Turnover and ICT Contribution in Organizational Knowledge Management

The case of employee turnover in portuguese real estate.

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Abstract— **Organizations face a number of major transformations; one of the most important is that all have been suffering from growing employee turnover. This phenomenon makes organization loses not only potential but also customer relationships, image, routines, and other more subtle issues. In some cases, the most significant lost is clients trust with may have a direct impact on sales and profit and, also, perceived quality of service. For organizations where the business processes are less depending from machinery and heavily rely on human relationships, this problem is even more relevant, being real estate business one such good example. Additionally, if we consider the increase time needed to sell real estate propriety after recent subprime worldwide crisis, sometimes the broker who initiates the process is not the one who finalizes it. It is easy to retain in the organization information about activities we performed (the "what" and "when"; that we may collectively consider as explicit knowledge). However, we cannot say the same about the way those activities are performed (the "how"; that can consider more of tacit knowledge). To solve this situation, organizations must promote ways to retain tacit knowledge, in a way that it can be stored and disseminated through the organization. This paper discusses such issues taking into consideration real estate professionals, forms of action against this phenomenon. Assess the contribution of Information and Communication Technologies (ICT), formulating a conceptual model for the capture and knowledge transfer, using Grounded Theory to inform the model.**

Keywords-Knowledge Management; Tacit Knowledge; Explicit Knowledge; ICT; Turnover; Real Estate.

I. INTRODUCTION

Knowledge has always being a hot topic in organizations, but nowadays assumes a critical role, because of constant changes, fast decision cycles and a knowledge oriented economy. Drucker [1] already pointed this in 1988, based it on the following three points: the basis of employment changes from the office and manual workers to knowledge workers, who resist the model inherited command of military organizations; an economy that requires organizations to be innovative and entrepreneurial; and, finally (and according to the author the most important), an heavy use of information technology. Also, we can say that human capital is the most remunerative resource of any organization in the long run.

Current changes are more common and faster, with less time to react and even less to predict them. In the organizational perspective, *"everything has an increasingly tight lifetime"*. Transactions change from local scale to regional scale, and from regional to international and global scale, becoming increasingly intense and less predictable, promoting additional levels of competition [2]. We live in a time that *"less is more and the time is now"* – creating a urge to act on moment. This reality is not exclusively in products but across the entire organization, processes, technology, and even people.

Considering human resources, we can observe a growing phenomenon: employee turnover. A few decades ago employment was considered as a relationship for life, both for employees and organizations. Nowadays, this relationship in most cases is very small in its time span. To analyze the workers flows in the Portuguese economy we use an administrative statistical source – *Quadro Pessoal* (QP) collected by the Ministry of Employment (MTSS). As we can see in Table I, more than half the working population is linked to an organization, less than 4 years.

TABLE I.   WORKERS SENIORITY (IN YEARS) IN PORTUGUESE ORGANIZATIONS

Year	Total Workers	Less than 1 year	1 to 4 years	5 to 9 Years	10 to 14 years	15 to 19 years	More than 20 years
2007	2967559	713897	883286	633051	272900	221758	242667
		24%	30%	21%	9%	7%	8%
2008	3016571	696045	954170	606046	294669	213196	252445
		23%	32%	20%	10%	7%	8%

Source: [3], [4].

As a result of employee turnover, in many cases, organizations face a hiring process that is always time consuming and costly. Moreover, it is the loss of intellectual capital that those assets can represent. Furthermore, it is also needed to consider the time required for a new employee to be effectively productive. If in the hiring process organization has few to innovate, in the loss of intellectual capital organizations must create mechanisms to minimize it. Knowledge management can support the creation of such mechanisms. Organizations shall promote the capture and transfer of knowledge, so the impact of employee turnover does not represent the loss of organizational memory or, at least, minimize it. These issues assume particularly importance in organizations where the activities are not mostly made by machines, but by direct human contact. Real Estate is a good example of this kind of organizations, where the relationship between real estate agent (broker) and the

client (buyer or seller), depends most directly from the quality of the relationship between them. If we focus our attention analyzing seniority organizations data, considering the special case of real estate, we see that the values are even more significant (Table II).

