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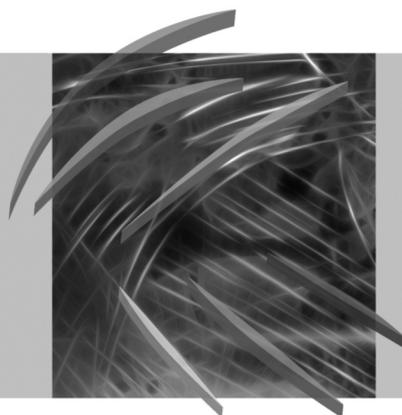
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WEB 2.0 TOOLS AND LEADERSHIP IN THE CONTEXT OF INCREASED INTERACTION COMPLEXITY

Abstract: The article concentrates on the aspects of ICT tools which might be used by leaders to enhance their leadership. While searching the EBSCO and ProQuest databases the authors have not found the combination of all the elements they have put together to form their framework of ICT-leadership mutual dependency. With Web 2.0 tools, leaders no longer need to go to a specific place for professional development or wait to hear someone from the outside tell them what they need to do. New technology environments are transforming the way the knowledge is experienced. Internet, intranet and wireless media offer new ways to share knowledge and are developing a modern approach to be more effective leader.

Keywords: complexity, leadership, web 2.0 tools.

1. Introduction

The context of the postmodern knowledge economy is characterized by uncertainty and turbulence. This new, dynamic context is driven by technological revolution and economic globalization [Hitt 1998], resulting in rapid and continuous change, diminished product lifecycles and the need to turn large amounts of data into useable information [Ireland, Hitt 1999]. Organizations now have to increase the rate at which they learn [Bettis, Hitt 1995; Child, McGrath 2001] in order to survive in this environment. Complexity is more a way of thinking about the world than a new way of working with mathematical models. Over a century ago, F.W. Taylor revolutionized leadership. Today, advances in complexity science, combined with knowledge from the cognitive sciences, are transforming the field once again. Complexity is poised to help current and future leaders make sense of advanced technology, globalization, intricate markets, cultural change, and much more. In short, the science of complexity can help all of us address the challenges and opportunities we face in a new era of human history.

A complex systems perspective introduces the new leadership "logic" to leadership theory and research by understanding leadership in terms of an *emergent event* rather than a person. A complexity view suggests a form of "distributed" leadership

[Brown, Gioia, 2002; Gronn 2002] that does not lie in a person but rather in an interactive dynamic, within which any particular person will participate as leader or a follower at different times and for different purposes. It is not limited to a formal managerial role, but rather emerges in the systemic interactions between heterogeneous agents [Marion, Uhl-Bien 2001, 2003]. Therefore, complexity leadership includes a descriptive analysis examining the conditions and dynamic processes of these interactions and the emergent phenomena.

2. Leadership in contemporary organizational context

Leadership theories have provided a number of explanations of leadership [Yukl 1981]. These behavioural models are often conflicting, occasionally weak, and seldom supported by empirical data. In a cheerfully cynical statement, W. Bennis [1959, p. 259] wrote: "Of all the hazy and confounding areas in social psychology, leadership theory undoubtedly contends for the top nomination. And, ironically, probably more has been written and less known about leadership than about any other topic in the behavioral sciences". This pessimism comes from an acknowledged inability to prepare a research design that will identify measurable characteristics of leaders (who they are) or leadership (what they do), and then relate those characteristics to various dimensions representing the success or failure of an organization. Theories for leaders are primarily normative, providing how-to prescriptions for improving leadership effectiveness. Theories of leadership, on the other hand, are primarily analytical, directed at better understanding leadership processes and the variations among them. Leadership theories are a product of the historical and sociopolitical context in which their creators live and work. A leadership paradigm is a shared mindset that represents a fundamental way of thinking about, perceiving, researching, and understanding leadership. From the trait perspective [Bryman 1996; House, Aditya 1997; Leatt, Porter 2003; Rainey 1991; Stogdill 1948], effective leaders were identified as being more intelligent, self-confident, determined and sociable than non-leaders. The theories developed then were called "Great Man" theories because they focused on identifying the innate qualities possessed by influential monarchs, military generals, and civil authorities. The subject matter for these studies was drawn from the social elite; little interest was shown in identifying traits of distinguished labour leaders or political revolutionaries. R. Stogdill [1974] completed two major reviews of trait research. His findings suggest among other things that no consistent set of characteristics or traits differentiates leaders from followers and that possession of any given set of traits does not guarantee leadership success. Another feature of interest is the emphasis on leadership as the capacity to relate an organization to its environment (so-called "strategic leadership") rather than the more internally oriented focus associated with earlier work [Boal, Hooijberg 2001]. S. Finkelstein and D.C. Hambrick [1996] in their strategic leadership theory suggested that

