Knowledge based organization
An identification model

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Abstract. In the recent years, the concept of knowledge based organization has been the object of much research. In addition, other concepts like: knowledge management, knowledge measurement, organizational learning, and knowledge types have seen an increased of researchers' focus. Various papers present the criteria for identifying if an organization is or isn't based on knowledge. Starting with the literature survey, this paper provides a model for identifying if an organization is knowledge based. By applying this model, the paper analyses a real Romanian organization and uses tools as survey and direct observation of the way in which organization is functioning and use its knowledge. In addition, based on the analysis results, this paper provides recommendation about the ways in which organization could develop its skills in managing organizational knowledge.

1   Introduction

Social and economic life is based on knowledge, and especially in the last years, we can see an increased attention on knowledge as the key resource of organization, knowledge which is embedded in the products and services available on the market. In these conditions, concepts such as knowledge based organization, intelligent or knowledge creating company have gained a lot in number of studies related to them. Other concepts like the old one of the organizational structure suffer transformations and a relatively new concept like knowledge worker creates contradictions. Which type of the organizational structure is the best, the flatter one or the bureaucratic, hierarchical but flexible? Who is knowledge worker, any specialist, expert in his domain of activity, no matter the education or only highly educated people?

Answering to these questions is highly required in indentifying if the organization where each one works is knowledge based or not. An easy answer could

be that all organizations are knowledge based and that people have used always knowledge in their activities.

This paper intention is to establish an order in the Pandora's Box of knowledge complexity, by answering to these questions in a more elaborated way.

1.1   Known results

Knowledge based organization have nowadays became widely an important research topic. Most researches are focused on one or some of aspects such as: types of knowledge, organizational learning and organizational knowledge, knowledge assets and their specific processes which allow knowledge to be acquired, used, stored, transferred and organizational strategies in order to support and / or improve the knowledge use inside and outside organization.

Several studies are discussing about the fact that knowledge is the primary resource in the organizations of the 21st century. Further more, knowledge flows are becoming more important than financial flows, employees are revenue creators, the organizational hierarchical structure has fewer levels and so on. Managers are becoming leaders and they are focused on employee's career development and on supporting the organizational learning and continuum innovation.

Based on these aspects mentioned above, researches are trying to define knowledge based organization and its core characteristics. We consider that these characteristics are presented partially and sometimes in a confusing way. In order to offer some clarification in this domain, we will use their integration in one identification model.

1.2   Our results

This paper tries, after the literature survey, to identify the characteristics of knowledge based organizations and to provide a complete definition of this concept. Building on these characteristics, further criteria will be developed and integrated in an identification model which will allow to analyze and conclude if an organization is knowledge based or not.

This model is called an identification model based on the fact that is limited to aspects such as: 1) human resources and the work performed; 2) knowledge creation processes; 3) organizational culture and 4) structure; 5) management and 6) information and communication technologies. It doesn't include a model for measuring the organizational knowledge assets; this would be a subject for another paper.

Finally, the paper will apply this model on a Romanian organization where direct observation and a survey were used in order to get the real image of this organization and analyzing it in order to identify its possible characteristics as knowledge based organization.

2   Literature survey

In the process of providing a more clear definition of the knowledge based organization we started by analyzing, based on the literature survey, how the organization of the knowledge society should look like. We have selected several definitions related to concepts such as knowledge based organization [1], knowledge creating company [2], learning organization [3-4], intelligent enterprise [5-6]. From these definitions we have extracted the aspects which will be used in the identification model, aspects such as: 1) knowledge is important internally and externally to the organization; 2) new knowledge has to be consistently created and disseminated in the entire organization and embedded in new products and services; 3) employees should learn together; 4) the organization's success depends on implementing its visions and strategies through systems, policies and organizational structure; 5) organizational structure should be flexible by combining three different layers: a) the bureaucratic layer; b) project team layer; c) knowledge layer.

