

Governance literature

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1 Introduction to governance and (public) organisations (1-1 and 1-2)

- Kersbergen and van Waarden, 2004, [Governance as a bridge between disciplines](#).

2 Hierarchy, Markets and Networks as governance modes (2-1 to 2-3)

- Van Heffen, Klok 2000, Institutionalism: State models and policy processes. **Download directly from the Teams site**
- Jones, Hesterly, Borgatti 1997, [A general theory of network governance: exchange conditions and social mechanisms](#).

3 Governance modes in the construction sector (3-1 and 3-2)

- Dubois, Gadde 2000, [Supply strategy and network effects, purchasing behaviour in the construction industry](#)
- Dubois, Gadde 2002, [The construction industry as a loosely coupled system: implications for productivity and innovation](#)
- Seaden, Manseau 2001, [Public policy and construction innovation](#)

4 Discussion on assignment 1, no literature needed

5 Towards network governance stakeholder management and Public Private Partnerships

- Voordijk e.a. 2000, [Changing governance of supply chains in the building industry: a multiple case study](#)
- Keung, Shen 2017, [Network strategy for contractors' business competitiveness](#)
- Leiringer 2006, [Technological innovation in PPPs: incentives, opportunities and actions](#)

Institutionalism: state models and policy processes

Van Heffen & Klok (2000)

- The authors put three governance modes in the Institutional Analysis and Development framework
- This framework has 7 types of rules:
 1. Position rules specify a set of positions and how many participants are to hold each position
 2. Boundary rules specify how participants enter or leave these positions
 3. Authority rules specify which set of actions is assigned to which position
 4. Aggregation rules specify the transformation function to be used to map actions to intermediate and final outcomes
 5. Scope rules specify the set of outcomes that may be affected
 6. Information rules specify the information available to each position
 7. Payoff rules specify how benefits and costs are required, permitted or forbidden in relation to actors, based on the full set of actions taken and the outcomes reached

Based on this framework, market, hierarchy and network governance can be described as follows:

Interaction Rules:	Multi-centric (market)	Uni-centric (hierarchy)	Pluri-centric (network)
Position	Seller Buyer	Authorities Citizen	Member Non-member
Boundary	non-restrictive: free entry for buyers and sellers	Authorities: restrictive Citizen: non-restrictive (except for foreigners)	Restrictive or non-restrictive
Authority	Freedom to act on own property (not on property of others), limited only by constitutional and general legal rules	Authorities: freedom to take decisions assigned to position by constitutional legal rules, in accordance with procedures. Citizen: freedom to use civil rights, also in relation to authorities	Members: specific positions might have specific authority, members mostly included in collective decisions Non-members: no specific authority, only as citizen
Aggregation	Bilateral agreement and spontaneous through individual action and price setting	Authorities decide on basis of constitutional rules	Consultation, multi-actor agreement, spontaneous through individual actions
Scope	Freedom, only limited by constitutional legal rules	For each authority-position specified by constitutional rules	Interconnected members' activities
Pay-off	Exchange of goods through payment	Decided by authorities, but limited by general rules	Decided by collective and individual decisions, mostly aimed at benefits of members with exclusion of non-members
Information	Truthful specification of prices and product characteristics	Specified in constitution, public motivation of decisions by authorities	Perhaps specified, mostly restricted to members
Actor's: Preferences	Personal interest	Authorities: linked to position, common interest Citizen: personal interest	Mix of common (members only) and personal interest
Information processing capacities	Personal/organisational	Authorities: organisational (bureaucratic and political) Citizen: personal/organisational	Personal/organisational and exchange by members
Selection criterion	Personal interest	Authorities: common interest Citizen: personal interest within limits of decisions by authorities	Mix of personal and common (members only) interest
Resources	Personal/organisational	Authorities: organisational and political Citizen: personal/organisational	Personal/organisational and exchange with members

Jones, Hesterly, Borgatti 1997, A general theory of network governance - exchange conditions and social mechanisms.

WHAT IS NETWORK GOVERNANCE?

Proposed Definition of Network Governance

- Network governance involves a select, persistent, and structured set of autonomous firms (as well as nonprofit agencies) engaged in creating products or services based on implicit and open-ended contracts to adapt to environmental contingencies and to coordinate and safeguard exchanges. These contracts are socially not legally-binding.
- "persistence": network members work repeatedly with each other over time
- Network governance is a dynamic process of organizing, rather than a static entity.
- Formal contracts may exist between some pairs of members, but these do not define the relations among all of the parties.
- Network governance is composed of autonomous firms that operate like a single entity in these tasks requiring joint activity; in other domains (e.g. markets) these firms often are fierce competitors.
- To enhance cooperation on shared tasks, the network form of governance relies more heavily on social coordination and control, such as occupational socialization, collective sanctions, and reputations, than on authority or legal recourse.

