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Time in Information Operations

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This paper applies concepts created in the field of time theories to increase understanding about the effects of information operations. Traditionally, the definitions of information operations have inherently included the time aspect but the role of time has not been explicitly explained. The paper describes the nature of information from the past, current moment and future. The paper uses Popper's three worlds as a theoretical framework to classify the environment of information operations. Short-term information operations have an effect on the operating level. They provide the operating level actors with power to select the moment of the implementation of the activities. This typically extends the duration given to perform the activities. Long-term information operations have an effect on the theories and mental models of information, war and information operations.

1. Introduction

This paper pays attention on the meaning of time when performing information operations. Especially, the paper applies concepts created in the field of time theories to increase understanding about the effects of information operations. Joint Vision 2020 (2000) defines that information operations are actions that are taken to affect an adversary's information and information systems while defending one's own information and information systems. Joint Vision (2000) describes that the level of action and desired effect is tactical, strategic or operational. In addition, it explains that the nature of situation where information operations are performed is peace, crisis or conflict. Time is inherently included when discussing about the level of action and desired effect as well as about situation. However, Joint Vision (2000) does not explicitly describe the role of time in the context of information operations.

Joint Vision (2000) extends the term information to cover target, weapon, resource, or domain of operations in the context of information operations. This paper emphasizes that the term information should cover data, information and knowledge when related to information operations (Fig 1). 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. Awad & Ghaziri (2003) described that information has a meaning, purpose and relevance. They emphasized that information is about understanding relations. 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. It was understood already in the 90s in the field of knowledge management that it is not sufficient to focus only on the management of information (Nonaka & Takeuchi 1995), (Krogh et al 2000). Currently knowledge is considered to be critical success factor of business activities. Information

and knowledge are essential in the strategic, tactic and operational level activities of organizations.

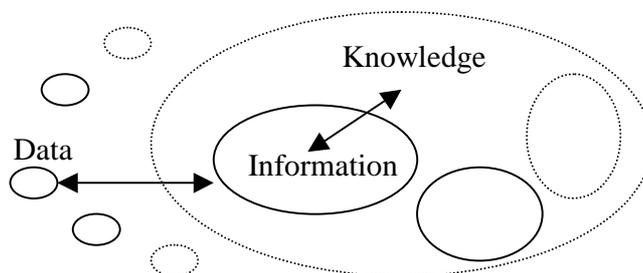


Fig. 1. Information operations cover the management of data, information and knowledge

Information about target, weapon, resources and domain of operations is data, information or knowledge depending on time and situation. For example, the term Force XXI is data for a casual reader, information for a military officer and knowledge for the developers of the Force XXI concept. This paper describes and applies concepts of data, information and knowledge and theories of time to the performing of information operations.

2. Information and Time

2.1 Past, Current and Future Information

When the term information is discussed with the theories of time, three types of information are identified. The types are: information about the past, i.e., memories; perceptions as information about the current moment 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) Memories, perceptions and insights are data, information and knowledge (Fig. 2).

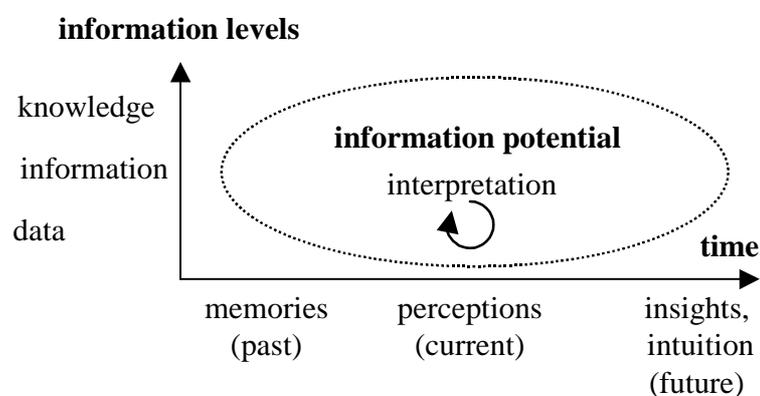


Fig.2. Memories, perceptions and insights are data, information and knowledge

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. The management of past, current and future information shall follow the practise of information management as presented in information research. For example, Choo (1998) describes an information management cycle that consists of defining information needs, acquiring information and organizing, storing, processing, creating, disseminating and using information. This information management cycle can be applied to the management of data, information and knowledge that are processed when performing information operations. So, in addition to collect, store and distribute data, there is a need to apply the information management cycle operations to the knowledge about information operations.

2.2 Time when Performing Information Operations

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 fierce competition situation, information superiority gives the organization a relative and decisive advantage over the competitors. To gain information advantage, information about time is crucial. We need information about how objective duration and subjective duration are formed. We need information about how the moment should be chosen.

