



## Models of analysis for enterprise information technology strategy

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**Abstract** – Creation of informatization strategy requires adjustment of its content to the existing standards, as well as principles of the contemporary market. A good practice is to use the worked out solutions and recommendations that have already been applied for a long time in IT companies, being the potential suppliers of IT solutions. The work focuses on the concept of using IT service, coming from ITIL library as a point of reference in evaluation of informatization alternatives, as well as communication between the IT supplier and recipient.

### 1 Introduction

Informatization strategy is created for a company that wants to increase the efficiency of their key business processes<sup>1</sup> as a result of competent use of IT. The essence of strategy formulation is concentration on key processes of the company and increasing their effectiveness<sup>2</sup> at the same time maintaining or reducing the investments related to their implementation. Computer science is a resource of the proper use which affects improvement in the functioning of particular business processes, and this may be reflected in a general condition of the company. Effective introduction of IT depends on a properly implemented informatization strategy. An important element of the strategy, but very problematic, is the construction of strategic alternatives, as well as assessment and selection of the best of them (Fig. 1).

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<sup>1</sup>The relation between the achieved results and used resources, item 3.2.15 of standard ISO 9000: 2005, [1].

<sup>2</sup>Degree to which the planned activities are completed and the planned results achieved, item 3.2.14 of standard ISO 9000: 2005, [1]

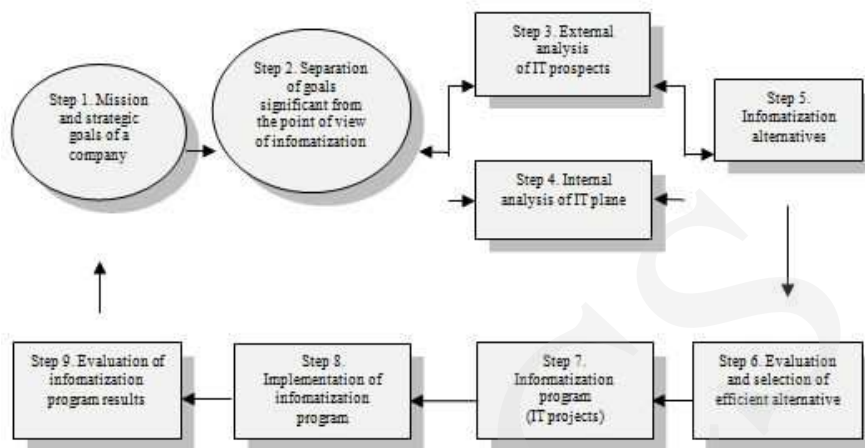


Fig. 1. Model of construction and implementation of company's informatization strategy. (Source: prepared by the author on the basis of [2]).

This problem has already been discussed by the author in [2, 3]. This article presents the concept utilizing the approach known from good practices used in IT which include: Process maturity models:

- Gartner IT Process Maturity Model,
- Capability Maturity Model Integration (CMMI®),
- IT Service Capability Maturity Model (F. Niessink and H. van Vliet 1999),
- Enhanced Telecom Operations Map (eTOM®).

Methods supporting IT project management:

- Projects In a Controlled Environment (PRINCE2®),
- Project Management Body of Knowledge (PMBOK®),
- Management of Risk (M\_o\_R®).

IT Practices:

- Information Technology Infrastructure Library (ITIL®),
- Control Objectives for Information and related Technology (COBIT®),
- SixSigma™,
- Sun Microsystem's Operations Management Capabilities Model (OMCM),
- eSourcing Capability Model for Service Providers (eSCM-SPTM),

IT Standards:

- ISO/IEC 20000,
- ISO/IEC 27001.

The article focuses on the ITIL approach which, as it results from the studies carried out by ITLife.pl portal concerning the use of best practices of IT management, already in 2005 was a concept considered by 42% of all organizations. In 2009 67%

of organizations participating in the study had a binding decision on its application behind them and 38% had already applied ITIL for a long time [4]. ITIL Library has gained trust of the Polish market, as well as the IT management staff and has become a commonly applied set of good practices. For this reason, attention should be paid to the importance of assumptions of this library. Especially to use the concept of IT service for building strategic alternatives and their evaluation and selection.