information processing and strategic decision making are reflections of the psychological make-up (e.g. values) of the top manager and the top management team.

Theorists who adopt the behaviour perspective on leadership attempt to answer the question, "What behaviours make leaders most effective?". These theorists observe what individual leaders do and, in particular, how they behave toward subordinates. Some examples of behaviour studies include research by H. Mintzberg [1973] who suggests that the manager's job can be described in terms of 10 roles or organized sets of behaviours identified with a position. F. Luthans, S.A. Rosenkrantz, and H.W. Hennessey [1985] identify socializing and politicking as common managerial behaviours. These studies try to relate generic behaviours or leadership styles to levels of work-group performance or satisfaction [Bryman 1996; House, Aditya 1997; Leatt, Porter 2003]. In order to better understand and explain variations in the impact of different leadership behaviours, some researchers therefore tried to take into account the influence of various situations or contextual factors using a contingency approach [Fiedler 1967]. Kotter [1982] identifies network building as a behaviour exhibited by many successful managers. Since the late 1950s, it has been increasingly suggested that leaders should seek to adopt the most appropriate leadership style to achieve their goals, given prevailing situational contingencies. The so-called contingency model of leadership is based on the idea that the most effective leadership style in a particular case depends on interactions among the leader, followers, and the situation. In other words, whether a set of traits or behaviours will result in leadership success will depend on situational variables, including the characteristics of followers, the external and internal environments, the organizational structure, and the nature of the work performed. Most contingency leadership theories assume that effective leaders must be flexible so as to adapt their behaviours and leadership styles to fit the situation. Societal social structures include class relations, cultural norms, bureaucracies, and patriarchies. Complex work organizations are microcosms of society and, as such, involve inequalities, ideologies, and asymmetrical power distributions. According to Bryman [1996, p. 280], a new approach to leadership study emerged during the 1980: "a conception of the leader as someone who defines organizational reality through the articulation of a vision which is a reflection of how he or she defines an organization's mission and the values which will support it". This conception is also reflected in the seminal work of P. Selznick [1957], *Leadership in Administration*, where leadership is described as a process of institutionalization of meaning "to infuse with value beyond the technical requirements of the task at hand" [Selznick 1957, p. 17]. This approach is well illustrated by the work of J.M. Burns [1978], B.M. Bass [1985], and W.C. Bennis and B. Nanus [1985] on transformational leadership. Among the various approaches to the study of leadership, one of the best known is the transformational/transactional leadership framework [Bass 1985]. Transactional leaders view the relationship between leader and follower as an exchange process [Bass, Avolio 1993] based on a system of reward and punishment. Transactional leadership is based on two factors: contingent

