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Business intelligence and its role in raising the level of corporate services

Abstract. Artificial intelligence has begun to show itself in all areas of the changing business world. With the introduction of new technologies in the digital age, business structures have to adapt to new projects and increase the productivity of business processes. The purpose of the study is to clarify the ways of using business intelligence tools to raise and increase the level of services within companies. As a result of the stated objective, we identified the following tasks: 1) to determine the role of business analytics in forming the company's development strategy; 2) to propose solutions for improving internal company services using business analytics tools; 3) to outline the framework for building business analytics (BI) within the company.

This study presents the concept of business intelligence and its importance in raising the level of service delivery in companies. For this purpose, Deming's course was used, were to find and provide some solutions, represented in the final decision-making process regarding the process of improving and providing services to companies. In other words, helping the general manager to see what is hidden from the eye, depending on the data and methods of processing it. In addition to the above, the stages involved in the development process were shown in the form of a data flow diagram, which is known as the Data Flow Diagram (DFD) for the system used within the company.

The results of this study are summarized as follows: a) this study presents a clear and simplified concept for solving all the tasks mentioned in this study; b) submitting a proposal to solve the problem of improving services within the company by using business intelligence tools; c) this study presents a data flow diagram that selects the appropriate agile process for that purpose; d) this study presented a partial development of the system in force in the company.

Keywords*: analysis, BI-analysis, business intelligence, improving, process, importance, service, solutions, corporate social responsibility*

Fig.: 3, bibl.: 23

JEL Classification: L84, M21, M41

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Introduction. Recently, SaaS (software as a service) is especially relevant in innovative enterprises moreover, innovative sectors of the economy. In addition, for such enterprises, the issue of the relevance and timeliness of the services provided is acute. Therefore, it is necessary to understand and take into account what exactly and at what point should be improved in the (Information Technology) IT service provided. To solve this issue, the concept of CSI (continuous service improvement) is often used - continuous improvement (improvement) of services (Ranjith ,V. (2016). Business Models and Competitive Advantage. Procedie Economics and Finance, 37:203-207).

In CSI, a special place is given to the analysis of the current organization of the IT service provided. This kind of analysis can be done using Business Intelligence (BI) technology. In this case, the purpose of BI is to decide and make the final decision about what exactly needs improvement in the current IT service organization. In other words, BI helps the product manager see what is hidden from the "human eye" based on the received and processed data.

Currently, all known approaches to CSI do not take into account the specifics of SaaS solutions. Taking into account, this specificity will help to avoid a number of errors that occur at the stage of analyzing the effectiveness of the current organization of an IT service, which will ultimately lead to an increase in the quality of the IT service provided. Therefore, the development of a method for continuous improvement of SaaS-solution services, given the lack of theoretical and practical development, is especially relevant.

The degree of scientific development of the issue of continuous improvement of IT services. The active use of service improvement methods, and, in particular, continuous improvement methods in various areas of modern life, has led to the development of these methods in the field of information technology. Methods for continuous improvement of IT services combine the principles, methods, practices related to quality management, change management and improvement of capabilities.

At the global level, the problems of managing the quality of IT services have been dealt with by Paul (2004), Jeamon (2000), Bounds,Greg & yorks, Lyle & Adams, meland & Ranney, Gipsie, (1994) . Many scientists have made a significant contribution to the development of change management theory: If we talk directly about the continuous improvement of IT services. Then in Jordan, at the moment, there have been several studies, but the following works of scientists are known: Al-Mansour's (2020) , Abu Nabaa and Massad's (2010), Banday & Nusair (2020), However, although their work addresses problems of improving services, the issue of continuity is not considered. This problem is more common among foreign scientists, including and many others. The above authors' developments are of great theoretical and practical interest. However, their paper does not address the application of continuous improvement methods to SaaS.

Literature review. Al-Mansour's study 2020: The title of the study is (Total Quality Management in the Jordanian Health Sector), a comparative field study in Al-Bashir Hospital and the Islamic Hospital.

