
Architecture and the Network Organization: *Inextricably Bound Up*

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Architecture and the Network Organization: *Inextricably Bound Up*

In the book *The Strategy Gap* it is strikingly illustrated why so many organizations have difficulty translating their magnificent strategies into concrete actions¹. This is partly due to the tension between old and new paradigms. A paradigm is a compilation of values, starting points, methods, and knowledge that are part of a way of "doing." In practice there is always a small group trying to explore a new paradigm. When a larger group starts to consider this paradigm as important, actions that are needed to shift well prepared into the new paradigm can then be *taken into consideration*.

Taking action is then hindered, as the executing party is often not able to imagine what the new paradigm signifies. Thus, for years the first cars had the shape of the carriages that were used as means of transport prior to the car. Later the architecture of the car was radically changed, free of the limitation of the carriages paradigm. Old paradigms have the tendency to make a "final sprint" wherein many of their principles stretch out far into the new paradigm.

In this article we envisage the transition from the industrial paradigm to the knowledge paradigm and its influence on the design of organizations. At the same time we ask ourselves which concrete instruments for organizational operation and architecture can make a contribution to the reduction of the gap between thinking and doing. First we briefly analyze the trends that influence the transition and show how the thinking already takes place in the knowledge paradigm, while the emphasis of the doing stops in the industrial paradigm. Subsequently a new organization form that is rising strongly in the knowledge paradigm is discussed: the network organization. We substantiate that the architecture of the current ICT solutions is based on an industrial paradigm and therefore not of added value to a network organization. A concrete steering model for a network organization, just as a prescriptive digital architecture of a network organization, has conditions for a successful design and a successful construction and implementation of ICT for a network organization. We recommend *Value Network Analysis* and *Digital Architecture* as two instruments within the knowledge paradigm which can provide flexibility, innovation, and exceeding of organizational boundaries.

Social trends

Policy makers realize that the knowledge economy is the next paradigm. In Lisbon the European leaders have set firm objectives for the European knowledge economy. Also the United States and many Asian countries pursue such objectives.

Signals from real life show differently. Recently in a radio broadcast a researcher described that already 3,000 civil servants are employed by De Nederlandsche Bank (The Dutch Bank), the Dutch Authority for the Financial Markets and the Pension and Insurance Chamber. This appears to be twice as many as with the Ministry of Finance. We claim that we are creating a knowledge economy, but in practice we are implementing regulations.

Meanwhile 85% of the United States population works in the service sector². The most important concepts in the industrial paradigm were scarcity, physical capital goods, and money. The paradigm of the knowledge economy has information and people as production factors, and trust, attention and collaboration as scarce "goods." For future prosperity, it is crucial that we get better control of the productivity of information work³. This leaves more time for knowledge work, which ultimately means change, innovation, and growth. We believe 80% of the information work is easily standardized, automated, and outsourced; on the contrary it is not possible to standardize knowledge work.

We see strong individualization in the social world. The rise of social software, such as blogs, podcasts, instant messaging, and online communities mean that one can be their own publisher of their own interests, while subscribing, on the basis of individual preferences, to information of like-minded intellects worldwide. The

consequence is that the world becomes much smaller and we concentrate more on personal desires and preferences. However, the corporate sector shows a lot of resistance to this movement in the social world. Partly this can be explained because of the technology adoption cycle, but recent research shows that in this case we may be dealing with a generation conflict⁴. Current management did not grow up with a computer, and still thinks and works within the industrial paradigm.

Many software suppliers have been living in the knowledge paradigm for a while. They will have to think approximately ten years ahead as the development of platforms takes time in these kinds of organizations. Applications that support the knowledge paradigm are peer-to-peer collaboration applications such as Groove, and the development of the WinFS file system which will store information in a network form. However when we look at the CIO budget we see that a growing part consists of administrative overhead and budgets to replace and consolidate the existing infrastructure. Few organizations invest in innovation budgets to support knowledge workers with these new techniques⁵.

The network organization and the ecosystem

Observation of today's organization shows that it is increasingly part of an ecosystem. Characteristic of such an ecosystem is that the achievements of individual organizations are mostly determined by the characteristics and the structure of the network in which they are active⁶. Surprisingly this behavior in organizations is not consciously managed. The value perception of today's customers is mostly determined by how well the supplying network of organizations is able to offer the services and products as a whole, where and when the customers actually want to consume them. The customer itself is also part of the ecosystem and wants to play an active role.

Actively managing knowledge work is the big management challenge of the 21st century⁷. The work of knowledge workers is characterized as diverse and ad hoc. Mental models that used to work as an operating and a communication instrument do not cover the dimensions of these new activities. The five forces model, the value chain, the hierarchy, and the countless other instruments that a manager has at his disposal are not suitable to manage this new dimension in the organization^{8,9}. The enterprise architecture has always complied with the mental models of operating organizations. Therefore the proposition is that along with the new mental operating models there should be a supplement to the architecture to support knowledge work effectively.