reward and management by exception. A transactional leader will thus offer positive reinforcement, prizes, praise, compliments, and rewards when goals are reached and will utilize negative reinforcement such as punishment and reproach when errors are made or failures occur. Transformational leadership is based on four principal factors: idealized influence (or "charisma"), inspirational motivation, intellectual stimulation, and individualized consideration [Bass, Avolio 1993]. Transformational leaders increase their followers' level of interest, respect the group's obligations and mission, demonstrate qualities which induce respect and pride, become role models, and examine new prospects for solving problems and reaching goals by encouraging followers to find new solutions and propose new ideas. Some researchers [Jung, Sosik, 2002] have found that transformational leadership predicts empowerment, cohesion, and perceived group effectiveness. On the whole, the presence of a transformational leader guarantees better results in terms of efficiency in virtual groups, even though situations were found in which transactional leadership can be positively associated with work outcomes (e.g., job performance [Judge Piccolo, 2004]. According to B.M. Bass [1996], transformational leadership is based on four main attributes: idealized influence or charisma, inspirational motivation, intellectual stimulation, and individualized consideration. To put it more precisely, a transformational leader is a model for others in the organization, provides a plausible and attractive vision of the organization's future, fosters a more reflexive approach to practices and current ways of organizing, and is able to pay attention to individuals' specificities. This type of leadership is opposed to transactional leadership based on contingent reward and management processes that pay attention to exceptions with a view to improving or adjusting the behaviours of subordinates. The transformational leadership perspective does not take into account the informal and complex dynamics that are at the basis of achieving influence and sustaining legitimacy. In his review of leadership theories, A. Bryman [1996] refers to emerging alternative conceptions of leadership.

Amongst other ideas, he refers to the term "dispersed leadership" which may foster a more "processual" approach to leadership research (see also [Pettigrew 1992]). Such a perspective pays more attention to how leadership emerges in concrete social or organizational settings and to interactions between organizational context and leaders' capabilities. Leadership is considered less as an attribute of single individuals but more as a collective process, where individuals negotiate their position with respect to others in more unpredictable ways than a rational view of organizations would suggest. This more collective and processual perspective on leadership has driven some of our own research (e.g., [Denis, Lamothe, Langley 2001]). From our point of view it is clear that leading – effective leadership – at this level happens through communication as well as through a host of organizational processes which support particular strategic initiatives. That is, while leading is usually thought of through face-to-face social influence, there are multiple ways in which organization-

al structures and systems influence the actions stakeholders take and the direction in which the collective goes.

Leadership cues in this context uncover underlying opportunities and increase variety by better understanding customer problems and their emerging needs and then assessing these in the context of current technology. Innovation involves a sense of emergent discovery that requires a different kind of leadership [Guastello et al. 2005; Lynn, Reilly 2002]; that is, a different ensemble of leadership signals that are received by the organization's members as action and decision cues. These are leadership-of-variety activities that increase the diversity of alternatives available to the system. Learning of individuals in organizations – and by extension, of organizations as systems – is likewise facilitated by ensembles of leadership cues that are expressed as routines and organizational capabilities [Nelson, Winter 1982]. Rising complexity creates new opportunities but demands new tools. Web 2.0 technology brings a set of new tools that leader can apply. But in the last few years, researchers of the role of leadership in virtual contexts have tried to answer several questions aimed for the most part at analyzing the roles assumed by leaders in Computer Mediated Groups, the ways in which their behaviour is expressed, and the differences between operating in face-to-face (FTF) situations versus Computer Mediated Communication (CMC) [DeChurch, Marks 2006]. I. Zigurs [2003] maintains that virtual groups afford us a unique opportunity to redefine leadership. According to the traditional model, leaders are supposed to offer encouragement, reward, and motivation, mostly through their physical presence or comments, and reinforce the development of relationships inside the group. A virtual environment makes it necessary to revise these aspects, owing in part to the fact that there is also interaction with a machine. One of the fundamental characteristics in this new context is the recognizability of the leader's status. In FTF interaction, the most significant indicators involve body language, vocal inflection, eye contact, clothing, and so on, which in CMG can be difficult to perceive.

3. Web 2.0 tools and leadership

H. Green and C. Hannon [2007, p. 13] define Web 2.0 as a "second generation" of internet-based services that emphasize online collaboration and sharing among users, often allowing users to build connections between themselves and others. However, other commentators see Web 2.0 more as embodying the original spirit of the World Wide Web as articulated by its inventor, T. Berners-Lee: We should be able not only to interact with other people, but to create with other people. Intercreativity is the process of making things or solving problems together. If interactivity is not just sitting there passively in front of a display screen, then intercreativity is not just sitting there in front of something "interactive" [Berners-Lee 1999, p. 182].