Further aspects that we consider related with this paper's goal were analyzed, such as:
- Knowledge worker – from two different perspectives: 1) permissive [7-8] – is based on the principle that "no matter what we do we are all, in some form or other, knowledge workers"; 2) restrictive one [9-11] – which includes only highly educated employees [12] secondary education is not enough to be a knowledge worker); knowledge work – involves using four main assets, such as: 1) knowledge; 2) relationship; 3) emotional; 4) time assets [11]. These assets are used in the process of knowledge creation [2] which converts two main type of knowledge: explicit and tacit;
- Knowledge creation – can effectively take place in an environment which promotes communication, trust, freedom to innovate and improvise [5];
- Organization structure could be 1) flatter with less hierarchical level [13] and his symphony organization); 2) hierarchical but flexible one combining three layers – bureaucratic layer with project team layers and knowledge layer [6].
- Management – its role is to create and promote the vision and strategies for knowledge conversion processes both internally and externally to the organization [6].
- Information and communication technologies are both conditions (involving knowledgeable users) and support tool (speeding up the information and knowledge transfer) – in these conditions, managers have to find the right information and communication technologies in order to ensure the knowledge creation and dissemination both inside and also externally by being involved in bigger knowledge networks from knowledge can be acquired [14].

In our opinion, a knowledge based organization is an organization which 1) acts intelligently and successfully in its domain by learning and creating knowledge in a continuum way, 2) uses its knowledge (both the tacit – resident in employees' minds – and the explicit which is embedded in the work procedures, databases, etc.) 3) by creating and implementing the right organizational culture (characterized by freedom to innovate and experiment) 4) supported by a flexible organizational structure (hierarchic structure combined with multifunctional, efficient and ad-hoc created and

efficient project teams) and 5) by the right combination of information and communication technologies in order to cover all four processes of knowledge conversion both internally and externally to the organization.

3   The identification model's components

"An organization is defined by the way in which the work is being done. The purpose of one organization is to get the work done. This requires a structure. Also, an organization is, above all, social. It is people. Its purpose must therefore be to make the strengths of people effective" [15].

Having this statement in our mind, we have decided to elaborate one model in order to identify if an organization has the features for being considerate a knowledge based type. The elements to be analyzed are: 1) the human resources; 2) the knowledge creation; 3) the organizational culture and 4) structure and 5) the information infrastructure for supporting knowledge conversion inside and outside the organization boundaries. For each element an average should be calculated in order to identify if it reaches the highest levels of the scales used. In the end a global average will be calculate, the bigger the average the better.

Knowledge workers are the owners of the most important and valuable resource of one organization, knowledge. Their knowledge skills are highly important in identifying the possible knowledge-based feature of one company. For evaluating the employee's knowledge skills we have combined the hierarchy of skills provided by Johnson and the skills provided by education:

Table 1 Knowledge worker's skills (adapted from [16])

Knowledge skills	Education
Basic	Secondary + Tertiary + Life Long Learning
Professional	Secondary + Tertiary + Life Long Learning
Technological	Secondary + Tertiary + Life Long Learning
Information Problem Solving and Higher Thinking	Tertiary + Life Long Learning
Conceptual	Life Long Learning

For each level of skills from the table 1, we presented the required level of education. The scale is 1 to 5 (1 is the lowest and 5 is the highest percentage of employees with that specific level of skills in the total of employees – one step of 10% can be used).

Knowledge creation should take place through all four processes of knowledge conversion:

Table 2 Knowledge creation and its methods [2, 6, 17-19]

Conversion	Method
Socialization	1) Apprenticeship; 2) Shared experiences; 3) On-the-job training; 5) Joint activities; 6) Physical proximity; 7) Walking in the company; 8) Informal meetings outside the workplace; 9) Wandering outside the company
Externalization	1) Use of metaphors and analogies; 2) Dialogue; 3)Self-reflection
Combination	1) Use different data sources; 2) Meetings and telephone conversations;

	3) Presentations; 4) Using ICTs
Internalization	1) Learning-by-doing; 2) Focused training with senior colleagues; 3) Simulation/experiments; 4) Self-reflection upon documents; 5) Reflection with others

The scale used to identify the level of knowledge creation inside the company is 1) Never; 2) Occasionally; 3) Often; 4) Regular; 5) Daily

The organizational culture should promote knowledge transfer between employees.

Table 3 Organizational culture (adapted from [20])

Aspects of the culture	Scale
Sociability	1) Very low; 2) Low; 3) Neutral; 4) High; 5) Very high
Solidarity	1) Very low; 2) Low; 3) Neutral; 4) High; 5) Very high
Knowledge transfer	1) Never; 2) Sometimes; 3) Often; 4) Regular; 5) Daily
Physical space	1) Highly functional; 2) Functional; 3) Neutral; 4) Open; 5) Highly open
Communication	1) Highly formal; 2) Formal; 3) Neutral; 4) Informal; 5) Highly informal
Flexible schedule	1) Never; 2) Sometimes; 3) Often; 4) Regular; 5) Daily
Identity	1) High individualism; 2) Individualism; 3) Neutral; 4) Some similarities; 5) High similarities

The organizational structure of actual companies is still mainly hierarchical. In these conditions, we use Nonaka's point of view about the hypertext organization based on flexible structure.

