

E-Learning and SMEs: Do demand and supply speak the same language?

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Abstract

This paper reports on research-in-progress designed to understand adoption and diffusion of e-learning (EL) among small and medium-sized enterprises (SMEs) in northern Italy. The research takes as its organizing framework the concept that diffusion of an innovation to a group of organizations reflects a match between demand and supply, and augments that framework by reference to Rogers' (1995) model of the processes of adoption and diffusion of innovation in organizations and the IS literature on adoption by individuals. The first two, exploratory stages of the research are completed. They identified that EL is not widely diffused among the firms of interest. In part, this reflects relatively low participation in all forms of training, but it also reflects low awareness of EL, difficulty in identifying and evaluating products and services on the market, and a perception among non-adopters that EL is costly and they do not have adequate ICT infrastructure for it. In the final stage of the research, focus groups were conducted with both SMEs and EL suppliers to identify the extent to which these groups (demand and supply) have a shared understanding of the nature of EL and its potential.

Keywords

E-learning, demand, supply, small business, SME, adoption, diffusion, industry-level analysis

1. Introduction

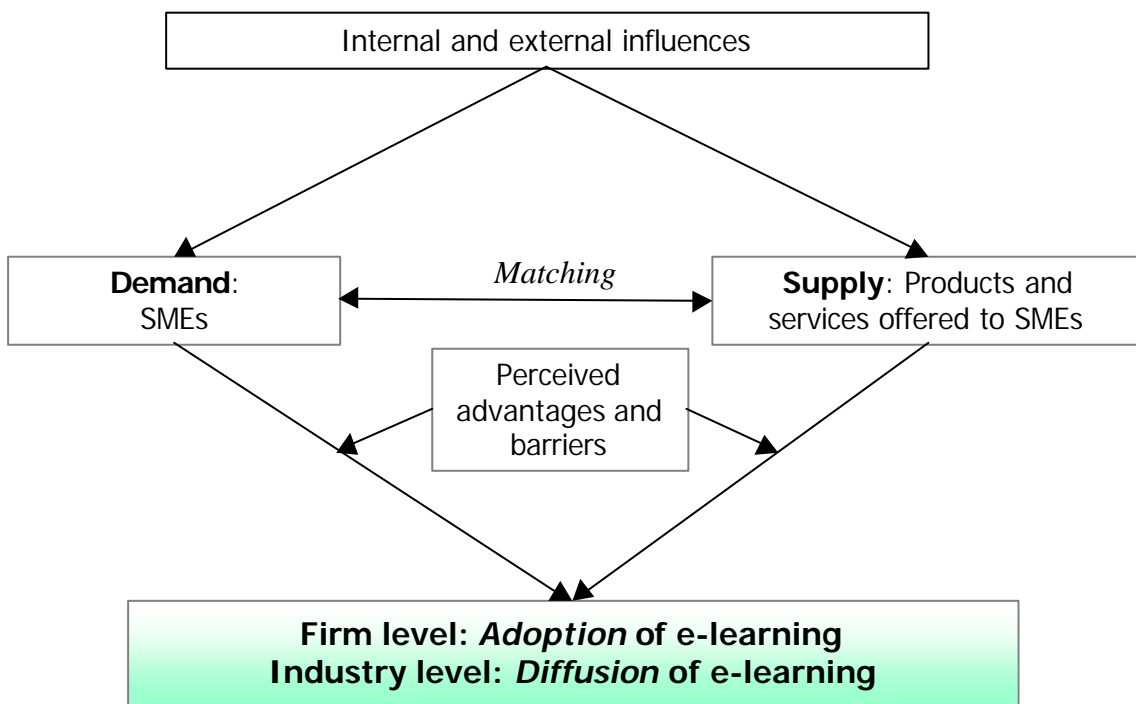
In the years 2000 and 2001, the information and communications technologies (ICT) industry had high expectations for e-learning (EL). Market analysts predicted double digit growth in the US and Europe (IDC, 2001), all major ICT companies were promoting EL solutions, and media interest was high. Textbooks promoted EL's advantages over existing ways to deliver education and training. Proposed advantages included cost savings, flexibility, learning customization, and time to market (Rosenberg, 2001). Recent industry and media attention has, however, been more cautious as diffusion of EL, in Europe at least, has not met expectations. This paper introduces a research project focused on understanding adoption and diffusion of EL among small and medium-sized enterprises (SMEs). It considers both

demand for and supply of EL products and services for SMEs in the industrial and commercial region centered around Milan in northern Italy.

