

Abstract. *The purpose of this paper is to present a conceptual analysis of the intergenerational learning as an entropy driven process in organizations. It is a new approach based on the following assumptions: a) in any organization there are three fields of knowledge in a continuous interaction: the cognitive knowledge field, the emotional knowledge field, and the spiritual knowledge field; b) in knowledge intensive organizations we can identify several knowledge generations; c) intergenerational learning is an entropy driven process. Each of these assumptions is discussed and integrated into the theory of the entropic management.*

Keywords: cognitive knowledge, emotional knowledge, spiritual knowledge, intergenerational learning.

INTERGENERATIONAL LEARNING AS AN ENTROPY DRIVEN PROCESS

Constantin BRĂTIANU

*Academy of Economic Studies, Bucharest
6 Romană Square, 1st district, Bucharest,
Romania
e-mail: cbratianu@yahoo.com*

Ivona ORZEA

*Academy of Economic Studies, Bucharest
6 Romană Square, 1st district, Bucharest,
Romania
e-mail: ivona.orzea@gmail.com*

*Management & Marketing
Challenges for the Knowledge Society
(2012) Vol. 7, No. 4, pp. 603-612*

1. Introduction

Intergenerational knowledge transfer and intergenerational learning are emergent processes in any organizations where there is a significant ageing phenomenon. In a strategic perspective, a significant ageing phenomena leads toward a large number of retired employees and to a significant knowledge loss for the whole organization. That means a decrease of the organizational knowledge level and, as a consequence, a real difficulty in keeping up the competitive advantage (Brătianu and Orzea, 2011; Carpenter and Sanders, 2007; Davenport and Prusak, 2000; Debowski, 2006; Dess et al., 2006; Geisler and Wickramasinghe, 2009).

Intergenerational knowledge transfer and intergenerational learning are social processes that exist since communities exist. However, these processes have been closely controlled by the old generation since knowledge always has been considered as power. That means that the entropy of the knowledge dissemination between generations has been kept down. We refer mostly to familial intergenerational learning, a process where elders of the family share their experience and wisdom with the younger members of the family. *“Familial intergenerational learning is informal and involves multi-generational interaction. However, in modern, more complex societies, intergenerational learning is no longer transmitted by the family alone and, increasingly, is occurring outside the family”* (Sharpe and Hatton-Yeo, 2008, p. 31).

What is new in these last years is a significant increase in the organizational need to stimulate and develop intergenerational knowledge transfer and intergenerational learning due to their importance in the organizational knowledge equilibrium, and a recognition of the role-played by entropy in enhancing knowledge exchange between workforce generations. In order to understand this correlation, it is necessary to imagine that in any organizations all the knowledge can be represented as a complex dynamics between the following fields: cognitive knowledge, emotional knowledge, and spiritual knowledge (Brătianu and Andriessen, 2008; Brătianu and Orzea, 2010a; Zohar and Marshall, 2004). Cognitive knowledge refers to all explicit and rational knowledge that is actually an expression of the Western perspective on knowledge. Emotional knowledge refers to all unconscious knowledge that results from processing sensory system information. It is expressed mostly as a nonverbal language, reflecting our feelings. Spiritual knowledge refers to all professional and cultural values we have and we use when making decisions. Values represent the guidelines of our way of making decisions and contribute to the spiritual capital of any organization. *“Our spiritual capital is our shared meaning, our shared vision of what most deeply matters in life – and how these are implemented in our lives and in our behavioral strategies. It is capital that is increased by drawing on the resources of the human spirit”* (Zohar and Marshall, 2004, p. 27).

The purpose of this paper is to present a conceptual analysis of what intergenerational learning means in an organizational context, where we consider a continuous interaction between the cognitive knowledge field, emotional knowledge field, and spiritual knowledge field. Also, we would like to explain why intergenerational learning is entropy driven process, and how it can be enhanced by letting the entropy law to act in a natural way. That means to identify possible organizational barriers and to

reduce them through an effective knowledge management and a strategic approach. We would like also to advance a new interpretation of this concept of generation, as “knowledge generation”.