An operating instrument for the network organization

The natural pattern of work and organization is the network¹⁰. A method to gain more perception into the complexity of the interactions between players in a value network is called *Value Networks Analysis*TM. Value networks analysis is based on the starting

point that intangible assets are not only to be considered as invisible property on the balance sheet, but also as negotiable and exchangeable assets and deliverables. At the same time organizations and their mutual relationships are reflected as a system of tangible and intangible transactions. Finally it offers the possibility to link score cards or indices to a network analysis, in order to obtain insight into the strategic consequences of decisions concerning transactions and activities in the network.

A practical example illustrates how value network analysis can help to obtain surprising insights. In figure 1 the tangible and intangible transactions and deliverables between Cisco and its most important contract parties are displayed. Delivered units such as services and payments are displayed with a continuing line. Intangibles such as information about the use of products, and loyalty, are displayed with dotted lines. This analysis offers insight into Cisco's ecosystem with its formal relations and also the exchange of knowledge, the collaboration with competitors in setting up standards for the industry, and the collaboration with strategic partners. The informal interactions between these players are characterized as being intangible.

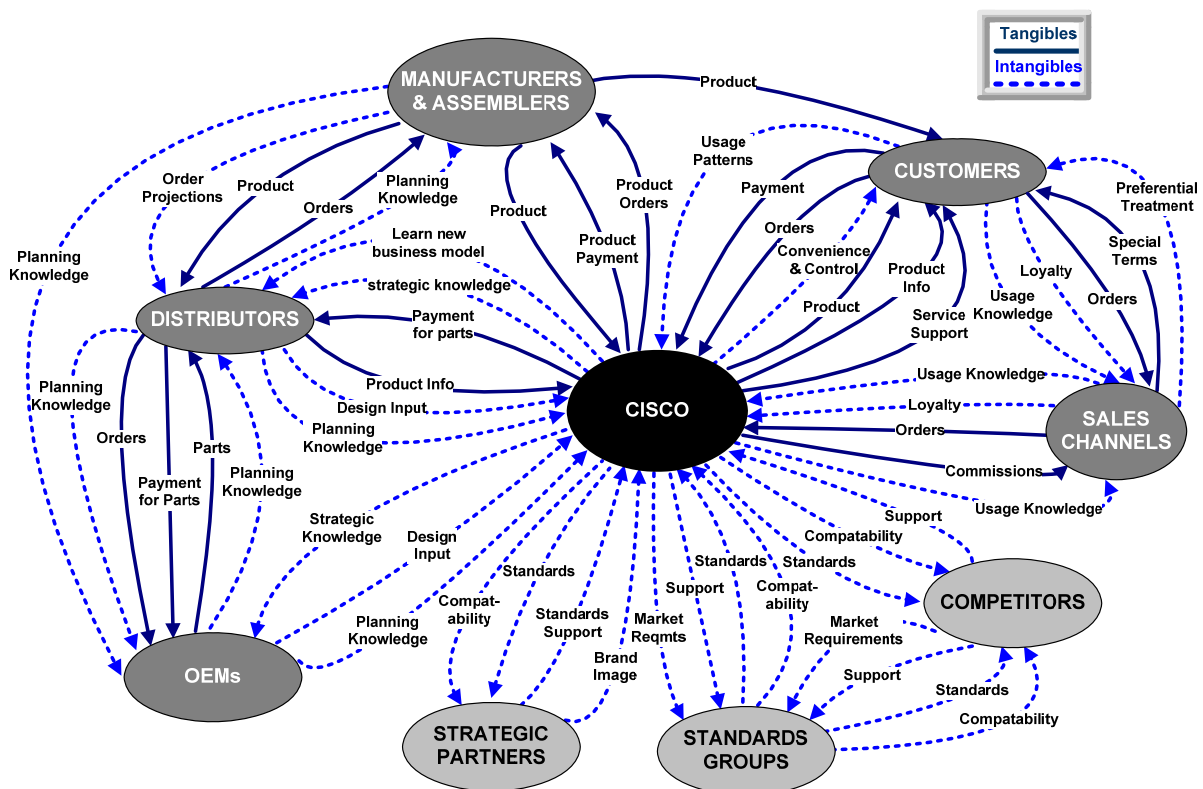


figure 1: Cisco's value network, with thanks to Verna Allee

Value networks analysis is suitable as a supplement to the managers' mental models, as it offers new paradigm methods to add logic to the network in which every organization works nowadays. The instrument offers an excellent link with the existing models for organizational management and communication. The

development of these instruments ultimately translates to an enterprise architecture of the network organization.

The concept digital architecture

In order to do business in the digital world we need architecture, just like architecture is needed when doing business in the physical world of cities, buildings, and landscapes; we denote this with digital architecture¹¹. Digital architecture is short for "architecture in the digital world." Therefore architecture is not digital but the artefacts (man-made objects) for which the architecture is conceived are. This use of the word "digital" has become commonplace, as has "digital architecture," which is a human working on conceiving digital architecture.

In practice the term digital architecture knows two interpretations¹¹:

1. The prescriptive: a compilation of design principles which are the operational materialization of general demands and desires.
2. The descriptive: the global design of a system drawn up according to the design principles which apply to the class which includes the system.

