

The Architecture of New Organizational Forms*

Thorbjørn Knudsen[†] Bo Eriksen[‡]

November 26, 2002

Abstract

The recent decade's research on organizational forms has gained important headway in converging upon a few particularly important causes of the new forms that have been observed. Yet, most studies offer no explicit definition of "organizational form," and ignore the need to establish what should count as a "new form." In order to advance this research, the present paper therefore aims to provide a preliminary definition of organizational form, developed along the lines of organizational economics. A typology is provided that allows identification of alternative forms of organizing in terms of distinct architectures (topology plus dynamic rules) and a corresponding level of delegation of decision rights.

1 Introduction

The emergence of new organizational forms through history has been a central topic for most branches of the social sciences, and a key issue for classical works in economics (Schumpeter, 1928, 1934) and economic sociology (Weber, 1978). Until the last decades, however, the arrival of new forms of organizing was a relatively rare occurrence. Then, "rather quietly," according to Romanelli (1991), a large body of literature emerged during the 1980s to consider the emergence and establishment of new organizational forms.

Romanelli (1991) reviewed a set of widely dispersed literatures encompassing organizational ecology, economics, institutional sociology, strategic management, and others, to identify three views of the mechanisms that might generate new organizational forms. In conclusion, the rather skeptic assessment was offered that no overarching themes could possibly integrate the great diversity of approaches uncovered in this review. Although one could point to a number of additional reasons for the observed diversity, Romanelli (1991) emphasized the lack of clarity and agreement in definitions of the concept of "organizational form" as a basic problem reflecting insecure conceptual foundations, ambiguity, and methodological disagreement.

In a sentence that deserves much attention, Romanelli (1991, p. 81) argued, "If we want to know how something comes into being, it seems reasonable that we should be able to identify the thing when it appears." Disappointingly, she concluded that this objective is not easily achieved in current organization theory, and that "the mere imputation of a concept of form

*© Thorbjørn Knudsen & Bo Eriksen. The present research is part of project 01 within the LINK research program, sponsored by The Danish Social Science Research Council. The authors thank Nicolai J. Foss, Anna Grandori and Claude Ménard for helpful comments. Draft of 22 November 2002.

[†]Corresponding author (e-mail: tok@sam.sdu.dk), University of Southern Denmark, Department of Marketing.

[‡]University of Southern Denmark, Department of Management.

serves to organize and advance investigation of changes in organizational diversity.” While this is undoubtedly true, it seems highly questionable if any amount of imputation based on empirical work can advance the required conceptual definition needed to distinguish between changes in outward appearances and changes in the essential characters of organizational forms.

Over the ten years that have elapsed since Romanelli’s (1991) review appeared, there has been an enormous increase in the academic research on new organizational forms, encompassing most branches of the social sciences. This research includes organization theory (Child & McGrath, 2001; Daft & Lewin 1993; Ilinitich, D’Aveni & Lewin, 1996; McKendrick, David & Carroll, 2001; Volberda, 1996), strategic management (Nault & Tyagi, 2001), R &D management (Davenport, Davies, Miller, 1999), marketing (Achrol, 1997; Moller & Rajala, 1999), accountancy theory (Cecil, Ciccotello, Grant, 1995), organizational economics (Foss & Foss, 2002; Zenger & Hesterly, 1997), and economics (Charness & Levine, 2002; Kole & Lehn, 1997). Most of the studies that appeared during the 1990s are empirical case studies aiming to uncover important aspects of the emerging new forms - see e.g. *Academy of Management Journal*, 2001, Vol. 44(6) and *Organization Science*, 1996, Vol. 7(4), *Organization Science*, 1999, Vol. 10(5). While this research has certainly met Romanelli’s (1991) concluding call for further empirical studies to gain insights regarding the appearance of a diversity of new organizational forms, there has not been much conceptual development to help distinguish between the observed diversity.

Romanelli (1991, p. 81-82) offered a very broad definition of organizational form as “those characteristics of an organization that identify it as a distinct entity and, at the same time, classify it as a member of a group of similar organizations.” It is questionable whether most of the new organizational forms that were uncovered during the last decade can even be classified according to this minimum definition, however. Therefore, in order to advance research in new organizational forms beyond futuristic speculation and identification of any deviation in aspects of organization as new, it is urgent that conceptual criteria are established to allow distinction between forms. As Child & McGrath (2001) note, social scientists face an embarrassment of riches with literally hundreds of new terms and perspectives introduced during the last decade. The viewpoint expressed in the present article is that the marginal benefit of additional new terms and perspectives is approaching zero, whereas the development of secure conceptual definitions of organizational forms promises great benefits.

In view of the gap between empirical research and theory identified in the literature on new organizational forms, the purpose of the present article is to further conceptual clarification. This aim is pursued by identifying a minimum set of characteristics that allow distinction between alternative forms of organization. Based on a review of the literature on new organizational forms, the present article identifies organizational economics as a promising starting point to accomplish this.

According to recent work in organizational economics, the new forms can be defined as *hybrid forms of hierarchy* in which decision rights are delegated to lower levels, or *hybrid forms of market exchange* in which elements of hierarchical control appear (Foss & Foss, 2002; Williamson, 1996; Zenger & Hesterly, 1997). The present article further defines the *architecture of an organizational form* as a structural configuration composed of a collection of members, a collection of channels through which the members can pass information or control to each other, and a set of dynamic rules that help define the flow of information or control and thus help define their decision rights. Using this definition, a simple modeling framework is developed that allows distinction between architectures (structural configurations) supporting different levels of delegation of decision rights. In addition to the pure market and the pure hierarchy, four classes

of hybrid organization are identified.

The present article aims to advance the literature on new organizational forms by providing a typology that allows identification of alternative forms of organizing in terms of distinct architectures and the corresponding level of delegation of decision rights. It must be emphasized, however, that further work remains. In particular, the much-discussed issue of organizational flexibility as a response to hypercompetition needs further consideration. Based on the modeling framework developed in Christensen & Knudsen (2002a, 2002b), the present article points out that the best performing organizational forms are particularly easy to predict under conditions of hypercompetition. Since these organizational forms appear to be opposites when the expected profits are positive and negative, however, it is an open question whether organizations should aim for flexibility or simply accept a dedicated short life-span (see March, 1995).

2 Literature Review

In the following, the literature on new organizational forms is reviewed to infer their causes and characteristics according to the reported empirical observations. We then proceed to infer what, according to this literature, defines an organizational form and what makes it new. The purpose of this review is to identify the elements that must be included in a useful definition of “organizational form.”

2.1 Causes of new organizational forms

The recent decade’s research in organizational forms has gained important headway in converging upon a few particularly important causes of the new forms that have been observed. Reflecting wide agreement in the organization literature, Child & McGrath (2001), in their introduction to nine articles in a special research forum on new organizational forms, published in the *Academy of Management Journal*, pointed to increased information intensity and internationalization as the main challenges that have resulted in the emergence of the new forms. The mentioned challenges were usefully grouped into four broad categories: (1) increased interdependence in interaction among organizations, (2) the possibility of disembodiment of performance from asset ownership, (3) higher velocity characterizing almost all aspects of organizational functioning, and (4) changes in power, in terms of a shift from a power-base of tangible assets and inputs to power derived from possession of knowledge and information.

The widely observed new organizational forms, it is argued, have emerged in response to these challenges. According to Child & McGrath (2001), the objective of the new form is to delegate decision rights to where the relevant knowledge and information reside, then to use *information technology* (IT) for support. In contract economics, this move of decision rights, closer to those with information, has been referred to as “the organization redesign solution,” as opposed to the traditional MIS solution according to which it is information which is moved closer to the decision maker (Brynjolfsson & Mendelson, 1993; Jensen and Meckling, 1992; Nault, 1998). Thus, fundamental advances in IT and measurement technologies have facilitated a number of observed experiments with organizational form (Nault, 1998; Zenger & Hesterly 1997) that are often referred to by the notion of “new organizational form” (Daft & Lewin 1993),

and a common characteristic of these experiments is the use of IT in hierarchies to achieve a decentralization of decision rights (Child & McGrath, 2001; Nault, 1998).

