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**KNOWLEDGE SPIRAL AND KNOW-HOW IN SERVICE FIRMS**

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*Conference Track: Knowledge Management*

**ABSTRACT**

With the proliferation of Knowledge Management it is easy to obtain somewhat wrong impression that we have finally reached the stage in the management science development where the application of a unitary approach can bridge the gap between the strategic management of the 1970-s and the failed efforts of Business Process Re-engineering (BPR) Gronroos [7]. To this end, a series of research papers were dedicated to showing how knowledge in a company is created, c.f. Hueseman [8]. However, Nonaka and Takeuchi [10] work attracted Authors' special attention, as it contains analyses of a set of case studies, complete with a model of knowledge spiral, which is of focal interest, here. We shall aim at extending this approach to include nonlinear dynamic aspects of creating a marketable knowledge and propose how to use layers of accumulated know-how during the tendering process and beyond. Albeit, the outlined results are presented in very general, descriptive terms, it should be rather straightforward to adopt them to needs of any

knowledge-based company equipped with an intranet intelligent network by way of encoding specific context of its business.

**OVERVIEW**

In this paper we focus on a situation prevalent in the US, Europe and in many Asian countries where the economy is literally driven by a magnitude of small to mid-sized businesses, c.f. Koulopoulos [9]. We focus on revisiting some assumptions and observations on a flow and utilization of organizational knowledge as defined by assumptions and observations on a flow and utilization of organizational knowledge made by Nonaka [13]. Service companies are in many ways different from the production sector companies. Often, production company knowledge utilization models do not necessarily apply to the former sector, c.f. Table 1.

Table 1. Knowledge utilization models in manufacturing and service firms, *see also Ref [2], [4] and [12].*

	<b>Knowledge dynamics in a manufacturing firm</b>	<b>Knowledge dynamics in a service firm</b>
Designing	Purely technical activity aided/supported by its social context	Social/interactive activity aided by/rooted in technical activities/aspects
Seeking knowledge about the product	With or without Client participation	With Client participation ( <i>always</i> )
Consumption	Upon completion	During production ( <i>provision</i> )
Quality assessment	During consumption	During production ( <i>provision</i> ) (process assessment), upon consuming (result assessment)
Distribution and sales	Long channels of distribution, no producer' s input	Short channels of distribution, consumer buys directly from the provider (producer)
Intellectual Property Rights	Easy to protect ( <i>legally</i> )	Difficult to secure a patent on a service provision
Knowledge about the offering	Maximum amount of knowledge about the product collected within organization, internal knowledge transfers	The client to explicate his knowledge about the offering
Importance/value of tacit knowledge	Tacit knowledge is important in terms of intuitive outguessing client' s expectations and arriving at material ways of meeting them	Tacit knowledge is important primarily in terms of an intuitive seeking of solutions to problems the client has, especially when his own needs are in part tacit to him; also, it is invaluable in terms of a need for a collective seeking to identify the scope of the service to be performed ( <i>designing a service product</i> )

Companies of interest to us are by industrial age standards small, not only in terms of a number of employees (some of them are simply operating units of much larger organizations), but also in their form of a very close setting of people working together. This “*working intimacy*”, for lack of a better term, is nourished and encouraged by employers as it gives company its flexibility, or to take it a step further: “its market survivability”. Especially in the group of service providers, such as the “consultants” (software, architectural and structural design consultants, developers, or advertising agencies) c.f. Edvinsson [3], or material service providers (most construction services, repair and maintenance, transportation, special-purpose manufacturing companies), the client often actively participates in creating the ultimate service product.

For any of those companies, the ability to satisfy client’s requirements is contingent on the speed it responds to ever changing preferences, technical and marketing know-how. Furthermore, as a provider of a very specialized professional service, its survival depends on its ability to outguess client’s needs and on conveying his own expectations back to him, c.f. [6].

### MARKETABLE KNOWLEDGE

As a model situation, from where a wider study was initiated, an observation made at a company employing one of the authors was chosen. This company is a leading architectural and engineering design and project management company, employing over 200 specialists, operating nationwide. Its comprehensive rendering of services to construction sector gave authors an access to a “living laboratory”, as their colleagues shared important

insights into marketing the knowledge as practiced in this sector.

