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THE INTER-ORGANIZATIONAL NETWORK MANAGEMENT MODEL AND THE DIFFUSION OF INFORMATION

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Abstract. *Contemporary companies are looking for opportunities to stay in the market in the long run. They invest a great effort in this purpose and create logical concepts for joint business activities, which take the form of inter-organizational networks. The challenge is to manage such a defined whole, as well as to provide information for decision-making. To streamline management, it is necessary to organize and manage the information flow in the network. The purpose of this paper is to outline the authors' approach to the design of an information flow in an inter-organizational network that takes into account the requirements of network managers. The starting point is to develop a common vision of the network's business model. On this basis, the functionality of the information subsystem should be defined.*
Keywords: *firm performance, information flow, business network, inter-organizational network.*

Introduction

The inter-organizational network is the entrepreneurs' response to turbulent changes in the environment that require taking up increasingly demanding activities for the organizations to exist and provide competitive products and services. Another important factor for consolidating cooperation is technological progress, which allows entrepreneurs to efficiently provide more and more functional solutions, as well as to consume the innovative offer of partners for the benefit of the value delivered to the market.

Business entities have diverse experiences in cooperating with other market participants. These experiences are gained through cooperation undertaken on

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their own initiative as well as through cooperation stimulated by, e.g. regulations and guidelines of public programmes supporting the creation or development of B2B and B2C cooperation. After a period of turbulent formation, the functioning inter-organizational networks need support, which enables them to build effective and efficient information channels to supply decision-makers with the necessary information and knowledge.

The purpose of this article is to outline a proprietary approach to designing information flow in an inter-organizational network. This approach is based on the assumption that the purpose of the information flow is to meet the information needs of network managers. The starting point for the study is to develop a shared vision of the business network's business model. This is essential, as it allows network participants to understand their place, role and information obligations (both as providers and recipients of information). The necessary functionalities of the information subsystem should be defined on this basis. The consequence of designing an information system should be a set of requirements for an IT system that supports the information flow. The identification, selection and implementation of software components supporting the specified requirements is a standard task of computer science and is not the subject of consideration.

The research was carried out as applied research. Its aim was to formulate new pragmatic conclusions that could be implemented in order to improve operational efficiency. In particular, an answer was sought to the question whether it was possible to formulate a uniform scenario for the information flow for any network organization. The research included both descriptive work to identify the structures and mechanisms of functioning, as well as explanatory work investigating the relationships and dependencies between the analyzed phenomena, and at times also replication work extending the subject of the research and allowing to formulate new hypotheses.

Empirical data used to develop assumptions of the approach to designing information flow in inter-organizational networks was collected during direct research. The research was conducted in the years 2010-2015 at the request of representatives of organizations forming inter-organizational networks. The subject of the study was 11 inter-organizational networks, varied in terms of scale of operation, organizational forms of functioning and the stage of developing and enhancing network relations. The approach proposed here was built in the course of actual work, achieving an increasingly satisfactory level of excellence. The approach applied had the features of Action Research (Chrostowski & Jemielniak, 2011). The above outlines the main and key stages of work. The authors are aware that the issue is very broad and its comprehensive presentation goes far beyond the scope of this study. The discussion covered selected elements considered crucial for understanding the

essence of the functioning conditions and information needs of the managers of inter-organizational networks.

The essence and importance of the information flow in the inter-organizational network

We treat the inter-organizational network as an organization (an organized entity). The factor that distinguishes inter-organizational networks is the manifestation of one of the most popular paradigms of management science, called the paradigm of synergy. The paradigm of synergy is commonly understood as "the cooperation of an organization and its elements, which is more effective than the sum of their separate activities" (Kisielnicki, 2012). Interoperative elements of the inter-organizational network should generate a combined result in accordance with the adopted criteria that are greater than a simple sum of effects achieved by each network element separately. The factor that undoubtedly contributes to the establishment of inter-organizational networks has been Information Technology, which provides tools for creating relationships not only within the company but also beyond its borders. Thanks to Information Technology, it has become possible to include the management of information needs of employees of business partners (suppliers, clients, co-operators, etc.) in the functionality of Information Systems. The relational approach in management sciences is seen as one of the concepts of building a competitive advantage (Macias, 2008). Thanks to the ever increasing possibilities of Information Technology, the formula (orientation) of the competition can change: from comparing with other companies in order to build one's own offer to cooperating with selected partners, including competitors, in order to build a joint offer. This is emphasized by researchers such as Klonowski (2004), who claims that "the survival and development of a modern enterprise is becoming an increasing challenge for the managerial staff and is dependent, to an extent not yet seen, on the efficiency of its Information System".

