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CREATING SPATIAL ORGANIZATIONS

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NRI
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Abstract
This paper addresses the spatial design of modern organizations in the context of a fundamental change which is currently taking place in the way companies view their organizations and the inherent performance expectations, requirements and results underlying these. This change involves a managerial shift in perspective from the commonly adopted *resource-based view of the firm*, towards the *knowledge based view of the firm*. This paper follows the notion that company performance from a knowledge-based perspective benefits more from new ways of organizing, than from new ways of managing. A different type of organizations is introduced - that of the spatial organization - in which traditional one size fits all organizational '*structures'* are replaced by '*spatial arrangements'* which aim to connect people, knowledge and technology in a mentally fitting –natural- way. A number of core spatial organizational forms are presented and discussed (modular, circular, cellular, constellar). This paper encompasses part two of a series of Nyenrode research papers on spatial organizations, of which part one describes the theoretical foundations underlying their emergence.

Keywords
Knowledge Economy, Knowledge Based View of the Firm, Spatial Arrangements, Organizational Design, Spatial Organizations

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1. Introduction

As countries and companies advance deeper into the knowledge based economy, the core assumptions underlying managerial thinking and practice towards company performance and – more ambitiously- towards organizational success increasingly become out of date (Foray, 2004; Leydesdorff, 2006; Dolfsma & Soete, 2006; Florida, 2008). Signs that traditional organizational structures and existing managerial ways of working are reaching their limits, continue to surface within both the academic and practice based body of knowledge (Pettigrew et.al, 2003; Miles, Miles & Snow, 2005; Tissen & Lekanne Deprez, 2006, Pfeffer & Sutton, 2006; Bryan & Joyce, 2007; Hamel & Breen, 2007, Birkinshaw, Hamel & Mol, 2008). Most organizations face all kinds of uncertain events and unpredictable challenges that collectively place huge demands on people's behavior in organizations. For example, the end of 2008 witnessed the collapse of the financial markets and institutions as we know them. People and companies all over the world suddenly saw themselves confronted with a world on the brink of a fundamental change, without this change being clear and unambiguous. The financial crises brought greater clarity on the interdependence of world financial markets and the vulnerability of organizations to global system failures bringing normal liquidity, cash flows and thus 'business as usual' to a halt. Can organizations plan for a crisis one can't even imagine? For the past two decades, The University of Southern California's Center for Crises Management monitored what they called the crisis 'readiness' of the Fortune 500 companies, primarily by conducting on-site crises audits of a wide variety of organizations, public as well as private, and through periodic surveys (Mitroff & Alpaslan, 2003). Based on their 20 year research findings Mitroff and Alpaslan grouped companies into two broad categories: *crises prepared* (or proactive) and *crises prone* (or reactive). Crises prone businesses prepare to handle only the types of calamities they've already suffered, and not even all of those. Crises - prepared companies develop plans to handle a large number and wide variety of emergencies that they have faced in the past. Preparedness not only reduces the number of calamities organizations have to grapple with, but these organizations stay 'alive'/ 'in business' longer and affect their corporate reputation (e.g. trustworthiness) in a positive way. Crises - prepared organizations distinguish themselves by being able to detect weak internal and external 'warning signs' and then taking clear, decisive action.

Although facing extreme uncertainties provides ample 'space' to rethink organizational performance and strategy, this does not seem to to apply to managers who generally portray routine reactions instead of learning ones. Miles, Miles & Snow (2005) believe that managers actually think and behave in a non-learning fashion:

"…*the biggest organizational barrier to operating tomorrow's innovative firms is everything that managers have learned about how to operate today's organizations. Leadership and planning approaches, control and reward systems, decision making processes – each of these organizational mechanisms need to be rethought to fit new business and organizational models* (Miles, Miles & Snow, 2005, p. 81)".

In turbulent and uncertain times, people increasingly feel the need to understand all that is happening around them particularly when their minds are confused, sometimes even unsettled by unexpected events and occurrences not yet ready for framing. Contrary, a great deal of reluctance normally exists in letting go of 'the known old' instead of 'the unknown new'

"All things are preceeded by the mind" (Wallace, 1999, p.185)

This seems to especially apply to management, which is increasingly regarded as a conservative profession not willing, ready or capable of adopting new ways of achieving performance and performance improvement. The way in which managers, but to some extent also workers, customers and other relevant constituents in and around organizations perceive, assess, interpret, and solve problems - or apply solutions to problems - is generally shaped by ideology, i.e., by a set of assumptions and beliefs about *how the world works and how it ought to work*. The way managers view reality not only shapes their behavior but also makes them hold on tight to what they know instead of *should* know:

> *"Today, management of the twenty-first century appears not to be much different from management in the late twentieth century* (Tissen & Lekanne Deprez, 2008, p. 1)".

To better understand managerial performance Finkelstein (2003) identified seven *habits* of spectacularly *un*successful people:

1. They see themselves and their companies as dominating their environments;
2. They identify so completely with the company that there is no clear boundary between their personal interests and their corporation's interests;
3. They think they have all the answers
4. They ruthlessly eliminate anyone who isn't 100% behind them;
5. They are consummate company spokespersons, obsessed with the company image, for reasons of self-preservation;
6. They underestimate major obstacles;
7. They stubbornly rely on what worked for them in the past (Finkelstein, 2003, pp. 213 – 238).

Noteworthy bad personal qualities are regularly found in conjunction with genuinely admirable qualities. Many good qualities of successful leaders can also be causes of failure. Longenecker, Neubert & Fink (2007) explore why managers at multiple levels in U.S. organizations (i.e. 100 different manufacturing and service organizations and 1040 managers), struggle and sometimes fail to achieve results when confronted with large scale change. Commonly managers fail to break old habits and adapt quickly:

> *"Lacking another 'model' for how to do their job or behave, managers often stick to what they know or are familiar with doing. Failing to adapt and/or break old habits perpetuates the continuance of behaviors and actions that no longer provide value to their department and organization. It also reults in the failure to take new roles, behaviors ,or activities that can make a critical difference in the successful implementation of continuous inprovement efforts, and/or in achieving results for the organization* (Longenecker, Neubert & Fink, 2007, p. 150)."

Self-destructive organizational (Sheth, 2007) and managerial (Longneck, Neubert & Fink, 2007) habits are seductive and in themselves resistant to change. By definition a habit is doing the same thing repeatedly. This especially applies to organizational structures which – once designed - portray a strong tendency of managers to hold on to as long as possible, also out of fear of having to enter into a reorganization, regarded by many as a painful process '*one only reluctantly involves oneself in'*. Managers rather aim for performance improvement by increasing pressure on people and enforcing results, then on viewing their organizations as a means to open up 'space'

for people to do what they believe is best for the company in an orderly, stable and transparent – but not always focussed- way.

One of the most displayed and common 'habits' of managers involves the 'rehashing' of familiar organizational forms and structures into so-called 'new' forms. Despite their variance in shapes and forms, the concept of 'new organizational forms' is often used as if it has a commonly understood meaning (Palmer, Benveniste, Dunford, 2007) , notwithstanding a cacophony of – more or less - appealing terms and metaphors. These sometimes create the impression that the more exotic they are named, the more 'avantgardistic' management is. Practice however often shows the theoretical nature of new organizational forms. Fenton & Pettigrew (2000), DiMaggio (2001), Pettigrew et al (2003) come to a remarkably similar set of conclusions on their emergence:

> *….both (authors) catalogue the diverse, fragmented and limited nature of empirical inquiry and theoretical development; both note the absence of a unifying theory to interpret the empirical findings which do exist; and both recognize the, at times, prescriptive and apocalyptic writing in the practitioner orientated literature and the consequent difficulty for the reader to disentangle what has been found from what the author would like to see* (Pettigrew et al, 2003, p. 9).*"*

Very few organizations have truly embraced these 'new' concepts. Palmer, Benveniste & Dunford (2007) identified *five areas* where different assumptions concerning new organizational forms are in use, underpinned by a variety of theoretical perspectives:

(1) the *type* of change represented in transferring to new organizational forms; (2) the *outcome* of changing to new organizational forms; (3) the *drivers* for changing to new organizational forms; (4) the *level of analysis* associated with discussing new organizational forms; and (5) the *meaning of new* in new organizational forms. Palmer, Benveniste & Dunford (2007, pp. 1832 – 1837) provide examples of the various theories associated with these differences:

1) Revolutionary Change versus Evolutionary Change

Fundamental to all literature on new organizational forms is the overall premise of change as preferable over stability. Equally fundamental seems to be the (strong) disagreement on the *type of change* representing new organizational forms. One position assumes that new organizational forms represent a *revolutionary change,* entailing '*complete departures from past practice instead of incremental improvements* (Brynjolfsson & Renshaw, p. 37).*'* This position suggests incompatibility between 'old' and 'new' organizational forms, with new organizational forms designed for flexibility and traditional forms for stability. In contrast to revolutionary change, a second position assumes

evolutionary change, where new organizational forms emerge or grow organically out of older, more traditional structures. New organizational forms are viewed as recombination of previously successful organizational forms.

2) Simplification versus Increased Complexity

Different positions exist in literature about the *outcome of changing* to new forms of organizing. One position, *simplification*, argues that new organizational forms are simpler ways of organizing compared to traditional organizational forms, as new organizational forms involve less bureaucratic and hierarchical structures. By removing organizational layers and increasing spans of control, new organizational forms are flat, open structures used to promote the sharing of knowledge and designed to empower stakeholders through the flatness of the design. In contrast, *increased complexity* argues that new organizational forms are more complex and less straightforward than traditional organizational forms. Increased complexity occurs because new organizational forms involve simultaneous needs for innovation and control, for flexibility and efficiency, and for differentiated decision-making authority and participation.

3) Management-Driven versus Environmental Selection

Different assumptions exist on who or what *drives change* to new organizational forms. One position, *management- driven*, views new organizational forms as emerging through management action. New organizational forms are a management tool in the alignment of organization and environment, where the management challenge is overcoming the inertia of bureaucratic organizations to change behavior. A contrasting position, *environmental selection*, proposes that the environment, rather than management action, stimulates the introduction of new organizational forms. Factors contributing to this kind of emergence include market forces, globalization, knowledge-intensive environments, deregulation, customer demands and information technology.

4) Intra-Organizational versus Inter-Organizational

Different assumptions also exist about the *level of analysis* used when discussing new organizational forms. One position, *intra-organizational*, describes new organizational forms at the level of the organization as a whole. This position describes new organizational forms as intra-organizational practices that include removing organizational layers, increasing spans of control, empowering employees, increasing information exchange and promoting knowledge-sharing. New organizational forms also shift organizational routines through outsourcing and increased contact

with the customer. A second position, *inter-organizational*, analyses new organizational forms at the level of the industry. Rather than focusing on new organizational practices or routines, 'new industries (and by implication new organizational forms) emerge from the entrepreneurial activity of new entrants'.