## 2 Good practices - ITIL Library

ITIL®(Information Technology Infrastructure Library) is an approach to IT Service Management most widely accepted in Poland and the world, which in the last dozen years has become the world standard in this field [5]. The library supports ordering of the organization responsible for maintenance and operation of IT services. It has defined and arranged a consistent map of processes, relations, roles, key terms, as well as measures which have been commonly adopted by the IT trade. It has also introduced a service culture in IT organizations. On the basis of ITIL library ISO standard 20000 has been built and its predecessor – British standard BS 15000, which is a collection of documents presenting the guidelines concerning IT services management. The basic scope of processes defined in ITIL as well as ISO 20000 is the same – the most important difference between documents refers to their detail and destination [6]. ITIL was created as a set of the best practices, in which each of the main processes is described in a separate publication along with broad instructions related to their interpretation and implementation. On the contrary, ISO/IEC 20000 is intended to standardize the IT area – and thus defines clear and legible requirements, being a subset of ITIL guidelines. Service life cycle is formed by five phases, each of which contains the processes listed below:

- Service Strategy
  - Strategy Generation
  - Financial Management
  - Service Portfolio Management
  - Demand Management
- Service Design
  - Service Level Management
  - Availability Management
  - Capacity Management
  - IT Service Continuity Management
  - Service Catalog Management
  - Supplier Management
  - Information Security Management
- Service Transition
  - Service Asset and Configuration Management
  - Service Validation and Testing

- Evaluation
- Release Management
- Change Management
- Knowledge Management
- Service Operation
  - Event Management
  - Incident Management
  - Problem Management
  - Request Fulfillment
  - Access Management
- Continual Service Improvement
  - Service Level Management
  - Service Measurement and Reporting
  - Continual Service Improvement [5].

ISO standard/IEC 20000 issued in 2005 defines the guidelines and requirements for construction of IT services management systems. Like in the case of other management systems – such as ISO 9001 ISO or 14001 – the standard determines the processes whose definition and implementation in an organization results in a complex regulation of the IT area – starting with services management, through management of infrastructure, configuration, efficiency, ending in financial settlements. ITIL Library and the standard ISO/IEC 20000 focus on supporting IT services, which become a link between the recipient and the supplier of this service.

### 3 IT service

The definition of IT service used in ITIL library states that this is a manner of supplying value to the client by giving him or her an opportunity to obtain results which he or she expects. The Client does not assume costs and risks associated with the delivery of IT service [7] (p. 10). From the point of view of IT supplier a service is a set of IT resources related to it (hardware infrastructure, basic software, application software<sup>3</sup> ensuring its correct implementation – the so called IT service map - IT resources map (Fig. 2). According to ITIL practices, these relations are called the configuration model, which carries significant information on managed IT resources [5] (p. 136). In this case, relations and objects of configuration are largely developed. The mentioned map allows, among others, a reliable evaluation of particular IT services or a quick change of its parameters. Owing to the precise configuration model the service provider may:

- assess the impact of different elements of configuration on one another,
- evaluate the impacts of changes on different elements of configuration,
- plan new IT services on the basis of the existing configuration,

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<sup>3</sup>The layers of IT infrastructure were discussed more precisely in [8] (p. 15.)

- optimize use of resources.

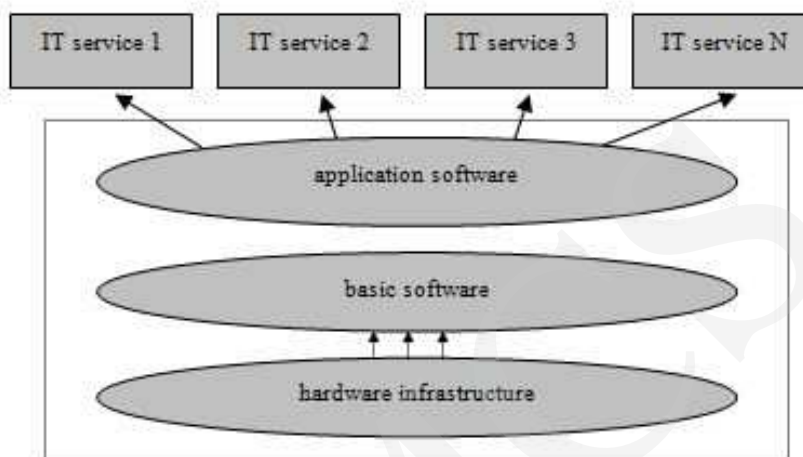


Fig. 2. Sample IT service-IT resources map. (Source: prepared by the author.)