Whereas advances in IT are commonly viewed as a facilitator of new forms, hypercompetition is seen as the primary cause of their emergence since traditional forms are considered maladaptive when massive change, environmental dynamism, and considerable uncertainty are the norm (Child & McGrath, 2001; Daft & Lewin, 1993; Volberda, 1996). Hypercompetition refers to the shift in the rules of competition observed through the 1990s (D’Aveni, 1994; Ilinitch, D’Aveni & Lewin, 1996; Volberda, 1996). It is argued that rapid technological change, the shortening of product life cycles, and the increasing aggressiveness of competitors have led to increasingly shorter periods of competitive advantage, punctuated by frequent disruptions. Often, hypercompetition is associated with fundamental uncertainty as in Volberda’s (1996, 366-367) proposition that organizational forms must be flexible under hypercompetition: “In a fundamentally unpredictable environment which may also be dynamic and complex (hypercompetitive), the optimal form employs a broad flexibility mix dominated by structural and strategic flexibility and has a nonroutine technology, an organic structure, and an innovative culture.” Volberda (1996) nicely sums up the argument for flexibility that has been forwarded in much of the literature on new organizational forms. “In the new mode of *hypercompetition* rents do not derive from specialized routines but from adaptive capability. The reason is that, with hypercompetition, competitive change cannot be predicted but only responded to more or less efficiently, *ex post*.” (Volberda, 1996, 360, emphasis in original). The identified imperative of firm-level flexibility is, in turn, stressing the need to maintain some level of organizational consistency. Thus, it has been emphasized that organizations must respond to the twin pressures of exploitation and exploration identified by March (1991). That is, organizations need to exhibit increasing flexibility while maintaining consistency and reliability (Bartlett and Ghoshal, 1998; Malnight, 2001, Volberda, 1996). As explained in the following, the problem with this argument is that, unless it is advanced as *ad hoc* reasoning, it must be demonstrated that flexibility outperforms rigidity under conditions of pervasive uncertainty.

2.2 Empirical observations of new organizational forms

Confusion surfaces when Child & McGrath (2001, fn 1) sample a list of the new forms that have been identified in organization research. This list includes the broader concepts of the “postbureaucratic” and “postmodern” organization (Clegg, 1990), the “postentrepreneurial organization” (Kanter, 1989) and the “flexible firm” (Volberda, 1998), as well as more specific concepts such as “federalism” (Handy, 1992), the “network organization” (Castells, 1996; Nohria & Eccles, 1992), the “virtual corporation” (Davidow & Malone, 1992), the “reengineered corporation” (Hammer & Champy, 1993), the “knowledge-creating company” (Nonaka & Takeuchi, 1995), the “ambidexterous organization” (Tushman & O’Reilly, 1996), the “high performance” or “high-commitment work system” (Garvin & Klein, 1993; Pfeffer, 1998), the “boundaryless company” (Devanna & Tichy, 1990; Hirschhorn & Gilmore, 1992), the “hybrid organization” (Borys & Jemison, 1989), and the “transnational solution” (Bartlett & Ghoshal, 1989). And more could be added, such as the learning organization (Garvin, 1993; Slater & Narver, 1995; Senge, 1990), and the “Born Global” firm (Madsen & Servais, 1997). According to Child & McGrath (2001), most of these formulations result from case studies of firms that have pioneered various organizational innovations, which helps to explain the overlaps and confusion of

terminology among them.

If we examine the observed changes in organizational characteristics in more detail, an impressionistic picture with marked features appears, including downsizing (Bowman, Singh, Useem & Bhadury, 1999), a trend toward more collaborative business relationships (Cannon & Homburg, 2001; Nault & Tyagi, 2001), network organizations (Achrol, 1997), flexibility achieved by more organic and temporary work arrangements (Bigley & Roberts, 2001; Child, 1997; Heydebrand, 1989; Ilinitich, D'Aveni, & Lewin, 1996; Zahra & O'Neill, 1998; Lewin & Volberda, 1999), more nimble governance structures (Kole & Lehn, 1997; Cecil; Ciccotello & Terry, 1995), decentralization of decision rights (Moller & Rajala, 1999), and new employment contracts characterized by less commitment between employer and employee (Charness & Levine, 2002). From an organizational economics viewpoint, these observations of new forms can be summarized as shifts: (1) from hierarchical organization to internal hybrids that operate "horizontally," e.g. by delegating decision rights to functional teams and project groups (Achrol, 1997; Moller & Rajala, 1999), and (2) from market organization to external hybrids that include vertical elements, e.g. by reducing to a minimum the core activities retained within one unit and assigning other responsibilities to semi-independent units (Child & McGrath, 2001). A third widely noted feature is the flexibility of the new organizational forms that most empirical studies emphasize as crucial. Whether further observed organizational features such as the virtual and boundaryless nature of new organizational forms deserve special mention is debatable, however. As explained in the following, the virtual nature of the new forms is associated with the observed delegation of decision rights. As regards the notion of boundaryless organizations, this is perhaps best viewed as an expression of the fuzzy conceptual definitions of organizational forms rather than actual empirical fuzziness. However that may be, the bewildering increase in new terms and perspectives undoubtedly reflects that something new is happening. But it also seems to reflect the need to develop sharper conceptualizations that can better separate the new from variations of the familiar.

2.3 Previous definitions of organizational form and what makes it new

While the empirical studies report an impressive number of instances in which organizational forms deviate from the familiar, it is unquestionably important from a scientific viewpoint to ascertain whether an observation is a variation of a known form or actually constitute a new. In order to do this, we need to define an organizational form, and to point out in what way a new form is different. One would therefore assume that the literature on new organizational forms had established a common definition of organizational form. Surprisingly, this is not the case. There are good reasons why it is difficult to establish commonly accepted definitions of organizational forms (Romanelli, 1991). Yet, it seems problematic to classify an observed organizational form as "new" until such a definition has been established. Most studies on new organizational forms offer no explicit definition of "organizational form," and ignore any difficulty in establishing what should count as a "new form." As one of the rare exceptions in recent organization research, Child & McGrath (2001) approaches a definition of organizational form that enables distinction between the new and the old.

There are a number of starting points that may help arrive at a useful definition of "organizational form." One possibility that seems particularly useful for organization research would be to start from economic sociology, building on Weber's (1978) classical categories of forms of

economic organization. Another related starting point chosen by Child & McGrath (2001) is to begin with categories of bureaucracy. They define an organizational form as a “bureaucracy” and argue that its familiar forms include the following characteristics: (1) hierarchical control and authority relations, (2) relatively fixed boundaries, and (3) top-down authority. Thus an observed bureaucracy would count as a new form if it negated one or more of these characteristics. Previously, Heydebrand (1989) had identified the emergence of new organizational forms with the transformation of the bureaucratic form caused by the transition from industrial to postindustrial capitalism. According to Heydebrand an organizational form can be defined in terms of (1) labor power, (2) the object, means, and division of labor, and (3) the control of labor at both the organizational and institutional levels. The new organizational forms identified by Heydebrand were characterized by informality, universalism, weak classification and framing of options, loose coupling, interdependence and networking, and propagation of a new corporate culture. These characteristics, it was argued, emerged in order to increase the organization’s flexibility. Aldrich & Mueller (1981) provided a related and useful sociological definition of organization form along the dimensions of technology, coordination, and control.

Another possibility would be to start from organizational economics and define form as particular instances of hybrids between markets and hierarchies (Williamson, 1975; 1996). This is what Foss & Foss (2002) aim at in defining two broad classes of new organizational forms as internal and external hybrids. According to Foss & Foss (2002), an “external hybrid” (Williamson, 1996) relies on market exchanges, but also incorporate elements of hierarchical control. The “internal hybrid” (Zenger and Hesterly, 1997) is the reverse case where hierarchical forms incorporate elements of market control.

The lack of definition of organizational forms and the ignorance of the defining criteria of what should count as a “new” form are sources of deep problems in the literature on new organization forms. For example, Whittington, Pettigrew, Peck, Fenton & Conyon (1999) identified three weaknesses in this literature: (1) a limited mapping of the extent of contemporary organizational change, (2) a confusion about how contemporary changes link together and (3) a lack of systematic testing of the performance consequences of this kind of change. The remedy of all three problems requires comparison across studies, which can only be accomplished if researchers use similar definitions of “organizational form.” According to the reviewed literature, there seem to be two particularly promising starting points, the delegation of decision rights associated with organizational economics, and the notion of bureaucracy associated with economic sociology. As a first step in advancing the understanding of what constitutes a new organizational form, the present article is interested in efficiency properties of organizations and therefore proceeds along the lines of organizational economics to define the notion of “organizational form.”