2. The concept of “generation”

There are several meanings of the concept of “generation”, and we shall try to explain them, and to identify the most adequate meaning for the organizational intergenerational learning. According to Gadsden and Hall (1996, p. 5), “*In most studies, the term generation has been used to refer to a person’s position in family lineage*”. Thus, we may have the generation of grandparents, of parents and of children. In this perspective, a generation is a subset of the family structure. The distinction between generations is not based on age, but on the position different members have within the family structure. The assumption is that the higher the position a member may have the more knowledge and wisdom he or she may have. For instance, in the Japanese family grandparents are considered in charge with the education of children since they possess the most explicit and tacit knowledge, and they are the owners of the family values. In this perspective, the meaning of generation is that of a *rank descent*. Thus, an individual is placed in a generation based on his or her position in the family’s hierarchy. In time, the structure of the family may remain the same, but the people move from one rank to another one. For instance, children grow, become adults and they get married. When they become parents themselves, their rank has been changed.

Another widely used meaning for generation is that of cohort. We say, for instance, the cohort of students who graduate this year a given school, or university. “*Cohorts as a generational indicator is based on age-homogeneous groupings. Children who are of the same age are assumed to have experienced certain social events in similar ways*” (Gadsden and Hall, 1996, p. 6). In this view a cohort of students is supposed to have a knowledge level that is proportional with life experiences and education of each student, which indicates a linear thinking. In linear thinking, outcomes are proportional with the inputs, regardless of their nature. For instance, any measuring system of physical quantities is based on a linear thinking model because it is easy to understand and to use. However, knowledge and especially tacit knowledge is not proportional with age. It correlates better with variety of experiences and the wealth of tacit knowledge. Unfortunately, many people make this confusion due to their linear thinking model. Linearity is the frontier between tangibles and intangibles (Brătianu, 2007; Brătianu, 2009).

According to Gadsden and Hall, there are three other meanings for the generation concept: developmental age, discrete time span and zeitgeist. “*Developmental age combines rank-descent and cohort perspectives and defines generation in relationship to task similarity among individuals, e.g., people who were housewives around the same time*” (Gadsden and Hall, 1996, p. 6). The other meaning of *discrete time span* refers to the time expected to take to a cohort to grow and to assume control, which is about 30 years. The third meaning, *zeitgeist* refers to a group of people sharing same cultural values. For instance, the generation of hippies may serve as a good illustration.

We would like to advance a new meaning for the concept of generation, a meaning coming from the knowledge content a group of people may have at a given time. We introduce the meaning of “knowledge generation”. This meaning is not anymore related to age, or to a given position within a family structure. Thus, in any organizational context we may group people based on some knowledge levels or content. For instance we may have the IT generation, the field workers generation, the entrepreneurial generation, and so on. This differentiation is more adequate from the knowledge transfer viewpoint and especially from intergenerational learning perspective. This is the dominant meaning we are going to use in the present paper. Since each generation can be characterized by a certain level and quality of knowledge, it results that knowledge transfer will take place from the knowledge generation having a higher level of knowledge toward the generation with a lower level of knowledge. By analogy, it will follow the pattern of heat transfer from the body with a higher temperature towards the body with a lower temperature, according to the law of thermodynamics (Brătianu and Andriessen, 2008).

3. Intergenerational learning

For centuries, intergenerational learning has been known as a family process for “*systematic transfer of knowledge, skills, competencies, norms and values between generations – and is as old as mankind*” (Hoff, 2007, p. 126). In this process, “*Typically the elders or grandparents of the family share their wisdom and are valued for their role in perpetuating the values, culture and uniqueness of the family*” (Sharpe and Hatton-Yeo, 2008, p. 31). The family has been considered during this historical time as a social provider of stability and education. Children learn from their parents and grandparents beliefs, cultural values and attitudes through direct exchange of knowledge, especially spiritual and emotional knowledge. Also, children learn indirectly by taking their parents and grandparents as role models and observing them in different contexts. A family may be considered as a social system and in a natural way the law of entropy acts to increase the entropy of the system for increasing its stability. That increase can be done through knowledge exchange, which means that intergenerational learning is actually an entropic process. The main assumption is that children will apply for themselves what they learn from their parents and grandparents, continuing this way the family traditions and values. “*The similarity between children and parents is seen as a result of these social and cultural statuses as much as parents’ socialization of children. Social statuses provide a comfortable context for beliefs to persist unchallenged because they cohere with or explain the life circumstances of individuals*” (Gadsden and Hall, 1996, p. 7). The knowledge transfer is dominant from elders towards youngsters, but it is not exclusive. Children may transfer as well cognitive or emotional knowledge towards their parents and grandparents. We would like to stress the fact that a family is a social web whose structure and dynamics depend on historical time, geography, and country’s culture. Thus, when we discuss intergenerational learning within a family, we have to think about a family paradigm. According to Gadsden and Hall (1996, p. 10), “*Family paradigms, for example, are defined by family members and include the shared, implicit beliefs that families have about themselves, their social worlds, and their relationship to social structure.*”

