European KM Forum

IST Project No 2000-26393

D 1.2 – fourth release

Future of KM: Business Roadmap

Knowledge Organisation Transformation

Circulation:	Public
Partners:	BT; IAO; Siemens ICN.
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Doc. Ref. N°:	EKMF.D12.V07.2003-06-30.doc
Status:	Final Report Month 23

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Acknowledgement

This work is partly funded by the European Commission through IST Project N° IST-2000-26393 "European Knowledge Management Forum". The authors wish to acknowledge the Commission for their support.

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DOCUMENT HISTORY

Version	Date	Comment
01-05		Trends and Visions in KM – Scenarios for future work in the knowledge economy
06a	2002-11-01	Future of KM: Business Roadmap, draft first release
06b	2003-05-12	Second draft
06c	2003-06-13	Third draft
06d	2003-06-13	Third draft with editorial changes
07	2003-06-30	Final version

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1 INTRODUCTION

"87 per cent of companies, whatever their industry, believe that they are a knowledge-based business." (Business Intelligence/Ernst &Young Survey, 1997)

"Successfully adapting systems have the property of translating apparent noise into meaning at a faster rate than the arrival of apparent noise." Seth Lloyd Complexity Scientist.

"A successful species not only has to be adapted to the environment, it also has to be adapted to adapting to the environment". The Blind Watchmaker, by Richard Dawkins.

Over the past decade a number of powerful drivers have transformed the environment in which most organisations operate. Probably the most dynamic is the factor that emerges out of the conjunction of innovations in ICT and new value network dynamics. This is the shift in the way value is created to **"advantage through knowledge"**.

Although many commentators agree that the western economies have shifted from industrial to intangible forms of wealth creation, the fact is that many older organisations have emerged into this new landscape with much of their legacy intact. There are many k-based organisations operating in a k-advantage environment that retain traditional management approaches. There are also organisations that have accurately made sense of these emergent realities. They have successfully innovated and experimented to create k-advantage. The positive impacts of adopting more appropriate management approaches are many and varied; from smarter sensing, responding and adapting, to faster speed of execution and increased flexibility, attracting the best talent, mobilising innovation and creating and delivering value.

We term organisations that maintain traditional approaches to management, yet operate in dominantly k-advantage environments K-T, where K stands for k-advantage environment and T represents the negative impact of traditional legacy management. We believe that this is a very real issue for many large, old and complex organisations in Europe. The term K+ is used for organisations who are successfully creating knowledge advantage. This means that there is a good fit between the organisation and its knowledge-advantage environment.

So if the above description of current realities is correct, how are K-T organisations going to catch up with the **K+ organisations**? In our experience many organisations have not formally undertaken a holistic transformation process in response to the new set of environmental drivers. Instead managers may be unsure of how and where the organisation needs to change, or may be unaware of the imperative to transform at all.

The assumption is that K-T organisations are going to operate sub-optimally on a number of areas. These include the strategic, process, operational and functional dimensions. In knowledge-base organisations people are often the critical value-adding component. Many of the sub-optimal forces in K-T organisations centre on how people are managed, organised, motivated, directed, supported and developed.

This project identifies some of the key environmental drivers and proposes a high-level framework for enabling holistic knowledge-advantage transformation. The process takes the form of a gap analysis, transformation strategy development, roadmap development and execution. Case studies, stories and other resources to support knowledge-based transformation will also be included.

This project is an attempt to map out some of the ground and offer some top-level resources and tools. This is an emerging area and there is much further work to do in bringing together the many different strands. Please feel free to comment, give feedback and provide suggestions on the approach. We would also welcome case studies, stories and resources and any other relevant other methods, approaches and ideas.

2 OBJECTIVE

The objective is **to improve the strategic fit between knowledge-based organisations and their environment**. The approach outlined here is to analyse the current state of a knowledge-based organisation and develop a unique roadmap for transformation.

3 ORGANISATIONAL ENVIRONMENT: KNOWLEDGE-BASED ECONOMY

"Every few hundred years in (Western) history a sharp transformation of society occurs. Within a few decades society will rearrange itself – its world view; its basic values; its social and political structure; its arts; its key institutions. We are currently living in such a transformation, a shift to the 'knowledge society'. " – Peter F. Drucker (1997)

"The context has changed – we are entering a new economy. It is widely accepted that the developed world is changing from an industrial economy based on steel, automobiles, and roads to a new economy built on silicon, computers, and networks…The new (digital) economy is a knowledge economy…" – Don Tapscott (1997)

"These changes, the most significant since the Industrial revolution, are far-reaching and global. They are not just about technology. They will affect everyone, everywhere. Managing this transformation represents one of the central economic and social challenges facing Europe today..." - Romano Prodi (2001)

Over time, technology and globalisation have altered the external environment beyond recognition, as manufacturing has shifted east and the west has moved to dominantly **service-based economies creating wealth through knowledge**. In addition, the current environment moves faster and is more complex and uncertain than ever before. Yet many managers often insist on the legacy of their traditional industrial success and organise around models that are not a good evolutionary fit with this environment.

3.1 Knowledge-Based Scenarios

The impact of the knowledge-based economy on organisations is broad and diverse. The driving forces of the knowledge-based economy impact all sectors of the economy. Overlooking the global economy as an organic system, the growing importance of knowledge-based ecosystems, or industries, can not be denied.

Knowledge-based industries already make up a considerable share of economic value add in developed countries: *"At the end of the 1990s, high- and medium-high-technology manufacturing accounted for about 9% of total OECD value added. Knowledge-based "market" services accounted for 18% (including education and health, about 29%)".* [OECD, 2001]

Moreover, knowledge-based industries are in most cases the fastest growing areas of economic activity in developed countries, exemplary figures of the USA: *"Within both manufacturing and services, technology companies have become more important. High-technology industries' share of value-added in manufacturing has grown from 18 percent in 1970 to 24 percent in 1994. High-tech companies' output has increased as a share of GDP from 5.5 percent in 1990 to 6.2 percent in 1996."* [NEI, 2001]

This also points to a fact that it is not only the importance of organisations in knowledge-based industries that have a growing importance for the overall economy. Moreover, the importance of knowledge-based work within industries that are not typically classified as knowledge-based industries is growing: *"since 1969, virtually all the jobs lost in goods production and distribution sectors have been replaced by office jobs. The tools most Americans use are now more likely to be faxes, copiers, telephones, or PCs than riveters, lathes, or forklifts. In the New Economy, where*

competitive advantage increasingly stems from customisation, design quality, and customer service, more of the value-added is produced in offices … higher rates of productivity growth in manufacturing and agriculture have meant that almost 93 million workers (80 percent the workforce) do not spend their days making things-instead, they work in jobs that require them to move things, process or generate information, or provide services to people." [NEI, 2001] This can be explained by the fact that knowledge is always embodied in human beings (as "human capital") and their work. According to among others Levy and Murrane [1997], in the USA, as recently as the 1950s, 20 percent of the workforce was professional, 20 percent was skilled workers, and 60 percent was unskilled workers. In dramatic contrast, by 1997, while professionals continued to be 20 percent of the workforce, less than 20 percent were unskilled workers, while more than 60 percent are skilled workers.

Finally, the importance of knowledge-based organisations can not solely be measured by facts and figures of knowledge-based industries alone. The value add and stream of innovations coming from knowledge-based organisations has a deep impact on practically all other sectors of the economy. In other words, *".. it is the high-tech products and services that are helping to transform the rest of the economy."* [NEI, 2001]

One could therefore say that the knowledge-based economy is *"a high-tech, services, and office economy."* [NEI, 2001] Individual knowledge-based organisations thereby should be seen as the main engines behind this macro-economic development.

In our earlier on ***EKMF's Task 1.2 - Strategies and Visions*** [1], we have developed three scenarios in order to reflect and explore on the resulting possible future opportunities or threats as the knowledge-based economy develops within Europe.

The three scenarios and their attributes are reflected in the following table.

[1] See for more information: http://www.knowledgeboard.com/library/deliverables/ekmf_d12_v05_2001_09_30_iao.pdf, or the Strategy SIG at: http://www.knowledgeboard.com/community/zones/sv.html

	Scenario 1 Community Hubs	**Scenario 2 Knowledge Hubs**	**Scenario 3 Divided World**
Business	*Small and networked*	*Large and small networked as new entities*	*Large dominate*
Nature of work	*Virtual e-lancers*	*Tied to virtual organisation*	*Tied to traditional organisation*
Value Creation Models	*Dynamic value network*	*Dynamic value network*	*Traditional value chain*
Org Culture	*Entrepreneurial*	*Secure*	*Insecure*
Leadership	*Facilitator*	*Facilitator*	*Controller*
Technology use	*Pervasive and intelligent*	*Pervasive and intelligent*	*Poor levels of adoption and use*

Table 1: Core drivers and attributes of the three scenarios

The main impacts for organisations both public and private in scenarios 1 and 2 include:

- The shift to inter-organisational networks
- Changes within working practices
- Change in the role and style of leadership.

Complementing these scenarios, we have investigated the underlying environmental mega-trends. A global economy is a complex system. It is a complex system, consisting of many different elements. Trying to grasp the big picture of development patterns within a complex system is not trivial, and involves understanding how the different parts constitute and impact the whole. In this sense, the diversity of opinions, which have influenced the way we think about what this complex system makes to what it is, is really like the story of the wise men and the elephant. Observing the elephant from the side (the body), one might conclude 'the elephant is like a big wall', observing the elephant from the front (the snout), one might conclude 'the elephant is like a tube', observing the elephant from the back (the tale), one might conclude 'the elephant is like a snake', and so on. And, off course, as in the story of the elephants, all wise men contribute to a relevant understanding of what the elephant is.

A global economy as a complex system, can be said to consist of different intertwining forces, of which the main ones are: technology (what instruments and processes are used?), resources (what are the relevant sources for productivity, for performing economic activity?), structures (what are the means of organising economic activity?), systems (how are different economic activity systems related to each other, interlinked?), value creation (in what way do economic systems lead to the creation of value and wealth?), growth (how do economic systems progress and develop?) and social fabric (how are economic systems influenced by it people's culture, values and beliefs?).

Following can be said about the main shapers and movers within these seven force fields of the socio-economical system:

- **Technology**: main instruments coming out of information- & communication-technologies, complemented with technical advancement in fields as bio-technology;
- **Resources**: main source for performing economic activity is the fourth production factor, knowledge;
- **Structures**: main influence of networked shaped models for organising economic activity;
- **Systems**: main influence by increased inter-linkage and interconnectivity of economical systems, within and across borders;
- **Value Creation**: main influence by the dematerialisation of value add out of economic activities;
- **Growth**: main influence by the role of ideas and speed of innovation in economic progress;
- **Social Fabric**: main influence by increasing emphasis on experience in health and ecological issues throughout the whole fabric of socio-economic systems.

