Abstract – Traditional ways of teaching and learning were used for centuries around the world. Shifting from these well known traditional ways of teaching and learning to a more recent ways – E-Learning – to adapt to the needs of the knowledge-based economies is requiring some adjustment from the part of the businesses. One of these adjustments is to overcome various barriers related to the use of e-learning. This research discusses the barriers that SMEs face when they want to use the e-learning and proposes an action plan to remove or at least decrease these barriers.

Index Terms – barriers to e-learning, e-learning, learning, training, workplace learning.

I. INTRODUCTION

Throughout the centuries, individuals and businesses have used various types of training to meet their learning needs and to adapt to changes in their environment. However, the economic and social transformation of the last twenty years, mostly due to the emergence of the new global economy which is based mainly on knowledge and information, has had an impact on the nature of the skills needed by workers. These needs went from those of a low-skilled workforce as required by traditional industry to those of a highly skilled workforce. These changes imply continuous learning on behalf of workers to keep their skills up to date [1].

On the other hand, technological and organizational innovations, in place and in emergence, as well as financial constraints and the need to downsize have led organisations to consider information technologies as a main to increase and improve their training capabilities. Furthermore, the link between training, competitiveness and economic development has intensified. To this end, the [2] considers that in the knowledge-based economies, a firm’s investment of in training and updating of skills is a key element of its growth. In particular, small and medium-sized enterprises (SMEs) must exploit e-learning to address their training needs in order to ensure their growth and survival. However, according to [3] and the [4], if SMEs are to use and benefit from e-learning, a number of barriers must be removed or at least lowered.

In Atlantic Canada, SMEs, defined as firms having 10 to 500 employees, represent the majority of businesses and they also create the majority of the jobs [5]. Due to their great flexibility and adaptability, these enterprises represent sectors in the economy that have the highest growth rate, create the most employment, and generate the most regional development [6]. This study has both a descriptive and a prescriptive aim. Having identified what we know of SMEs with regard to e-learning, based on a survey of the literature, the first objective is to determine, through a multiple case study, the barriers to e-learning actually encountered by SMEs in Atlantic Canada. The second objective is to develop the conceptual and methodological framework for an action plan to assist SMEs in surmounting these barriers and meet their training needs.

II. THEORETICAL CONTEXT

Although the adoption of e-Learning technology for purposes of workplace training and human resource development is rapidly growing in large organisations, both private and public, and to a lesser extent in SMEs [7, 8], the practitioner literature shows that there are barriers to the use of e-Learning for enterprises and more particularly for SMEs.

A. Barriers to e-Learning in SMEs

Barriers in the use of e-learning as a method of training for learners, both for businesses and educational institutions, has been identified by various studies. For example, [9] mentions that the main barriers to the use of e-learning in Canada are learners and technical infrastructure. Among other barriers mentioned by [9] we find the lack of knowledge towards e-learning, the accessibility, the lack of commitment from senior management, the lack of quality courses, the development costs and the priorities of investment. According to [10],
the bandwidth, the access to the Internet, the reluctance of the employees to use the technologies, the lack of investment on the part of companies in technology and the lack of university-level course and not university relevant to the needs of businesses are still barriers to the use of e-learning. In addition to the lack of relevant course, the reluctance of employees and the lack of expertise or technical capacity of these as barriers to e-learning, [1] refers to the lack of realism of businesses towards what e-learning can and cannot do. The barriers facing companies when they want to use the e-Learning are summarized in Table 1.

B. Possible solutions to the barriers

Just as the barriers to the use of e-Learning, ways to overcome them have been identified by various studies. The results of two of these studies, is that of [3] and the [4] are presented in Table 2.

