

Community Governance – Management Concept for Value Networks of Textile Industry

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Abstract This contribution discusses a new management concept for value networks. The concept implements a particular type of value added community that bases on design and coordination of dynamically networked value partnerships. The paper presents core aspects of the management concept and their organizational implications. Following a design science approach, the results presented draw on a particular implementation of new organizational structures in a large value ecosystem of textile manufacturing firms. This paper contributes to the discussion on approaches for design and governance of networked value creation. It is shown, how historically grown cooperation structures can be transformed into manageable, coordinated and dynamically networked partnerships.

Keywords value networks, coordination, governance, textile industry

1 Historical development of textile value networks

The manufacture of textiles traditionally takes place along value chains. In most cases, several firms are involved in the value creation process each contributing complementary competences and value in a cooperative manner. Upon and between the various manufacturing stages of these value chains, the contributing partners interact in horizontal and vertical directions. Apart from the fact that historically, there have been fully integrated (vertical) textile manufacturing firms – that sporadically still exist – those partners together form particular value networks for the creation of specific products and services. A characteristic property of their partnerships in those networks is the cultivation of an open, cooperative management style, which includes suppliers, customers, service providers and other stakeholders. Today, the textile sector constitutes of highly complex, globally distributed manufacturing steps and services, with an equally diverse pattern of interlinked firm networks and relationships, linking also with other sectors.

Historically, the industrial development of the textile industry has taken place within and between so-called industrial clusters or districts, perceived as regional-

ly concentrated accumulations of firms [13], [23], [24], [28]. Those clusters allowed flexibly changing partnerships, in particular between micro, small and medium sized firms. From those collectives originated further activities, like (mechanical) engineering, artisanry, trade, services, research and others. With their characteristic social and economic variety, and their disposition for cooperative partnerships, it is widely accepted that those clusters have contributed fundamentally to economic wealth in various (in particular European) regions, and can be considered a driver and warrantee for technical, social, and economic progress and innovation. Within those clusters, formal as well as informal relationships and cooperative partnerships built upon experience and tradition were maintained [6]. Trust based on mutual interests and experiences, shared values and knowledge about the cluster's partners, which had to manifest during years of cooperation, provided the ground for (a vital disposition of) firms to cooperate and collaborate.

In the recent three decades a radical change of this situation has happened. On the one hand, textile products have become ever more complex and diverse, due to the development of new technologies, processing techniques and materials. Firms tend to specialize in an increasingly diverging environment that not only comprises the manufacture of clothing and home textiles, but increasingly also the production of technical textiles, i.e. products, applications and services for markets in sectors like automotive, aerospace, health care, medical applications, construction, and many others more [1], [16], [20]. As a result of market pressure innovation cycles shorten and at the same time high (and novel) requirements for life cycle management need to be fulfilled, regarding for instance environmental, energy efficiency, or health aspects along the phases of design, production, use or application, recycling and disposal (e.g. [14]). The firms are therefore progressively urged to flexibly initiate new partnerships, integrating partners from other industrial and service sectors.

On the other hand, a continuous liberation of markets, rising cost pressure in production due to international competition, and an ascending demand for new, high fashion textile products have led to the relocation of production to low-wage countries. Gradually, the regional clusters thinned out through such globalization effects. In particular small and medium sized firms cannot find appropriate partners within their region anymore. They are increasingly forced to enter into partnerships with distant and hitherto unfamiliar partners. (For an overview of how textile companies face globalization see e.g. [5], [19]).

From the nature of the textile value chain, and from the cluster tradition of textile manufacturing, the idea of the value network had emerged, identified by entrepreneurs and managers as a potential approach to organize value creation. This idea is still present, as is shown in a recent study [34]. However, today textile manufacturing firms collaborate on a global scale, engaging in flexible value networks that exist for a shorter or a longer period and disappear afterwards. In many cases, those flexible value networks are being formed on basis of existing relationships that resemble the original collective nature of clusters, which can be termed *value ecosystems*. Those can be understood as open communities, relying on for-

mal as well as informal, business and social relationships – which are not necessarily geographically focused.

Our research investigated the economic opportunities arising from the existence of such value ecosystems. In particular, approaches to coordination of the relationships within those ecosystems in a way that is appropriate for competitive value creation in today's globalized economy were examined. As a result, a management concept was developed that helps demonstrating the potential of such value ecosystems by implementing a specific instrumentation for inter-organizational networking and coordination. In this context, the consideration of governance aspects was imperative. In the following paragraphs organizational aspects of relevant industrial strategies and relationships are described in more detail, from a governance perspective.

2 The evolution of textile value net governance

During the recent three decades, the economically changing environment has resulted in a vivid adoption and evolution of organizational forms within the existing value ecosystems of textile industry and its partners, mirroring the entire spectrum of economic coordination forms [7], [35].

In order to achieve a better coordination of vertical value creation, many firms have since the 1980s maintained a strategy of vertical integration along the value chain. Relevant competences were linked through strategic networks or integrated through acquisitions [27], [33]. The primary strategic objective was to optimize (traditional) textile manufacturing processes, products and applications (in order to reduce costs). Popular examples have been described in literature, among them the success stories of Zara, Gap and Benetton [10], [11], [15], [22].

Recently, such integrated firms increasingly dissolved through continuing pressure to succeed on fashion consumer markets with their brand strategies. This development favored a strategic positioning on the value chain of clothing manufacturing and retail. Other strategies focused on the development of new, non-conventional textile products, applications and services. The business models that underlie these strategies primarily base on the utilization of horizontal value partnerships, as part of larger, flexible value nets, covering the entire textile value chain and eventually further value stages of other industries.