P. Anderson [2007] identifies six "big ideas" of Web 2.0. Through these runs a common thread of the novel and sometimes unpredictable effects of mass participa-

tion, and he uses terms such as "data on an epic scale" and the "wisdom of crowds" to support the contention that these massively collaborative systems can result in new ways of generating and exchanging knowledge, simultaneously supporting individual expression and community consensus. The socially mediated knowledge generated using Web applications is distinct from the formal, propositional knowledge of the textbook.

This distinction draws upon the ideas of Schon [1983] and is developed by P. Williams [2007], who argues that strong similarities exist between the skills and preferred learning styles of Web 2.0 users and the emerging occupations of the knowledge-intensive services sector of the economy. Key in this new economy are what R. Reich [1991] called symbolic-analytic workers, and M. Castells [1997] self--programmable workers. These roles require the abilities to identify and solve problems and to create new knowledge products through the analysis and synthesis of existing information.

Web 2.0 is the popular term for advanced internet technology and applications, including blogs, wikis, RSS and social bookmarking. It facilitates interactive information sharing, interoperability, user centred design and collaboration on the world wide web. In this context a new concept of using these technologies inside an organization has emerged, the so-called Enterprise 2.0 phenomenon. The term "Enterprise 2.0" was first coined in 2006 by Harvard Business School Associate Professor A. McAfee in an article for the *MIT Sloan Management Review* as the use of emergent social software platforms within companies, or between companies and their partners or customers [McAfee 2006].

Traditional acting of a leader equipped with information tools is based on the cycle starting with registering and collecting information about the actions taken by workers during business processes. With the use of ETL (Extract-Transform-Load) tools they are structuralized and put into appropriate repositories (databases or data warehouses). The next step is to run algorithms of data analysis and knowledge exploration. In traditional environment leader's role is to acquire and verify knowledge, which is created as a result of Data Mining algorithms, and then to apply the knowledge among the workers appropriately. It may be stated that it is non-active role towards information system. Leader is a passive receiver of the information acquired from the information system and knowledge system, he/she processes and transforms the knowledge into own attitude and decisions (see Figure 1). Other workers act similarly as they cooperate with the information system and use it with their co-workers. However, the most important area of creativity and initiative as well as emotion, stays in the second circulation, not only the information system, but often out of the leader's observation field.
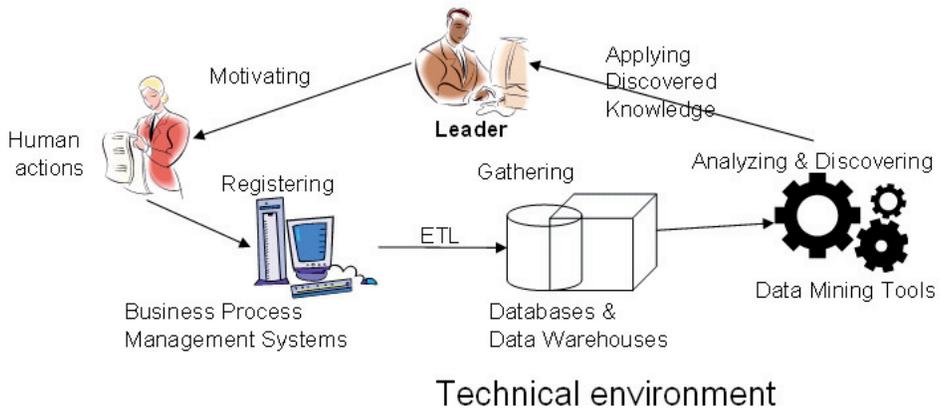
Figure 1. Traditional passive position of the leader

Leader's role is to activate workers and make them participate in organization's life and problem solving. In the complex and turbulent environment new needs meet classical methods and tools of leadership which seem to be inadequate or too slow. Thanks to Web 2.0 technology leaders can open new channels of communication or enhance their own possibilities. The main advantage of Web 2.0 tools is their ability to create environment for interaction between author of the content and receiver (subscriber), as well as between subscribers, change passive role of subscribers, and turn them into authors (see Table 1).

