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## Intellectual Capital and Time in Information Superiority

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### Abstract

This paper pays attention on the meaning of information superiority. Traditionally, the definitions of information superiority have emphasized the management of data and information. This paper describes and applies the concepts created in the fields of information and knowledge management and the theories of time to increase understanding about the contents of information superiority. The paper uses Popper's three worlds as a theoretical framework to classify the components of information superiority.

**Keywords:** Information warfare, intellectual capital, communication

### 1. Introduction

This paper pays attention on the meaning of information superiority. The paper applies the concepts created in the fields of information and knowledge management and theories of time to increase understanding about the contents of information superiority. During the recent decades the developments in information and communication technology have affected strongly behind the progress of business activities as well as military affairs. An increasing amount of effective data and information is currently available. Information and knowledge have turned out to be an important asset besides the traditional elements of production: work, capital and material. The results of business and military activities including products are often information. Currently information and especially knowledge are considered to be critical success factors of business activities. Information and knowledge are essential in the strategic, tactic and operational level activities of organizations. Especially, the quality and timing of information has to be concerned to be able to perform well in strategic, tactic and daily activities.

The increased importance of information and knowledge has launched research interests covered by an umbrella title "information and knowledge management". Information and knowledge management is a multidisciplinary approach having its roots in various fields of research. These fields include philosophy, psychology, sociology, information science, economics and information and communication technology. Information and knowledge management approaches focus on the role of data, information and knowledge when performing business activities. Data is typically defined to be a representation of facts in a formalized manner, e.g., (Telecom Glossary 2000). Data is suitable for communication, interpretation, or processing by humans or artificial systems. When structured, data are turned into information, e.g., (Niiniluoto

1997). Awad & Ghaziri (2003) described that information has a meaning, purpose and relevance. They emphasized that information is about understanding relations. Knowledge is distinctly different from data and information. Knowledge is the ability to turn information and data into effective action (Applehans et al. 1999). It is a capacity to act, e.g., (Sveiby 2001). Explicit knowledge can be articulated or expressed but tacit knowledge is difficult to describe. Tacit knowledge is often based on experience. (Polanyi 1966) Rather than regarding knowledge as something that people have, it is widely understood that knowing is better regarded as something that people do (Blackler 1995). So, knowledge is dynamic and personal.

When information is approached with theories of time, three types of information are identified. The types are: information about the past, perceptions as information about the current situation and insight and intuition as information about the future (Bergson 1911), (Damasio 1999). A perception is a physical sensation interpreted in the light of experience. Intuition is the power or faculty of attaining to direct knowledge or cognition without evident rational thought and inference. Insight is the act or result of apprehending the inner nature of things or of seeing intuitively. (Merriam-Webster 2003) Information about past, current and future contains data, information and knowledge. Current situation and imaginations about the future cannot be understood without information about the past (Bergson 1911), (Damasio 1999). When the emphasis is on the future, information about past, current and future has to be in balance and sufficient.

Popular approaches among information and knowledge management include knowledge management, business intelligence, intellectual capital management, strategic competence management and learning organizations. Sveiby (2001) defined knowledge management to be the art of creating value from intangible assets. Knowledge management focuses on the knowledge creating concepts and models as well as enabling of knowledge creation, e.g. (Nonaka & Takeuchi 1995), (Krogh et al 2000). Business intelligence is defined to be a process where data, information and knowledge are being transformed to actionable business intelligence (Thierauf 2001). Business intelligence applications are designed to support decision-making in dynamic environment. Thierauf (2001) defined that intelligence is a keen insight into understanding important relationships. Intelligence consists of data, information and knowledge.

Intellectual capital management regards information and knowledge as an asset of an organization. It emphasises the value of the organization's information and knowledge. Steward (2001) described that intellectual capital is knowledge that transforms raw materials, which can be either physical or intangible, and adds value to them. Typically, value is regarded as the trade-off between benefits and sacrifices (Parolini, 1999). Current strategic competence management approach is based on the work of Prahalad & Hamel (1990), who introduced the concept of core competence, which refers to a certain organisation's own specific competencies that cannot be easily imitated by other companies and on which the company can develop its future activities. Competence is a more comprehensive term than knowledge. Within psychology, competence has been characterized as the ability of individuals to respond to the demands placed on them by their environment (White 1959). Organizations are only interested in the competencies that are relevant for the organizations and thus, contribute to its intellectual capital (Helokunnas et al. 2003). Senge (1990) described the principles of learning organizations. Learning organizations have the ability to renew themselves based on information processed by the organizations.