Starting from hierarchical coordination within integrated firms, and closely (vertically) integrated value nets, an entire spectrum of coordination mechanisms has emerged today. This spectrum comprises open, market-type relationships as well as hybrid and hierarchical forms of coordination. As a consequence, different coordination mechanisms exist in parallel allowing differently organized vertical and horizontal partnerships. In general, this has led to a decomposition of traditional organizational structures, as well as to a substitution of inflexible business relations by modern forms of organization, for instance in form of Supply Chains and Supply Networks, but also as Extended, Virtual or Smart Enterprises or Col-

laborative Networks ([2], [8], [12], [21] examples from textiles are given in [4], [26]).

This variety of organizational forms mirrors the variety and complexity of the economic environment, thus suggesting a hypothesis that future forms of value creation in textile manufacturing will not take place within (strictly) hierarchical or market-type, but within different forms of *networks*. The value added partnerships are likely not to adopt the extreme forms of hierarchy or market, but rather hybrid forms of networks allowing for a variety of coordination mechanisms. Developments supporting this prognosis already can be observed in industry (e.g. in the case of Benetton [3]).

This dynamic environment forces firms to become more flexible in their organizational adaptiveness, for being able to partner in various forms of networked relationships, and within several value nets at a time. Questions of design, coordination and leadership of these value nets as parts of larger value ecosystems therefore emerge as core aspects of managing those evolving networked relationships (see also [31]).

For the single firm, this postulate for flexible creation of variable partnerships results in a paradigm change regarding the awareness towards cooperation and coordination of partnerships. The firms require new competences regarding their ability to pro-actively organize flexible and dynamic relationships. In particular knowledge about opportunities for value creation and about networking potentials is of growing importance in an environment of diversified products and services, and highly specified competences.

3 Ecosystems and value nets – a networking case study (1)

Our research covered three ecosystems of textile manufacturing firms, all based in Europe. One of these is an ecosystem in the northern part of Italy in the home textiles sector. Our analysis has identified 63 different value nets within this particular ecosystem. Each value net consisted of about five to fifteen partners along the value chain, producing specific products or product lines, and was characterized by distinct forms of partnerships between its members [30]. Figure 1 illustrates the distribution of partners of such a typical value net throughout the value chain, showing the material flows between the partners.

The major value added stages of textile manufacturing are displayed as rows. Five partners (network partners A to E) are involved in the manufacturing process, starting from purchase of fibers to distribution of the final product. Manufacturing (production or service) activities of each partner are displayed in columns (as production steps P_i), arrows indicate the material flow in between the production steps. For the sake of simplicity, information on logistic or stock is omitted. The lower area of the figure shows the complex information exchange between the functional units of the partners, e.g. shop floor, production planning, purchase, sales, controlling etc.

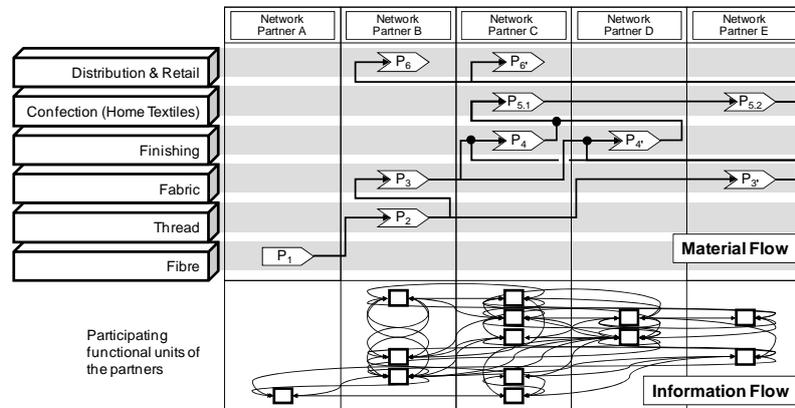


Fig. 1. Material and information flows between partners of a textile value net (adapted from [30])

A recent study [9] shows that in the European textile industry about 19% of the firms use modern information and communication technology (ICT) for internal and external communication (sharing documents online 27%, collaborative design processes 15%, collaborative forecasting of demand 10%, managing capacity/ inventories online 24%; for N=561 textile manufacturing firms of all sizes in the EU-7 countries). Within our observed value ecosystem, two partners – both large firms – had implemented such technologies for internal communication, i.e. Enterprise Resource Planning (ERP) and shop floor control systems. For external business relationships, like cooperative production planning, order management etc., telephone, fax, e-mail or ordinary mail were used. Business process management systems or seamless information integration with the cooperating partners did not exist. Consequences were inter alia duplicate work as well as lacking master plans for production. No systematic approach for the design of the business relations was followed; operations between partners were reactively managed instead of systematically designed. This situation resulted in inefficiencies in the operative processes, and evoked supply chain problems which sometimes led to supply (production) deficiencies. As the information flow in Figure 1 indicates, an efficient coordination, planning and control of processes in the value net was unreachable.

Imagine this example being just one out of 63 within the value ecosystem considered. It became obvious, that in the existing industrial environment an efficient coordination and cooperation could not be achieved. The companies were lacking appropriate *methods and tools* to support cooperation and knowledge exchange within and across value nets using effective ICT. Despite of these findings, value nets do exist, and they are managed successfully. In fact they are planned cooperatively and product development as well as production planning and management are cooperatively performed. Our analysis showed that in most cases they are not managed *efficiently*.