These seven identified mega-trends will be here shortly described, mainly from the perspectives of its concrete implications on traditional organisations.

3.2 Mega Trend One: Digitisation

Don Tapscott [1997] is one of the main proponents of the arrival of an Information Age or Digital Economy. In this view, *"corporations need to get beyond reengineering to the transformation of the corporation enabled by information technology (IT). The goal should not just be cost control but the dramatic and profound transformation of customer service, responsiveness, and innovation". Reengineering is a "necessary but insufficient condition for competitiveness.*" [Tapscott, 1997]

The main emphasis in this view is on the disrupting impact of information- and communication-technologies on all aspects of life: *"Information networks will be highways for the new economy"*.

In summary, the drastic **digitisation of the world have made quicker transport, faster interchange and more efficient processing of large amounts of data and information possible**, thereby making information a commodity, which is accessible in large amounts, at many locations for many users. Moreover, has the increasing pace of development of the complete spectrum of diverse technologies, like for example bio-technologies and transportation technologies, caused global shortening of both technology-lifecycles and product- lifecycles.

The invention of the computer and the rapid development and broad array of applications of information and communication technologies can be seen as a major driver of in the field of technology.

3.3 Mega Trend Two: Knowledge-Intensity

Peter Drucker [1993] is one of the main pioneers speaking about the arrival of a Knowledge Society. In this view, the main driver of socio-economical change is the rising importance of knowledge for economic activity and the professionalisation of the workforce: *"In the new economy, the industrial workers are replaced more and more by so called 'knowledge workers'. The new knowledge jobs require good formal education, abilities to apply and to acquire knowledge, a special approach to work and a different mindset. Life-long learning is an essential element of knowledge society."* [Drucker, 1993]

In this view, learning and education on and off the job, will become the centre of the knowledge society, and the school its key institution: *"Mainly, knowledge will be acquired by schools, but also through education-processes outside of school. The productivity of knowledge work will define the competitive position of companies, nations, regions and institutions. Learning technologies enable nearly everybody to acquire knowledge."* [Drucker, 1993] In a knowledge society, competition, but also specialisation will increase.

In summary, increasing **knowledge-intensity implies a shift in resource usage away from land, capital and labour in favour of knowledge** and has to do with: an overwhelming flood of information at hand; an increasing percentage of knowledge sectors and knowledge work; a decreasing half-value time of knowledge; life-long learning; and rising levels of education and skilled workers.

As a driving force in the field of economic resources, do the rising levels of education and professionalisation of jobs play an important role. Many service industries but also manufacturing industries and even agricultural industries have a heavily increasing demand for workers who use their heads more than they use their hands. With all educational institutions, like schools and universities, being more and more accessible, the amount of educated people has drastically risen this last century. So, changes in the workforce have lead to the situation that over 70 percent of all workers in developed economies are information workers [Sveiby, 2000].

3.4 Mega Trend Three: Connectivity

Manuel Castells is one of the main proponents highlighting the importance of networks in current life: *"Networks are for the current times what factories were within the industrial revolution. Actually we now see the process reversed: decentralisation and disintegration of big vertical organisations into highly flexible networks of small, dispersed units: individuals, companies and small companies which are able to change and adapt to changed conditions. Such a network can often operate much more effective than a large organisation."* [Castells, 1997]

In the Network Society for the first time in history, the basic unit of economic organisation is not a subject, be it individual or collective, the unit is the network. In the Network Society perspective, the main difference between the new global economy and the previous ones is that *"it is an economy with the capacity to work as a unit in real time on a planetary scale"*. It is characterised *"by its interdependence, its asymmetry, its regionalization, the increased diversification within each region, its selective inclusiveness, its exclusionary segmentation, and, as a result of all those*

features, an extraordinarily variable geometry that tends to dissolve historical, economic geography" [Castells, 1997]

Dominant functions and processes in this day and age are increasingly organised around networks. Networks constitute the new social morphology of our societies and the diffusion of networking logic substantially modifies the operation and outcomes in the processes of production, experience, power and culture. While the networking form of social organisation has existed in other times and spaces, the new information technology paradigm provides the basis for its pervasive expansion throughout the entire social structure. The new network affects changing patterns of cooperation and competition across institutions. The network enterprise is *"that specific form of enterprise whose system of means is constituted by the intersection of autonomous systems of goals".* [Castells, 1997]

According to Castells [1997], the integrated global network, the so called space of flows, comprises several connected elements: private networks, company intranets; semi-public, closed and proprietary networks such as the financial networks; and public, open networks, the Internet.

Within the Network Society, power is given to the nodes and switches connecting different networks. These nodes and switches form and define the network society. The convergence of social evolution and development of IT has created a new material base for work. This network base defines the social processes and the social structure. The business is organised in networks of capital, management and information. The access to these networks decide on productivity and competitiveness. Networks of variable form replace the difference between SMEs and conglomerates. The work process is more individualised, work is divided and integrated. The result is a new form of division of labour, based on every single worker and not on the organisation of workflows. Capital flows globally. Work is organised locally. The unit of business processes still exists, but work is differentiated and workers are segmented. [Castells, 1997]

In summary, **networks are more and more becoming the new structure and infrastructure of modern economies and societies**. Networking-technologies (e.g. internet), communication technologies (e.g. mobiles), improved transportation infrastructure (e.g. air transport), but also collaboration via networks on a social and business level (e.g. increasing importance of intra- and inter-firm networking) are transforming the domain of economic structures.

Some of the factors which exemplary elicit the influence of networking, collaboration and connectivity are: individualisation (e.g. mobile communication and computing), networks in firms (intra-firm networking), networks between firms (inter-firm networking), decentralisation (of firms number MBO) and deregulation (of markets e.g. telecom).

3.5 Mega Trend Four: Globalisation

According to many systems thinkers, and very explicitly by Russell Ackoff [1997], one of the main changes occurring today is the arrival of a globalised Systems Age. The arguments behind the Systems Age are mainly conceptual in nature and basically imply that we move from a Machine Age to what is called the Systems Age. This change is intellectually founded in the concepts of reductionism and expansionism, of analytical thinking and of open systems. Systems have become the organisational concept in science: *"A system ... is a divisible whole; but viewed functionally it*

is an indivisible whole in the sense that some of its essential properties are lost in taking it apart. The parts of a system may themselves be systems and every system may be part of a larger system … a system's performance depends on how it relates to its environment". [Ackoff, 1997]

In the global Systems Age perspective, management should focus on identifying a containing system of which the thing to be explained is part; explaining the behaviour or properties of the containing whole; explaining the behaviour of the thing to be explained in terms of its role(s) and function(s) within its containing whole. Moreover, the System Age implies a shift from 'analysis' to 'synthesis' as the dominant way of thinking about events: analysis focuses on structure, it reveals how things work - synthesis focuses on function, it reveals why things operate as they do; analysis yields knowledge - synthesis yields understanding; analysis enables description - synthesis enables explanation; analysis looks into things - synthesis looks out of things. [Ackoff, 1997]

Furthermore, innovations in information and communications technology have transformed previous economic constraints on global access to information. In today's world knowledge workers can operate from virtually anywhere. An international team set new Internet2 Land Speed Records by transferring 6.7 gigabytes of data across 10,978 kilometres (more than 6,800 miles) of network in less than one minute. Using a quantity of data equivalent to nearly two feature-length DVD-quality movies, the transfer was accomplished at an average speed of more than 923 megabits per second, or more than 3500 times faster than a typical home broadband connection, during the SC2002 conference held 16-22 November 2002

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Still, the effects of increasing globalisation and globalised systems is still something heavily discussed [Moerman, 1998] and its impacts are diverse and not clear cut. Some arguments speaking for the case of globalisation are e.g. increasing global import/export flows and rising levels of foreign direct investment [Economist, 2001].

3.6 Mega Trend Five: Dematerialisation

As post-war economies evolved and welfare increased, consumers became more and more influentially powerful in the markets. With an increasing amount of more demanding and better informed consumers, **organisations have to rely more on 'soft factors' like for example image and design**, to position their products successfully. Furthermore the markets for immaterial goods (services), like for example holiday services and entertainment industry, are growing on a large scale. To give an indication of the degree of dematerialization, are according to Tapscott [1997], 60% of all American workers knowledge workers and eight of ten new jobs in information-intensive sectors of the economy. According to [Quinn, 1992] the service industries in the USA already accounted for 74% of GNP and 77% of all jobs in 1988. Current figures show a delineation of this trend [NEI, 2001].

3.7 Mega Trend Six: Idea-Driven Growth

Recently a new perspective on current events is added, mainly by for example Chris Meyer [2002], who states that we move from a Connected Economy to an Adaptive Economy. The main idea behind this perspective is that because of the growing number of connections within the economy, the overall socio-economical system becomes unpredictable and accordingly the ability to be adaptive becomes the key issue: *"As the number of connections among the elements of a system grows, the system no longer behaves predictably. Information technology enforced speed and number of connections between organisations, individuals, and information. Because of this, economy will be turned into a complex adaptive system"*. [Meyer, 2002] An overarching implication of an Adaptive Economy is that the ideal will be a balance of stability and innovation, which will take cue from adaptive systems and facilitate experimentation, recombination, evolution, and proliferation. [Meyer, 2002]

Idea-driven growth thereby implies a **growing importance of ideas and innovation for economical progress and development**. This assumable goes hand in hand with more risk, speed and uncertainty of strategic decisions. Some factors that speak in its favour are e.g. increasing number of patents, rising levels of R&D spending (both public and private), and the rising level of start ups [NEI, 2001]. The development of the current economical system is based on technical and non-technical innovation. With shortening of product life cycles and rapid technological development, an organisation is more and more challenged to strive for a constant stream of innovative products, or as they would say at Microsoft: 'Obsolete your own products'. Human imagination thus becomes the main source of adding value.

3.8 Mega Trend Seven: Experience

The view of an Experience Economy, has most often attached with the names of Pine and Gillmore. This view on events implies that the main differentiating factor of current days has to do with the creation of value, more specifically with a shift away from the offering of products and services, to offering of experiences: *"in the experience economy, beyond merely providing services, businesses stage memorable experiences for customers that are entertaining and/or educational in nature … the newly identified offering of experiences occurs whenever a company intentionally uses services as the stage and goods as props to engage an individual. While commodities are fungible, goods tangible, and services intangible, experiences are memorable."*

In the long run, experiences will become commodities. Individuals are looking for the next level of economic offering, which will be the of transformations. Now, the customer becomes the product. Then organisations will be in the business of personal transformation.

