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## Research article

# Strategic alliances in higher education in Ecuador: the challenge of knowledge transfer and its effect on the learning curve

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### A B S T R A C T

This paper examines the effect of knowledge transfer on the learning curve in higher education institutions involved in a strategic alliance. A qualitative inductive approach was used to analyze the case of a learning alliance between two higher education institutions. The authors found sufficient evidence, in the environment of universities in Ecuador, to support the idea that successful knowledge transfer processes between allied institutions have a positive effect on the learning curve of the institution that adopts the knowledge transferred in its initial stages. Furthermore, with the maturity of the relationship, this process of knowledge transfer becomes a two way exchange process that promotes the improvement of the institutions involved in the alliance. Key factors in the process of knowledge transfer are effective communication processes, social networks between institutions involved in alliance, motivation, absorptive capacity, rotating membership, and leadership of managers.

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### Alianzas estratégicas en la educación superior en Ecuador: el reto de la transferencia de conocimiento y su efecto en la curva de aprendizaje

### R E S U M E N

Este artículo examina el efecto de la transferencia de conocimientos en la curva de aprendizaje de instituciones de educación superior que participan en una alianza estratégica. Se realiza una investigación cualitativa inductiva en la que se analiza el caso de una alianza de aprendizaje entre dos instituciones de educación superior. Los autores encontraron evidencia suficiente en el entorno universitario de Ecuador para soportar la idea de que los procesos exitosos de transferencia de conocimientos entre instituciones aliadas tienen un efecto positivo en la curva de aprendizaje de la institución que adopta el conocimiento transferido en sus etapas iniciales. Además se encontró que, con la

#### Palabras clave:

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madurez de la relación, este proceso de transferencia de conocimientos se convierte en un intercambio de dos vías que promueve el mejoramiento de las instituciones participantes en la alianza. Los factores fundamentales en el proceso de transferencia de conocimientos entre las instituciones aliadas son: procesos efectivos de comunicación, redes sociales entre las instituciones, motivación, capacidad absorbente, rotación de miembros entre las instituciones y el liderazgo de los gerentes.

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Universities around the world are currently experiencing a high level of competitiveness in the student recruitment process, due to this universities are concerned about issues such as quality of service, attention to students and parents, training and updating of its faculty and staff, and the production of knowledge that can be published in order to improve the institution's position in international rankings.

According to Salmi (2007), a high concentration of talent (faculty and students) is a fundamental factor in order to university to become in world Class University, this is, the presence of a critical mass of top students and outstanding faculty. This point of view is no so far from the resource based view of the firm which propose that in order to obtain sustainable competitive advantage, resources such as human capital play a fundamental role if they are valuable, rare, imperfectly imitable, and non substitutable (Barney, 1991).

The constant change in the environment of universities in Latin-American countries makes cumulate knowledge and previous experiences key factors for success and recognition. Therefore universities are looking to produce new knowledge and, through it, increase the number of publications and researches in order to obtain notoriety and relevance that allows them to survive in the universities new market. It means that knowledge play a fundamental role in the future of universities as institutions as proposed by Kogut and Zander (1992).

In this new market of universities, it is increasingly common to find new alliances between local higher education institutions. These alliances have emerged as a response to the growing needs of students and teachers, and survival conditions increasingly tough that have been imposed by the university market.

The purpose of this paper is to apply the alliances conceptual framework to an academic setting in order to examine knowledge transfer processes and its association with the change of the characteristics of the learning curve of allied higher education institutions. The main research questions of this article are: (a) Which is the nature of the knowledge transfer process between allied institutions?; (b) What strategies can be used in order to transfer knowledge between allied higher education institutions?, and (c) What is the impact of knowledge transfer in the learning curve of the institution with which the strategic partnership is performed in an environment of higher education?

Specifically we found sufficient evidence, in the environment of universities in Ecuador, to support the idea

that successful knowledge transfer process between allied institutions have a positive effect in the learning curve of the institution that adopts the knowledge transferred in it's early stages, and with the maturity of the relationship this process of knowledge transfer become in a two way exchange process that promote the improvement of the institutions involved in the alliance.

### The alliance—Knowledge transfer need

Gulati (1998) defines strategic alliance as voluntary agreements between two or more firms that involve exchange, share, or develop products, technologies or services. Interdependence between firms has been the more accepted reason for strategic alliances in the literature, nevertheless according to Burt (1983) interfirm collaboration exists as a response to a common environment challenges. Alliances are designed to allow partners to share risk and resources, gain knowledge, and obtain access to markets (Hitt, Dacin, Arregle, & Borza, 2000). Alliances where the primary goal of the partners is to learn from each other have been categorized as learning alliances, and constitute an important class of interfirm alliances (Hamel, 1991). In the context of higher education institutions, learning alliances are the most common.

From a learning perspective, strategic alliance promotes costs reduction of knowledge searching process, an agile institutional learning, and the growing of the cooperation capacity between allied institutions. It means that firms sign alliances in order to access to a valuable resources from the allied firm, such as knowledge (Eisenhardt & Schoonhoven, 1996).