Its main objectives are to identify the extent to which each sub-element of the elements of total quality management exists (leadership, focus on the customer, employee integration, continuous improvement, relationship with the supplier, and performance measures). The size of the sample of employees in both hospitals was (490) male and female employees, and the sample size of inpatients: (340) patients for both hospitals. Total quality management techniques are better than the management of Al-Bashir Hospital, which expressed a lack of interest in the applications and techniques of total quality management or lack of awareness of the importance of this modern administrative approach in improving the quality of services provided to the public.

Abu Nabaa and Massad's study, 2010: Study Title (Towards the Application of Total Quality Management) An exploratory study of the opinions of a sample of deans and students of Al-Ahliyya Amman University.

This study aims at the possibility of applying total quality management in higher education services and Al-Ahliyya Amman University in particular. The university applied the concepts and methods of total quality management. It also included a sample of university students enrolled and enrolled in the undergraduate level for the academic year 1996-1997, whose number is (600) students, in order to identify the level of satisfaction with the quality of educational services. The most important finding of the study is that the level of satisfaction was high among students with regard to the university's equipment. As for the other dimensions represented by the academic staff, internal regulations and instructions, study plans, university services, the level of satisfaction was low. Already applied.

Banday & Nusair study, 2020: title of the study (the application of total quality in the management of educational institutions).

The researchers laid out several steps that should be followed by educational institutions for applying total quality, the most important of which are:

Seeking to create awareness of the concept of total quality among students, university administration and faculty, through teaching programs.

Develop comprehensive standards for evaluating and monitoring performance in educational institutions.

Actual evaluation of performance in light of established standards.

A collective of Ukrainian authors K. Bezverkhyi, L. Hnylytska, O. Yurchenko, & N. Poddubna, 2023 are researching analytical procedures for auditing integrated reporting of corporate enterprises.

Bounds,Greg & yorks, Lyle & Adams, meland & Ranney, Gipsie, 1994, Establish strategic planning teams that define overall quality requirements, and monitor changes in the business environment to determine the risks and threats the organization is exposed to and how to seize opportunities by focusing on the strengths that the organization has. Important findings of the study are that TQM in higher education institutions should provide a high level of motivation and preparation for comparison, assessment, delegation, mentoring and documentation, as well as an extensive review of work, as well as the preparation of curricula for students. and management.

Jeamoon (2000) A study entitled: "Organizational Commitment Revisited in New Public Management Motivation Organizational Culture Sector". The purpose of the study was to find out the impact of the organization on productivity, the performance of organizations and their effectiveness at night.

A study of a group of organizations, thus achieving competitive advantage. The study used the analysis method formally. I commissioned the study to study the literature related to the subject matter in New York, most of the organizations

There is a clear relationship between the organizational structure and the organizations that are formed and the employees, and it showed that there is a negative relationship with you. From job performance and desire to leave the job. As a result, the low level of organization. The study paid attention to the necessity and completeness of the concept of organization because of the importance of gaining a competitive advantage for organizations.

Paul (2004) a study entitled: "Quality Management as a Systematic Management Philosophy for Use in Non-Profit Organizations".

The purpose of the study was to analyze. Mada. The traditional administration of AH, MD, and MD. Total return management and the extension of the possibility of applying the total return philosophy in non-profit organizations and affected the efficiency and effectiveness of those organizations. The study was presented in the United States of America. The study used the methods of analysis and analysis tools. Referral eg. Means, standard deviations, and ANOVA. Moreover, I concluded that the application of total return management in non-profit organizations is necessary to improve and lead productivity, and maintain performance. Leading the number of non-governmental organizations and suffering from lack of funding. It was also rewarded that the

application of complete return management in governmental organizations is a matter. If application requirements are provided. The study stressed the necessity of leadership in financing. For non-profit organizations to improve AA performance.