TABLE II.   REAL ESTATE WORKERS SENIORITY (IN YEARS) IN PORTUGUESE ORGANIZATIONS

Year	Total Workers	Less than 1 year	1 to 4 years	5 to 9 Years	10 to 14 years	15 to 19 years	More than 20 years
2007	21905	6135	8675	4223	1286	772	814
		28%	40%	19%	6%	4%	4%
2008	22539	5646	9496	4366	1485	704	842
		25%	42%	19%	7%	3%	4%

Source: [3], [4].

While the overall picture, up to 4 years of seniority in the company, had general values of around 55%, considering real estate in Portugal case these values are around 70%. The question is what organizations should (and can…) do to minimize the loss of organizational memory caused by this level of turnover. By organizational memory we mean the extension and amplification of knowledge as the key asset of a knowledge organization by capturing, organizing, disseminating, and reusing the knowledge created by its employees [5]. Dalkir also refers to the impact that of losing organization employees, by giving the example of NASA where "*60% of aerospace workers were slated to reach retirement age all within a few years of each other*", and by this, threatened the loss of valuable knowledge of the Apollo-era missions [5], in what can be called as employee generation problem turnover.

Not losing the traditional techniques like coaching and shadowing, the aim of this paper is to assess the contribution that information and communication technology (ICT) can add to this problem. This study reports the efforts that are conducted in the context of the first author doctoral program. As a result, the paper presents the problem and proposes a knowledge management approach to retain tacit knowledge in order to cope with employee turnover.

II. SET THE CONTEXT: A BRIEF LITERATURE REVIEW

A. Knowledge Management

As defended by several authors, the value of knowledge is from all the organizational assets, the most decisive in the production [1], [6], [7], [8]. Organizational changes were very deep and with high impact in recent years. On one hand, the opening of markets resulting from globalization produces many challenges and puts pressure on both times to react and adapt to evolving markets. On the other hand, the emergence of a knowledge-based society turns knowledge into more central organizational assets and ones that needed to be further understand and preserved.

Organizations are made of people and many are feeling that the knowledge of its human resources is its most valuable asset [9]. To succeed, a knowledge management

initiative must have a robust theoretical foundation [5]. According to Dalkir, these models providing the widest possible perspective on KM Choo (1998), Weick (2001), Nonaka and Takeuchi (1995), Wiig (1993), Von Krogh and Roos (1995), Boisot (1998), Beer (1984), and Bennet and Bennet (2004). [5].

The Nonaka and Takeuchi Knowledge Creation Model have the major contribute to this project, so it will be present in more detail. The Nonaka and Takeuchi theory of organizational knowledge management (Fig. 1 illustrates the four modes of knowledge conversion that are the core of the overall knowledge-creation process) argues that knowledge creation is an ongoing process of socialization, explicit, combination and internalization [10]:

- Socialization: sharing individual tacit knowledge;
- Externalization: from tacit knowledge to explicit knowledge (codification of tacit knowledge in metaphors, analogies, figures and stories to create new concepts and then justify them before the corporate imperatives);
- Combination: in which the prototypes of new concepts are developed and incorporated into the organization;
- Internalization: this knowledge through learning by doing and experimenting, making tacit knowledge to be generated again.
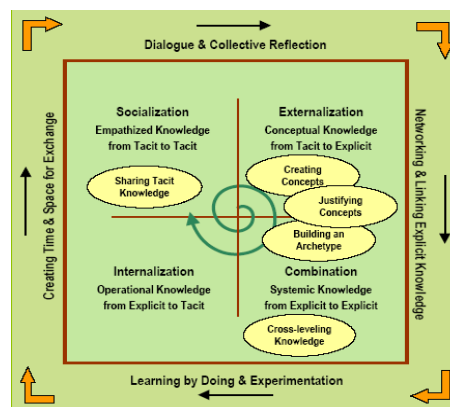

Figure 1.   SECI Model [10].