A critical aspect in learning alliances is the process of knowledge transfer, because it allows both companies to respond more quickly to changes in the environment in which it develop. If knowledge is explicit, it is more easily communicable, for example through procedures manuals. However, tacit knowledge is best transferred through social practices and experiences (for the concepts of tacit and explicit knowledge, see Polanyi, 1966). According to Szulanski (1996) knowledge with a proven record of past usefulness is less difficult to transfer. This paper contributes to the knowledge transfer literature by examining the process of knowledge transfer in allied higher education institutions.

As we mentioned before, tacit knowledge is best transferred through social practices and experiences, this is in concordance with Granovetter (1985) when emphasizes the

importance of social ties in order to being able to disseminate knowledge and information. In learning alliances, the transferring of tacit knowledge is an important issue that could be solve through the creation of networks between similar departments of institutions that form the alliance. These networks could promote trusting relationship and joint-problem solving (Uzzi, 1997), and also may offer "network resources that are the source of valuable information for firms" (Gulati, 1999) which in turn will help in the process of transfer the tacit knowledge.

Generally what are transferred between allied institutions are the best practices. Transfer of best practices could be conceived as replications of organizational routines. According to Rolland and Chauvel (2000), the process of knowledge transfer should be considered in terms of space, time and mechanisms. Particularly we consider that leadership and communication processes also play an important role in the knowledge transfer between allied institutions.

The mechanisms used to knowledge transfer between allied institutions, among others, are: member rotation, technology, firm structure, and social networks (Argote & Ophir, 2005). It is important to mention what Szulanski (1996) identified as the major barriers to transfer of knowledge, these are: lack of motivation, lack of absorptive capacity, lack of credibility, arduous relationship between the source and the recipient, and causal ambiguity (due to the complexity of knowledge), and suggested that the last three, that are the knowledge-related barriers, are the principal impediments to knowledge transfer.

During the activities that occur in a learning alliance, competitive and cooperative behavior of participating firms could appear, due to this is very important that involved firms understand well the strategic dynamics within such partnership. According to Khanna, Gulati and Nohria (1998), competitive and cooperative behavior is associated with the ratio of private benefits to common benefits, and also with the concept of relative scope. They argue that "firms' incentives to learn are driven by their expected pay-offs" and also that "optimal strategic behavior ... requires managers to appreciate the simultaneously cooperative and competitive nature of alliances."

But, what kind of knowledge is transferred? According to Fang et al. (2007), marketing skills and technological knowledge, among others, are knowledge resources that can be transferred between allied institutions to facilitate the competitiveness and performance of the institution that acquire the transferred knowledge. We also consider that knowledge about positioning strategies and products portfolio can be transferred between allied institutions, principally higher education institutions. At the same time, we agree with the position of Cohen and Levinthal (1990) that refer to a firm's absorptive capacity, when express:

"Absorptive capacity refers not only to the acquisition or assimilation of information by an organization, but also the organization's ability to exploit it. Therefore, an organization's absorptive capacity does not simply depend on the organization's direct interface with the external environment. It also depends on the transfers

of knowledge across and within subunits that may be quite removed from the original point of entry. Thus, to understand the sources of a firm's absorptive capacity, we focus on the structure of communication between the external environment and the organization, as well as among the subunits of the organizations, and also on the character and distribution of expertise within the organization" (pp. 131-132).

In other words, absorptive capacity is related with the abilities to acquire, assimilate, and exploit knowledge. Absorptive capacity of a firm is a function of the firm's prior knowledge. Clearly, the level of absorptive capacity is an important factor in the knowledge transfer process between allied institutions involved in a learning alliance. Based on the previous discussion, we present the following hypotheses:

*Hypothesis 1:* An adequate communication process, tied with leadership of the managers of the allied institutions, will promote the creation of networks of inter-institutional collaboration, which in turn will have positive implications on the success of the transfer of tacit knowledge between allied institutions.

*Hypothesis 2:* Absorptive capacity of the allied institution that adopt the knowledge will have a positive effect in the successful of the knowledge transfer process between institutions involved in a learning alliance.

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### The knowledge transfer-learning curve relationship

According to Szulanski (1996), the process of knowledge transfer within a firm could be split in four stages, as follow: initiation, implementation, ramp-up, and integration. The first stage is characterized by all the events that conduct to the decision to transfer. Once the decision has been taken, the implementation stage begins with the resolution to go on in the knowledge transfer process. When the recipient starts using the transferred knowledge, begins the ramp-up stage, i.e. after the first moment of use. In this stage all participants has the opportunity to solve problems that could be presented, and through this cumulate more knowledge and increase their actual learning. The integration stage is accomplished once the transferred knowledge becomes in routines, and therefore institutionalized. We also believe that after the integration stage, while the beneficiaries achieve successful results, a short period of inertia appears, after which the recipients begin again the process of knowledge transfer. This latter feature provides the dynamic aspect of knowledge transfer process. We consider that these four stages of the process are presented in the relationship between allied higher education institutions that participate in a learning alliance.