Jun, Cai & Shin (2006) A study entitled: «TQM practice in Maquiladora: Antecedents of Employee Satisfaction and Loyalty». The purpose of the study was to investigate the effect of practicing the principles of total return management. Current manufacturing companies, and the investigation of the relationship between total quality management, job achievement, organizational commitment, and job satisfaction among employees. The study was conducted in Australia. The study used the Wolfe analysis method, where the sample consisted of two arcs for current generation, pervasive. The application of the principles of comprehensive return management prevented a long period, and the opinion poll was used as a tool for the study. The results of the study showed that the principles of total return management are compromised. That is, a father on defining job satisfaction and achieving the organization of its employees. It turned out that the progress, success and profits achieved by the current management company were significant after the implementation of the principles of total quality management, since the principles on which the total quality management depends are represented. P Uncle. No, with cooperation, training and development of employees, and empowering them functionally and happily. Mamba and provide a suitable functional environment for the mother, which leads to the definition of the organization of the days of the study, the need to implement the principles of the management of the full, complete Pak. Better. in the arcs. The study of (2006) Shin & Cai, Jun compromised in identifying the impact of the principles of total return management. As it differs from the current study, the opinion poll was used as a tool.

Nazarova K. and others, 2021 conduct risk analysis of company activities based on non-financial and financial reports.

Shygun M. and others, 2023 analyze the presentation of financial information in digital formats as a basis for the analysis and audit of business activities of enterprises.

Purpose, objectives and research methods. The purpose of the study is to clarify the ways of using business intelligence tools to raise and increase the level of services within companies. As a result of the stated objective, we identified the following tasks: 1) to determine the role of business analytics in forming the company's development strategy; 2) to propose solutions for improving internal company services using business analytics tools; 3) to outline the framework for building business analytics (BI) within the company.

Study methodology: In this study, some business intelligence tools were used, such as the AGILE methodology, and the SCRUM methodology.

Research results. Formation of the concept of the method of continuous improvement of services:

As mentioned above, SaaS has a number of features: the application is adapted for remote use;

Many users use one application;

– Updating and modernization are carried out promptly and for the client;

– Payment is charged in the form of subscriptions or subscription fees;

- consists, as a rule, of several smaller modules;

– Updates and upgrades take place regularly;

- The possibility of independent expansion of functionality by the end user.

Since the existing methods of continuous improvement of IT services do not take into account the features of SaaS, the following is the concept of the method of continuous improvement of services, taking into account all the most important features of SaaS: 1. Analysis of the current state of the service and identification of bottlenecks. At this stage, analytical monitoring of the entire IT service should be carried out. Based on the identified data, experts conclude that there is some problem that prevents the efficient operation of the entire IT service. Issues can be technical,

pricing, design, and more. Moreover, each of these problems has a different impact on the performance of an IT service. It should be understood that for an objective assessment of the state of IT services in an enterprise, high-quality analytics must be implemented.

2. Analysis of possible causes of problems. This stage is the least objective, and as a result, the most responsible. Since there can be a huge number of possible causes of problems and bottlenecks in the service. Moreover, it is not always possible to say unequivocally what exactly caused it.

3. Formation of requirements for improving the service. Before you start troubleshooting identified problems, you need to identify functional and non-functional requirements, and then describe them and pass them on to development. The methodology uses user story and use case formats to describe requirements. Continual Service Improvement does not impose additional conditions on the form of use case descriptions.

4. Development of a part of the system, including troubleshooting. Since the continuous improvement of the service fits into the concept of the Deming Cycle, it is necessary to choose an Agile methodology during development, in particular, it can be Scrum or its derivatives. A new working version of the SaaS product, that is, a version with a fixed problem, should be received every 1-4 weeks. These terms should be regulated even before the start of development. It should be understood that the higher the quality of the requirements described in the previous step, the higher the chance to get the highest quality released version of the product.

5. Analysis of the results of the implemented changes. This step should be carried out in parallel with the other steps of this method. Since in SaaS the effectiveness of the received changes can be obtained only on a large sample. In other words, you need to conduct analytical monitoring and identify the reaction of end users to the implemented change. The methods used to analyze the results obtained after implementation may be the same as those used in the first stage of the continuous improvement method.

