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Chain-computerisation and theories on knowledge-sharing

Prevent a fallacy of the wrong level and do not step into the pitfall of an unstructured-information overload

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This is a personal contribution.

Abstract: Chain-computerisation is, as always, still a topical subject and the demand for more insights and tools is steadily increasing. These can be obtained from other areas of research, but caution should be exercised when applying them to social chains.
A fallacy of the wrong level is easily made and you can't structure an unstructured-information overload so easily. In my Master's thesis, I identified aspects that can be used to assess the usability of insights and tools from other theories in the context of large-scale social chains. As far as I know, the only knowledge theory that pays explicit attention to – or is based on – scale is that of Nonaka.
The insight that knowledge-sharing is essential for chain co-operation (focused on dealing with the dominant chain problem) emphasizes that the core of chain-computerisation is all about communication and not about simply compiling files. A dominant chain problem ensures the necessary focus and selection with respect to the exchange of information and the knowledge to be shared at the level of the chain as a whole. A standard solution does not often provide the chain communication that is necessary for dealing with a specific dominant chain problem; a chain-specific solution is generally necessary.

Keywords: chain-computerisation, knowledge-sharing, large-scale co-operation, development of theories, fallacy of the wrong level

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1 Chain-computerisation, innovative and relevant

I have come to know the theory of Chain-computerisation as an innovative and robust theory that has proved its value in practice. The subject is still topical and the demand for more insights and tools is steadily increasing.

- As social problems are becoming continually more complex so is the approach of these problems;
- The pressure from society and politics to achieve an effective approach to these problems is increasing;
- Chain parties are becoming more aware of the complexity of chain problems.

The demand for more insights has been the trigger for my Master's thesis research on the sharing of knowledge in chains. In chain country, an increasing number of initiatives are being developed in the area of knowledge-sharing and there are high expectations with respect to chain co-operation and chain performance. However, what knowledge-sharing means in the large-scale context of chains had not yet been studied. The impetus for my doctoral research arises from the same need for

more insights. Via chain parties themselves, joint ventures of chain parties and the national government, computerisation initiatives are being taken to stimulate, develop and improve chain co-operation. However, not all initiatives are successful and, with my doctoral research, I intend to identify the factors that influence the success of an initiative.

2 Insights from other areas of research should be assessed for applicability in chains

Relevant insights and tools can possibly be obtained from other areas of research than Chain-computerisation, such as Public Administration, Knowledge theory, Organisation Science, Behavioural Sciences and Economics. We say *possibly* because these insights cannot simply be applied in the specific context of social chains.

Social chains have, because of their scale and social objective, their own characteristics in comparison to other interorganisational co-operative ventures and individual organisations: chains have no coordinating authority and co-operation between chain parties is enforced through a dominant chain problem (Grijpink & Plomp, 2009). For that reason, insights that are derived from a certain system level (for example, organisation level) and are applied to a higher or lower level (for example, chain level) lead to a 'fallacy of the wrong level.' One then runs the risk "that the insight does not apply there and, therefore, the application does not provide the expected result" (Grijpink & Plomp, 2009, p. 241).

The chain perspective of Chain-computerisation provides insight into the characteristics of chains and offers points of departure for assessing the applicability of other theories on the large-scale context of chains. In my Master's research, I have – on the basis of the theory – identified four aspects by which the applicability of other theories can be assessed. Previously, however, I first fell into the pitfall of a 'toppled bookcase', a Dutch expression for an unstructured-information overload.

3 Theories about knowledge-sharing and knowledge management are not focused on large-scale contexts

Like many other graduate students, I started my research by studying the literature on relevant subjects, such as knowledge, knowledge-sharing, knowledge management and co-operation.

I first made a list of a large number of definitions of knowledge, analysed them and tried to combine them into one definition that I could use for my research. The concept of 'knowledge' has a great variety of definitions and interpretations and is described in scientific literature in numerous ways. The juxtaposition and analysis of these definitions did not produce much more than an 'unstructured-information overload' and failed to produce any usable all- encompassing definition of knowledge. In retrospect, this is understandable, because a definition is simply a scientific tool that is there to serve the research objective and the explanatory framework to be used. A definition, therefore, never has the presumption of a true and complete description of reality.