As we mentioned earlier, the transfer of knowledge helps in the process of decision making in allied institutions. In a university management process, decisions are the production units on which are supported the success of the institution. Based on this, we could say that the knowledge transfer

between institutions within alliances help in increasing units of production (decisions) expressed in the reduced time in the process of decision making in allied higher education institutions.

This time reduction in the production process, as a result of learning, is recognized in the literature as learning rate (Argote & Beckman, 1990). It is important to notice that research has shown that there is considerable variation in the rate at which organizations learn (Hayes & Clark, 1986; Pisano, Bohmer & Edmondson, 2001). On the other hand, we can say that the learning rate determines the slope of the learning curve of a particular production process (in our case the process of decision making). According to Argote and Epple (1990), learning curve models are capable of reflecting the observed improvements in the input-output productivity ratios as a result of learning.

The mathematical expression generally used to compute the learning curve is the following (Conway & Schultz, 1969):

$$y_x = a \cdot x^b$$

where  $y_x$  is the average labor hours required to produce the first  $x$  units (in our case would be the average time required to take  $x$  decisions),  $a$  always represents the theoretical labor hours required to take the first decision ( $a$  positive number),  $x$  is the number of a decision taken, and  $b$  is the index of the learning curve, also called natural slope, generally is a negative number (except for forgetting in organization).  $B$  value determines the rate of learning curve, commonly denominated  $r$  (that is computed according to the expression  $R = 2^b$ ). It is important to mention that because of the negative value of  $b$ ,  $y_x$  decrease as  $x$  increase, this decrease represents the learning effect.

In the early stage of the learning process that occurs in an alliance, the learner institution will acquire new skills, learn the rules of the business, and as a result, due to the cumulative knowledge, the learning rate will be incremental. After that, the acquired knowledge became more selective and aims to improve outcomes, but really in this stage institutions do not learn many new things, so the learning rate reaches a point where no longer increases (Yelle, 1979).

But which is the effect of the process of knowledge transfer between partner institutions in the learning curve? Much has been written about the impact of technology in the knowledge transfer process and the learning curve, considering the transfer of knowledge as a dependent variable (Epple, Argote & Devadas, 1991; Ashworth, Argote & Mukhopadhyay, 2005). Other publications show the effects of the learning curve in productive sectors (Argote & Epple, Learning Curves in Manufacturing, 1990; Zorgios, Vlismas & Venieris, 2009); however, there are not enough studies in the literature to analyze the effect of knowledge transfer (as independent variable) on the learning curve of allied institutions in the context of higher education. This paper contributes to the literature on the learning curve, by analyzing the effect of knowledge transfer in alliances on the learning curve of allied higher education institutions.

According to Levitt and March (1988), organizations learn from their own direct experience or from the other

experience, one of the mechanisms of learning from others can be through learning alliances with successful knowledge transfer processes. The cumulated knowledge allows us to observe a change in the learning curve of an institution. We believe that knowledge transfer has a direct influence on two parameters of the learning curve: in a given that because of the transfer of knowledge, the time needed to make the first decision might be less than that required if the institution receiving the knowledge, does not receive it. The knowledge transfer also has an effect in the learning rate of the institution that receive the knowledge in the earlier stage, because with the previous experience of the allied institution, and the willingness to share this experience, the learner institution will learn more quickly than if they do without this shared knowledge. In other words the knowledge transfer will contribute to obtain a steep learning curve in the learner institution. Based on the previous discussion, we present the following hypothesis:

*Hypothesis 3:* The learning curve of the allied institution that adopts the knowledge transferred will be steeper than the learning curve observed in the institution that transfers knowledge.

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## Research setting

This research takes place in the university environment of Ecuador; specifically we analyze the case of the strategic learning alliance between UEES and Ecotec, both universities in the city of Guayaquil. The time period that is considered in the study is from 2006 to 2012, since in 2006 was founded Ecotec and in that year a learning alliance was signed between UEES and Ecotec, both private institutions.

In the higher education context of Ecuador, there are two different types of institutions that offer different degrees to their students. The first type are considered technological institutions where students could obtain a degree that is not considered as terminal degree, but is an intermediate degree between the school and the university. The second type of institutions is formed by universities that could receive in its classrooms students that came from school or students that came from technological institutions. In order to obtain a degree, a student must to complete four and a half years of education if she/he came from school, and two and a half years if she/he came from a technological institution.

In 2005, the current Higher Education Law in Ecuador demanded some conditions to create a new university: for one, it should have the sponsorship and guidance of a more experienced university legally recognized in Ecuador. Ecotec had served as a technological school for some years and its first students in technological careers were beginning to graduate and needed to continue their studies in order to obtain a university degree. For that reason, authorities of Ecotec decided to apply for authorization to become university.