In addition, the engagement in new business opportunities, i.e. creating value nets with new partners from outside the implemented networks or from outside the

ecosystem, was only hardly possible and caused significant efforts for integration, e.g. for adaption of production planning tasks. The question was how long those firms – which do not adapt a more rigid approach for networking – would stand the pressure of today’s turbulent economic conditions? It showed that the grown *structures* have become ineffective, because they prevented the uptake of new, flexible forms of networked partnerships. More flexible organizational structures are required, and management needs to develop the ability to lead and to cooperate within those new structures. In other words, approaches for an *effective* management of value nets were missing taking into account the existing networking requirements. To break new ground for networking however, a paradigm shift in the networking approach is required. Consequently, we have formulated three basic networking challenges within value ecosystems this approach needs to answer.

Three networking challenges

Today’s dimension and interdependence of value networks and ecosystems entail an *Integration Challenge* implementing “dynamic networking”. During the process of network creation from an underlying ecosystem an appropriate definition of coordination forms and mechanisms for the partnerships within the value networks is required. The partnerships have to be flexibly, often dynamically, designed. This requires the definition of adequate degrees of integration of activities on the one hand and of autonomy and synchronization on the other hand, e.g. for cooperative production planning tasks.

If this postulated form of “dynamic networking” is to be implemented in business processes, a *Navigation Challenge* results. A variable design of business relations asks for a systematic business process management that mirrors the integration design. In principle every communication and decision process needs to be designed and coordinated individually. Within the multitude of processes implemented in the value nets, this requires to guarantee a task-dependent orientation and a situation-dependent execution of processes.

An implementation of this kind of networking moreover requires profound knowledge about the partners of the value network and the entire ecosystem, proposing a *Challenge of Sharing Knowledge*. Only a systematic process of sharing knowledge (as shared standard) allows such an appropriate design of cooperation in a value net. Existing knowledge and information sources like enterprise information systems, databases etc. have to be made accessible, to be selectively integrated into relevant processes.

Targeting a new management concept for value nets we have approached these challenges following a design science approach [17]. A couple of conceptual, methodical and technological artefacts have been derived and engineered on basis of existing works and knowledge in the areas of the systems sciences, management cybernetics and knowledge management [30]. We applied them in practice and evaluated them in a couple of case studies. Those artefacts foresee a particular infrastructure for governance. In this paper, we highlight their central conceptual and methodical aspects.

4 The concept of Community Governance

In our research we have developed an alternative management concept for value nets reacting to the previously formulated networking challenges. As a starting point, we have assumed a governance perspective. In systemic terms, *governance* approaches target a definition of boundary conditions, rules and instruments that allow defining, directing or regulating system structures (e.g. modes of behavior), sub-systems, and self-organization within those structures. In organizations, governance approaches allow implementation of novel, “standardized” organizational and leadership principles. The *management* task is then to practically direct activities within those bounds set by governance [18].

In analogy, the *Community Governance* concept intends to enable the firms in a value ecosystem environment to self-organize their networking activities, i.e. to systematically design, implement and coordinate value nets. It can be understood as an implementation framework or guideline for networking comprising procedures and tools to design and to coordinate business processes, information exchange, rules for coordination and integration etc. which are required within a particular partnership.

This idea of Community Governance supports the creation of relatively unstable value nets which orient towards fashion consumer markets. In this context, starting from a pool of firms in an ecosystem, several firms initiate cooperation for a specific *business case*, i.e. in order to produce a specific product or product line for the end market. The respective manufacturing process is defined by a specific combination of value contributions along the value chain. This determines the appropriate partners and also yields specific requirements for coordination of partner interactions. A business case comprises all transaction activities in terms of material and information flows as well as financial transactions which are necessary for value creation. Community Governance defines the boundary conditions for this generation of value nets in a value ecosystem environment. According to these considerations, a definition can be provided:

Community Governance represents a concept for the design and the management of value networks in an environment of volatile markets. It includes the design of organizational forms of cooperation and of interactions within. Objectives for implementing Community Governance within value ecosystems are (a) to temporarily or permanently create value nets as organizational form and (b) to coordinate the activities within the resulting organizational structures.

The idea of implementing Community Governance is shown in Figure 2. On a first level (Value Ecosystem), firms in the value ecosystem maintain social relationships, identifying relevant strategic and competent cooperation partners for particular business activities according to their market and product strategies. Po-

tential cooperation partners are benchmarked and selected (won) as partners for a particular value net.

On a second level (Value Net), the process of designing, adapting and dissolving particular value nets takes place. This comprises a tactical planning of how the cooperating partners contribute to the value net. The firms also define the modus operandi in the value net. This can be done by decomposing the overall task of managing the value net into smaller sub-tasks representing specific coordination problems. For instance, when the production capacity in a particular value segment is provided by two firms, those firms may cooperatively allocate orders from a general contract in between each other's production sites, which requires a specific coordination mechanism. Within the value nets, such coordination problems constitute *Integration Areas*, for which specific mechanisms of coordination can be defined.

