

## NETWORK STRUCTURES IN KNOWLEDGE-BASED ECONOMY

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### **Abstract:**

This article presents the essence of network organization and how it naturally fits into knowledge-based economy. The author explores the key characteristics of network structure highlighting the benefits to the organization from cooperating within a network. Furthermore, network structure's advantages and disadvantages are presented. Finally, the need for cooperation in knowledge and innovation networks in the new economy is addressed.

*Keywords: inter-organizational, networks, structures, knowledge, innovation, knowledge-based economy.*

# 1. INTRODUCTION

XXI century world economy is truly global and vastly interconnected. It favours intangible assets such as ideas, information and relations much more than physical assets. In effect, a new genre of market and society with its roots in e-networks emerges (K. Kelly, 2001). The Internet is the symbol of XXI century much as the atom was the symbol of the XX century. Internet is a space and a tool enabling close cooperation between organizations making it easier for them to cooperate internationally. (Castells, 2013).

Modern economy is characterized by knowledge creation, greater revenues from Internet sales, dynamic responsiveness, openness, information symmetry, buyer's market, innovation, ad hoc alliances, knowledge asymmetry and relatively low cost of switching suppliers (A. Tiwana, 2003). The keys to comparative advantage are knowledge and innovation. Knowledges and intellectual assets are becoming crucial assets that need to be managed.

Knowledge management is about managing people with a little help from technology. Managing knowledge aims to facilitate the type of network cooperation that will neutralize weaknesses and capitalize on talents and strengths of employees. Inter-organizational networks are also on the rise (J. Rokita, 2005). They play a big role in the modern economy by influencing and helping regulate economic activity in addition to market and hierarchy regulation. Networks are crucial during breakthroughs and in turbulent times (W. Morawski, 2010). They allow small firms to survive and lack of barriers of entry favours the creation of new start-ups (A. Koźmiński et. al., 2011).

This article shows the key role of knowledge in global network economy. A critical review of existing literature on the subject and inference were used as scientific methods.

# 2. INTER-ORGANIZATIONAL NETWORKS

Inter-organizational networks are omnipresent and becoming increasingly important in the world of science, economy and our daily lives. The ubiquity of networks means that more and more talk is done on the emergence of a new discipline - network science, the scope of which includes elements of science, life and social sciences, including management, economics and sociology. Substantial evidence can be found in T.G. Lewis's 'Network science (T.G Lewis, 2009). It is worth noting that nowadays, beside tangible assets a lot of scientific attention is devoted to relational assets.

For an organization, being a part of a network allows it to receive signals and impulses from changing environment allowing the organization to exploit emerging opportunities for development. Thus, every organization interacts with a myriad of organizations. This is clearly visible in the new strategic management paradigm which is termed net, network, cooperation, co-acting paradigm<sup>2</sup>. Global shift from tangibles to intangibles has acted in favour of the new network paradigm.

Inter-organizational networks are most important intangible assets. According to R. Gulati's research, inter-organizational resources are specific as they remain external yet accessible. Those resources are used for building lasting competitive advantage because they conform to so-called VRIS (valuable, rare, inimitable, non-substitutable) criteria (R. Gulati, 1999).

Inter-organizational network paradigm has become fundamental for modern knowledge-based economy. It provides better comprehension of the new quality of human action and offers new opportunities and perspectives. Network is unique in that there are different organizations and stakeholders involved in it and therefore management methods and practices need to evolve to meet the demand of networks. Further research in that respect is necessary (see tab.1.).

**Table1:** Network paradigm vs classical paradigm.

Classical paradigm	Network paradigm
Anonymous business environment	Specific entities
Atomized business environment	Inter-connected business environment
Environment beyond control	Partly shaping the environment
Business opportunities occur as objective goals	Opportunities occur in a network which spots them, conditions the and exploits them

Resources are controlled through hierarchy	No need for hierarchy in controlling resources
Competitive advantage depends on resource configuration and exploitation effectiveness	Competitive advantage depends upon network structures, position and relations within a network
Environment conditions change often	Environment conditions can be stabilized

Source: W. Czakon, Warsaw 2012, p. 28.

Network is a coordinating instrument bearing some similarities to the market and hierarchy at the same time being elastic, innovative and creative (M. Castells, 2007). Emergence and development of inter-organizational networks brings about changes in the model of functioning of the society, the economy and the state.

Networks facilitate accumulation of social capital and trust and are themselves the source of intellectual capital. Evidently, for the free and efficient operation of the market trust is needed (L. Bruni, 2000). Mutual trust must be generated and work for organizations, their stakeholders and work in doing business (M. Neuman, 2006). Exchange of any kind is guided by the fundamental reciprocity norm (J.H. Turner, 2006). Reciprocity rule is observed through pacta sunt servanda rule and by being fair in exchange (V. Vandberg, 1997).

Research by L. Young and G. Albaum proves that a high role in building trust, including consumer trust, can be assigned to personal and behavioural traits of the management and staff (L. Young, G. Albaum, 2003).