Traditionally, the definitions of information superiority have emphasized the management of data and information. For example, Joint Vision (2020) defined that information superiority is the capability to collect, process, and disseminate an uninterrupted flow of information. However, as it was understood already in the 90s among the practitioners of information and knowledge management, it is not sufficient to focus only on the management of data and information. It is the intellectual capital that shall be concerned when competing in a dynamic environment. The paper describes and applies the concept of intellectual capital augmented with the theories of time in acquiring and maintaining information superiority.

## 2. Intellectual Capital and Time Management

### 2.1 Intellectual Capital

Theories behind the concept of an intellectual capital were first developed in accounting and business economics. Currently there is no established definition for an intellectual capital. As an umbrella concept it contains all intangible assets of an organisation. It covers information, knowledge and competence related issues from IPRs to tacit knowledge and from data storages to employees' skills. According to a quite widely accepted view intellectual capital consists of human capital, organizational or structural capital and social capital, e.g., (Pike et al. 2002) (Fig. 1). Human capital contains competence (skills and education), attitude (behavioural component of the employees work) and intellectual agility (ability to change practices and innovativeness) as a manifestation of competence (Roos et al. 1997). Structural capital consists of intellectual property, software, documents and methodologies of the organization (Steward 2001) and the organization itself (infrastructure, processes and culture) as well as renewal and development as a manifestation of organisational attributes and assets (Roos et al. 1997). Social capital contains intra- and inter-organizational relationships with customers, suppliers, partners and networks (Nahapiet and Ghoshal 1998), (Yli-Renko 1999). Social capital is needed when creating intellectual capital. Social capital resides in the relationships, which are created through exchange between the actors of value nets and networks. (Nahapiet and Ghoshal 1998) Today more and more emphasis is put on the understanding of the nature of social capital and applying of the concept of social capital in business activities.

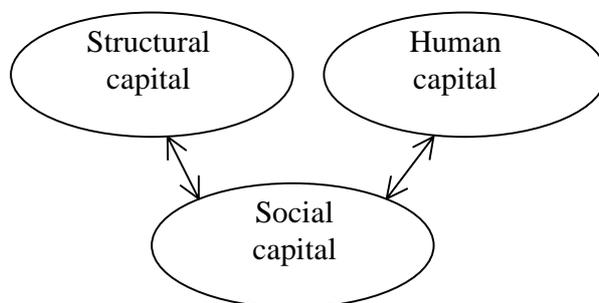


Fig.1. Intellectual capital consists of structural capital and human capital that interact through social capital, e.g., (Pike et al. 2002)

Often intellectual capital is understood as a single organization's asset of information and knowledge. In the context of information superiority, intellectual capital to be examined spreads over all the nets and networks of friendly and hostile organizations and nations. Structural capital to be examined includes the needed information and communication technology infrastructure like data storages and data networks; the needed information and knowledge management processes and the structures and cultures of friendly and hostile organizations. Social capital contains relationships inside and between friendly and hostile organizations. Human capital consists of competence, attitude and intellectual agility of people working for friendly and hostile organizations.

The current thinking of information superiority emphasises structural capital such as data storages and data management processes. Structural capital is an essential component of intellectual capital and forms the basis of information superiority. However, information superiority should not be limited to only one component of intellectual capital. Instead, relative superiority over all the items of intellectual capital shall be the target. The management of intellectual capital shall follow the practise of information management in information research. For example, Choo (1998) described an information management cycle that consists of defining information needs, acquiring information and organizing, storing, processing, creating, distributing and using information. So, in addition to storing data, information and knowledge, there is a need to create and distribute intellectual capital when acquiring and maintaining information superiority. However, information management cycle based on approach to the management of intellectual capital ignores the role of time in the intellectual capital creating and processing activities.

## **2.2 Time in Information Superiority**

Organization having information superiority is able to control the moment and duration of the effect of data, information, knowledge and competence. When organizations are in a war or are competing in a business environment, in sports or in games, information superiority gives the organization a relative and decisive advantage over the competitors. To gain information superiority we need information about time. We need information about how objective duration and subjective duration are formed. We need information about how the moment should be chosen.

Let us take McTaggart's (1908) time series A and B as a starting point. He stated that Series A divides the temporal word to the past and to the future, which are separated by subjective, ever-changing experience of "now". Series B divides this world into separate measurable moments, which have taken place either before the measured moment of "now" or will happen after it. Series A describes the world as a sliding duration, which is tied to the reality with subjective experience of the present moment. Series B fills the world with temporally noticeable events, which have starting and ending moments.