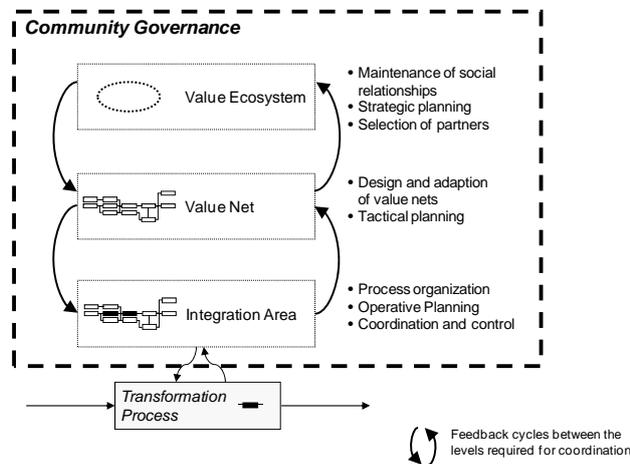


Fig. 2. Influence levels of Community Governance (adapted from [30])

On a third level (Integration Area), the firms coordinate the activities within the Integration Areas in a decentralized manner as autonomous functional units. The overall process organization happens and the firms carry out an operative planning in order to control their own *transformation processes* (or production). The business processes implemented in the Integration Areas will mirror the self-defined degrees of integration, autonomy and synchronization of partners or partnerships respectively. In general terms, the *type of coordination* concerned in this context is coordination via mechanisms – instead of institutions – and non-hierarchical coordination via self-organization – instead of hierarchical coordination.

This way, it is possible to break down the complex task of coordinating a value net into self-organized functional areas as manageable sub-systems. As a result, new boundary conditions are set, enabling the cooperating partners to design and manage the business case in an effective and efficient way. Implementation how-

ever requires the readiness of partners to organize like this, which in consequence leads to the particular *organizational concept* of the *Value Community*:

A ***Value Community*** is the capability (or potential) to define and to design value networks of firms in a value ecosystem. The Value Community consists of potential partners in the ecosystem and their possible relationships with each other.

A Value Community thus enables the design of value networks as an organizational form of cooperation that allows variable coordination mechanisms. It forms an open system which can be extended by new firms. While this definition appears to be similar to the idea of the value ecosystem, it imposes a decisive constraint to the behavior of firms. From a network perspective, firms organizing their relationships this way are potentially open (and able) to implement any hybrid coordination form (in a spectrum from market-type to hierarchical coordination forms).

A core factor in this networking approach is that partners are likely to cooperate within more than just one value net. At the same time, every single case of cooperation might be differently defined – according to the integration requirements imposed by the business cases constituting the value nets. For a single firm which is participating in various value nets, both the coordination mechanisms and the partners can change over time.

This consideration implies that within a Value Community, the organizational forms of interactions, i.e. the governance structure, can vary in between a spectrum of coordination forms, from hierarchical to temporary integration to market-type coordination, with each coordination form comprising various coordination mechanisms. According to its definition, Community Governance thus favors hybrid forms in the organization of interactions, as it allows the variable selection of coordination mechanisms and flexible design of interactions within value nets and Integration Areas. As a result the firms of a Value Community become *dynamically networked*.

Dynamic Networking (or ***dynamically networked*** respectively) is the capability to freely design interactions within a Value Community with respect to selected business partners as cooperators and forms of coordination.

This understanding of Dynamic Networking is aimed towards the “Integration Challenge”, as one of the three previously defined challenges in value ecosystems. For implementing Dynamic Networking, the *integration* strategy plays a significant part, which is detailed in Chapter 6.

The attribute *dynamic* relates to coordination, supporting the fact that the selection of cooperation partners bases not on hierarchical, but factual and task-dependency aspects and depends on when decisions about the organization of interactions (process organization) are taken.

This degree of freedom in the selection (process) and the design of interactions allows for a variable change pattern of relationships, i.e. in the structure of net-

working. Within the Value Community, this (theoretically) can lead to an increased variety (number of possible choices) in the design of interactions, regarding the establishment of partnerships as well as the selection of coordination mechanisms. Thus, within Value Communities firms can achieve a novel form of networked organization.

Dynamically Networked Enterprises represent those organizations in a Value Community whose networking pattern changes in time within the governance structure of the Value Community.

In order to implement the Community Governance concept and to enable the firms in a value ecosystem to act as Dynamically Networked Enterprises, a number of aspects have to be considered. In the following chapters, the aspects of analysis and design of value nets, the underlying integration concept as well as the ideas of coordination and of sharing knowledge are described in more detail.

5 Value net analysis and design – a networking case study (2)

As shown, within existing ecosystem environments most often grown networking structures can be found, and very often no systematic management of the networked relationships throughout a value chain is carried out. Our research, covering a particular value ecosystem in the home textile industry therefore started with an analysis of the existing relationships. The nature of interactions was examined and a procedure to transform those existing relationships into dynamically networked value nets was developed, having the form of a business process re-engineering project. Particular approaches for coordination, integration and sharing knowledge complemented this project approach, in order to design the resulting interactions in an appropriate way. The basis for communication was provided by a web-based collaboration platform that was prototypically implemented and accessible for the firms participating in the project.

Our research project involved an ecosystem of firms networking for the production of high fashion and top-price segment home textiles. These firms together produced more than 75.000 articles per year across 12 product classes in the area of home textiles. About 10.000 new articles were developed per year. A highly diversified product range and very specific products required likewise specialized production units and expert machinery. Business activities covered the entire textile value chain. A company holding of about 25 firms was involved as a core partner, including 20 production sites, 15 trade organizations and 150 points-of-sale in Europe. This company holding was complemented by a large number of micro, small and medium sized firms from the Mediterranean area, Eastern Europe and India, adding up to more than 250 partners throughout the value stages.

In order to understand a network of this size, we developed a systematic approach for analyzing the network relationships. The approach considers the firms'

relationships as a networked system and allows structuring the firm's relationships by starting from a top-down-perspective, with the help of structural elements that step-by-step detail the primarily intransparent accumulation of firms [29]. These elements are illustrated in Figure 3.