Part 1 – Exchange conditions

EXCHANGE CONDITIONS FOR NETWORK GOVERNANCE

- Three exchange conditions (uncertainty, asset specificity, and frequency) determine which governance form is more efficient.
- Environmental uncertainty triggers adaptation, which is the "central problem of economic organization"
- Asset-specific (or customized) exchanges involve unique equipment, processes, or knowledge developed by participants to complete exchanges. This intensifies coordination between parties
- Frequency is important for three reasons. First, frequency facilitates transferring tacit knowledge in customized exchanges, especially for specialized processes or knowledge. Second, frequent interactions establish the conditions for relational and structural embeddedness, which provide the foundation for social mechanisms to adapt, coordinate, and safeguard exchanges effectively. Third, frequent interactions provide cost efficiency in using specialized governance structures
- Embeddedness refers to the fact that economic action and outcomes ... are affected by actors' dyadic (pairwise) relations and by the structure of the overall network of relations
- We identify four conditions necessary for network governance to emerge and thrive (see Figure 1):
 - (1) demand uncertainty with stable supply
 - (2) customized exchanges high in human asset specificity
 - (3) complex tasks under time pressure

- (4) frequent exchanges among parties comprising the network

FIGURE 1
How Interaction of Exchange Conditions Leads to Structural Embeddedness and Social Mechanisms in Network Governance

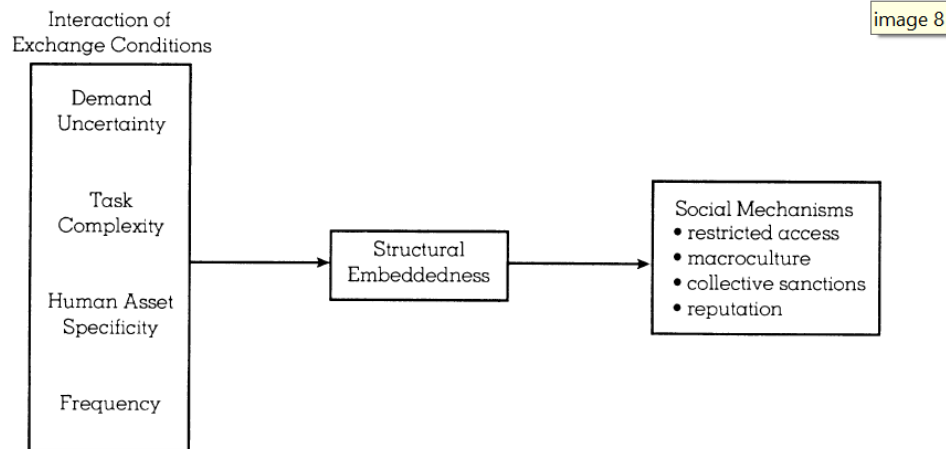


Figure 1: left side shows conditions necessary for network governance to emerge and thrive

1. Product Demand Uncertainty with Stable Supply

- "Environmental uncertainty" (also called "state uncertainty") refers to the inability of an individual or organization to predict future events. The source of this uncertainty can come from suppliers, customers, competitors, regulatory agencies, unions, or financial markets
- Under conditions of demand uncertainty, firms disaggregate into autonomous units, primarily through outsourcing or subcontracting
- resource bundles can be reallocated cheaply and quickly to meet changing environmental demands.
- We find network governance in industries with high levels of demand uncertainty but a relatively stable supply of labor
- Demand uncertainty also is generated by rapid changes in knowledge or technology, which results in short product life cycles and makes the rapid dissemination of information critical
- In essence, demand uncertainty with stable supply provides conditions amenable to networks and markets but inimical to hierarchies.

2. Customized Exchanges High in Human Asset Specificity

- Customized (or asset-specific) exchanges create dependency between parties. For example, if a buyer decides not to purchase the customized product or service, the seller cannot sell or transfer the product or service easily to another.
- The customization of products or services increases demands for coordination between parties. It also raises concerns about how to safeguard these exchanges, since customizing products or services makes both seller and buyer more vulnerable to shifts in market.
- Customization of products or services is common among firms in a network. This form of customization involves human asset specificity (e.g., culture, skills, routines, and teamwork acquired through "learning-by-doing"); because it is derived from participants' knowledge and skills.

- Customized exchanges with high levels of human asset specificity require an organizational form that enhances cooperation, proximity and repeated exchanges to transfer effectively tacit knowledge among parties.
- Customized exchanges with high levels of human asset specificity are not effectively coordinated by market mechanisms and require either hierarchies or networks.

3. Complex Tasks Under Intense Time Pressure

- "Task complexity" refers to the number of different specialized inputs needed to complete a product or service. Task complexity creates behavioral interdependence (Pfeffer & Salancik, 1978: 41) and heightens the need for coordinating activities
- Task complexity coupled with time pressures makes coordinating through a series of sequential exchanges unfeasible
- Task complexity in conjunction with time pressures has led to team coordination, where diversely skilled members work simultaneously to produce a good or service.
- Network governance facilitates integrating multiple autonomous, diversely skilled parties under intense time pressures to create complex products or services. The need for speeding products and services to markets is a critical condition for network
- Coriat (1995) argues that automotive firms across the globe are moving toward network governance in an effort to achieve product variety under intense time pressures.

4. Frequent Exchanges Among Parties

- "Frequency" concerns how often specific parties exchange with one another
- Frequency allows human asset specificity to develop from learning-by-doing and to "deepen" through continued interaction; this creates exchanges where the "identity" of the other matters and enhances the transfer of tacit knowledge among parties.
- "Repeated personal contacts across organizational boundaries support some minimum level of courtesy and consideration between the parties [and] discourage[s] efforts to seek a narrow advantage in any particular transaction"

