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## THE APPLICATION OF VALUE NETWORK ANALYSIS AT AN ICT COMPANY – CASE STUDY

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The article presents a research method, which is the analysis of a value network and its practical applicability in the implementation of a project by an ICT company. In such companies the space for implemented measures is not only determined by technical infrastructure, but also by the resources of knowledge and skills to commercialize information. The dominance of these resources results in a search for other deductive methods to analyze modern enterprises.

**Keywords:** value network analysis, ICT sector, network organization

### 1. THE IMPORTANCE OF NETWORKS AND NETWORKINGNESS IN THE MODERN ECONOMY

#### 1.1. Network perspective of an organization

The values of contemporary businesses are created within network systems. These systems arise both in the relation of an enterprise with the market (with various stakeholders) and in an organization perceived as a dynamic structure with a network character. Networks and network models are a way to present a variety of phenomena, processes, objects and relations taking place between them (Barczak, Walas-Trębacz, 2011, p. 26). Networks can take a variety of forms, sizes and can be of a different organizational nature. The main assumption, on which network relationships are based, is that each of the exchanging parties benefits from another's resources (Barczak, Walas-Trębacz, 2011, p. 29-30). In network organization, the main role is played by internal social relationships between employees, aimed at the creation, transfer and the use of knowledge (Stępką, Subda, 2009).

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Social relationships play a major role in creating network organizations, while self-managing entities focus on processes by working together (Maik, 2013, p. 337-338). The functioning of organizational networks allows joining forces in joint initiatives and other innovative activities, and the use of different skills and the creation of specialized competencies deployed in different places (Tubielewicz, 2013, p. 388). A contemporary enterprise is a system that should be analyzed holistically. The primary factors in the development of any entity are its asynchronicity and disharmony. These are the new paradigms of network organizations' functioning. The categories of balanced, harmonious development are outdated and ineffective in the process of operationalization. Therefore, a network enterprise involves the following purposeful actions (Perechuda, 2013, p. 57):

- the creation of ragged structures,
- the development of information, communication, decision-making and transformation tensions,
- the spreading of knowledge in an asynchronous manner.

The prospect of a network organization has found its application in various aspects of its operation, including networks of practitioners, networks of knowledge, and networks of values, network thinking and the social exchange theory (Table 1).

Table 1. The examples of terms referring to the network metaphor and networkiness appearing in the literature devoted to organization and management (Stępką, Subda, 2009)

No.	Concept	Aspect	Creator (year)
1	Value networks	Environment and structure of organization	Verna Allee (2003)
2	Networked organization	Organization's structure	Jessica Lipnack and Jeffrey Stamps (1994)
3	Network of Practice-NoPs	Employee teams	John Seely Brown and Paul Duguid (2000)
4	Collaborative Innovation Networks -COINs	Employee teams	Peter A. Gloor (2005)
5	<i>Knowledge networks</i>	Employee teams	Charles Savage (1996)
6	<i>Knowledge networking</i>	Creating knowledge	David J. Skyrme (1999)
7	Net work	Working in an organization	Patti Anklam (2007)
8	Network thinking	Environment and organization	Gomez, Probst, Ulrich (1989)

According to Gomez, Probst, and Ulrich a network is a result of a "start" of various processes that activate parts, which result in the appearance of a string of interactions. Establishing a network does not guarantee that the system will achieve its goals in an optimal way. This is because there are often disturbances that carry surprising and undesirable effects (Piekarczyk, Zimniewicz, 2010, p. 46).

Each network is composed of two elements: nodes and links. The network nodes are emerging parts that remain peculiar to each structure, and may take a variety of sizes and organizational forms. Links, on the other hand, can be characterized by greater or lesser uniformity, or be more or less formalized (Mikuła, Pirtuszka-Ortyl, Potocki, 2007, p. 56).

According to Czakon, due to the nature of links, each node within the structure of the network can identify different types of networks. Vertical ones act as drivelines of cooperation between economic entities in the process of creating value for customers, and horizontal ones take the form of cooperation between economic entities engaged in the same stage of the value creation process (Mikuła, Pirtuszka-Ortyl, Potocki, 2007, p. 57).

The paramount challenge for any organization is to belong to such networks, which would protect the interests of its participants - the friendly networks. A mistake is to enter an absorbing network. Exiting such a network is associated with high costs or is virtually impossible (Perechuda, 2013, p. 57).

## 1.2. The theoretical assumptions of value network analysis

The idea of the exchange value according to V. Alee is based on the assumptions that network participants and stakeholders get involved in the value network by converting the value of their impact on other parties into the growth of their tangible and intangible assets (Kubiak, 2011, p. 79).

