Competitiveness of an IT Provider: from benchmarking and “Best Practices” to models and management mechanisms

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Abstract. The paper proposes the development of the approach described in the ITIL -3,4 library to the formation by an IT provider of competitive IT assets (called “best practices”). The ITIL mechanism provides for regular benchmarking in order to determine the composition and values of indicators of critical factors for the success of the market area and the formation by the IT provider by methods of the theory of asset management, the functioning of which ensures the achievement/superiority of market values of these indicators. The difference between the proposed approach consists in replacing the “best practices” of management with procedures for solving optimization and game problems, the mathematical models and control mechanisms of which are based on mathematics, control theory, decision theory and game theory. The proposed approach makes it possible to overcome such disadvantages of “best practices” as the averaging of the conditions for their application and their insufficient efficiency. This is achieved due to the multivariate formulation of control problems, and the multi-structure and optimality of control mechanisms. In conclusion, it is indicated that it is legitimate to consider the developed models and management mechanisms as a separate new type of IT provider assets.

1. Introduction
The IT service lifecycle concept in ITIL-3,4 is based on the strategic goal of the IT provider – market competitiveness. One of the necessary conditions for achieving this goal is to ensure the performance of the provider’s IT assets, which is not inferior to the effectiveness of the assets of other participants in the IT market. To fulfill this condition and ensure its competitiveness, an IT provider monitors the effectiveness of IT assets of market leaders (performs the function of benchmarking) and improves its assets taking into account the achievements of competitors and its capabilities [1].

2. Benchmarking and critical success factors
One of the most important tasks solved by an IT provider in order to achieve competitiveness is benchmarking, which consists in finding out whether its IT assets (in particular, IT processes and ways of solving problems by processes) are competitive, that is, cost-effective, promptly responsive to the needs of customers, as well as those which are not inferior in performance to competitors. Benchmarking is a process used in management (especially strategic management) to assess the performance of a provider and compare it with the performance of “best practices” in the industry or in a specific area of the market space.
Benchmarking can be one-off, but it is often implemented as an ongoing process to continually improve the performance of the IT provider. In implementing this process, the provider interacts with benchmarking partners, exchanging experience. When performing the benchmarking process, the following tasks are solved, in particular:

- determination of the composition of critical success factors (CSF) and performance indicators for each of them [2],
- evaluating the values of CSF performance indicators,
- convincing senior management to invest in improvement of IT assets,
- identification of processes, improvement of which is necessary for achievement and/or superiority over the effectiveness of competitors processes [3],
- comparison of processes in terms of internal structural organization, and not only on the basis of quality indicators of their functioning,
- creation of a benchmarking unit with competent staff.

The IT provider plans the benchmarking work based on its own vision of performance improvement. Some of the data on cross-sectoral performance indicators are usually taken from publications of international research organizations. However, these publications often do not contain the information that the company performing benchmarking needs. Benchmarking research results are of great value, including for those companies that are competitors of the IT provider.

It is widely believed that benchmarking is the process of comparing the performance of an organization with the relevant industry standards (benchmarking in the narrow sense). However, more broadly, comparison with available industry benchmarks is only the first step in benchmarking. Comparison with industry benchmarks is useful if it is done using the same metrics and for companies of similar size, industry, and geography.

Benchmarking is preceded by the identification of problem areas in the company's activities. The benchmarking procedure can be applied to any process or function performed in order to improve it. During the implementation of the procedure, various research methods can be used, which include: informal conversations with clients, employees or suppliers; creation of various thematic groups to carry out in-depth marketing research; various quantitative calculations; organizing a variety of surveys; reengineering and financial analysis.

Benchmarking is quite costly, but in the end it pays for itself. Three main types of benchmarking costs are most significant: travel costs; the time spent by the benchmarking team members on researching problems, as well as finding companies that are most suitable for conducting research; the costs of developing and filling the database of the company's benchmarking process.

The purpose of benchmarking is to get a clear picture of your own position and the position of competitors in the market space and in the perceptions of customers. It is not enough to have self-assessment reports on the effectiveness of services and processes; it is important to compare this effectiveness with the perceptions of their effectiveness by market participants. Benchmarking results serve as the basis for initiating projects to improve processes, functions and describe the risks associated with the implementation of these projects.