The SECI or spiral model provides a good reference on how an organization deal with knowledge management issues and how a group of people are involved in the knowledge creation process. Knowledge creation always begins with the individual [5]. Making personal knowledge available to others in an organization is at the core of the Nonaka and Takeuchi Knowledge Spiral Model: this type of knowledge creation process takes place continuously and occurs at all levels of the organization – many times it occurs in an unexpected or unplanned way. Central to the SECI model proposal is the sharing of Tacit Knowledge that Davenport and Prusak define as complex knowledge developed and internalized by the professionals, over a long period of time which incorporates so much accrued and embedded learning that its rules may be impossible to separate from how an individual acts [8].

B. *The Role of Information and Communication Technology*

Traditionally, information and communication technology systems are used in organizations to support processes. One of current challenges is to make them support the professional competencies of individuals and to turn its adoption work in a broader collective context.

The use of computers and networks cannot stay only within the frame of operational tasks; they should add value to new forms of communication, conversation and learning on-the-job, support communities of practice, and provide the structure and access to ideas and experiences needed to excel in day-to-day organizational life. As stated by Davenport and Prusak, "*The computer's ability has little relevance to knowledge work, but the resources for communication and storage of networked computers make them enablers of knowledge*" [8] – this reinforces the role that human resources may have in knowledge organizations as the most value asset.

Without knowledge acquisition, knowledge transfer is meaningless. While knowledge transfer may be technology-enabled, knowledge acquisition is human-driven, so systems must be develop people-centered, not technology-centered [11]. Information and communication technology continues to be a powerful force in the ways in which people and organizations operate. ICT advances have become a permanent force bringing continuous and sometimes unpredictable changes to organizational structures and processes, including services delivered, management practices and governance [12].

Technological evolution allows tremendous freedom for creative thinking and a massive expansion of relationships, it also as a multiplier effect in promotion collaborative processes [13]. The use of computers, networks and digital information can open new opportunities in knowledge management and play important roles in meeting the prevailing challenges related to sharing, exchanging and disseminating knowledge.

As we know a large part of knowledge is not explicit but tacit, and this will a trend as human nature prevails as one of the most important sources for creativity. This is also true for knowledge in real estate business where a lot of good practices are transferred without being well documented in books, papers or any other documents. We must also notice that real estate business is largely based on face-to-face contacts and puts a real stress on human relationship. We defend that the use of ICT is needed to manage the knowledge properly.

C. *Employee Turnover*

A few years ago when we refer to employment, its general understanding that it was a lifetime relationship between the organization and the employee. Today this concept is passing by a radical transformation and must be redefined. A discussion about employment and its social role is presented by [14].

High turnover takes extreme importance, since human resource turnover represent costs to organizations. Chiavenato [2] proposes a cost list that are divided into primary, secondary and tertiary groups. The first group is quantitative, the second and third are qualitative estimates. Table 3 lists the Chiavenato costs for staff turnover [2].

TABLE III.   COSTS OF STAFF TURNOVER

Primary	*Recruitment and selection costs;* *Registration and documentation costs;* *Integration costs;* *Separation costs.*
Secondary	*Production effects;* *Staff attitude effects;* *Extra labor cost;* *Extra operating cost.*
Tertiary	*Extra investment costs;* *Losses in business.*

Source: [2]

We may think, "*Some employee turnover is unavoidable, even desirable*". Some turnover is necessary, to replace some employees with more productive ones and to bring in people with new ideas and expertise. However, high turnover costs are both avoidable and unnecessary.

As new team members are added and others leave, it is critical to prevent the loss of information, even during such periods of major structural change [15]. Organizations can face a "Brain Drain" phenomenon if a turnover occurs and loses competent personnel at a higher rate than the organization can recruit and train new personnel. Some of costs involved to the organization or business could have easily been prevented in the first place if we experienced a way to retain employees´ knowledge. It is important to develop a strategy for retaining knowledge.

The knowledge lost from a departing employee is not a short-term problem; it is a long-term problem that breeds other problems and reduces an organization's effectiveness [11]. This is both a challenge and a problem that deserves to be dealt with.