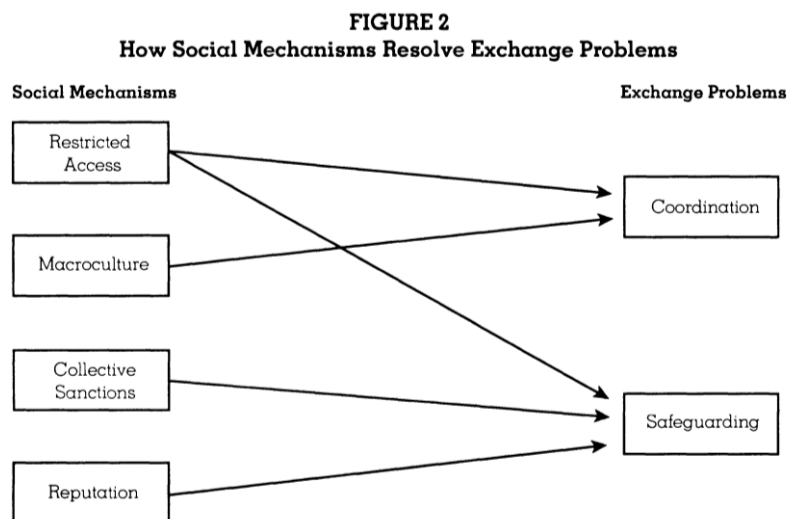
Interaction Effects of Exchange Conditions

- No single exchange condition propels the emergence of network governance; rather, a combination of specific conditions is required for network governance to emerge and to thrive as an organizational form, offering comparative advantages over markets and hierarchies. These conditions involve high adaptation needs, owing to changing product demand; high coordination needs, owing to integrating diverse specialists in complex tasks; and high safeguarding needs, owing to overseeing and integrating parties' interests in customized exchanges.
- The interaction of exchange conditions- demand uncertainty with stable inputs, customized goods/services requiring high levels of human asset specificity, complex tasks requiring diverse specialists, and frequent exchanges-promotes structural embeddedness among exchange parties.

Part 2 – Social mechanisms

NETWORK GOVERNANCE: SOCIAL MECHANISMS AS SOLUTIONS TO EXCHANGE PROBLEMS

- The network form of governance carries with it special problems of adapting, coordinating, and safeguarding exchanges, relying as it does on autonomous units operating in a setting of demand uncertainty with high interdependence, owing to customized, complex tasks.
- Network governance overcomes these problems by using social mechanisms rather than authority, bureaucratic rules, standardization, or legal recourse.
- Social mechanisms consist of:
 - restricting access to exchanges
 - imposing collective sanctions
 - making use of social memory and cultural processes
- Network governance is more likely to thrive as a viable alternative governance form when these social mechanisms are present.



1. Restricted Access to Exchanges in the Network

- Restricted access is a strategic reduction in the number of exchange partners within a network.
- Partners seek to avoid partners of lower status (status maximization strategy)
- Restricted access reduces coordination costs, and fewer partners increase interaction frequency, which can augment both the actors' motivation and ability to coordinate smoothly.
- Often reduces variance in expectations, skills, and goals that parties bring to exchanges, facilitating mutual adjustment.
- Having fewer partners decreases the total amount of monitoring a firm must do, which allows the firm to do a better job of monitoring the relationships it does engage in, thus both reducing transaction costs and the danger of becoming the victim of opportunistic behavior
- Having fewer partners who interact more often increases identification among parties and provides the conditions for developing strong ties among those involved.

- When this occurs, the actors involved tend to see their interests and needs as aligned rather than in opposition, which reduces the incentives for opportunism.
- Too little restriction reduces performance because it impedes coordination of complex tasks
- Whereas too much restriction reduces performance because it provides inadequate incentives for quality and innovation.

2. Macroculture

- Macroculture is a system of widely shared assumptions and values, comprising industry-specific, occupational, or professional knowledge, that guide actions and create typical behavior patterns among independent entities.
- Macroculture specifies:
 - roles
 - role relationships
 - conventions-accepted approaches and solutions to problems to be employed by participants
- Macroculture coordinates interdependent activities among independent entities so that complex tasks may be completed.
- The more structurally embedded (e.g., the more connected and frequently interacting) the industry participants, the more widely they share their values, assumptions, and role understandings.
- Interfirm movement of participants diffuses norms, values, and expectations among those within the industry (e.g. frequent strategic alliances, subcontracting, and job hopping of individuals among firms).
- Macroculture enhances coordination among autonomous parties in three ways:
 - (1) by creating "convergence of expectations" through socialization so that members do not work at "cross-purposes"
 - (2) by allowing for their own common language to summarize complex routines and information
 - (3) by specifying "broad tacitly understood rules ... for appropriate actions under unspecified contingencies"
- Macroculture facilitates efficient exchange among parties because the ground rules do not have to be re-created for each interaction.
- However, macroculture difficult to establish. Because networks involve disseminating cultural beliefs and values among many autonomous exchange parties.
 - It may take decades to establish the shared understandings, routines, and conventions for complex tasks.
- Macrocultures are enhanced by close geographic proximity, because of the increased likelihood and ease of interaction.

3. Collective sanctions

- Collective sanctions involve group members punishing other members who violate group norms, values, or goals and range from gossip and rumors to ostracism (exclusion from the network for short periods or indefinitely) and sabotage.
- In network governance one's reputation is hurt when one recommends someone whose performance does not meet expected standards.
- Also, a collective sanction punishes those who do not adequately screen or punish poor performers.

- Consequently, collective sanctions reduce behavioral uncertainty by increasing the costs of opportunism, decreasing the costs of monitoring to any one party, and providing incentives to sort and monitor compatriots.
- Collective sanctions are limited in how accurately they may be applied.
 - For example, one is often unable to discern intentional opportunism from a genuine misunderstanding, especially with complex tasks under conditions of high uncertainty.
- As uncertainty increases, it becomes increasingly difficult to tell when parties have met or left unmet their obligations to one another.
- Human asset specificity makes it difficult to discern minimal versus best effort.