According to the concept of value networks by V. Alee there are two types of flows between the parties: income (received values), expenditure (supplied values) (Alee, 2000, p. 4).

At the same time within the framework of income and expenditure, there is a traditional exchange in the form of material values and in the form of intangible assets. Material exchange includes goods, services and income. It also contains all transactions involved in the exchange. Knowledge products and services that generate income, or those that are anticipated, and which are purchased as part of a service (e.g. reports), are all defined as the tangible ones (Alee, 2003, p. 182).

In turn, the intangible values include strategic information, process knowledge, and technical know-how; designing collaboration, joint planning of activities and policy development. Intangible benefits are the advantages or favors, which can be enlarged from one person or group to another person or group (Alee, 2003, p. 182).

The exchange value can be described using a simple map creating technique. The following diagram shows the exchange of values between a pharmaceutical company and external stakeholders (Fig. 1).

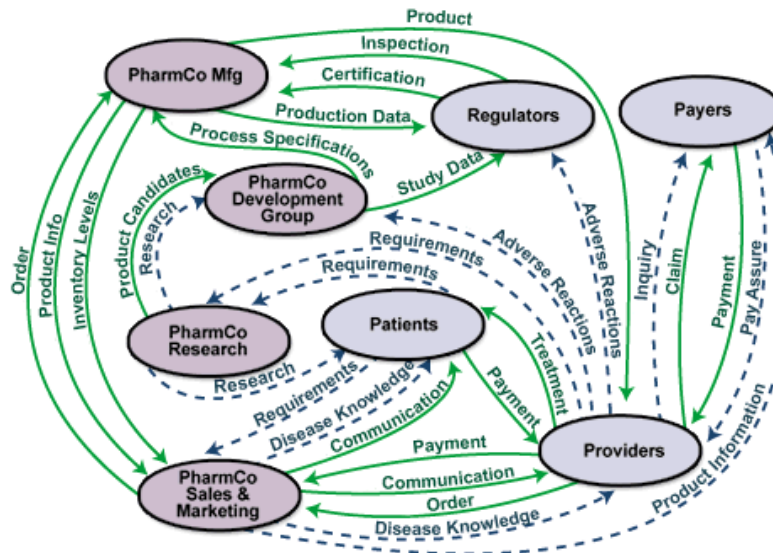


Fig. 1. Value exchange network (Alee, 2003, p. 196)

Ovals represent participants. They are people, small groups, teams, business units, whole organizations, collectives such as business networks, industry or nationality groups. Participants may not include databases, software or other technology. This technique first focuses on participants and exchanges, then takes into account mechanisms that can be most effective in supporting the tasks of individual units or groups. Transactions are represented by arrows. One transaction begins with one participant and ends with the next. An arrow shows movement and indicates the direction of the transaction. Compared to participants who are generally stable over time, the transactions are temporary and are short-lived. The arrow should be one-way, as it describes a single transaction. Arrows with tips on both ends have no significance from the point of view of management or conducting useful analysis (Alee, 2003, p. 184-185).

The value network refers to each weave of relationships that generates both tangible and intangible value through dynamic, complex exchange between two or more individuals, groups or organizations. People, in addition to the exchange of goods, services and income, also exchange knowledge and other intangible assets, such as favors and benefits. The exchanges of knowledge and other intangible assets are not only the activities that support the business model, but they also constitute a part of that model. The perception of an enterprise as a value network causes a better understanding of the business model than its perception as a value chain (Alee, 2003, p. 192-193).

Modeling value networks is not only a strategic technique, but also a tool for people on every level of organization. Value networks play an important role in the exchange of knowledge and other intangible assets, and thus, help in identifying

the forces of business and the possibilities for creating value. Rating value networks requires an understanding of exchange patterns and to determine the effects of intangible and tangible assets for each participant. The assessment of value networks should be carried out using the following three analyses: of exchange, of impact, of value creation (Alee, 2003, p. 194).

The analysis of exchange assesses the overall pattern of exchange value. We find out if: there is a coherent logic and proper flow, the system has a "healthy" replacement value of tangible and intangible assets, or is one type of exchange dominant. If so, why does it happen? Is there an overall pattern of repetition? Are there "dead" and weak ties? Is the entire system optimized? Do some participants benefit at the expense of others? (Alee, 2003, p. 201-202).

The analysis of impact involves looking at each of the "contributions" and defining various costs and benefits that they carry. Even if it is a view from the perspective of an individual participant, the entire company should be taken into consideration (Alee, 2003, p. 204-205).