Table 4 Organizational culture

Aspects	Scale
Use	1) Never; 2) Sometimes; 3) Often; 4) Regular; 5) Daily
Flexibility	1) Highly rigid 2) Rigid; 3) Neutral; 4) Flexible; 5) Highly flexible
Creation	1) Imposed by the procedures 2) Imposed by the boss; 3) At demand; 4) Voluntarily; 5) Ad-hoc
Variety	1) One domain – one department; 2) One domain – more departments; 3) more domains and internal experts 4) one domain – internal experts – one external expert; 5) more domains-internal and external experts
Physical space	1) Highly closed 2) Closed; 3) Neutral; 4) Some openness; 5) Highly open
Efficiency	1) No efficiency; 2) Very Low; 3) Low; 4) Some openness; 5) Highly open

The management should move to a new direction in offering more freedom and training to organization's employees.

Table 5 Management (adapted from [17])

Aspects	Scale
Autonomy	1) High supervision 2) Some supervision; 3) Neutral; 4) Some freedom; 5) High freedom
Empowerment	1) Highly subjective 2) Subjective; 3) Neutral; 4) Objective; 5) Highly objective
Evaluation	1) Highly subjective 2) Subjective; 3) Neutral; 4) Objective; 5) Highly

	objective
Incentives	1) Highly subjective 2) Subjective; 3) Neutral; 4) Objective; 5) Highly objective
Accessibility to knowledge	1) Highly restrictive 2) Restrictive; 3) Neutral; 4) Some access; 5) Highly accessible
Communication	1) Mainly inside the department 2) On the same level; 3) Both inside the department and the same level; 4) Between different levels; 5) Mainly between levels and with external environment
Openness to ideas	1) Highly restrictive 2) Restrictive; 3) Neutral; 4) Some openness; 5) Highly open

The information infrastructure in one knowledge based organization should contain information and communication technologies able to cover all four knowledge conversion processes.

Table 6 ICTs for knowledge based organization [2, 14]

Conversion	Technology
Socialization	Groupware, Expertise location, Knowledge Map Systems, Visualization tools, Instant Messaging, Email, Knowledge Portals
Externalization	Groupware, Newsgroups, Forums, Instant messaging, Email, Workflow systems, AI (Artificial Intelligence), Knowledge Portals
Combination	Search Engines, Workflow, Innovation Supporting Tools, Competitive Intelligent tools, BI (Business Intelligence), Document and content management systems, ERP Systems, Intranet, Voice / Speech Recognition, Search Engine, Taxonomy, Knowledge Portals
Internalization	eLearning, Computer Based Training, Innovative supporting tools

For the evaluation of information and communication technologies, the scale is 1) Not existing 2) In the implementation; 3) Existing but very limited and low efficiency; 4) Existing with low use and efficiency; 5) Existing and high use and efficiency.

One organization is knowledge based if, by using this model, the final result (average of the values for all six aspects analyzed) is higher than 3. For results lower or equal with 3, the organization is not knowledge based.

There is will be no organizational model, because organizations "will increasingly be fashioned differently: for different purposes, different kinds of work" [15]. These are two limitations of the identification model proposed here. Additionally, the model could be affected by the characteristics of the national or local culture and people's behavior (some tend to be more introverted or extroverted than the others).

4   Romanian case study

The company selected for the case study is a Romanian water supply company, the biggest in the north-east of Romania. It is a public company and has an organizational structure with five levels with three main divisions 1) economic, 2) technique and 3) production – which is the largest because it covers the company's main activity – maintaining and modernizing the water infrastructure.

The human resources structure is represented by 85% of employees with secondary education and 80 % are at the operative level working mainly outside the office being part of the production division. The information infrastructure is available only for top and middle managers and administrative and technical staff (around 20% of the employees).

The analysis of the Romanian company was done by using a survey in the case of top and middle managers, direct observation in case of administrative and employees from the operative level. The partial results gained through these research methods were included in the identification model in the case of this Romanian company.

The final result, based on the identification model proposed and by calculating an average of the results for all six elements of analysis, is 3 which highlight some aspects were company needs to improve.