4. Reputation

- Reputation involves an estimation of one's character, skills, reliability, and other attributes important to exchanges and is important under exchange conditions of uncertainty and customization.
- As environmental uncertainty increases, exchange parties become more concerned with information about their own and others' reputations.
- Reputation reduces behavioral uncertainty by providing information about the reliability and goodwill of others.
- Reputation safeguards exchanges because it relays the detection of and serves to deter deceptive behavior, which enhances cooperation.
- Reputations for mutual adjustment are critical for deciding who gets to repeat exchanges.
- Reputations have limitations in their use. For instance, information about reputation may be inaccurate or misinterpreted. When diffused across long chains of links, information may become distorted as it is filtered by participants.
- Overreliance on reputation may reduce new and innovative information as actors limit their range of partners to a small, increasingly in-bred group. Over time, this may increase homophily, effectively shutting out players that are very different.

Interaction Effects of Social Mechanisms

- Multiple social mechanisms of restricted access, macroculture, collective sanctions, and reputation interact to decrease the coordination costs of and to enhance the safeguarding of customized exchanges.
- As more of these social mechanisms are used, the likelihood of network governance emerging and thriving is enhanced for overseeing complex, customized tasks in rapidly changing markets.

TABLE 2
How Social Mechanisms Influence Exchange Behavior

Social Mechanism	Effect on Adapting, Coordinating, and Safeguarding Exchanges	Boundary Conditions
Restrict access to exchanges	Reduces coordination costs by • minimizing variance in parties' expectations, skills, and goals • developing communication protocols and establishing routines from continued interactions <i>Safeguards exchanges by</i> • decreasing the amount of monitoring required and enhancing the monitoring of others that is done • increasing parties' interaction to enhance commitment and identification	Need some permeability of boundaries for innovation and new knowledge; otherwise, participants "wallow in their collective ignorance"
Macroculture	Reduces coordination costs by • creating convergence of expectations through socialization • establishing common language to convey complex information • specifying broadly shared, tacit rules for behavior	• Takes decades to establish shared understandings and routines • Requires third parties (e.g., guilds and professional schools) to institutionalize across firms • Content should value cooperation and commercial exchange
Collective sanctions	<i>Safeguards exchanges by</i> • increasing costs of misfeasance • decreasing costs of monitoring to any one party • providing incentives to sort and monitor partners	• Difficult to distinguish misunderstandings from opportunism • Need to discern best from minimal effort
Reputation	<i>Safeguards exchanges by</i> spreading information about behavior among parties	• Information may be inaccurate or misused • May induce greater homophily in system and exclude women and minorities from network

Supply strategy and network effects - purchasing behaviour in the construction industry

Anna Dubois and Lars-Erik Gadde (2000)

Supply strategy and network effects

- Studies of customer-supplier collaboration have shown that major benefits may be achieved when firms make adaptations to one another.
- Three types of adaptation:
 1. *Technical adaptations* connect the production operations of supplier and customer. Another form of technical adaptation is related to the material flow between supplier and customer.
 2. The second type of adaptation is in *administrative routines*. Business transactions are characterised by a great deal of information exchange, regarding inquiries, tenders, orders, delivery notifications, invoices, etc. Adaptations in terms of integrated information systems are intended to improve the efficiency of administrative operations and bureaucracy.
 3. The third main type of adaptation is *knowledge-based*. Long-term, relationships customer and supplier develop considerable knowledge about one another's operations.
- In well-developed partnerships, skills on both sides tend to be connected and not easily separable. These mutual adaptations tend to bring the firms together and have a particular significance for joint efforts in technical development.
- The most important dimension of a relationship is its substance. The substance stems from the adaptations undertaken. There are three different kinds of substance that connect the parties in a relationship:
 1. Linking of the activities of the firms. Activity links connect the production, logistics and administrative operations of the companies.
 2. The second substance type relates to the resource ties between the companies.
 - The relationship ties the resource elements on both sides. These resources may be physical facilities, such as machines and equipment, or human knowledge.
 - Resource ties create substance that promotes joint technical development.
 3. The third type of substance is created through interaction between people.
 - Actor bonds are important determinants of trust and commitment, which are, in turn, prerequisites for investments in activity links and resource ties.

The paper addresses four themes:

1. The first theme deals with standardisation and adaptation in construction materials supply.
2. The level of standardization activities and resources, in turn, affects the roles of the actors, which is the second theme. An actor in a network can either be specialised or broad in terms of activity scope and resource collection. The mixture of the actor structure impacts on what kind of network substance can be generated.
3. The third theme relates to the consequences of one of the most fundamental organizational characteristics in construction: a construction project is a temporary organisation. It can also be regarded as a temporary network within the larger permanent network of the construction industry as a whole.
4. The fourth theme of the discussion concerns conditions for substance development depending on the type of exchange implemented.