5) 'New in Time' versus 'New in Context'

A definition of 'newness' further complicates organizational literature. Two positions represent contrasting views on what constitutes 'newness'. The first position, *'new in time'*, distinguishes 'newness' in terms of being recent. As such, new organizational forms are described as appropriate to the 21st century, for a new economic era, and as being associated with new economic pressures. In the second position, *'new in context'*, organizational forms are new if they are novel to a particular industry or context, even if the organizational form has been present in other contexts for a substantial period of time, e.g. the change in professional services firma such as accountancies to multidisciplinary practices of accountants, lawyers and consultants of some years ago, followed 'standard operating practice' in industry, where multifunctional teams have been advocated and in use for some considerable time.

The shift from old to new organizational *forms* is increasingly supplemented by a shift from old to new organizational *design*, i.e. from what modern organizations should ideally look like, to how they can actually be created. The renewed interest in organizational (re-) design mainly stems from practical research showing that leveraging the power of organizational design across all aspects of an organization can establish and sustain an organization's unique position and increase its inherent vitality (Pettigrew et al, 2003; O'Reilly III & Tushman, 2004; Joyce, 2005; Neilson & Pasternack, 2005; Dunbar, Romme, Starbuck, 2008; Jelinek, Romme & Boland, 2008). Bryan & Joyce (2007) believe that in the 21st century, "*the real money (for companies) will be in strategic organizational design* (p.29)." Organizational design is thus shifting from a peripheral activity performed by managers once an economic need to do so presents itself to becoming an integral part of corporate strategy, even the 'heart of it'. The US Organization Design Forum[a] promotes in this respect the notion and need for conscious organizational design as being more than 'now and again' changing the structure of organizations:

> "*Managers need to redesign not simply restructure', which is why it is 'not a good idea to simply redraw the organization chart, put people in their new places and expect performance improvements* (Stanford, 2005, p.8)*"*.

[a] (http://www.organizationdesign forum.org/)

The above refers to a managerial set of perspectives and problems in organizational design, which on the one hand portray design as messy and complicated, while on the other hand treating design as a simple extension of regular – day to day - managerial work. Frank Nuovo, one of the world's best-known industrial designers, believes that "*design in its simplist form is the activity of creating solutions. Design is something that everyone does every day* (Pink, 2005, p. 75)". Dunbar, Romme & Starbuck (2008) believe that current approaches to organizational design are often out of touch with the changing realities they are designed for:

> "*Although contemporary management texts create an impression that the search for design principles is active and ongoing, this professed interest is in fact more symbolic than real. Most often, management texts refer to descriptive research on organizational structures and designs carried out from the 1950's through the 1970's (Daft, 2006) and teachers and consultants present this material as established, accepted truth. However, many new kinds of organizations have appeared since the 1970's, shifting the focus of design projects to issues that were not important and to organizational properties that were not possible when researchers carried out these earlier studies. For example, current organizational designs must take account of how information and communication technologies have revolutionized organizing processes, how globalization has changed organizational identities, and how staff educational levels, abilities and expectations have risen rapidly and changed work* (Dunbar, Romme & Starbuck, 2008, p. 555)."

For example, Miles, Miles & Snow (2005) show that most mainstream organizational structures create and sustain tight deparmentalization of some kind. Whether organizational units are focused on market segments (divisions), specialized expertise (functions), or even a particular point along the industry value chain (supplier, manufacturer, distributor, etc), boundaries emerge that are often difficult to penetrate and which may make intra- and interfirrm collaboration unlikely to occur smoothly, if at all. Miles, Miles & Snow (2005) imagine a new organizational design: a multi-firm network that shares common resources (primarily knowledge) and which, as a total entity, both creates and appropriates economic wealth. This organizational form is seen to emerge as a necessary means for delivering one of the twenty-first century's greatest economic promises:

> *"the utilization of the world's exploding knowledge base to drive continuous product and service innovations across markets and economies; it is the sort of entrepreneurial engine the global economy is demanding – a knowledge – driven organization that meet the challenge of continuous wealth creation* (Miles, Miles & Snow, 2005, p. 6)*".*

Such a type of organization – "the collaborative entrepreneurship model' (Miles, Miles & Snow, 2005, p. 9) – cannot be centrally directed and controlled. Its operations depend on the widespread ability of people to collaborate – vertically and laterally within a particular firm and horizontally across firms in the network. The emergence of this type of 'new organizational forms' in the context of environmental turbulance, generally referred to as the 'spikiness' of globalization[b] (Florida, 2008, p. 20), advanced information technologies, mobilizing global talent and rise of the knowledge based economy, has nevertheless attracted renewed interest in organizational design. By reforming, reshaping, reframing and remodeling - instead of restructuring and 'tweaking' - an organization, better company performance can be realized through the organized ability of people to tap into the world's knowledge base, particularly the reservoir of exisiting, but underutilized, knowledge, talent and technology to create sustainable value.

[b] Based on traditional measures of population density and new measures of global economic production and innovation, these maps – which depict global economic activity on a fine spatial scale – show the striking location-based spikiness of globalization. There are roughly two or three dozen places that dominate the global economy (Florida, 2008, p. 20)

2. The Knowledge Economy

At this moment in time the knowledge economy is generally accepted as a meaningful economic concept, one worthwhile pursuing but not yet realized. Although attractive, this economy is viewed as a yet to be proven successor to both the industrial and service-based economies. The past 15 years have seen a wide variety of visions, ambitions, concepts, strategies, policies and initiatives aimed at introducing and advancing the knowledge based economy. The pervasive features of knowledge are to be seen everywhere around the globe. Many people believe that "knowledge in al its many guises will bring them closer to the elusive goal of high quality of life for all people everywhere (United Nations, 2005, p. 4)." We tend to associate knowledge with progress and a major source of economic prosperity (Foray, 2004; Leydesdorff, 2006). In their recent review on the state-of-the-art of the knowledge economy, Dolfsma and Soete (2006b, p. 1) portray its relevance as follows:

> *"Some commentators believe the term knowledge economy to be too elusive to be useful. Others have found the idea of knowledge, information and abilities as being prime resources for economies to be very valuable. It is fair to say that any assessment of the contemporary role of knowledge must recognize that most economic activity rests on knowledge, not only in the present society but in all forms of human society. Palaeolithic society was by any standards 'knowledge –based' and palaeontologists have demonstrated the existence of well-formed bodies of knowledge with respect to animal behaviour, materials, mining, symbolic communication and even medicine. In more recent past, the industrial economy of the nineteenth century was knowledge based. At first sight many claims about the the current 'knowledge – economy 'could plausibly have been made a hundred years ago. It is of course true that knowledge accumulates over time, that is changes the quality and quantity of output. Hence that today the knowledge intensity of production is likely to be much higher than ever before"*

According to Jessop (2008) an accelerated transition currently takes place to knowledge – based economies as 'global scale' economies. This transition is central to the future growth prospects underlying many – still largely local - economies and emphasizes the need for favourable, but distinguishing, human conditions in the struggle for long-term competitive advantage and sustained prosperity in the world market.

> *"Discovery of the 'knowledge economy' reflects instead a shift in master economic narratives in response to the 1970s crisis of the post-war model of national economic growth based on mass production and mass consumption. It identifies new sources of competitive advantage in a capitalist world market, encourages the treatment of knowledge as if it were a naturally scarce resource, and transforms the relationship between economic and extra-economic competitiveness. This leads to the importance of lifelong learning, the global war for talents, the promotion of creativity, the subordination of university teaching and research to economic imperatives, and the evaluation of welfare state expenditure in terms of its contribution (or otherwise) to international competition. The growing commodification of knowledge intensifies contradictions between the circulation of knowledge as a collective resource (the intellectual commons) and its appropriation as a source of private profit (whether as de facto or de jure intellectual property). In short, while the expansion and circulation of knowledge holds out the promise of emancipation, in its commodified form it can reinforce subordination to the treadmill of capitalist competition and unending pressure for economic growth, with harmful effects on humankind that are becoming ever more evident in climate change as well as economic and social exclusion* (Jessop, 2008, pp. 9 – 10)."

Most people involved – both academicians as well as practitioners - would today still characterize the knowledge based economy (OECD, 1996; Dolfsma & Soete, 2006; Leydesdorff, 2006; Jessop, 2008; Florida, 2008) as a largely theoretical concept for creating (global) economic growth and wealth. This is believed to be the case due to the absence of a common – globally understood and accepted economic framework and the lack of a set of measurable models and indicators for successful performance. At the same time the knowledge based economy is becoming more and more explicit (Dolfsma & Soete, 2006; Leydesdorff, 2006; Florida, 2008) , although significant progress still needs to be made.

Adding to this, next to all the positive effects of worldwide growth and wealth creation, the knowledge based economy is envisaged to bring forth, many economists now also point out the potential downsides of such an economy. Downsides are expected to occur once it becomes clear that substantial investments (e.g. in education and innovation) may not always lead to worthwhile economic growth and wealth creation, as unforeseen mechanisms - such as the offshoring of knowledge - may prevent the knowledge based economy from realizing its full potential, i.e. of sustainable levels of economic returns and of competitive advantage. In that case costs would be added and substantial, while revenues would lag behind.

Knowledge - based societies recognize that most commercially viable knowledge is of such a nature that it can more or less be 'bought' elsewhere in the world from (highly) educated people and at reasonable costs. This practice increasingly fuels the notion within management that knowledge will eventually become a means of mass production – similar to the manual labour of the Industrial Economy - once web based Information & Communication Technologies have reached worldwide penetration levels allowing individuals to work and provide all kinds of knowledge in a virtually networked (global) business environment. Many countries and organizations already have a technological infrastructure in place – in various parts of the world - to enable them to fully benefit from the mass production of knowledge. To counteract this, short term protectionary measures may occur, once countries and companies find it difficult to sustain their existing competitive advantage over other countries and companies. An increase in the sense of urgency of Western countries and companies to become substantially more competitive with regard to a number of Asian and even Eastern countries and companies, has become noticeable. To achieve such a position the knowledge based economy is currently recognized as an economy which needs to be both creative as well as innovative.