That information is a resource that enables organisations to prepare background for solving organizational problems. Kisielnicki (2012) emphasizes that this is particularly related to the shortage of various goods, essential from the point of view of doing business and implementing customer value delivery processes. It seems that the problem of scarcity of goods that are indispensable in business processes of enterprises (production capacity, employees with specific competences, specialized services) should be perceived more broadly, in terms of economic assessment. From the point of view of a combined result, it is more reasonable to own resources and sometimes use them in a limited scope, or to acquire them as part of cooperation with other enterprises. Decisions on

acquiring resources in cooperation lead to the creation of inter-organizational networks in various forms and modes of operation.

Business process management within the inter-organizational network is conditioned by building an efficient Information System, to supply information to decision-makers. Regardless of the context in which it is entered (a single organization or inter-organizational network), the Information System imposes requirements, the fulfilment of which should guarantee the provision of appropriate information to recipients. Upon analysing the opinions of authors in the literature of the subject, three groups of views can be distinguished depending on the addressee of quality requirements that allow managers to make decisions and the organization to achieve goals. According to this criterion:

- the first group of authors points to specifying desirable features of the Information System, assuming that the quality of decisions depends on it,
- the second group of authors points to information flows,
- the third group of authors believe that the quality of decisions depends on the quality of information.

An example of the first approach is Gąsowska (2014), who indicates “availability, timeliness, reliability, completeness, comparability, reliability, process ability, flexibility, efficiency, economy, adequate response time, detail, system stability, priority, confidentiality and security” as the requirements for the Information System. She also points out that “the Information System should also be ergonomic, which is related to ensuring user-friendliness of the Information Technology System”. The representatives of the second approach are Wąsik and Kotulski (2002). In their opinion, "the information received could form the basis for making optimal decisions; the flow of information in the enterprise must meet appropriate conditions ensuring the fulfilment of quality requirements". An example of an opinion referring to the quality of information as a factor determining the quality of activities in an organization, i.e. the third group highlighted above, are Podobińska-Staniec & Wilkosz (2014). They claim that "processes should be implemented on the basis of reliable information, allowing for effective use of the enterprise's potential".

The efficient and rational functioning of the management system is conditioned by:

- managerial skills that can coexist within the developed business model,
- functionality of the Information System that corresponds to the needs of managers and reporting obligations resulting from formal and legal requirements,

- Information Technology solutions that are agile enough to adapt to the changing information needs of their users, i.e. recipients of information.

As in the case of other resources, information gathered in the organization should be managed. "Proper management of information resources increases the quality and effectiveness of public administration activities. Good information management is an instrument through which better provision of public services is possible" (Sasak, 2008).

The literature review allows a conclusion that the system definitions either refer to the enterprise, or are described in a more general way, which makes it possible to refer them to the inter-organizational network. An example of the approach relating an Information System to an enterprise is the definition proposed by Sęk (2001): "The Information System in an enterprise is understood as the flow of appropriately targeted and selected information between departments within the company's organizational structure in order to ensure ongoing registration of phenomena and control of activities, as well as their compliance, with the assumed objectives of the organization". In determining the flow of information, Wasik and Kotulski (2002) use a wider context, pointing out that the flow of information is "defining connections between objects that are the source of information, and the objects that utilize this information (for their own purposes, or to process it and send it to other objects). Each process of data flow between objects can be treated as an object, with an internal structure and parameters responsible for its functioning. Such an object can be a specific implementation of a common pattern for all data flows. A data flow diagram is a graphical record of the object layout and data flows between them".

A business model as a way of creating the concept of value delivery

Reflections on the essence of the business model appear in publications from the 1990's, focusing the attention of business people, consultants and researchers who turn many research projects into separate subjects of study (Gassmann, Frankenberger, & Csik, 2003). The topic of business models is analysed in many different fields, but first and foremost, in management and IT (as the aspects of building IT applications in management), as well as e-business.

In general, a business model is defined as a tool to describe how elements interact with each other. More specifically, a business model is often presented as a superior concept, presenting the components of a business and how they are integrated. As a concept or tool, a business model is used to direct changes and allows focusing on innovation, either in the organization or within the model

itself (Demil & Lecocq, 2010; Cupiał, Kobuszewski, Szeląg-Sikora, & Niemiec, 2015). P. Seddon and G.P. Lewis (2003) see a business model as an abstract representation of some aspect of a company's strategy. There is also a group of researchers who refer in the definition of a business model to the value that business provides to stakeholders. Some of the definitions are as follows:

- a business model is the company's logic, method of operation and how it creates value for stakeholders (Casadesus-Masanell & Ricart, 2010),
- a business model refers to co-workers who form business relationships in order to create value for clients and wealth for their stakeholders (Tapscott, Ticoll, & Lowy, 2000),
- a business model includes a concept, potential (resources necessary to launch the concept) and value (Applegate, 2001).