6- Identification of new bottlenecks. After a new version of the IT service has been released and in parallel with the analysis of the results after the problem is resolved, it is necessary to analyze the system again to identify problems, but it is worth mentioning that at this stage that part should be thrown out of the general consideration, which was implemented in the latest release, since it is impossible to determine its effectiveness on such a small sample. In other words, there is a formation of a constant cycle (circle) of continuous improvement of the service. It is at this step that the continuity of improvement is formed (Ranjith, V. (2016). Business Models and Competitive Advantage. Procedie Economics and Finance , 37:203- 207).

Identification of problems in the existing state of the IT service. It is worth emphasizing that recently, SaaS is especially relevant and the need for such systems is growing on the market. It is also worth mentioning that analytical systems are especially relevant in the IT market, which can significantly improve the quality of decisions made (Ranjith,V. (2016). Business Models and Competitive Advantage. Procedie Economics and Finance, 37:203- 207 Ranjith, V. (2016). Business Models and Competitive Advantage. Procedie Economics and Finance, 37:203-207) A special place among analytical systems is occupied by systems of the Business Intelligence class. BI technologies can significantly simplify the process of decision-making and reporting by all employees of the company, based on the capabilities of multidimensional (OLAP) data analysis. This is a tool for multidimensional interactive analysis of large amounts of information using specialized analytical models (OLAP cubes), and allows you to generate reports in both tabular and graphical form Ranjith, V. (2016). Business Models and Competitive Advantage. Procedie Economics and Finance, 37:203-207 Based on the available data, you can identify the most bottlenecks in SaaS application and form the necessary requirements for their elimination. To identify bottlenecks and justify the need to eliminate them, and in general for the continuous improvement of the service, it is necessary to fully build BI in the enterprise. This process is shown in Fig. 1 in DFD notation.