McTaggart (1908) stated that time can be studied by two time-series, A and B. 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.

Let us reinforce series A with Bergson’s (1911) thinking about duration. Time shows itself as a relative matter between interacting entities. According to Bergson (1911, 7) conscious subjects will create themselves endlessly in time by maturing via change in their existence. The present state of this subject is a combination of all the past it remembers 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. 3). Obviously it could be seen that understanding duration needs lots of perceptive activities and thinking about action under thinkable future interest.

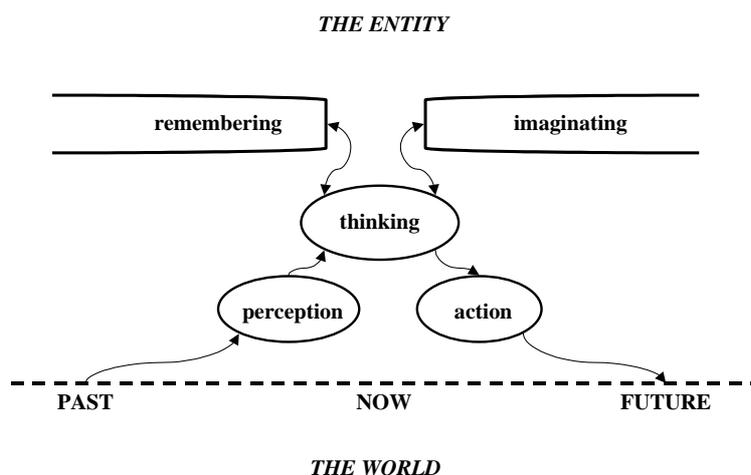


Fig. 3. Interaction between an entity and the world. (Bergson 1911)

McTaggart's series B describes moments of those perceivable or expectable events, when some kind of change will happen. When combining Bergson (1911) into series B, several events from the past effecting choices made on the present moment can be identified. All these events have their temporal lengths. One must understand, where putting into practice could be situated on the temporal axis. Making choices is always imagining 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. One has to know its own capabilities to understand limits of the subjective duration. One has to know the world outside to understand limits that objective duration sets to it. It is not essential to notice all time variables, but understand and be aware of those that pertain to the situation under concern (Friman 2001, 161) .

3. Information Operations

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 (Fig. 4). The world of physical states contains all the potential information, activities, situations, moments and objective and subjective durations such as all potential information and knowing in the context of time. The results of performing activities are included in the world of physical states too. The world of possible objects of thought consists of ideas in the objective sense, theories and their logical relations, arguments and problem situations. 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. (Popper 1975) For example, violating the confidentiality of information is an activity that is included in the world of physical states. The meaning of information that confidentiality is violated is interpreted through mental states. This interpretation might yield correct or incorrect thoughts that are included in Popper's third world.

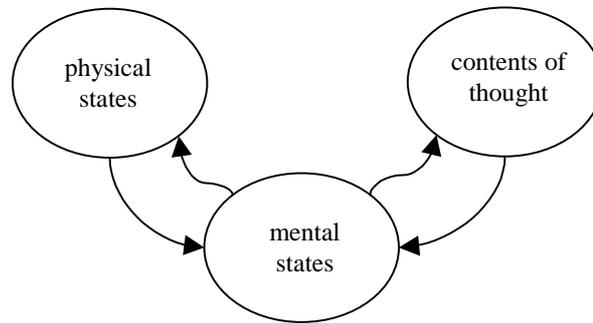


Fig. 4. Popper's (1975) classification of three worlds

When Popper's classification is applied to the environment of information operations, a three level description is formulated (Fig. 5). At the science of war level Popper's world of physical states contains all information and activities. The world of contents of thought contains theories of war and theories of information such as classification of information into data, information and knowledge. The science of war level is connected to the art of war level through the worlds of physical states. At the art of war level Popper's world of physical states contains information operations. The world of contents of thought contains theories of information operations. The art of war level is connected to the operating level through the worlds of physical states. At the operating level the world of physical states contains performing of information operations such as psychological operations, intelligence and deception. The world of contents of thought contains field manuals about performing of the operations.

The aim of warfare is to have an effect to the world of physical states and to the world of possible objects of thoughts. The way to control information and activities of these worlds is to control the world of mental states at the science of war, art of war and operating levels. Information operations provide 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 supposed to evolve towards a shared mental model of the global noosphere described by Arquilla & Ronfeldt (1999). Rather than changing only the behaviour of people, the changes in mental models change the beliefs of people (Hutchinson 2003). Mental models are influenced by organizational and societal cultures of people (Kuusisto et al. 2003). Most current organizations and groups of organizations act in multi-cultural environments. This makes achieving the state of a mutual understanding a challenge. Communication provides means to develop shared mental models between individuals and organizations. Communication is a comprehensive process that increases understanding between the ones who communicate (Habermas 1984). Information operations to be effective should be based on shared mental models. Further on, Habermas (1984, 1987) argues that those who take part in interaction, should have at least one shared item of knowledge. Shared knowledge is information by which models for creating mutual understanding can be formed. Without these models, creating of understanding is not possible. Prerequisite is that people commit to believe in the models. By those, the question "Why those involved want to share their valuations and knowledge?" is answered. So, communication for

developing those models is a key activity when an organization aims to perform information operations.