Theme 1: Standardisation versus adaptation

- In construction sector, supply of building materials is primarily characterised by exchange of standardised products (i.e. one size fits all).
- Customer-supplier relationships in construction are generally of the arms-length type (i.e. they are independent and do not have a close relationship with each other) rather than being partnerships.
 - Different companies (main contractor and subcontractors) work together building unique buildings in temporary projects. →
 - Competitive tendering assures that sub-contracting is procured to the lowest-price supplier with little or no guarantee (or even incentive) to future work.
- Local adjustment of activities on site using standardised parts is characteristic for the construction sector.
 - At first glance this standardization may seem confusing since a construction project is characterised by a 'unique combination of input factors required to complete the project. But standardized parts are used for unique buildings.
 - The uniqueness of a particular building must be created at the construction site, resulting in situations where operative decisions are still very important at the work level modifications of tools for special purposes is done by workers.
- Most activities are integrated through fairly standardized links, which also seem to have been established as norms and common routines for the entire industry.
- The low level of customization, however, does not imply that manufacturers of materials have avoided adaptations to customer requirements. On the contrary, very few other industries are so entirely devoted to a specific, homogeneous group of customers.
- Adaptations in the construction industry are typically collective and project specific rather than relationship specific. A particular feature of these collective adaptations is strong reliance on contracts.

- In summary:
 - Local adjustment of activities on site using standardised parts.
 - Strong couplings on site of work by different companies
 - High dependency, high need for coordination

Theme 2: Specialisation and role of actors

- Two prominent characteristics of the construction industry can be identified:
 - “the organisation of the production work force into a variety of trades”
 - “the practice of subcontracting portions of a project to special trade contractors by primary contractor”
- Specialisation of industry is an important determinant of subcontracting.
- The construction industry is, in general, characterised by a substantial degree of specialisation.
 - In terms of the role of the actors, however, the situation is somewhat different. The division of labour among the actors varies greatly from project to project and the role of an individual firm can be very different depending on the project.
- The roles of the different actors are characterised by substantial variation. This also means that their roles are somewhat diffused.
- The activity scope of an individual actor tends to be broad, including design, production and distribution in various combinations, which may also vary between different projects.
- There are certain consequences regarding potential network effects owing to these characteristics. One observation is that tasks in projects seem to be divided into functional disciplines that operate quite independently.
- Standard forms of contracts are “nothing more than instruments used by the parties to seek strict liability and attach blame to events as they occur”.

Theme 3: The network within the network

- The most significant characteristic of the construction industry and the construction process is the project organization which has been described as a “temporary multiple organization”.
- Two firms may be both partners and competitors. Within a specific project, however, the situation is very different. In the project the actors involved are partners in a larger context, the common objective being to erect a specific building within a set time frame.
 - The interdependence within the project organisation tends to be strong, while it is quite weak among the firms in the permanent construction network.
- Two major reasons seem to explain the strong interdependence in the project. First, as discussed above, substantial adjustments have to be undertaken on site. In addition, the bulk of products delivered are standardised.

- Therefore, the participating actors need to interact and compromise extensively to be able to make the necessary adjustments.
- The second cause of interdependence is related to time. In most construction projects there are severe time restrictions. For some projects time is clearly the dominant restriction.
- The need for adjustments is also affected by “unpredictable site conditions”.

Theme 4: Relational exchange versus transactional exchange

- Transactional exchange is the dominant form of business in the construction industry.
- Business exchange tends to be contractual rather than relational.
- Management of supply chains in traditional craft housing production are often “typified by market-based, short-term interactions between independent businesses”.
 - The underlying reason for this is the heavy reliance on tendering procedures.
 - Supplier competition in each transaction is assumed to be the most appropriate means of securing efficiency in operations.
 - Competitive tendering has other effects as well. The prevailing procedures guarantee that the actor constellations change all the time, making it difficult to utilise experience gained in previous projects.
 - This creates particular cost inefficiencies for the client as a new learning curve is climbed by the supplier each time.
- Fair to be called a market? → Most supply “markets” show few signs of being real markets, because in many cases only a few suppliers are available.
- There is a strong connection between how companies buy and what they can buy. In a long-term perspective it is important to recognise that purchasing behaviour determines product development and innovation.
- In summary: competitive tendering in selection of partners (market) characteristic for construction sector. Thus the co-ordination of projects is emphasised while co-ordination among firms is left to transactional exchange (tendering).
 - For the duration of the project
 - Not only for partners but also for materials (supply chain) using standardised parts

The construction industry as a loosely coupled system: implications for productivity and innovation

Dubois & Gadde (2002)

- The aim of the study is to find out why the construction industry operates like it does
- The industry is characterised by a connection of tight and loose couplings
 - On a macro level, the system is loosely connected because many firms tend to work within a 'community of practice' as a common macro culture where every organisation roughly knows what everyone is supposed to do
 - On top of that, firms do not repeatedly cooperate on projects because of the market conditions and therefore have no relational ties
 - On a project level, the system is tightly connected because project team members depend on each other with regards to supplies, timetables, workflows and ad hoc improvisations
- Table 1 shows the central features of the construction industries

Table 1 Complexity factors, central features of construction and the effects of loose couplings

Complexity in construction		Central features of construction	Effects of loose coupling
Interdependence	Uncertainty		
Number of technologies and interdependences	Lack of complete activity specification	Focus on single projects	Localized adaptation
Rigidity of sequence between the various main operations	Unfamiliarity with local resources and local environment	Local adjustment	Buffering mechanism
Overlap of stages or elements of construction	Lack of uniformity of materials, work and teams with regard to time and place.	Utilization of standardized parts	Sensing mechanism
	Unpredictability of environment	Competitive tendering	Generation of variation
		Market-based exchange	Self-determination
		Multiple roles	