For A. Osterwalder and Y. Pigneur (2002), the ontology of the e-business model is based on four main elements:

1. products and services offered by the company, which represent a significant value for the client and for which the client is willing to pay,
2. the infrastructure and network of partners that are necessary to create value and maintain good relations with clients,
3. the capital of the relationship that the company creates and maintains with the client to meet his/her needs, which generates long-term revenues for the company,
4. financial aspects that can be found in all the three previous elements.

The development and design of business models in the last decade are becoming more and more important. The factors that particularly affected the changes in competitive conditions include: growing globalization, deregulation of many market segments, faster innovation cycles and high degree of economic integration of more dynamic markets. Professional consulting services offering methodological support to entrepreneurs are also important for the development of business models.

Companies that want to be competitive on a global scale must strive to adapt to constantly changing market conditions at a rational rate. Business model management supports companies in creating new business ideas, researching business activities and modifying existing strategies and structures by systematically simplifying their complexity and dynamics. As tools for streamlining business conceptualization, business models are important to management support, as they provide guidelines for business decisions through a systematic analysis of success factors.

Business models are considered an effective method for gathering information about high-level business needs (Persson & Stirna, 2014). Based on business models, and information on the type and amount of funds available for

the company, a business strategy can be developed. Figure 1 presents the relationship between the business model, resources and strategy in a repeatable process supporting the selection of a business model. If a company decides on a business model for which it cannot acquire the necessary resources, it must re-evaluate the business model options in order to find a model that is compatible with its resources. If this has been achieved, the company must develop strategies to implement the business model. In this process, some strategic decisions may require resource changes, and this may result in the need to re-design the changes in the original business model. Therefore, this process should be carried out repeatedly.