Knowledge, lack of information asymmetry through development of IT and the Internet as communication platform have become chief factors diminishing the barrier of market entry. Organizational bonds can take form of hierarchic, functional, cooperative, informational and informal bond. The reasons behind creating organizational bonds include creating the stream of interactions and institutionalization of relations. Network plays a role of intermediary between the market and hierarchy. It is only natural for the new networking organizations to seek change, absorb uncertainty and not to be apprehensive of the lack of strict future scenarios and predictions. Product life gets shorter, organizations come and go, inter-organizational relations are formed and terminated faster than ever. (tab.2.).

**Table2:** Coordination of economic activity in conditions of the market, hierarchy and network.

Criterion	Market	Hierarchy	Network
Normative regulation	contract, ownership rights	Relations based on contractual arrangements and agreements	Complementary potentials, strengths
Communication and signalling	price	procedures	relations
Conflict resolution	Price bargaining, court of law settlements	Supervision, administrative decision-making	Reciprocity rules, respect and reputation
Elasticity	high	low	medium
Level of involvement	high	Medium to high	Medium to high
Relations climate	Precision and/or suspicion	Formal, bureaucratic	Openness, mutual gain focus
Type of relation preferred	independence	dependence	co-dependence
Presence of other types of transactions	Repeating business transactions, contracts as hierarchical documents	Informal arrangements, market resemblance, profit centres, transfer prices	Hierarchy present, multiple partners, formal rules

Source: W.W. Powell, Neither market nor hierarchy: Network form of organization, Research in Organizational Behaviour 1990, vol. 12, p. 300.

When faced with fast-paced technological advances it is crucial to cooperate in innovation networks. Firms need to evaluate the level of saturation of networks in the economy. They need to engage in

building network structures. They must reinvent themselves time and again, seek efficiency and discover the successes from cooperating in a network (Czakon, 2012). Proximity is another important aspect for sound network functioning (P. Klimas, 2011) because it:

- stimulates and makes possible cooperative activity,
- improves cooperation and coordination,
- improves communication and initiates channels that stream information,
- constitutes necessary condition for obtaining and transfer of data, information and knowledge,
- facilitates learning processes,
- spills over innovation and raises the level of innovativeness.

Lack of proximity may hinder or make impossible organizational bonding in a network (Ch. Prell et. al., 2009).

There are social networks like Facebook or Twitter and inter-organizational networks like clusters, global supply chains, Internet. In a network-rich environment it is natural for inter-organizational networks to be formed. Network ubiquity requires mental shift towards network mindset (A. Piekarczyk, K. Ziemniewicz, 2010). Environment pressures offer ultimate choice to either join the network or perish.

Inter-organizational networks may come in a number of forms (management encyclopedia, 2015):

- integrated which connect entities that belong to a group by the power of law,
- correlated which connect entities that share the same needs and strive to satisfy them jointly
- contractual which connect entities operating as franchise
- based on direct relations in social and economic life (direct sales networks).

Network administration requires different management rules and methods, modifications in hitherto used methods are necessary, knowledge workers need to be employed who will bring in new skills and wide knowledge. Managers are facing new challenges which are brought about by the four factors:

- what is required from regular employees,
- different from traditional motivational system,
- leadership style,
- requirements from organizational culture.

Benefits from network cooperation are perceived as the most important pillars of the modern economy (R. Mellon et. al., 2008). Knowledge-based economy is perceived as a network economy (B. Mikuła, 2007). It is characterized by dynamics, is process oriented, chaotic, boundary less, unpredictable, favours intangible assets and inter-organizational cooperation. Organizational effectiveness and competitive advantage is determined by being a member of a network. In network economy communication capability is of utmost importance (A. Skrzypek, 2015). New technologies enable network-based organization of the global economy (A. Skrzypek, 2015). Organizational structures are built around projects undertaken by cooperating units from different firms from a network for the duration of the project and reconfigure every time a new project is undertaken (M. Castells, 2007).

Fiercer competition triggers the emergence of networks and relations. Cooperative networks reflect ongoing adaptations. Network creation is a natural process in the face of risk and change (A. Skrzypek, 2015). Social bonds are fundamental for cooperation between firms. They may comprise capital, personal or cooperative bonds. Relations may take the form of communicating with customers, suppliers, subcontractors, alliance members, universities or R&D centres (B. S. Burt, 2001).

Mega trends play a major role in socio-economic development. They are best described as significant, gradual social, economic, political and technological changes which:

- impact our lives in 7-10 years time,
- lead to empowerment of employees who are more creative and knowledgeable,
- are global, take a long time to emerge and last for around a decade,
- are global and durable,
- impact culture, law, economy and society,
- exist objectively and can be deductively inferred (A. M. Kaplan et. al. 2010),

Existing mega trends usually storm through some branches, dominate and transform them, causing the emerge of new macrobiotics (J. Babbitt et al. In the year 2000) there were 10 mega trends identified by John Babbitt, the majority of which materialized fully or to some extent:

Becoming an information society after having been an industrial one

1. From technology being forced into use, to technology being pulled into use where it is appealing to people
2. From a predominantly national economy to one in the global marketplace
3. From short term to long term perspectives
4. From centralization to decentralization
5. From getting help through institutions like government to self-help
6. From representative to participative democracy
7. From hierarchies to networking
8. From a northeaster bias to a southwester one
9. From seeing things as "either/or" to having more choices.