The analysis' final results for each criteria and aspects which need rapid solutions are:

- Knowledge skills – 3,16 – high order thinking and conceptual skills;
- Knowledge creation – 3, 23 – externalization and internalization;
- Culture – 3 – analyzed also through Goffee and Jones model and it resulted to be a mercenary type of organizational culture;
- Structure – 2,83 – with low values for flexibility and openness;
- Management – 3,71 – evaluation and incentives;
- Information infrastructure – 2,5 – ICTs for internalization.

The lowest result is represented by the information and communication technologies unavailable for internalization. The solution for this problem was included in the company's strategy. A project was proposed (it is in the analysis phase) for creating an integrated management solution which will be a web-based software and will incorporate, besides the workflow management (both internally and externally – collaboration with partners) other important key features like eLearning, knowledge management based and visualization and optimization tools.

5   Conclusions

The knowledge society implies knowledge based organizations with the culture and management which promotes knowledge transfer and supports knowledge workers to constantly create knowledge trough their daily work and use, store and transfer it through the right information and communication technologies.

This paper proposes an identification model in order to highlight the strong and weak elements of the organization. This model is very useful in the initial phase of the analysis in case the company intends to implement a knowledge management strategy.

This identification model was applied in the case of the Romanian company which is committed to its development. The results have showed that it is not yet knowledge-based but has the potential (the management and the IT strategy) to develop in order to reach at least the value 4 which means, in our opinion, the core knowledge infrastructure which could help organization to survive in a dynamic and complex environment.

References

1. 1. J. Liebowitz, Knowledge organization. What every manager should know, CRC Press, 1998, p.14
2. I. Nonaka, The Knowledge Creating Company in Harvard Business Review on Knowledge Management, 1998, pp.21-45
3. C. Argyris and D. Schon, Organizational learning – A Theory of Action Perspective, Addison-Wesley, 1978, p.29
4. P. Senge, The Fifth Discipline – The Art and Practice of the Learning Organization, Random House, 1990, 3
5. K., M. Wiig, The Intelligent Enterprise and Knowledge Management, 2000, http://www.krii.com/downloads/intellig_enterprise%20&%20km.pdf
6. I. Nonaka, A dynamic theory of organizational knowledge creation", in Organization Science, 5 (1), 1994, pp.14-36
7. P. Drucker, The New Productivity Challenge, Harvard Business Review November – December 1991, p.71
8. Collins, D., Knowledge Work of Working Knowledge? Ambiguity and Confusion in the Analysis of the "Knowledge Age", Employees Relations, Vol. 19(1), 1997, p.45
9. C. Despres and J. M. Hiltrop, Human Resource Management in the Knowledge Age: Current Practice and Perspectives on the Future, Employee Relations, Vol. 17(1), 1995, pp. 9-23
10. K. Standfield, Intangible Management, Tools for Solving the Accounting and Management Crisis, Academic Press, 2002, p.9
11. M. J. Barrow and H. M. Loughlin, Towards a learning organization, Industrial and Commercial Training, 1992, vol. 24, no, 1, pp.3-7
12. Th. Davenport, Thinking for a Living – How to Get Bette Performance and Results from Knowledge Workers, Harvard Business School Press, 2005, p.10
13. P. Drucker, The Coming of the New Organization, in Harvard Business Review on Knowledge Management, 1998, p.7
14. R. Maier, Knowledge Management Systems: Information and Communication Technologies for Knowledge Management, Springer, 2002
15. P. Drucker, The Organization of the Future, Jossey Bass, 1997, pp.1-5
16. D. Johnson, *KWRedux,* http://www.doug-johnson.com/dougwri/KWRedux.pdf, 2005
17. I. Nonaka, I., R. Toyama, and N. Konno, SECI, Ba and Leadership: a Unified Model of Dynamic Knowledge Creation, Long Range Planning 33, pp. 5-34
18. I. Nonaka and N. Konno, The Concept of Ba: Building a Foundation for Knowledge Creation, California Management Review, Vol. 40(3) 1998, pp. 40-54
19. I. Nonaka, B. Byosiere, C. Borucki, and Konno, N., Organizational Knowledge Creation Theory: A First Comprehensive Test, International Business Review, Vol 3(4), 1994, pp. 337-351
20. R. Goffee and G. Jones, Organizational Culture: A Sociological Perspective in Cooper, C.L., Cartwright, S., Earley, P.S., The Organizational Handbook of Organization Culture and Climate, Willey, 2001, pp.3-20