IT service shall be treated differently from the point of view of a recipient - a business. We will define it as a manner of improving the efficiency of business processes<sup>4</sup> of a company by the application of IT resources. Business processes are the processes that are significant for achieving the goal of company operations and provide measurable benefits for it. In conclusion, IT service will constitute a resource, which carries value for a business directly proportional to increased effects of the supported business process or to reduced investments related to the execution of the process. Every company, in order to increase the efficiency of its business activities should, in the first place, consider the reconstruction of business processes<sup>5</sup>, in the next step, it should improve the efficiency of processes by means of introduction of additional resources – in the concerned case – introduction of new IT services.

In this case, it is important to create the map – business process – IT service presented in Fig. 3 which will provide the picture for demand for processes for specific IT services and will facilitate the measurement of their efficiency. It is important to remember that the IT supplier and the business should be regarded as two independent units – these can be separate companies which will have a different approach to IT services.

Another important issue is a manner of providing IT services which depends on profiles of operations, maturity and the adopted model of company management. To illustrate the problem, a model company may be used, which is composed of several

<sup>4</sup>According to the standard ISO 9000: 2000, a process is every activity, which transforms an input (input data) to output (output data). A process may, in its "interior", contain a set of various operations (activities) mutually related with each other and interacting with one another. Definition of a process is included in standard ISO 9000: 2000 item 3.4.1. [1]

<sup>5</sup>More about reconstruction of business processes in [9], p. 76-85.

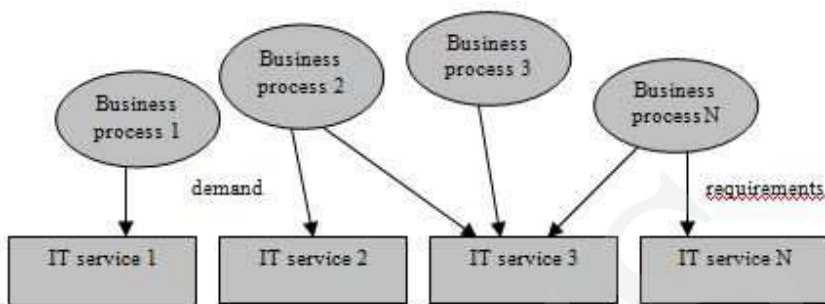


Fig. 3. Sample business process – IT service map. (Source: prepared by the author.)

business units – departments dealing with a separate scope of company’s operations. These can be the following departments: orders, production, sales, staff and wages, financial etc. Small companies may not have separated departments, in such case they should be treated as companies with one department.

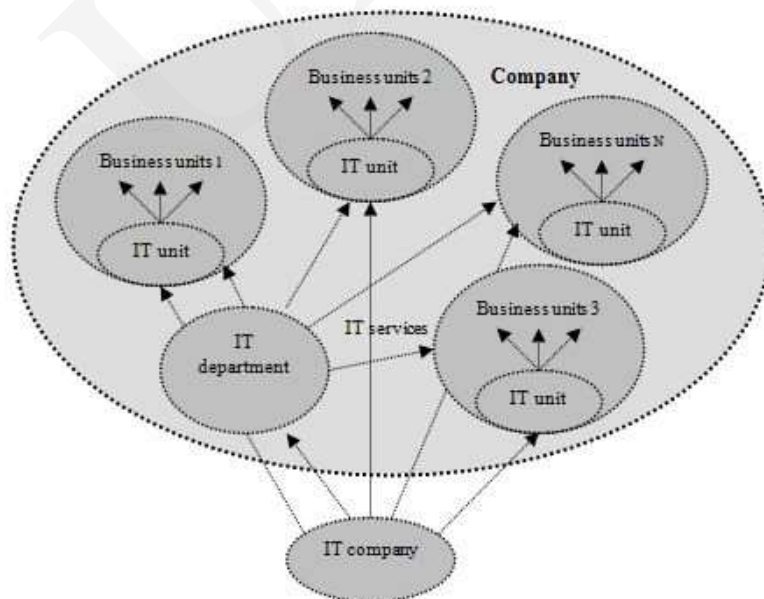


Fig. 4. Model of providing IT services. (Source: prepared by the author on the basis of [10]).

In such company as presented in Figure 4, IT service may be provided in several ways. On the basis of work [10] it is assumed that a supplier of IT service may be:

- internal supplier – being a part of structure of the company:
  - IT unit being a part of each business unit of the company, providing IT services exclusively for this unit,
  - IT department belonging to the company but independent of business units, which provides IT services for all units,
- external supplier – an IT company which provides IT services in the outsourcing model.