Consequences for innovation and trade-offs

- While prototyping does not have benefit from economies of scale, there is a lot of problem solving during each project and thus also many potential innovations
 - Though there is a high chance of "reinventing the wheel" and innovations that cannot spread because of several reasons:
 - the uniqueness of every project
 - project members also being competitors of each other
 - knowledge not spreading within (and to the rest of) the companies because of the loose connections ("the left hand not only does not know what the right hand is doing but also it may not even know that there is a right hand")
 - time constraints limiting learning
- The community of practice in the construction industry makes companies similar and independent which is the opposite of what you need to generate and spread knowledge
- The industry standards and best practices also hinder innovation because while they provide robust solutions, they also prevent parties to invent new solutions

- One of the more potentially successful paths for innovation is to make supply chain couplings tighter so that the overall network has continues interaction and can adapt to each other better
- Another way to improve innovation is to put less emphasis on the project boundary and efficiency so that other types of actor constellations and potential outcomes changes

Public policy and construction innovation

George Seaden and André Manseau (2001)

Defining innovation

- Re-engineering, lean production, investments in the information technology, TQM and other techniques of optimizing productivity and asset utilization have now all become parts of companies' efforts to remain/become competitive in the global marketplace.
- Spectacular achievements of the high-technology sectors of the economy have driven interest in the generation of new ideas and its implementation, i.e. what is now being considered innovation.
- Innovation appears to be viewed as a process that enhances the competitive position of a firm through the implementation of a large spectrum of new ideas.
- Innovation→
 - Development of new products
 - Development of new technology to make products
 - Development of new way to produce products: use or combine (new) technology in a new way
 - In order to improve quality or reduce costs
 - Searching for gain in market share and/or margins (profit)
- Construction sector regarded as conservative.
- Innovation happens on an individual level to gain individual benefit on the marketplace
 - Many small firms operating in submarkets
 - Fierce price competition, limited resources for innovation investment
 - Limited use of innovation in building unique designs
 - Limited learning within firms
- Limited learning and collaboration between firms and over projects

Innovation theory

- Linear models to analyse innovation:
 - Technology push (or science-based) model
 - Market pull
- Non-linear models of the innovation system approach:
 - Firm centered knowledge networks
 - Innovation climate within single firms
 - Innovation by specific projects

1. Technology push

- It assumed that basic (pure) research followed by applied research led to experimental development and then to new products/processes.
- Propensity to innovate by an industrial sector or a firm could be measured by its research intensity using several proxy indicators such as expenditure on research and development (R&D), citation analysis or education of research-qualified professionals.

- Internationally (with the exception of Japan) the level of R&D effort of the construction industry has been very low which has led the believers in the technology push model to conclude that it is a non-innovative industry.

2. Market pull

- This model suggests that firm's employees and collaborator as well as its clients and customers are the dominant sources of new ideas for innovation.
- Very close ties to the customer base and innovation activity linked to the actual market opportunities.
- The challenge of arriving at innovative products/processes that are truly competitive (i.e. meet clients' needs, have superior quality, reduce costs and present visible benefits) is met by tapping into the vast pools of existing knowledge.
- Consumers needs (demand) for better products drive innovation
- Producers with products meeting demand will gain market share and will survive
- Consumer demands have to be known to producers
- In construction needs are first and foremost formulated in design, not in production technology
 - Design of unique buildings hamper investment in production process innovation by producers

3. Firm-centered knowledge networks

- It places the firm (lead company) as the 'innovation dynamo' (where economic benefits of innovation can be appropriated) at the centre of an enabling network of suppliers, competitors, clients, as well as educational, communication, financial and legislative resources.
 - These actors and how they interact between each other in creating and exploiting innovation constitutes an innovation system.
- This model has focused on the role of technology as a key source of innovation while recognizing the importance of organizational change as a potential source of innovation.
- Lead company combines knowledge and resources from different partners.
 - The enabling network or system is taken into consideration by measuring technology dissemination, access to sources of information, internal/external barriers and potential impact of public policies.
- Presumes durable relations and limits in design variation
 - Cooperate with design firms

4. Innovation climate within single firms

- Larger firms with large scope of activities (hierarchy)
- Willingness to invest in innovation
- Increase grip on design

5. Innovation by specific projects

- Develop and show innovation by example projects
 - Innovation as a specific goal of the project
- Convince conservative actors that benefits are real
- Depends on others in construction, design and buyers to accept
- innovations as good ideas

Changing governance of supply chains in the building industry: a multiple case study

Voordijk et al. (2000)

- A paradox emerged with the deregulation of the construction industry because even though there are more market conditions, it appears that more hierarchical forms of organising emerged
- The study builds on Transactional Costs Economics (TCE) and networks are seen as hybrids between market and hierarchical governance (as opposed to van Heffen & Klok 2000))
- The focus of this study lies on Supply Chain Management (SCM)

Type of SCM	Supplier-led	Contractor-led	Designer-led
Prominent company	Unidek Volumebouw	Goldewijk	Takenaka
Business model of respective company	Manufacturing prefab roofing elements	Constructing residences from brochure plans	Integrated (architectural) design and engineering
Use of other supply chain members	Use the same designer and contractors to design and construct standard building solutions	Use of inhouse designers and construction workers with limited subcontracting to work in batch-like production processes	While the design is done inhouse, the construction has a strong hierarchical process with several layers of sub-contractors
Advantages	• Cheap • Fast process	• Catalogue selection • Price indication • Conventional styles covered • Limited risk of failure	• Construction starts before design is finished • Flexibility • High quality
Disadvantages	• Only standard solutions; little flexibility	• Offers limited variation	• Lack of standardisation and prefabrication
Driving TCE elements	• Selection • Bargaining • Monitoring		
	High asset specificity	Medium asset specificity	Low asset specificity
Product market combination	Cheap and functional buildings with limited client involvement like warehouses and logistic centres	Build housing with modest variety and complexity for conventional clients	The client can order a complex design and gets a full high-quality product

Other information from presentation

- **Shared governance:** all participants participate in the governance of the network on a 'more or less' equal basis
- **Lead organisation:** central organisation takes the lead and coordinates activity
 - Trust in powerful leader, legitimacy with partners

Ho et al.