In order to get the bookcase 'back on its feet' again, and to formulate a usable definition of knowledge, I did a short analysis of the article by Ackoff (1988) "From

data to wisdom." In Informatics literature, this article is often referred to in relationship to the Data-Information-Knowledge-Wisdom (DIKW) hierarchy. Because of the many references to this single source, it would seem that, for the concepts in this hierarchy, there would be unambiguous definitions that would be usable for everyone doing (Information Science) research. From the short analysis of the article, it appears that the DIKW hierarchy is based on an introductory passage from the article which, other than that, is not further developed or supported by Ackoff. There is, therefore, room for interpretation of the concepts, which means that, although a large number of scientific articles (Liew, 2000; Davenport & Prusak, 2000; Weggeman, 2000) on knowledge and information do, in fact, refer to Ackoff, they then go on to give their own personal interpretation to the model.

From every perspective, knowledge is seen differently and, moreover, it depends upon the objective of the scientist how these concepts are precisely defined. Because my Master's research also had its own perspective and objective, I, too, formulated my own definition of knowledge for this study.

In order to find an applicable theory on knowledge-sharing -- and to avoid, once more, falling into the pitfall of the 'unstructured-information overload,' -- I did a limited exploration of theories that focus on both interorganisational co-operative ventures and organisations. In general, theories on knowledge focus on small-scale situations (i.e. the sharing of knowledge between individuals) and are focused on specific forms of organisation (generally those of hierarchical organisations). Of the theories that I studied for applicability at the large-scale level of a chain, there is only one theory that proved to be applicable: the knowledge-creation theory by Nonaka (1994).

Nonaka describes, alongside of knowledge creation processes at the individual level, also knowledge creation processes at the collective level, between persons and groups. I tested the applicability of this theory at the large-scale level of social chains further by using the principles of the theory of Chain-computerisation by Jan Grijpink (1997). The results of this assessment are included in Table 1. Here, I also included the most important assessment aspects -- based on the theory of Chain-computerisation.

Basic assumption / **Aspect**	**Basic assumption Grijpink (1997)**	**Basic assumption Nonaka (1994)**
Organisation concept	Dynamic chain concept: Chain patterns are subject to changes in society	Dynamic organisation concept: Necessary in order to be able to describe how organisations deal with their complex environment
Problem orientation	Dominant chain problem forces co-operation	Organisations must create knowledge in order to tackle problems
Organisational forms	No coordinating authority, dominant chain problem is the boss in the chain	Organising based on self-management
Irrationality	Conflicting interests make chain co-operation complex	Conflicting interests are a good medium for knowledge creation

Table 1 Assessment aspects for applicability at large-scale level and assessment results

From Table 1 it appears that Nonaka, just as Grijpink, uses a dynamic organisation concept that is also problem-oriented. Nonaka also recognises that parties and persons may have conflicting interests (which does not appear in any of the other theories studied) and assumes self-management and a supporting role for management in collective knowledge creation. This fits well with the important

characteristics of social chains. Thus, Nonaka's theory has proved to be sufficiently applicable to the specific context of chains.

4 The necessity of knowledge-sharing supports the fact that chain-computerisation is all about communication

Nonaka's theory is, therefore, applicable, but cannot simply be applied in the context of social chains. Nonaka studies how collective knowledge is established and assumes that that collective knowledge is created. In the context of social chains, this basic assumption leads to overly high expectations. Although co-operation and, along with it, collective knowledge creation are necessary in order to tackle a dominant chain problem, it is not self-evident that collective knowledge is also actually created or even that the processes that could lead to it emerge spontaneously. Thus, the basis for co-operation in a chain can be so thin that a chain party only has to make a tiny error in the eyes of another party in order to lose its credibility, after which knowledge-sharing is abruptly halted.