The analysis of value creation is similar to the impact analysis. It focuses on one of the participants, indicating the increased value of each participant in relation to the others present in the system. It also allows one to specify tangible and intangible costs and benefits from the "contribution" of each value for each participant. For the value network to be profitable, the overall "contributions" of positive values must be greater than negative or neutral ones (Alee, 2003, p. 206).

The analysis of the value network (Alee, 2003, p. 208-209):

- changes the perspective of business from process engineering to a dynamically living system,
- rewards people as active, intelligent agents, who create value,
- reveals cognitive paths, which are important for the process of knowledge sharing,
- includes emotional exchange, such as favors, and other intangible assets,
- shows the limits of the analyzed system,
- shows all the key players, even those engaged in non-financial transactions,
- shows all the key values supplied along with senders and receivers of each of them,
- shows both tangible and intangible "contributions" for each participant,
- shows all the key transactions,
- combines transactions into sequences to show the time of entering into relationships,
- can reveal important feedback loops of the system,
- can be used at every level of the system,
- creates diagrams,
- can be used for an infinite number of organizational systems (governmental, non-governmental, corporate organizations).

Intangible assets are perceived as assets that can be managed and which can be estimated by using non-financial scorecards.

## **2. VALUE FLOW ANALYSIS IN AN ICT COMPANY'S PROJECT**

### **2.1. The characteristics of the surveyed enterprise and the implemented project**

The analyzed company is a provider of mobile applications for planning journeys using public transport. The company initially acquired EU funds under the program 8.1. The most important advantage of the system is a possibility to find optimal routes and communication links, taking into account all the current changes to the routes of municipal public carriers (Kubiak, Skawińska, 2015, p. 188-189). The company belongs to the ICT sector, which is the engine of the modern economy, delivering innovative solutions for communication and information. The ICT sector is characterized by the intensity of implemented innovations and research and development activities (Sierotowicz, Wisła, 2012, p. 7). The formation of companies in this sector is justified by an increased interest in enterprise informatization and the emergence of new e-business solutions (Lasek, 2006, p. 47).

The implemented project involves increasing the functionality of the application by allowing the purchase of tickets. Besides the benefits on the client's (passenger's) side, it will become a new channel of distribution of tickets for the carriers, increasing profits for the provider of the application. The system will be able to prove that a ticket has been purchased. The new functionality of the application will provide a convenient form of its purchase, at any time, without the need to search for a ticket machine. The electronic ticket can be purchased using mobile devices running Android, IOS and Windows Phone.

### **2.2. The analysis of the value network**

To illustrate the value flow, the method of in-depth interview was used. This interview was conducted on selected participants of the project. The first part identified the following four stakeholder groups (Fig. 2):

- the organization (the owner of the application), which in fact appears as both the sender and receiver of values,
- public administration - the city authorities, municipal road authority, carriers,
- advertisers - companies that provide promotional information in the area of application,
- users or customers of the mobile application.

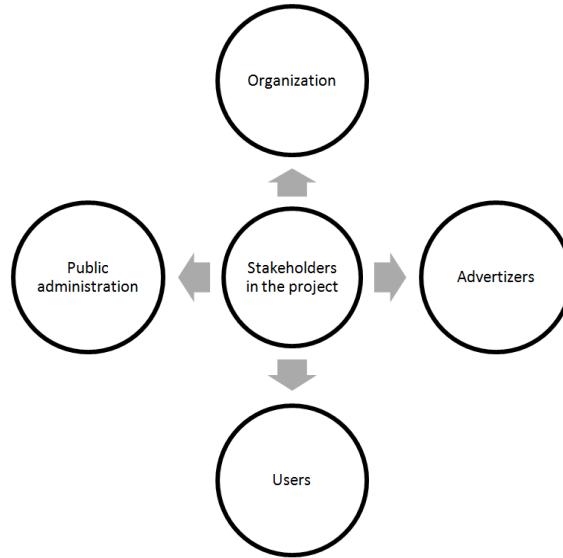


Fig. 2. Stakeholders in the project (own study)

The next stage of research involved using the method of value networks to identify flows between the stakeholders, which were divided into the following two groups (Fig. 3):

- tangible ones (marked with a solid line),
- intangible ones (dotted line).

