

MODELING IT SERVICE MANAGEMENT FOR EFFECTIVE BUSINESS OPERATIONS: A CLIENT-ORIENTED APPROACH TO BUILDING IT INFRASTRUCTURE

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ABSTRACT

The article is concerned with modeling the activities of IT companies, whose main task is to conduct an effective business. The study aims at determining the role of IT service management in understanding a business strategy and identifying the most effective approach to building IT infrastructure. The article provides an overview of solutions aimed at modeling business processes for managing IT services and analyzes various approaches to managing IT services and methods for business process modeling diagrams. The authors propose a model for creating IT infrastructure based on a clearly defined organizational structure to maximize the efficiency of information services, reduce costs and plan IT development. As a result, the modeling of IT business processes should be based on a client-oriented and process-service approach, which contributes to competitiveness at all levels of corporate development. The article highlights such issues in the field of Internet technologies as privacy, security of transmitted information, and availability of the Internet in some regions, as well as technical problems relevant even for modern high-tech systems.

Keywords: IT companies; Information business; Internet business; Business models; Risks.

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INTRODUCTION

Today the introduction of modern IT technologies is an integral part of any business entity. They are used to store and process big data, automate business processes, and bring other benefits. In addition, the effective management of IT services is important for the full-fledged functioning of an organization. However, it can be difficult to manage IT services, which can lead to non-return on investments in projects.

To prevent such situations, IT process modeling approaches and design methods are used to better understand business processes within an organization.

The modeling of IT processes is an important tool for optimizing the company's activities, increasing productivity, and analyzing IT infrastructure within the corporate information system (Andrésen, 2005; Biryukov, 2010).

Effective modeling requires an appropriate method that will develop IT processes with due regard to other business processes, the life cycle, and the dynamics of business processes.

Currently, there is a wide range of standards and notations for modeling IT processes.

These standards and notations might differ in the level of abstraction, purpose, and method of representing and detailing the modeled processes.

The research objective was to define the concept of IT service management (ITSM) in understanding a business strategy and select the most appropriate standard or notation for a specific situation and IT process modeling to achieve maximum accuracy and modeling efficiency.

METHODOLOGY

Within the framework of this study, we used methods of literature review and comparative analysis. We also studied and analyzed the existing scientific sources related to the modeling of business processes in IT companies and the management of IT services. This method allows us to determine the current state of research in this area and to identify gaps in knowledge. As part of the comparative analysis, we compared various approaches to managing IT services and building an IT infrastructure to identify the most effective methods.

RESULTS

Review of solutions aimed at modeling business processes for managing IT services

Role of ITSM in understanding business strategy

The concept of ITSM plays an important role in understanding business strategy because it focuses on the needs of businesses and meets them through IT services. By using this concept, the IT department can better align its activities with business needs and goals, enabling more efficient use of IT resources and delivering greater business value. In addition, the concept of ITSM more accurately determines the performance indicators of the IT department, such as customer satisfaction, response time, service quality, etc. This allows to measure the contribution of the IT department to the achievement of business goals and to respond to changes in business strategy promptly (Scheer, 1999; Vasilev, n.d.).

In the 2000s, IT services became an integral part of people's daily lives and the main engine of business thanks to the development and availability of IT. After the economic crisis of 2008-2009 and considering other factors, the competitiveness of modern enterprises was affected. To secure a leading position in the market, it is necessary to change the way the company is managed and focus on IT services in business rather than improving the final product.

To this end, it is necessary to apply the best world practices, standards, and methods. Thanks to IT technologies, it is possible to fully automate the management of work activities and technological operations, which contributes to the development of the scientific potential of qualified specialists and an increase in economic performance.

The concept of ITSM plays an important role in understanding business strategy, especially when IT is growing more important to a business. ITSM describes processes, tools, and methods for managing the IT services that are provided to a business entity.

ITSM helps companies identify their business needs and determine which IT services can be used to achieve their business goals. In addition, ITSM allows businesses to manage the provision of IT services, determine indicators to measure the quality and effectiveness of IT services, and ensure their continuous optimization and improvement.

Therefore, ITSM is a key element in understanding business strategy, enabling business entities to define and achieve their goals and adapt to new market conditions.

Analysis of approaches to ITSM

In the early stages of the development of computer systems, we used a component/process-based approach to ITSM. It consisted in creating an enterprise unit (for example, an IT department) to provide software and hardware systems, including automation tools. The head of this unit was a manager performing the tasks related to IT support, such as implementation and maintenance, as well as ensuring the stable operation of the IT complex.

When a business customer or a functional customer puts forward tasks for system automation, they are formulated as functional requirements. When using a component-based approach, non-functional requirements such as reliability or availability might be missed. Within the framework of this approach, the requirements for IT architecture are rarely described.

Under the component-based approach, the CIO is a technical expert who can communicate with business users in technical language. The disadvantage is that there is a misunderstanding between the business and the technical department (Grekul et al., 2008; Zaramenskikh, 2014).