It was observed, some time ago, that drawn out negotiations lead to much higher profits later on, during the project implementation, than the ones based on Client choosing what was hitherto considered to be the *best-ever* offer straight out of the company catalogue. In the figure below, we schematically present such a situation, where the *Proponent One* submits an earlier-prepared menu and two others are entering negotiations. In order to differentiate between the latter two, we shall set on *Proponent Two* vying for an extended scope of service, while *Proponent Three* is gambling on an elevated quality of the service he is offering (Fig. 1.). As shown, client’s decision, assuming the *Object of the Future Contract* is well defined beforehand, weighs his criteria, including subjective ones, not necessarily based on the ready-made catalogue offer contents. Quite possibly, the client may opt for a whole sequence of encounters during the process of negotiations, as a way of leveraging the financial resources available to him. This reflects the interactive, effectively *nonlinear*, nature of the phase diagrams, c.f. Gleick [5], of a typical tendering process. It also exposes a common occurrence of creating value added for both participants by means of negotiating options (known explicitly, implicitly or just based on a pure “gut feeling”) at each “*turn*” of the negotiations. The convergence of standpoints, or in worse case, divergence leading to foregoing the deal, depends mostly on how problems are explicated by experts involved in the process. Yet the ultimate result is the value both participants place on the aggregate, e.g. attractor, or “*looping-turns*”, result of the prolonged negotiations. This could be viewed as a manifestation of the *prosumption*, as defined by Toffler [14].

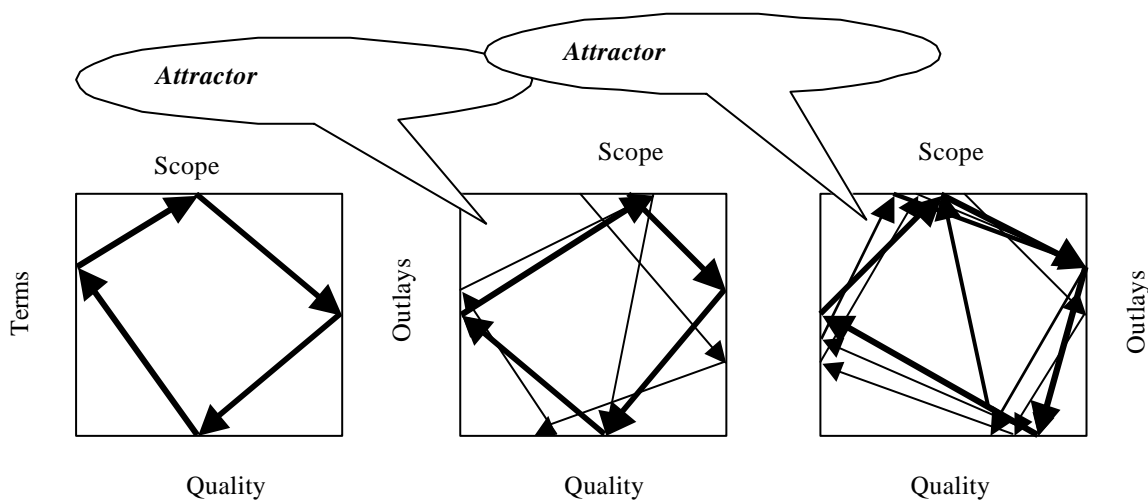


Fig. 1. Three proponents offer different options to an investor

**“INFORMED” KNOWLEDGE CREATION**

The diagrams (“*schematics*”), to be presented next, concerns specific issues of creation of knowledge taking advantage of the “working intimacy”, deferred opinion-and decision-making by company executives as the criteria, or even paradigms, remain unclear way into the ongoing project time span. We shall keep in mind a characteristic intertwining of marketing, sociology with a very

specialized professional, *e.g. engineering*, knowledge in action during this complicated creative process. Furthermore, from now on we shall stop differentiating between the knowledge created, or only recalled *on-spot* during the negotiations and the one gained from specific studies, or projects *done in the past*. From the standpoint of professionals participating in the creative process it matters very little, and the depth of insights required to accomplish any given step is quite often the same (Fig. 2.).