This study is significant for several reasons. Italy is the world’s seventh largest economy, and the area around Milan is the primary industrial and commercial area in Italy. Milanese firms are therefore a significant target market for national and international providers of EL. With an average of 52 employees, most firms in this area would be classified as SMEs by international standards. The contribution of SMEs to economic growth is widely recognized and Italy is one of the countries where SMEs have always played a primary role (Best, 1990; Kumar et al, 1998). Information about adoption and diffusion of EL among SMEs in the Milan area should therefore be of interest to academics with an interest in EL, scholars of ICT diffusion, suppliers of EL, and SMEs and companies with small foreign subsidiaries which have an interest in adopting EL.

2. Research Framework and Goals

In economic terms, diffusion represents the equilibrium between what the market offers (supply) and what consumers want and need (demand). In the case of a supplier-led market, as the market for EL appears to be, demand lags behind supply of products and services. If the innovation is successful, demand will increase as the advantages of the product are identified, and equilibrium is reached over time as both demand and supply adjust to meet business needs, supplier costs, and buyers’ willingness to pay. Figure 1 contains a schematic representation of this mechanism.



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Figure 1. Adoption and diffusion of e-learning among SMEs as matching of demand and supply

Early in the life of an innovation, it is not easy to see where the balance between demand and supply will lie. Innovation theory provides some insight into the processes that occur prior to adoption as potential buyers of new products and services recognize and evaluate them. Distinctions have been made between various levels of adoption and acceptance by individuals within an organization (Bhattacharjee, 2001; Davis, 1989; Dillon, Morris, 1996; Karahanna et al., 1999), but Rogers' original definition of adoption suggests that his conception is appropriate for the present organizational level study: "Adoption is a decision to make full use of an innovation as the best course of action" (Rogers, 1995, p. 171). Of particular interest for this research, Rogers (1995) distinguishes between initiation of the adoption process in an organization, the adoption decision, and subsequent implementation of the innovation. During the initiation phase, the adopting organization recognizes business problems and innovation opportunities and matches an innovation to a business need. The current research addresses this matching process at the sector level, by examining how SMEs (on the demand side) and the firms which offer EL products and services to SMEs (the supply side) perceive EL and its potential contributions (perceived advantages) to the organization. This research is also concerned with the firm-level adoption decision, and thus with diffusion: while adoption occurs when the organization decides to implement the innovation, diffusion represents the cumulative effect of adoption by a group of organizations. The second goal of this research is therefore to understand influences on adoption by SMEs, including common perceived advantages and barriers which, at the sector level, will contribute to diffusion. Both goals are discussed in more detail below.

2.1 Research Goal 1: Differing Perceptions of EL

The first aim of this research is to better understand what both suppliers (the ICT industry) and potential buyers (in this case, SMEs) mean by EL and what they understand to be the advantages it has to offer. We adopted a broad working definition of EL in our initial discussions with suppliers and potential buyers to recognize that, although academics distinguish between computer-based learning (CBL) such as courses on stand-alone CD-ROMs and e-learning, learning which uses communication networks for communication or delivery of training materials, this distinction is not so clear in industry. The suppliers of multimedia training courses distributed by CD-ROM seem quite happy to market their products at EL fairs, and potential buyers did not seem, in our initial discussions with them, readily able to distinguish between such courses and those more strictly defined as EL. Identifying the extent to which both suppliers and potential buyers make a distinction between network-supported EL and other forms of CBL is therefore a part of understanding what these groups understand EL to be.