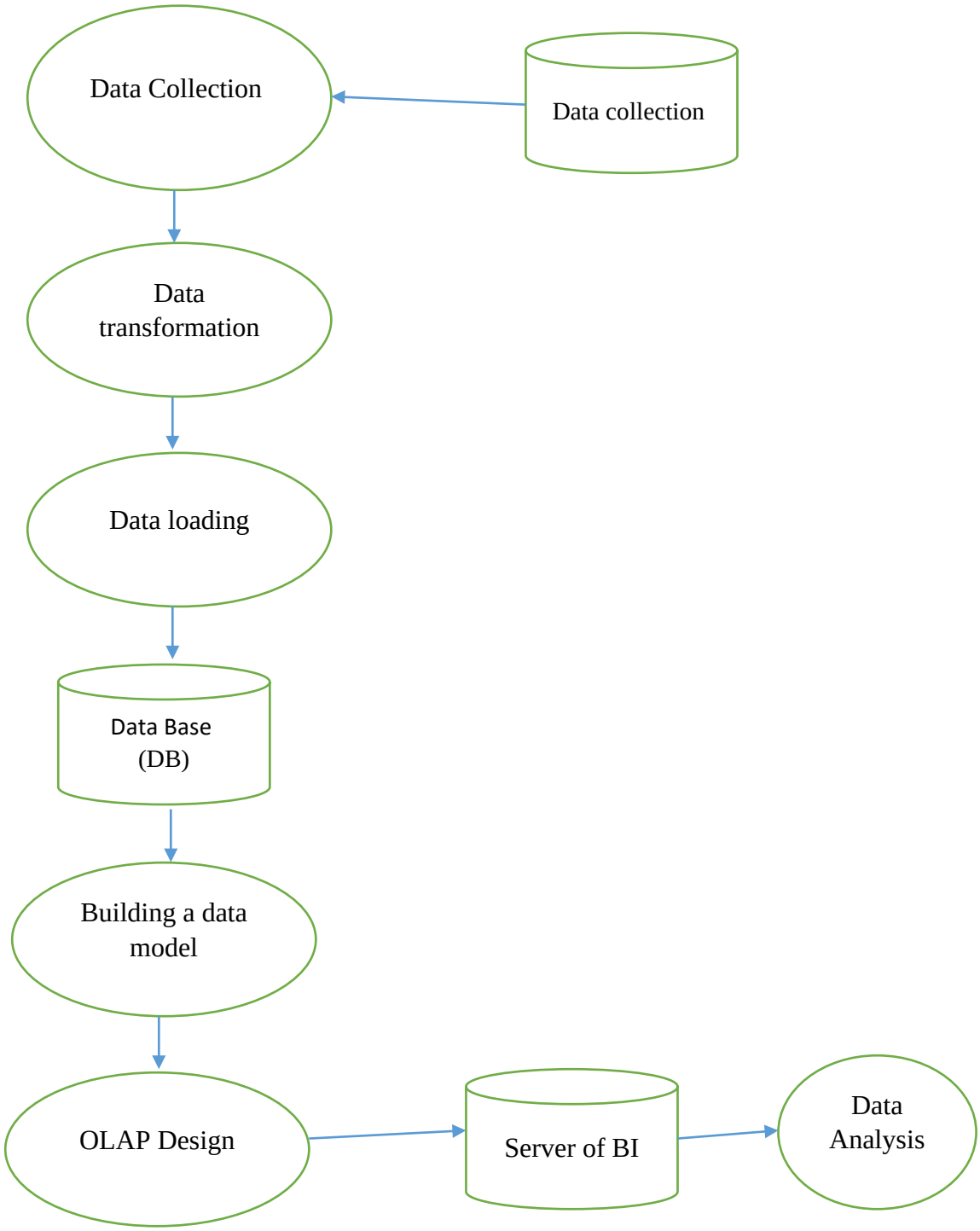

Figure 1. Scheme building a business intelligence (BI) in Company
Source: generated by the authors

Various file formats can be used as data sources, in particular, they can be text files, excel files, xml files, relational databases (MS SQL, DB2, MySQL), non-relational databases (Mongo DB, eXist, CounchDB), various metrics (Yandex.Metrika, Google Analytics), etc. Supported data sources depend only on the ETL tool chosen at the enterprise. Figure 1 shows the complete scheme of building BI. It should also be understood that if the enterprise has already built BI, then the whole process of analyzing the existing state of the service and identifying bottlenecks comes down to building an OLAP cube and analyzing data (analytical monitoring).

At the stage of analytical monitoring, problems in the IT service are identified. This means that a number of indicators are presented, after which the compliance or non-compliance of the service / part of the service (module) with the requirements provided is revealed. In particular, such indicators can be: - the percentage of users leaving the page; - percentage of negative user reviews; – number of users; - the average number of pages viewed per session by the user; - the number of actions to obtain the desired result by the user; and etc.

These indicators depend on the subject area of the SaaS application and the structure of the SaaS itself, so each SaaS requires its own performance indicators. It is worth mentioning that Data Mining can also be used for analytical monitoring, the use of intelligent data mining methods allows you to more accurately identify problems, and sometimes get completely unexpected results. The most popular systems that offer data mining work are the following: SPSS Modeler, Rapid Miner, SAS, as well as the system Dedicator Studio. However, as practice shows, not all enterprises are ready to use Data Mining and they manage only using OLAP (Ranjith ,V. (2016). Business Models and Competitive Advantage. Procedie Economics and Finance , 37:203- 207).

Using BI to analyze the current state of a service and identify bottlenecks can serve both to completely redesign a service (or a separate module) and to improve it. Using BI to survey the current state of a SaaS service and to identify bottlenecks has a number of advantages: 1. Improving the efficiency and quality of decision-making based on available data. 2. Possibility to get unexpected results that will help to reorganize the current process. 3. Increasing the availability of data. Despite the obvious advantages of using BI, there are problems and disadvantages: 1. there may be errors in the interpretation of certain data, which is directly related to the competence of participants in building BI. 2. Not all enterprises are ready to spend money on using BI to analyze the quality of service and identify bottlenecks. Despite the growing popularity of BI, many enterprises are not yet ready to implement BI systems without understanding their obvious benefits.