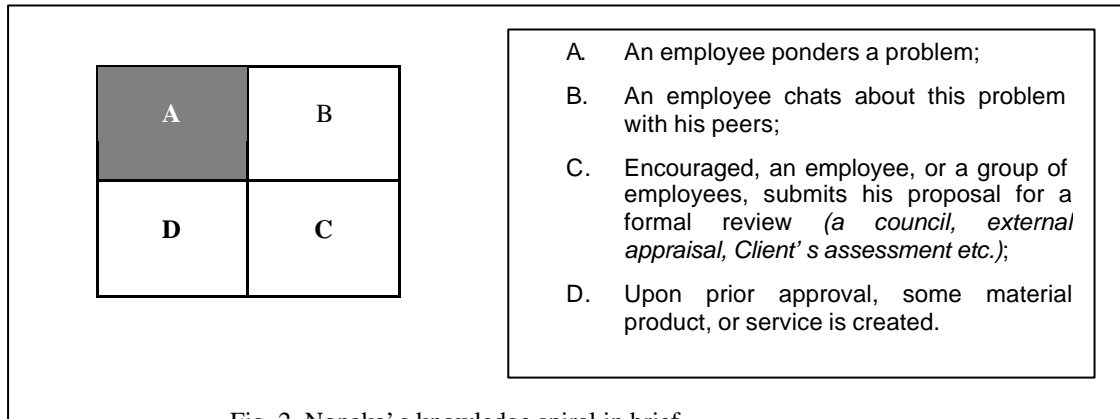


Fig. 2. Nonaka's knowledge spiral in brief.

We note:

- Fields B and C are *communicable*
- Fields C and D are *retrievable* (presumably written materials were created)
- Field D is only *retrievable*
- Field A is neither *communicable* nor directly *retrievable*

We will for simplicity assume that for each of the stages B, C and D lone thinkers initiated new processes. Thus, by virtue of inspiring employees having access to any of those three fields, the picture bifurcates into a flood of derivative processes, as shown in Fig. 3.

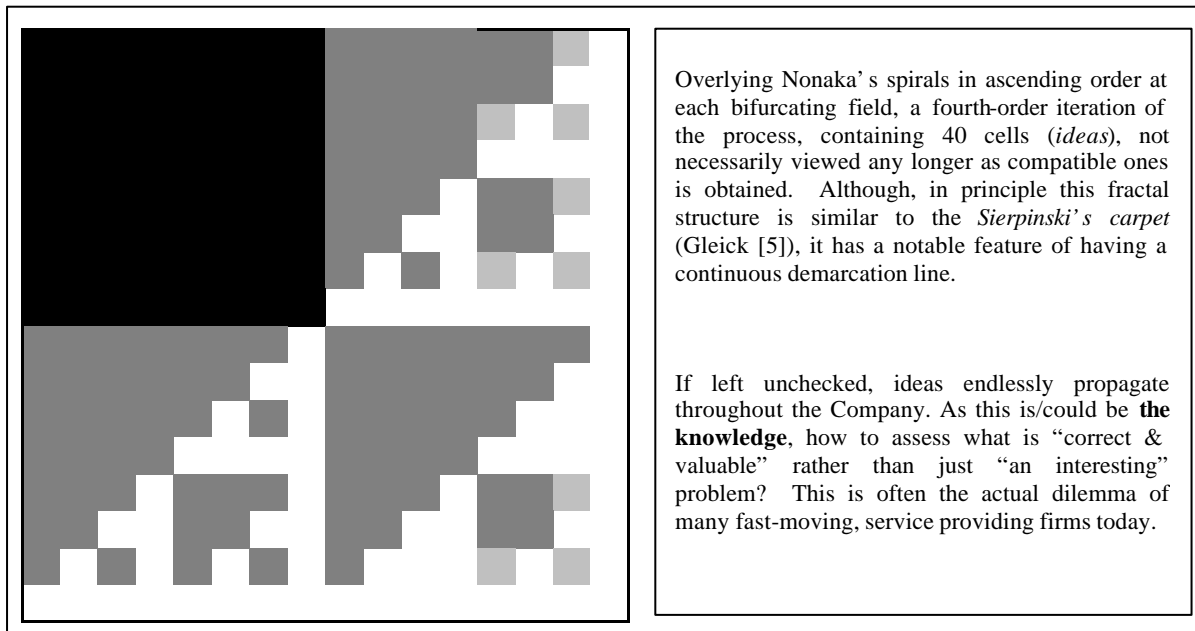


Fig. 3. Nonaka's knowledge spiral bifurcation

Authors' first-hand record of events and observations was compared with the most commonly known examples of KM practices. Nonaka [10] describes the knowledge creation in Japanese manufacturing firms. Ref. [1] abounds with examples of successful knowledge practices and

programs in biotechnology, software, pharmaceuticals and electronics sectors. However service firms are ominously omitted in articles and papers on Knowledge Management published in management literature.

Further review and discussions revealed that articles detailing consulting firms usually neglect the industrial sector context those firms are often related to. Authors are grateful to their colleagues at SAP-PROJEKT for pointing out to this fact and offering their valuable suggestions.