The provider uses the benchmarking results to gain advantages in achieving savings in the form of lower prices and increasing the effectiveness of the supplied IT services, in increasing the efficiency of processes by reducing costs in comparison with other organizations, in implementing a new goal setting.

During the implementation of the procedure, the necessary measurements are carried out, key performance indicators are calculated and, based on the analysis, decisions are made to improve them.

The benchmarking procedure is based on one of the following two approaches:

- internal benchmarking, when the maturity assessment of the management system for IT services and processes is carried out by the company itself by comparing the performance indicators of the processes with the specified reference values;
- external benchmarking carried out by an external company, which, as a rule, has its own ideas about the procedures for assessing the maturity of the IT service life cycle processes.
From a business perspective, the measurements taken during the benchmarking process help an organization evaluate the performance and costs of IT services against competing organizations and best practices, both across the IT industry as a whole and across the respective business areas of individual countries.

Benchmarking work is focused on the interests of the business and can be costly. Regardless of whether the procedure is carried out internally or by an external organization, it should be aimed at obtaining maximum benefits primarily for the business.

There are different types of IT benchmarking, performed individually or in some combination. Examples of commonly used benchmarking:

- comparison of the cost and effectiveness of IT services for providers of type I,
- comparison of the price and performance of IT services for external providers,
- comparison of the effectiveness of an individual process against industry best practices,
- comparison of financial costs for information technology in comparison with industry indicators [4],
- comparison of the IT services performance, taking into account customer satisfaction.

Organizations performing the benchmarking procedure are classified, in particular, on the following grounds: profile and complexity. An organization’s profile is usually described by four key characteristics:

- the landscape of the organization, that is, information about the size of the company, the industry it belongs to,
- geographic location and type of users,
- a set of current IT assets (production, desktop and mobile, peripheral devices, network and server),
- available best practices (life cycle structure, composition of stage processes, efficiency of stage IT processes, policies, procedures and tools to increase profitability).

The complexity of the organization is information about the set of end users, the types and number of technologies used and the ways of their application [5,6].

3. Best practices ITIL-3,4 and critical success factors ITIL-3,4

According to the ITIL 3,4 classifications at the stages of the IT service life cycle, the following main tasks of IT services and IT assets management are solved (table 1).

| Table 1. The main management tasks solved at the stages of the life cycle of an IT service. |
|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
| Strategy (P_s) | Design (P_d) | Implementation (P_t) | Exploitation (P_e) |
| Analysis and assessment of the market area of the IT provider. | Development of a schedule of service design. | Development of an IT service implementation plan. | Management of IT incidents (events, incidents, problems). |
| Analysis and assessment of the expected value and competitiveness of IT assets. | Design of new or changing services to meet the requirements for usefulness and applicability. | Management of services change and service assets. | Management of user’s requests for service. |
| Analysis and assessment of the expected and actual profitability of services and IT assets. | Design and integration of architectures for technical infrastructure, data, applications. | IT asset and configuration management | Technical infrastructure management. |
Analysis and assessment of the advantages and disadvantages of service assets.

Designing management systems and tools for IT assets.

Release management, testing of releases and services, deployment of releases and services in the operating environment.

Application management.

Designing support processes of IT services for all stages of their life cycle.

IT-knowledge Management.

Operations management, monitoring and control.

Service portfolio management

Designing metrics for IT services and processes.

Service quality management.

For each of the tasks in table 1 in the ITIL v.3.4 library, a solution procedure was developed based on the analysis of the activities of IT-market leaders, which is implemented by the corresponding IT-process. The set of IT-processes proposed in the library for the stages of the life cycle of an IT-service is currently the de facto world standard, known under the brand of ITIL “best practices”. These processes are based on the current composition of the success factors in the IT-market, and the achievement of those values of the success factors that are characteristic of the leaders of the IT market in the current period. The IT provider’s use of the processes presented in the ITIL-3,4 library provides it with certain competitive advantages. Note, however, that as more and more IT-providers master “best practices”, these competitive advantages become less and less significant [7].

Thus, continuous improvement of the performance indicators of the provider’s IT-assets, ensuring compliance or superiority over the target values of the critical success factors of the market area, is a necessary condition for its competitiveness [8].