### TABLE 1

<table>
<thead>
<tr>
<th>Barriers</th>
<th>Explanation of barriers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accessibility</td>
<td>Difficulty for the trainer and learner to acquire or have access to the necessary technology (hardware, software, bandwidth) [9, 10, 11, 12, 13, 14, 15, 16, 17].</td>
</tr>
<tr>
<td>Training and support not available</td>
<td>Teachers and learners do not always understand how to use the technology required for the course (computers, software, Internet, TV…) [10, 15, 17, 18, 19, 20].</td>
</tr>
<tr>
<td>Course and course content</td>
<td>Determine the purpose of the course: learning through technology or learn technology [22]. Determine the course content and the order of presentation of content [23, 24]. Align the objectives of the course with the course content and assessments [13, 19]. Choose the method of training (an active method, which allows the learner to construct their learning, and have access to a teacher if necessary, is a better method than an affirmative one) [18, 20]. Déterminer la durée et le coût [25]. Determine the duration and cost [13, 19, 25]. Lack of involvement of different stakeholders and no strategic plan [15, 21].</td>
</tr>
<tr>
<td>Interaction</td>
<td>Lack of human interaction (face to face) [12, 14, 21].</td>
</tr>
<tr>
<td>Learners</td>
<td>The profile of the learner may not always match the desired profile. The following characteristics are desirable in order to ensure the success of the training: self-motivated [9, 18, 19, 23, 26], ability to work alone [9, 18, 26], self-disciplined [9, 23, 26], &quot;focused&quot; [9, 23].</td>
</tr>
<tr>
<td>Environment</td>
<td>The political, social and economic forces which may influence the choice of courses offered, the quality of courses and the place [21].</td>
</tr>
<tr>
<td>Costs</td>
<td>Costs (infrastructure, development and / or purchase of course) required to support e-learning [3, 4].</td>
</tr>
</tbody>
</table>

### TABLE 2

<table>
<thead>
<tr>
<th>Barriers</th>
<th>Possible solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accessibility</td>
<td>Increased availability of bandwidth. Reduce the cost of connectivity. Develop agreements for standardization.</td>
</tr>
<tr>
<td>Training and support not available</td>
<td>Providing the appropriate training and support for educators, learners and administrators. Educate various stakeholders to the benefits of e-learning.</td>
</tr>
<tr>
<td>Conceptual Framework research not available</td>
<td>Develop new conceptual frameworks for research on how people learn at the age of the Internet, tools to facilitate learning and assessment, and organizational structures that underlie learning.</td>
</tr>
<tr>
<td>Course and course content</td>
<td>Develop online courses in greater numbers and better quality. Set ownership of online courses in universities.</td>
</tr>
<tr>
<td>Policies and regulations</td>
<td>Review policies and regulations in place and replace them with approaches to provide training anywhere, anytime, at the pace of the learner. Review policies and regulations to encourage the creation of consortiums among universities and businesses.</td>
</tr>
<tr>
<td>Protection of the learner and his private life</td>
<td>Establish laws and regulations necessary to protect students and their online privacy.</td>
</tr>
<tr>
<td>Costs</td>
<td>Establish adequate funding to enable the development of necessary infrastructure and courses.</td>
</tr>
</tbody>
</table>
The barriers to the use of e-learning have been studied for very large enterprises and organizations. Overall however, there is insufficient theoretical and empirical evidence and understanding of the barriers face by SMEs to support the use of e-learning as an efficient and effective solution to the training problems of these one [27]. With a view to provide such added evidence and understanding, the present study shows the barriers which are really facing SMEs and proposes an action plan to overcome them.

III. RESEARCH METHODS

Given the present state of knowledge on e-learning in SMEs, a qualitative and exploratory research approach was used. The case study method is well adapted in situations where theoretical propositions are few and field experience is still limited [28]. A multiple-site case study allows one to understand the particular context and evolution of each firm with regard to e-learning. Sixteen SMEs located in the Atlantic region of Canada were studied, that is, four in each of the provinces of New Brunswick, Nova Scotia, Prince Edward Island and Newfoundland, selected to be sufficiently successful (at least 10 years in business) and representative in terms of industry and size, for theoretical generalization purposes. Following North American research [29, 30], a small enterprise (SE) is defined as having 20 to 99 employees, whereas a medium-sized one (ME) has 100 to 499.

Data were collected through semi-structured tape-recorded interviews with the owner-manager or CEO and with the firm’s HR manager or manager responsible for training. E-learning users were also interviewed in four cases. Interview transcripts were then coded and analyzed following [31] prescriptions. As presented in the research results section, these firms range in size from 60 to 485 employees and operate in industries whose technological intensity varies from low to high. All export except for one firm (M). The SMEs were regrouped in four e-learning profiles of increasing intensity, based on the extent of their knowledge and use of e-learning (none, weak, average, strong).

IV. RESEARCH RESULTS

SMEs encounter some barriers when they want to use e-learning as a means of training. Even SMEs that use little or not at all the e-learning are aware that certain barriers may be encountered with the e-learning.