2.2 Research Goal 2: Explaining Adoption of EL among SMEs

The second aim of this research is to gain a better understanding of why SMEs might adopt EL. While there has been considerable research on implementation of ICT innovations at the organizational level, and ICT adoption by individuals within organizations has received much attention in the information systems (IS) literature, there has been less research into the initial influences on adoption at the firm level. Although Rogers' model has been criticized for failure to take account of the complexity of the adoption process (Larsen & Levine, 1998), it contributes some important notions for understanding adoption. For example, Rogers notes that an adoption decision is made on an organization's behalf by a person (or group) with authority. In this research, we are interested in explaining the adoption decision made by those with authority within SMEs (typically the owner or a delegated individual or group),

thus the decision may often be made by an individual and may therefore be influenced both the factors that influence individual adoption decisions as well as additional organizational considerations. We therefore drew on both sets of literature to develop propositions about influences on the adoption decision to guide this research.

Rogers (1995) characterized adoption as a process which begins with awareness of the innovation and is followed by the formation of attitudes on the basis of which adoption decisions are made. Proposition 1 places the need for awareness of an innovation in the organizational context.

Proposition 1 (Awareness): SMEs which have adopted EL will have greater awareness of EL than those which have not adopted it.

The technology acceptance literature (Davis, 1989) focuses on the cognitive processes of individual technology users. The key cognition to emerge from this research is usefulness: people use ICTs they perceive to be useful for their work. This point of view, while derived from studies of individual adopters within a firm, may provide some insight into e-learning adoption in SMEs where adoption decisions are made by an individual on behalf of the organization.

Proposition 2 (Usefulness): SMEs will adopt EL if they perceive it to be useful.

But why might a SME perceive EL to be useful? One potential answer comes from another stream of IT acceptance literature. Goodhue's model of task-technology fit (TTF; Goodhue, Thompson, 1995) demonstrates that individuals will use ICT when they perceive a good fit between the technology and the task for which it is used. At the individual level, this is a very similar concept to Rogers' (1995) concept of the match between organizational 'problem' and innovation opportunity. Proposition 3 places this observation in the context of the current research.

Proposition 3 (Fit): Italian SMEs will adopt EL only if they consider it suitable for SMEs in the Italian context.

It is not sufficient, however, for an innovation to be useful or compatible. To be adopted it must also be perceived to have a relative advantage over existing means of getting the same task done (Rogers, 1995; Moore, Benbasat, 1991).

Proposition 4 (Relative Advantage): SMEs will adopt EL if it offers relative advantage, such as greater flexibility in time, place or range of opportunities for training.

The final proposition acknowledges that decisions to adopt an innovation take into account real and perceived barriers to adoption as well as the potential advantages (Ajzen, 1991; Compeau, Higgins, Huff, 1999; Mathieson, 1991):

Proposition 5 (Barriers): SMEs will adopt EL if perceived barriers, such as cost, technology access, and time to implement, are low.

3. Research Design

When the research began, in October 2001, little data was available about participation in training among SMEs in the region in which the study was to take place, let alone about the firms' awareness of or participation in EL. For this reason, the research was conducted in a series of exploratory phases, each building on information gathered in the preceding stage. The first phase of the research consisted of identifying demand-side firms (SMEs) which had an interest in training and EL. The association for industrial and commercial firms in the Milan region, Assolombarda, distributed a questionnaire to its members (both large firms and SMEs) seeking information about investment and participation in training and EL. Members of the research team used follow-up telephone calls to contact non-respondents to this survey. This process had two outcomes. Firstly, it confirmed that interest in EL was associated with interest in training: firms with little or no investment in training had not considered EL. Secondly, it enabled the researchers to identify a small number of SMEs which were sufficiently interested in training and EL to complete a shorter, targeted questionnaire.

Thirty-one SMEs participated during 2002 in Phase 2, an initial exploration of attitudes to EL among SMEs with an interest in training. The owner, general manager, or other senior officer with authority to make training decisions responded to a questionnaire which gathered summary data about the size of the organization, expenditure on training, ICT infrastructure and expenditure, forms of CBL and EL used during 2000-2002, attitudes to training in general, awareness of and attitudes to EL, and attitudes to the EL market. Attitudinal responses were collected using a 5-point Likert-type scale of 1 (*disagree*) to 5 (*agree*). The latter two sections of the questionnaire are of particular interest for this research, and are reproduced in the Appendix to this paper, along with a summary of responses by category. These responses enabled exploration of the five influences on adoption represented in the five propositions developed earlier: awareness, usefulness, fit, relative advantage, and barriers to adoption. (Each item in the appendix is annotated to indicate the potential influence on adoption which it represented.) Of the firms participating in this phase of the research, 16 had used some form of CBL or EL and 15 of had not. The responses of non-adopters and adopters were compared by chi-square analysis (as implemented in Microsoft Excel 2002) of the proportion of agreement on each item after responses had been collapsed into two categories: *agree* (4 or 5 on the response scale) and *fail to agree* (responses of 1, 2 or 3).