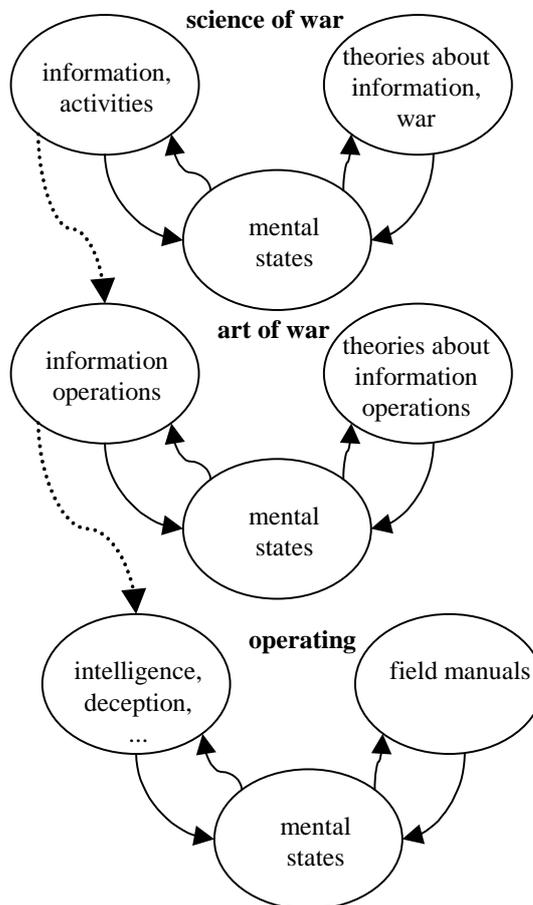


Fig. 5 Popper's three worlds applied to information operations

Popper's three worlds do not explicitly express time aspect of information and activities. Memories, perceptions and insights are included into all the three worlds. However, the three level description of the environment of information operations presented in Figure 5 forms a good basis to understand the meaning of time in information operations. Long lasting theories of information and war are needed to be able to formulate information operations. Information operations provide the operating level actors with power to select the moment of the implementation of operating level activities. This typically extends the objective duration given to perform the activities. When information operations are supported by advanced technology such as wireless, electronic communication, people are able to fully utilize the objective duration given to perform the operations. For example, the short message service provided by a mobile communication network was a great success because it released people both from a fixed place and the need to communicate synchronously when sending messages. However, there is still a possibility to misunderstand the message.

Performing information operations requires future oriented mind. One should be aware of realistic future actions and their temporal nature. 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 effects of short-term and long-term operations. Short-term information operations have an effect on the world of physical states at the operating level. As described previously, they create an ability to control the moment and duration of operating level activities. Long-term information operations have an effect on the world of possible objects of thought through mental states at the science of war and art of war levels. They have an effect on the theories and mental models of information, war and information operations. They create ability to control the moment and duration of the activities performed in the worlds of possible objects of thought.

4. Conclusions

This paper applied the theories of time to increase understanding about the contents of information operations. Traditionally, the definitions of information operations have not explicitly described the role of time. McTaggart's time series A and B, enforced with Bergson's thinking, were introduced to combine time with information operations. Popper's three worlds were presented as a theoretical framework to classify the environment of information operations. A description consisting of the science of war, art of war and operating levels was formulated.

Performing information operations requires future oriented mind. One should be able to understand effects of short-term and long-term operations. Short-term information operations have an effect on the world of physical states at the operating level. They provide the operating level actors with power to select the moment of the implementation of operating level activities. This typically extends the objective duration given to perform the activities. Long-term information operations have an effect on the world of possible objects of thought through the world of mental states. For example, the operations have an effect on the theories and mental models of information, war and information operations. They create ability to control the moment and duration of the activities performed in the worlds of possible objects of thought. This view to information operations 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) extends to describe universal information based acting.

It is rather obvious that long-term information operations have deeper and wider effect than short-term information operations. Long-term information operations are continuously ongoing. It takes time to create long lasting changes. The means to perform long-term operations have to be developed all the time, because cultural environment keeps to be changing. If short-term operations are favoured and long-term operations are ignored, the success over competitor will remain temporal.

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