First we shall adopt series A and reinforce it with Bergson's (1911) thinking about duration. Doing this, we abandon absolute image about time and consider time as a relative matter between interacting entities. According to Bergson (1911, 7) we will create ourselves endlessly

in time by maturing via change in our existence. “We” here should be understood as any conscious subject. Further on, the present state is a combination of all the past remembered at this situation. The potential of becoming future is formed by projecting into future what has been perceived in the past, or imaging for a later time a new order of those elements already perceived. (Bergson 1911, 2-6) This means that future potential cannot be formed without experience about such past that produces relevant information for the foreseeable future. Further on, this means that a successful entity must have somewhat broad experience about the world, which it is supposed to interact with, and an ability to learn. This requires such a memory that is updated with reasonable information in a cycle, which is fast enough compared to on-going situation. This demands imaging, and a good process of thinking, as well (Fig. 2.). Obviously it could be seen that understanding duration (both objective and subjective) needs lots of perceptive activities and thinking about action under thinkable future interest. All this should be done over suitably long period – the more complicated is the future problem, the more resources (time and people) this process will require.

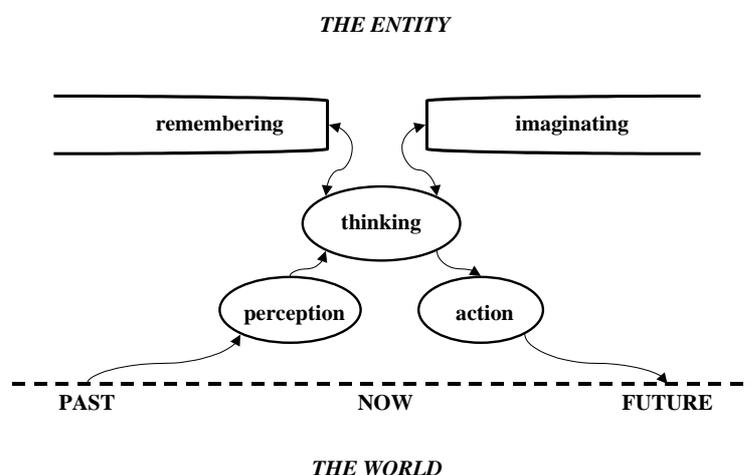


Fig. 2. A Bergsonian view to interaction between an entity and the world. Remembering the past makes us able to act to gain our imagination about plausible futures.

McTaggart’s series B describes moments. Those perceivable or expectable events, when some kind of change will happen. We shall combine Bergson (1911) into series B, too. As a result, from the subjects’ point of view, we can identify several events from the past effecting choices made on the present moment. All these events have their temporal lengths. However, those durations are substantially more or less irrelevant, when content of information of those events is used for decision-making. On the other hand, the decision-maker must be aware of duration on those items in order to be able to make temporally reasonable choices. One must understand, where putting into practice could be situated on the temporal axis. Making choices is always imaging the future. To be able to make realistic imaginations, one must understand that information put into use is effective, i.e. objective duration is exposable. One must know it’s own temporal capabilities, as well, i.e. how long time an activity will take and how long is the delay and when the activity will effect on the outer world. After that the right moment can be chosen. Again, experiences about success and defeat containing temporal information are transferred into memory and further on to future decision-making process.

Making things takes time. All interaction between different actors requires duration. All actions inside one actor take their time. This describes objective duration and subjective duration. You have to know your own capabilities to understand limits of the subjective duration. You have to know the world outside to understand limits that objective duration sets to you. Like Friman (2001, 161) says, it is not essential to notice all time variables, but understand and be aware of those that pertain to the situation under concern. Whether it is now or in the future. You have to understand how long duration the world allows to you or demands from you, how long your own activities take and when to put them in practice. This requires good experience whatsoever. Gaining information superiority requires future-oriented mind. Staying in the past will produce solutions for the past, not for the desired future.

### 3. Acquiring Information Superiority

Popper (1975) claimed that the whole world could be classified into three ontologically distinct sub-worlds: the world of physical states, the world of mental states and the world of possible objects of thought. The world of physical states contains all the potential information, activities, situations, moments and objective and subjective durations such as all potential intellectual capital and knowing in the context of time. The results of performing activities are included in the world of physical states too. For example, performing information warfare activities such as violating the confidentiality, integrity or availability of information yields information that is included in the world of physical states. The world of possible objects of thought consists of ideas in the objective sense, theories and their logical relations, arguments and problem situations. For example, it includes theories of information and theories of war.