The final phase of the research, which commenced in November 2002, built on the understanding of SMEs' attitudes to EL gained during phase 2, and enabled comparison between the attitudes of SMEs (the demand side) and the firms that marketed EL products and services to them (the supply side). Two focus groups were held with individuals in a position to make or to influence EL adoption decisions by SMEs; one group consisted of participants from SMEs which have used CBL or EL, while the other included SMEs with an interest in training but without direct experience in EL. Participants in the supply-side focus groups were individuals with responsibility for marketing of their organizations' EL products to SMEs. Each group was prompted to discuss two sets of issues related to the two goals of this research. The first set of issues concerned the nature of EL: what is it, and what are the potential advantages for organizations. The second set of issues was concerned with influences on adoption. Both demand- and supply-side focus groups were asked to consider the same issues using prompts that were identical (except where it was necessary to distinguish supply from demand). The focus groups were videotaped. Verbal contributions to the focus groups were transcribed and records of non-verbal expressions were inserted into

the transcript during review of the videotape by three members of the research team. Responses are currently being classified using content analysis.

4. Initial Results

This section presents the phase 2 results, with additional references to some phase 3 results available at the time of writing. At least two-thirds of the 31 SMEs included in phase 2 participated in some form of training between January 2000 and September 2002. Of the 16 firms which had used some form of CBL or EL, most (10) had used CD-ROMs developed externally to the firm, and half (8) of the firms had participated in EL such as online learning, traditional courses with online tutorship, and participation in communities of practice.

Knowledge of EL among the phase 2 respondents ranged from very low to high, but although most respondents (27, 87%) had heard of EL, the majority of them (19, 61%) reported knowing little or nothing about it. Participants in the focus groups confirmed that EL as an opportunity is known, but few respondents have ever used or tried it.

Respondents who had some knowledge of e-learning (28, 90%) were able to respond to questions about influences on EL adoption in their firm (the first group of items in the Appendix), although only 22 (71%) were able to respond to items which asked about their perceptions of market offerings.

4.1 Propositions 2 and 4: Usefulness and Relative Advantage

There is a perception among SMEs that EL is useful and that training programs that incorporate EL have some advantages over programs that do not include it. SME participants in the focus groups were convinced that EL is more than a business fad. They emphasised its potential to improve the efficiency of training. The phase 2 respondents saw EL as a way to reduce training costs (19, 67%) and to enrich traditional training in areas of common knowledge (16, 57%). Not all the relative advantages proposed in the literature were supported, however. EL was more accepted for training in the office (23, 82%) than outside business hours (12, 43%) and relatively few respondents agreed that it is a suitable substitute for classroom-based training (11, 39%) or a way to improve training quality (11, 39%). Those respondents with some familiarity with the EL market noted EL's potential to add to the firm's training portfolio (15, 68%) as well as a way to access international products and services (17, 77%).

4.2 Proposition 3: Fit

All respondents considered EL a suitable approach to training for large firms. Respondents in all the SMEs that had adopted EL, and half of those that did not, also considered it suitable for SMEs. Among those respondents able to evaluate the market's EL offerings, more considered the available products and services suitable for large firms than for SMEs, and more considered them suitable for foreign business contexts than for Italy.

4.3 Proposition 5: Barriers to adoption

The barriers to adoption considered in the literature were not strongly supported by the survey responses. The majority of respondents neither agreed nor disagreed that EL was expensive and only 22% (6) of the surveyed SMEs found ICT infrastructure a barrier to

adoption. Two of the three statistically significant differences between adopters and non-adopters were, however, in response to questions about barriers to adoption within the firm: the adopting SMEs reported lower perceptions of costs (chi-square = .99, $df=1$, $p=.01$) and access to the necessary ICT infrastructure (chi-square = .82, $df=1$, $p=.02$). It is not possible to determine from the survey responses whether respondents' perceptions of these factors followed or preceded their adoption.