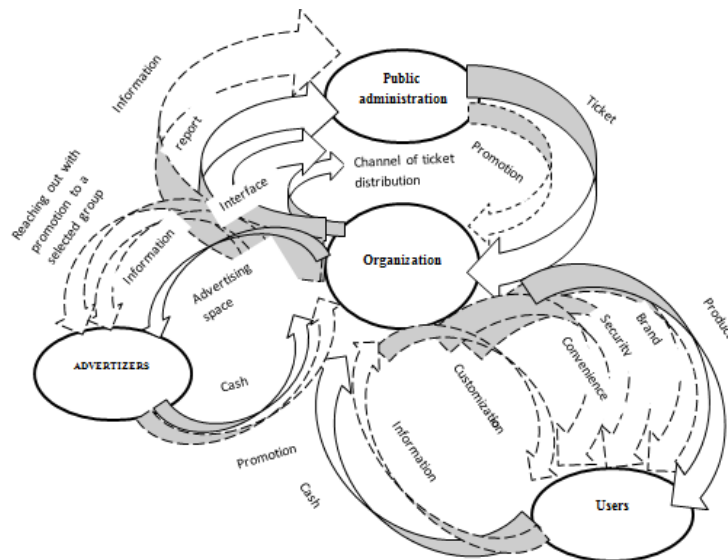


Fig. 3. Value networks of the project (own study)

There were eighteen flows identified in the network, of which eight are of tangible nature. Flows occurred within the network in the relations between the organization and the user, the organization and public administration, and the organization and advertisers. In this network the organization operates as a "broker" who intercepts values. In the organization - user relationship, the enterprise communicates such values as: product, brand, a sense of security, convenience and customization. It receives cash and customer information (a customer, who has to register) in return. However, in the relations organization - public administration, the company communicates such values as: a new channel of ticket distribution, friendly interface, information regarding the selection of routes and ticket types. It receives cash (virtual tickets) and promotional information in return. In the relationship organization – advertiser, the company provides advertising space in the area of application and the possibility of reaching out with promotion to a selected group and information about geolocation. It receives cash in return for the opportunity to place advertisements and a new form of promotion.

In order to better analyze the flows in the above network, a table of obtained and delivered values was used. The analysis was performed from the point of view of the organization.

Table 2. The values delivered to the organization within the project (own study)

What does it receive?	From whom?	Activities	What is the tangible impact?	What is the intangible impact?	Costs	Benefits
Liquid Assets	Users	Purchasing tickets by customer	Increasing the income of the organization	Increasing market position	High	High
Information about customer		Registration in the system	Increasing the database	Tailoring the product to the customer's needs	Low	High
Tickets	Public administration	Signing agreements with the city and the carriers	Cash from the sale of tickets	Starting a complementary service	High	High
Promotion		Signing agreements with the city and the production of promotional materials	Increasing ticket sales	Increasing market position	Medium	High
Liquid Assets	Advertisers	Placing ads on the server and monitoring the advertising	Increasing the income of the organization	Increasing market position	Low	High
Promotion		Sale of advertising space and invoicing	Increasing the income of the organization	Improvement of PR activities	Medium	High



Table 3. The values provided by the organization within the framework of the project (own study)

What do we give?	To whom?	What is the strengthening of values?	Costs	Benefits
Product	Users	More users making use of	High	High
Brand		Improving the image of the company	High	High
Sense of security		The perception of a high quality product by the customer	High	High
Convenience		The perception of a high quality product by the customer	Medium	High
Adapting to the needs		The perception of a high quality product by the customer	Medium	High
Product Information	Public administration	The company supports public administration sector - improving the image	Medium	High
Sales reports		The company supports public administration sector - improving the image	Medium	High
New channel of ticket distribution		The company provides the city with mobile channels - improving the image	Medium	High
Interface		The city exercises control over the sale of tickets and the organization is aware of the city's supervision	Medium	High
Reaching the target group	Advertisers	An increase in advertisers' interest - increasing the income of the organization	High	High
Location Information		An increase in advertisers' interest - increasing the income of the organization	Low	High
Advertising space		An increase in advertisers' interest - increasing the income of the organization	Low	High

The analysis found that a balance or predominance of benefits over costs occurs in the flows. The organization is present in the network as an intermediary, who provides, but also takes over certain values among other stakeholders.

By increasing the functionality of the application, the company gains a number of benefits both on the part of the users, who provide data about themselves (by registering in the system), and money (through the purchase of tickets). The user receives a high quality product that provides a sense of security. From other stakeholders (carriers, advertisers), the company receives primarily financial assets and a new form of promotion of the application.