D. *Real Estate Bussiness*

The real estate business has been in the last decades, one of the most important engines in western development economies. In first hand, if we live in modern cities, it is easy to observe the phenomena of empty places where nothing existed, but the real estate business changed them radically.

More recently, in 2008, the subprime crisis turns real state a more dangerous activity but still central for our economy. Nowadays we can expect to have a more challenging environment to buy and sells properties. In the context of Portugal, current sector statistics shows the importance of presenting smaller selling times, although there is a trend of the opposite.

1) *Time to make real estate business*

In the real estate business one key concept is selling time. Selling time can be defined as the amount of time needed for a certain property to be sold. It can be displayed in various units, usually days or months. For the independent Portuguese Real Estate Confidential (*Confidencial Imobiliário*) – which operates in two complementary areas

of business, editorial and production indicators of market analysis, the absorption time is the number of months that mediate between the first placed on offer and completion of the sale, understood as and the conclusion of the promissory contract of sale [16]. As for the ERA real estate network, presents itself under the name Average Days on Market [17].

Whatever the case, the reality is that this time has increased in recent years. According to data from *Confidencial Imobiliário*, in the last three years the increase was more moderate in the center of the country, more pronounced in the north of the country, while in the Algarve that time has nearly tripled [18]. The provided data by ERA real estate network in its most recent survey available, pointing in the same direction, although in this case the information is presented only in aggregate form, the values are global to the country and not by zone, as in the previous case. Indicating an average of 240 days on the market for 270 days for 2007 and 2008 [17].

Real estate organizations require real-time access to knowledge on a variety of subjects, including information on the core business and conditions affecting it, the business units' current objectives and corresponding real estate requirements, and the latest thinking in approaches to real estate [15].

Properties sales, like any complicated transaction, benefit from the attention and continuity of the real estate broker, and when that isn't possible, deal is delayed and can take more time to close because of staff turnover. New employees need time to establish relations with costumers, understand them, and then conclude the deal.

III. METHODOLOGY

We cannot look only consistency and validity in structured data, quantitative arrangements. At a time when the paradigm highlights the importance of the person as a guarantee of success – Knowledge Society – is increasing, the need for text analysis, interviews, speeches, among others, that is, pursue a qualitative analysis.

The qualitative methodological approach used in this research is the Grounded Theory. According to Fortin this "*aims to generate a theory from data collected in the field and among those who have relevant experience*" [19]. This theory began with Glaser and Strauss in 1967 and continued more expressive, with Corbin and Strauss in 1990.

Interview was used to collect data. This is indicated in cases where little knowledge exists about a particular phenomenon, and the researcher intends to obtain data on the research questions. In this particular case, partially structured interview were made. We interact through interviews with real estate professionals who hold a large experience, which gives them a deep knowledge of the subject under review.

Was defined a non-probabilistic sample selection rational, determined by the purpose of the study and theoretical relevance, and its potential for the development of the theory. The theoretical sampling aims not the representativeness of the sample, but the "*representation of the concepts*" [20].
Individuals are selected according to their level (expected), for generate new ideas for the elaboration of the theory [21].

The profile of respondents will be based on two different assumptions. On one hand professional experience in an area of more than 10 years, and on the other, organization seniority of at least 5 years. The first, it will ensure a thorough understanding of the study area, as well as all the elements needed for success in business. The second one gives us the double vision of the deep knowledge of the organization and the importance of the impact of turnover in the loss of skills. We contacted real estate agencies by email and when needed later by phone. Most of the interviews were conducted at the broker's agencies. In the interviews the researcher presents his study and the interviewed signed the informed consent – a document to authorize the data usage, as previously approved by the university ethics committee. This process took about 30 minutes per interview. A voice recorder device was used in the interviews so they later could be transcribed for analysis.

In the data analysis phase Strauss and Corbin proposed a method of comparative orientation composed of three types of coding [20]:

1) Open coding: are identified and coded, all statements, which the investigator deems significant, near or far the phenomenon under study;

2) Axial coding: preliminary codes will be compared and grouped according to their properties and dimensions and will allow the construction of conceptual categories;

3) Selective coding: categories intended to regroup for the construction of several major categories. These main categories will become central concepts and integrators to form the grounded theory to formulate.