Having a clear vision and ambition with regard to the knowledge based economy has meanwhile proven not to be sufficient to actually realize and reap the benefits of it. Both the Barcelona' and Lisbon agenda's on the knowledge based economy of the European Union have for example shown to have only had a limited, to marginal, effect on actual economic performance. After initially positioning the knowledge based economy as a 'new tech' economy centred around the global e-business potential (Business to Business and Business to Consumer) of web based worldwide network structures, the focus gradually shifted towards intensifying education and innovation efforts of both countries and companies. The current focus of the knowledge based economy has moved towards identifying and realizing the constituent elements of a 'new' social (soft and hard) infrastructure which is supportive to the rapid creation, application and commercialization of knowledge in increasingly global competitive markets and regions. Here, the question of political, legal and social stability of countries is addressed from the perspective that a durable knowledge based economy can only be realized through linking the 'internal social cohesion' of countries and companies to their ability in stimulating, developing and nurturing the (individual) entrepreneurship of people. Over the years these ingredients (e.g. social innovation, social capital, social computing) have become recognized as being essential for the knowledge based economy (KBE) to be a stable one in continuously changing circumstances. From the very beginning of the knowledge based economy the role of governments in establishing and

advancing it has been recognized as an issue (Leyesdorff, 2006; Dunnewijk & Wintjes, 2006), sometimes even as a stumbling block. Whether governments should adopt a 'strong' (interventionnist/directive) approach to stimulating the knowledge based economy- for example through the identification and focussed development of knowledge cities/zones and/or regions - or that it should adopt a more 'soft' (supportive and infrastructural) role is for many governments a matter of balancing between differing expectations and potential results. Lastly, questions are currently being raised as to the global nature of the knowledge based economy. It is almost routinely accepted that the knowledge based economy is indeed a global economy (as knowledge can be created, shared and commercialized everywhere), but substantial differences in thinking processes between Asia and the West may prevent the knowledge based economy to be a truly global one. Recent research by Nisbett (2003), Andriessen & Van den Boom (2007), Gueldenberg & Helting (2007), Andriessen (2008) have for example made clear that people of the East and West actually see, understand and think about their worlds in fundamentally different ways. Whereas people in Asia tend to be more attentive to the context in which they live and work, most Westerners have a dominant tendency to extract objects from their environment. And whereas Asians are more willing to anticipate changes in the direction of trends, Westerners tend to think linearly and expect that trends will continue indefinitely.

As most developments in our current economy are related to knowledge (Soete, 2005; Dolfsma & Soete, 2006; Florida, 2008), knowledge continues to be an 'abstract' concept (Andriessen & van den Boom, 2007; Andriessen, 2008):

> *"It [knowledge] has no direct referent in the real world. To make it comprehensible, we use metaphor to map elements of things we are familiar with in the real world (organisms, resources, products) onto the concept of knowledge* (Andriessen & Van den Boom, 2007, p. 641)*."*

> *"The fact that we can only reason about knowledge through metaphors is not a bad thing (or a good thing), it is inescapable; that's how the human mind works. However, the unconscious choice of metaphor has enormous impact on how we reason about knowledge, what is highlighted, and what is hidden, what is seen in organizations as problems and what is understood as solutions* (Andriessen, 2008, pp. 5 – 6)*."*

> *"Given the distinct differences in concpetualizations of knowledge between East and West, we question whether this view can and will be as productive in an Asian business context as it is in the West* (Andriessen & Van den Boom, 2007, p. 649). *"*

These differences may have a structurally negative impact on what is gradually becoming known as the concept of 'reach' in the knowledge based economy, i.e. the need for people to be able to globally exchange knowledge effectively, without physical, virtual and/or mental boundaries.

The trouble with the spatio – temporal transmission of knowledge across space

Boisot (1998) discusses the ability of knowledge assets to circulate across space. Cultural transmission of knowledge has to be spatio – temporal if it is to have discernible effect. An item of knowledge has to be internalized by contemporaries as well as by descendants before it can properly considered cultural. Furthermore the chances of it being internalized by descendants partly turns on how effectively it has been incorporated in the culture of contemporaries and then given some minimum level of stability. We can thus think of culture as a kind of collective memory whose spatio – temporal reach is determined by that of its biological and purely physical substrates. Physical substrates for information vary in their storage and transmission properties. Some types of knowledge assets can transmit well over time but not at all in space. Their information content is deeply embedded in, and hence confined to a specific location and cannot travel at all. Some works of architecture have this quality. No photographs of the west portal of Chartes Cathedral of the nave of Amniens Cathedral, for example, can ever fully replace the spatial experience of them (Boisot, 1998, pp. 120 – 121).

Within this context, it's no wonder that as yet not one generally accepted definition and/or model of the knowledge based economy exists (Dolfsma & Soete, 2006). Even within the Lisbon Council the use of the word knowledge economy has been challenged as recently stated by Ann Mettler (executive director of the Lisbon Council):

> *"In line with this thinking, out go the abstract concepts of innovation, knowledge economy and entrepreneurship, enter the more tangible, real and important actors: innovators, knowledge workers and entrepreneurs. Enough of hiding behind sterile, abstract concepts. Policy makers' job is to breathe life into these ideas, and to put the emphasis where it should be: on the individual, on the citizen, on the consumer, on the entrepreneur, on the innovator. No more conferences on entrepreneurship without a single entrepreneur present. No more papers on innovation by people who do not have an innovative bone in their*

bodies. Instead, let us celebrate those who bring about changes, bring them into the policy arena, recognize them and build them up as role models for others. And, most importantly, make Europe a place where new ideas can fly, create an environment that is open to change and renewal, even if it is uncomfortable or threatening upfront. That will ultimately be Europe's true test of innovation, far more than the number of researchers or the level of R&D spending. As long as it is easier to make ideas fly elsewhere, they will fly elsewhere; it is as simple as that (Mettler, 2008, p. 9, italics added)."

Many attempts have been made to better understand, develop and measure the Knowledge Economy (OECD, 1996; ABS, 2002; Knowledgeland Foundation, 2003; Mahdjoubi, 2005; Chen & Dahlman, 2005; KEI, 2005; Shapira, Youtie, Yogeesvaran & Jaafar, 2006; Dolfsma & Soete, 2006; Leydesdorff, 2006; CBS, 2007; Stähle & Bounfour, 2008). Especially the Knowledge Assessment Methodology (Chen & Dahlman, 2005) of the 'Knowledge for Development'-programme within World Bank is a fruitful source for better understanding the dynamics of knowledge – based economies in the world. According to Chen (2007), the World Bank Institute's Knowledge for Development (K4D) Program was formed with the objective of assisting countries in developing policies and making investments that would enable them to become a knowledge economy – an economy in which knowledge is the key engine of economic growth. The Program's knowledge economy approach focuses on four key fields or pillars of knowledge for economic development: (1) economic and institutional regime (environment for knowledge use), (2) education and training (formal assimilation of knowledge), (3) innovation (generation of new knowledge) and (4) the information infrastructure (dissemination of knowledge). To facilitate the transition process to the knowledge economy, K4D has developed a so-called 'Knowledge Assessment Methodology' (KAM). The KAM is a user-friendly Internet-based tool that provides benchmarking assessments of countries' and regions' readiness for the knowledge economy. It is designed to help client countries understand their strengths and weaknesses by enabling them to easily compare themselves with neighbors, competitors, or other countries that they may wish to emulate. KAM is therefore useful for identifying problems and opportunities a country may face, and where it may need to focus policy attention or future investments on, with respect to making the transition to the knowledge economy.

Comparisons in KAM are made on the basis of 81 structural and qualitative variables that serve as proxies for the four knowledge economy pillars. Currently, there are 132 countries and 9 regional groupings available in the KAM. Apart from World Bank datasets, such as the World Development Indicators and the Doing Business reports, the KAM also uses external data sources, such as the World Competitiveness Report from the World Economic Forum, and the

Index of Economic Freedom from Freedom House. The data are continuously updated and the country coverage is expanded whenever possible. Because the 81 variables that are contained in the KAM span over different ranges of values, all variables are normalized from 0 (weakest) to 10 (strongest) and the 132 countries are ranked on an ordinal scale. The comparisons are presented in a variety of charts and figures that visibly highlight similarities and differences, strengths and weaknesses across countries. The KAM has been instrumental in facilitating policy dialogue with country government officials. Because of the easily understood figures and charts illustrating the most recent data, government officials are able to almost immediately see how their countries fair against the rest of the world and identify urgent issues that need to be resolved if they are to compete on the global economy. The countries that are included in the KAM are Brazil, Mexico, United States, The Republic of Korea, China, Ireland and Spain. The World Banks' KAM program provides a knowledge economy framework and asserts that sustained investments in the four economic pillars will not only lead to the availability of knowledge, but also to its effective and efficient use for knowledge rich organizations to thrive in the knowledge based economy.

3. The Knowledge Based View of the Firm

The purpose of a theory of the firm must be to understand the nature of the firm; not only to explain why they differ, but also to explain where and how much (Nonaka, von Krogh & Voelpel, 2006). During the 1980s, the resource based view of organizations (Snow & Hrebiniak, 1980) created an important step forward in organization theory and practice. Traditionally, organizations are confronted with uncertainty, crises, risks, complexity and turbulence. Therefore companies built mechanisms and resources to get through difficult periods. The 'resource base' (e.g. specialized know – how and financial capital) of an organization (Penrose, 1959; Barney 1991; Barney & Arikan, 2001; Newbert, 2007; Newbert, 2008) includes tangible - and intangible resources as well as capabilities which an organization possesses, controls, or have access to on a preferential basis (Helfat et al, 2007). Thus resources are assets with value-adding potential which organizations can draw upon to accomplish certain aims (Helfat et al, 2007, p. 4). According to the *resource – based theory*, a companies' competitive advantage is regarded to be the result of a unique set of conditions originating from the resources of an organization, which value is determined by phenomena such as rarity, non – imitability and non –substitutability of its resources. Organizations have access to many sorts of resources of their own and of others that they do not possess but which they can use purposefully. For example, companies may choose to invest in developing :

- a *dynamic capability* (Teece, Pisano and Shuen, 1997; Wang & Ahmed, 2007) , i.e. the capability of an organization to *purposefully* create, extend, or modify its resource base (Helfat et al, 2007, p.1).
- an *absorptive capacity*[c] (Cohen & Levinthal,1990), i.e. the ability to recognize new external knowledge, assimilate it and apply it to commercial ends (Jansen, Van den Bosch & Volberda, 2005; Lane, Koka & Pathak, 2006).
- a *transformative capacity* (Garud & Nayyar, 1994), i.e. the ability to continue redefine a product portfolio on technological opportunities created within a firm (Garud & Nayyar, 1994, p. 367).

[c] "The word 'capacity' refers to the ability to perform a task in at least a minimally acceptable manner. Thus, if an organization has a dynamic capability, it can alter its resource base in at least some minimally satisfactory manner. How well the organization alters its resource base is another matter. Neither 'capability' nor the related term 'competence' implies outstanding ability according to the Merriam – Webster Dictionary of Synonyms and Antonyms. These terms imply only the *potential* for 'adequate performance'. In the definition of dynamic capability, we therefore are careful to exclude any sort of tautology with regard to superior performance. Change in the resource base of an organization implies only that the organization is *doing something different, but not necessary better, than before* (Helfat et al, 2007, p. 5 *italics added*).

- a *meta-capability* (Miles, Miles & Snow, 2005) i.e. the widespread presence of the knowledge and skills that are crucial to the effective operation of a particular strategy – structure process package. Each time in business history that a new strategy has been invented, it has required a new organization structure and a new capability to its operation (Miles et.al, 1997).