As a first step, the borders of the network to be considered are identified, i.e. the system boundaries of the *Value Community* in terms of its value chain or creation structure. This requires the identification of the relevant firms and their principle activities along the value chain. In a second step, selected firms are further described as *network nodes* according to their roles and contributions within the Value Community. In particular their potential (manufacturing and service) capabilities and competences are documented. In the third step, the major *business cases* of the Value Community are identified. For particular business cases, the actual configuration of the value net is analyzed, and the coordination tasks are examined in detail. The business cases in this sense constitute sub-systems which are separately analyzed and re-engineered. In a fourth step, the *Integration Areas* within the selected business cases are considered. Here, operative planning as well as definition or adaption of coordination mechanisms are carried out. This view shows the relationships between firms (system elements) within the Integration Areas (sub-systems). Step five deals with design and implementation of the *business processes* carried out between the firms, constituting independent sub-systems.

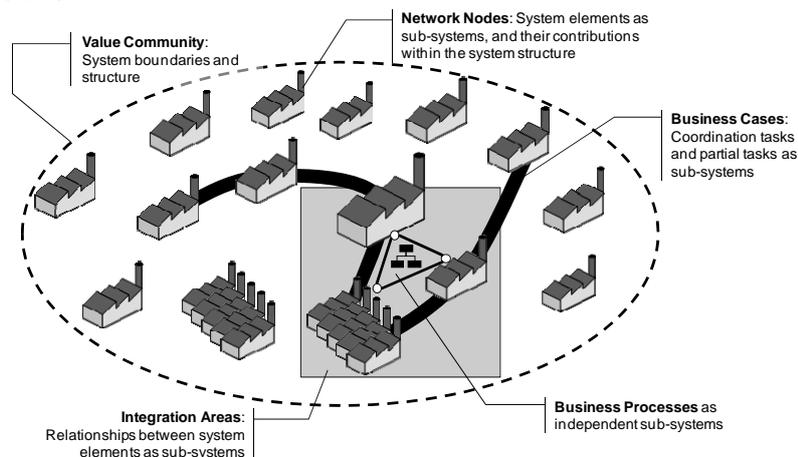


Fig. 3. Structuring Value Communities from a systems perspective (adapted from [30])

This layered scheme provides a blueprint for a re-engineering project with the objective to transform the grown structures within an ecosystem into manageable organizational structures of a Value Community. We have defined four phases in this transformation process, *Analysis, Design, Implementation* and *Operation*. In a re-engineering project, these project *phases* are subsequently carried out in order to put an initial number of value networks into operation. They constitute *modules* for the further extension, adaption, refinement and monitoring of the value nets.

In this context Business Process Modeling (BPM) plays a vital role. Re-engineering of the organizational structures requires substantial knowledge about the firms, their organizational relationships and processes, which need to be captured. We have developed an integrative BPM methodology, basing on the ARIS method and reference model [32], which was extended in order to capture this relevant knowledge and to visualize inter-firm relationships and coordination tasks. Within each of the abovementioned modules, BPM models are used to support the respective analysis and engineering activities. During the process, numerous models of the Value Community are developed. These models together provide a substantial *knowledge repository* for further management activities, not only for re-engineering tasks. The knowledge repository thus answers to the Navigation and Knowledge Sharing Challenges.

The *Analysis* phase focuses on the current, actual situation of the firms. In particular the major business cases have to be identified. Within these cases, those areas requiring specific coordination need to be recognized. These areas are potential Integration Areas of the value net. During the *Design* phase, for those identified areas the actual requirements for coordination in terms of coordination mechanisms are determined and potential solutions, i.e. adequate configurations of interactions in form of business processes are developed. After a decision on the appropriate design of business processes is taken, they need to be implemented. The *Implementation* phase thus covers re-engineering activities and eventually the implementation of ICT infrastructures and tools for collaboration. During *Operation* of the re-engineered value nets, continuous monitoring activities can be carried out, regarding e.g. indicators on business processes performance or coordination success.

For each of the mentioned modules, the developed BPM methodology provides specific model types that allow the capturing of relevant information for each of the considered questions. A complete account of this methodology and the re-engineering project we have carried out in the particular Value Community is given in [30]. In a nutshell, within 63 value nets we have identified about 150 Integration Areas. 10 value nets were selected for a detailed analysis of business processes. Out of those, one Integration Area was chosen for re-design. The scenario provided a group of about 10 small and medium sized firms on the value stage of textile confection which were acting as sub-contractors to a common customer. A design for the coordination of production planning activities, production monitoring and delivery management between the collaborators was developed and respective business processes were implemented on a web-based collaboration platform. A study identified benefits for a two-year period regarding reduction of throughput times (-28,6%/value stage, -8%/entire chain), stock levels (-8%), transport cost (-9%) and response times for delivery (-21%), leading to higher order fulfillment rate (96%), savings in storage costs (0,5% of turnover), savings in interest rates for stocks (4% of stock value) and improvement of the client satisfaction index (+39%) [30].

6 Forms of planning integration

The main objective for establishing dynamic networking within the concept of Community Governance is to enable firms to flexibly apply different coordination mechanisms. These coordination mechanisms are implemented by business processes that realize particular degrees – or intensities – of integration between cooperating firms. A reason for designing such business processes is thus to implement an *integration strategy* allowing for an appropriate degree of mutual synchronization, or autonomy respectively, between business partners.