In short, the researcher makes connections between all of the facts obtained, to construct a theory. To implement this methodology, first we select the "initial case", one significant case, associating with direct observation, in the environment or following the professional on the job and some relevant literature and we are in conditions make first analyses and to achieve the theoretical base (Fig. 2).
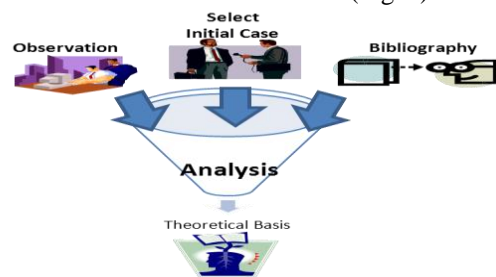

Figure 2. Grounded Theory Method – Theoretical Base.

After this first theoretical base formulation, followed an iterative phase where new cases are added (eg. other interviews) more observations and readings to make a new analyses (Fig. 3). If new findings appear, the theoretical base is reformulated and a new iteration begins; otherwise the theoretical saturation is achieved (when nothing new is found and the theory no longer suffers changes). Now the researcher formulates the theory.
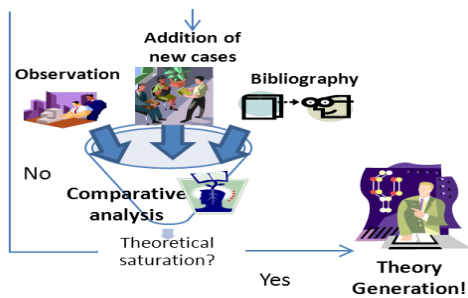
Figure 3. Grounded Theory Method – Theoretical Sturation.

In order to validate the theory an alignment must be made with the theoretical reference.

IV. RESULTS ANALYSIS

Although the main focus of this paper was to build a conceptual model linking Information and Communications Technologies, Employee Turnover to Knowledge Management, our results also provide an opportunity for some substantial comments on the Portugal Real Estate Business. Many efforts are made regard the use ICT, however, there appears to be a lag with respect to the advanced use of technologies such as video conferencing, intranets, etc. As we can see from one of the interviews:

"...I can tell you that after two days I was about to leave because I did not realize anything about computers, and still don't, but ... now I perform a task in 10 minutes that at the beginning took me one day, two days and ended my patience".

Another one refers:

"... I don't say them aren't good, I don't know I to manage them".

Other says:

"...I'm old school; I'm more of the paper and pen time".

However is common opinion that ICT are a fundamental resource on their jobs:

"It's very, very important. Without Internet we can't do anything. When there is no system, we act like crazy".

Employee turnover, and its effects in the organizations it's also a very concern issue:

"...when a person leaves an organization, always exists a loss, because contact with the client was that person. And then when the next contact is another person, the client whether he will or will not retreat ...".

"...not only loss of knowledge/information, but also affect in a negative way by the loss of an asset created by the company. ...".

Organizations also waste a lot of time settling down their new employees and make them productive:

"...there were people, who learned quickly, and there were people that cost a bit more, it depends from one person to another. In some cases after two, three years had not yet heard a complete document or needed assistance to do it others after one month or two already knew how to do it ...".

An indicator of this is that, for specialist positions responsible for KM, not a single position (i.e.: department, section) was found.

Results also suggest that many decision-makers still think that KM begins and ends with building sophisticated information technology systems and that no further organizational change is required.

Many others opinions were collected, but also point in the same way. In order to represent and show relations among these findings, a conceptual map was created. The theory about the concept map was developed in the 70s by Joseph Novak, he defines it as an administrative tool for organizing and representing knowledge [22].