In communication between the supplier and the recipient, it is important that the defined IT services have clearly identified legible parameters for both parties. They can take the form of critical success factors (CSF) – something that must occur so that an IT process or service could succeed. These parameters should be expressed by measures which determine the level of CSF implementation (Fig. 5).

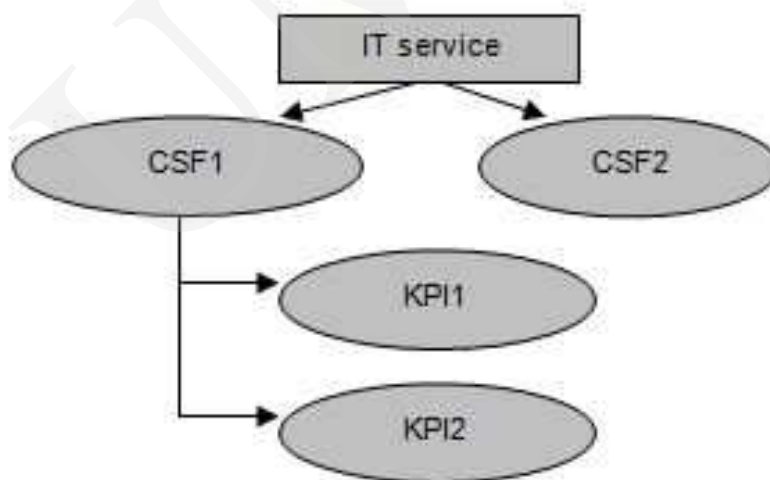


Fig. 5. Model of IT service parameters. (Source: prepared by the author).

These measures are called the key performance indicators (KPI) which help in managing an IT process or service. In other words, it can be said that KPI measures the implementation of each CSF, and CSF determines the parameters and the quality level of a service.

## 4 Construction and evaluation of informatization alternatives

Informatization of a company is often prepared without a thorough analysis of the effects of implementation and impact of its application on the processes of the organization [11] (p. 81). This results in inefficient investment projects in IT. For this reason, it is important to perform a competent identification of informatization alternatives and their reliable evaluation. Each of the assumed variants should be carefully thought-out and evaluated in terms of benefits from its application and outlays related to it. The selected alternative should constitute a solution with the highest efficiency. On the basis of a model of construction and implementation of the company's informatization strategy (illustrated in Fig. 1) we know that informatization strategy requires implementation of nine basic steps<sup>6</sup>. Step 5 consists in determining informatization alternatives – also referred to as the process of defining potential variants of implementing the IT system of a company. Implementation of this step is very difficult and there are many different approaches reported in the literature. In the article the informatization alternatives are defined as a set of potential IT services – the so called system of IT services. This will be consistent with, among others, practices of ITIL library, which may bring additional benefits. Alternatives may be formulated in two basic ways:

- deliberation of supplier - the same groups of services in separate alternatives differing in the origin of a supplier. For instance, the first alternative of infomatization is formulated for a system of services provided by an internal supplier, the other for a system of services provided by an external supplier,
- deliberation of services – alternatives are built from different variations of services.

Building of alternatives in a mixed manner may also occur, namely simultaneous deliberation of supplier and services. In the case of considering a supplier, we normally focus on searching for the lowest expenses for IT for the previously specified services system functionality level. In the case of considering services, emphasis is put on maximization of service system functionality at a given level of costs. However, it does not exclude considering different groups of services for different suppliers which can be very laborious but the most efficient.

After determining variants of informatization, Step 6 takes place - evaluation and selection of efficient alternative, bearing the responsibility for selection of a proper, best suited IT solution. Analysis and comparison of particular variants from the point of view of costs, time outlays, personnel load and effects and meeting the requirements of the user should give rise to the most efficient alternative of informatization. Without application of the relevant measures and preparation of transparent selection criteria, this step is very difficult to perform – probably even impossible. Application of the concept of IT service increases the possibility of evaluation of the informatization

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<sup>6</sup>Steps of strategy realization have been discussed in the work [2].