Worth mentioning are K. Kelly's 10 rules for the new economy, five of which address inter-organizational networks (K. Kelly, 2001):

- embrace the swarm,
- increasing returns
- plenitude not scarcity
- follow the Free
- feed the Web first
- let go at the top
- from places to spaces
- no harmony, all flux
- relationship tech
- opportunities before efficiencies

Network organizations are a modern form of organizations made up of independent business entities. Network organizations are the result of globalization, internet technology, evolution in defining what an organization really is and gradual disappearing boundaries between organizations.

### **3. ROLE OF KNOWLEDGE IN A NETWORK ORGANIZATION**

Network organizations intensify the amount of trust, widespread information and knowledge circulation. Knowledge is a conscious and factually proven conviction. In terms of information symmetry, managing knowledge and knowledge asymmetry are becoming the main factors of competitive advantage.

Relations in network organizations may vary with respect to the goals that need to be attained by the elements (entities) of the network structure (I. Maj, 2014):

- relation of collision of goals where the realization of particular goals leads to conflict of interest; there is a lack of conversion knowledge of socialization type (tacit to tacit), though externalization (tacit-explicit) takes place,
- relation of tolerance of goals, elements of structure are tolerant in terms of goals, all types of knowledge conversion take place,
- relation of similarity of goals all types of conversions may take place,
- relation of equivalence of goals, goal are identical or alternative, all types of knowledge conversion between organizations (elements of network structure) take place,
- relation of superiority (inferiority) of goals, lack of socialization or externalization of knowledge as an outcome of apprehension of losing the position in the hierarchy, combination and internalization of knowledge take place (explicit-tacit),
- relation of neutrality of goals all types of knowledge conversion between organization may occur.

Network organizations are highly autonomous, speedy, self-reliant in making decisions, offer high quality products, incorporate creative and manage effectively. The number of organizations that initiate or form network structures is growing rapidly among the groups of R&D centres, financial and jet-

propelled organizations. Network is composed of cooperating organizations, self-managing and process-oriented.

The Internet, new perceptions of the business environment, boundary-lessness are all characteristic of teaching, learning, intelligent and virtual organizations. Proximal environment is plentiful of stakeholders (both in and outside organizations) who can benefit the organization.

In knowledge-based economy innovation networks are crucial for creation and advancing knowledge, inter-organizational learning and disseminating innovation. Innovation networks abound in synergy effect which result in extraordinary capability to accelerate and modernize innovation processes (J. McKenzie, 2007).

Network science has become of interest to a growing number of management researchers and consultants. Network analysis is helpful in analysing:

- network structure (concentration, diversification, centralization, position/status held by organizations in a network),
- network content, including inter-organizational trust, mutual relations, resources and modes of action, proximity, transfer, knowledge sharing.

Network analysis can be done on the level of hubs, group of hubs and entire networks (W. Czakon, op. cit)

According to the research findings (W. Powell, B. Uzzi) networks are becoming increasingly popular and facilitate:

- information, knowledge and know-how sharing, accelerating innovation implementation,
- development intensification due to the effects from mutually beneficial of cooperation,
- building inter-organizational trust diminishing the level of operational uncertainty.

Network organizations allow for enormous cost-cutting, enhanced innovativeness and strengthening market presence.

Gaining gateway to knowledge and innovative ideas is often the rationale for inter-organizational network formation and functioning. Network is formed as an organizational system of at least three independent and autonomous organizations inter-connected with one another forming a long-term cooperative bond with the aim of joint attainment of some kind of product or process innovation (N. Petri et. al., 2006).

In the process of tacit and explicit knowledge application new or enhanced products and services are created. The innovation process may take the form of radical or incremental innovation (T. Todd, 2006).

In knowledge-based economy networks do much for the economic and social development. M.

Andersen lists the following functions of networks (M.M Andersen, 2016):

- creation of favourable external conditions (the function of market and beyond-the-market mediator),
- setting direction for research done by technology suppliers,
- cation and diffusion of knowledge,
- supplies resources (chiefly intellectual capital and competences),
- market creation.

Much skill in research on inter-organizational networks is needed to come up with a pool of solutions for problems of modern learning, knowledge-based organizations functioning in conditions of change of proximal and distal business, economic and social environment.

#### **4. SUMMARY**

Inter-organizational networks are relatively new grounds for researchers. Numerous publications address the subject from the point of view of network structure, network bonds such as knowledge exchange, cooperation, trust and dependants. Organizations searching for competitive advantage need to look into the bonds and relations that govern their existing and desired networks and focus on organizational innovations in inter-organizational space.

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