3 Toward a definition of organizational form

According to organizational economics, markets and hierarchies (firms) are two distinct forms of economic organization. One key distinguishing feature is that decision rights are centralized in the hierarchy, whereas they are decentralized in the market form. Further features are necessary to provide a useful definition. Thus, it has been emphasized that the institution of property rights and the possibility that an organization of people can act as a “legal person” are defining characteristics of the firm, and that the employment contract is further necessary to identify the

modern capitalist firm (Hodgson, 1998, 2002).

Although recognizing these features as necessary to define the firm, the starting point of the present article is the allocation of decision rights. Two extremes are identified according to which the members of an economic organization experience maximum or minimum discretion. The minimum discretion occurs when only a single organization member (the CEO) can decide to accept or reject projects on behalf of the organization, whereas any other member can individually decide neither to ultimately accept nor to ultimately reject a project. This is the instance of centralized decision rights denoted “centralized hierarchy.” The opposite case, denoted a “pure market,” involves maximum discretion, which occurs when a member can individually decide to accept a project on behalf of the organization, but cannot reject without the consent of the other members. The purpose here is to develop a simple modeling framework that allows distinction between organizational forms, modeled as architectures whose structural configurations support different levels of delegation of decision rights, including these two extreme cases.

3.1 Basic Two-Member Organizational Architectures

In order to proceed, the present section introduces the basic two-member organizational architecture. In section 4, we extend this basic two-member organizational architecture to define an organizational form as a n -member architecture.

Our definition of an organizational form as a structural configuration is based on the model of organizational architecture provided by Sah & Stiglitz (1986, 1988). The first model of Sah & Stiglitz (1986) is limited to two topological structures, each consisting of only two economic agents. One of these structures, the hierarchy was thought of as a stylized representation of organization by the firm, whereas the other structure, the polyarchy, could be thought of as a stylized representation of the market. In the present work, we build on Christensen & Knudsen’s (2002a, b) generalization of Sah & Stiglitz work to any finite topological structure.

In these models, often referred to as project selection models, the delegation of decision rights appears as the discretion for individual agents to ultimately accept or reject projects without interference of other agents. A weaker condition is that an agent may influence the possibility that other agents accept or reject a project.

The key ingredient in the context presented by Sah & Stiglitz is the *agent* along with the realization that agents are fallible when they evaluate the profit potential of projects. Uncertainty is added on behalf of the finite processing capabilities of the agent. This finiteness is an expression of limits as a characteristic of the decision-maker, to be understood in any possible way, ranging from the failure to obtain, assimilate, interpret and evaluate information relevant to a project, to a state of profound uncertainty.

Following the ideas and terminology of Sah & Stiglitz (1986), the basic process of making a decision goes loosely as follows. A decision-making structure will (repeatedly) be confronted with a *project* drawn from an *initial portfolio*. The project enters the structure through one of its agents and traverses the structure until it is either rejected or accepted ultimately. Rejection means that the project is terminated and no profit can be earned from it. Accept means that the project is realized, symbolized by storing it in a *final portfolio*, and profit is earned according to the quality of the project. In both cases a cost is paid for making the decision. If a project capable of producing any income, thereby reducing the costs and perhaps even produce profit, is rejected, then the organization made an error, denoted a *Type-I error*. If, on the other hand,

the organization accepts a project producing a negative income, it is said to have made a *Type-II error*. In both of these cases, the decision was a *failure*, and in all other cases it was a *success*. The ultimate fate of the project depends on how the agents are interconnected, thereby motivating the study of different organizational architectures. The point raised in the present paper is that distinct architectures support different levels of delegation of decision rights.

The two basic architectures, the two-member hierarchy and polyarchy, are the simplest non-trivial structures. Due to the limited possibilities for composing intuitively sound architectures, they are fairly representative of two-agent structures in general. Starting out with two nodes in the graph, two obvious (non-cyclic) configurations stand out (from a number of structures to be labeled as illegal in section 4), namely the two-member hierarchy and polyarchy.

Figure 1 provides a static overview of the graph representing the hierarchy of Sah & Stiglitz, and its environment, the initial portfolio I and the final portfolio F in which projects accepted by the hierarchy are stored. The termination node is denoted T , the waste bin where the rejected projects are dumped forever. The hierarchy represents a serial processing as a project traverses the structure and it is straightforward to generalize it to n -member hierarchies simply by adding nodes to the sequence between I and F .

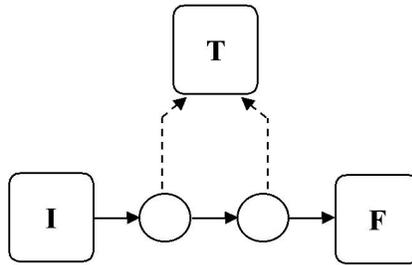


Figure 1: *The two-member hierarchy. In order for the graph to accept a project, both agents must accept the project individually. Or, the other way around, each individual has the ability to terminate the project.*

The distribution of decision rights in the two-member hierarchy shown in Figure 1 can be inferred from the members' access to the termination node T and the final portfolio F . Only one member has direct access to the final portfolio F . Since the ultimate accept of a project requires direct access to the final portfolio F , only one member has the right to ultimately accept projects on behalf of the organization. Both members can ultimately reject projects on behalf of the organization, however, since both members have direct access to the termination node T . These properties generalize in a straightforward way to n -member hierarchies. In the n -member hierarchy, only one member can ultimately accept a project on behalf of the organization, whereas each member can ultimately reject a project on behalf of the organization. Note further that ultimate acceptance by the agent entitled to do so, requires that all the other agents must also have accepted the project. The hierarchy thus supports an allocation of decision rights that can be summarized as n rejection edges leading from the individual agents to the termination node T , and *one* acceptance edge leading jointly from the n agents to the final portfolio F .

In contrast to the simple hierarchy, the polyarchy, shown in Figure 2, has a more specialized behavior and is more difficult to generalize in an unambiguous way. Since polyarchies represent a parallel processing, the agents must have the same level of competence. This can be modeled in various ways. The agents may incorporate a level of competence in their internal state such that all agents of matching competence belong to the same polyarchy. Alternatively, and in order to keep the simple picture of agents and channels of communication with no internal structure, three types of edges can be used – accept, standard reject and polyarchy reject. Such a setup allows for the type of polyarchy of Sah & Stiglitz, but additional rules of traversal, the dynamics of the architecture, must be supplied to ensure the polyarchy behavior.

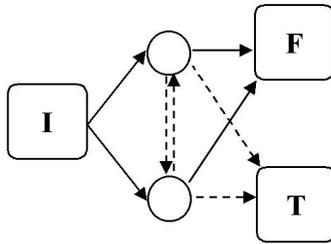


Figure 2: *The two-member polyarchy of Sah & Stiglitz. Here, the project is sent to any of the agents at random. The individual can accept the project on behalf of the graph, but in order to get an overall reject, both agents must reject. This behavior cannot be observed from the graph topology alone but is partly implemented in the dynamic rules that constrain the traversal.*

We also infer the distribution of decision rights in the two-member polyarchy shown in Figure 2 from the members' access to the termination node T and the final portfolio F . In the polyarchy, both members have direct access to the final portfolio F , and thus have the right to ultimately accept projects on behalf of the organization. None of these members can individually reject projects on behalf of the organization, however, since they only have access to the termination node T through the other agent. The two-member polyarchy thus supports an allocation of decision rights that can be summarized as 2 acceptance edges leading from the individual agents to the final portfolio F , and *one* rejection edge leading jointly from the 2 agents to the termination node T .

Problems arise when considering polyarchies of 3 or more members. It is not obvious how the agents are interconnected inside the polyarchy neither in what temporal order they evaluate a project. Here it is important to note that these properties are related to the architecture as a whole and cannot (in the general case) be extracted from the topology of the graph alone. In order to extend the Sah & Stiglitz polyarchy to include 3 or more members, added specification must be provided, and the actual choice of specification reflects, among other properties, the internal structure and the causal type of the graph. We will use Christensen & Knudsen (2002a) to define the required specifications.