### 3. SUMMARY

The growing importance of ICT technologies stimulates demand for ICT products and services. In recent years it has been possible to observe a growing importance of mobile applications. These applications may refer to finding hotels, planning journeys, or may be used for information and entertainment purposes. Thus, the importance of the ICT sector has also been growing. This sector is strategic for economic development. Services and new products marketed by the companies of this sector are usually executed within the frameworks of the projects. Unfortunately, a problem of their insufficient efficiency and effectiveness is also well visible (Jasińska, 2014, p. 9). One of the methods for the assessment of actions within the framework of the project is the method of value networks by V. Alee.

On the basis of the project realized by the ICT sector company regarding the introduction of a possibility to purchase tickets in a mobile application, it was concluded that the project will certainly benefit the organization. Among other things, it will increase the organizations' income, its promotional activities and expand the number of potential customers.

The aim of the article was primarily to present the possibilities of using value networks to evaluate projects, rather than to discuss the network itself. Contemporary enterprises must be approached holistically. It requires the use of new tools for diagnosis, measurement and description of the organization.

### LITERATURE

1. Alee, V. (2003). *The future of knowledge*, Elsevier, Burlington.
2. Alee, V. (2000). Reconfiguring the Value Network. *Journal of Business Strategy*, 21, 4.
3. Barczak, B., Walas-Trębacz, J. (2011). Uwarunkowania tworzenia relacji partnerskich w ramach sieci dostaw. *International Journal of Management and Economics* 32, 26-49.
4. Jasińska, K., Szapiro, T. (2014). *Zarządzanie procesami realizacji projektów w sektorze ICT*. Warszawa: PWN.
5. Kubiak, K. (2011). Wykorzystanie sieci wartości podczas analizy przepływu wiedzy, In: *Zarządzanie wartością przedsiębiorstw. Zeszyty Naukowe 686*, Uniwersytet Szczeciński, 79-89.
6. Kubiak, K., Skawińska, A. (2015). Przedsiębiorstwa high-tech w kreowaniu nowych rozwiązań aplikacji mobilnych. In: *Cyfryzacja i wirtualizacja gospodarki. Zeszyty Naukowe 852*, Uniwersytet Szczeciński, 185-192.
7. Lasek, M. (2006). Ogólne tendencje rozwoju informatyzacji w Polsce i na Świecie. In: Kasprzak, T. (Eds.). *W kierunku rozszerzonego przedsiębiorstwa. Analiza sektora ICT w Polsce*. Warszawa: Difin.

8. Maik, A., Godzisz, A. (2013). Istota i pojęcie organizacji sieciowej. In: *Studia i Materiały. Miscellanea Oeconomicae*, 2/2013. Kielce: Uniwersytet Jana Kochanowskiego, 335-342.
9. Mikuła, B., Pirtuszka-Ortyl, A., Potocki, A. (2007). *Podstawy zarządzania przedsiębiorstwami w gospodarce opartej na wiedzy*. Warszawa: Difin.
10. Piekarczyk, A., Zimmewicz, K. (2010). *Myślenie sieciowe w teorii i praktyce*. Warszawa: PWE.
11. Perechuda, K. (2013). *Dyfuzja wiedzy w przedsiębiorstwie sieciowym. Wizualizacja i kompozycja*. Wrocław: Uniwersytet Ekonomiczny we Wrocławiu.
12. Sierotowicz, T., Wisła, R. (2012). *Identyfikacja trendów technologicznych w obszarze ICT z wykorzystaniem statystyki patentowej*. Kraków.
13. Stępka, P., Subda, K. (2009). Wykorzystanie analizy sieci społecznych (SNA) do budowy organizacji opartej na wiedzy. *E-mentor*, 1(28)/2009.
14. Tubielewicz, A. (2013). Koncepcja tworzenia organizacji sieciowej. In: *Efektywność, produktywność i organizacja przedsiębiorstw. Zarządzanie przedsiębiorstwem*.

## ZASTOSOWANIE ANALIZY SIECI WARTOŚCI W FIRMIE SEKTORA ICT – CASE STUDY

### Streszczenie

Artykuł przybliży metodę badawczą, jaką jest analiza sieci wartości i jej praktyczne możliwości zastosowania przy realizacji wybranego projektu w firmie sektora ICT. W firmach tych przestrzeń realizowanych działań nie jest wyłącznie wyznaczona przez infrastrukturę techniczną, lecz zasoby wiedzy oraz umiejętności komercjalizacji informacji. Dominacja tych zasobów sprawia, że coraz częściej poszukuje się innych metod szczególnie dedukcyjnych do analizy współczesnych przedsiębiorstw.

**Słowa kluczowe:** analiza sieci wartości, sektor ICT, organizacja sieciowa