The conclusion of my research on the relationship between knowledge sharing and co-operation in social chains is that knowledge sharing is essential for tackling the dominant chain problem together. Because of the forces that are in play at the chain level, knowledge-sharing is a complex process that is difficult to manage. Incidents may occur or there may be developments that cause a setback in the co-operation that has been created. Knowledge-sharing is no guarantee for the development of chain co-operation because, at the chain level, there is always the matter of irrationality. One should, therefore, not have overly high expectations with respect to the initiatives in the area of knowledge-sharing at chain level.

Once a knowledge-sharing initiative has been started, it must be ascertained whether or not the initiative fits within the current degree of chain co-operation and, even more important, if the initiative is focused on the dominant chain problem. It is only under the pressure of a dominant chain problem that sufficient support is created for chain parties to work together and share knowledge. Thus, the dominant chain problem brings focus and selection to the information and knowledge that is to be shared.

In two care chains that I studied in the past year, there proved to be clear differences in the information and knowledge that was shared. At the beginning of the stroke (CVA) care chain, the focus lies on factual information; in the manic depressive disorder (MDS) care chain, the context focuses more on unstructured information, a clinical picture of the behaviour and the state of mind of the person in question. This difference is caused by the fact that the chains have different dominant chain problems:

- The dominant chain problem of the CVA care chain is: "incorrect administering of blood thinners due to lack of clarity about whether or not these drugs may be administered." (Grijpink & Plomp, 2009). In order to tackle this chain problem, information on the cause a stroke is necessary: is it a haemorrhage or a clot? That determines if a patient must be given blood-thinning drugs or if that is precisely the wrong way to go. The communication surrounding this part of the process is, therefore, focused on the diagnosis of the cause of the stroke (the CVA) in order to then be able to administer the correct medication as quickly as possible.

- The dominant chain problem with the MDS care chain is: “intervention that is too late and unbalanced, because signals of approaching mood swings are difficult to interpret and are distorted -- or get through too late or not at all” (Grijpink, Visser, Dijkman & Plomp, 2010). In order to tackle this chain problem, it is necessary not only to pick up on the signals, but also to consult on the cases with the caregivers involved in order to be able to interpret the signals and to set up the correct therapy.

The communication between caregivers in the CVA care chain is primarily focused on the transfer of data to the following step in the process. In the MDS care chain, case discussions are held every day in a number of districts during which the patients who have been admitted or who are in danger of going into crisis are discussed. These examples show that knowledge sharing is important for tackling a dominant chain problem, but that the form of knowledge sharing -- and also of information exchange -- depends upon the dominant chain problem. This problem ensures focus and selection in the communication. One general solution for all care chains does not support this essentially chain-specific communication and, therefore, also does not contribute to the tackling of the dominant chain problem in a specific care chain.

5 Chain thinking has great added value for chain parties and for me

The timeliness of chain-computerisation is a recurrent theme in my work as a consultant in this field. It is sometimes difficult to apply the insights because not many people see that they are actually part of a chain. The practice is often permeated with fallacies of the wrong levels and unstructured-information overloads, but fortunately an increasing number of people are starting to see that a different conceptual framework is necessary in order to understand complex chain processes.

For every assignment for which this is relevant, it emerges that chain thinking, time and time again, offers a major added value in comprehending the problems chain parties are struggling with and simply providing insight into this is already a benefit. The chain perspective of Chain-computerisation provides insight into the characteristics of chains and offers points of departure for assessing the applicability of other theories on the large-scale context of chains. The dominant chain problem is key here: this problem ensures focus and selection in the communication. One general solution for all chains does not support this essentially chain-specific communication and, therefore, also does not contribute to the tackling of the dominant chain problem in a specific chain.

My enthusiasm for chain-computerisation and, in particular, for the theory of Chain-computerisation, increases with every project and with every insight that it provides to me and those around me. That has now resulted, as indicated above, in the commencement of doctoral research in this area. I hope that my enthusiasm leads to more insights in the complex context of social chains and to more successful computerisation projects in chain country.

Biography: T. (Tjitske) Visser (1984) has a Master's degree in Business Informatics from the University of Utrecht and is now employed as an advisor at PwC Advisory. There, she focuses on technology and privacy-related projects, with a special focus on chain-computerisation.

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