Sah & Stiglitz further defined a unifying sub-structure called a *committee* of n members and consensus k . This sub-structure was constructed by picking a polyarchical structure and supplying a dynamic rule according to which the organization should accept only if k or more

agents evaluate the project positively. The invention of the n -member committee of consensus k was both a generalization of the two basic structures and a unification of the two into a common framework.

4 Modeling Organizational Forms as n -Member Architectures

The following section 4.1 provides a definition of organizational form as a n -member architecture. The mathematical description of the system to be modeled has two intimately connected facets, a physical structure and a set of dynamic rules. These two facets must always be compatible and support/reflect the phenomena to be studied. Thus, section 4.2 turns the attention toward structural components and dynamic rules. Section 4.3 then explains how the allocation of decision rights can be modeled in an n -member architecture, and section 4.4 proceeds to establish correspondence between organizational architectures and the allocation of decision rights.

4.1 A Definition of Organizational Form

We define an organizational form as a n -member architecture, which is: *a collection of members, a collection of channels through which the members can pass information or control to each other, and a set of dynamic rules that help define the flow of information or control and thus help define their decision rights.* The purpose of an organizational form as considered here is to make decisions regarding whether to accept or reject projects, and these decisions have economic consequences. Decision rights are introduced as the right to ultimately accept or reject a project on behalf of the architecture. Since the present article is concerned with the definition of alternative economic organizations, we need to be clear about the meaning of acceptance and rejection within this context.

Acceptance or rejection of a project on behalf of an economic organization refers to the exchange of property rights and to the exchange of rights to determine the use of human resources within some bounds (we do not consider slavery). Drawing on Hodgson's (2002) useful definition of firms and markets, an economic organization is further defined as an entity in which regular exchange of property rights takes place within a framework of law. Thus markets and firms are types of economic organization. In markets, two or more legal entities exchange property rights. These legal entities can be self-employed individuals or firms. A firm can be defined as (Hodgson, 2002, p. 56): "...an integrated and durable organization involving two or more people, acting openly or tacitly as a 'legal person', capable of owning assets, set up for the purpose of producing goods or services, with the capacity to sell or hire these goods or services to customers."

In the following, we are going to consider alternative forms of economic organization. These organizations will consist of a number of agents (self-employed individuals, employees, or firms) that exchange goods and exchange rights to determine the use of human resources within some bounds. We are further going to identify six classes of economic organization. One is referred to as the "pure market". The others are described as hierarchies and hybrids. These terms represent different degrees of decentralization of decision rights and correspond to new forms of economic organization as identified in the literature (Foss & Foss, 2002). Consistent with the definition of firms and markets used in the present article, "hybrids" represent economic

organizations with different degrees of relational exchange (Hodgson, 2002) situated in a firm (internal hybrids) or in a market (external hybrids).¹

According to our definition, the form of an economic organization can be thought of as a particular structural configuration of connected members that have established rules for passing information or control of projects exchanged by the organization. Further specification is provided in the following.

The architecture of an economic organization can be represented by a *graph* consisting of *nodes* and *edges* (Christofides, 1975). In such a representation each node corresponds to an individual or more generally to the basic building block, the simplest constituent, here denoted an *agent*. These agents can have very different properties depending on the specifics of the model. Similarly, each edge represents a channel of communication to another agent or more generally the passing of information or control to another unit, and it is here denoted a *choice* because agents must pick only one during the individual decision process. These choices will also be equipped with certain characteristics to incorporate realistic features into the model system.

The basic process of making a decision was described above in section 3.1. The project quality is determined by the initial portfolio, and detailed cost considerations may be an important part of a model too, since they are closely related to the measuring of performance, and since they represent assumptions on time scales, parallel processing capabilities and employment strategies of agents.

In terms of the graph representing the structure, an *input* (I), an *output* (F) and a *termination* (T) node are introduced. These external nodes are of a different type than the internal nodes representing agents, as they represent the environment or store historical information about the system. The projects are drawn from the initial portfolio and may be represented by a d dimensional vector, \vec{x} , encoding the relevant information available to the agents and to the organization as an entity. It may even store dynamic information on the decision process itself. The simplest project description is just the real number ($d = 1$) describing the income (excluding the cost of the decision process itself) produced by the project in case of acceptance.

The decision-making process is realized by traversing the graph from the input node to either the output or to the termination node. Such a connected *path* of subsequent choices is simply denoted a *decision*. The overall picture is illustrated in Figure 3, where the edges must be interpreted loosely, because a decision-making structure can have several entry points as well as more than one path may lead to acceptance or rejection.

4.2 Graph Components and Dynamics

The basic constituents of the framework is described in Christensen & Knudsen (2002a). Here we will introduce a part of this material in order to pursue the aim of the present article.

4.2.1 The Cost Model

The explicit cost of making a decision is important to include because it facilitates comparison of graphs across sizes and families, and because it sets a scale on which to measure profit. The architecture is viewed as the brain of a larger and more directly productive apparatus, and as such it has its own internal accounts (a cost is paid for evaluating a project even if the production apparatus is never started). Three basic models were proposed in Christensen & Knudsen (2002a): (1) Large-scale operation costs (fixed per time unit), (2) Employment costs

(scales linearly with the number of agents), and (3) Free-lance costs (scales linearly with the number of active agents).

Starting from the bottom of the list, the free-lance cost model reflects small organizations that demand very specific and rapidly varying (over time) competences from its employees. The second model, the employment cost, simulates organizations with a fixed staff, either because the organization is big enough to cover all fields of competence needed or, reversely, because there is only a very few fields of competence in the niche. This cost model can be used to effectively model parallel processing of projects in time, since generally not all agents are active during a single decision. Finally, with the large-scale operation cost the other extreme has been covered, that is, the situation where the organization is large and where several similar projects can be treated simultaneously implying relatively low overall expenses for each project. Again, this model can be used to effectively model parallel processing, and the incoming projects should now be viewed as multi-project cases².

4.2.2 The Initial Portfolio

A project may be represented by a d dimensional vector, \vec{x} , encoding the relevant information available to the agents and to the organization as an entity. It may also leave room for internal evaluation data as long as an initial default state is uniquely given. The quality of a project is the potential for profit calculated by some scalar field

$$\mathcal{P} : \mathbb{R}^d \rightarrow \mathbb{R} \tag{1}$$

This potential profit includes all costs of production, effectuation or implementation, but excludes the cost of making the decision whether to realize the project or not, because this cost may depend on the architecture or even the specifics of the decision process. In the simplest case, the project is simply represented by the single scalar value, x , measuring its potential for profit.

The initial portfolio represents any part of the external environment that has nothing to do with the costs of making the decision itself. Thus it reflects the information, resources, available

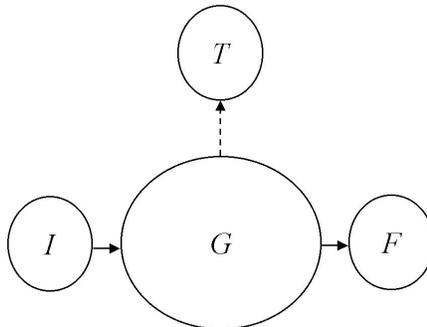


Figure 3: A static overview of the graph \mathbf{G} , representing a decision-making structure, and its environment, the initial portfolio I , the final portfolio F , and the termination node T .

technology, political circumstances and market dynamics. It, and not the organization itself, defines the (available) projects, whose values are determined by a given income distribution G .