Intergenerational learning as an entropy driven process

In the last century, in many countries *the family paradigm* changed significantly. Firstly, due to increased mobility of people in searching for jobs, most families reduced their structure from three layers to only two: parents and children. Secondly, due to increased rate of broken marriages from different reasons, family structure became very fluid and its members spent less time together. In this new family paradigm, intergenerational learning reduced its significance. *“While traditional families still may value the elder as the transmitter of cultural lore, preparing younger individuals for life in the modern, more complex world has become a function of a wider social groups that are non-familial. There is now a new model that is extrafamilial”* (Sharpe and Hatton-Yeo, 2008, p. 31).

Ropes (2012) considers that *intergenerational communities of practice* can be such a new model. *“Communities of practice are often conceptualized as emergent, informal, self-organizing social constructs where members are responsible for their own learning and the direction it takes. This is contrary to more typical ideas of training and development programs, which are usually intentionally (and formally) organized by management and designed and facilitated by outside experts”* (Ropes, 2012, p. 5). Communities of practice are social constructs with loose structures, and a common field of interests. People mutually engage in such communities of practice over longer periods of time being attracted by the opportunity to improve their knowledge and skills in a certain domain. Since people in these communities of practice have different ages, intergenerational learning appears as a natural phenomenon. People exchange their knowledge based on informal rules and the law of entropy that results in a continuous increase of the community entropy. Intergenerational learning is not the purpose of community, but a by-product of the social capital built within such a community.

Intensity and efficiency of the intergenerational learning within communities of practice depend strongly on the individual motivation and commitment. In order to increase the effects of intergenerational learning, especially in the knowledge intensive organizations, it is necessary to implement planned interventions as intergenerational programs. The main challenge of such intergenerational programs is to find out how to create the necessary motivation for knowledge exchange and synergy production in contexts that are non-biologically linked. According to Sharpe and Hatton-Yeo (2008, p. 32), *“Fundamental to intergenerational programs was the expectation that the generational synergy evident in familial settings could be captured in social planning models, thereby, creating opportunities for intergenerational learning and the development of meaningful relationships among non-familial older and younger generations.”* Intergenerational learning programs can be organized at the governmental or organizational levels. For instance, in the Nordic European countries governments developed a series of such programs aiming at creating contexts that are favorable to intergenerational learning and to extending the usefulness of the ageing workforce. Intergenerational learning became the major mechanism of the lifelong and life wide learning. Intergenerational learning may happen in any range of contexts in which individuals belonging to different generations come together with the willingness of knowledge sharing and learning (Boström, 2003). The benefits are for both individuals and their social environment. Lifelong learning refers to the whole lifespan of the

individual, while life wide learning refers to the learning that takes place in formal, informal and nonformal educational contexts. Formal education means the whole spectrum of activities developed within schools and universities, following a well-defined structure of curricula. Nonformal education contains organized activities outside of the formal system, activities programmed to achieve a certain level of knowing for a given subject or domain. These activities may be organized by schools and universities, as well as specialized organizations in human resources training. For instance, short courses and training programs designed for some target groups of employees constitute classical examples of nonformal education. Informal education refers to the individual efforts made by anybody in order to enhance the level of cognitive, emotional and spiritual knowledge.

Brătianu and Orzea (2011) demonstrated that the knowledge equilibrium dynamics of any organization depends on three factors: knowledge creation, knowledge acquisition, and knowledge loss. In order to decrease the possible knowledge loss through retirement, management should design interventions for stimulating and increasing intergenerational learning. Brătianu and his colleagues (Brătianu et al., 2011a) performed a research aiming at explaining how intergenerational learning might happen within an university, which is by its own nature an aged layered organization. Thus, they performed a research based on the Analytic Hierarchy Process (AHP) method; being interested in the intervention of mixed age teams (i.e. teams composed of professors, associate professors, assistant professors and university assistants). There were evidenced three main intergenerational learning strategies: performing research, writing papers and writing books. Using questionnaires and processing them in concordance with the AHP method, the authors reached the conclusion that the most significant process of intergenerational learning happens within the research teams, where knowledge is exchanged between generations in all possible directions, since each generation may have a high level of a certain kind of knowledge.