UEES with eleven years since its foundation, had gained the recognition of the society for the quality of its services and the professional abilities of its graduate students. UEES

and Ecotec had some common features: (a) they both were private institutions; (b) they shared some members in their investors group; (c) they had successfully finished some projects together, and (d) they know the strengths of each institution.

Based on the previous reasons, Ecotec decided to propose to UEES the signing of an alliance. With the alliance, Ecotec could get the following: (a) fulfill the condition required by law; (b) learn from UEES how to manage a university; (c) share technology, and (d) receive counseling for the design of their academic programs. For its part, UEES could: (a) receive Ecotec's students in its graduate programs; (b) receive an annual value by concept of the advising, and (c) earn points for advising young universities that are necessary for national accreditation. The alliance, that we consider is a learning alliance, was signed in January of 2006 and, at the end of that year, Ecotec obtained the authorization to become university, and the alliance started its functioning.

It is important to mention that, at the same time that Ecotec decided to become a university, five new universities in Ecuador were created. Because of this, the level of competition in order to gain students from the market was increasingly tough, and Ecotec must to do something really unique and attractive to the students in order to survive.

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## Method and data

This research is based on an in-depth, inductive case study of the learning alliance between two higher education institutions: UEES and Ecotec, in Guayaquil, Ecuador. In this study, the data collection consisted of a twofold process: (a) background information was extracted from documents of both institutions, and took information about the academic offer, major decisions that were taken in each historical period and the financial results of institutions from the first year to current date; additionally, research protocols (questions) were prepared prior to the interviews, and (b) detailed case data on knowledge transfer were collected through in-depth interviews with the founders, deans and collaborators of both higher education institutions participating in the learning alliance.

According to Yin (2003), the validity and reliability were reinforced by the use of consistent case study protocols and multiple sources of evidence (interviewing different persons and comparing documents). In total, we interviewed 10 people (including founders) in both universities (UEES and ECOTEC), and each interviewee was interviewed two or three times (for 1-2 h each time). All of the interviewees still held managerial positions in the universities when interviewed. The interviews were carried out between February and May, 2012. We did in that time because, due to the nature of the alliance between UEES and Ecotec, we consider that the maturity of the relationship is in the best stage, and the experience gained for the actors of both institutions allows them to better understand the facts that occurred during the early stages and the current stages of the alliance, additionally it is important to mention that we have been working in UEES since a few years, and we know principals authorities of both

institutions. We think that this helped in the openness in the interview process.

After the data collection, we plotted the learning curve of both institutions in two crucial moments: (a) after the first two years of Ecotec, and (b) today. Thus we see graphically the effect of knowledge transfer in the learning curve of both institutions.

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## Learning alliance UEES-Ecotec

### *The critical first two years*

As we mentioned before, in 2005 Ecotec (that functioned as technological educational institution) took the decision of apply for authorization to become university, and also proposed to UEES the signing of a learning alliance in order to fulfill the law requirement. At that time UEES personnel felt that with the signing of the alliance could lose some students because Ecotec would now be competing in the university market, nevertheless the rector of UEES started a communicational process where explained that the target population of each university was different, where Ecotec market was students from the medium and low economical class, while UEES market was students from the high economical class. UEES's rector also explained to the academic community the principal goals of the alliance, and encourages all to be aligning with the objective. Few general meetings after the decision, UEES personnel felt more confident with the alliance and started to collaborate with Ecotec personnel in the creation of the academic offer of Ecotec.

Due to the trust that the rector had generated during his years leading UEES, all members of the board of directors of UEES and Ecotec, decided that the alliance would be in charge of the rector of UEES, so personnel of both institutions had to follow his instructions. The first decision taken by the rector was to form teams composed of staff from Ecotec and UEES, these teams should develop planning Ecotec as a university, and split the work in three major areas: (a) the academic, where they had to define the academic offer of Ecotec and provide the structure of each one of the academic careers, as well as the academic periods in which the classes were delivery to students; (b) the marketing area, which should define the type of communication campaign to be developed in order to promote the new university, and (c) the technology area, which should define the technological tools that would be used to manage the university, i.e. the financial software, academic system, and the system of personnel control. Each team had to show the progress of their work at the end of each week, so that all decisions were being stored in access logs that were shared by all members and also by the rector.

Members of Ecotec working in the academic team were workers who had experience in designing academic courses; this allowed them with the members of UEES quickly decide the structure of each career. Additionally, Ecotec's staff had predefined schemes for the design of the academic periods that would not change, but were not suitable for university. Due to this constant disagreement between academic team members, the progress made to complete the task was slow.

Ecotec hired young professionals for the Information Technology (IT) Department, which rapidly started to work with personnel of IT department of UEES. In a very short period of time, all technological tools were implemented, and Ecotec was ready to start offering the service. The principal decision in this team was to use the same tools that UEES already uses, and because of this the time needed in the implementation was relatively short. Nevertheless, the academic team had not finished their task.