An alternative approach is a service-based approach, which allows the IT department to realize that business entities do not always understand how IT tools work. When using the service-based approach, the IT department must develop a relationship with the functional customer to build an efficient and profitable business structure. In this case, the concept of service arises that helps reach a mutual understanding between the IT department and the business customer.

The service-based approach is used to improve the quality and efficiency of IT services. Its main benefits are to improve the quality of services for end users, ensure business continuity and reduce the cost of maintaining IT infrastructure. With the help of the service-based approach, the IT department becomes a key element of the company and acts as a service provider to other business units. Relations between them can be presented in the following way: service provider – service consumer. Business departments formulate their requirements for the required set of services and set the quality level, while IT departments maintain and develop the company's information infrastructure to provide the required set of services at the requested quality level.

Like in any other country, there are several approaches to managing IT services in Russia (Table 1).

Table 1. Approaches to managing IT services used in Russia (Larman, 2002; National Institute of Standards and Technology, 1993; Skripnik, n.d.)

No.	Approach	Description
1	ITIL	This framework is used to manage IT services. It was developed in the UK and has become widely used throughout the world, including in Russia. ITIL provides a set of practices and methods for managing IT services at all stages of their life cycle. ITIL is especially popular in large Russian companies.
2	COBIT	This is another ITSM framework used in Russia. COBIT focuses on risk management, security, and control of IT systems and processes. It can be especially useful for companies that have high-security requirements.
3	ISO/IEC 20000	This is an international standard that defines the requirements for ITSM systems. In Russia, it is used in government organizations and large companies. ISO/IEC 20000 also covers all stages of the IT service life cycle and provides practices and methods for managing them.
4	Agile	This approach to developing and managing IT services has become popular in recent years. Agile focuses on responding quickly and flexibly to changes in user requirements and needs. It can be especially useful for companies that operate in a dynamic environment and often experience changes in IT service requirements.

Each approach has its advantages and disadvantages, and the selection of a particular approach depends on the needs and goals of a particular company. Some companies might use several approaches simultaneously or adapt them to better suit their needs.

Methods for modeling business process diagrams

IT processes are part of a business model that describes the current state of affairs and might suggest new improvements. Business modeling helps to understand internal relationships in a company and solve its problems. It also creates the conditions for planning the implementation of IT services. Every business process has an owner and stakeholders whose role depends on the value of the process to them.

To model IT processes, it is possible to use a functional approach, which involves the creation of sequential diagrams of business functions with due regard to material and information objects, resources, and business units. This represents the sequence of operations but might lead to the subjective assessment of operations.

An alternative approach is object-oriented and consists in dividing the corporate information system into objects that interact with each other by sending messages. This

approach determines the interaction between objects and simplifies the process of modeling, avoiding subjectivity in determining the sequence of operations.

Many people prefer to use the process-based approach for modeling IT processes because they consider business processes without considering the vertical hierarchy between units of IT infrastructure and highlight the horizontal relationship between them. This approach allows for integrating and coordinating business processes to achieve the set goals (Kaplan & Norton, 2001; Zavivaev et al., 2014).

There are many methodologies for designing business process diagrams, some of which are presented in Table 2.

Table 2. Methods for modeling business process diagrams

No.	Method	Description
1	Data flow diagram	Graphical representation of the data flows in the system
2	Process diagram	Graphical representation of a sequence of operations or steps in a process
3	Functional unit diagram	Modeling and description of functional blocks and the relationships between them in a system or process
4	Workflow diagram	Sequence of activities and roles within a particular process or task
5	Use case diagram	Modeling interactions between users and the system

ITSM methods

The increasing complexity of IT infrastructure requires the implementation of various ITSM processes that ensure the high quality of the services provided. However, the lack of a single database and inconsistency of the existing approaches, methods, and standards lead to significant differences in basic definitions, concepts, and principles of ITSM.

ITSM is a set of methods, processes, practices, and tools used to manage IT infrastructure within a company.

The main goal of ITSM is to ensure the high quality of IT services and improve the performance of the company as a whole. To attain this end, the ITSM system includes process management which varies depending on the specifics of the company and its needs.

Examples of ITSM processes are incident, problem, change, release, configuration, and service level management. In addition, the ITSM system includes process automation and data management, which can help identify bottlenecks in the infrastructure and improve its efficiency.

The ISO/IEC 20000 processes comprise release, service delivery, authorization, control, and relationship management. One of these processes (capacity management) ensures that

service and infrastructure capacity meets service-level requirements. Another key process is service level management which establishes achievable service level requirements, meets customer expectations, and monitors service level performance by reporting and evaluating services together with customers.

IT Service Continuity and Availability Management are the processes that ensure that services operate at an acceptable level and provide the maximum availability of resources. The importance of information security management is explained by the fact that most companies use electronic documents, store data and conduct transactions through the global Internet (Lambin, 1996; Thompson, 2009).

Ensuring security is a prerequisite for the effective functioning of any company, as the number of intruders, hackers, and viruses that can harm it is increasing every day. Information security includes the integrity, confidentiality, and availability of information.