The world of physical objects and the world of possible objects of thought have a relation through the world of mental states. The world of mental states consists of means to turn objects of the physical world into artefacts of the world of possible thoughts. For example, in the context of information superiority the world of mental states contains mental models about the meaning of the security attributes of information, e.g., integrity, confidentiality and availability of information (Fig. 3).

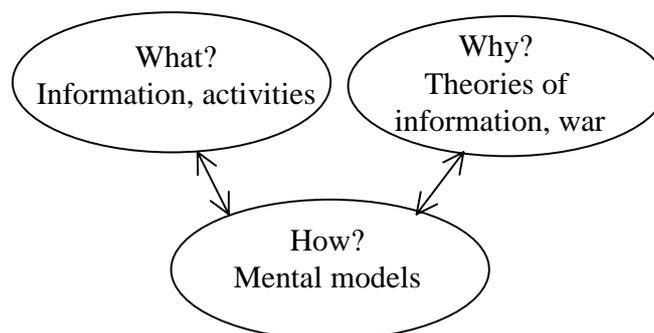


Fig. 3. Popper's (1975) classification of three worlds applied to acquiring information superiority

The aim of information superiority is to acquire superiority over the world of physical states, i.e., the question “what”, and over the world of possible objects of thoughts, i.e., the question “why”. The way to control information and activities of these worlds is to control the world of mental states. Information warfare provides means to control the world of mental states. People make perceptions and interpret them through their mental models (Merleau-Ponty 1979). Mental models evolve in time by continuous learning processes. Mental models of people are evolving towards a shared mental model of the global noosphere described by Arquilla & Ronfeldt (1999). Mental models are influenced by organizational and societal cultures of people. Mental models based on a societal culture changes more slowly than mental models based on an organizational culture. Most current organizations like independent states, global companies or global interest groups act in multi-cultural environments. This makes achieving the state of a mutual understanding, i.e., a shared mental model even inside a single organization a challenge. However, an organization aiming to information superiority has to share mental models with all the organizations to be effected. Communication is a key activity to develop shared mental models between organizations. It is a comprehensive process that increases understanding between organizations and individuals (Habermas 1984). Especially, communication is needed in global networks of organizations consisting of people having different cultural backgrounds.

Like stated earlier, gaining information superiority requires future oriented mind. One should be aware of realistic future actions and their temporal nature. Information from past does not include information about time automatically. Temporal aspects of past actions should be handled deliberately to gain understanding about pace and rhythm of futures. Conclusively, one should be able to understand durations of change. When Popper’s three worlds is applied to the concept of intellectual capital and the concepts of time, the following classification of information superiority components is formed: Short-term information superiority consists of relative and decisive superiority of structural, social and human capital. It is the ability to control the moment and duration of the effect of structural, social and human capital. Long-term information superiority consists of relative and decisive superiority of theories and mental models of information and theories and mental models of war. It is the ability to control the moment and duration of the effect of the theories and mental models of information and theories and mental models of war.

#### **4. Conclusions**

This paper applied the concepts created in the fields of information and knowledge management and theories of time to increase understanding about the contents of information superiority. Traditionally, the definitions of information superiority have emphasized the management of data and information. For example, Joint Vision defined that information superiority is the capability to collect, process, and disseminate an uninterrupted flow of information. However, intellectual capital consisting of human capital, organizational or structural capital and social capital shall be concerned when acting in a dynamic environment.

The current concept of intellectual capital ignores the role of time in intellectual capital creating and processing activities. McTaggart’s time series A and B, enforced with Bergson’s thinking, were introduced to combine time with activities. Gaining information superiority requires future

oriented mind. One should be aware of realistic future actions and their temporal nature. Information from past does not include information about time automatically. Temporal aspects of past actions should be handled deliberately to gain understanding about pace and rhythm of futures. Conclusively, one should be able to understand durations of change.

Finally, Popper's three worlds were described as a theoretical framework to classify the components of information superiority. When Popper's three worlds is applied to the concept of intellectual capital and the concepts of time, the following classification of information superiority components is formed: A short-term information superiority consists of relative and decisive superiority of intellectual capital. It is the ability to control the moment and duration of the effect of structural, social and human capital. Long-term information superiority consists of relative and decisive superiority of theories and mental models of information and theories and mental models of war. It is the ability to control the moment and duration of the effect of the theories and mental models of information as well as theories and mental models of war. This view to information superiority emphasises that information has a value in itself and it is not only an instrument of acting. Information as an instrument is emphasised, e.g., in Boyd's OODA-loop (Hammond 2001) that Ahvenainen et al. (2003) extended to describe universal information based acting.

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