In principle, a *spectrum of integration intensities* is possible, resembling the known spectrum of coordination forms. Integration accordingly can resemble a market-type form of coordination, based on supply and demand. Further, it can take the form of cooperative planning, in the sense of a hybrid arrangement, e.g. for a cooperative matching (or balancing) of production plans. Finally, activities can be integrated in a hierarchical manner, e.g. for an alignment of operative production planning on shop floor.

We have formulated an integration concept that defines three intensities of integration, *Market Interaction*, *Planning Interoperation*, and *Activity Integration*. Those classify integration intensities between cooperating partners as specific *forms of manufacturing planning integration* according to the spectrum of coordination forms. Each of these three forms of planning integration results in individually designed business processes (in particular regarding requirements for information exchange).

The planning integration form of *Market Interaction* refers to market-type coordination. Integration occurs within negotiations about purchase or trade of products and services. A basic question could be „Which products or (production) services do you offer?“ Accordingly, new partners are primarily sought, eventually a cooperation agreement is negotiated, and order processes are initiated. Within this form of integration, cooperating firms remain fully autonomous regarding their decisions and actions. From a coordination theory point of view, in this integration form interactions are uncoupled [25].

The planning integration form of *Planning Interoperation* refers to hybrid coordination arrangements. Integration in this case takes the form of mutual matching or balancing of production plans, with the intention to achieve a common (shared) planning. Objective is a synchronization of plans, in a way that the partners extend their manufacturing capacity in horizontal or vertical direction within defined limits. A basic problem could be „Which production (or service) capacity is available for my disposition (planning)?“ Only partners with existing business relationships might implement this form of integration, presumably with partners which are considered affirmed or permanent partners within a business case. Accordingly, the respective processes need to implement procedures for cooperative capacity planning (or similar). In this case, the partner sharing own manufacturing capacity remains fully autonomous in planning; the planning pro-

cedures are synchronized only partially. Regarding coordination of this integration form, interactions need to be predicted or estimated.

The planning integration form of **Activity Integration** refers to cooperation resembling hierarchical coordination. Integration is performed by collaborative planning in the scope of operative production planning. In this case, a provider puts own manufacturing resources (a defined capacity within a defined time frame) at a contracting purchaser's disposal. The purchaser carries out the production planning which is then put into operation by the provider. Doing so, the provider – in principle – gives away his autonomy for production planning and a full synchronization can be achieved. At the same time, the purchaser is allowed to define very specific and precise parameters for manufacturing operations and processes. In this way a hierarchical integration of activities is accomplished. The objective is to find – on basis of the current shop floor situation – the most economic way to manufacture and to deliver a particular product or service to the purchaser's customers. Actually, a planning procedure is realized in which both partners together (collaboratively) carry out the planning (thus, integrating the partners' *activities*). A characteristic question could be „How can the short term production program be changed in order to produce and deliver product X on time and with adequate cost in the current production status?“ This form of integration is therefore primarily established in close partnerships, or internally, if for instance production sites operate as profit centers. Accordingly, during this type of cooperation, information about the production status must be accessible by both partners – at least those information concerning the contracted capacity, plan or machinery in a defined time frame. Communication processes between the partners will contain for instance order sequences, production progress or monitoring information. In this integration form, coordination consists in interaction balancing.

These integration forms together define a concept for planning integration, which meets in particular the previously formulated Integration Challenge within value nets. It can be applied when defining appropriate integration intensities between networked partners and designing according business processes. Accordingly, it allows defining particular processes for information exchange, facing the Knowledge Sharing Challenge. If, within value networks, Integration Areas are defined, specific integration forms can be assigned to them. The selected integration form then provides the boundary conditions for business process design and for carrying out a self-organized coordination of the Integration Areas as decentralized units in a value net (potentially between the Integration Areas). The following paragraph details the underlying idea of value net coordination in this context.

7 Coordination synthesis

Objective of the Community Governance concept is to enable firms to self-organize their participation to value nets. In our research we have developed a particular methodology for synthesis of the coordination task in value nets, which al-

allows allocating and implementing different coordination mechanisms to Integration Areas within value nets, and to coordinate between those areas.

As has been pointed out, a value net can be understood as principle implementation of a particular business case, i.e. a specific combination of value contributions along the value chain, determining appropriate partners and requirements for coordination. Each business case involves particular partners in a specific way, and accordingly assumes a unique shape or *topography*. As is indicated in Figure 4, particular parts of value nets can be defined as Integration Areas for which particular coordination mechanisms are to be implemented, according to the three defined forms of planning integration.

For the entire value net, according to our analysis of several value ecosystems, in most cases a central coordinator emerges during the business case (network) creation process, who acts as principal promoter of the value net. In our methodology, this *promoter* adopts the task of (overall) *hierarchical* coordination of the entire value net. Within the Integration Areas however, pre-selected, permanent or varying coordinators locally and autonomously coordinate the sub-systems, according to the selected form of integration, i.e. applying hierarchical as well as hybrid or market-type mechanisms. This way, factual hierarchies emerge, which are not predetermined by organizational dependencies.