Moreover, the social fabric of the current economical system is more and more dominated by an emphasis on health related issues and increasing awareness for environmental and social responsible behaviour. The underlying reasons are diverse, like for example the increase in medical capacity, the bio-technological and pharmaceutical constant stream innovations, the rising levels of average age in developed countries, as well as better informed and more influential consumers and non-governmental organisations pushing organisations for more responsibility and awareness. This might eventually lead to higher long term performance of enterprises that adhere to a triple-bottom-

line responsibility (financial, social and ecological) and take into account in strategic decisions a broader set of stakeholder interests.

3.9 Impact on Organisations

Overlooking the different perspectives on the 'elephant' and the mega-trends in the seven main domains of the complex economic system, a number of things can be concluded.

The organisational environment of a knowledge-based economy and the underlying forces, which were described above, are obviously having an impact on the way organisations do business, and at the same time is changing the way they have to organise, to do strategic thinking and to manage their resources, in particular knowledge and competencies as the most important ones. It seems worth questioning, which of the 'traditional' management approaches, coming from an industrial era mindset, will be adequate and which ones not adequate, to provide appropriate answers and solutions to managers in these evolving broader setting.

Overlooking the development of the seven identified forces, it was argued that information is one very important resource in the shift to this new situation, the information era. And therefore it seems necessary to integrate such an important resource (information) in a management approach by planning, organising and structurally executing activities that handle its dynamics - and more important the appropriate action and decision based on it - throughout the organisations.

One could state that a number of things should be emphasised in a different manner. First of all, with the increase in information processing capacity ('Digitisation'), information as such becomes more and more a commodity. Especially in combination with the increased 'Connectivity', information can be obtained from around the globe via e.g. internet or corporate information systems. The result is that information is a rapidly devaluating resource. And as the supply of this resource is so overwhelmingly large and nearly inexhaustible, the capacity to find and use only the right information becomes more and more crucial. Thus in order to avoid information overload and find a way through the information glut, a different intellectual capacity will be needed: knowledge and/or intelligence.

Secondly, the characteristics of 'Idea-driven Growth' and 'Dematerialisation' both point in a similar direction. Dematerialisation implies that instead of tangible products more and more products become intangible, services. Next to this do tangible products, like e.g. automobiles, create more and more value through knowledge-based work, like e.g. design, marketing and R&D. One of the largest growing industries is that of pure knowledge companies, like e.g. consulting and engineering, where knowledge has become the raw material, production factor and product. The characteristic of 'Idea-driven Growth' implies that for creating value not only existing information and knowledge can be recycled, but human capacities like e.g. learning and creativity ('Knowledge-Intensity') are necessary for creating new knowledge and thus become increasingly vital for corporate competitive advantage.

And finally, do the characteristics of 'Knowledge-Intensity', 'Technological Advancement' and 'Social Fabric' make it possible to emphasise knowledge instead of information as the central element of management. With a growing amount of employees with a high level of education ('professionalisation'), the growing demand for knowledge workers can be encountered. Moreover, is continual learning possibly a more natural activity to employees who have learned a large part of their life.

Overall, it can be stated that *in light of an unimaginable and unpredictable, near and far future for our society, and thus for industry, an utmost state of readiness is necessary* [Moerman, 1999]. Concretely, this implies that organisations in the knowledge-based economy will be based on ideas, knowledge, connectivity and adaptation and that the modern organisation should be oriented, concerning e.g. organisational form and management, accordingly.

4 KNOWLEDGE PLUS ORGANISATIONS: STORIES & PRACTICES

Organisations that have either started with knowledge-based attributes, or have successfully transformed within a knowledge-based environment are termed K+. Organisations that are knowledge-based, but have traditional attributes are termed K-T, where the assumption is that the traditional legacy has a negative impact on performance.

The process of holistic business transformation and especially the pointers for a K+ organisation are based on good practice and available knowledge (e.g. expert opinion, articles, stories, etc.) out of the business world. Before coming to the framework covering the Traditional to Knowledge (T to K) continuum, this chapter will anecdotally define the picture of a K+ organisation. The practices and stories are described along the five organisational enablers.

4.1 About Corporate Transformation

"All around us we see evidence of an accelerating rate of change and increased volatility, arising from the dense connectivity of the information economy—just look at the rapid rise in business failures and in CEO turnover, or the tenfold increase in S&P 500 stock price variability over the past two decades. The only response, indeed the new management imperative, is to abandon assumptions of stability and control, to accept the reality of constant change, and to build the capacity to respond ... The practical implications of an adaptive management framework, which derives its fundamental principles from evolutionary systems, will transform the future workplace..." - Chris Meyer & Stan Davis, It's Alive (KB – theme 6) , May 2003

Powerful drivers have transformed the environment. Therefore organisations are forced to perform a shift in the way value is created to "advantage through knowledge". There are many and varied positive impacts of adopting more appropriate management approaches, e.g. smarter sensing, responding and adapting, attracting the best talent, etc. K+ organisations are characterised by successfully creating knowledge advantage as well as by achieving a good fit between organisation and k-advantage environment.

How are K-T organisations going to catch up with the K+ organisations? There is obviously a strong need for a holistic transformation process in response to the new set of environmental drivers. Thus, the objective of business transformation is to improve the strategic fit between k-based organisations and their environment.

Resource: Knowledge versus Industrial Enterprise. Useful site that discussed approaches to the emerging knowledge economy and the need for organisational transformation.

http://www.1000ventures.com/business_guide/crosscuttings/knowledge_based_enterprise.html

Resource: The Knowledge Organisation. Karl-Erik Sveiby 1996 article on knowledge organisation. The Knowledge Organisation belongs to a subgroup within the service sector. The service sector is not a discrete phenomenon but rather a spectrum of company types ranging from those organisations totally adapted to their customers - the knowledge organisations - to organisations that have refined and packaged their output. The latter have more in common with manufacturing companies.

http://www.sveiby.com.au/articles/KOS1.html

Resource: Adaptive Enterprise: Creating and Leading Sense-And-Respond Organisations. Useful book covering complex adaptive systems and evolutionary approaches to strategy and organisational design by Stephen H. Haeckel. HBS Press. http://www.amazon.com/exec/obidos/tg/detail/-/0875848745/102-2332239-6096938?vi=glance

Resource: The Wealth of Knowledge: Intellectual Capital and the Twenty-first Century Organisation, (2001), Tom Stewart, Doubleday. http://www.amazon.com/exec/obidos/tg/detail/-/0385500718/qid=1056992693/sr=1-1/ref=sr_1_1/102-2332239-6096938?v=glance&s=books

Resource: **Knowledge in Organisations.** (1997), Laurence Prusak Butterworth Heinemann An anthology of key articles represents a variety of perspectives, including sociology, economics and management science.

http://www.amazon.co.uk/exec/obidos/ASIN/0750697180/qid=1057653523/sr=1-4/ref=sr_1_2_4/026-6024349-2226015

4.2 Knowledge-based Environment Indicator

Value creation is the most fundamental indicator for identifying a knowledge-based business. After all, one of the reasons that the social groupings we call organisations exist is that value accumulates through collective learning, innovation, collaboration and information leverage. This applies as well to public as private organisations. Value creation is a good proxy for an organisation's environment because all organisations have customers, or consumers of output, that are the beneficiaries and determinants of value.

Indicator	Traditional	Knowledge
How is value Created?	Automated and routine	Customised and unique
	Physical Assets	People-based, information-centric
	Tangible	Intangible
	Commodity Products	Complex Solutions
	Traditional Value Chain	Dynamic value Network

Table 2: Value creation in traditional and knowledge-based business

Resource: Review of Gary Hamel and CK Prahalad book "Competing for the Future" on strategic planning, but with a focus on breakthrough strategies for industry leadership and the markets of tomorrow. http://www.inspired.co.nz/Reading Room/Competing_for_the_Future.htm

Resource: "The Value of Emergent Value Creation Models in the Knowledge Economy". Written in the year 2000, these position paper by George Pór, Founder of Community Intelligence Labs. Visionary framework that takes in complex systems to propose new ways of organising work. http://www.co-i-l.com/coil/knowledge-garden/kd/vcmodels.shtml

4.3 Knowledge-based Organisation Enablers

We proposed that five key enablers for transformation are Leadership, Culture, Structure, People and Technology. These dimensions are addressed from a knowledge-based perspective.

4.3.1 Leadership

There are different schools[2] of thought on the role of leadership in strategy formation (see figure 1):

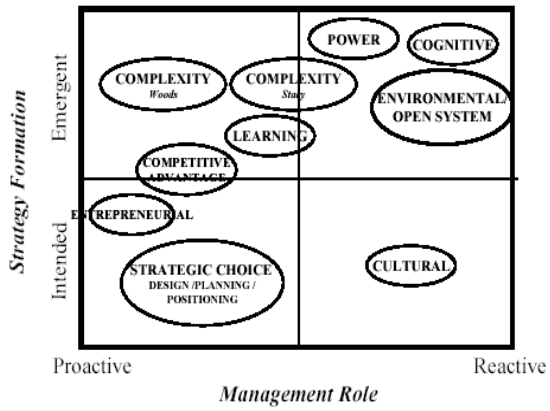

figure 1: schools of thought on strategy formation and management[3]

[2] See Kemp, J. and Ashish, J. (2003), Review of Henry Mintzberg's Nine Strategy Schools of Thought, http://www.knowledgeboard.com/cgi-bin/item.cgi?id=109595&d=1&h=417&f=418&dateformat=%o%20%B%20%Y

[3] Ziv, A. (2003) The Role of Complexity in Managing Strategy. http://www.knowledgeboard.com/cgi-bin/item.cgi?id=109676&d=1&h=417&f=418&dateformat=%o%20%B%20%Y

From this, ZIV (2003) developed a Management Role Matrix, which gives a good overview about possible management role clusters in the process of strategy formation:

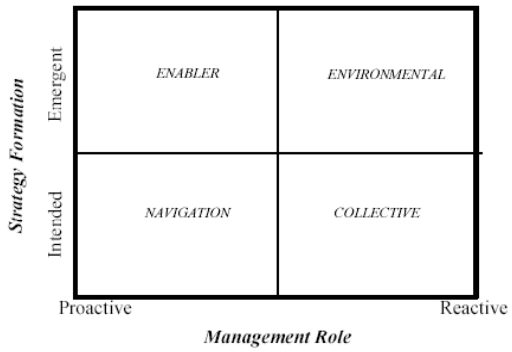

figure 2: schools of thought on strategy formation and management

As ZIV states, the four quadrants are the followings:

- Navigation – where management plays a proactive role in intended strategy formation
- Enabler – where management role is proactive in enabling an emergent strategy formation process
- Environmental - where management role is reactive in an emergent strategy formation process
- Collective – where management role is reactive in an intended strategy formation process

Concerning knowledge based organisations, complexity theory related to management has great implications on the definition of the role of the management in strategy formation processes. STACEY[4] mentioned that managers as members of the organisation are not able to step outside organisational processes nor to control, plan or direct them. Mintzberg et al.[5] see the role of leadership not in preconceiving strategies but in coordinating and guiding a process of continuous strategic learning which affords an opportunity to the emergence of new strategies. Strategic management from this point of view means constituting and balancing the boundary between control and learning, stability and change. From there, the environmental cluster of management role and strategy development might perfectly fit the needs of an ***ideal*** knowledge based organisation.