These capabilities and capacities improve a company's ability to convert its inputs into valuable outcome. It is not the mere possession of resources that leads to competitive advantages; it is the uncommon ability to use those resources that is crucial.

Theories of the firm are inescapably about integration. Nonetheless value and the process of creating value has risks and opportunities associated with and attached to it, uncertainties which require seperation instead of integration. For example, one of the key roles of today's management relates to shifts that need to be accomplished in the mindset of workers (Colbert, 1996; Gosling & Mintzberg, 2003; Gardner, 2007) toward considering risk as an *opportunity* (Davis & Meyer, 2000) particularly with regard to processes and practices of exploring, generating, updating, advancing and exploiting *knowledge*. Anna Grandori (in Grandori and Kogur, 2002) observed that what knowledge approaches can contribute to organizational theory is "... a new contingency' factor for understanding *organizational arrangements*... Knowledge complexity, differentiation, specialization, complementarity and interdependence are emerging as important contingencies affecting effective organization and governance solutions (Grandori & Kogut, 2002, p. 225, *italics added*)."

The increasing awareness of knowledge as a valuable asset is generally referred to as a paradigm shift away from the resource-based view of the firm towards the *knowledge-based view* of the firm (Schendel, 1996, Grant, 1996). Together with a number of other authors (Kaplan et al, 2001; Krogh & Grand, 2002; Nonaka, Krogh & Voelpel, 2006; Kapoor & Lim, 2007) the knowledeg-based view focusses on *knowledge* as a dominant *source* of competitive advantage (Grant, 1996; Foss, 1996; Foss, 1996b; Kaplan et al, 2001; Grandori, 2001; Spender, 2003; Nickerson & Zenger, 2004; Nonaka, von Krogh & Voelpel, 2006; Foss, 2006; Felin & Hesterly, 2007). During the last 15 years, economic and management research has focused on understanding and explaining why some organizations appear to earn profit or gain value of its knowledge base, competences and capabilities. Some firms are, in fact, more capable than others, and they are able to leverage their knowledge, competences and capabilities to gain value.

Is knowledge a simple subset of the resource – based view of the firm?

"The distinct treatment of knowledge as a resource in its own right differentiates the knowledge-based view of the firm from the resource-based view of the firm. The latter regards all resources in a broad sense that tends to include many concepts traditionally associated with knowledge. In the knowledge - based view, a resource is treated as a finite traditional stock, which must be replenished after it is depleted and which contributes to achieving competitive advantage (primarily by depriving other firms of that resource). Knowledge, by contrast, can be replicated or transferred from a transmitting entity to a receiving entity without loss to the transmitting entity, making a "knowledge position barrier" much harder to erect. The accumulation of knowledge in and of itself is *not* an inherent source of competitive advantage. Every firm must make an active effort at protecting its knowledge by selectively preventing it from being transferred to potential competitors outside the firm, but at the same time specifically transferring it to strategic partners and collaborators (Kaplan et al, 2001, p. 16, *italics added*)."

Of course it is difficult for competitors to duplicate such a competitive advantage because it is based on combinations of valuable and organization – specific resources which arise from organizational processes that are often causally ambigious, path dependent, and socially complex. According to Foss (2007), a key idea here is that differential firm performance can be traced to differential capabilities; successful firms control capabilities that result in more appropriable value-added that less successful firms.

> *"However, the explanatory stance typically taken in the resource/capabilities view is not satisfactory. There are two reasons for this. First, the current literature reasons directly from something placed on firm – level (e.g. capabilities are antecedents) to something else that is also placed on the firm – level (e.g. competitive advantage). Aggregates are directly linked to (in fact, claimed to cause) other aggregates. This is known as 'methodological collectivism' ... Thus, a 'collectivist' approach obscures important micro – mechanisms Second, the collectivist capabilities perspective in strategy neglects organization – and does so at its peril. Although capabilities are often taken to be organizational processes that enable managers to carry out certain key tasks, organization itself seems almost conspicuousby its absence in most capabilities work* (Foss, 2007, pp. 33 - 34)."

Other researchers (Kaplan et al, 2001; Felin & Hesterley, 2007; Bridoux, Coeurderoy & Durand, 2008) have indicated that a knowledge based theory of the firm should also include the individual level of analysis. Although there is no clear and coherent conceptualization of what it means to

say that an organization – for example a Multinational Corporation (MNC)- is a 'knowledge – based entity', Foss (2006) claims that particularly the knowledge based MNC arguably serves as *the most advanced manifestation of the knowledge – based approach, both theoretically and empirically (*Foss, 2006, p. 4, *italics added*). Furthermore, Foss (2006, p. 8) claims that the lack of micro-specificity makes explanation vulnerable to critique from approaches (such as transaction cost economics) that do take an explicit micro-perspective and can point to other, more subtle, explanatory mechanisms than those identified in the knowledge-based approach. The lack of micro-specificity also leads to implicit assumptions. Thus in much of the knowledge-based view, the assumption appears (implicitly) to be made that knowledge inside firms is considerably more homogenous, and therefore less costly to communicate, than knowledge between firms.

Within this context it is important to understand the extent to which organizations are managed, i.e. to which management really matters – the so-called management effect (Ruefli & Wiggins, 2003; Bloom et al, 2005; Miles, Miles & Snow, 2005; Rosenzweig, 2007). This refers to the question whether a firm's fate is largely the result of how it conducts itself or not and how deliberate such conduct is (Miles , Miles & Snow, 2005). The knowledge based view of the organization has on the other hand led to a greater theoretical interest in how organizations can 'grow' and integrate knowledge resources embedded in their employees' expertise, experience competences and capabilities, from a more natural – not enforced - point of view. Viewing organizations in this way does not mean the end of the resource – based view of organizations. It simply means that knowledge has emerged as an extension to it (Grant, 1996).

In history, it was the agricultural economy which depended on the ability of people to work and harvest their land; the Industrial Economy core success came from the ability and skill of companies to effectively combine capital (expensive), resources (scarce) and labour (unwilling) to mass produce products in as efficient a way as possible. The knowledge – based economy aims to 'connect' people, knowledge and technology in such a way that they can act as 'value generators'. Both in theory and practice the latter refers to the degree in which companies are capable of innovating and of bringing innovations to scale. Once scaleability is achieved, knowledge based companies are expected to contribute to the overall economy in both a meaningful and tangible fashion.

A Theory of the Firm Comprises More Than a Single Type of Knowledge

Spender (2003) believes that there is much value in considering problems that intangible, slippery/sticky, inimitable, rare, scarce, etc assets present to a conventional theory of the firm ór to considering how imperfect information might change market behavior, or decision-making biases:

* "But while these questions seem to form part of the Knowledge Manageemnt lietrature I suggest they do not fall properly within the domain of a knowledge based theory of the firm – simply because the terms knowledge based and knowledge management are superfluous when knowledge is unproblematic [e.g. considering only its absence]. Under these circumstances we can replace the term knowledge with terms like information, data, facts etc.., without loss. Likewise, rhetoric about the differences between data, information and wisdom is meaningless without a supporting theory of how people know (Spender, 2003, pp. 272 – 273)."

* "In short, the real value of the concept of tacit knowledge is that, in spite of its ambiguities, it lets us posit pluralism and incommensurability, and thus the problem of integrating various types of knowledge. It opens up a new theory of the firm, *one not derived from Adam Smith's or Marschall's notion of an apparatus for combining factually understood capital, land and labor*. It also embraces a theory of knowing people as other than purely rational (Spender, 2003, p.274)."

The knowledge based view of the organization basically expands the limits of the resource based view, but does not (yet) break with it. Emphasis is given to the importance of how organizations identify, recognize and utilize knowledge to improve their strategic and operational position. Within this view:

- *people* utilize and exploit their mental capabilities ('mental space') to generate value.
- *technology* offers global access and connectivity to knowledge assets.
- *knowledge* is considered as the primar source from which value creation takes place.

This way of looking at organizations implies the ability of companies to deal with so-called VRIN resources (e.g. resources that are Valuable, Rare, Inimitable and Non-substitutable (Stähle & Bounfour, 2008, p. 165), which themsleves are often intangible and 'less to not' manageable. Baldwin (2007, p.9) asserts that such knowledge-based firms can be diverse, but have the following in common:

(1) an overall focus on what goes on *inside* a firm or organization ('inside - out' versus 'outside - in'), as a means to build - and benefit from- the inherent strength of organizations.
(2) a general agreement on the value (or "advantage") derived from 'things' that a firm can do, variously labelled as routines, competencies, or capabilities — that are *not easily imitated or purchased*
(3) a joint recognition that these routines, competencies or capabilities are *based on knowledge*, which is distributed across individuals and must and can be assembled and reconfigured in various ways. Krogh & Grand (2002, pp. 171 – 178)) state that in order for a knowledge based theory of the firm achieve its appropriate status as a theoretical as well as managerial contribution, it must satisfy at least five conditions. It needs a concept of :

1. *Knowledge origin*. Evolutionary as well as conventional economic theory lacks a concept of knowledge that can explain the origin of new knowledge, a process central to the creation of competitive advantage
2. *Knowledge creation process*. This is an activity description of what the firm does or does not do. This ongoing organizational activity could become a source of profit, due to its valuable but unique character.
3. *'Corporate coherence'*. A view of the firm as a collage of resources, processes and competences is overly simplistic and might divert attention away from the underlying dynamics in patterns of firm activity and development. Corporate coherence can be understood as the glue or logic underlying strategic decisions.
4. *Change*. A knowledge based theory of the firm must link the level of change affecting the firm to the creation of coherence in the firm.
5. *Management*. Such a theory must establish a link between managerially led initiatives and competitive advantage

Kaplan et al (2001) have attempted to develop an *integrated* knowledge – based view of the firm. Within this integrated approach the authors unravel seven weaknesses in the current approaches (broadly from the disciplines economics, sociology and philosophy):

- *Theoretical perspective*. The knowledge based theories of the firm originate from different disciplines and provide a melting pot of ontological and epistemological foundations.
- *Concept of knowledge*. The definitional ambuigity of knowledge is high. There is a disagreement about the level of analysis (individual versus collectivist) and types of knowledge (implicit, explicit, tacit, sticky, leaky etc.). Furthermore, knowledge is a double-

edged sword: while the benefits are often immediate and easily recognizable, the costs related to rigidity, failure of appropriation, and change are more subtle, less transparent, and intimately tied to social processes. While too little knowledge leads to inefficiencies, too much results in rigidities that tend to be counterproductive in a dynamically changing world; while too little might result in chaotic social relations, too much implies the silencing of diverse perspectives (Schulze & Leidner, 2002).