For its part, the marketing team decided to designate a corporate director of marketing that would be responsible for directing communication campaigns of UEES and Ecotec. All team members handled a common language, and this made that progress was seen very quickly. The principal strategy of the marketing team was to use the experience of UEES instead of explore new possibilities that could represent long periods of time, which was needed to promote Ecotec's new services.

The moment which Ecotec should open its doors to the public was near, and the academic team had not completed its task because of continuing disagreements among its members. Therefore, the rector of UEES decided to nominate the oldest Dean of UEES as rector of Ecotec, and assign him with responsibility for leading the academic team. With this personnel movement from UEES to Ecotec, the academic team began to work more coordinated and, a short period of time after the new member enter to the team, the academic offer of Ecotec was ready and also the planning of the academic periods where the classes will be offered to students. The first group of university students of Ecotec began classes at May, 2007. The economic performance of the new university (Ecotec) were negative, i.e. losses during the first year. Nevertheless, by the end of the second year, the financial performance of Ecotec began to show positive values, which really showed a great improvement over UEES, that had its first economical positive balance after 7 years of operation. The key decisions that were taken in Ecotec, and the results obtained during the first two years of operation, are shown in table 1. Similar information about UEES are included in table

2, which consider the period between 1994 and 2008, because 2008 was the second year of Ecotec functioning. Data included in both tables were obtained from institutional archives and interviews.

With obtained information, we plotted the learning curve for both institutions (figure 1). For better understand the graph, we include the real values of the equation of learning curve for both institutions.

When comparing the learning curves obtained with the information of the first two years of functioning Ecotec and UEES, we could see that the parameter *a* of the learning curve of UEES was bigger than obtained for Ecotec, with a difference almost the double. As we mentioned before, this parameter represents the required time or labor hours to take the first decision, it shows that Ecotec was faster in the decision making process. As an example of the velocity in the process of decision making, you can see that at the beginning Ecotec starts with five faculties, while UEES needs almost four years to create the same number of faculties. The velocity in the decision making process is also reflected in the financial results obtained for both institutions, where

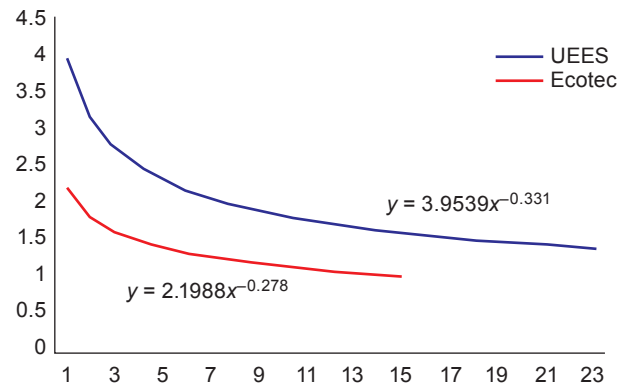


Figure 1 – Learning curves from UEES and Ecotec.

Table 1 – Ecotec's summary information		
Year	Principal decisions	Financial outcomes
2007, first year	<p>Ecotec decided to use the same technological tools that UEES already used</p> <p>Creation of faculties of: Economic Sciences, Social Communication and Marketing, Computational Systems and Telecommunication, Tourism, and Law</p> <p>Promotion of Ecotec's services starts on major newspapers and radio stations</p> <p>Ecotec's operation began with 193 enrolled students</p> <p>Ecotec obtained the environmental accreditation license. Was the first university in Guayaquil that obtains this accreditation</p>	At the end of 2007, Ecotec's financial operation showed a negative result of -786,347.32 dollars
2008, second year	<p>Ecotec obtained the quality accreditation ISO 9001-2000</p> <p>Creation of the Bilingual International Program</p> <p>Ecotec starts the planning of the new campus acquisition and construction</p>	At the end of 2008, Ecotec's financial operation showed a positive result of 437,598.76 dollars

**Table 2 – UEES's summary information**

Year	Principal decisions	Financial outcomes
1994	UEES started its academic activities with the Faculty of Business and its respective schools: Foreign Trade, Business Management, Finance, Banking and Marketing	-938,637.43 dollars
1995-2000	Creation of faculties of: Law, Weekend college, Social Communication, and Liberal Arts	From 1995 to 2000, the financial results of UEES were the following:
	The "International Degree Program" was launched	-679,752.86 dollars
	Research Center began its activities	-433,980.74 dollars
	The Entrepreneurship Development UDEM unit was created to promote and create opportunities of development for its students	-398,267.98 dollars
		-214,912.61 dollars
		-39,519.44 dollars
		491,723.19 dollars
2001-2008	Creation of faculties of: System, Telecommunication and Electronics, Architecture and Design, Tourism, International Studies, Graduate Studies, Medical Sciences, Civil Engineering, and Environmental Sciences	During these years, UEES financial results were positive every year. In 2002, after 8 years of functioning, the annual financial results exceed one million dollars, and UEES started a new age of inversions and growth that was valued by students and parents
	UEES acquired its own campus and begin the development and construction of new buildings every year	
	UEES acquired laboratory equipment engineering, telecommunications, recording studio and radio station	
	The Institute of Development, Equity and Peace was established in the Faculty of Law, Politics and Development	