The above stated does not mean to managers that they all will have to move immediately to the environmental cluster of management role. This leadership role does not fit to all organisations, most of them will need a mix of different management roles. Instead, it was aimed to point out that the role of the management in a strategy formation process is addicted to the complex reality of the organisation and that managers have to give up thinking in the old paradigm of power and control

[4] Stacey, R.D. (2000) Strategic Management & Organisational Dynamics : The Challenge of Complexity, 3rd ed.

[5] Mintzberg, H. et al. (1998): Strategy safari: a guided tour through the wilds of strategy.

when it comes to strategy. Or, to say it with the words of Christopher Meyer[6]: "The new management imperative is to abandon assumptions of stability and control, to accept the reality of constant change, and to build the capacity to respond."

4.3.1.1 Resources and case studies

Case: Skandia Intellectual Capital Navigator. World famous approach to organising around a framework for intellectual capital.

http://www.knowledgeboard.com/cgi-bin/item.cgi?id=81482&d=506&h=417&f=418&dateformat=%o%20%B%20%Y

Case: IBA West transforms itself into a Knowledge-Based Organisation within the Financial Services sector. Includes structure and cultural transformation.

http://www.centeronline.org/knowledge/casestudy.cfm?ID=631&

Case: BASF . Chemical giant BASF Corporation, a subsidiary of Germany-based BASF AG, finds itself changing rapidly in order to stay ahead of an increasingly competitive marketplace. New leadership within the company is relying more and more on knowledge resources like Information Technology, and asking such business units to break from traditional roles and lend their expertise to strategic discussions that influence the profitability of the company.

http://www.alsinc.com/casestudies.html

http://www.cpaaustralia.com.au/01_information_centre/16_media_releases/docs/speech_20021119_larsen.pdf

Case: CPA Australia. Transforming any organisation for the knowledge-based economy is not an easy task. The author discusses the introduction of a knowledge management culture at CPA Australia, which is the fifth largest accounting body in the world. The challenge is to manage knowledge in the management team and in the membership structure, and to align and build on both.

http://www.cpaaustralia.com.au/01_information_centre/16_media_releases/docs/speech_20021119_larsen.pdf

Case: The Case of Singapore's Small and Medium-Sized Enterprises. University of Göttingen study was aimed at examining the adaptability and change readiness of Singapore's SMEs and their owners vis-à-vis the rapidly changing external business environment, as exemplified by the process of economic globalisation, intense competition, technology development and the Asian crisis.

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[6] Meyer, C. and Davis, S. (2003): "It's Alive". See review on KnowledgeBoard at http://www.knowledgeboard.com/cgi-bin/item.cgi?id=109570&d=1&h=417&f=418&dateformat=%o%20%B%20%Y

http://www.zdh-connect.com/PDF/ISBS28-Change%20Leadership%20in%20Organizations%20-%20The%20Case%20of%20Singapore's%20SME.PDF

Case: Vigo Inc. World-leadership through superior knowledge creation. Polish SME case includes leadership, structure and cultural transformation.

http://www.knowledgeboard.com/cgi-bin/item.cgi?id=102307&d=506&h=417&f=418&dateformat=%o%20%B%20%Y

Resource: Transformational Leadership in the Knowledge Economy. To achieve optimal sustainable performance, leaders in the knowledge economy need to express their leadership capability in two distinct domains.

http://www.ethoschannel.com/prodevelopment/robinson/transformational.html

4.3.2 Culture

When looking at an organisation through the lenses of the knowledge-based theory of the firm the strategic support of a shift from traditional Fordist organisational cultures towards cultures capable to cope with actual demands of new organisational structures can be seen as one of the most important issues that should be addressed in strategy development. LUHMANN[7] refers to the definition of RODRIGO who proposed to define organisational culture as "the complex of the not decidable premises of decisions" within an organisation. The most important insights this definition of organisational culture leads us to are:

- Organisational culture arises where problems appear which cannot be solved by hierarchical orders (e.g. the uniform presentation of an organisation to it's environment while there are different opinions/sentiments inside: Organisational culture regulates "how to make faces" without demanding from it's members to believe in the presented values).
- An organisational culture gets it's particularity from the implicit or explicit reference to the history of the system. This history of decisions is very local, and that is the reason why there can be more than one consistent organisational culture in-side the same organisation.
- Organisational culture is produced by formal redundant communication like chats and informal conversations. The result of this communication is anonymously produced. The function of this kind of conversation is to express a spirit of belonging without discussing it directly as a theme in the communication in order to avoid occasions for accepting or refusing this spirit.
- The basic elements of organisational culture are values that are latently communicated within the organisation. The effort to address the values of an organisational culture to the organisation would make different intentions, interests and conflicts visible. This may lead to a change of the organisational culture. How this change will look like

[7] Luhmann (2000), Organisation and decision, Wiesbaden

> depends from the local receptions of how the organisation should be in the future. A cultural change can't be managed in terms of directing.

MINTZBERG therefore assumes that culture is largely influencing the maintaining of strategic stability also meaning that culture often is one of the biggest barriers to strategic change. Therefore organisations need to take in account that strategy formation is a collective process of social interaction based on the beliefs and understandings shared by the members of an organisation. STANCEY states that strategy is a perspective above all, rooted in collective intentions and reflected in the patterns by which the deeply embedded capabilities of the organisation are protected and used for competitive advantage.

Dr. LISSACK[8] stated in his interview, that one of the most important cultural factors to make an organisation robust in a turbulent environment is its sense of identity: "If you have a good sense of identity, such that you are prepared to dialog about the next thing, then that's an indication of robustness.". Thus, the knowledge strategy of the organisations should be dedicated to support the process of identity formation.

Culture obviously seems to be the organisational element the hardest to change within the shift towards a knowledge based organisation. A successful approach to change might be to teach the organisation with SHOEMAKERS words how it "[…] can learn to profit from leaving the boundaries of the known."[9]. Strategy might support that process by giving occasion for a continuous reflection on its own assumptions and turning them into artefacts of the organisation.

4.3.2.1 Resources and case studies

Case: UK National Health Service. This project aimed to develop and evaluate knowledge management processes to support best practice in patient care. It looked widely at knowledge flows across the Sandwell Healthcare NHS Trust, and within a local GP practice including the culture, attitudes and working practices of the staff involved
http://www.knowledgeboard.com/cgi-bin/item.cgi?id=48831&d=506&h=417&f=418&dateformat=%o%20%B%20%Y

Case: Incorporating KM into Ogilvy Mather, In 1997 Ogilvy & Mather Direct re-organized and re-branded itself as OgilvyOne. As part of this redevelopment, OgilvyOne developed a proprietary methodology called Customer Ownership. To ensure this philosophy was put into the hearts, minds and not least the hands of our 2500 employees, the chairman asked that it be made "electronic".

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[8] Lissack, M. (2003) Interview at the KnowledgeBoard at the 28th of May 2003, http://www.knowledgeboard.com/cgi-bin/item.cgi?id=110164&d=1&h=417&f=418&dateformat=%o%20%B%20%Y

[9] Shoemaker, P. (2003) Keynote presentation on KnowledgeBoard at the 26th of May 2003, see weekly digest at http://www.knowledgeboard.com/cgi-bin/item.cgi?id=112298&d=1&h=417&f=418&dateformat=%o%20%B%20%Y

http://www.knowledgeboard.com/cgi-bin/item.cgi?id=48523&d=506&h=417&f=418&dateformat=%o%20%B%20%Y

Case: Knowledge Management in the GTZ. In the person- and hierarchy-oriented expert culture, knowledge is the domain of individuals who consider it their personal property. Individualism is a characteristic feature of the GTZ as is its advisers' preference for investing in their own approaches rather than making use of what is already there. Consequently, individual problem solutions are the order of the day. People would prefer to instruct rather than learn themselves, to talk rather than listen. A lack of knowledge is regarded by some as a weakness instead of being comprehended as the basis for further learning and the generation of new knowledge. For this reason, the perhaps the greatest challenge when embracing the concept of knowledge management is the need to alter corporate culture.

http://www.knowledgeboard.com/cgi-bin/item.cgi?id=51869&d=506&h=417&f=418&dateformat=%o%20%B%20%Y

Resource: The Value of Trust. It's hard to measure the value of trust in a relationship but most of us will know the cost of losing it. This can be seen in our personal lives – for instance, in the destructive consequences of an affair – or in the world of business where the value of a firm such as Andersen was virtually destroyed when trust was lost.

http://www.knowledgeboard.com/cgi-bin/item.cgi?id=86659&d=506&h=417&f=418&dateformat=%o%20%B%20%Y

Resource: Bibliography on Cultural Aspects of KM Prepared by Eric Tsui, Computer Sciences Corporation. http://www.knowledgeboard.com/cgi-bin/item.cgi?id=83941

Resource: CEN definition on organisational culture. Culture is a multi-level feature or capacity of an organisation. Organisational culture incorporates external survival issues, internal integration issues and deeper underlying assumptions of the organisation. In the organisational culture are included e.g. mission, strategy and goals; structures, systems and processes; common language and concepts, group boundaries and identity, the nature of authority and relationships; assumptions of human nature, of time and space and of reality and truth. Organisational culture is a combination of shared history, expectations, unwritten rules, and social mores that affect the behaviour of the members and the organisation itself. Organisational learning refers to a company's creation, acquisition and adoption of knowledge with the objective of enhancing its performance. Organisational learning includes detecting and correcting errors in the ways that involve the modification of an organisation's underlying norms, policies and objectives. Organisational learning involves continual review of the assumptions, values and manner of carrying out activities. http://www.knowledgeboard.com/cgi-bin/item.cgi?id=105924

4.3.3 Structure

Structure is defined as the way the organisation has organised what it does to fulfil its purpose. This includes processes, performance measurement, organisational structure both formal and informal, physical work design and geographic context. Business connections within inter-organisational networks are also important aspects of structure. IT infrastructure and information architecture are increasingly important enablers of structure an will be covered in chapter 4.3.5.

