisational learning, information technology so indirectly helps to get better results. The findings of our study support the claims made by Popper and Lipshitz (2000) on the need of a social-cultural climate conducive to learning in conjunction with suitable organizational structures, methods, and procedures for the development of learning capacity. Failure to include human and organizational factors likely explains the high incidence of knowledge management system installation failures. The need of human connection is a key component of functional systems (McDermott, 1999). Choi and Lee (2003) argue that a balance between systems orientation and human-centeredness is necessary. Therefore, when used appropriately, information technology has a greater impact on learning outcomes.

Both the IT and learning techniques that small organizations use have been able to be evaluated in this research. The development of a straightforward and practical methodological tool has been developed. When put into action, it will highlight the areas where chief executive officers should concentrate their efforts to help their organizations' knowledge production and transfer processes.

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