Table 1. Traditional and Web 2.0 tools of leadership

Classical tool	Corresponding Web 2.0 tools	Benefits
Meetings, workshops, discussion	Chats, forums	Not limited in time and space, parallel work - many threads in one time, free anonymous voices
Schedules, agendas, Gantt charts	Predictive markets	More than a simple control, early warning
Orders, checklists, articles	Blogs, RSS, e-learning tools	Voluntary, persuasion rather than orders
Stick-carrot management	Predictive markets, dashboards	Participation, rewarding
Gathering documentation, best practice libraries	Wiki, taxonomies, folksonomies	Participation, being up-to-date
Interviews, surveys, espionage, spying	Internet spiders, intelligent agents, semantic search, social network analysis	Permanent, cheap, non-intrusive, discreet

However, when social applications start functioning in a company, roles of a leader and followers change radically. Workers can (or even are encouraged to) express their opinions on almost everything freely using social platforms. Moreover, they share some knowledge about themselves and about their environment. The leader can gain additional benefits from that (see Table 2).

Table 2. Expected benefits of using Web 2.0 tools

Blogs analysis	Ability to research moods in organization and moods of individual workers; acquire information about workers problems, both personal and work-related, which may influence work efficiency; recognize workers expectations, desires and dreams; recognize human relations in a company, analyze workers attitudes to tasks and projects.
Wiki	Gathering expert knowledge, generating organization memory, creating the environment where current and useful knowledge is accessible, developing library of best practice, knowledge retention.
Predictive markets	Direct access to conventional wisdom, activation of workers who often have great ideas or comments but never have the opportunity to share them with others. Early warnings, acquiring the forecasts in advance.
Folksonomies	Creating and managing collaborative tags. Understanding keywords used by co-workers, indicating and assessing of knowledge sources inside and outside the company.
Social software applications	The effects similar to blogs and forums analysis, but often more sincere.

Source: based on [Khan 2007; Anderson 2007].

Although Web 2.0 tools promise many benefits, they are not for everyone. At the first glance it is clear that Web 2.0 tools do not fit style of autocratic leader, who doesn't want to listen to the voice of employees. To get benefits they need to be correlated with proper leadership style. They will be useless when leader is not willing to read them and react properly.

From technical perspective implementation of social software applications is relatively simple. There is no need of special trainings, it is intuitive and easy to operate, and well known to anybody who ever used computer. The tools are cheap, as there are many freeware solutions which might be easily and quickly installed on company server. But to make the social software applications useful several conditions must be fulfilled. They cannot be left on their own if useful information is to occur on the entry. Social software applications without a proper care/attention will be of no benefit to a company, but may lead to arguments, and general dissatisfaction. Instead of being forums for exchange of experiences, knowledge, ideas they may become a place of chaotic exchange of gossip, insults or they will die quickly. The key to social software applications is to encourage users to cooperate, implement acquired knowledge, and reward the authors of best ideas and forecasts. In other words, there must be created the positive feedback between social software applications level and business level. Therefore, social software applications set leaders new tasks (see Table 3).

Implementing Web2.0 requires to work out leader's new working habits where they always have a little time to follow new entries, and work out the habit of responding and keeping the discussion going, etc. (see Figure 2). Obviously it is not possible to undertake all these tasks without appropriate support. In a large organization it is impossible to follow and respond promptly to every single blog or forum entry. In such a case such tools as Text Mining and automatic analysis of the content are useful.