A very interesting situation happened in Romania last year, after publication of the new Law of Education, i.e. Law no.1/2012. This new law introduced compulsory retirement for university professors at the age 65, while the former law permitted to this category of professors to continue their academic activity up to the age of 70, if the university needed them. That means that the new legislation sent to pension exactly those professors having an important research activity and being academic advisers for doctoral students. During the whole year 2011, more than 1000 professors have been sent to pension. Some of them could continue their teaching activity, but not their research due to this rigid legislation. That means a huge loss of cognitive, emotional and spiritual knowledge for universities. From some interviews we had with rectors and vice-rectors of the most important universities in the country, we learned that none of these universities was prepared for such a situation since the law introduced this retirement condition unexpectedly. That means that in most of our universities there is a lack of awareness concerning the knowledge loss, and of implementing planned interventions for stimulating intergenerational learning.

Intergenerational learning in an organizational context depends on the degree of awareness of stakeholders about the need to decrease the knowledge loss by stimulating

Intergenerational learning as an entropy driven process

knowledge exchange between generations. In the SILVER project, there are four levels of awareness:

1. General awareness about the fact that the work population is ageing.
2. Awareness about the consequences of the ageing population for organizations in general and for one's own organization.
3. Awareness about increasing diversity and its consequences in organizations in general and age-diversity in particular.
4. Awareness about the goals, benefits, conditions for and potential barriers of intergenerational learning with the aim of motivating the stakeholders to implement intergenerational learning.

The first level refers to the demographic process of ageing population, and of increasing the percentage of old people among total workforce. The second level refers to a strategic thinking problem. It is about the capacity of anticipating possible consequences of this process of ageing and retirement. The most important consequence is the knowledge loss at the level of organization, and of weakening chances for obtaining or maintaining a competitive advantage. Another important consequence is the motivation system for the old people who know that their working life cycle is almost ending. How to motivate these people for intergenerational learning? The third level of awareness refers to the fact that in knowledge intensive organizations there is an increased probability to have people belonging to different generations, as age or as knowledge level. The last level of awareness is very pragmatic, because is looking for concrete benefits of stimulating intergenerational learning. Designing managerial interventions to stimulate intergenerational learning must be done only after we evaluate the level of awareness within the organization, such that to use most adequate tools for increasing this level of awareness. Although the managerial interventions can be well designed and implemented, the results depend on the degree of motivation of people since knowledge sharing and learning are highly motivational processes.

4. Entropy driven process

The following discussion is based on the metaphorical analysis between *energy* and *knowledge* (Brătianu and Andriessen, 2008). Recent research in cognitive science demonstrated that our mind works in a metaphorical way. As Lakoff and Johnson (1999, p. 7) remarked, "*The fact that abstract thought is mostly metaphorical means that answers to philosophical questions have always been, and always will be, mostly metaphorical. In itself, that is neither good or bad. It is simply a fact about the capacities of the human mind.*" Within this conceptual framework we consider that the organizational knowledge is spread throughout the whole company as a *multifield* of knowledge composed of: cognitive knowledge field, emotional knowledge field and spiritual knowledge field. These fields are in a continuous interaction, and knowledge from one field transforms into knowledge from another field (Brătianu, 2011). In other words, cognitive knowledge may transform into emotional knowledge or spiritual knowledge; emotional knowledge may transform into cognitive knowledge or spiritual knowledge, and spiritual knowledge may transform into cognitive knowledge or emotional knowledge. These transformations are

very important in understanding the process of intergenerational learning that cannot be restricted only to cognitive knowledge.