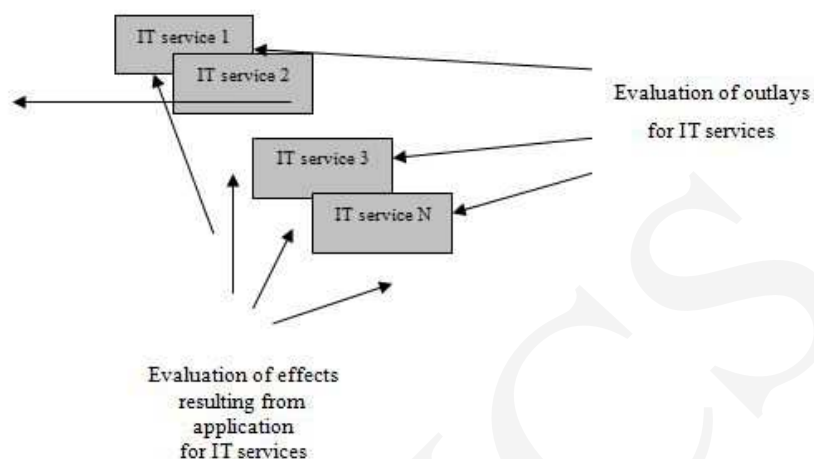


Fig. 6. Evaluation of informatization alternative. (Source: prepared by the author.)

alternatives. Evaluation of effects and outlays of a single IT service affects the evaluation of the informatization alternatives (Fig. 6). Adaptation of a developed approach to IT resources treating them as an IT service provides new, two-plane, possibilities. First of all, basing the informatization strategy on the business process - IT service model helps make the management aware (finance administrators) of demand of business processes for new resources in the form of IT. The object of IT service hides the technical information (IT means necessary for its implementation) unnecessary for the decision-maker, but carries the necessary information about which business processes it will satisfy and to what extent it will reduce the related outlays (application of ABC evaluation – Activity-Based Costing)<sup>7</sup>, as well as what the maintenance costs of IT service are. This allows the determination of demand for IT resources and explains the justified character of sustained investment outlays in a simple way. These outlays may be estimated by means of the map – IT service – IT resource or a more accurate model of IT services configuration. Such a model, along with applied measurement methods e.g.. TCO (Total Cost of Ownership)<sup>8</sup> allows identification of approximate costs of each IT service. A company may have to evaluate costs of the IT services system – an external company providing such services will do it. A company knowing the potential

<sup>7</sup>Activity-Based Costing (ABC) - is a method of measurement and analysis of indirect costs (production and non-production), allowing their more precise assignment to cost units – goods services, customers, distribution channels, consisting in linking consumption of all the resources with activities and activities with cost units on the basis of the degree of utilization.

<sup>8</sup>Total Cost of Ownership (TCO) - in accordance with Gartner Group, is a total cost of obtaining, installation, use, maintenance and, in the end, getting rid of assets in the company over a specific time. More [12].

demand for IT services may specify their CFS - KPI parameters and send a request for quotation to the market (Fig. 7). In response, IT companies should report their offers (ensuring a competent level of services) presenting the cost conditions. In the case of considering a supplier, comparison of costs of a alternative will allow selection of the least expensive.

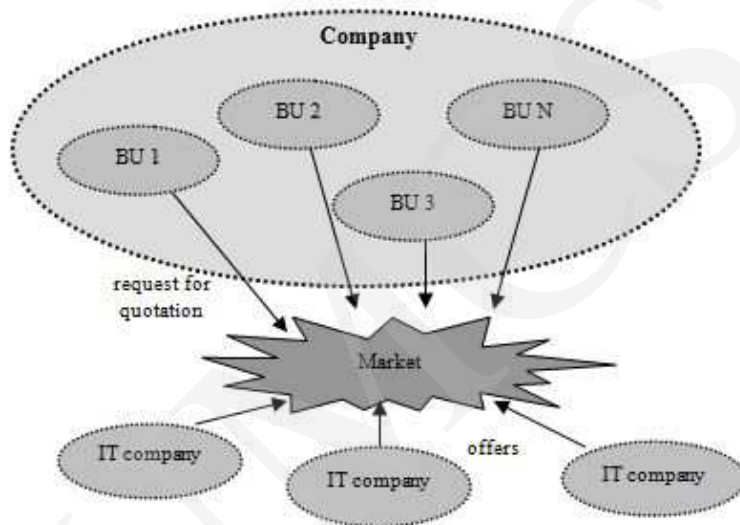


Fig. 7. IT services on market. (Source: prepared by the author on the basis of [10]).

It is necessary to take into consideration the fact that with an appropriate maturity of a company and its IT departments, a request for quotation may be also addressed to the internal market. Units and IT departments of a company should have the possibility of responding to a request for quotation (Fig. 8). Such possibility expands the search for suppliers, which should be reflected in an alternative of informatization taking into account the company's own resources. In the case of considering services, requests for quotation may be sent to single IT services or their groups, which will allow to specify the outlays for particular informatization alternative. Determination of benefits from the adopted alternatives will entirely be a responsibility on the part of a business.

