BUSINESS INFORMATICS

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Abstract: *A definition of the concept "business informatics" based on the General Information Theory is discussed in the paper.*

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Conference topic: *Philosophy and methodology of informatics.*

1. Introduction

The concept "Business informatics" became popular about fifteen years ago when the usual concepts had lost theirs generality, abstractness and actuality. Concepts such as "automation of the company's management", "information service of the decision making", "information modeling of the micro-economical processes", and so on, had caused theoretical rationalizing of the whole information basics and searching of a new unified concept.

Till now there is no common definition of the concept "Business informatics". In the paper we propose our understanding of it based on the General Information Theory [Markov et al, 2006].

1.1. Business

We use the law oriented understanding of the concept "business". We assume only formally registered companies as main business structures – it is correctly to hold on law-determined meaning and to connect the concept "business" with more concrete definition as doing some activities as juridical-registered organization and the name (firm) with defined in advance purposes, with adhering to some rules, norms and laws, received by the community as a regulator of these activities.

Let's remember that like every social formation the company is a social organism, which, like other organisms, generates, develops and dies. The life cycle of the company strongly depends on harmonic development of each their elements, which is subordinated of the main goal of existing of every organism – *to develop itself, searching its place in the environment*. From here follows that not "making money" but "development and entering in the environment" are main goals of each company. Every deviation of this goal leads to isolating of the company and step-by-step disappearing.

There exist different ways to represent the structure of the company. Here we will represent two main approaches from the point of view of:

- the elements, which construct the company – so cold "horizontal" view;
- the management structure and levels of decision making – so cold "vertical" view.

The main elements of every company (*horizontal view*) are:

- *Human resources* (H) - this concept usually is connected with the firm staff. Here we expand the examining and we will mention that each company is connected with sizeable number of "non-staff" physical or juridical persons, which in one or a different way contribute to its development. No one company can develop without a contingent of "partners". The market presence of the company is

unthinkable without "clients". The activity of "competitors" is one of the main stimuli for the development of the company. So, the external relationships determine the place of the company in the business environment.

- *Material resources* (M) include all objects which are processed by the "human resources". Material resources include the means of production and needed prime and raw materials as well as the output production which is still under the control of the company.

- *Financial resources* (F) are indication of the company capabilities.

Some resources may belong to the company (i.e. its own) as well as some may belong to the other companies or individuals but for the given period are on disposition of the company (black and gray circles around the letters) (Fig. 1).
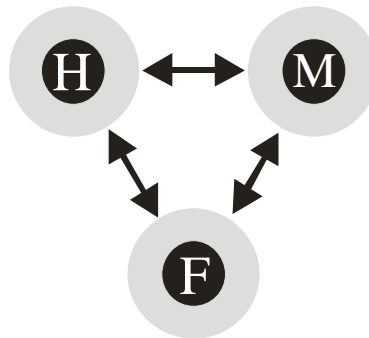

Fig.1. The main elements of a company

In general, the company's development is quantity and quality changing of its main resources to achieve the basic goal – adaptation to the neighboring environment and consolidation the relationships with the business partners.

The companies are functioning as cybernetic systems. So this is another (*vertical*) view to the company (Fig. 2).

Level 1. "Strategy"
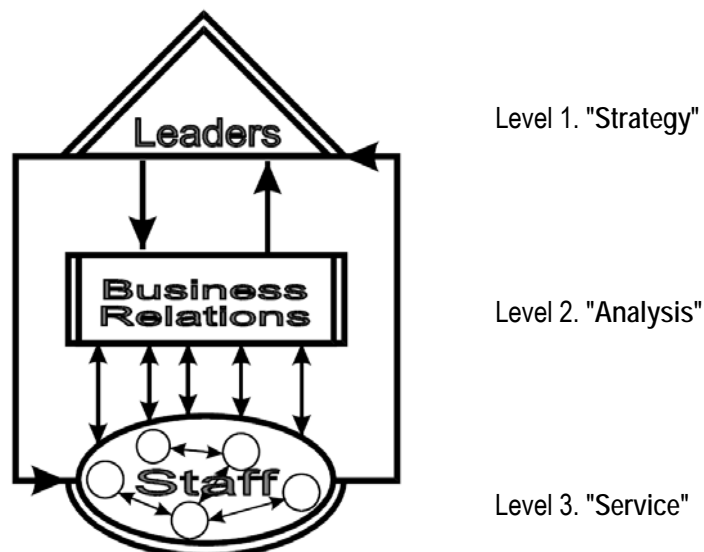
Level 2. "Analysis"