An important insight into barriers to adoption was gained from the focus groups: participants considered the lack of information about EL products and services in the market a critical barrier to adoption. Phase 2 participants' responses to questions about the EL market provide further support for this opinion. Firstly, nearly one-third of participants did not respond to this set of items. Of the 22 who responded, 11 (50%) agreed that it was difficult to identify EL market offerings and 15 (68%) said they were difficult to evaluate. More than half of the respondents could neither agree nor disagree that EL offerings were expensive or value for money, and between 40% and 50% were unable to evaluate the suitability of EL offerings for Italian or foreign contexts or for the needs of big or small and medium businesses. Overall, the greatest barrier to EL adoption may well be the lack of information about what is available.

5. Conclusion

This paper has described research-in-progress into adoption and diffusion of EL among SMEs in northern Italy. A macroeconomic model of diffusion, and five adoption influence propositions derived from the literatures of diffusion of innovation and IT adoption and acceptance, guided the research. So far, we have confirmed that diffusion is low, and associated with relatively low participation in training in general. Among those firms with an interest in training, diffusion of EL is higher, but its use is still not widespread. Low awareness, and consequent difficulty in identifying and evaluating EL products and services, appear to be particular limiting factors. Few SMEs are able to evaluate usefulness, relative advantage, or fit because they are not sufficiently aware of what is available in the market. Our preliminary attitudinal data suggest, however, that EL adoption by SMEs is associated with a perception that EL is suitable for SMEs, and a lack of perceived (or real) barriers in terms of cost and necessary ICT infrastructure. These preliminary findings will be analyzed in more depth as the focus group data is analyzed. At the conference, we will present the focus group-based comparison of demand- and supply-side views of EL, its potential advantages, and barriers to adoption, and draw conclusions about the extent to which, at this stage in the EL life-cycle, demand and supply are 'speaking the same language'.

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Appendix: Extract from Survey of SMEs interested in Training

[translated from the original Italian, annotated with number of respondents in each category]

E-learning activities in our firm are (mark the cell that best fits your assessment), N = 28

Cat.		Disagree	Disagree partially	Neither agree nor disagree	Agree partially	Agree
RA	Considered an opportunity to increase our training portfolio	0	2	3	9	14
A	Considered a fad	11	1	4	6	3
RA	A suitable substitute for classroom-based training	7	5	4	8	3
RA	A way to enrich classroom-based training	2	1	7	9	7
RA	An opportunity to reduce training costs	1	1	6	11	8
RA	A way to provide training in the office	1	0	2	13	10
RA	A better solution (in relation to traditional training) for quality training	5	4	6	8	3
B	Difficult to introduce because our technical infrastructure (network, PCs, etc) doesn't support it	13	3	4	4	2
B	Considered very expensive	7	3	12	4	0
RA	A way to provide training outside business hours (evenings, weekends, etc)	9	2	5	8	4
Fit	Considered suitable for big businesses	2	1	10	8	5
Fit	Considered suitable for small and medium businesses	3	2	3	9	3
U	An instrument for acquiring common knowledge standard in the market	1	1	6	11	5

With reference to e-learning offered by the market, it is, N = 22

Cat		Disagree	Disagree partially	Neither agree nor disagree	Agree partially	Agree
Fit	Appropriate for our needs	4	2	9	6	1
A	Difficult to identify	1	3	4	7	4
A	Difficult to evaluate	1	1	5	8	7
Fit	Built with foreign contexts (e.g. US) in mind	1	1	11	5	3
Fit	Built with the Italian context in mind	3	6	9	3	1
Fit	Addresses the needs of big business	0	0	9	7	4
Fit	Addresses the needs of small and medium businesses	3	4	9	3	2
B	Expensive	1	5	12	2	1
B	A solution which offers value for money	1	2	13	3	2
RA	A way to access a wider catalogue of courses	0	1	5	13	2
U	A way to access international products and services	0	0	4	12	5