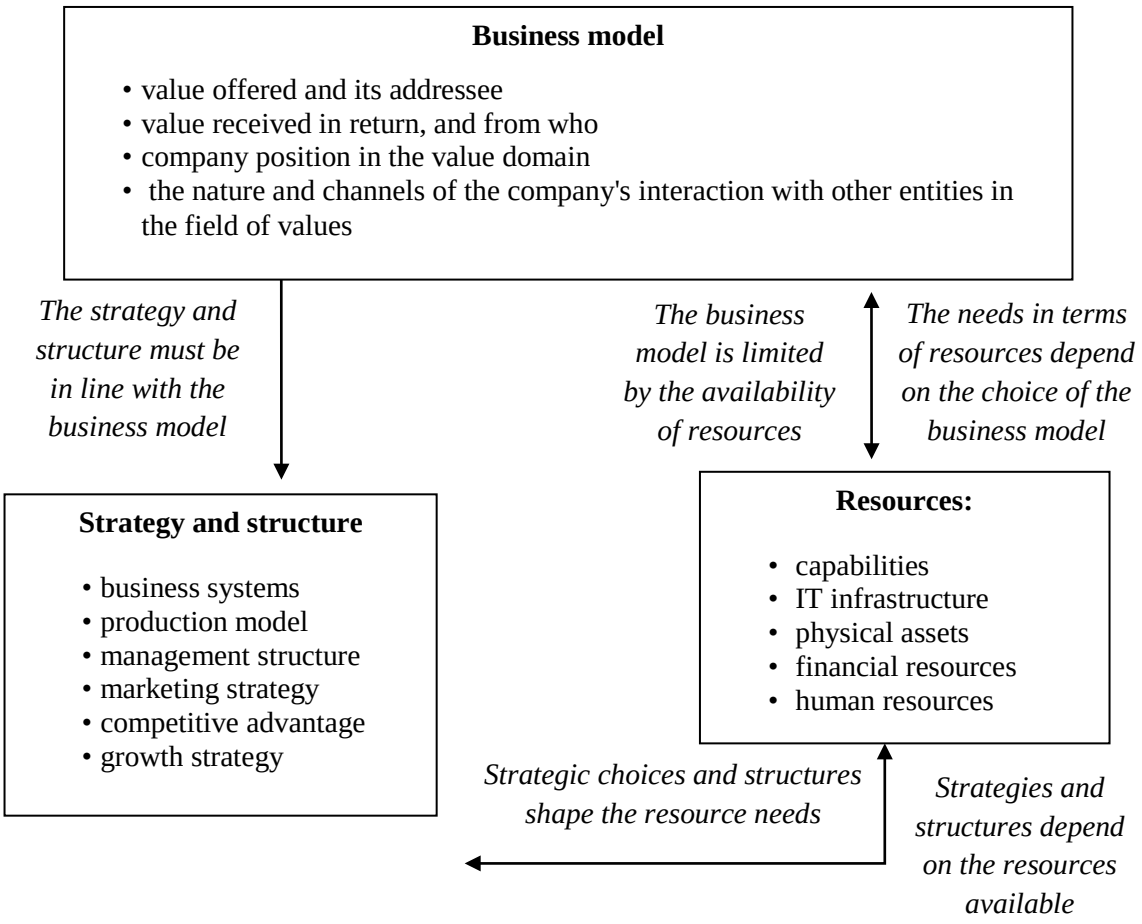

Figure 1 ***Relationships between the business model, resources and strategy***
(own study based on Ross, 2003)

The above-mentioned approaches to the business model have been formulated by the authors as a description of specific components and their relationships. In business practice, presentations built using simple graphic objects are also used. It seems that the most widespread business model presented graphically is the Canvas model. It has the character of a template in

which the characteristics for a model developed for a specific situation are entered. The Canvas model has an academic background and was presented as a doctoral thesis by Osterwalder (2002).

The inter-organizational network as a management object

According to Mazurkiewicz & Frączek (2007), the inter-organizational network "presents a way to organize mutual ties between organizations". Lachiewicz & Zakrzewska-Bielawska (2010) include people in addition to the organization, indicating that the network is being created "in order to exchange information, ideas and resources". In these considerations, the term "inter-organizational network" was used to emphasize cooperation established by several entities. Podolny & Page (1998) refer to this approach directly, defining the network form of the organization as any collection of entities (N>=2), which carries out repeated, permanent exchange relations with others, and at the same time does not have a legitimate organizational body to resolve disputes that may arise during the exchange.

Among the conditions for cooperation of enterprises within the network, the authors mention:

- mutually complementary goals of organizations wishing to establish cooperation relations,
- similarity of the organization's attributes (the so-called inter-organizational proximity),
- understanding and accepting the departure from the hierarchy principle for the voluntary creation of a network of cooperation between various entities to implement specific strategic intentions,
- inter-organizational networks are created not only to use the partners' information resources, but also to increase the volume of information resources and skills.

Managing an inter-organizational network requires adapting the management mechanisms to the characteristics of the network. Since the expansion of the network and the system of connections takes place mainly in the vertical system, this leads to the intensification of the interdependence of participants as elements of the global system. Leaders-coordinators emerge, polarizing the other participants. Following this, the direction of information flows is changing. Well-known vertical flows (planning and reporting in organizations) are extended to flows and horizontal communication. In addition to the formal structural links of organizational units, links between partners develop, which requires dedicated information flows.

Conclusions

Data acquisition is a fundamental function of an information system that ensures that primary data is recorded at the location of the business transaction described by this data. The scope of transaction description by means of attribute values results from two premises:

1. formal and legal requirements imposed by the organization's environment (e.g. legal and tax regulations, environmental protection, etc.),
2. the needs of the organization's managers, i.e. the attributes of transactions, the status and changes of which managers observe in order to make business decisions that align with their objectives and scope of responsibilities.

On the one hand, it seems that the aim should be to ensure that values for as many as possible transaction attributes should be registered. Having multi-attribute primary data sets seems usable for various analyzes in the future. However, the economic aspect becomes an obstacle to such an approach. Recording and then storing attribute values that are not used in any application is an unjustified expense. If the inter-organizational network is not an economic entity entered on the list of business enterprises (and functions only as a voluntary declaration of cooperation of economic entities that constitute it), then the data acquisition for the needs of network management is subordinated only to the needs of the managers. The list of attributes should be a result of the analysis of decision-making needs. In addition, the frequency requirements for recording primary data should be specified. These elements will co-create requirements for IT solutions.

Summary

The presented approach to designing information flows for network management purposes was based on experience. Employees of enterprises taking part in the development of a satisfactory solution understand the idea of the network and can define its requirements. There are, however, insufficiently available patterns of conduct. Actions undertaken by teams are not always efficient and effectively aimed at the set goal.

The research undertaken in the field of management sciences is aimed at developing a methodology that will include a universal work scenario, include suggestions for the use of specific methods, and indicate the critical work results.

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