4.2.3 Agents and Choices

An agent, represented by a node in the graph, is the basic unit of the decision-making structure. Moreover, the single agent is the simplest, non-trivial structure that can be formed. The task of the agent is to receive projects, evaluate or “screen” them and, according to the screening, dispatch the projects along the appropriate channels of communication available to the agent. The actual channel used corresponds to a single edge in the graph and represents the agents choice of what to do with the project. The evaluation of the project by the individual agent is described by a mapping from the project space into the closed real unit interval representing a Bayesian probability

$$f : \mathbb{R}^d \rightarrow [0, 1] \tag{2}$$

This *agent screening function* can be interpreted in several ways, depending on the imposed dynamics. The simplest choice of a screening function is a hard-coded function representing the static properties of the agent. But as internal state and memory of agents is incorporated, reflecting experience and the ability to learn, it may not even be a true function (unless the agent, the history and even the graph are accepted as arguments as well). Nevertheless, the outcome of the screening should always be accept or reject, possibly followed by a transformation

$$\mathcal{T} : \mathbb{R}^d \rightarrow \mathbb{R}^d \tag{3}$$

of the project \vec{x} . What happens to the project next is determined by the topology of the graph and the specifics of the dynamics.

The project transformation of equation (3) represents the process of adding or distorting information during the process of communication or even the direct manipulation of the initial project, whether this is an attempt to improve the project or simply an update of internal evaluation data.

Since the choices (edges) can have various, both statical and dynamic, properties similar to the agents (nodes), our proposed definition of organizational form can be used to develop rigorous and yet realistic models of business organizations.

4.2.4 Invariants

In order to maintain realism in the use of graphs as representatives for decision-making models Christensen & Knudsen (2002a) pinned down the following seven invariants: (1) The graph is directed, finite and connected, (2) there exists one external node I having only out-bound acceptance edges to internal nodes, (3) there exists one external node F having only in-bound acceptance edges, from internal nodes, (4) there exists one external node T having only in-bound rejection edges from internal nodes, (5) each internal node must have at least one acceptance edge, (6) each internal node must have at least one rejection edge, and (7) the external node F or T must be reachable from any internal node.

As explained in Christensen & Knudsen (2002a), additional structural criteria may be applied to further restrict the type of model being considered and in order to exclude non-intuitive constructs. It is further important to extend the finiteness requirement of the graph to the dynamic rules. In particular it must be noted that cyclic architectures may result in infinite loops, which are obviously infeasible as it requires a finite time for each agent to evaluate a project³. Additional issues to be considered are causality, time-ordering and the possibility of feedback (Christensen & Knudsen, 2002a). Armed with this overview of the framework developed in (Christensen & Knudsen, 2002a, b), we now proceed to consider the possible correspondence between organizational n -member architectures and the allocation of decision rights.

4.3 Allocation of Decision Rights for n -member Architectures

On the basis of the modeling framework developed in Christensen & Knudsen (2002a) we have provided the basis for considering the allocation of decision rights in n -member structures. The method used to infer the architecture's support of decision rights was outlined in section 3.1. The members can either be allocated the right to ultimately accept or reject a project on behalf of the organization. The right to ultimately terminate a project is represented as a direct access from the member to the termination node T , and the right to ultimately reject is represented as a direct access to the final portfolio F . Here, direct access means that the project after acceptance or rejection appears with probability 1 in the termination node T or the final portfolio F . Accordingly, as mentioned in section 3.1, *the n -member hierarchy supports a delegation of decision rights that can be summarized as n rejection edges leading from the individual agents to the termination node T , and one acceptance edge leading jointly from the n agents to the final portfolio F .*

It was further mentioned that the two-member polyarchy supports an allocation of decision rights that can be summarized as two acceptance edges and one rejection edge (in terms of two indirect rejection edges by way of the other agent). What about the n -member polyarchy?

As indicated above, one possibility chosen here (in order to keep the simple picture of agents and channels of communication with no internal structure), three types of edges are used – accept, standard reject and polyarchy reject. But we need to add a further rule of traversal in order to ensure the polyarchy behavior. The rule chosen here is that in the case of polyarchy rejection, a project is sent to the nearest neighbor, if any, to which the member is connected by a polyarchy edge. Only when all the members connected by polyarchy edges reject a project, is it ultimately rejected. All members connected by polyarchy rejection edges can accept a project, but termination can only happen if each and everyone rejects the project. In case of acceptance, the project travels to the next hierarchical layer or is ultimately accepted, i.e. stored in the final portfolio F . Using this definition, *the n -member polyarchy supports a delegation of decision rights that can be summarized as n acceptance edges leading from the individual agents to the final portfolio F , and one rejection edge leading jointly from the n agents to the termination node T .*

4.4 Identifying a Correspondence Between Architecture and Decision Rights

So far, two pure architectures have been provided: the n -member hierarchy, and the n -member polyarchy. Here we introduce four additional distinct classes of architectures that correspond to

the following classes of economic organization identified in the literature: centralized hierarchies, internal hybrids, external hybrids, and the pure market. The purpose is to show that the classes of architecture support increasing (decreasing) levels of delegation of decision rights. In order to compare the level of delegation we sum the number of edges that lead to ultimate acceptance and rejection of a project. By “ultimate acceptance” we mean that an organization member dispatches a project to the final portfolio F , and by “ultimate rejection” we mean that a member dispatches a project to the termination node T . The architectures discussed in the following encompass graphs that are consistent with the invariants listed in section 4.2.4.

The centralized hierarchy. A centralized hierarchy is an architecture in which only one member has the right to ultimately accept projects. This member is said to reside at the highest hierarchical layer. The pure hierarchy discussed in the above is a special case of the centralized hierarchy, and if the architecture only has two members, the two forms are identical. In terms of allocation of decision rights, there are two extremes of the centralized hierarchy. First, the maximum delegation of decision rights occurs when all the members at a lower hierarchical layer are each connected to the member at the highest hierarchical layer but are mutually unconnected. In this case, there are n edges that lead to ultimate rejection and one edge leading to ultimate acceptance of a project. In case just two lower level members were mutually connected there would be $n-1$ edges that lead to ultimate rejection and one edge leading to ultimate acceptance. At the opposite extreme, the minimum delegation of decision rights occurs when all the members at lower hierarchical layers are each connected to the member at the highest hierarchical layer and also mutually connected by polyarchy rejection edges. In this case, there are two edges leading to ultimate rejection (one is the combined effect of the polyarchy edges) and one edge leading to ultimate acceptance.

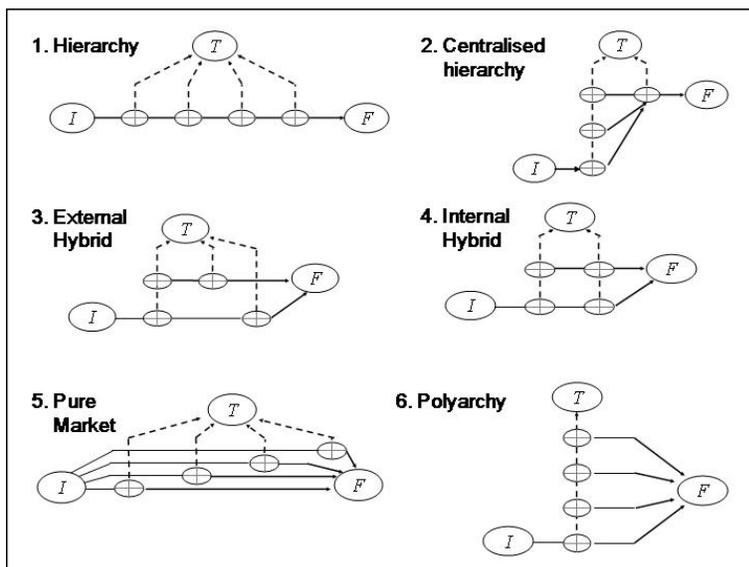


Figure 4: The six classes of organizational form establishing correspondence between the delegation of decision rights and economic architecture.

The internal hybrid. An internal hybrid is an architecture in which k of n members ($1 < k < n$) have the right to ultimately accept projects. As opposed to the external hybrid,

described below, these k members are connected by a polyarchy edge and thus have the same level of competence. That is, in the internal hybrid, the k members residing at the highest hierarchical layer can only reject a project on behalf of the organization if all agree it must be dumped. By contrast, if only one member residing at the highest hierarchical layer accepts the project, it is accepted by the organization. There are two extremes of the internal hybrid. First, the maximum delegation of decision rights occurs when all the members at lower hierarchical layers are each connected to one member at the highest hierarchical layer, but are mutually unconnected. In this case, there are $n-(k-1)$ edges that lead to ultimate rejection and k edges leading to ultimate acceptance of a project, i.e. a total of $n + 1$ edges leading to an ultimate decision. At the opposite extreme, the minimum delegation of decision rights occurs when all the members at lower hierarchical layers (as in the example shown in Figure 4) are each connected to one of the members at the highest hierarchical layer and are also mutually connected by polyarchy rejection edges. In this case, there are two rejection edges (one is the combined effect of the polyarchy edges) and a minimum of k acceptance edges (the maximum in this case is $n-1$ acceptance edges if all members but one were residing at the highest level).