- Equity (new organisation as legal entity) and non-equity (partnering)
 - Temporary (terminated after the project)
 - Part of their activities (no merger)
- Jointly managed JV's (JMJ) & Separately managed (SMJ)
- Factors for joint or separated JVs
 - Corporate cultural differences
 - Trust
 - Need for procurement autonomy
 - Motivation for learning

Network strategy for contractors' business competitiveness

Keung & Shen (2017)

- The aim of the paper is to get a better understanding of how interfirm cooperation efforts actually benefits them over several areas
- The researchers did this by building a theoretical framework and conducting a questionnaire among contractors in Hong Kong

Framework

- There are 31 NPMs which are ways for companies to collaborate
 - These NPMs are grouped under 5 key network techniques
- There are 34 NOCs which are potential benefits of cooperating
 - The NOCs are grouped under 7 Business competitiveness attributes (BCAs)
- The main goal is to use the results of the questionnaire to determine whether the key network techniques are effective in general or in particular cases for the BCAs

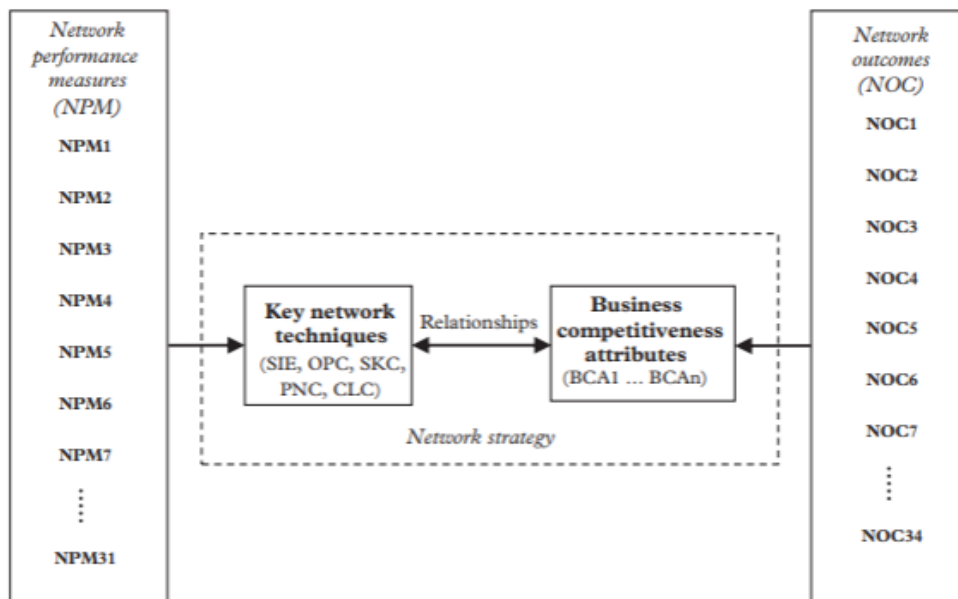


Table 1: Ranking of the BCA components and key network techniques to their importance

#	Indicator		Example
BCA components			
#1	Management capability	MCA	Construction site management skills for site operation and coordination
#2	Organizational resources	ORE	Better use of human resources for benefits such as staff loyalty
#3	Bidding performance	BPE	Getting better market information from networking to improve the bidding strategy

#4	Technological advancement	TAD	Creating learning opportunities for project team members for more technological development and innovation
#5	Competitive strategies	CST	Creating competitive advantage for individual firms by uniting in a network
#6	Organizational structure	OST	Better distribution of human resources among firms
#7	Sustainable relationships	SRE	Long term relations providing information and opportunities for new contracts
Key network techniques			
#1	Supporting information exchange	SIE	
#2	Organizing project communication	OPC	
#3	Sharing knowledge for collaboration	SKC	
#4	Promoting networking culture	PNC	
#5	Creating learning capacity	CLC	

Conclusions

- SIE and OPC are the most important techniques for several BCAs
- CLC is important for BPE and CST
- SKC is only good for MCA and OST
- PNC has no (observed) effect
- The techniques that a contractor should invest in for the best business competitiveness increase depends on the properties of their project network

Technological innovation in PPPs: incentives, opportunities and actions

Leiringer (2005)

- The aim of the study was to examine the extent to which the PPP procurement route enables the actors involved in the design and construction phases to be innovative and novel practices and technology to be successfully implemented.
- Abstract: "From a construction perspective, Public-Private Partnership projects (PPPs) are often credited as providing real incentives for the actors involved as well as a business environment that is conducive to innovation and improved practices."

PPP →

- Public sector contracts services, including construction and maintenance, from private sector
 - Design, finance, build, own, operate, maintain/manage
- Using private resources, including know-how, to construct more efficient and or with less risk
- Efficiency and innovation compensate for more expensive 'private money'

The context of public-private partnerships

- Broadly defined, a PPP is an arrangement that brings public and private sectors together in long-term partnership for mutual benefit.
- A public-private partnership is an arrangement between public sector and private sector investors and businesses (the Private Sector) whereby the private sector on a non-recourse or limited recourse financial basis provides a service under a concession for a defined period that would otherwise be provided by the public sector.
- According to some literature, both sectors have unique skills and characteristics providing them with advantages in undertaking certain tasks and that combining these skills would therefore be beneficial.