Table 3. Leader's new tasks in Web 2.0 environment

| Blogs/forums	Running own blog, initiation of blogs (like product blogs, projects blogs, crisis blogs), comment on the entries, reading other workers entries, indicating significant ideas, focusing other workers on the most valuable blogs, assessment of activity
Wiki	Initiating, indicating significant areas, introducing new entries, verification, sustaining activity, encouraging new posts, updating the entries, assessment of activity, rewarding authors of entries
Predictive markets	Indicating problems, areas of enquiries, determining the form (competition, exchange), determining the reward, setting deadlines
Folksonomies	Ordering, indicating sources, assessment of usefulness, assessment of activity
Social software applications	Following, analyzing, correcting, counter acting
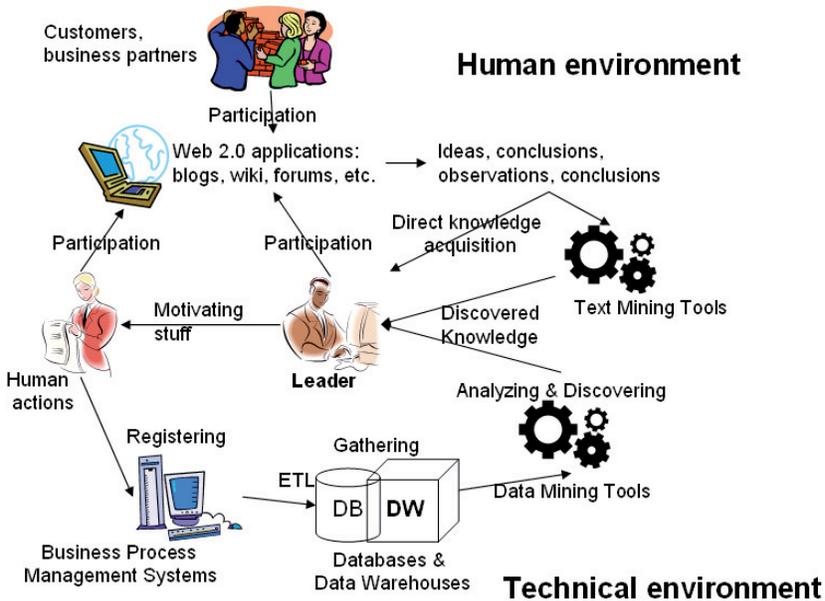
Figure 2. Central active role of the leader in Web 2.0 environment

J. Howe [2008] in his book *Crowdsourcing: Why the Power of the Crowd Is Driving the Future of Business*, defines crowdsourcing as: "the act of taking a job traditionally performed by a designated agent [usually an employee] and outsourcing it to an undefined, generally large group of people in the form of an open call". A. Sharma in his *Crowdsourcing Critical Success Factor Model* [Sharma 2010], argues that motive alignment of the crowd is the central idea whereas the vision & strategy of the crowdsourcing initiative, linkages trust, external environment, infrastructure and human capital are the peripheral factors. Motive alignment of the crowd is the most critical factor of the model. It is extremely vital that the motives of the crowd are aligned to long term objectives of the crowdsourcing initiative as it ensures their participation. So, dependencies between leadership and Web 2.0 tools are mutual. On the one hand these tools give the leader new possibilities, on the other, proactive leadership is one of the critical success factor of their effective use. As attracting of participants and motive alignment play such a decisive role, the main task of a leader is to convince employees to participate in the Web 2.0 initiatives and using tools. In order to build the practical model, the authors suggest the following dimensions:
– behaviors,
– business goals,
– leadership styles (leadership 1.0/2.0),
– communication styles,
– team types.

In the next step the authors determine the usability of the ICT tools depending on the above mentioned dimensions. It will result in the mutual dependency model which leaders might use individually to choose the most suitable ICT tools, depending on their preferred leadership style, or business goals, and other dimensions, later on referred to as leadership-ICT mutual dependency framework.

The framework of leadership-ICT mutual dependency can be gathered in the form of a table where each row can be interpreted as a single rule. Premises of rules are the elements of the dimensions describing the leadership and an ICT tool, while the conclusion is the degree of usability of the tool (Figure 3).

Leadership 1.0/2.0	Behaviour	Goal	Communication style	Team type	ICT tool	Degree of usability
Web 2.0	Employs collaboration	time reduction	Preciseness	Action	forums	2
Web 2.0	Employs collaboration	time reduction	Preciseness	Action	portals	2
Web 2.0	Employs collaboration	time reduction	Expressiveness	Action	wiki	3
Web 2.0	Employs collaboration	time reduction	Expressiveness	Action	ECMS	2
Web 2.0	Employs collaboration	cost reduction	Expressiveness	Action	forums	2
Web 2.0	Employs collaboration	cost reduction	Expressiveness	Action	portals	2
Web 2.0	Employs collaboration	time reduction	Expressiveness	Management	wiki	3
Web 2.0	Employs collaboration	time reduction	Expressiveness	Management	ECMS	2
Web 2.0	Employs collaboration	cost reduction	Expressiveness	Management	wiki	3
Web 2.0	Employs collaboration	cost reduction	Expressiveness	Project	wiki	3
Web 2.0	Practices sharing	knowledge management improvement	Verbal Aggressiveness	Project	blogs	3
Web 2.0	Practices sharing	knowledge management improvement	Verbal Aggressiveness	Project	forums	3
Web 2.0	Practices sharing	knowledge management improvement	Expressiveness	Project	wiki	3