The external hybrid. An external hybrid is defined as an architecture in which k of n ($1 < k < n$) members have the right to ultimately accept projects. As opposed to the internal hybrid, these k members are mutually unconnected. In the external hybrid, the k members residing at the highest hierarchical layer can therefore individually reject and accept a project on behalf of the organization (complete autonomy of each of the k members at the highest level). We also find two extremes of the external hybrid. First, the maximum delegation of decision rights occurs when only a single member at a lower hierarchical layer is connected to $k=n-1$ members that all reside at the highest hierarchical layer. In this extreme case, there are n edges that lead to ultimate rejection and $n-1$ edges leading to ultimate acceptance of a project. As more members are located at lower levels, the number of edges leading to ultimate rejection or acceptance decreases. At the opposite extreme, the minimum delegation of decision rights occurs when all the members at lower hierarchical layers are each connected to one of the k members at the highest hierarchical layer and are also mutually connected by polyarchy rejection edges. In this case, there are $k+1$ rejection edges (one is the combined effect of the polyarchy edges at the lower level) and a minimum of k acceptance edges (also in this case the maximum is $n-1$ acceptance edges if all members but one were residing at the highest level).

The pure market. The pure market is defined as an architecture in which all n members have the right to ultimately accept and reject projects. This extreme architecture is simply a collection of n unconnected members. In this case, there are n edges that lead to ultimate acceptance or rejection.

Figure 1 shows the architecture of the six classes of organizational form. These six cases define six distinct classes of organizational architecture (and thus organizational form as defined here). As explained in the following, the six classes of architecture also support a ranking of increasing (decreasing) levels of delegation of decision rights. The pure market has the maximum delegation of decision rights, whereas the minimum occurs in the centralized hierarchy.

From Table 1, the following relations can be established for $n > 2$ and $k > 1$ (tighter relations can be established in some instances, but this leads to a less clean picture):

1. $PM_{Max} > EH_{Max} > PH_{Max}$.
2. $PM_{Min} > EH_{Min} \wedge EH_{Min} > PH_{Min}$ for $k > n/2$.

Architecture	PH: Pure Hierarchy	CH: Centralized Hierarchy
Max. Dec.	$PH_{Max}: n + 1$	$CH_{Max}: n + 1$
Min. Dec.	$PH_{Min}: n + 1$	$CH_{Min}: 3$
Architecture	EH: External Hybrid	IH: Internal Hybrid
Max. Dec.	$EH_{Max}: 2n - 1$	$IH_{Max}: n + 1$
Min. Dec.	$EH_{Min}: 2k + 1$	$IH_{Min}: k + 2$
Architecture	PM: Pure Market	PO: Polyarchy
Max. Dec.	$PM_{Max}: 2n$	$PO_{Max}: n + 1$
Min. Dec.	$PM_{Min}: 2n$	$PO_{Min}: n + 1$

Table 1: *Levels of Delegation for Alternative Architectures ($1 < k < n$).*

3. $PO_{Max} = IH_{Max} = CH_{Max}$.
4. $PO_{Min} > IH_{Min} > CH_{Min}$.
7. $PH_{Max} = CH_{Max} \wedge PH_{Min} > CH_{Min}$.
8. $EH_{Max} > IH_{Max} \wedge EH_{Min} > IH_{Min}$.
9. $PM_{Max} > PO_{Max} \wedge PM_{Min} > PO_{Min}$.

Thus, decision rights tend to be increasingly decentralized as we move from the top to the bottom, and from the right to the left, in Table 1. Moreover, the minimum decentralization occurs in the pure hierarchy, and the maximum in the pure market. We have thus established that distinct alternative architectures can be ranked according to their support of a level of delegation of decision rights.

5 Discussion

We have shown that distinct alternative architectures can be ranked according to their support of a level of delegation of decision rights. As mentioned above, recent works in organizational economics define new organizational forms as *hybrid forms of hierarchy* in which decision rights are delegated to lower levels, or *hybrid forms of market exchange* in which elements of hierarchical control appear (Foss & Foss, 2002; Williamson, 1996; Zenger & Hesterly, 1997). The contribution of the present article is to define six distinct classes of architecture that can be ranked according to their support of alternative levels of decision rights. When we speak of a new organizational form, it is now possible to define wherein some aspect of the new lies, i.e. in terms of a previously unknown hybrid.

The definition of organizational form advanced here can, therefore, be used as a basis for an empirical classification of the forms of organizing that have emerged through history. As an example, we will consider the study of network organization in marketing during the past three decades (Achrol & Kotler, 1999). The early work studied networks by mapping patterns of interpersonal ties, often occurring as a collection of dyadic bonds. According to Achrol & Kotler (1999), the emergence of large-scale managed networks in recent years can be associated

with a significant shift in the basis of network research, in terms of a move away from studying networks as informal relations to studying them as formal governance structures. The present work offers a definition of organizational form in terms of organizational architecture, and an approach to classification of architectures that can help advance this line of research. The empirical research we have in mind is therefore consistent with the emerging new conceptual basis of marketing theory, according to which networks are studied as alternatives to the classical governance structures, the market and the hierarchy.

Achrol & Kotler (1999) usefully defined four types of networks: internal networks, vertical networks, intermarket networks, and opportunity networks. According to Achrol & Kotler (1999), an internal market network is designed to reduce hierarchy and open firms to their environments. Achrol & Kotler (1999, 149) defined the internal market network as “a firm organized into internal enterprise units that operate as semiautonomous profit centers buying from, selling to, or investing in other internal and external units as best serves their needs on market-determined terms of trade but subject to firm policy.” This definition is consistent with the class of the internal hybrid identified in the present work. What we add here, apart from the classification, is the possibility of evaluating how this structure will influence the firm’s ability to select projects, and thus its performance (Christensen & Knudsen 2002a, 2002b show how the performance of any economic architecture can be evaluated).

Achrol & Kotler (1999) further argued that the vertical network maximizes productivity of serially dependent functions by creating partnerships among independent skill-specialized firms. The vertical market network was defined as comprising “a group of resource firms specializing in the various products, technologies, or services that constitute the inputs of a particular industry, organized around a focal company (sometimes a ‘virtual’ company) that focuses on monitoring and managing the critical contingencies faced by the network participants in that market.” Achrol & Kotler (1999, 152-3). This definition would be consistent with the class of the external hybrid identified in the present work if multiple independent focal companies acted to focus activities. If only one firm is acting as the focal unit, however, we classify the vertical network as an instance of the centralized hierarchy. Regarding Achrol & Kotler’s (1999) intermarket network, this represents a shift in the unit of analysis, and thus the scope of the network. Since the intermarket network encompasses multiple focal companies, it is consistent with the external hybrid defined in the present work. Finally, Achrol & Kotler (1999) consider networks designed to optimize customer opportunity organized around a central clearing house. According to this description, the opportunity network can be viewed as an instance of the internal hybrid or perhaps, in extreme cases, the centralized hierarchy.

There are limitations that need to be addressed before comprehensive empirical classification can be accomplished, however. Among these are: (1) the range and degree of coordination of the activities that business organizations are engaged in, and (2) the need for renewal of the activities, and the organizational architecture that support these activities. We will consider each topic in turn.

5.1 The Scope and Coordination of Multiple Activities

In the literature on new organizational forms, the rationale given for their emergence is the need to maintain flexibility in an increasingly global and hypercompetitive environment. The organizations in the new hypercompetitive environment must adapt to rapidly shifting opportunities

or perish. Furthermore, the organizations need to maintain a stable course despite increasing their capability to adapt. Finally, organizations need to organize around an increasingly diverse portfolio of functions, technologies, and customer wants (Achrol & Kotler's, 1999). Therefore, it is argued, the new emerging organizations increase their ability to adapt, they maintain stability despite frequent adaptation by focusing on meta-stability, and they manage diversity through layered networks (Achrol & Kotler, 1999). While this diagnosis is probably true, the possible solutions could turn out to be problematic (March, 1995). The problem here is whether the costs of adaptation, flexibility and coordination may outweigh the benefits.