Level 3. "Service"

Fig. 2. The cybernetic structure of a company

We may separate at least three levels depending of types of management – strategic, tactical and operative management:

- Level 1. "Strategy" – The Leaders make long-term *strategic* decisions;
- Level 2. "Analysis" – The internal business relations are concentrated at this level. As a rule, the accountancy department serves as mediator between leaders and the staff of the company and provides the *tactical* management and the short-term decision making;
- Level 3. "Service" – The realization of the leaders' strategy is provided at this level by the company's staff. Staff members provide *operative* management and decision making.

When the company is a small one, the contacts between the leaders and the staff are direct and may be provided by the leaders. It is clear, the great companies and corporations need a middle level for support the communication between high and low management levels. The good practice advices to have direct contacts, too. But they are episodic and have more informative character.

1.2. Informatics

Our understanding of the "informatics" follows the General Information Theory (GIT) [Markov et al, 2006]. The concept information is defined as special kind of reflection of one entity in another for which there exists reflection evidence.

The real world contains unlimited number of entities. When an entity contacts another, there exists a great possibility to join third entity in this process. It is clear; the third entity may contact and reflect each of others as well as the process of realization of the interaction between them – the process of realization of the contact is a specific (temporal) forming relationship between entities and during the process of establishing the contact the entities form new (temporal) entity which in the same moment may be reflected by the third entity. So, the third entity may reflect any traces of this interaction from both first and second entities.

In the special case when the third entity contains reflections of the first entity received by both two different ways:

1. by transitive impact of the first entity on the third one through the second entity,
2. by impact of the first entity on the third one which is different from the transitive one, i.e. it can be direct impact or transitive impact through another entity (-ies)

then the third entity became as an external relationship between first entity and its reflection in the second entity – it became as *"reflection evidence"* of this relationship.

The first entity is called *reflection source;* the second entity is called *reflection recipient*; and the third entity is called *reflection evidence.*

In this special case, when there exist the triple

"(source, recipient: evidence)",

the reflection of the first entity in the second is called *information* in the second for the first entity.

In the nature there exist countless entities, interactions and reflections. The "Theory of reverberation" is a good step to understanding the reflection phenomena [Павлов, 1987]. From point of view of the General information theory it is important that only the subject may use reflections and reflection evidences in accordance with any goals. For instance, in the story "Cinderella" the crystal shoe is only a beautiful entity till the moment of proving that this is the shoe which reflects exactly the foot of Cinderella and it became an element of information triad presenting in a given way the Cinderella, i.e. any information about her.

> *For the Subject:*
> **a reflection**
>   of an entity (*source*)
>   in another entity (*recipient*)
> is **information** about the first entity,
>   iff there exists corresponded
> **evidence** (*reflection evidence*).

In other words, every reflection may be assumed by the Subject as information provided that there exists evidence what really it reflects. I.e. the information is a kind of reflection, but not every reflection is information. Information is only these reflections for which the subject has evidences what they reflect.

This understanding is in the foundation of the General Information Theory (GIT). The basic structure of the GIT presented in [Markov et al, 2006] is reproduced in the Table 1.

GIT is completed by three theories: "Theory of the *information*", "Theory of the *information subject* (INFOS)" and "Theory of the *information interaction* (inforaction)". We have no place to present GIT in details.

Table 1. Basic Structure of the General Information Theory

Occurrence	Specificity	Subject	Theory
Reflection	Information Relationship	Evidence	Theory of the Information
Activity	Information Expectation	Witness	Theory of the Infos
Modeling	Information Modeling	Information Subject (Infos)	
Interaction	Information Interaction	Society	Theory of the Inforaction

The main result that follows from the Table 1 is the definition of the informatics in more general view as science about the types and properties of:

- information and the information structures;

- information subjects;

- information interaction.

2. Business Informatics

The traditional understanding of the concept "Business Informatics" is as an interdisciplinary discipline, which is aimed to study information structures, operations and processes that are inherent to the business and support theirs automation.

Now we can try to extend this definition taking into account the concepts presented in GIT as well as the views of the company structure presented above.