- *Firm existence*. How does knowledge relate to the existence of firms? There is little consistency in explanations.
- *Firm boundaries*. Many knowledge based theories of the firm do not address boundaries at all or treat a firm boundary "somewhat simplistic' (Kaplan et al, 2001, p. 12).
- *Firm structure*. To the extent that scholars of the knowledge – based view of the firm discuss organization structure, it is mainly in the debate of the value, the role and the negative features of hierarchy.
- *Firm behavior*. Firm behavior, the direct consequence of a firm exercising its capabilities, results in action that is observed externally as well as internally. Since different actions can be ascribed to different capabilities, the presence of a specific constellation of actions can provide convincing evidence for the existence of specific capabilities inside the firm. A capability represents an organization's capacity to act. Kaplan et al. (2001) have developed a synthesis of the past knowledge based theories of the firm. This process generated six critical capabilities: creation, destruction, integration, absorption, replication and protection.
- *Firm Performance*. The link between knowledge and performance is one of the critical aspects of any knowledge based theory of the firm. Kaplan et al (2001, p.14) assert "while resources and knowledge – based views have opened the 'black box' of the firm so that we can look inside their behaviors, they have left their own black box, that of the link between behavior and performance. Most theories either do not address performance at all or simply state that a certain knowledge capability (variously, absorptive capacity, innovation, combinative capabilities, knowledge transfer, and protective capabilities) will give a firm competitive advantage and thus lead to performance." .

According to Grant (2002), an important implication of the assumptions underlying knowledge is a dichotomy that starts to occur between two types of knowledge-based activity in the economy. There are those activities that are concerned with increasing the stock of knowledge — what March (1991) refers to as "exploration," and Spender (1992) calls "knowledge generation" — and

those activities concerned with deploying knowledge in order to produce goods and services — what March (1991) refers to as "exploitation," and Spender (1992) calls "knowledge application". Reconciling the dichotomy between knowledge creating and knowledge applying activities represents a key challenge for organizations: knowledge creation requires specialization, while knowledge application requires diversity of knowledge.

Different Types of Knowledge

Apart from explicit/implicit, sticky/leaky, tangible/intangible and other types of knowledge, Holsapple and Wu (2008) argue that the most strategic knowledge resources of a firm are *product knowledge*, *customer knowledge*, and *managerial knowledge* (Tanriverdi & Venkatraman, 2005), Product knowledge refers to research, development, and operational knowledge employed by the firm to develop and produce its products and services. Related to marketing and advertising skills and policies, customer knowledge refers to the knowledge of customer needs, preferences, and buying behaviors, and knowledge of the firm's markets... At corporate level managerial practices, policies, and processes, managerial knowledge refers to the knowledge required for governing the firm's business units. These three types of knowledge resources complement each other.

Blackler (2002) assumes four types of organizational knowledge:

1) *Embrained knowledge* depends on conceptual knowledge and cognitive abilities, thus, is largely explicit

2) *Embodied knowledge* is action oriented and essentially tacit

3) *Encultured knowledge* is collective, but explicit

4) *Embedded knowledge* is collective but more tacit, related to social and institutional arrangements.

Given the limited transferability of knowledge, this presents considerable difficulty for the institutions of production. The solution seems to lie in some process of knowledge integration that permits individuals to apply their specialized knowledge to the production of goods and services, while preserving the efficiencies of specialization in knowledge acquisition (Demsetz, 1991). Grant (1996) interprets many new organizational form initiatives as attempts to access and integrate implicit knowledge - Grant uses the term "tacit" knowledge[d] - of organizational members while recognizing the barriers to the transfer of such knowledge:

[d] Nonaka & Tachuchi's proposition that knowledge is created through the interaction of tacit and explicit knowledge involving four modes of knowledge conversion is flawed (Gourlay, 2006; McAdam, Mason, McCrory, 2007; Ribeiro & Collins, 2007). Wilson (2002) states that Nonaka & Takeuchi's use of the terms tacit, implicit and explicit knowledge has contributed to more ambiguity instead of 'increasing insight': "Consequently, tacit knowledge is an *inexpressible* process that enables an assessment of phenomena in the course of becoming knowledgeable about the

"A knowledge based view favors integration mechanisms which bring the varied knowledge of small numbers of individuals together to deliver organizational solutions. The question of boundary of the firm is then analyzed in terms of relative efficiency of knowledge utilization (Fenton & Pettigrew, 2000, pp. 29 – 30). "

Grant (2002) distinguishes a specific area where the impact of knowledge – based thinking has yet to make its mark:

"Knowledge – based approaches offer some hope for filling the widening gap between the evolution of organizational forms in the business sector and the capacity for organizational theory to explain them (Grant, 2002, p. 145)."

He further proposes that:

"some of the most potentially interesting applications of knowledge-based approaches to the theory of the firm lie in the area of organizational design (Grant, 2002, p. 142)."

In other words, the key to economic success of modern companies does not lie in the ability of managers to manage better, but in their ability to organize better.
According to Jackson (2000, p.15):

"*...organization design is to the knowledge era what the steam engine was to the industrial revolution and the computer was to the information age. Excellence in organization design, in full sense of the phrase, is the essential skill for success in the knowledge er*a".

Equal to organizing in the Industrial era, there does not seem to be one ideal organizational form, which delivers performance and performance improvement in a reliable manner, even when circumstances and expectations change. The old mantra 'there is 'one best way to organize (Kanigel, 1997)' continuous to exist. According to Jackson (2000, p.15), the key therefore

"*is not to find the right organization but rather to master the art of organization design* (*italics added*)."

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world. In what sense then, can it be captured? The answer, of course, is that it cannot be 'captured'- it can only be demonstrated through our expressible knowledge and through our acts (Wilson, 2002, p, 29)…" "Implicit knowledge is expressible, tacit knowledge is not and Nonaka & Takeuchi would have saved a great deal of confusion had they chosen a more appropriate term (Wilson, 2002, p. 31)."

The adoption of space in organization design and the emergence of a *spatial organization theory* originates from the continuous need for modern organizations to find better ways to perform 'in the best possible way' both *within* as well as *beyond* existing boundaries and limits, whether perceived or real and whether structural or incidental. However, the actual rise of spatial thinking in organizational design theory comes from a perceived - and thus yet to be proven - managerial paradigm shift which turns away from the resource-based ('placebound') view of the firm dominant in most organizations today, to the knowledge-based ('spacebound') view of the firm, the latter arising from the potential for development and growth inherently associated with the knowledge-based economy. Whereas the dominant managerial paradigm derived from the resource-based view is '*to manage first and organize later*', this is the opposite in the knowledge-based view. In this view it is expected that *organizing better* will have a more profound effect on business performance and on improving it than *managing better*.

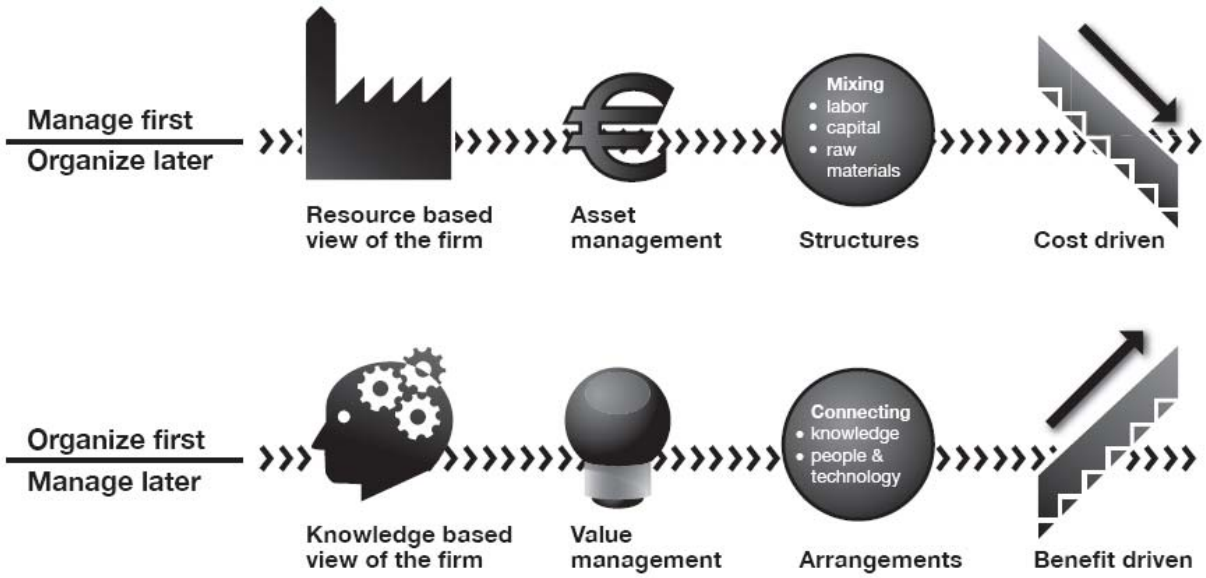

Figure 1: The Resource Based View of the Firm and the Knowledge Based View.

It must be noted that the actual paradigm shift has as yet not taken place and may not take place at all, mostly because of a lack of innovation in managerial thinking and action. Whereas the future of management as a value-adding profession lies in the adoption of forward looking new ways of working, actual practice shows many management principles and practices to be 'founded on a hopelessly obsolete management paradigm' (Cloke and Goldsmith 2002; Ghoshal 2005; Hamel and Breen 2007; Birkinshaw, Crainer & Mol, 2007; Birkinshaw, Hamel & Mol, 2008).

Designers often face conflicting standards of excellence and practizing the art of organizational design can have both a forward and a reverse effect on the attitudes and behaviors of individuals, teams, organizations and nations. Here, the dominant mindset by which an knowledge organization is designed and managed is regarded as a design *challenge* then as a techniquein order to "keeping things *liquid* as long as possible (Collopy, Boland & VanPatter, 2005, p. 5, italics added)". Garud, Jain & Tuertscher (2008) even view design :

> "*... as continually evolving and essentially incomplete. Within such an approach, boundaries between designers and users become blurred, heterogeneous user preferences emerge in use, tasks remain partially partitioned and the goals of the design emerge through interaction. Such an approach to design acknowledges the partial nature of knowledge possessed by any one individual and focuses on the means by which distributed knowledge can be harnessed. In summary, while the scientific approach views incompleteness as a threat, a pragmatic approach harnesses its value. Eventually, a pragmatic approach involves the fusing together of two meanings of design – that is, as both process and as outcome. Any outcome is but an intermediate step in an ongoing journey, representing both the completion of a process as well as its beginning. Whereas the scientific approach emphasizes the need to crystallize designs, the pragmatic approach highlights the value of retaining fluidity* (Garud, Jain & Tuertscher, 2008, p. 367)."

A degree of 'solidification' of a newly designed organization - by means of its form - is at some point in time required, albeit less a 'structured' one, then an 'arranged' one, following the earlier notion of different organizational designs matching different strategies of firms, even within one firm. Differences in form emphasize the 'framing[e]' effect organizations have on performance and performance improvement. According to Kaplan, "frames shape how individual actors see the the world and perceive their own interests. Actors make choices and act from within that understanding. By corollary, framing also allows people to suggest what is going on to others. This process is not necessarily seamless and inevitable. People have multiple frames[f] from which

[e] Frames are 'schemata of interpretation' that actors use to affect the interpretation of events, looking at these through multiple lenses. Frames simplify and condense 'the world out there' by *selectively* punctuating and encoding events in order to render them meaning, keeping some elements in view while hiding others (Fiss & Zajac 2006).