A. Perceived barriers of e-Learning by SMEs

The barrier which is most often quoted, in fact it is mentioned by all SMEs interviewed, is the one connected with the bandwidth, that is the accessibility. The capacity to download e-learning courses is not available because the required bandwidth is not always available in the workplace or in regions where employees remain. This problem is illustrated by the comments of Gérôme, who says: « The bandwidth is insufficient. It takes an eternity to download an e-mail, forgets videos and other sophisticated things. It would be difficult to administer training of this style with the system such as it operates at present. By the time a course would be online, the employees would have left home » (G:181-186). In addition, some SMEs do not have a training room equipped with the necessary equipment for this type of training, and some employees do not have a computer at home.

Another barrier mentioned by the majority of SMEs is the one of the level of knowledge of the employees towards computers. There are several employees whose level of knowledge is not sufficient or still, they have no interest in computers. The comments of Jules illustrates the problem « There are some employees who are fascinated by computers and there are others who don’t want to touch them ...Is that the medium that is most suitable for these people learn » (J:652-654). The motivation and discipline required to take a course online were also mentioned.

The lack of knowledge about the courses available is another barrier highlighted. It is not known what courses are offered, where they can be found, what is their level of interaction, what are the possibilities of mentoring, what are the possibilities for the evaluation and what level of security is necessary in order to avoid problems and ensure that it is the right person that makes the course. Hector gives us an example of the lack of knowledge about what is available, he says: « there’s no directory, or if there is one, I am not aware of it » (H:145-146).

The barriers cited by SMEs in the use of e-learning are illustrated in box 1. These barriers, as shown in Table 3 can be grouped into broad categories, namely: lack of access to computers or the Internet, the lack of training and support both for SMEs and for the employees, lack of knowledge on the courses and content relevant to the needs of SMEs including lack of realism of SMEs towards what e-learning can and cannot do, the level of interaction, the cost of purchases or development and the
The barriers faced by SMEs are similar to those found in the review of the literature.

**BOX 1**
ILLUSTRATIONS OF THE BARRIERS ENCOUNTERS BY SMEs

- «The necessary bandwidth is not available in all regions.» Gérôme (G:264-267)
- «It lacks the facilities for such courses. [...] They were conditioned to receive training in a certain way, with a teacher. It will be difficult to change this.» Arthur (A:509-513:613-617)
- «Employees do not have all the necessary knowledge.» Ivan (I:822-830)
- «First we would have to know what is available.» Hector (H:140-142)
- «It is difficult to find courses relevant to what you need and it takes time.» Bert (B:719-726)
- «The cost and time for development at the Internal are high.» Edna (E:419-423)

**TABLE 3**
BARRIERS TO THE USE OF E-LEARNING ACCORDING TO SMEs

<table>
<thead>
<tr>
<th>BARRIERS</th>
<th>SME</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Profile I</td>
</tr>
<tr>
<td></td>
<td>strong</td>
</tr>
<tr>
<td>No. of employees</td>
<td>300 to 485</td>
</tr>
<tr>
<td>Accessibility</td>
<td>x</td>
</tr>
<tr>
<td>Training and support</td>
<td>x</td>
</tr>
<tr>
<td>Course and content</td>
<td>x</td>
</tr>
<tr>
<td>Interaction</td>
<td>x</td>
</tr>
<tr>
<td>Learners</td>
<td>x</td>
</tr>
<tr>
<td>Costs</td>
<td>x</td>
</tr>
</tbody>
</table>

**Nota.** A “strong” use means that the firm regularly uses e-Learning to train its employees. An “average” use means that the firm has developed at least two courses in e-Learning format and that production employees must take these courses. A “weak” use means that only a few employees use e-Learning. A “non-existent” use means that the firm does not use e-Learning to train its employees.

Therefore, in order for e-learning to be a viable and feasible solution for all SMEs, we must eliminate, or at least alleviate some of these barriers. The action plan presented below is a start in that direction.

**B. Action Plan**

“Reference [2]” considers that in the knowledge-based economies, the investments of a company in the training and the update of the skills of the employees are one of the key elements of the growth. According to this organization, SMEs need to exploit the e-learning to address their training needs in order to ensure their growth and survival. “Reference [32]” mentions more or less the same thing, and for the latter, e-learning has to be part of the development of businesses in order to ensure the sustainability of these.