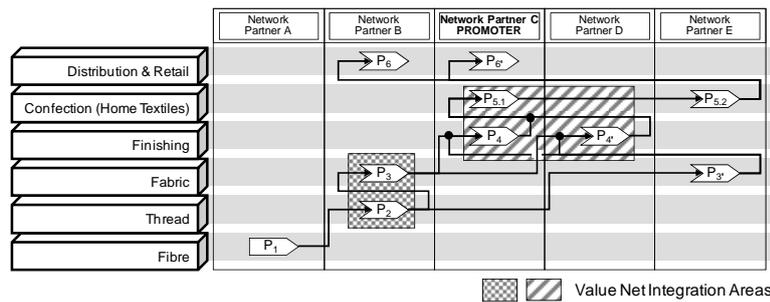


Fig. 4. Integration Areas and promoter as elements of value net coordination

Under certain conditions, for instance in the case of Market Interaction, it can happen that coordinators are variably or flexibly defined in the Integration Area according to current boundary conditions. In other words, the coordinators within the Integration Areas change and *temporary coordinators* emerge. This temporary coordinator acting as an agent (representative) of the Integration Area is then defined with the help of pre-configured coordination mechanisms. The firm acting as temporary coordinator can change according to the situation or task – depending on how exactly the coordination process is defined. The construct of a temporary coordinator allows synthesizing (dynamic) *virtual hierarchies* that emerge from the interaction dynamics of the value net, which depend only from the actual networking structure (i.e. the point of time). After completion of the coordination task, the hierarchy resolves and eventually a new coordinator is selected.

Following this synthesis principle, for each Integration Area, the appropriate integration intensity can be defined. By selection of the adequate form of planning

integration the respective business processes can be implemented. The form of planning integration defines the rules and conditions for selecting the (temporary) coordinator. Only with the help of this dynamic selection of (temporary) coordinators, flexible hierarchies can emerge, constituting units that can be coordinated and can resemble the entire spectrum of coordination mechanisms and integration intensities. Integration Areas become locally coordinated, autonomous units within value nets which organize themselves. With respect to coordination, this allows for the self-organization of firms that participate in value nets. Further, this approach allows a systematic design and coordination of business processes, thus answering to the Navigation Challenge.

8 A framework for sharing knowledge

In order to adequately design their cooperation, i.e. finding appropriate forms of integration and designs for business processes, firms need to develop a readiness to share knowledge with each other. Only profound knowledge about the partners of the value network and the entire ecosystem will allow the implementation of dynamic networking. This requirement poses a Challenge of Sharing Knowledge. In practice, for the cooperation design it has to be defined, which business processes need to be installed, how they will be implemented, which information will be shared, and which competences (experts) and information systems need to be included. As part of our research, we have developed a *knowledge framework* that allows identifying required information in the cooperation design process. It distinguishes between four major fields of knowledge relevant for cooperation within value nets (cf. Fig. 5). This framework is complemented by *levels of knowledge access*, which describe the availability or accessibility of this knowledge (or shared information respectively).

The Community Governance approach provides a guideline for the task of the configuration and coordination of value nets. In order to fulfill this task, management needs information about the value ecosystem and its potential capabilities (i.e. the Value Community) from an organizational perspective in the first place. Potential cooperators need to be identified and value nets need to be formed, starting from business cases. This requires knowledge about the experiences of partners as well as their potential capabilities for organization of partnerships – aspects which possibly need to be worked out in a process between two or several potential partners. A resulting value net will show a peculiar topography, i.e. constellation of partners, which mirrors this design (or creation) process. This field of knowledge we have termed *Topographical-organizational Knowledge*.

From a value creation point of view, it must be defined which value contributions are required in a certain business case. Appropriate partners with a potential to contribute need to be defined and selected. To do this, knowledge is required about their individual value creation process in terms of obtainable manufacturing techniques, available machines, equipment and facilities, applied materials and of-

ferred products/services etc. This perspective considers aspects of value creation and can be termed ***Procedural Knowledge***.

In order to configure and coordinate cooperation processes, knowledge about the current situation within a value net is required, for instance knowledge about business processes in production planning and order management. The ability to gain an overall perspective on all resources and activities relevant for coordination of a business case is imperative. This comprises knowledge about which activities and resources are required and available, further, which data sources and information need to be integrated into the business process, and how they are available (or accessible). This is a basic requirement for the definition of appropriate communication and coordination processes. This perspective summarizes knowledge about the current condition of activities and resources and is termed ***Operational Knowledge*** in our approach.

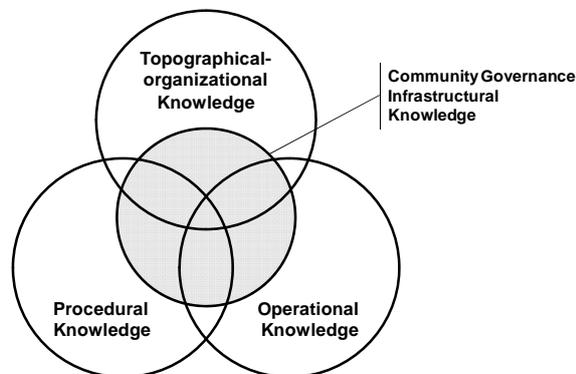


Fig. 5. Community Governance Knowledge Framework (adapted from [30])

These three fields of knowledge allow gaining an overall view on relevant aspects in the cooperation design process. Actually, a particular piece of information might belong to more than one field of knowledge as defined in this framework. For instance, if a partner is able to offer a certain manufacturing process (Procedural Knowledge) it must be examined if he is able to provide it under the peculiar conditions of a certain business case (Topographical-Organizational Knowledge), in which production costs must not reach a certain limit. In consequence, the knowledge fields overlap, as indicated in Figure 5. Those areas can be interpreted as *inference areas*, which allow navigating the available knowledge. Accordingly, the knowledge fields do not intend to pre-define all items required in cooperation, but they are understood as an instrument for systematically identifying and opening up relevant knowledge sources. A navigation example could be, asking: “Is the status of a machine *relevant* for our cooperative manufacturing planning (Topographical-Organizational Knowledge), and if so, which data about it is *accessible* using our ICT infrastructure (Operational Knowledge)?”