There was made some relations between the phases from ground theory and the concepts representation in the concept map. Tree rings and a central concept are the present elements, as we can see in figure 4.
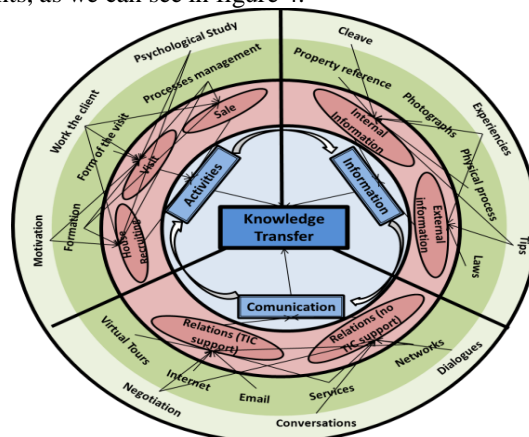

Figure 4. Conceptual Map.

The external ring, is divided in two parts, both represent concepts that we consider as atomic ones. A division exists between them. The light green (more exterior) is compose by elements from tacit dimension (eg. experiences, talk,…) and the dark green by elements from explicit dimension (eg. photography's, email,…). We can establish a relation between this ring and the open code from grounded theory. The second ring represents more aggregated concepts, generated by the first ones and his relationships, and in a similar way a relation with grounded theory axial code. In the last ring we found the principal concepts, as in grounded theory selective code, these main categories will become central concepts and integrators to formulate the theory. Real estate business has three major activities:

- House recruiting: real estate agent connect to the seller of a real estate property in order to represent him to the potential buyers;
- Visit: real estate agent show, showing the real estate property to the potential buyers;
- Sale: help the buyer and the seller of the real estate property making the transaction.

All this activities generate information that must be stored and disseminated throw organization. The information dissemination must be done using some communications channels. In fact what we are doing by performing these activities; stored the generate information and use communications channels to disseminated it, is achieve the main objective – knowledge transfer.

V. PROPOSED MODEL

In the former part, we have analyzed the results. In this section we propose a conceptual model (Fig. 5) in order to transfer tacit knowledge based in the concepts mentioned before.
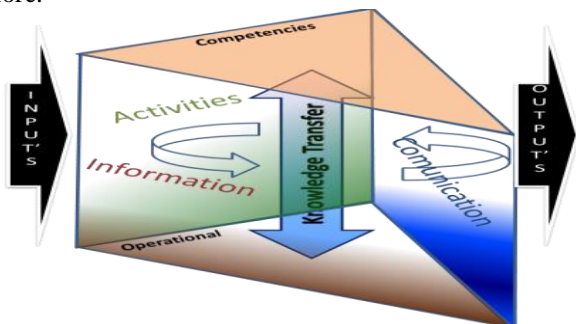

Figure 5. TATEK – Tacit to Explicit Knowledge.

A geometric figure was used – triangular prism to represent the model. The "*input's*" and "*output's*" arrows represents the model interaction with environment, what to receive and to provide.

Each lateral face of the prism represents the main categories mentioned in the conceptual map – Activities, Information and Communication. In all cases the colors nearby the inferior base are darkness and in the opposite side, nearby the top base are light. This difference represents the fact that either in Activities, Information and Communications we can found elements from two different dimensions of knowledge – explicit (dark ones) and tacit (light ones). Nearby the inferior base, the dark stands for the elements from explicit dimension. The inferior base represents the operational dimension, which give operational support to real estate business. In this dimension we can already found systems to support the explicit components from activities, information and communication. For example, when we schedule a meeting with a potential seller in order to recruit a new real estate property to represent we use ICT that give support to schedule the meeting, to store the result information and to communicate it to the organization.

But what if we think about the competences we needed? In all three dimensions Activities, Information and Communications, we use intangible elements. How can ICT give support in these cases? That's what the top base of the prism represent, an existing reality without support from ICT. We need to focus not only in creating systems that support operational task, but also systems to support competencies. Also create channels to disseminate them to the organization and make them available to operational systems. We can also make an alignment from the proposed model: TATEK, with the Knowledge Model from Nonaka & Takeuchi (Fig. 6). In the top base, previously identified as competencies dimension, we can find a correspondence with two elements of the knowledge conversion model from Nonaka & Takeuchi – Socialization and Externalization. In the TATEK model we assume that booth them can be supported by ICT. Nowadays, more people use ICT to

socialize the Facebook platform is a good example. Emerging virtual worlds enable new ways to support knowledge and knowing processes because these virtual environments consider social aspects that are necessary for knowledge creating and knowledge sharing processes [23].