The last element in step 6 is the final evaluation of an informatization alternative through measurement of its efficiency. In scientific literature there are many definitions of efficiency (defined also as efficacy, effectiveness, ability, positive result) and approaches to observation of its symptoms and methods of its measurement and evaluation. One of the definitions states that economic efficiency is "a result of business

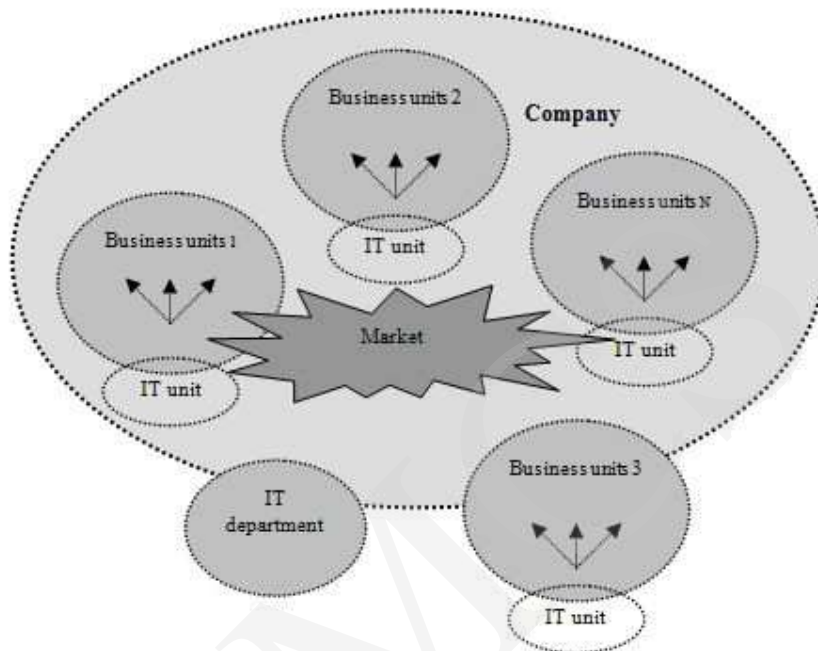


Fig. 8. IT services on internal market. (Source: prepared by the author).

operations determined by relation of the obtained effect to outlays<sup>9</sup>. Another definition specifies economic efficiency as economic efficiency which is characterized by speed and purposefulness of operation<sup>10</sup>. Looking through the prism of economic efficiency, efficiency will always be an economic result of a project counted as a result of relations of assumed (obtained) utility, economic effects to planned (incurred) outlays [13]. It is presented by a differential formula (formula of advantage), which is expressed by the formula:

$$Ef = E(t) \sim N(t), \tag{1}$$

where:  $Ef$  – efficiency,  $E(t)$  – effect,  $N(t)$  – outlays, as well as a quotient formula (performance formula) expressed by the formula:

$$Ef = E(t)/N(t). \tag{2}$$

This means that when seeking the most efficient informatization alternative, we will search for a system of IT services, whose difference or quotient of effects resulting from the use of IT services and outlays for IT services will be the greatest. In the case of considering a supplier, emphasis should be put on the solutions with the smallest outlays (with observance of services level), which will have impact on the highest efficiency of an alternative. In the case of considering a service, the task may be slightly

<sup>9</sup>The definition taken from Dictionary of Polish language.

<sup>10</sup>The definition taken from Small Economic Encyclopedia.

more difficult, but a solution with the largest effects at the assumed acceptable outlays should be sought. In the case of mixed variants, marginal efficiency should be also taken into account<sup>11</sup>.

## 5 Conclusions

Informatization strategies of companies should be adapted to market principles. A good practice when developing the informatization strategy of a company may be to use existing standards, as well as principles of the contemporary market. It requires adjustment of strategy elements to certain assumptions operating on the IT market. One of them is an approach to IT as a resource supplied in the form of IT service. Such a solution is suggested by ITIL Library and the standard ISO/IEC 20000. Consideration of such approach will affect the clarity of strategy goals, boosting the efficiency of its implementation. Use of the concept of IT service as a point of reference for construction and evaluation of the informatization alternatives introduces a clear manner of determining business needs and allows a reliable evaluation of outlays and the potential effects of applying new IT resources. It may affect a better communication between IT services provider and their recipient.

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<sup>11</sup>Marginal efficiency (incremental) - efficiency of added (additional) outlay units.