One of the best-known models of knowledge dynamics has been developed by Nonaka and his colleagues (Nonaka, 1991; Nonaka, 1994; Nonaka and Takeuchi, 1995). This model – known as the SECI model – is based on four major knowledge transformations: Socialization (tacit knowledge – tacit knowledge), Externalization (tacit knowledge – explicit knowledge), Combination (explicit knowledge – explicit knowledge), and Internalization (explicit knowledge – tacit knowledge). However, this model ignores completely the need for a difference in the knowledge levels between the two entities participating in a knowledge transfer process, a fact that may lead to a *perpetuum mobile* in the knowledge domain (Brătianu, 2010). The new perspective described by Brătianu (2011) is based on the fact that organizational knowledge fields are highly nonuniform, and this nonuniformity generates fluxes of knowledge aiming at leveling out these fields. Knowledge fluxes are directed along the field gradients, but in the reverse direction of these vectors. In this way, we may understand any knowledge transfer as being quite natural and based on the trend of increasing organizational entropy. Of course, knowledge transfer processes can be also a result of the managerial decisions and interventions, which means a reduction in the organizational entropy of the company. Entropy is a measure of disorder (Atkins, 2010), and any managerial intervention aiming of creating order contributes directly to the reduction of entropy.

Intergenerational learning is a natural process, as we have seen it in a family framework. In this situation, knowledge is distributed quite unequally between the three or two generations. Grandparents accumulate much more spiritual knowledge and tacit knowledge than their children and grandchildren, and parents have definitely much more cognitive knowledge than their children. Due to these differences, and to a cultural tradition, knowledge is transferred from the higher levels of understanding towards the lower ones, i.e., from grandparents toward their children and grandchildren. In this way the family entropy is increased and its stability is increasing as well. We call this intergenerational learning entropy driven process.

In organizational contexts, intergenerational learning may happen in a natural way, based on willingness of old people to share their knowledge with the younger ones. However, knowledge sharing has many barriers, especially in the former socialist countries due to the cultural heritage. Also, the awareness of ageing people and the possibility of producing a significant knowledge loss through retirement has a very low level. In order to increase the stakeholders' awareness it is necessary to design specific interventions to stimulate knowledge transfer and intergenerational learning. If these interventions aim at creating an adequate motivational climate for stimulating intergenerational learning, then the process of knowledge sharing will be entropy driven process.

5. Conclusions

Intergenerational learning is a process that has been developed for centuries within a familial framework. In the last century, the family paradigm suffered significant changes and the intergenerational learning became more and more a social process

developed in communities of practice and within organizational frameworks. Since in many countries, especially in Europe, there is a clear trend toward ageing population and companies' workforce, intergenerational learning may be a useful tool in increasing knowledge retention when old workers retire, or as a result of the entropy driven processes for the organizational knowledge fields. Understanding organizational knowledge dynamics and entropy driven processes we can design managerial interventions to enhance the outcomes of the knowledge sharing and intergenerational learning processes.

Acknowledgement

We would like to acknowledge the support received from SILVER Project – Successful Intergenerational learning through Validation, Education & Research, Project Number: 517557-LLP-1-2011-1-NL-GRUNDTVIG-GMP.

References

- Andriessen, D. (2006), "On the metaphorical nature of intellectual capital: a textual analysis", *Journal of Intellectual Capital*, 7(1), pp. 93-110
- Atkins, P. (2010), *The law of thermodynamics. A very short introduction*. Oxford: Oxford University Press
- Boström, A.K. (2003), *Lifelong learning, intergenerational learning, and social capital*. Institute of International Education, Stockholm University
- Brătianu, C. (2007), "Thinking patterns and knowledge dynamics", *Proceedings of the 8th European Conference on Knowledge Management*, 6-7 September 2007, Barcelona, pp. 152-157
- Brătianu, C. (2009), "The frontier of linearity in the intellectual capital metaphor", *Electronic Journal of Knowledge Management*, Vol. 7, No. 4, pp. 415-424
- Brătianu, C. (2010), "A critical analysis of the Nonaka's model of knowledge dynamics", *Proceedings of the 2nd European Conference on Intellectual Capital*, ISCTE Lisbon University Institute, Lisbon, Portugal, 29-30 March 2010, pp. 115-120
- Brătianu, C. (2011), "Changing paradigm for knowledge metaphors from dynamics to thermodynamics", *Systems Research and Behavioral Sciences*, Vol. 28, pp. 160-169
- Brătianu, C. and Andriessen, D. (2008), "Knowledge as energy: a metaphorical analysis", *Proceedings of the 9th European Conference of Knowledge Management*, The Solent University of Southampton, September 3-4, 2008, UK
- Brătianu, C., Agapie, A., Orzea, I. and Agoston, S. (2011a), "Intergenerational learning dynamics in universities", *Electronic Journal of Knowledge Management*, Vol. 9, Issue 1, Special issue, pp. 10-18
- Brătianu, C., Agapie, A. and Orzea, I. (2011b), "Strategies for increasing knowledge retention in universities through intergenerational knowledge transfer", *Proceedings of the 12th European Conference on Knowledge Management*, pp. 124-130, Vol. 1, University of Passau, Germany, 1-2 September 2011
- Brătianu, C. and Orzea, I. (2010a), "Emergence of the cognitive-emotional knowledge dyad", *Review of the International Comparative Management*, Vol. 10, No. 5, pp. 893-902
- Brătianu, C. and Orzea, I. (2010b), "Tacit knowledge sharing in organizational knowledge dynamics", *Journal of Knowledge Management Practice*, Vol. 11, No. 2, June
- Brătianu, C. and Orzea, I. (2011), "The organizational knowledge dynamics (OKD) model. Case study Vodafone Romania", *Management & Marketing*, Vol. 6, No. 3, pp. 393-406