With the appropriate ICT tools workers can do the same in professional environment, creating reports of their success in the job tasks, additionally associating his reports with images, sounds, and video; and made it available to others in theirs organizations.
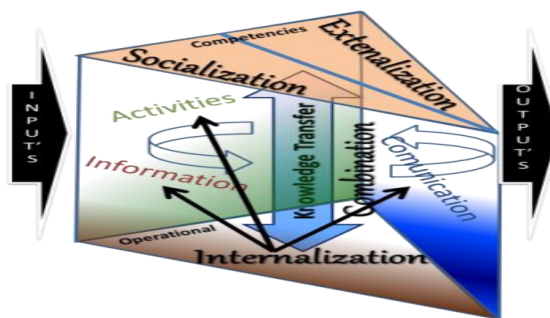

Figure 6. TATEK – Tacit to Explicit Knowledge - SECI.

Organizations play important roles creating conditions to make possible (and desirable) what we define as digital socialization and externalization, creating retribution programs to the knowledge providers is critical in this case.

These roles are also important to promote the combination of new knowledge's with the ones they already had. A successful KM implementation depends on a harmonious amalgamation of infrastructure and process capabilities, including technology, culture and organizational structure [24]. And, finally, evaluate the knowledge internalization, identified new activities, new information to provide and to receive to clients or to organizations and also new ways to communicate, otherwise in all three cases new approaches to the existing ones. This new knowledge represents the start point to a new cycle in the knowledge spiral.

Based on the *TATEK* model we can develop systems to share real estate stories (*SHREX – Sharing Real Estate eXperiencies*) – following a storytelling approach. This approach can take into consideration some clues to support its effectiveness like *raking*: scales showing the importance of each individual contribution and its organizational compensation (measures for Socialization and Extenalization); *ratios*: evaluating professional performance comparing who have and who have not access to the system (measures for Combination); *process modeling*: make a process model AS-IS comparing the before and after states and establish timeline making a new instance of the process model, allowing to identify innovations (in products, processes, activities, information, communication – measures for Internalization) .

VI. FINAL REMARKS

This research investigates the impact of employee turnover in organizational knowledge and influences of information and communication technology (ICT) in

knowledge management in the context of the Portuguese real estate organizations.

We use grounded theory methodology to collect data, associating direct observation, literature review and interviews to real estate agents in order to formulate a theory. Then, it was developed a conceptual model linking ICT to Knowledge Management.

Through our conceptual model, our researched, we are contributing to a better understanding of the principles and practices involved in building the foundations for Knowledge Management practice. Our findings about the relationships between ICT, Knowledge Management and Real Estate Business are relatively general. However, they prove to be particularly relevant for the Real Estate situation. On one hand Real Estate is a business depends particularly from relations between people, and consequently from the knowledge created by those contacts. On the other hand, the employee turnover has always been a phenomenon with which organizations have to confront. The point is that today, time to market pressure (which made it increasingly reduced) makes the increase turnover employee in Real Estate business a more operational and challenging problem.

As the time of a property stays in the market is rising, contributing to the central issue placed by our research, in many cases the real estate individual agent changes during the business. As a result, there is a need to create mechanisms to retain knowledge and allow continuity even with high rates of employee turnover.

The success and the competitive advantages of organizations came from the individual knowledge, so the ability to capture and disseminate it within the organization is a key factor for sustainable success. The abilities of an individual valued knowledge resulting from its activity (when speaking of human resources) should be retained in the organization so that their separation is not only an advantage to the host organization.

It is not enough to attempt to improve only one element, ICT, in its relationship with Knowledge Management, but it fails if not recognize Knowledge Management as essential for proper targeting Real Estate objectives. Progress depends on both technical and organizational change, and ICT professionals need to work closely with the others organizational players, in the deployment of Knowledge Management strategies.

The association of knowledge management and information and communication technology can leverage provide better systems that can support organizational success and cope with employee turnover.

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