In the following section, we consider this issue by identifying two distinct aspects of organizing that might be adapted, the structure of decision rights among organization members, and the members' decision making competence. Finally, we examine the profitability of the six classes of organizational architecture identified in Table 1. On this basis, it is pointed out that there are only two optimal forms of organizing under conditions of pervasive uncertainty, the pure hierarchy and the pure polyarchy. Since these structures are opposites, adaptation between them requires a maximum of switching costs. In view of the obstacles associated with adaptation it is, therefore, an open question whether organizations should aim for flexibility or simply accept a dedicated short life-span (see March, 1995).

5.2 Renewal of Activities and Organizational Architecture

At this point, it is useful to briefly summarize the ground covered so far. According to our definition of an organizational form, it is a topological structure (a collection of members and a collection of channels through which the members can pass information or control to each other) and a set of dynamic rules imposed on that structure that help define the members' decision rights. As pointed out in the above, an organizational form is engaged in exchange and can usefully be modeled as a sound (i.e. consistent with the invariants mentioned in section 4.2.4) directed, finite and connected graph. This graph pays a cost to exist (according to a particular cost model), faces a project distribution (a market choice), and its members may alter the quality of the projects (project transformation) during their evaluation of projects.

When we speak of organizational forms as new, we may therefore refer to: (1) topology, (2) dynamic rules, (3) the cost model, (4) the market choice (the distribution and dimensionality of projects), (5) the delegation of rights to alter project quality, or (6) to the rate of change in any of these aspects of organizational form.⁵ The present paper identifies the topology and dynamic rules as the basic criteria for definition and classification of organizational forms. The further aspects of organization mentioned in (3)-(6) are best viewed as additional criteria that may help identify emergent shades of economic organization.

Recently, it has been emphasized that the competitive world is characterized by "hypercompetition," a state of the world associated with fundamental uncertainty. It has further been proposed that organizational forms must be increasingly flexible under hypercompetition (e.g. Volberda, 1996). If we associate hypercompetition with fundamental uncertainty, agents do not know the value of a project. At the limit, the agent decides what to do on the basis of hunch. In this situation, the screening function of the agent is a constant (representing the absence of perceived difference between projects) and the organizational form is particularly easy to predict. It can thus be shown (Christensen & Knudsen, 2002a, 2002b) that the n -member hierarchy and polyarchy (see Figure 4) are the optimal forms that bound any sound finite structure. In good

times (positive project value), polyarchies will dominate, and in bad times (negative project value), polyarchies will dominate.

Even if it were not the case that decision makers operated on hunch, it can be shown that the agents should organize in an n -member hierarchy in bad times (negative project value), and should choose the n -member polyarchy in good times (positive project value), the number n in both instances depending on cost considerations.⁶ Contradicting recent claims, organizational forms are thus particularly easy to predict when the oscillations of the business cycle become more extreme or agents experience pervasive uncertainty. Perhaps, the tendency to organize in flat structures observed through the 1990s was simply reflecting the upswing of the business cycle that would favor polyarchies.

Since these organizational forms are opposites when the expected profits are positive and negative, however, it is an open question whether organizations should aim for flexibility or simply accept a dedicated short life-span (see March, 1995). Unless the switching costs are negligible, we should expect rather persistent compromises (in terms of topology and dynamic rules) or increased rates of failure as the business cycle swings. These considerations appear to seriously question the wisdom of compromise and flexibility expressed in the literature on new organizational forms, an issue that must be addressed in future research.

6 Conclusion

According to the last decade's literature on organizational forms, a number of causes underlie the emergence of new forms. The widely observed new organizational forms, it is argued, have emerged in response to increased information intensity and internationalization. Yet, numerous aspects of organization have been emphasized as new, pointing to insecure conceptual foundations, ambiguity, and methodological disagreement.

While the empirical studies on new organizational forms report an impressive number of instances in which new forms deviate from the familiar, we need to define an organizational form, and to point out in what way a new form is different. There are good reasons why it is difficult to establish commonly accepted definitions of organizational forms, yet, it seems problematic to classify an observed organizational form as "new" until such a definition has been established. Most studies on new organizational forms offer no explicit definition of "organizational form," and ignore any difficulty in establishing what should count as a "new form."

The recent decade's research in organizational forms has gained important headway in converging upon a few particularly important causes of the new forms that have been observed. In order to further advance this research, the present paper has aimed to provide a preliminary definition of organizational forms, developed along the lines of organizational economics. Thus, we advanced a broad definition of organizational form as a collection of members, a collection of channels through which the members can pass information or control to each other, and a set of dynamic rules that help define the flow of information or control and thus help define their decision rights. Decision rights were further defined in terms of the member's right to ultimately accept or reject a project on behalf of the architecture.

The strength of this definition is that it establishes a typology that allows identification of alternative forms of organizing (in terms of topology and dynamic rules), and the corresponding level of delegation of decision rights. Thus, a particular choice of allocation of decision rights

dictates a particular organization structure (topology and dynamic rules), and *vice versa*. The proposed definition further opens the possibility of modeling how alternative choices regarding the cost model, the market choice, and the delegation of rights to alter project quality will influence performance. A further issue pertains to the evaluation of compromise and flexibility versus switching costs.

Whereas the mere imputation of a concept of form may serve to organize and advance investigation of changes in organizational diversity, it would be better if we knew a form before we had seen it. The present article has offered a preliminary attempt to define organizational forms that may help a move in this direction.

References

- Achrol, R. S. (1997). Changes in the theory of interorganizational relations in marketing: Toward a network paradigm. *Academy of Marketing Science*, 25(1): 56-71.
- Achrol, R. S. & Kotler, P. (1999). Marketing in the network economy. *Journal of Marketing*, 63(Special Issue): 146-163.
- Aldrich, H. E. & Mueller, S. (1981). The Evolution of Organizational Forms: Technology, Coordination, and Control. In Staw, B. & Cummings, L. L. (Eds.): *Research in Organizational Behavior*, Vol. IV. JAI Press: 33-87.
- Bartlett, C. A., & Ghoshal, S. (1998). *Managing across borders: The transnational solution (2nd ed.)*. Boston: Harvard Business School Press.
- Bigley & Roberts, (2001). The incident command system: High-reliability organizing for complex and volatile task environments. *Academy of Management Journal*, 44: 1278-1296.
- Borys, B., & Jemison, D. B. (1989). Hybrid arrangements as strategic alliances: Theoretical issues in organizational combinations. *Academy of Management Review*, 14: 234-249.
- Bowman, E. H., Singh, H., Useem, M., & Bhadury, R. (1999). When does restructuring improve economic performance? *California Management Review*, 41(2): 33-54.
- Brynjolfsson, E. & Mendelson, H. (1993). Information systems and the organization of modern enterprise. *Journal of Organizational Computing*, 3(4), 245-255.
- Cannon & Homburg, (2001). Buyers-supplier relationships and customer firm costs. *Journal of Marketing*, 65(1), 29-43.
- Castells, M. (1996). *The rise of the network society*. Cambridge, MA: Blackwell.
- Cecil, H. W., Ciccotello, C. S., Grant, C. T. (1995). The choice of organizational form. *Journal of Accountancy*, 180(6): 45.
- Charness, G. & Levine, D. I. (2002). Changes in the employment contract? Evidence from a quasi-experiment. *Journal of Economic Behavior & Organization*, 47(4): 391-405.
- Child, J. (1997). Strategic choice in the analysis of action, structure, organizations and environment: Retrospect and prospect. *Organization Studies*, 18: 43-76.
- Child, J. & McGrath, R.G. (2001). Organizations unfettered: Organizational form in an information-intensive economy. *Academy of Management Journal*, 44(6): 1135-1148.
- Christensen, M. & Knudsen, T. (2002a). *The Architecture of Economic Organization: Toward a General Framework*. Odense, Denmark: Mimeo, Dep. of Marketing, University of Southern Denmark.
- Christensen, M. & Knudsen, T. (2002b). *Extremal Screening, Cost and Performance of Economic Architectures*. Odense, Denmark: Mimeo, Dep. of Marketing, University of Southern Denmark.
- Christofides, N. (1975). *Graph theory: An algorithmic approach*. Academic Press.
- Clegg, S. R. (1990). Modern organization: Organization studies in the post-modern world. London: Sage. Colombo, M. G. (Ed.): *The changing boundaries of the firm*. New York: Routledge.
- Daft, R. & Lewin, A. Y. (1993). Where are the theories for the new organizational forms?, *Organization Science*, 4(4), i-vi.
- Davenport, S., Davies, J. & Miller, A. (1999). Framing of international research alliances: Influence on strategy. *R & D Management*, 29(4): 329-342.
- Davidow, W. H., & Malone, M. S. (1992). *The virtual corporation*. New York: Burlingame/ Harper Business.
- Devanna, M. A., & Tichy, N. (1990). Creating the competitive organization of the 21st century: The boundaryless corporation. *Human Resource Management*, 29: 455-471.
- Foss, K. & Foss, N. J. (2002). *Authority and discretion: tensions, credible managerial commitment, and implications for new organizational forms*. Mimeo.
- Garvin, D. A. (1993). Building a learning organization, *Harvard Business Review*, 71 (July/ August): 78-91.
- Garvin, D. A., & Klein, N. (1993). *A note on high-commitment work systems*. Note no. 693080, Harvard Business School, Boston.
- Hammer, M., & Champy, J. (1993). *Reengineering the corporation: A manifesto for business revolution*. New York: Harper Business.