[f] Fairhurst (2005) notes that a large number of managers struggle to comprehend what framing means in practice. In 1996 Fairhurst and Sarr produced an influential book "The Art of Framing: Managing the Language of Leadership". Based on research she identified three reasons why most managers fail to implement framing in their managerial practice. Within this context, one reason is that many managers experience insecurity because framing challenges the commonly held belief of an objective and stable reality: "If managers adopt the idea of framing reality, it means that they become *reality makers* rather than reality discoverers (to discover how reality is and act on the facts discovered). Due to the strong belief in an objective and stable reality, most managers feel highly insecure about abandoning their current role as reality discoverers and instead adopting the role of reality creators (Sandberg & Targama, 2007, p.17)".

they can draw in any one moment (Kaplan, 2008), p. 732)". Framing requires the ability to see patterns, to parse the important information from the less important information, and to create models that yield insights that can be shared across individuals, teams and organizations. It often recquires the art of 'reframing': moving it away from its original perception of what the issue is all about to a new focus (Beckman & Barry, 2007). For example, in their classic publication "Reframing Organizations", Bolman and Deal (1991) use four 'lenses' – four frames - to establish a more direct relationship between form and performance (the 'structural', 'human resources', 'political' and the 'symbolic' frame). It is indeed for this very reason that many new alternative organizational design options have in the recent past emerged, specifically because of the introduction of new ways of working, resulting from a structural shift in the nature of work. Work itself is becoming knowledge-based (Wolff 2005; Sinha and Van de Ven 2005; Davenport 2005; Chan, Beckman and Lawrence 2007; Heckscher 2007), with knowledge-based work increasingly being regarded as 'mindful' work, i.e. as cognitively embedded, intense, passionate, time pressured, and collaborative. Knowledge – based organizations develop a view of the firm:

> "*as a dynamic entity of flow. Human beings do not exist independently of each other and the environment, but are the relation and accumulation of their unique experiences at a particular time and space* (Nonaka,Toyama, Hirata, 2008, p. 242)."

Organizing the *flow* of knowledge becomes crucial in organizations that depend on social networking and social media for getting things done.

4. Spatial Organizations

4.1. Introduction

Organizational space is generally divided into three separate but finite spaces: physical, virtual and mental (Tissen & Lekanne Deprez, 2008). The most common managerial understanding of space is ' being a mere extension of place': *physical space* (offices, buildings). When discussing space it is often regarded as *invisible emptiness*; space is the absence of things, as well as (by definition) in between things. But space is never 'empty' and always represents diverse meanings (room to move, degrees of freedom, geographical constraints etc). Organization researchers have taken space mostly for granted or, at best, have treated is implicitly (Sydow, 2002). As we have discussed in our previous research paper, there is a rising interest in space (Tissen & Lekanne Deprez, 2008), both as an economic asset to be effectively utilized and as a social tool to achieve key organizational goals. However, when space is mentioned within organization science - i.e. *virtual space* (spatial networks, ICT, computers), *mental space* (people, frames) - one should not expect that the space – dimension is seriously dealt with. There are a number of interfering and overlapping dimensions - space is complex, multidimensional, fluid and evolving - which need to, but cannot, be connected in a straightforward fashion. Within a knowledge based perspective on organizations, knowledge - and more specifically the differentiation of knowledge – is introduced as a key design principle of spatial organizations. Spatial organizations have an ínvisible, fluid form that guides how people and organizations 'move' and evolve in a knowledge based world. Here, it seems possible to organize space through the matching of *different kinds of knowledge* (e.g. *routine* knowledge, *learning* and *innovation*) to *likeminded 'mental models'* of workers. Both exist 'inside the mind' Thus, different spatial organizational forms can be constructed once it is clear that different types of knowledge actually constitute and match different mental capabilitiesof people. These mental capabilities can be metaphorized as 'mental space'. '

Instead of organizing for traditional performance through the structuring of work – of things to do or not to do - performance can be organized through 'arranging' the minds of people and by bringing those people together who share the same – or similar - mental models. An organizational setting becomesan arrangement of minds which is based on putting knowledge flows to value. This makes it possible to view modern organizations as more then 'one size fits all' singular structures, namely as portfolio's of spatial arrangements in which differing but strong relationships exist between the arrangement itself and the (required) performance of people and

organizations. Because of their 'mentality' these '*spatial arrangements*' can and do act as 'frames' of what optimal performance constitutes (and what not), as they provide direction and guidance for workers to concentrate their minds on. To hold the frame of a subject is to choose one particular meaning (or set of meanings) over another. When we share our frames with others (the process of framing), we manage meaning because we assert that our interpretations should be taken as real over other possible interpretations (Fairhurst, 2005).

Focussing the minds of the workers, spatial arrangements can be directly linked to performance by defining the *intent* of an arrangement. Intent can in this respect be defined as the underlying motivation of people to realize strategic and operational targets and objectives, 'as their minds see fit' within the overall setting of an arrangement. Intent is a phenomenon diffused at multiple organizational levels and needs to be possessed by some or all of its members. For collective intent ('we-intent') to be created, each member of a collective needs to be able to formulate a conception of, or adjust to, the intentions of a significant number of other members in the collective (Mantere & Sillince, 2007). Whereas strategic and operational objectives are content-based, 'intent' is used to direct and guide people's performance to what they (collectively) stand for and are best at in their work. On the one hand strategic and operational objectives tell workers *what* to realize, while the intent tells them *why and in what direction* they should employ their minds.

Spatial arrangements can not be forced upon people. They act as a natural extension of the way people work best with knowledge. to bring out optimal performance. Once aligned with the right technology, these spatial arrangements direct, guide and facilitate workers towards what 'really' needs to be done, without them being unduly distracted. Managing organizations as spatial arrangements requires a different kind of people management to fit the natural preferenceof people to work with some types of knowledge better then with others. Some people like to work as routinely as possible in order to add optimal value and expect to be selected, appraised and rewarded on that basis. Others like to be recognized for their knowledeg sharing and learning behavior and be managed accordingly, while those knowledge workers with a mindset for innovation will want yet another type of people management. In essence this means that modern organizations not only consist of a portfolio of organizational forms and arrangements, but also of varying ways of managing people all aimed at mobilizing the collective minds of people at work, not by treating them as a whole but by differentiating them into seperate spaces, linked to the performance preferences of individual workers.

4.2. Organizing for Space

Just imagine for a moment that:

- all knowledge work can be arranged in spaces, instead of organized in functions and processes;
- it is easier to *arrange* work, then it is to *structure* it
- this can be achieved by matching the knowledge people possess to the way their mind works, by means of organizing instead of managing;
- strategies and objectives can be realized through intent;
- boundaries, structures and hierarchies only apply when and where they are really needed, i.e. where they add tangible value.
- technology can directly be linked to pre-established 'value propositions', pointing to what people are good at and guiding them in terms of optimal performance.

Simply stated, spatial arrangements entail a purposeful mix of knowledge, people and technology in which technology becomes 'spatial technology' as it guides the mental aptitude of knowledge workers towards the:

- right – most effective, efficient and sometimes original - way of thinking
- away from being distracted by other organizational internal and external stimuli which makes them loose attention and concentration.

Once the right type of knowledge and the right kind of people are linked to the right kind of technology, different spatial arrangements can be designed and managed in such a way that the arrangement indicates what kind of value is expected to come out of it. One company that is fully aware of its' 'spatial' capabilities is Google. Google largely functions as a communty in which both the collective as well as individual 'Google minds' realize and sustain the incredible success and growth of this company.

4.3. Why Google Has Plenty of 'Space' to Offer

According to Carr (2008), Google's success is a mystery. The company's growth has been dizzying, its revenues shooting up from less than US$500 million in 2002 to more than $10.5 billion in 2006. Google remains robustly profitable, earning a net income of $2 billion on $7.5 billion of sales through the first half of 2007. Since the company's initial public offering in August 2004, its stock price has risen fivefold. Whenever a company becomes wildly successful in a brief span of time, it naturally becomes an object of fascination for corporate executives and even the general public. More than that, it comes to be presented as a new model for business success.

Google managed to solve a fundamental problem on the Internet, which for many proved to be to difficult to make money from. The way Google does make money is actually very straightforward: it brokers and publishes advertisements through digital media. Google found a way tolink focused advertising to user searches. Ads appear only along with specific searches, meaning that users could have some interest in the advertisers. It's about matching interests. More than 99 percent of its sales have come from the fees it charges advertisers for using its network to get their messages out on the Internet. Google's '*protean appearance*' is not a reflection of its core business. Rather, it stems from the vast number of complements to its core business. Complements are, to put it simply, any products or services that tend be consumed together. Think hot dogs and mustard, or houses and mortgages. For Google, literally everything that happens on the Internet is a complement to its main business. The more things that people and companies do online, the more ads they see and the more money Google makes. Most of Google's success and all of its profits can be traced to three innovations: the first is a brilliant insight into the organization of information, the second a creative act of imitation, and the third a breakthrough in the engineering of computer systems. These innovations represent a remarkable accomplishment. But it's important to remember that they largely predate the formal innovation process that Google developed as it expanded and that is now the source of much of the praise lavished on the company.

The process appears to have three key principles. First, Google believes in throwing lots of people at innovation. Its aggressive recruitment of talented software engineers is legendary in Silicon Valley, and it keeps its workers happy by (over)loading them with gourmet food, toys and games, free bus services, and other generous perks. Second, it organizes its product development

staff into a lot of small teams and gives them considerable freedom ('mental space') in how they allocate their time and money. In a variation on a practice made famous by 3M, Google allows its engineers to devote 20 percent of their time to pet projects, with little corporate oversight. Third, the company is fanatical about using computers to monitor and analyze its employees' work as well as its customers' use of its services. Google's CEO, Eric Schmidt, has said its goal is to use 'metrics of performance' to 'systematize' every aspect of its operations. It hires the smartest people it can find, allows them to pursue their interests in small collegial teams, and measures the progress and results of their work with scientific precision. When it comes to creating hit products, Google may actually be impeded by its unique economics. Because the cost of failure is so low, it can experiment in all sorts of areas and rush new services to market in the early stages of their development. That kind of freedom brings many benefits, but it can also lead to an erosion of discipline. In the absence of strong economic pressures, it's easy for companies like Google to put off making the hard choices and difficult trade-offs that lie at the heart of long-term business success. There are signs that Google is coming to recognize this problem. Over the past year, its management has begun tightening the reins on its organization, imposing some restrictions on the company's freewheeling and free-spending culture. Late in 2006, in what CEO Schmidt called "a big change in the way we run the company," it ordered its innovation teams to focus on fewer initiatives and reduce the overall number of products under development by 20%. Google may not be a perfect model, but it deserves close attention and study. Carr (2008b, pp. 211 - 212) reveals in his publication "The Big Switch" the deepest ambition of Larry Page and Sergey Brin - the founders of Google -: "They [Larry & Sergey] weren't just interested in perfecting their search engine, they said. What they really looked forward to was melding their technology within the human brain itself. 'You want access to as much information as possible so you can discern what is most relevant and correct', explained Brin. 'The solution isn't to limit the information you receive. Ultimately you want to have the entire world's knowledge connected directly to your mind.' This kind of ambition requires a spatial approach to organizational design where physical, virtual and mental space provide plenty of space to cover the world's knowledge and connect that body of knowledge 'real time' to one's body and mind. The marvel of Google is its ability, after so many years, to continue to instill a sense of creative fearlessness and ambition, even as it has grown to more than 16.000 employees (Salter, 2008, p.74). In the new Zurich "Google Engineering" office -the biggest R&D centre outside of Mountain View, California- Google has created workspaces where people literally 'slide into space' (i.e. the restaurant). It's really true: Google Is different. It's in the design; it's in the air and in the spirit of the 'place'. It's almost organizing without management. A workplace becomes a 'workspace',

mobilizing the collective Google minds and get them linked to their fellow "Zooglers" inside the Zurich office and to access all the outside/external knowledge to be captured by the All Mighty Google organization.