Our starting point is the prescriptive approach, as the stakeholder with his demands and desires will then be taken as the starting point for the architectural study. We believe this to be a more suitable approach compared the system as the focus point, as in the descriptive approach. In fact it is the architecture, starting from the demands and desires of the stakeholders that subsequently creates a coherent and consistent compilation of principles, rules, guidelines, and standards. If the solution is the focus point of the architectural thinking, the risk is being run of overlooking the perception of the stakeholder as not being at the forefront. Consequently this may lead to solutions that do not meet the stakeholders' expectations.

Principles, guidelines, and standards for network organizations

The formulation of the architectural principles for network organizations on an enterprise level is set up from a top-down approach in the organization as a whole. The goal is a first separation of company processes, the applications, and the underlying technical infrastructure. Value network analysis clarifies complexity between the players in the ecosystem. Enterprise architecture contributes to the clarification of the interactions between the mutual players and creates controllability of these interactions. Use of the right principles, rules, and guidelines ensures this clarification and controllability of the interactions with the players in the ecosystem.

Principles influence the way ICT is put into action. The further specification of principles in rules, guidelines, and standards creates clarification. The fact is principles indicate *what* should be limited within the design space by rules and guidelines - and standards indicate *how* the design space should be limited. Rules

are helpful within the organization; standards are required for communication internally, with the outside world, and for the use of purchased components. With regard to the rules, guidelines have more freedom of interpretation; they are in fact "best practices". The sketching of enterprise architecture for network organizations is still in an exploring phase. We plead for freedom of interpretation in this architectural sketch and therefore choose principles and guidelines to indicate that this subject is still in an early stage. The fact is principles are mostly formulated on an abstract level and guidelines are less coercive than rules. Also several standards pass in review to further materialize the principles. The most important architectural principles that contribute to an improvement of the position of the network organization in the value network - with several guidelines are:

- Optimal insight in the strategic consequences of decisions

The following guideline makes this principle concrete: *maximum insight in transactions and activities in the network*. In fact a maximum insight in transactions and activities in the network ensures a better insight in strategic consequences of decisions.

- Optimal competitive position

Because a network organization achieves an optimal competitive position by minimizing hierarchy and bureaucracy, it applies that the following guideline, *minimal hierarchy and bureaucracy in the network organization*, specifies this principle.

- Optimal insight in the influence of the network on the intangible aspects of human capital, organizational capital, and relation capital

These three categories of intangible assets are in current research on intangible aspects of organizations appointed as a logic and manageable division of the difference between the book value and the market value of an organization^{12, 13}.

The following guideline belongs to this principle: *maximal use of instruments that explicitly take intangible aspects into consideration*. This guideline is necessary to acquire sufficient insight in the network organization's future yield and to be able to recognize pro-active structure changes.

- Optimize the network organization according to the Pareto principle

The Pareto principle, or also called the 80/20 principle, was discovered in 1897 by the Italian economist Vilfredo Pareto (1848 - 1923). The Pareto principle states that a low number of causes (limited input or labour), is responsible for the majority of the results (output or reward). Applied to value network analysis this produces numerous examples. The following example guidelines belong to this principle:

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- 20% of the players in the value network are responsible for 80% of the most important transactions with the own network organization.
 - 80% of the results realized by a network organization originate from 20% of all efforts.
 - 80% of the most important intangible aspects are located in 20% of the business domains.
- “Enabling” methodical labour in the value network

With Business Process Reengineering (BPR), primary or supporting processes are radically redesigned. The goal is to realize concrete achievement enhancements in terms of effectiveness and efficiency. In the end BPR will have to be made more specific for the network organization and could be called NBPR (Network Business Process Reengineering), as in the following examples. The realization of achievement enhancements in the whole value network will be the result of this *principle*. A *guideline* belonging to this principle is *maximum use of the best practices of business processes of partners in the value network*. A *standard* belonging to this principle is BPEL (Business Process Execution Language). With BPEL, a business process using web services can be defined and executed. A future *standard* (grafted onto the network organization) linked to this could be called NEL (Network Execution Language). Subsequently, with NEL business processes the *whole* value network can be defined and executed. Such functionalities avail a big strategic advantage with respect to the current standards in this field, because the current standards do not yet rise above the boundaries of an organization as a whole.

- “Enabling” control and monitoring in the value network

A guideline belonging to this principle goes as follows: *maximum use of best practices from reporting processes of partners in the value network*. A standard belonging to this principle is XBRL (eXtensible Business Reporting Language). With XBRL, financial reporting processes can be steered into the right direction. A future standard (grafted onto the network organization) linked to this could be called NBRL (Network Business Reporting Language). Subsequently, with NBRL the scope is widened to financial reporting processes from the whole value network, augmented with reports about the flow and status of intangible assets.

Architectural principles, rules, and guidelines for the network organization make the transition from the industrial paradigm to the knowledge paradigm happen. Diminution of structure and bureaucracy thus leads to a knowledge exchange crossing organizational boundaries. Information and knowledge should therefore not only be managed within the traditional organizational boundaries. Furthermore, digital architecture is a necessary condition to achieve a network organization.

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