What is specific to the research presented here, is realizing how much client's input pressures all participating experts to create new, and access stored (*to a very large extent implicit*) knowledge and to tailor it to the fast changing paradigms. Given the context of a specific service providing company, e.g. by storing the genealogy of events and keywords of professional memos in some intelligent database, it becomes feasible to manage knowledge fast enough to suit that imperative as well. It is intrinsic to the service sector, especially when offering a knowledge-rich product, to being forced to come up with the answers on demand and letting client in on insights and experience of specialists, including client's own consultants, concurrent with offering the solid (e.g.

*irrefutable* and *substantiated*) professional knowledge. This corresponds to the "**Ba**" concept by Nonaka and Konno [13] when the client gains the right to participate in the overall process of inventing. This entering of **Ba** by the client happens because he not only brings in and wants to protect his financial resources, but he actually is a source of knowledge to the service provider.

A very important feature of such a client-provider collaboration is the fact that often explication of knowledge takes place in front of the client as problems are discussed and approached. Client finds himself in a midst of process of inventing, c.f. Leonard and Sensiper [11]. The description of the tendering process, above, serves to illustrate how important giving such answers (the "*turns*") is to securing client's positive response, or decision, and also how important it is to come up with such answers (*that is to explicate the available knowledge*) quickly, in an elegant and error-free way. Our research points to a specific way of looking at what become available, see Fig. 4.