5. Spatial Arrangements

5.1. Introduction

All around the world work is becoming more knowledge-intensive (Wolff 2005; Sinha and Van de Ven 2005; Davenport 2005; Chan, Beckman and Lawrence 2007; Heckscher 2007). Once complex knowledge work takes place, this is increasingly regarded as 'mindful' work, i.e. as cognitively embedded, intense, passionate, time pressured, and collaborative. Mindfulness means being awake, aware and constantly attending to oneself and the world around. Following Levinthal and Rerup (2006), mindfulness is conceived as involving attentiveness as well as the ability to respond agile to 'cues'. By contrast, less mindful work involves *fewer* cognitive processes and *greater* reliance on previous routines. But even the knowledge workers at Google cannot be mindful of all their activities. While Google can be regarded as a 'mindful organization', it is not one deliberately designed for that purpose. 'Mindful' work requires 'framing': to choose one particular meaning (or set of meanings) over another. So far the Google community has proven to be a master in the intuitive – not explicit - art of framing. The company created a new industry standard by identifying and designing a technology (Google web search) and by making their platform fundamental to the company system as well as to the market. Google created a multisided – market and benefits from the brainpower of the Googlers. But Google did not deliberately design it this way.

How to benefit from spatial arrangements: Organize first, manage later

Google understands how to benefit from abundance. The more content for it to organize and the more sites where it can place advertisements, the better (Jarvis, 2009). Like many Internet companies, Google hosted a large pool of users before it knew how to make money. Unlike many of those companies, the Google's 'creative collectives' developed an effective business model and achieved considerable success. One of Google's mantra, "focus on the user" comes from the time when Google could record 60 million searches a day and only made a few dollars out of it. In fact Google only had to deal with users, because they were the only customers. Google's professional community understood that money was not to be made from individual users and quickly gave up the hypothesis of licensing its technology through a Business – to - Business

(B2B) framework. By deciding to let everybody use its unique search engine for free, Google had to introduce a new type of contribuant: advertisers. By recognizing this simple fact, Google entered what is called a "two-sided market".Typically, a two-sided market is made up of a platform and two user groups. If the platform wants to be successful, it needs to appeal to both groups. For instance, to be successful, a creditcard company needs consumers to own its credit cards and businesses to run its systems.

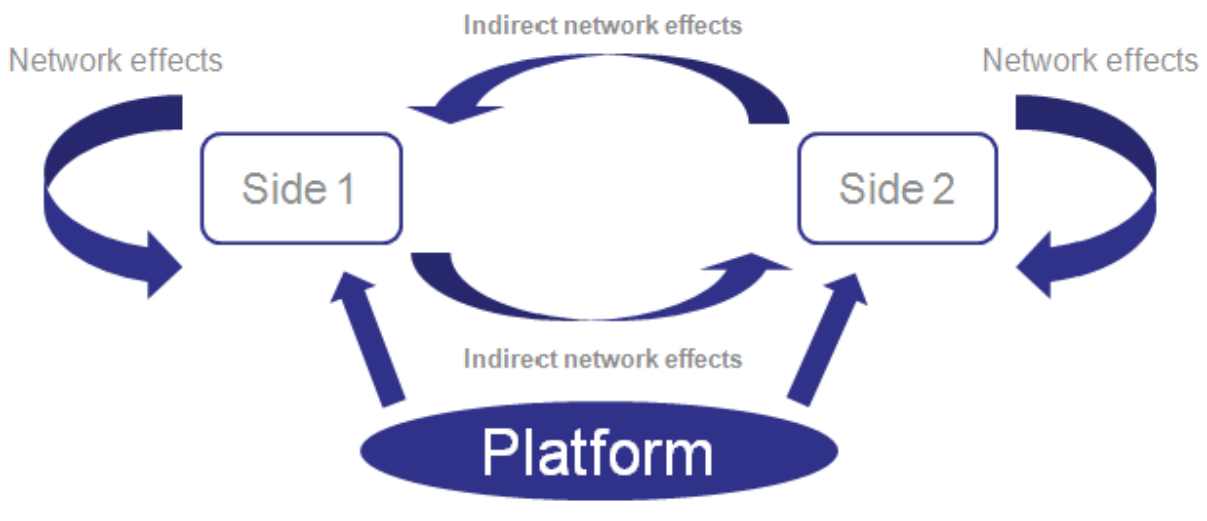

Figure 2: Google as a Platform (Source: FaberNovel, 2008, p. 4)

One of the main characteristics of these markets is their "network effects". It means that a service becomes more valuable as more people are using it. For instance, the value of the telephone depends on the number of people who own one. For a single user, the value of Google search engine partly increases with the total amount of people logging into Google since the organization exploits and analyzes customer data to enrich its system. The same cannot be said for advertisers: any single one of them would rather appear alone on a page and have no competitors. On the other hand, indirect network effects played a major part in Google's success. Indirect network effects are a phenomenon increasing the value of a service with the number of members of the other group. In Google's case, advertisers benefit from any increase in the amount of people using Google search Engine. This explains Google's "focus on the user", users come first and advertisers will follow and creating a business model by combining the knowledge from its global community, people and technology in an unique way (FaberNovel, 2008, p. 4 – 5; Jarvis, 2009)

Google's unique *spatial arrangement* of knowledge, people and technology purposefully serves to differentiate knowledge *and* concentrate the minds of managers and workers to improve performance. Spatial arrangements should therefore be seen as 'distinct' organizational forms and already existing in the minds of people. These forms need to be made explicit, in order to establsh a more direct – but naturally fitting - relationship between what people 'have in their minds' and the actual performance resulting from this. A variety of forms can be distinguished, all depending on the preferred type of knowledge people possess, in relation to the performance which is expected and even required from them. In this paper four of these are distinguished: the *modular, circular, cellular and constellar* form.

5.2. Modular Arrangements

A modular arrangement assumes that each module constitutes only one dominant –single minded- way of working with knowledge. It's about the efficient application of knowledge, preferably through intensified automation. Efficiency is the key word: costs can be kept low because knowledge production as a whole is streamlined. People are only deployed if they can contribute to optimising efficiency. Non-core knowledge functions and processes are all out- or offsourced, while the core of the network maintains full strategic control (Baldwin and Clark, 1997).

According to Anand & Daft (2007, pp. 336 – 338) the modular organization was popularized in the early 1990s in the manufacturing industry, bringing about the image that it represents a collection of Lego bricks that can snap together or be hived off. This also seems possible with regard to knowledge, as most knowledge is routine knowledge requiring varying degrees of explicitation, formalization and replication, in order to increase its productive use. In practice this kind of knowledge 'shows' up in formats, procedures, guidelines, rules & regulations for others to add specific value to. What is different and distinctive about modular knowledge-based arrangements is that outsourcing not only conforms to pieces of the product as is the case in manufacturing, but also of the mind (Fisher & Fisher, 1998; Albrecht, 2003). The assembly of decomposable knowledge 'chunks' provided by internal and external subcontractors is also the defining feature of a modular knowledge arrangement.

Design Principles

Four principles govern the design of modular organization:

- First, break key knowledge processes up into separable modules that can be produced on a stand-alone basis.
- Second, design interfaces that allow different modules to work with each other. In a modu;ar architecture, the components are not tightly coupled. This allows changes in some components not to affect the design of components (Huber, 2004).
- Third, outsource knowledge chunks that can be made more efficiently by external contractors.
- Finally, enable the organization to focus on assembling the different chunks of the knowledge created in-house and outside, by means of technology and connectivity.

The focus of managers in modular arrangements is to create a 'natural' context in which knowledge workers, with a 'routine mentality' become better at what they think and do through focus and concentration, leading to higher degrees of knowledge productivity , while ultimately leading to the mass production of knowledge (Lekanne Deprez, 2004; Stam, 2007). A critical success factor of modular arrangements involves the encapsulating of people and knowledge by firmly tying them to information and communication technology. In modular arrangements the role of technology is first and foremost to direct and guise the attention of workers towards what needs to be thought of and what not. This is called 'mental prioritizing' enforced by technology.

Another key element of modular arrangements involves the separation of various and diverse 'levels of knowledge' from equally various and diverse 'levels of education' to such an extent that it becomes possible for someone to execute routine knowledge work while having a high education level. Modular arrangements have an advantage over routine knowledge work which has been 'left to the right people' instead of being deliberately organizaed, as modular arrangements allow for optimal levels of standardization and automation and are thus more inherently productive. Modular arrangements also allow for performance improvement to happen within a framework of pre-defined and pre-set knowledge 'packages', in which learning only takes place within the *boundaries* of such a package. Modular arrangements are both designed to 'frame' the minds of people as well as to 'tweak' them.

Advantages

The prime advantage of the modular arrangement lies in its efficiency and speed of response. Modular design also allows firms to take advantage of competences beyond their own boundaries. For example by partnering with a *specialized* production company, a Telco was able to reduce defects by 50%. Firms can experiment with the use of different suppliers that focus on being the best in their class. Another advantage for modular firms is the increased ability to innovate through the recombination of modules in different ways.

Disadvantages

One key issue limiting modular organization design forms the perception that not all knowledge or knowledge-creating processes are amenable to chunking into modules. In practice only a disting type of knowledge allows for modularisation, of which the boundaries are not always clear. Secondly, poorly designed interfaces can hinder knowledge flows from connecting to the right people at the right moment, potentially leading to costly rework. Finally, the predictability inherent in modular approaches raises the odds that competitors will develop similar knowledge (Fleming & Sorenson, 2001, p. 21)."