Management & Marketing

- Carpenter, M.A. and Sanders, Wm.G. (2007), *Strategic management. A dynamic perspective*, Upper Saddle River, New Jersey: Pearson Educational
- Davenport, T.H. and Prusak, L. (2000), *Working knowledge. How organizations manage what they know*, Boston: Harvard Business School Press
- Debowski, S. (2006), *Knowledge management*, Sydney: John Wiley & Sons Australia
- Dess, G.G., Lumkin, G.T. and Eisner, A.B. (2006), *Strategic management. Text and cases*. 2nd edition, Boston: McGraw-Hill Irwin
- Gadsden, V.L. and Hall, M. (1996), *Intergenerational learning: a review of the literature*, LR-FP-96-07, National Center on Fathers and Families, University of Pennsylvania
- Geisler, E. and Wickramasinghe, N. (2009), *Principle of knowledge management. Theory, practice, and cases*, New York: Armonk
- Sharpe, M.E. and Hatton-Yeo, A. (2008), "Intergenerational learning and the contributions of older people", *Ageing Horizons*, No.8, pp. 31-39
- Hoff, A. (2007), "Intergenerational learning as an adaptation strategy in ageing knowledge societies", In: European Commission (ed.) *Education, Employment, Europe*, Warsaw: National Contact Point for Research Programs of the European Union, pp. 126-129
- Lakoff, G. and Johnson, M. (1999) *Philosophy in the flesh. The embodied mind and its challenge to Western thought*. New York: Basic Books
- Nonaka, I. (1991), "The knowledge-creating company", *Harvard Business Review*, Vol. 69, No. 6, pp. 96-104
- Nonaka, I. (1994), "A dynamic theory of organizational knowledge creation", *Organization Science*, Vol. 5, No. 1, pp. 14-37
- Nonaka, I. and Takeuchi, H. (1995), *The knowledge creating company. How Japanese companies create the dynamics of innovation*, Oxford University Press: Oxford
- Ropes, D. (2012), "Intergenerational communities of practice; shedding new light on older workers?", *Proceedings of the International Conference on Organizational Learning, Knowledge, and Capabilities*, 25-27 April 2012, Valencia, Spain
- Zohar, D. and Marshall, I. (2004), *Spiritual capital. Wealth we can live by*, San Francisco: Berrett-Koehler Publishers, Inc
- *** SILVER Project – Successful Intergenerational learning through Validation, Education & Research, Project Number: 517557-LLP-1-2011-1-NL-GRUNDTVIG-GMP

About the authors

Constantin BRĂȚIANU is professor of Business Management, Strategic Management and Knowledge Management at the Academy of Economic Studies of Bucharest, Romania. He is Director of the Research Center for Intellectual Capital. His main academic interests are: knowledge dynamics, knowledge management, intellectual capital, strategic management and university management.

Ivona ORZEA is an assistant professor of Knowledge Management and Strategic Management at the Academy of Economic Studies of Bucharest, Romania. She is member of the Research Center for Intellectual Capital. Her main academic interests are: knowledge management, intellectual capital, strategic management and change management.