Figure 3. Selected items of leadership-ICT mutual dependency framework

As the set of rules can be very large it will be useful to build its visual representation. It helps a manager to find a proper tool to reach particular goal in specific circumstances. A demonstration table is presented in Figure 4.

				Behaviour				Team type		
Suma z Degree of usability				Builds community				Practices sharing		Welcomes
Communication style	Leadership	Goal	ICT tool	Project	Action	Service	Management	Project	Service	Project
Expressiveness	Web 1.0	knowledge management improvement	blogs		3					
	Web 2.0	innovation improvement	forums	3						
			social networks		3					
			wiki	3						
		knowledge management improvement	knowledge maps	3					3	
			wiki		3			3		
		time reduction	ECMS							
			wiki							
		cost reduction	forums							
			portals							
			wiki							
Preciseness	Web 2.0	innovation improvement	predictive markets							
			semantic search		3					
		knowledge management improvement	forums						3	
		time reduction	forums							
			portals							
		quality improvement	blogs		3					
		resource using improvement	blogs						3	
			social networks			2				
Verbal Aggressiveness	Web 1.0	knowledge management improvement	blogs					1	1	1
		resource using improvement	blogs						1	
	Web 2.0	innovation improvement	blogs	1	2		2			
			forums		3					
			knowledge maps	3	3					

Figure 4. A demonstration table with a visualization of the leadership-ICT mutual dependency framework

One should keep in mind that the analysis and rules formulation in this framework require thorough knowledge based on literature research and empirical data, which will be the area of interest of the authors in the near future.

4. Conclusions

New technologies provide a simpler way to manage knowledge and offer new content format, including graphic and multimedia, which help and are able to incentive knowledge diffusion. Also communication styles and problem solving are evolving in a more collaborative approach, especially for the so called generation x and millennial people. Leadership style may be important to complex functioning because differences in how decisions are made within the organization could affect the co-evolution of human and social capital. For instance, directive and participative styles of decision-making are theorized to have an effect on information flows in an organization [Anthony 1978]. From a structural perspective, these different leadership styles imply different information flows within the organization. For example, information needed for decision making would flow into a directive leader and, in contrast, out from a participative leader. As such, the different information flows could lead to different co-evolutions of human and social capital. Managerial leadership is the traditional notion of formal leadership roles with top-down control and strategic planning. Leadership style is a behaviour that is associated with formal leadership roles. Leadership occurs within the interdependent interactions of emergent collective action and helps produce emergent outcomes such as learning and adaptation.

Summarizing leadership is important to the complex functioning of the network. Enabling leadership has two roles. First, it creates conditions that stimulate emergent collective action and adaptive leadership. Second, it channels productive emergent outcomes originating in the collective action response back up to managerial leadership for strategic planning and exploitation.

How introducing Web 2.0 tools change leader's possibilities and tasks depending on her/his leadership style in the growing interaction complexity and how leadership style changes usability and scope of use of Web 2.0 tools (and what is the influence of leadership styles on the usability and scope of use of Web 2.0 tools)? These and other questions we leave for the future research.

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NARZĘDZIA WEB 2.0 I PRZYWÓDZTWO W KONTEKŚCIE PROBLEMATYKI ZŁOŻONOŚCI

Streszczenie: Dzięki wykorzystywaniu narzędzi Web 2.0 liderzy nie muszą już wyjeżdżać do specjalnych ośrodków szkoleniowych czy czekać, aż ktoś spoza firmy powie im, co mają zrobić. Wykorzystywanie nowych technologii zmienia sposób postrzegania i gromadzenia wiedzy. Internet, intranet i media bezprzewodowe oferują nowe sposoby dzielenia się wiedzą i dzięki nim rozwija się nowa generacja bardziej efektywnych liderów.