5.3. Circular arrangements

Most learning in organizations is individual learning, aimed at improving the personal and professional qualities of people, often without the existance of an explicit link between personal performance and organizational performance. Organizations are generally challenged to create a supportive learning environment and improve both individual as well as collective learning. Knowledge sharing is the broader act of circulating relevant knowledge to others across the organization, with the purpose of adding and improving value. People usually exchange both implicit as well as explicit knowledge to achieve personal, team and organizational goals. Workers are generally aware of this, which is why they seek favourable conditions to knowledge sharing (Van Burg, Berends & van Raaij, 2008; Lam & Lambermont – Ford, 2008, Klein, 2008), while acknowledging existing barriers to knowledge sharing (de Rooij, Verburg, Andriessen & Den Hartog, 2007) and sometimes reinforcing them. Organizing for knowledge sharing by adressing knowledge sharing dilemma's (Cabrera & Cabrera, 2002; Matsuo & Easterby – Smith, 2008) is still in its infancy. Attemps to optimize individual learning and organizational learning centres around the idea that sharing information should become commonplace – even natural- and knowledge creation should be a structural result from learning. Learning can thus be fed back where the quality of 'routine knowledge packages' is concerned and fed forward for the single purpose of providing the breeding ground for innovation. The key to circular arrangements is to

facilitate and install a 'willingness to learn' - culture and therefore create knowledge sharing processes that will produce "moments of value" – those fleeting moments of true human and digital interaction that define an organization's image and performance. Personal learning will be considered as a desirable side effect but is not the major goal for organizing knowledge in a circular way.' Modern call centres – or contact centres as they are increasingly called - serve as a prime example for the separation of knowledge work into different mental arrangements. Old style call centres typically work as knowledge factories in which routine knowledge is provided to the outside world, usually through menu's of Q/A's and FAQ's, often more generic in the form of format information, protocols and procedures. To counteract widespread criticism on the (low) quality of first generation call centres, modern call centres also organize learning. This is generally done by separating 'front office' work (routine) from back office work (innovative, one-of-a kind). Efforts to upgrade the quality of both usually fail however, because both types of work are often not in sync with eachother. There are experiments to migrate from a call center where all agents are pooled and customers are treated indifferently by any agent, toward a call center where customers are grouped into clusters with dedicated teams of agents (Jouini, Dallery, Nait-Abdallah, 2008) .

Circular arrangements serve to purposefully bring together those knowledge workers who are – by nature - inclined to share what they know with others and who are good at generating meaningful knowledge by and for the organization, by means of knowledge transfer (Ackoff, 1989; Romme, 1997). The circular organizational design, pioneered by Gerard Endenburg (Romme & Endenburg, 2006), aims at the identifiable and structured creation of learning at the organizational level as well as at group and individual levels (Romme, 2003, p. 565). This type of formalized learning transcends individual learning as it is deliberately fed back and forward into the organization, either to further improve knowledge productivity or stimulate innovation. Information and Communication Technology will contribute to the development of circular arrangements by providing tools and platforms for teams, communities and networks to jointly design new products, processes and services. An ICT – based coordination and/or collaboration mechanism (e.g social networks, wiki's) can connect knowledge and people to each other, open up opportunities to improved decision making and knowledge creation, and increases the reach and richness of the organization's knowledge flows.

Does Knowledge Sharing Deliver on Its Promise? Different Knowledge, Different Benefits.

Haas & Hansen (2007) have developed a differentiated productivity model of knowledge sharing in organizations that proposes that different types of knowledge have different benefits for task units. Their results demonstrate that knowledge sharing clearly has costs as well as benefits, including the investments required to rework documents and secure assistance from colleagues. Because the costs of knowledge sharing may sometimes outweigh the benefits, using electronic documents and personal advice from colleagues around the firm does not necessarily help — and sometimes actually hurts task-level performance. The implication is that research on knowledge sharing must look beyond intermediate activities such as knowledge search and transfer to examine the costs as well as the benefits of different types of knowledge content and processes, and the implications for task-level performance outcomes.

To move beyond research that focuses on knowledge sharing itself as the outcome of interest, we have identified and investigated time savings, work quality, and signals of competence as three dimensions of task performance that are understudied yet often critical to the productivity of knowledge work. Our study reveals very different effects of using the same types of knowledge on these different task performance dimensions, indicating not only that it is unsafe to assume that more knowledge sharing is always better, but also that is unsafe to assume that the net costs and benefits of the same type of knowledge are always the same. For example, high quality documents offered greater benefits for saving time than for improving work quality in this study, while lack of effort by colleagues imposed greater costs on work quality than on time (Haas &Hansen, 2007, pp. 1151).

Design Principles

Four principles govern the design of circular arrangements.

- First, a number of design rules for defining decisions as well as the decision-making process are created and decision-makers identified and linked to each other (Romme & Endenburg, 2006, p. 296);
- Second, guiding tools and techniques are developed in the setting of learning objectives and of organizing and improving learning at the individual, group and organizational level;
- Third, the arrangement is focused on process and result solutions, rather than on problems and issues;

- Fourth, the circular approach acknowledges the ill-defined and embedded nature of organizational processes, and uses broader purposes, ideal-target solutions and systems thinking, to guide long - term organizational development

Advantages

The circular organization provides organizations with a set of straightforward design principles such as "boundaries are continually explored and set" and "mistakes must be made". This approach implies that principles and rules, ideally, come before design. The organization first explores whether the design works - that is, produces the expected organizational processes - and subsequently tries to develop a deeper understanding of how and why it works (Romme & Endenburg, 2006).

Disadvantages

A potential downside of circular arrangements involves the effective implementation of and commitment to decisions on policy, process and practice issues in a group of people identified and authorized to do so, whether such decisions are taken on the basis of consent (defined as 'no argued objection') or through hierarchal and/or professional authority and power. This essentially involves the degree to which a circulararrangement can be steered into a different direction and/or output by means of managerial intervention and control. Such intervention may interfere with the natural need of workers sharing knowledge, to reach a conclusion 'in their own right' on what is shared versus what needs to be shared.

5.4. Cellular Arrangements

Cellular organizations generally fit well into the publicly accepted profile of future organizations (i.e. being perceived as dynamic, responsive, fluid, customer oriented, technology driven and virtual). These forms have over the years been regarded and discussed as ideally suited for the purpose of innovation, i.e. of creating and generating new knowledge-based products and services (Miles et al, 1997), essentially because they are seen to operate at arms length of the parent organization or financiers. The concept as such has been around since the early 1960s (Miles et al, 1997, p.19), but has never achieved mainstream status, primarily because of its 'free flowing' image. A cellular organization is made up of cells (self-managing teams, autonomous business units) that can operate alone and in interaction with others. It is this combination of independence and interdependence that allows a cellular arrangement to generate and share the

know-how that produces continuous innovation. Chowdhury, Endres & Endres (2000) present a *revised* cellular organization that is not only ideal for knowledge creation and innovation, but also able to ensure proper maintenance and utlilization of existing knowledge. Companys often forget things that have long been embedded in its organizational memory. 'Organizational memory decay' (Scalzo, 2006) occurs when organizations are merged or (temporary) 'lose' people because of redundancy, retirement and natural staff turnover. On the other hand, when knowledge is no longer valuable – or products and business functions are in decay and/or disappearing - retaining it can be counterproductive and /or costly. Often organizations resist the destruction of available knowledge because of the investments that were made to put the 'old' knowledge into value in the first place. Information and Communication Technology will contribute to the development of cellular arrangements by enable employees to work where, when and how it makes the most sense – both from an individual's, team's and organizational perspective. With the new technologies employees stay connected with colleagues and customers, anywhere, anyway, anyhow.

Design Principles

The design principles of a cellular structure include:

- Each cell (group,team, business unit etc) has an autonomous and entrepreneurial responsibility to be inherently innovative;
- Each cell must be able to continually shape and reshape itself in order to live up to its promise
- Each cell is rewarded for acting independantly in a business-like manner (Miles et al, 1997, p. 12).

Advantages

The cellular structure lends itself to sharing not only the explicit know how that cells have accumulated and articulated, but also the implicit know-how that emerges when cells combine to design unique new customers solutions (Miles et al, 1997, p.16).

Disadvantages

An organization must continually 'break' itself into cells. The challenge of a cellular organization is to establish some kind of common framework to create a shared understanding and a shared

identity of the 'whole' organization, without endangering or even losing its focus on flexibility and entrepreneurship.

5.5. Constellar Arrangements

Recently a fourth spatial arrangement – that of the '*constellar*' form - has surfaced which combines the previous arrangements into one 'mingled organization'. The notion of a 'united organization' can be beneficial when different spatial arrangements operate in a connected fashion towards each other, by virtue of their management deliberately selecting and matching different arrangements into a 'portfolio of forms' or a platform (Ciborra, 2006, Ciborra, 2007), with which they aim to mirror strategy with. In that case a similar approach towards organizational design can become possible as is common in business strategy processes, usually conducted by managers operating from corporate headquarters or other types of holding companies. On the surface a platform looks like a stable pool of different organizational forms – e.g. modular, cellular, circular- and hardly organized according to efficiency, control and risk management criteria. At a deeper level the platform is a collective 'frame' that allows managers and employees to improvise effectively – that is, relentlessly deploying new spatial arrangements in order to anticipate and adapt to complex, chaotic and crisis contexts.

6. Conclusions

Organizing from an industrial tradition essentially involves the 'placebound' concentration of labour, capital and raw materials in a demand driven, timely, low cost and efficient manner. Industrial organizations manage and integrate these 'resources' in '*places'* (factories and offices) and 'over *time*' (working hours). This "mix' has given rise to the '*resource-based*' view of the firm. The key to successful organizations in the knowledge based economy seems more to lie in the 'spacebound' concentration of the mental qualities of people, within the framework of likeminded knowledge and with the help of human-centred technology which directs and guides the minds of people to what is important and needs to be adressed and/or solved. In te placebound view of the firm, organizations exists of both formal as well as informal '*structures*'. In the spacebound view organizations exist as '*arrangements*'. In traditional organizational structures work is meant to create results, often in a focussed manner. In modern organizations, work is meant to create moments of value through the concentration of minds.

Many organizations are becoming aware of space as a potential lever for designing successful organizations. However, for any theory on spatial organizations to 'arrive' in practice, a logical and transparant set of design principles and methodologies needs to be available to managers and (knowledge-)workers, in order for them to 'frame' and actually implement new organizational forms. Without such a methodology it will be difficult to imagine and assess the opportunities and risks associated with new organizational forms, both prior to their implementation as well as afterwards when performance results are measured against their predecessor form. Within this working paper, a number of spatial arrangements (modular, circular, cellular and constellar) were presented and its advantages, disadvantages and design principles discussed. In this respect, research paper #4 (Lekanne Deprez, 2009) will present a new methodology of organizational design aimed at creating spatial organizations, together with a case describing this methodology in actual practice, while discussing its added value in the context of successful performance.

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