you can see that it took 7 years to UEES to obtain a positive financial results at the end of the year, whereas Ecotec in the second year of functioning start enjoyed the positive benefit of the financial results because of the faster decision making process due to the knowledge transferred from UEES. This previous discussion shows that the work of teams or networks of collaboration between UEES and Ecotec, and also the regular pattern of interactions of the members of the teams, had a positive effect on the initial results of Ecotec, that allow it to obtain competitive advantage in front other young universities created in the same time of Ecotec. This is consistent with the findings of Dyer and Hatch (2006). It is important to mention that previous knowledge of Ecotec's personnel was a key factor that also determines the velocity of the knowledge transfer process.

Figure 1 also shows that there is a difference in the index of the learning curve  $b$ , where the slop of the learning curve of Ecotec is represented by a smaller number in comparison with the slop or index ( $b$ ) of the learning curve of UEES. This difference is traduced in a bigger learning rate for Ecotec ( $r=82.5\%$ ) than the learning rate of UEES ( $r=79.5\%$ ). This is why we observe that Ecotec learning curve is steeper than UEES learning curve. It is common to find in the literature of learning curve (Xu, Krzyzak & Oja, 1993) that a learning rate represented by a smaller number (in this case UEES learning rate) is better than those represented by a large number (in this case Ecotec learning rate). We completely agree with the previous statement, because it means that that more quickly the institution with bigger learning rate (in this case

Ecotec) will arrive to a moment where the reduction of the time in the decision process will be imperceptible, i.e. no more learning or knowledge could be accumulated in order to improve the decision making process. Nevertheless, we consider this bigger learning rate of Ecotec as a positive effect of the knowledge transfer process that occur in the learning alliance with UEES, because thanks to this rapidly learning of Ecotec, it was able to answer more effectively to the changes in the environment of universities in Ecuador, and also allowed it to capture a bigger part of the market. In addition, and fortunately, this learning rate does not remain constant over the time, which gives the dynamic aspect of the learning curve phenomenon.

### 2007-2011: Ecotec flight begins

In 2009, after seeing the positive results of the management of Ecotec, thanks to the transfer of knowledge gained through the learning alliance, Ecotec staff felt more secure and motivated, was independent and able to produce new things. Meanwhile UEES was living a period of inertia. IT department was still using the same systems that had once been transferred to Ecotec, the UEES website showed an old design that was not on par with technological advances and student's demand; as a result UEES had been frozen and needed a technological change in order to show an evolution to their students and teachers. Due to this, the rector of the UEES, who was in charge of the alliance UEES-Ecotec, asked

the young professionals who work in the IT department of Ecotec that help in the process of UEES technological change.

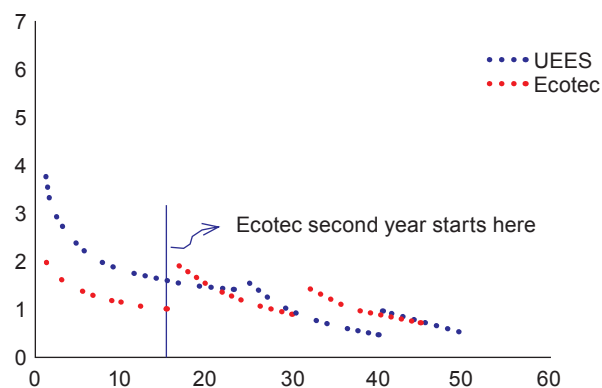
The UEES IT department staff was initially reluctant to accept the knowledge produced by Ecotec staff. During the interview with Head of UEES IT department, he said: "These young men gave me a lesson, we thought they were young and had no experience, and for all he proposed we found a big BUT, but the reality is that technology of UEES evolved through the innovation injection of Ecotec's young IT personnel." This change in perception of the UEES IT department staff occur after the rector decided to ask one of the members of the Ecotec technology department to work on the UEES. Once more, the leadership characteristics of UEES rector encourage personnel of both institutions to work together as real partners.

The 2009-2011 period was of growth and change within Ecotec. The main achievements include: (a) the acquisition of the new campus; (b) open a new headquarters in a nearby town; (c) implement new technological tools such as electronic card access control, and automatization of student services, and (d) start the operation of the school for executive, establishing lasting relationships with community businesses, among other achievements. This led to the awakening of a competitive spirit among staff of both institutions UEES and Ecotec, which far from being negative, led both institutions to innovate constantly, and thus increased their ability to adapt quickly to changes.