However, according to [3] and [4], if we want businesses use the e-learning, barriers to the use thereof shall be removed or at least reduced. In addition, a culture more favorable to e-learning, in addition to the benefits associated with it, encourages companies to use e-Learning [10].

The action plan to incite SMEs to use the e-Learning must include both actions to develop a culture more conducive to e-learning and actions to remove or reduce barriers to the use of this one.

According to Middleton [33], if companies want to position themselves so that they can compete on a global scale, they will need much better trained employees and getting better trained employees will be done through a change of culture towards training. Moreover, the culture change must be transmitted and adopted by all stakeholders, ie by SMEs, the various players in economic development and society in general.

The development of a culture of learning and e-learning passes, among other things, by valuing learning and a better understanding of the e-learning [2, 14, 34]. The comment issued by Denise illustrates indeed the need to enhance learning and to learn more about the e-learning. She says: «We must develop a learning culture, in society in general, because without education or training businesses cannot survive.» (D:985-999) For its part Ivan says: «There must be information sessions. People should be made aware of what e-Learning. They should be presented a demo of what the e-Learning can do.» (I:1081-1085)
We need champions of e-learning for the promotion and awareness of e-learning in companies. This promotion and awareness can be done by internal champions of e-training [34, 35, 36], as well as by external champions [2, 37, 38]. However, champions must have credibility and knowledge of the e-learning. The comment issued by Edna clearly illustrates the need for champions of e-learning. She says: "I think it should be someone, like economic development agencies, to tell them about what is available." (Edna E:613-615)

As previously mentioned, in addition to actions to develop a culture more conducive to e-learning, the action plan should include actions to remove or reduce barriers to the use if we want to encourage SMEs to use e-Learning. To this end, the action plan should include various actions including the upgrading of employees towards technology in general and the e-learning, offering technical support, the development of a toolbox, and the increase in bandwidth in some regions.

Among the factors that discourage students from using the e-learning, we find the lack of knowledge towards this one and of the technology [39]. Thus, in order to ensure that learners do not drop out or refuse to use the e-learning, we must ensure that employees have the equipment, the software, the skills and the necessary knowledge needed to use the e-learning [34, 39]. It is also necessary to provide basic courses to those who do not know how to use computers. Jules's comment goes in this direction, he says: "Some of our employees do not have the knowledge and skills necessary [...]" (J:654-658)

One of the factors which discourage businesses to use the e-learning is the lack of support available. Thus, in order to ensure that learners do not drop out or refuse to use the e-learning, they must be given the necessary support to use the e-learning [3, 4, 39, 41]. To this effect Ivan said: "Universities or another body should put available resources, by e-mail or phone, to provide consulting services for SMEs." (I:1086-1090)

Although, according to [41, 42], there are currently a large number of courses on the Internet and, even for SMEs, the lack of information about what is available on the Internet is one of the barriers identified in the use of e-learning; barrier identified both by some authors that by SMEs themselves. To overcome this barrier, some researchers [42, 43, 44] suggested using tools to explore the availability of e-learning, and thus better understand what is available on the Internet. For its part, [34] suggests to create and distribute tools to help companies use e-learning. The comment of Gérôme illustrates well this need of a toolbox, he says: "The most interesting way would be to bring me a catalogue and to tell me what is available as training [...]" (Gérôme G:595-597)

Finally, initiatives should be undertaken in order to increase bandwidth in the regions because this barrier reduces the ability of companies and employees to download training courses, in e-learning format, depending on where they are.

Although communication is not as such a barrier to the use of e-learning, it seems that the communication between SMEs and economic development agencies is not what it should be. Indeed, SMEs are under the impression that the agencies do not know their needs and that the programs they offer are not fitted to their needs. These problems are not directly related to e-learning, but would have an impact on how SMEs can fill their needs. They could possibly be mitigated through various outreach initiatives emanating from the economic development agencies via an action plan.

5. CONCLUSION

SMEs face many barriers when they want to use the e-Learning and these barriers are the same as those which larger organizations are facing, namely: lack of access to computers or the Internet, the lack of training and support both for SMEs and for the employees, lack of knowledge on the courses and content relevant to the needs of SMEs including lack of realism towards what e-learning can and cannot do, the level of interaction, the cost of purchases or development and the learner himself.

The action plan drafted, by its initiatives to develop a culture and to reduce the barriers to e-learning, is a start of solutions to the barriers facing SMEs when they want to use the e-Learning to train their employees.

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