This process of applying the identified relevant knowledge is described by a fourth knowledge field, ***Community Governance Infrastructural Knowledge***.

This perspective considers the system (infrastructure) of conceptions, methods and instruments which is defined through the Community Governance concept. In other words, it covers the capabilities and opportunities provided by the instruments described in this paper, enabling the use of the knowledge from the three other fields. It therefore intersects with those parts of the three former knowledge fields which are relevant for an implementation of Community Governance, in particular the inference areas (but not all of the three fields is covered). A compound description of this knowledge framework together with a characterization in a knowledge management context is given in [30].

The knowledge described with the help of this framework is not expected, nor supposed, to be available arbitrarily. The framework serves as an instrument which can be used during the process of defining appropriate business processes, helping to identify relevant pieces of information and data sources. Specific relevant information or data sources must be made available (or accessible) for each process individually, according to the requirements posed by the design's integration and coordination conditions. Thus, it is not intended to open up *all* principally available information sources between firms, but to enable selective information integration.

According to the various intensities of integration which are possible, several degrees of information sharing – or levels of information access – can be defined. Those *access levels* can be understood as steps of information integration, regarding the provision of knowledge between partnering firms (or within organizations). Our framework distinguishes in between three access levels.

The *Public Level* comprises knowledge which in principle is publically available, or which is available in the scope of market-type relationships. This knowledge is shared within the entire ecosystem as well as with outside firms. Examples are product catalogues on a public web site. The *Community Level* covers knowledge which is opened up only to partners in a Value Community. On basis of a particular cooperation design (a particular business process or integration strategy), a firm decides about the provisioning of information. For instance, if two firms cooperate in a Planning Interoperation arrangement in production planning, eventually information about the own production status can be shared, which would in other cases not be revealed. This access level is thus intended primarily to enable hybrid coordination forms. The *Internal Level* involves knowledge which usually remains confidential within an organization, but which is opened up to cooperators on a task basis. It comprises knowledge about the own organization which is of a competitive nature. Such knowledge will only be shared in cases with clearly defined objectives, e.g. when two cooperators share data on shop floor monitoring in a collaborative production planning process, realizing a case of Activity Integration.

9 Summary and conclusions

Today firms are facing ever more volatile markets and changing economic environments. For those industries which have traditionally developed within cluster-like structures, relying on flexibly partnerships for value creation, these developments impose a strong imperative to develop new competencies regarding their ability to pro-actively organize flexible and dynamic partnerships. Appropriate methods and tools are required to support cooperation and knowledge exchange within and across value nets on the basis of current ICT. Those instruments must enable firms to change the grown structures and to transform them into more flexible organizational structures. The management must develop the ability to lead and to cooperate within those novel circumstances.

Our research analyzed value ecosystems in textile industry, and has implemented a novel management concept for value nets within a particular ecosystem in the northern part of Italy. The Community Governance concept intends to implement a particular type of value added community that relies on design and coordination of dynamically networked value partnerships. It answers to three basic challenges for value net governance by providing a number of instruments for management. Those are the Challenges of Integration, Navigation and Knowledge Sharing.

The ideas of the Value Community and Dynamic Networking enable a novel form of networking, which favors hybrid arrangements in the design of value nets, leading to an increased potential for leveraging more efficient and effective value creation structures. A process for the analysis and design of value nets is described. It supports the development of a business process model repository that can be deployed during re-engineering of business processes and implementation of ICT infrastructures for collaboration. The procedure allows defining Integration Areas as manageable sub-structures within value nets. Integration strategies can be defined and flexibly assigned within these structures by using forms of manufacturing planning integration such as Market Interaction, Planning Interoperation and Activity Integration. They allow for a synthesis of single coordination tasks, as elements of an overall value net coordination. A knowledge framework provides support during the process of defining individual business processes in each cooperation case. A guideline for information integration is provided by a framework for knowledge access, distinguishing between Public, Community and Internal Levels.

The implementation of this management concept has led to promising results in practice. In this respect, it could be justified that the developed conceptual and methodical artefacts principally fit with the organizational requirements of networking in a value ecosystem environment. For a particular case of textile industry it was shown that historically grown cooperation structures could be transferred into manageable, coordinated and dynamically networked partnerships. In this context, the Community Governance concept was successfully introduced, which is motivating a positive outlook on future approaches that rely on imple-

mentation of novel forms of governance and coordination within value ecosystems. Yet, a fundamental transformation of large value ecosystems can only be achieved within equally large and long-term re-engineering projects. This presupposes the commitment of many firms to a fundamental transformation, which principally has hindered a broader and durable implementation of this concept in practice up to now. In several cases we have examined, “candidate” firms did not commit themselves to engage in networking structures, but in other forms of partnership strategies, which in many cases based on uncoupling from the network. Future research on enterprise interoperability and transformation as well as on service-orientation might presumably lower the existing initial barrier for preparing organizational and technological infrastructures in order to engage in networked partnerships.

Acknowledgments The major part of the applied research work preceding the elaboration of issues described in this paper was funded by the European Commission through the TEXTERM project (GROWTH Program, 2001-2004). I want to thank expressly my colleagues at the Center for Management Research of the German Institutes for Textile and Fiber Research Denkendorf as well as at WHU – Otto Beisheim School of Management who provided valuable comments and insightful discussions. I would particularly like to thank Thomas Fischer for his indispensable suggestions and encouragement to continue this line of research.

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