Ensuring competitive values of the characteristics of the assets of an IT-provider (primarily the most dynamic of them – IT-processes) requires a consistent solution of the following strategic tasks of the stages of the life cycle of an IT service:

1. Identification of the set of critical success factors \( \{F(x_n | n = 1, N}\} \) for the IT-assets of the IT-provider’s market environment, the selection of performance indicators \( \{x_n | n = 1, N\} \) describing the critical success factors and the assessment \( r_{nx, n = 1, N} \) of the market values of these indicators.

2. Implementation of strategic goal-setting: splitting the sets of indicators \( \{x_n | n = 1, N\} \) into two subsets:
   - A subset of indicators \( \{x_n | n = 1, N^b\} \) – basic factors (“competition standards”);
   - A subset of indicators \( \{x_n | n = 1, N^p\} \) – factors – “success potentials”.

3. Maintaining up to date a set of critical success factors \( \{F(x_n | n = 1, N}\} \) and values \( \{x_n | n = 1, N\} \) of their effectiveness indicators.

4. Development and implementation of IT-processes of stages, focused on achieving market values of indicators \( \{x_n^b | n = 1, N^b\} \) of basic factors of success and optimization of indicators \( \{x_n^p | n = 1, N^p\} \) – factors – “success potentials”.
5. Formation and implementation of a portfolio of projects that ensure that IT-processes achieve the current market values of indicators \( \{x_n^r\} | n=1, N^b \} \) of basic success factors and optimization of indicators \( \{x_n \} | n=1, N^p \} \) – factors – “success potentials”.

Objectives 1, 2, and 3 are addressed at the strategy stage, while objectives 4 and 5 are addressed at the continuous improvement stage of the IT-service lifecycle. Improved “best practices” are the result of meeting these challenges.

4. From “best practices” to mathematical models and control mechanisms

A promising direction for increasing the competitiveness of IT-assets of an IT-service provider is a qualitative improvement in the values of indicators of the efficiency of IT assets, in comparison with those values that are achieved by summarizing the experience of IT-market leaders and using methods of management theory [9,10].

The room for improvement stems from two main flaws in “ITIL 3.4 best practices”:

1. These practices are designed for “average” conditions of their application (for example, ITIL recommends using the same process for implementing changes in IT-service with significant variations in the scale and type of enterprise) and do not take into account the specific external conditions of operation and internal features of the organizational structure of IT-provider.

2. “Best practices” are limited to a meaningful description of the problems being solved and the development of heuristic search procedures, as a rule, approximate solutions to problems.

As a result, the management approach applied for the development of “best practices” of IT-services and processes management (“averaged”, meaningful and heuristic) often leads to:

- insufficient correspondence between the actually solved problem by the “best practice” and the problem that needs to be solved in a particular situation by the IT-provider (this causes one of the reasons for the approximation of the solution obtained);

- to the impossibility of evaluating and constructing the complete space of solutions of the problem under study, and, consequently, to the impossibility of assessing the quality of the solutions obtained from approximate solutions (for example, assessing the degree of their “remoteness” from a possible optimal solution).

3. “Best practices” do not include game formulations of problems, which are necessary when the goals of the agents solving the problem are not opposite, but also cannot be reduced to one common goal.

Overcoming these shortcomings of the “best ITIL practices”, aimed at qualitatively improving the values of the performance indicators of critical success factors, determines the relevance of the following tasks:

1. Investigation of the tasks solved by the IT-provider as weakly structured ones, requiring the development of multivariate statements and multi-structured solution procedures.

2. Development, with the using modern achievements of mathematical theories, of management theory and decision-making theory of optimization models of IT-assets management problems, in which indicators of factors – success potentials act as criteria, and the values of basic success factors – as the right sides of the corresponding constraints.

3. Development, with the using modern achievements of mathematical theories, of management theory and game theory of game models of IT-assets management problems, in which the solution of the game is a set of values of critical success factors that suits the players (compromise).

4. Development of effective procedures for making management decisions (management mechanisms) for mathematically posed optimization and game tasks of IT-assets management.

5. Software implementation and research of the proposed models and corresponding control mechanisms.
5. Conclusion
In the structure of IT-assets proposed in ITIL 3.4, there are no such types of assets as a mathematical model of a management problem and a management mechanism (a set of procedures for developing a management decision). As effective models and mechanisms for managing IT-assets are being developed and implemented, it is legitimate to raise the issue of including these important assets into the IT-provider’s assets.

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