At this time, a new phase began in which each change implemented in Ecotec, motivates a change in UEES and vice versa. For example, UEES began to change its technological systems and used many technological applications developed by Ecotec. On the other hand, when UEES designed the online education modality, Ecotec started thinking about alternative methodologies of education. Each institution has improved its services based on the successful experiences of the other institution, without the improvement to become the single copy of the experience, but always added some kind of self-worth of the institution which took the experience. In 2010, when the new Higher Education Law was approved, many changes occurred in the university context in Ecuador, all aimed to improving the national higher education system. Product of the changes implemented by the law, 26 of the 72 universities in Ecuador were closed, others were tested, and only the best remained legally recognized, including UEES and Ecotec.

With collected information from interviews and archival data, we plot the learning curves from UEES and Ecotec since the alliance was signed until the end of 2011 (figure 2).

In order to better analyze figure 2, we used scatter with only markers instead lines displayed the trend over time because using markers we can observe the discontinuous nature of both institutions learning curves. You can notice that, more than once, a "jump" is observed, indicating that some innovation or qualitative changes in the mechanism of institutional learning occur. Sometimes the learning curve of UEES is presented above the learning curve of Ecotec, precisely in periods where the transfer of knowledge goes from UEES to Ecotec (see the first two years). When learning curve of Ecotec is presented above of learning curve of UEES,



**Figure 2 – Cumulative learning curves UEES-Ecotec from 2007 to 2011.**

indicates that the knowledge is transferred from Ecotec to UEES (just when the second year finished, Ecotec transfer some of its technological knowledge to UEES).

It is important to notice Ecotec was able to transfer its knowledge at a younger age than UEES did, indicating that the rapid rate of learning in its early stages as a university (which had been seen as something not so positive in a business environment), had a positive effect on the ability to transfer knowledge of Ecotec and the ability to analyze the environment and to capture and produce new knowledge that meets the environment needs. By the other hand, the knowledge transfer in the alliance also had a positive effect in UEES, it was like an injection of curiosity and novelty, which allowed UEES to react and break the inertial moment that it was living. Both institutions experimented an improvement of their process of decision-making and, as a result, an improvement of the adaptation ability.

## Discussion and conclusions

Our goal in this paper was to explore the effect of the process of knowledge transfer in the learning curve of allied higher education institutions. While prior work has shown the process of knowledge transfer within alliances and the learning curves phenomenon applied to different settings, little emphasis has been devoted, at least in the higher education context, to understanding the effect of knowledge transfer in the learning curve of allied institutions. Through the story of the case of the learning alliance between UEES and Ecotec, it was clearly demonstrates that an adequate communication process, tied with leadership of the managers of the allied institutions, promotes the creation of networks of inter-institutional collaboration, which in turn have positive implications on the success of the transfer of tacit knowledge between allied institutions. We also found evidence that absorptive capacity of the allied institution that adopt the knowledge have a positive effect in the successful of the knowledge transfer process between institutions involved in a learning alliance; nevertheless, in some occasions this absorptive capacity could became in a rigidity if members of the relationship does not understands the changes in their



positions. In this case knowledge-related barriers are the principal impediments to knowledge transfer.

Learning in allied institutions will depend on environmental factors (law, competitors, etc.), and also formal and informal encounters through the networks that are developed between allied institutions. In addition, allied higher education institutions learn when they are motivated (for example, for competitive behavior) and have prior knowledge of the topic. Allied institutions may learn from mobility of their employees, which promotes cooperative behavior in the process of knowledge transfer between allied institutions.

Knowledge transfer between partner institutions is fundamentally based on trust and building of long term relationships. Stability of the inter-firm networks, develops relational trust, and facilitates the learning process in allied institutions. The learning curve of the allied institution that adopts the knowledge transferred is steeper than the learning curve observed in the institution that transfers knowledge. This implies that, because of the discontinuous nature of the learning curve, in some occasions the learning curve of one institution of the alliance could be above of the learning curve of the other participant institution, and vice versa.

The success of the knowledge transfer process in the learning alliance increases the adaptive capacity to the changes (resilience) of both institutions. Strategic learning alliances are an important tool that higher education institutions could use in order to survive in the constantly in change university market.