Within the knowledge based economy it becomes crucial to establish fast and efficient communication structures for information transfer and use. Therefore, organisations are building up intra- and inter-organisational network structures.

At the intra-organisational level, knowledge based organisations should identify a structure that allows dealing with the complexity of the non-linear system and supports open and efficient knowledge transfer. POR[10] pointed out that the major goal thereby should be to create a structure fostering the emergence of disruptive innovations. He states that the main organisational enabler for that is "[…]an innovation architecture well integrated with a holistic knowledge strategy that recognises that the highest value asset/capacity of any company is not simply the members but the productive and trustful relationships among them. If the knowledge strategy is strong on developing such meta-capabilities as collaborative learning (c-learning), it will be more successful in leveraging the power of communities of practice (CoPs) for innovation." CoP are typically engaged in incremental improvement, but by close alignment and cooperation with such functional areas as marketing, R&D or strategic management they would be able to contribute even with radical ideas, because they might be able to break out of old patterns of organising and allow to cross hierarchical, technical, geographic and cross-cultural boundaries. A knowledge strategy should be dedicated to support the build up and development of CoPs.

At the inter-organisational level, EDERER[11] points out that the pressures of competition and cooperation creates a tension for strategists when determining inter-organisational relationships: "They must choose whether to emphasise a more competitive posture and select more competitive relational arrangements, or whether to decide for a more cooperative posture, with the more collaborative arrangements to match.". From this point of view, he identified two diametrically opposed positions: The discrete and the embedded organisation perspective (see figure 3).

[10] Por, G. (2003) Radical innovation with Communities of Practice, published at the KnowledgeBoard at the 27th of May 2003, http://www.knowledgeboard.com/cgi-bin/item.cgi?ap=1&id=110849&d=pnd&dateformat=%25o-%25B

[11] Ederer, P. (2003) Perspectives on Network Level Strategy, published at the KnowledgeBoard at the 20th of May 2003, http://www.knowledgeboard.com/cgi-bin/item.cgi?ap=1&id=110505&d=pnd&dateformat=%25o-%25B

	Discrete Organization Perspective	Embedded Organization Perspective
Emphasis on	Competition over cooperation	Cooperation over competition
Preferred position	Independence	Interdependence
Environment structure	Discrete organizations (atomistic)	Embedded organizations (networked)
Firm boundaries	Distinct & defended	Fuzzy & open
Inter-organizational relations	Arm's length & transactional	Close & structural
Interaction outcomes	Mainly zero-sum (win/lose)	Mainly positive-sum (win/win)
Interaction based on	Bargaining power & calculation	Trust & reciprocity
Network level strategy	No	Yes
Use of collaboration	Temporary coalitions (tactical alliance)	Durable partnerships (strategic alliance)
Collaborative arrangements	Limited, well-defined, contract-based	Broad, open, relationship-based

figure 3: Organisational perspectives

Strategists within a discrete positioned organisation belief that the best strategy for each organisation is to obtain the market power required e.g. in order to achieve good quality-price-deals, to limit government demands and to determine the development of the industry. In their terms, effective power requires independence and collective arrangements are only second best. These organisations are not developing network level strategies but are striving for 'strategic self-sufficiency'. Collaborative arrangements are selectively employed as a tactic tool.

Whilst the position of discrete organisation evoke the picture of traditional organisations, the perspective of the embedded organisation seems to provide a strategic approach for knowledge based organisations. Strategists in the embedded organisation are at odds with the assumption that competition is the predominant factor in the relationship between organisations. They hypothesise that companies are brought together by emphasising and living the idea of creating value towards a common goal: Symbiosis, not aggression, is the fundamental nature of economic functioning. The benefits of close collaborating organisations are according to EDERER the followings:

- By specialising in a certain area, an organisation is able to achieve scale and experience advantages much faster.
- Specialisation helps to focus on a more limited set of core competences, which can be developed more efficiently and rapidly.
- The organisation can tap into the complementary resources by its co-specialised partners. These resources are usually at a higher quality and lower price than if the organisation had built them up independently.
- The organisation is able to combine their resources with industry outsiders. Product and service innovation is high.

Successful organisations strategically embedded themselves in networks of cooperative relationships, developing strategies together with their partners.

4.3.3.1 Resources and case studies

Case: Shell outlines the use of Distributed Teams and Communities of Practice. This presentation from Shell outlines the use of Distributed Teams and Communities of Practice within their Exploration and Production section. It talks of 'Knowledge Bases', what Shell has learned in their implementation, and what Shell thinks are the keys to their success.

http://www.knowledgeboard.com/cgi-bin/item.cgi?id=79389&d=506&h=417&f=418&dateformat=%o%20%B%20%Y

Case: Evolving Communities of Practice: IBM Global Services Experience. In 1995, IBM Global Services began implementing a business model that included support for the growth and development of communities of practice focused on the competencies of the organization. This paper describes our experience working with these communities over a five-year period, concentrating specifically on how the communities evolved. We present an evolution model based on observing over 60 communities, and we discuss the evolution in terms of people and organization behaviour, supporting processes, and enabling technology factors. Also described are specific scenarios of communities within IBM Global Services at various stages of evolution.

http://www.knowledgeboard.com/cgi-bin/item.cgi?id=71207&d=506&h=417&f=418&dateformat=%o%20%B%20%Y

Case: Technical Communities of Practice at Schlumberger. In the oil and gas sector, knowledge management has demonstrated results in faster project completion and less duplication of effort. This is certainly true of Schlumberger, where technical communities are linking more than 5,200 technical experts in order to increase knowledge sharing. In this article, Henry Edmunson describes the KM initiative "Eureka".

http://www.knowledgeboard.com/cgi-bin/item.cgi?id=62192&d=506&h=417&f=418&dateformat=%o%20%B%20%Y

Case: indiGo project on business process change. A case study on process introduction. The indiGo project has developed a methodology and technical platform to support the management of change of business processes by eParticipcation and experience management.

http://www.knowledgeboard.com/cgi-bin/item.cgi?id=109644&d=506&h=417&f=418&dateformat=%o%20%B%20%Y

Case: Solvision. (See Case 2. Solvision, making change structural). “They called it Solvision: solutions through vision. The founders knew that it is impossible to make a blueprint for a flexible, non-hierarchical organisation. Instead, they just waited how the business structure would evolve, guiding the process with five general principles: continuous change, knowledge infrastructure, virtual offices, virtual communities and participation. Eventually this should meet three objectives: high employer’s satisfaction, highly adaptable production and business growth.” http://www.knowledgeboard.com/cgi-bin/item.cgi?id=101990&d=506&h=417&f=418&dateformat=%o%20%B%20%Y

Case: Knowledge Management at Electricite de France. The current fashion in knowledge management is evidence of a growing collective awareness: intellectual capital is a key point to adding value both economically and to a company itself. The question now is whether companies and institutions are going to be able to find the organisational and human innovation which will

allow the 'knowledge virus' to spread into all company procedures. Can one expect to see a second generation of knowledge management, and what form will it take? Taking the French utility EDF (Electricity of France) as an example, let us describe the transformation taking place in the knowledge management approach.

http://www.knowledgeboard.com/cgi-bin/item.cgi?id=63608&d=506&h=417&f=418&dateformat=%o%20%B%20%Y

Resource: Investing in Dynamic Capabilities as A Strategy in the Knowledge-Based Economy. Long-range planning is a strategy process that is adapted to more conventional industries that are said to be complex but relatively stable. In knowledge industries however strategy processes can be characterised by what Schumpeter (1943) called 'creative responses' to new opportunities, for example new products or production processes. Penrose (1959) attributes such creative responses to 'entrepreneurial services' as the strategic resource of the firm.

http://www.knowledgeboard.com/cgi-bin/item.cgi?id=110977&d=101&h=0&f=0&dateformat=%o%20%B%20%Y

Resource: Assessment and Measurement SIG. Useful collection of resources and views on measurement and assessment of KM in organisations.

http://www.knowledgeboard.com/community/zones/am.html

Resource: Community of Practice SIG. Useful collection of resources and views communities as an alternative to traditional forms of organisational structure. .

http://www.knowledgeboard.com/community/zones/sig/cp.html

Resource: KM Processes SIG. "One of the most pressing practical and theoretical research issue in KM lies in the "integration of knowledge management into the common business processes".

http://www.knowledgeboard.com/community/zones/kmp.html

Resource: Perspectives on Network Level Strategy. Useful paper on the distinction between discrete and embedded organisational perspectives to strategy. "The pressures of competition and cooperation seem to pull the organization in opposite directions, which are, at least partially, incompatible. Obviously, this creates a tension for strategists when determining the inter-organizational relations they would prefer. They must choose whether to emphasize a more *competitive posture* and select more competitive relational arrangements, or whether to decide for a more *cooperative posture*, with the more collaborative arrangements to match. In other words, they must come to terms with the tension between competition and cooperation."

http://www.knowledgeboard.com/download/2399/Ederer_Perspectives-on-Network-Level-Strategy.pdf

4.3.4 People

Concerning the dimension of people as members of the organisation, it is one of the most important tasks of the strategy to highlight the importance of learning for the organisational development. Strategy expert Kazem Chaharbaghi[12] states that employees are the most valuable employees in an organisation, because their learning results in new possibilities on which the creation of new market values can be based. "If the term "strategic" implies seeking advantage then it is only through the learning of employees that knowledge-based organisations can achieve and sustain a competitive advantage", he outlines. Furthermore, Chaharbaghi introduces the metaphor of flowers and bees to illustrate the impact of a supportive, knowledge based environment for motivating people to strive for (strategic) value creation: "Let's assume metaphorically that employees are bees and knowledge-based organisations are flowers. Bees always go where the flowers are and to attract bees flowers have to look nice. In an attempt to attract more bees a beauty contest between flowers develops.