Why public-private partnerships?

- UK government states that 'the search for new opportunities to develop profitable business provides the private sector with an incentive to be innovative and try out new ideas'.
 - This in turn can lead to better value services, delivered more flexibly and to a higher standard.
- Sweden: 'PPPs are based on the principle of 'value for money', as the outcome of increased incentives, innovations [and] utilization of the private sector's commercial skills in the planning, design and provision of public services etc.'
- ➔ The prevailing view seems to be that these kinds of projects (PPP related) provide real incentives and create a business environment that encourages innovation and improved practices in the construction phase

- PPP generally involves replacing cheaper public finance with more expensive private finance, project participants will look for compensatory savings in other cost areas – essentially those of construction and operation.
- Collaboration between operators, designers and contractors in conjunction with added incentives and longer-term thinking being adopted will lead to innovative solutions to the client's service requirements.

Technological innovation

- Discussion presented in the paper is solely concerned with technological innovations.
Definition:
 - 'Technological product and process (TPP) innovations comprise implemented technologically new products and processes and significant technological improvements in products and processes.'
 - 'A TPP innovation has been implemented if it has been introduced on the market (product innovation) or used within a production process (process innovation).'

Four imperfect arguments

The validity of four common rhetorical arguments used to promote the PPP procurement route is explored: design freedom, collaborative working, long-term commitment and risk transfer.

1. Design freedom

- Public bodies that procure large capital assets using public funds typically have detailed manuals and standards that specify, for example, the designs, materials and components that should be used.
 - Public sector clients use legislation, regulations, standards and norms to ensure that the construction complies with the criteria of the specific context.
- In a PPP, the private actors are given greater freedom to interpret the tender documents without being impeded by past practices, rigid standards and norms.
 - This phenomenon has been dubbed design freedom and is frequently brought forward as a positive aspect of the PPP arrangement.
 - It enables private sector actors to be innovative and use their skill
- There is, in practice, little more chance to design away from the traditional standards and norms than there would be on any other type of project. Because the constructed facilities have still to be approved by the various regulating bodies.
- There is often misconception with private actors about what "freedom of design" actually means, e.g., they might think that they can design away from norms and standards to a greater extent than the public sector client and regulating bodies would allow.
- Ultimately, there is not likely to be any design freedom unless both the public sector and the private sector are comfortable with the meaning of the term and create an environment that encourages it.

Collaborative working

- In PPP projects, there is room for collaboration between design, contractor and operator
 - However:
 - Contracts between private partners remain market based (not relational)
 - Contracts remain strict in specification and separation of responsibilities
 - Reducing inclination to innovate and be creative (avoiding risk)

- Most types of innovation that are introduced into a project context have to be agreed upon by one or several of the associated actors. Hence, the establishment of effective communication between the actors on the project ought to facilitate innovative behaviour.
- Organizations have a greater chance of successfully implementing an innovation if sufficient resources and knowledge are applied.
- There is a need for public sector and private sector actors to create a mutual understanding of the needs and ambitions of the other parties involved.
 - This facilitates a smoother development of the output specifications into a workable design.

Risk transfer

- It is unavoidable that an infrastructure project will contain risks for the parties involved. Exactly how these are identified, allocated and managed is dependent on the type of project, the procurement route.
- Most government guidelines on PPP procurement from around the world, tend to use the maxim that the risk should be allocated to the party that is best able to control and manage it (private).
 - However, not an easy thing to do. For example, should the risk be allocated to the party that has the greater ability to influence the probability of occurrence or the party that is best suited to deal with the consequences of the risk occurring?
- A greater degree of risk transfer from the public to the private actors could lead to achieving value for money for the client on the project due to greater cost certainty.
- It is suggested here that it is not the risk transfer per se that is of importance, rather it is the greater clarity of the where the risks have been allocated that might prove beneficial for innovative efforts.
- It is evident that even though an innovation might be more likely to be successfully implemented if the implementing organization is clear over the risk allocation and, hence, is able to make rational decisions based on it; the allocation also has to be appropriate and manageable.
- In dealing with the risks that are closely coupled to innovations, there is a need for all actors involved to understand that there are upsides as well as downsides to risks.

In essence:

- Transfer risk to party that is able to control risk and severity of consequences (private)
 - But:
 - Risk cannot always be reduced
 - Innovation to reduce (impact of) risk is itself a risky business
 - Actor who feels risk has been imposed on him might not be inclined to reduce it for the sake of the client (who has put him in this situation)

Long-term commitment

- A longer-term commitment places capital at risk and is believed to force private actors to produce something that is durable and functional whilst keeping whole life costs to a minimum.
 - In order to do so, both the client and the contractor are forced to consider the interaction of design solutions and construction methods with long-term performance.

- Instead of increased long-term commitment leading to technological innovations being implemented, it could be argued that the characteristics of the main construction contract forces the actors concerned to look at tried and tested solutions, i.e. existing methods and technology, in order to limit the risk exposure. Prevention risk → innovation not very likely.
- Prolonged responsibility (also for operation, maintenance) induces willingness to invest in quality
 - But:
 - Despite responsibility, short term bias is still possible, certainly during the life-cycle of a building
 - Expertise in design, building AND operation?

Conclusion

Benefits of Partnerships do not come automatically and will not always appear in practice, but have to be organized.