## REFERENCES

- Argote, L., & Beckman, S.L. (1990). The persistence and transfer of learning in industrial settings. *Management Science*, 36, 140-154.
- Argote, L., & Eppler, D. (1990). Learning curves in manufacturing. *Science*, 920-924.
- Argote, L., & Ophir, R. (2005). Intraorganizational learning.
- Ashworth, M., Argote, L., & Mukhopadhyay, T. (2005). The effect of information technology on organizational learning and knowledge transfer: a natural experiment. Recuperado de: [http://www.google.com.ec/url?sa=t&rct=j&q=the%20effect%20of%20information%20technology%20on%20organizational%20learning&source=web&cd=1&ved=0CGQQFjAA&url=http%3A%2F%2Fbusiness.tepper.cmu.edu%2Ffiles%2Ftepper\\_cart\\_05\\_100.pdf&ei=TVwCUNGHF5TW2wXdjMGfCw&usg=A](http://www.google.com.ec/url?sa=t&rct=j&q=the%20effect%20of%20information%20technology%20on%20organizational%20learning&source=web&cd=1&ved=0CGQQFjAA&url=http%3A%2F%2Fbusiness.tepper.cmu.edu%2Ffiles%2Ftepper_cart_05_100.pdf&ei=TVwCUNGHF5TW2wXdjMGfCw&usg=A)
- Ashworth<sup>†</sup>, M. (n.d.). Recuperado de: [http://www.google.com.ec/url?sa=t&rct=j&q=the%20effect%20of%20information%20technology%20on%20organizational%20learning&source=web&cd=1&ved=0CGQQFjAA&url=http%3A%2F%2Fbusiness.tepper.cmu.edu%2Ffiles%2Ftepper\\_cart\\_05\\_100.pdf&ei=TVwCUNGHF5TW2wXdjMGfCw&usg=A](http://www.google.com.ec/url?sa=t&rct=j&q=the%20effect%20of%20information%20technology%20on%20organizational%20learning&source=web&cd=1&ved=0CGQQFjAA&url=http%3A%2F%2Fbusiness.tepper.cmu.edu%2Ffiles%2Ftepper_cart_05_100.pdf&ei=TVwCUNGHF5TW2wXdjMGfCw&usg=A)
- Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17, 99-120.
- Burt, R. (1983). *Corporate Profits and Cooptation*. Nueva York: Academic Press.
- Cohen, W., & Levinthal, D. (1990). Absorptive capacity: A new perspective on learning and innovation. *Administrative Science Quarterly*, 35, 128-153.
- Conway, R.W., & Schultz, A. (1969). The manufacturing progress function. *Journal of Industrial Engineering*, 10, 39-54.
- Dyer, J., & Hatch, N. (2006). Relation-specific capabilities and barriers to knowledge transfers: creating advantage through network relationships. *Strategic Management Journal*, 27, 701-719.
- Eisenhardt, K., & Schoonhoven, C. (1996). Resource-based view of strategic alliance formation: Strategic and social effects in entrepreneurial firms. *Organization Science*, 7, 136-150.
- Eppler, D., Argote, L., & Devadas, R. (1991). Organizational learning curves: A method for investigating intra-plant transfer of knowledge acquired through learning by doing. *Organization Science*, 2, 58-70.
- Granovetter, M. (1985). Economic action and social structure: the problem of embeddedness. *American Journal of Sociology*, 91, 481-510.
- Gulati, R. (1998). Alliances and Networks. *Strategic Management Journal*, 293-317.
- Gulati, R. (1999). Network location and learning: the influence of network resources and firm capabilities on alliance formation. *Strategic Management Journal*, 20, 397-420.
- Hamel, G. (1991). Competition for competence and inter-partner learning within international strategic alliances. *Strategic Management Journal*, 83-103.
- Hayes, R.H., & Clark, K.B. (1986). Why some factories are more productive than others. *Harvard Business Review*, 64, 66-73.
- Hitt, M., Dacin, M.L., Arregle, J., & Borza, A. (2000). Partner selection in emerging and developed market contexts: resource-based and organizational learning perspectives. *Academy of Management Journal*, 43, 449-467.
- Khanna, T., Gulati, R., & Nohria, N. (1998). The dynamics of learning alliances: competition, cooperation, and relative scope. *Strategic Management Journal*, 19, 193-210.
- Kogut, B., & Zander, U. (1992). Knowledge of the firm, combinative capabilities, and the replication of technology. *Organization Science*, 3, 383-397.
- Levitt, B., & March, J. (1988). Organizational learning. *Annual Review of Sociology*, 14, 319-340.
- Pisano, G.P., Bohmer, M., & Edmondson, A. (2001). Organizational differences in rates of learning: Evidence from the adoption of minimally invasive cardiac surgery. *Management Science*, 47, 752-768.
- Polanyi, M. (1966). *The tacit dimension*. London: Routledge.
- Rolland, N., & Chauvel, D. (2000). Knowledge transfer in strategic alliances. In: Despres, C., & Chauvel, D., *Knowledge Horizons: The Present and the Promise of Knowledge Management* (pp. 225-236). Boston, MA: Butterworth Heinemann.
- Szulanski, G. (1996). Exploring internal stickiness: impediments to the transfer of best practice within the firm. *Strategic Management Journal*, 17, 27-43.
- Uzzi, B. (1997). Social structure and competition in interfirm networks: the paradox of embeddedness. *Administrative Science Quarterly*, 42, 35-67.
- Xu, L., Krzyzak, A., & Oja, E. (1993). Rival penalized competitive learning for clustering analysis, RBF net, and curve detection. *IEEE Transactions on Neural Networks*, 4, 636-649.
- Yelle, L. (1979). The learning curve: Historical review and comprehensive survey. *Decisions Science*, 10, 302-328.
- Yin, R.K. (2003). *Case study research: design and methods*. Thousand Oaks: SAGE.
- Zorgios, Y., Vlismas, O., & Venieris, G. (2009). A learning curve explanatory theory for team learning valuation. *VINE*, 39, 20-39.