The implication of this metaphorical argument for knowledge-based organisations is that they must ensure that they remain the employer of choice so that they can retain, attract, engage, develop, lead and fully utilise a workforce that has the capacity for learning. This calls for a supportive work environment that allows employees to look forward to work, to feel positive about themselves, their organisation, to have good working relations, and most importantly have access to learning opportunities. Without such a supportive environment the follower loses its beauty and the bees fly away. And that what the cause is all about. […]However, in the post industrial era we are developing a greater capacity for learning, partly because of the rapid advancement in information and communication technologies that is overcoming the constraints of time and distance, but more importantly we are learning how to learn which is accelerating our learning. And as long as there is ignorance there is potential for leaning and as ignorance is infinite the potential for creating and exploiting new possibilities is unlimited.".

Strategy concerning the dimension of people should reflect and develop formal and informal people policies and practices for motivating value creation that include:

- The employee lifecycle
  - Recruitment and selection
  - Induction
  - Learning and development
  - Leaving process
- The cognitive diversity of the workforce
- Managing capabilities and competencies
- Performance management

[12] Chaharbabhi, K. (2003), Interview on KnowledgeBoard at the 21st of May 2003, http://www.knowledgeboard.com/cgi-bin/item.cgi?ap=1&id=110879&d=pnd&dateformat=%25o-%25B

- Recognition and reward
- Work styles.

4.3.4.1 Resources and case studies

Case: BT Ideas. Organisational-wide ideas process that represents good practice in reward and recognition. "Ideas are one of the most valuable commodities in knowledge-driven organizations. Knowledge creation is a critical part of a whole knowledge management initiative, yet often KM programs are focused more in the capture of knowledge. Here, Steve Lakin describes how BT is encouraging knowledge creation, while managing to store it for re-use."

http://www.knowledgeboard.com/cgi-bin/item.cgi?id=63466&d=506&h=417&f=418&dateformat=%o%20%B%20%Y

Case: UK National Police Training - as Knowledge Managers. The need for continuous 'life-long learning' is made out by the life span of information and particularly legislation, proposing that course attendees be updated – electronically on post- course material. The use of Information Technology and e-learning is integrated with (not replacing) traditional training. National Police Training is used as an example of these principles, suggesting Trainers step up to become Knowledge Managers.

http://www.knowledgeboard.com/cgi-bin/item.cgi?id=55509&d=506&h=417&f=418&dateformat=%o%20%B%20%Y

Case: Marconi Technical Support. When Marconi acquired 10 telecommunications companies over a three-year period, it faced a serious challenge: How could the manufacturer of telecommunications equipment ensure that its technical support agents knew enough about newly acquired technology to provide quick and accurate answers to customers on the phone?

http://www.knowledgeboard.com/cgi-bin/item.cgi?ap=1&id=104115&d=pnd&dateformat=%25o-%25B

Resource: "Managing Knowledge Workers" from Business e-Coach site, which include traits, needs and requirements.

http://www.1000ventures.com/business_guide/mgmt_knowledge_workers.html

Resource: Motivating Knowledge Workers. "The goal of the **"Motivating Knowledge Workers"** theme has been to investigate how to identify, manage and then exploit these soft factors, in order to add to technology and rewarding policies a new and powerful lever."

http://www.knowledgeboard.com/cgi-bin/item.cgi?id=102850&d=101&dateformat=%o-%B

Resource: KM and Emotional Intelligence SIG. Special Interest Group that explores the relationship between KM, Emotional Intelligence, Social Capital, Human-centric living systems and more.

http://www.knowledgeboard.com/community/zones/sig/kmei.html

4.3.5 Information and Communications Technology

A KM strategy is aimed to include strategic ideas on the development and use of applications, information and infrastructure that support the organisation's purpose. Technologies that support knowledge-based organisations include Intranets, collaborative platforms, learning management, integrated core process applications, personalisation, ontologies, content and document management, identity management, expertise location and sophisticated search.

As well as identifying enabling technology, the degree of user adoption for these systems needs to be taken into account. At the latest offline survey at the ICE conference 2003[13] the strategic direction for the further development of ICT tools was made obvious:

At the current stage, more than 50% of the companies the interviewees are working for do not use any specific tool for supporting KM efforts or are just at the development stage. The most common KM ICT tools are email, document management, mind mapping tools, internet portals and lessons learned databases.

In order to reach their strategic goals for the future, the interviewees highlighted a strong need for integrated solutions supporting knowledge sharing and capturing within the business processes as there are mentioned:

- Intranet tools for supporting knowledge sharing and communication, e.g. related to ICQ and synchronous virtual workspaces with and without video. Furthermore, new intranet facilities that can serve the strategic needs of an organisation by integrating personal knowledge and organisational knowledge are requested.
- Simple and easy accessible solutions supporting the business process by allowing easy archival storage and retrieval of data e.g. from previous projects. These solutions are demanded to be accessible anywhere on a mobile internet device.
- KM tools acting as avatars supporting the low brain functions of people and thus maximising the time people could spend on human issues.
- Mind mapping tools should be better integrated with other resources. They are aimed to be linked to content management systems in order to provide the opportunity of better modelling the knowledge in the company and to allow an easy overview of where the knowledge can be found.

[13] Mulholland, P./ Wolf, P. (2003), Results from the offline survey conducted at the ICE 2003 Conference, published at KnowledgeBoard at the 25th of June 2003, http://www.knowledgeboard.com/cgi-bin/item.cgi?id=113331&d=101&h=0&f=0&dateformat=%o%20%B%20%Y

- Internet portals for collaboration, e.g. a distributed knowledge portal for complex product development with the interactive and dynamic provision of information or KM databases for SMEs that are aimed to collect practices, skills, competences and business possibilities.
- Advice facilities integrated with Computer Aided Design. This would move organisations from document-based KM to an advisor system.

The required ICT structure elements and tools are obviously supporting the shift from a traditional towards a knowledge based organisation: They are aimed to foster knowledge sharing, collaboration and transparency at a complex level, taking in account turbulent and unpredictable environments.

4.3.5.1 Resources and case studies

Case: Ernst and Young CBK. E&Y spent 6% of their annual revenues on Knowledge Management, creating huge databases and establishing all sorts of communities for knowledge exchange.

http://www.knowledgeboard.com/cgi-bin/item.cgi?id=101990&d=506&h=417&f=418&dateformat=%o%20%B%20%Y

Full case: http://www.mccombs.utexas.edu/kman/E&Y.htm

Case: EU Project Salesman. The target of the EU-Project Salesman is to support the sales process with information technology in an intelligent way. Focused on complex products, products that have very short lifecycles of technical parts or products that are complementary in a high number the main problem is always the same. To sell these products is complex or in a customers view to find the right configuration of a product is hard. A possible way to solve the problem is the use of product configuration systems. Salesman is to proof this possibility and develop best practices.

http://www.knowledgeboard.com/cgi-bin/item.cgi?id=92707&d=506&h=417&f=418&dateformat=%o%20%B%20%Y

Case: Australian Road Traffic Authority. Use of KM technology to improve effectiveness of call centre environment.
http://www.knowledgeboard.com/doclibrary/knowledgeboard/rtacasestudy.pdf

Case: Bouygues Telecom. "With more than six million customers and a network covering 98 per cent of France, Bouygues Telecom has established itself as one of the most dynamic and innovative players on the French mobile telephone market. But size can be a challenge - as with most large companies, Bouygues Telecom has been struggling to manage the flow of information and know-how across the organisation. At times, departments and individuals were unable to collaborate effectively with employees in many other parts of the business."

http://www.knowledgeboard.com/cgi-bin/item.cgi?id=70020&d=506&h=417&f=418&dateformat=%o%20%B%20%Y

Case: Knowledge Management Applications at Pirelli Tires. A KM system to support the Business Unit Truck of Pirelli Tires in knowledge management in order to improve both design and manufacturing activities of truck tires.

http://www.knowledgeboard.com/cgi-bin/item.cgi?id=111988&d=1&h=417&f=418&dateformat=%o%20%B%20%Y

Resource: VISION project on Future KM Technology. The VISION project will provide a strategic roadmap towards next-generation organisational knowledge management. VISION pursues a cyclic and incremental approach for reviewing existing showcases (research projects, products, etc.) and state-of-the-art technology. The results of the VISION roadmap project will provide guidelines for enabling ambient access to knowledge within next-generation applications. http://km.aifb.uni-karlsruhe.de/fzi/vision/

Resource: Next Generation Technology for KM. This SIG is particularly interested in sharing state-of-the-art reports on innovative knowledge management technologies, interesting technology combinations, user requirements, research projects, case studies, commercial products, best practices, tips and tricks from applying and using next-generation KM technologies.

http://www.knowledgeboard.com/community/zones/kt.html

KNOWLEDGE ORGANISATION TRANSFORMATION CYCLE

The transformation process is based on a 4 step adaptive, learning cycle.

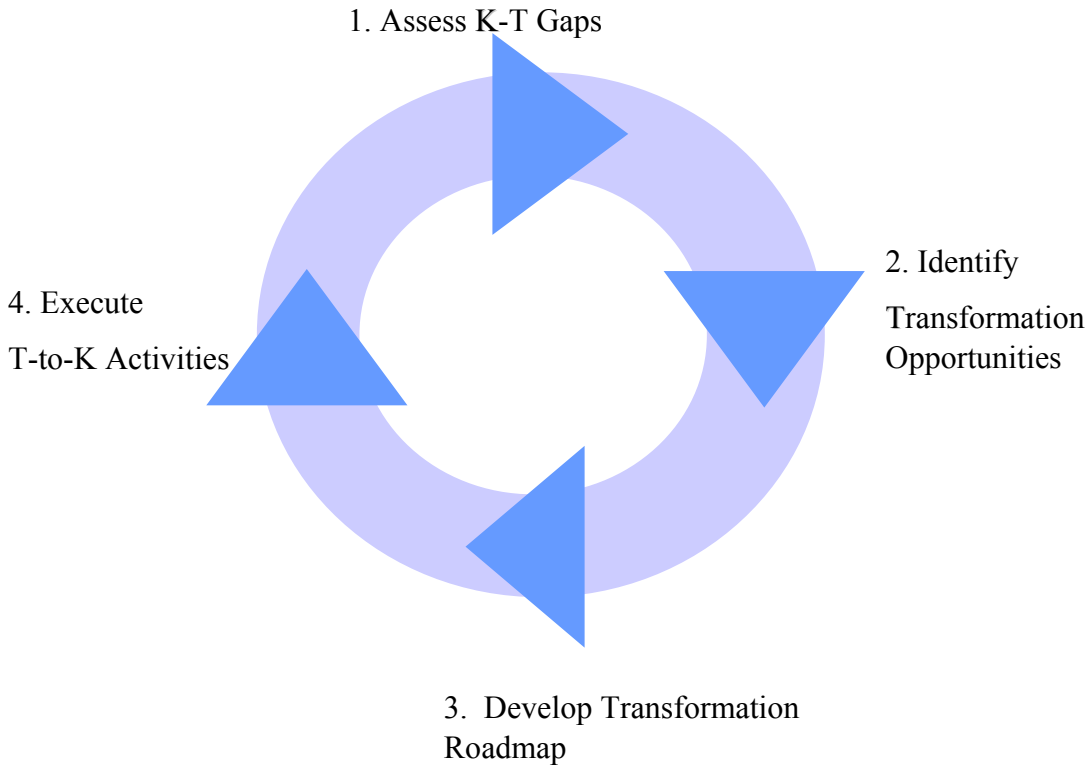

Figure 4: Knowledge organisation transformation roadmap

4.4 Assess K-T Gaps

Assuming that the organisation tests positive for operating in a knowledge-based environment, the current state of the organisation needs to be assessed along a range of dimensions. This framework covers the Traditional to Knowledge (T to K) continuum and includes an indicator to identify whether or not the organisation operates within a knowledge-based environment. Five key transformation enablers are also described.