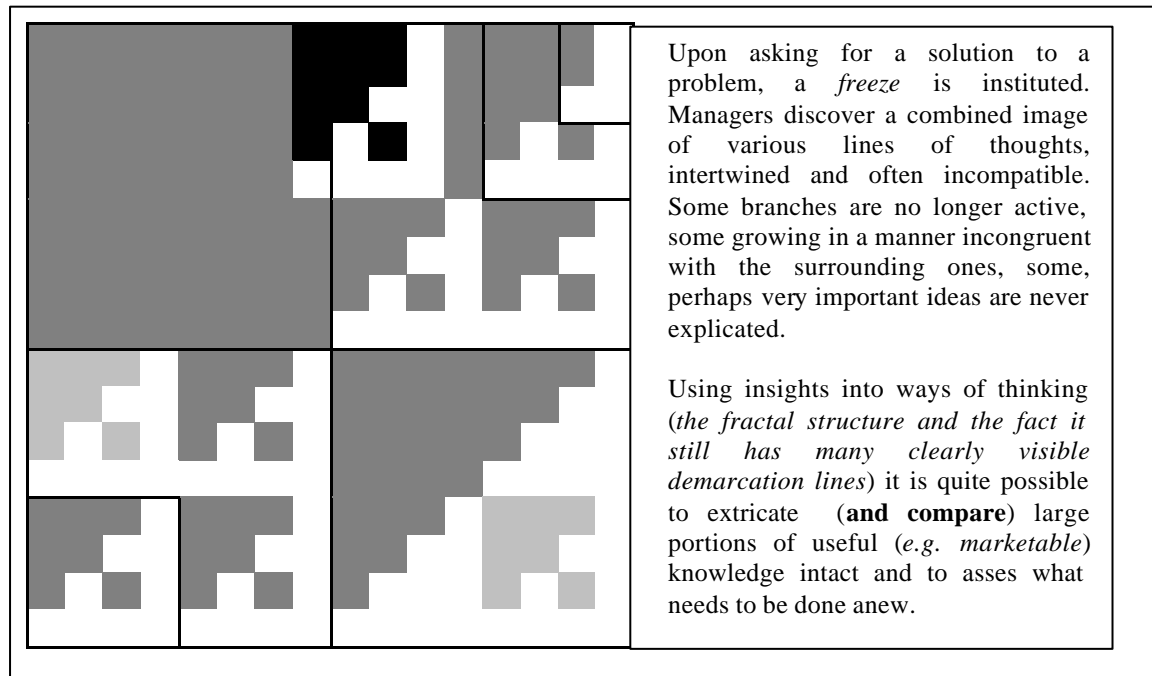


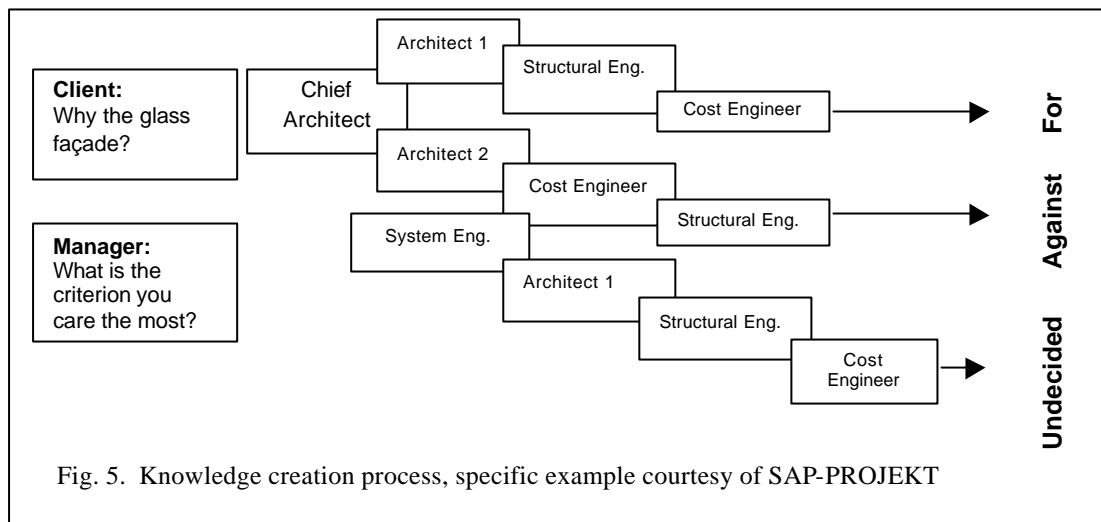
Fig. 4. Combinatorial retrieve scheme

The abstract image above represents *chaos*, but need not to be frightening at all. Any company has a set of keywords or key terms describing its main activities, so the fractal branches draw, so to speak, themselves. Employees

"*verbiate*" what they do, company-wide slang could be quite useful, so we may trace back some thoughts, rather than reject them *a priori*. If we find certain ideas no longer compatible, it may just be very useful to see how were

they created, who came up with what? (This happens to be straightforward, because the slang, topics for discussion, professional terminology, skills etc. do not change as fast as human thoughts and attitudes.) The freeze frame of different ideas is actually useful as it gives ready-made viewpoints, that way the strategic managerial decision

could be left for the very last moment, and entire sectors of available knowledge be preserved, even should demands/paradigms change abruptly. Client may be given an insight, without exposing the service provider to any (*major*) criticism. A simple example for such a “chaotic” back-search is shown in Fig. 5.



By letting the client state his criteria, the manager makes the decision maker to explicate his knowledge. Depending on the answer he receives, he is either able to give an outright answer to the question, or to backtrack the way participants arrived at their answers and stopping at where the *status quo* coincided. In worse case scenario, a new branch is initiated. It is important to realize the criteria used by the manager are not “*who is right or wrong*”-type, as for example Architect 1 participated in two different trains of thoughts which concluded with basically two different answers. This is an example of a retrieval scheme initiated at B and C fields, fourth and fourth/seventh iteration, respectively c.f. Fig. 3 and 4.

### CONCLUSIONS

Authors applied very basic tenets of chaotic approach to the flow of information within a service-providing company. From this base they attempted to describe how knowledge creation and resource management could be used more efficiently. The research points to a specific technique of looking at what becomes available by way of applying a new approach to knowledge creation, especially when an auxiliary of building a suitable intelligent computer network is contemplated.

Main features of the results are:

- ❑ Demonstrated possibility of introducing a management style taking advantage of inescapably nonlinear (*chaotic*) interactions taking place in a service company;

- ❑ Indicating an efficient way of introducing the client into the activities of a company working on creating knowledge;
- ❑ Based on prior observations, introducing implicit and explicit knowledge into the model on equal footings;
- ❑ Indicating basic and novel requirements concerning construction of an efficient intelligent computer network;
- ❑ Referring research base to well-known and established scientific works of KM;
- ❑ Limiting required insights into nonlinear mathematics to an absolute minimum.

In closing, authors felt it is necessary to address the question of costs of allowing such a *bazaar*-like situation to develop in a service company. In their opinion that derogative term loses its currency at present. Employees use computers to communicate, and the best any attempt to suppress the information exchange (“*the talking*”) could do for the company is to prevent important ideas from being communicated. It is to the contrary, exchange should be encouraged, because it is plainly impossible to distinguish a priori the “correct & valuable” from the drivel flowing through the nets. Furthermore, as the service providers become ever more numerous, their product sophistication level rising, and especially as the value of projects they are responsible for at present reaches astronomical heights, in authors’ opinion it is time to dispel the taboo and take the advantage of information age rather than expose company to the dangers of being non-innovative “by *virtue*” of its employees being non-inquisitive, non-responsive and detached.

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