Project risk management is the process of identifying, analyzing, planning, controlling, and managing risks that may arise in a project. A risk is a potential threat to the successful completion of a project or achievement of its objectives. The goal of risk management is to minimize or eliminate negative consequences and maximize positive consequences (Kiseleva & Iskadzhyan, 2017; Shapkin & Shapkin, 2013; Veselov et al., 2016).

The risk management process includes several stages. The first stage is risk identification. At this stage, it is necessary to identify potential risks that could affect the project. Risks are determined using various methods, such as expert analysis, historical data research, scenario analysis, etc.

The second stage is risk analysis. At this stage, analysts assess the likelihood of a risk occurring, its impact on the project, and possible consequences. Risk analysis helps to reveal the most critical risks that require special attention.

The third stage is risk management planning. At this stage, plans are developed to manage the identified risks. A risk management plan should describe risk prevention measures, mitigation measures, and consequences management measures.

The fourth stage is risk control. At this stage, the risks that have been identified in the project are monitored and controlled. This allows for quickly responding to emerging risks and taking necessary measures to mitigate them.

Risk management is a significant process that prevents or minimizes potential threats to the project. It is critical to regularly monitor risks and manage them to ensure the successful completion of the project.

Change Management (CHG) is a process used within the company's IT infrastructure to handle all changes efficiently and quickly to minimize the impact of system incidents. This improves productivity, prevents risks, and reduces the impact on the quality of services. Standard changes are grouped and processed through simplified procedures with a target treatment time that is controlled by process metrics. The changes associated with accidents and failures that can lead to a massive loss of service are marked as urgent and are controlled by a person responsible for CHG. All the changes must be implemented on time and with proper quality.

Within IT infrastructure, the Incident Management (IM) process is used to promptly respond to events that may lead to a decrease in the quality of IT services or affect their provision (Foss, 2007; Kotler & Keller, 2008; Morrow et al., 2007; Potekhin, 2012).

An incident is any abnormal event that is not part of the normal operation of an IT system and can potentially disrupt its performance. In addition, IM is responsible for handling service requests that come from customers and are related to technical support, advice, or information to resolve problems not related to failures in IT infrastructure. The main goal of the IM process is to minimize the impact of incidents and service requests on business processes and increase customer satisfaction with the services provided.

To achieve these goals, the IM process includes the operational detection, registration, classification, and prioritization of incidents and service requests, the assignment of responsible persons, and the resolution and control of such problems.

The problem management process in IT infrastructure is related to the concepts of problem, known error, and change request. The definition of a problem is related to the unknown reason for one or more incidents that can be caused by it. A known error is an incident or problem for which the cause is defined and a solution has been developed. Errors can be identified by analyzing requests and tickets in technical support or by analyzing systems. These concepts are interrelated and complement each other.

Release management is a process that deals with the installation, implementation, and quality control of all types of hardware and software deployed in an IT environment (Eliferov & Repin, 2013; Potekhin, 2012). Its main task is to ensure the quality of the productive environment when introducing new versions of software and hardware.

Release management consists of the deployment process and is performed in collaboration with configuration management and change management. As part of the process, policies for the introduction of new versions of hardware and software are created and adopted.

It is mandatory to update the Uniform Configuration Management Database (CMDB) for each release.

Release management consists in updating the release content (software code) in the reference software library (DSL) and keeping track of hardware specifications, manuals, installation and implementation guides, network configurations, etc. The main focus of release management is software.

Configuration management involves identifying, linking, maintaining, and managing various components of a program or project to keep information up-to-date after the project is released. This process is not limited to configuration items but also includes information about how they relate to each other.

IT outsourcing can help companies reduce indirect costs, which has led to a booming IT outsourcing market. However, not all companies obtain significant savings. In Europe, about 40% of telecommunications companies stopped using IT outsourcing services due to inconsistencies in the price/quality criterion. In Russia, companies that are rapidly developing most often solve automation problems by increasing their IT staff, regardless of the effectiveness of this solution (Kotler & Keller, 2008; Volkov, 2012, 2015).

The Customer Relationship Management (CRM) process aims at creating mutually beneficial partnerships between a company and its customers using a customer-centric strategy and IT.

The main goal of CRM is to build long-term and profitable relationships with customers by understanding and meeting their individual needs and increasing their loyalty throughout the life cycle. This process helps companies grow and boost revenue through different approaches aimed at improving customer relationships.

CONCLUSION

The different methodologies, standards, and best practices for managing IT services and assessed their effectiveness and role in building a high-quality IT infrastructure were analyzed. The main project management standards and substantiated their applicability to IT projects were considered. The conducted study allowed us to describe methods for modeling business processes, structured the existing modeling approaches, and identified their role in managing IT processes. Some aspects related to the influence of IT services on the transformation of business processes and methods of doing business today were studied.

The proposed approach to building IT infrastructure based on a well-defined structure ensures the maximum efficiency of information services at an enterprise, reduces the costs of maintaining all departments and units, and plans the development of IT.

The modeling of IT business processes is based on the client-oriented service/process-based approach that ensures the competitiveness of a company at all levels of its development.

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