- Handy, C. (1992). Balancing corporate power: A new federalist paper. *Harvard Business Review*, 70(6): 59-72.
- Heydebrand, W. V. (1989). New organizational forms. *Work and Occupations*, 16: 323-357.
- Hirschhorn, L., & Gilmore, T. (1992). The new boundaries of the “boundaryless” company. *Harvard Business Review*, 70(3): 104-115.
- Hodgson, G. M. (1998). The approach of evolutionary economics. *Journal of Economic Literature*, 35(1), 166-192.
- Hodgson, G. M. (2002). The legal Nature of the Firm and the Myth of the Firm-Market Hybrid. *International Journal of the Economics of Business*, 9(1), 37-60.
- Ilinitch, A. Y., D’Aveni, R. A., & Lewin, A. Y. (1996). New organizational forms and strategies for managing in hypercompetitive environments. *Organization Science*, 7: 211-220.
- Jensen, M. & Meckling, W. (1992). Knowledge, control and organizational structure: Parts I and II. In: Werin, L. & Hijckander, H. (Eds.), *Contract economics*, Cambridge, MA.: Basil Blackwell.
- Kanter, R. M. (1989). *When giants learn to dance: Mastering the challenge of strategy management, and careers in the 1990’s*. New York: Simon & Schuster
- Kole, S. & Lehn, K. (1997). Deregulation, the evolution of corporate governance structure, and survival. *The American Economic Review*, 87(2), 421-425.
- Lewin, A. Y., & Volberda, H. W. (1999). Prolegomena on coevolution: A framework for research on strategy and new organizational forms. *Organization Science*, 10: 519-534.
- Madsen, T. K., & Servais, P. (1997). The Internationalization of Born Globals - an Evolutionary Process? *International Business Review*, 6(6): 561-583.
- March, J. G. (1991). Exploration and exploitation in organizational learning. *Organization Science*, 2, 71-87.
- March, J. G. (1995). The Future, Disposable Organizations, and the Rigidities of Imagination. *Organization*, 2, 427-440.
- McKendrick, D. G. & Carroll, G. R. (2001). On the genesis of organizational forms: Evidence from the market for disk arrays, *Organization Science*, 12(6), 661-682.
- Moller, K. & Rajala, A. (1999). Organizing marketing in industrial high-tech firms: The role of internal marketing relationships. *Industrial Marketing Management*, 28(5): 521-535.
- Nault, B. R. (1998). Information Technology and Organization design: Locating Decisions and Information, *Management Science*, 44(10), 1321-1335.
- Nault, B. R. & Tyagi, R. K. (2001). Implementable mechanisms to coordinate horizontal alliances. *Management Science*, 47(6): 787-799.
- Nohria, N., & Eccles, R. G. (Eds.) (1992). *Networks and organizations*. Boston: Harvard Business School Press.
- Nonaka, I., & Takeuchi, H. (1995). *The knowledge-creating company*. New York: Oxford University Press.
- Organization Science, (1999). Special issue on “coevolution of strategy and new organizational forms.” *Organization Science*, 10(5), Whole issue.
- Pfeffer, J. (1998). Seven practices of successful organizations. *California Management Review*, 40(2): 96-124.
- Romanelli, E. (1991). The Evolution of New Organizational Forms. *Annual Review of Sociology*, 17: 79-103.
- Sah, R.K. & Stiglitz, J.E. (1986). The architecture of economic systems: Hierarchies and polyarchies, *American Economic Review*, 76: 716-727.
- Sah, R.K. & Stiglitz, J.E. (1988). Committees, hierarchies and polyarchies, *Economic Journal*, 98: 451-470.
- Schumpeter, J. A. (1928). Entrepreneur (Unternehmer). First published in 1928 as “Unternehmer” in “Handwörterbuch der Staatswissenschaften”, (4th ed.), Jena: Verlag von G. Fischer. English translation, Becker, M C. & Knudsen, T., *Advances of Austrian Economics (forthcoming)*.
- Schumpeter, J. A. (1934). *The theory of economic development*. An Inquiry into Profits, Capital, Credit, Interest, and the Business Cycle. Harvard University Press, Cambridge MA.
- Senge, P. M. (1990). *The fifth discipline*. New York: Doubleday.

- Slater, S. F. & Narver, J. C. (1995). Market orientation and the learning organization. *Journal of Marketing*, 59 (July): 63-74.
- Tushman, M. L., & O'Reilly, C. A. (1996). The ambidextrous organization. *California Management Review*, 38(4): 8-30.
- Volberda, H. W. (1996). Toward the flexible form: How to remain vital in hypercompetitive environments, *Organization Science*, 7(4), 359-374.
- Volberda, H. W. (1998). *Building the flexible firm*. Oxford, England: Oxford University Press.
- Weber, M. (1978). *Economy and society* (edited by Guenther Roth and Claus Wittich). Berkeley/Los Angeles/ London: University of California Press.
- Whittington, R., Pettigrew, Peck, A., Fenton E., & Conyon, M. (1999). Change and complementarities in the new competitive landscape: A European panel study, 1992-1996. *Organization Science*, 10(5): 583-600.
- Williamson, O. E. (1975). *Markets and hierarchies: Analysis and antitrust implications*. New York: Free Press.
- Williamson, O. E. (1996).
- Zahra, S. A. & O'Neill, H. M. (1998). Charting the landscape of global competition: Reflections on emerging organizational challenges and their implications for senior executives. *Academy of Management Executive*, 12(4): 13-21.
- Zenger, T. R. & Hesterly, W. S. (1997). The disaggregation of corporations: Selective intervention, high-powered incentives, and molecular units. *Organization Science*, 8(3), 209-222.

Endnotes

1 Since the “polyarchy” of Sah & Stiglitz is best viewed as one legal entity (agents do not have the right to individually accept and reject projects), we consider this special structure as a particular instance of an internal hybrid. Sah & Stiglitz (1986), by contrast, presented the polyarchy as a stylized representation of the market.

2 The approach of projects consisting of similar sub-projects in some limits leads to Gaussian income distributions, whence it biases the project distribution of the initial portfolio.

3 Finiteness of cyclic graphs can be achieved by counting the number of evaluations by agents in total, by polyarchies in total or by individual agents. Whenever a finite maximal count is reached, some default behavior leading to ultimate acceptance or rejection should be activated.

4 The strict version of outward determinism results in trivial graphs that either accept or reject every project.

5 Note here that the delegation of decision rights that underlie the six classes of organizational form identified above (illustrated in Figure 4) concern topology and dynamic rules.

6 See (Christensen & Knudsen, 2002b) for a proof.