The following T-K continuums can be used to determine the dominant position of each enabler within the organisation. This can be achieved by developing and applying a questionnaire, through business analysis and stakeholder workshops. A prototype KOT Assessment tool is included in the Appendix.

4.4.1 Knowledge-based Environment Indicator

Value creation is the most fundamental indicator for identifying a knowledge-based business. After all, one of the reasons that the social groupings we call organisations exist is that value accumulates through collective learning, innovation, collaboration and information leverage. This applies as well to public as private organisations. Value creation is a good proxy for an organisation's

environment because all organisations have customers, or consumers of output, that are the beneficiaries and determinants of value.

Indicator	Traditional	Knowledge
How is value Created?	Automated and routine	Customised and unique
	Physical Assets	People-based, information-centric
	Tangible	Intangible
	Commodity Products	Complex Solutions
	Traditional Value Chain	Dynamic value Network

Table 3: Value creation in traditional and knowledge-based business

4.4.2 Knowledge-based Organisation Enablers

We proposed that five key enablers for transformation are Leadership, Culture, Structure, People and Technology. These dimensions are addressed from a knowledge-based perspective.

Leadership

The dominant management style, approaches and mental models employed by senior managers and other leaders throughout the organisation.

Enabler	Traditional	Knowledge
Leadership	Autocratic	Democratic
	Controller	Facilitator
	Directive	Coach
	Technocrat	Visionary
	Micro-management	Management by objectives

Table 4: Enablers of traditional and knowledge-based business - LEADERSHIP

Culture

The basic assumptions, values, beliefs, behaviours and artefacts that characterise the organisation.

Enabler	Traditional	Knowledge
Culture	Closed	Open
	Low Trust	High Trust
	Fragmented	Unified
	Change averse	Change Embracing
	Need to know	Duty to share

Table 5: Enablers of traditional and knowledge-based business - CULTURE

Structure

The way the organisation has organised what it does to fulfil its purpose. This includes processes, performance measurement, organisational structure both formal and informal, physical work design and geographic context. Business connections within inter-organisational networks are also important aspects of structure. IT infrastructure and information architecture are increasingly important enablers of structure.

Enabler	Traditional	Knowledge
Structure	Bureaucracy	Adhocracy
	Hierarchy	Heterarchy
	Rigid	Flexible
	Functional Silos	Modular Capabilities
	Fragmented Processes	Integrated Processes

Table 6: Enablers of traditional and knowledge-based business - STRUCTURE

People

The formal and informal people policies and practices for motivating value creation that include:

- The employee lifecycle
  - Recruitment and selection
  - Induction
  - Learning and development
  - Leaving process
- The cognitive diversity of the workforce
- Managing capabilities and competencies
- Performance management
- Recognition and reward

- Work styles

Enabler	Traditional	Knowledge
People	De-skilled & Dependent Learning = Training Work style fixed to time and location People seen as expense Knowledge in routines	Empowered & Autonomous Embedded Learning Work style flexible and mobile People seen as investment Knowledge in people

Table 7: Enablers of traditional and knowledge-based business - PEOPLE

Information and Communications Technology

This area covers the applications, information and infrastructure that support the organisation's purpose. Technologies that support knowledge-based organisations include Intranets, collaborative platforms, learning management, integrated core process applications, personalisation, ontologies, content and document management, identity management, expertise location and sophisticated search.

As well as identifying enabling technology, the degree of user adoption for these systems needs to be taken into account.

Enabler	Traditional	Knowledge
IC Technology	Context Independent Fragmented Generic Restricted and Inaccessible Transaction oriented	Context Driven Integrated Personalised Transparent and Accessible Knowledge oriented

Table 8: Enablers of traditional and knowledge-based business - ICT

4.5 Identify Transformation Opportunities

Following the assessment of K-T gaps, opportunities for transformation can be identified. Given that the objective is to improve the organisation's adaptive fit with the organisational environment, key senior stakeholders need to be involved. Key stakeholders would include senior executives, heads of People and Information management functions.

The workshop outline would be similar to the following:

- Set strategic context
- Explore K-T Assessment output
- Establish transformation objectives that align with strategic goals
- Carry out benefits mapping exercise
- Identify key opportunity areas
- Capture output and filter through roadmap criteria

We make the assumption that strategic goals have logical alignment with environment – so alignment of transformation objectives should be straightforward.

An example of a K-T Assessment gap, the strategic goal and the transformation objective is given below.

Assessment Gap	Strategic Goal	Transformation Objective
Structural hierarchy to rigid - stovepipes	Increase responsiveness, speed and flexibility	Establish community networks

Table 9: Example for a K-T assessment gap

4.6 Develop Transformation Roadmaps

Taking the output from the Opportunity Identification stage, the options are analysed against a set of roadmap criteria outlined below. These criteria act as a filter to prioritise projects for knowledge-based transformation roadmaps.

4.6.1 Roadmap Criteria

The following criteria can be used to assess and rank initiatives that arise from knowledge transformation analysis across the dimensions outlined above. The resulting ranked list will provide the basis for the transformation roadmap.

4.6.1.1 Feasibility

Is the transformation possible and practical within the existing organisation? For instance one dimension to emerge maybe leadership style.

4.6.1.2 Timescale

How long is the initiative going to take from planning to full implementation and benefit realisation?

4.6.1.3 Dependencies

What dependencies emerge from the initiatives? For instance, a web based application maybe dependent on appropriate network infrastructure being in place.

4.6.1.4 Business case

What are the top-line projected benefits and costs of the initiative?

4.6.1.5 Ease and Impact

How much disruption will the initiative cause? How much impact will the initiative have on the main objective of transformation?

The following Ease and Impact assessment was an output of a workshop at the Fraunhofer Institute for Industrial Engineering in November 2002.

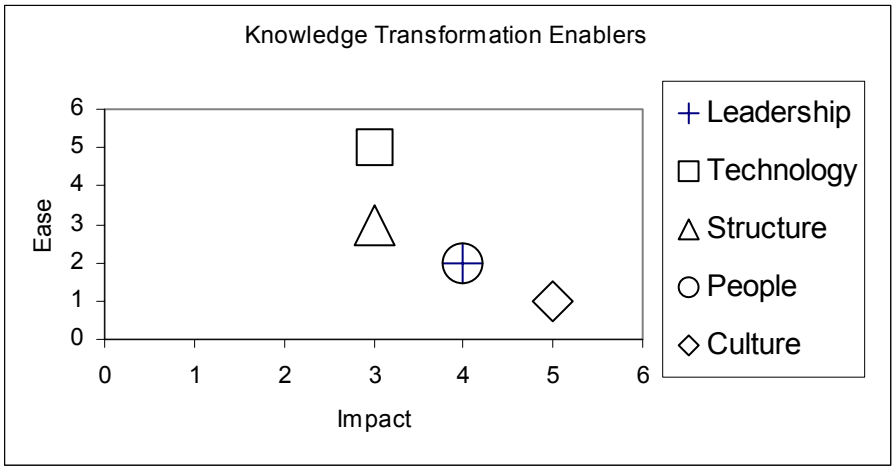

Figure 5: Knowledge transformation Enablers

4.6.2 High-level Enabler Ease/Impact Assessment

The high-level enabler ease/impact diagram can be used as a pointer in starting with the easiest areas, which provide greatest impact.

4.6.2.1 Capability to implement

Do you have the capability (required knowledge and resource) to implement the initiative, or will you require external assistance?

4.6.2.2 Fit with other strategic initiatives

What is the degree of fit with other strategic organisational initiatives?

4.6.3 KOT Filter example

Opportunity	Score
Integrate with key stakeholders	**47**
Feasibility	6
Timescale	3
Dependencies	4
Business case	8
Ease, impact and urgency	7
Capability to implement	3
Risk	2
Sustainability	6
Alignment with strategic objectives	8

Technology Opportunities	Score
Integrate with key stakeholders	47
Implement Content Management	45
Develop Ontology	40
Expertise Location application	35
Collaborative applications	34

Table 10: Assessment of Opportunities agains roadmap criteria

4.6.4 Completed KOT Roadmap

A set of Transformation Objectives, based on the identified opportunities to overcome the most critical gaps on the T-to-K Continuum has been established.

These have been filtered through the Roadmap Criteria (e.g. feasibility and ease/impact).

The Roadmap is developed to transform the business and thus move on the Traditional to Knowledge (T to K) Continuum thereby taking into account the time line and interaction of required Solutions.