At the first place, the concept of "Business Informatics" we may define as a science about the unity of:

- Business Information,

- Business Information Subjects,

- Business Information Interaction.

Integrating the *horizontal* and *vertical* views of the company we may build a specific "*pyramidal*" model [Марков и др., 1994] separated on three levels (Fig. 3):

-   "*Strategy*" (the highest level of the model);
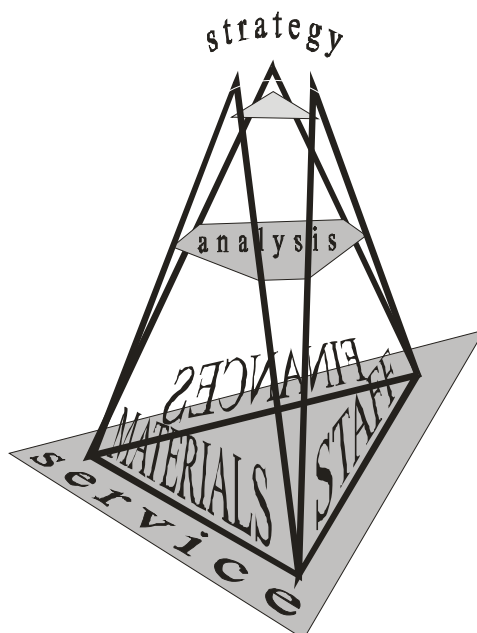-   "*Analysis*";
-   "*Service*" (the lowest level).

Fig.3. The "pyramidal" model of a company

This way we have possibility to make more detailed description of the main scientific areas of the Business Informatics.

-   **Business Information**: The variety of reflections in the business does not allow us to present and discuss all of them in the frame of this paper. Important task of the Business Informatics is to propose relatively complete investigation and classification of the business-reflections. In the same time we need to remark that the dynamics of the development of the different companies as well as of the changing of the business environment, on principle does not allow complete description. As a rule the scientists are contented by the systematizing of the formally defined reflections which are used by the community structures - taxation authorities, statistics, etc. Usually out of consideration are types of reflections created by the company in the environment and vice versa – by the environment in the company;

-   **Business Information Subjects**: One business reflection can be perceived in a different manner from different business subjects. The classification of the business subjects has a crucial role because of the subjective character of perception of business reflections. Often even formally defined types of reflection have perceived differently and this leads to serious practical problems. As we mentioned above, in general the business information subjects may be divided in two main groups – which belong to the company and the rest, which belong to the environment: partners, clients, rivals and neutrals, which in given moment may change their type;

-   **Business Information Interaction**: The investigation of the business information subjects is determined by the necessity of provide qualitative automated service of theirs interaction. The important information need to be collected, stored, processed and distributed to corresponded decision makers in appropriate mode suitable for quick and non-vague perceiving, in one hand, and ensuring correct information interaction in the frame of the company as well as in the environment, from other hand. That is the main goal of the information service.

3. Conclusion

Building of adequate information models of business activities, based on common theoretical foundation, leads to more clear and deep understanding of these activities and thence to theirs optimizing and automating.

Let's underline that main subject of the Business Informatics is to examine as a whole both forming elements of the business – "organization" and "information" [Марков и др., 1994].

In conclusion we need to point that main goal of the Business Informatics is to ensure the automation of business activities in accordance with the pyramidal information model [Марков и др., 1994]. For instance there exists variety of software systems for information service, which may be classified to separate levels of the pyramid:

- the lowest level "*Service*" is formed by components for the operative information service of activities of and with the main company resources – human, material and financial. In concrete implementations here we may see program systems for information service of processing the personal information, the salaries and other working contracts, the logistic activity in one or more storehouses, the fixed assets amortization, etc.;

- the level "*Analysis*" contains the systems for information service of accounting activities. These are the systems from new quality where the accent is made on the serious analysis and preparation of prognoses;

- the highest level "*Strategy*" includes systems for information service of the decision making in the conditions of collective information interaction and multi-variant decisions. Usually, the OLAP and Data Warehouses are classified at this level.

The leading information service systems render an account to main areas of the Business Informatics – Business Information, Business Information Subjects and Business Information Interaction in accordance with different levels of management.

The approach, presented in this paper, had been implemented in the Complex FOI – a Bulgarian program product for information service of company management and accounting.

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