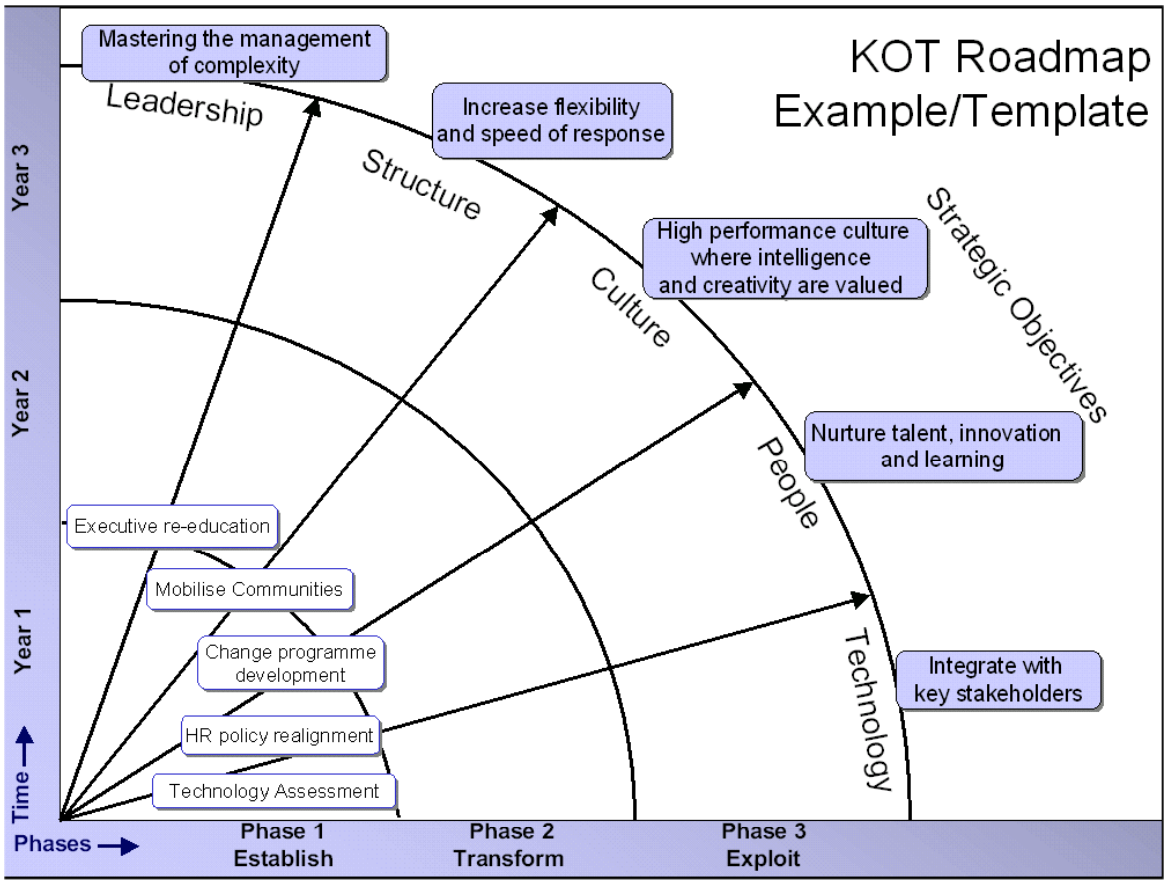

Figure 6: KOT Roadmap example

The top-level roadmap is used to determine a more detailed transformation programme that includes integrated projects. The detail of this is covered in the next section.

4.7 Execute

The execution stage of implementing the roadmap programme is obviously critical to the success of the transformation initiative. As excellent resources exist for programme management and change management approaches elsewhere, we will not go into detail here.

4.7.1 Programme and Project Design and Management

We would expect the KOT programme to utilise good practice in programme and prjoect management.

4.7.1.1 Programme and Project resources

IRNOP - The International Research Network on Organising by Projects

http://www.irnop.org/resources/pm.shtml

UK Government OGC Site on Programme Management

http://www.ogc.gov.uk/sdtoolkit/reference/deliverylifecycle/impplans/prog_mgmt.html

Project Connections site Project management Resources

http://www.projectconnections.com/knowhow/kb_contents/organizational.html#portfoliomgmt

4.7.2 Change Programme

We would expect the change programme to include the outputs from the KOT Assessment in the form of prioritised initiatives, a synchronised communications plan and a measurement plan.

As part of our approach to KM within BT, we use a Barrier Assessment approach to understand the main causes of poor user adoption on a project-by-project basis. Using this holistic barrier assessment approach we can identify areas that will cause real problems with user adoption that attenuate value realisation. Appropriate change interventions can then be designed to mobilise enablers and remove identified barriers.

The dimensions for Barrier Assessment include:

- People Barriers associated with people (e.g. training issues)
- Culture Barriers within organisational behaviour, norms and beliefs
- Processes Barriers within any processes involved
- Structure Barriers imposed through how work is organised and measured
- Technology Barriers imposed by the technology itself

4.7.2.1 Change Programme Principles

The following are a collection of change programme principles:

- Ensure that the programme has strong, visible and effective sponsorship.
- When designing the programme, understand dependencies across different projects and synchronise their linkage to the change programme
- Address resistance at all levels of the organisation
- Design an effective communications plan and disseminate at the right time
- Employ pilot projects using a “Change and Test” approach prior to wider implementation
- Identity and utilise key points of leverage for optimising transition management
- The management of benefit delivery, time, cost, risk, quality and responsiveness to external events are key success factors
- Ensure that business benefits are realised early and incrementally throughout the programme
- Leadership and cross-functional collaboration are critical
- Start change management activities early and do not view it as an add-on to a project

4.7.2.2 Change Management Resources

Change Management primer

http://home.att.net/~nickols/change.htm

Change Management Resource Library

http://www.change-management.org/

Journal of Organisational Change Management

http://fernando.emeraldinsight.com/vl=1326039/cl=32/nw=1/rpsv/jocm.htm

4.7.3 KOT Programme Plan

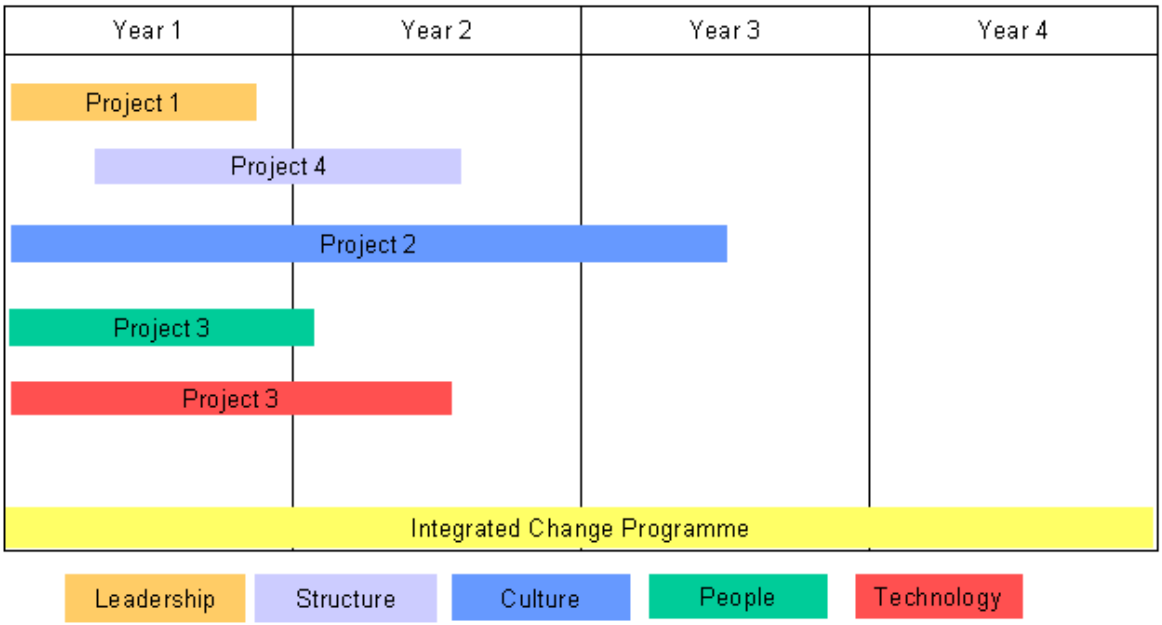

Figure 7: KOT Programme plan

We would expect the programme plan to consist of a set of integrated projects over a 2-4 year timeline as illustrated below.

5 OUTLOOK

The KOT Approach needs to be tested within a real organisation context. This methodology takes a rational approach to identifying gaps between an organisation's knowledge-based attributes and its knowledge-based environment. In doing so, the complexity of interactions and inter-relationships between attributes are not taken explored. Instead, there is a pragmatic assumption is that transformation will be more likely to succeed by adopting a holistic approach across a range of organisational dimensions.

Further development and testing of the KOT Assessment tool would be a useful tool for refining the identification of K-T gaps.

The following research questions have arisen from the development of the approach:

What are the links between complexity theory, contemporary ideas on evolution and environmental adaptation, bounded rationality and organisational transformation?

Given that organisations are complex systems, will a rational and aligned approach succeed?

Given the enablers outlined above – which really have the biggest impact in adapting an organisation to its environment?

What are the capabilities and characteristics that enable an organisation to be adapted to adapting to its environment and how can adaptive capability be measured?

6 APPENDIX: KOT ASSESSMENT

This Knowledge Organisation Transformation (KOT) Assessment is designed to gauge a knowledge-based organisation across a range of dimensions. Different characteristics are represented as poles of a continuum. For each characteristic, identify a score that represents the dominant position. Where possible, the assessment should be based on gathered evidence, rather than subjective report.

KOT Indicator				
How is value Created?				
Automated and routine				Customised and unique
1	2	3	4	5
Physical Assets				People-based, information-centric
1	2	3	4	5
Tangible				Intangible
1	2	3	4	5
Commodity Products				Complex Solutions
1	2	3	4	5
Traditional Value Chain				Dynamic Value Network
1	2	3	4	5

KOT Enablers				
				
Autocratic				Democratic
1	2	3	4	5
Controller				Facilitator
1	2	3	4	5
Directive				Coach
1	2	3	4	5
Technocratic				Visionary
1	2	3	4	5
Micro-management				Management by objectives
1	2	3	4	5

Culture				
Closed				Open
1	2	3	4	5
Low Trust				High Trust
1	2	3	4	5
Fragmented				Unified
1	2	3	4	5
Change Averse				Change Embracing
1	2	3	4	5
Need to know				Duty to share
1	2	3	4	5

Structure				
Bureaucracy				Adhocracy
1	2	3	4	5
Hierarchy				Heterarchy
1	2	3	4	5
Rigid				Flexible
1	2	3	4	5
Functional Silos				Modular Capabilities
1	2	3	4	5
Fragmented Processes				Integrated Processes
1	2	3	4	5

People				
De-skilled & Dependent				Empowered & Autonomous
1	2	3	4	5
Learning = Training				Embedded Learning
1	2	3	4	5
Work style fixed to Time and Location				Work style Flexible and Mobile
1	2	3	4	5
People seen as Expense				People seen as Investment
1	2	3	4	5
Knowledge in Routines				Knowledge in People
1	2	3	4	5

IC Technology				
Context Independent				Context Driven
1	2	3	4	5
Fragmented				Integrated
1	2	3	4	5
Generic				Personalised
1	2	3	4	5
Restricted Access				Transparent Access
1	2	3	4	5
Transaction Oriented				Knowledge Oriented
1	2	3	4	5