It is worth noting that the use of BI as a method for identifying bottlenecks in the current SaaS service organization does not imply the use of any specific BI product and specific ETL tool. But despite this, the choice of a BI system is one of the most important elements of this method. Given the dynamic development of the market for this software, it is necessary to analyze their capabilities. The following criterion base for comparing systems is recommended: information system capabilities (analytical tools); analytical tasks that the system allows to solve; categories of system users. Also, when choosing a suitable BI system, it is worth considering the cost of the product and the qualifications of the users of the platform being purchased. The most popular BI systems are the following solutions: SAS, IBM Cognos BI, Tableau, Qlikview, SAP BO, Oracle BI, as well as the Russian Prognoz system (Sekaran, & Bougie, (2010)).The most popular ETL tools are the following solutions: IBM Data Stage, Pentaho Data Integration and Oracle Data Integration (Ranjith,V. (2016). Business Models and Competitive Advantage. Procedie Economics and Finance, 37:203- 207).

It should be understood that in the method of continuous improvement of a service, the term “problems” refers to any problems that reduce the effectiveness of an IT service. Bottlenecks can be problems. According to the definition, the bottlenecks of the process are operations and communications that reduce the efficiency of the process, increasing its complexity and cost.

Bottlenecks are usually duplicate operations/works, time delays beyond the norm, information loops, and overloads of individual elements. Also among the problems of IT services are problems with the technical implementation and quality of the information system. In addition, problems may be related to the fact that the service is not used to the extent that the SaaS vendor wanted to be. This means that a problem is anything that prevents both the end user and the SaaS vendor from being fully satisfied with the service. There can be a huge number of reasons for the occurrence of certain problems, therefore, in practice, this stage is the least objective, and, as a result, the most responsible. Since the possible causes of problems and bottlenecks in the service, there can be a huge variety. Moreover, it is not always possible to say unequivocally what exactly caused it. Often, identifying the causes of problems comes down to the experience and competence of the person involved in identifying the cause. Such a specialist can be a data analyst, a system analyst, a product owner, or a project manager (Russell, S, Roberta & Taylor, W, Bernard. (2009)).

The most favorable and accurate situation is when the cause of the problems can be substantiated using the calculations performed. For such a justification, a number of formulas can be presented, which the specialist who is involved in identifying the cause determines. If the cause cannot be justified numerically, then everything comes down to the experience of a specialist. If, based on the data received, he sees that one of the tools does not bring any profit at all, and then there can be many reasons: problems with design, pricing, functionality complexity, weak reference material. In addition, here the specialist himself must understand what exactly caused the problems, and sometimes a combination of factors could be the cause. As mentioned above, this stage is one of the most critical, since an incorrect determination of the cause of the problem can lead to errors in the formation of requirements. If several weeks are spent on fixing the problem, and, as a result, it turns out that the identified problem has not been solved, then, in fact, several weeks of development will be wasted, and, consequently, extra money (Sekaran, & Bougie, (2010)).

Development of a part of the system, including troubleshooting. Since the whole process of continuous improvement of the service fits into the concept of the Deming Cycle, which was mentioned above, it is advisable to use flexible development methodologies (Agile). Now, an agile approach to development is gaining popularity and there are many different methodologies, the most popular of which are Scrum, XP, Lean, AUP, Kanban. The choice of an appropriate methodology depends on a number of factors: business priorities, an acceptable way of communication and team interaction, the number of serious risks, whether requirements change often, what is more important: speed or quality? Moreover, much more. In particular, the choice of an appropriate methodology can be presented in Fig. 2. Based on fig. 2, we can conclude that, since the presented method involves continuous improvement, the recommended methodology can be Scrum and other Scrum-like methodologies (Scrumban, Scrum + XP and others). The whole Scrum process can be represented in Fig. 3. If we talk directly about the formation of requirements, then Agile and Scrum, in particular, short User Stories (user stories) and Use cases (user scenarios) are used as requirements description formats. User stories are a summary of the functionality that needs to be implemented in order for a specific stakeholder to benefit from a software product (Solomon, Michael, R., Marshall, Greq, W., & Stuart, Elnora, W., " (2009)). The most popular format for describing user stories includes three components: 1. User role. Answers the question "Who?" 2. Necessary behavior (function, action). Answers the question "What does he do?" 3. Benefit, value. Answers the questions "Why?", "For what?" Schematically, this can be riper sensed as follows: As a <role>, I want a <behavior> for <value>.

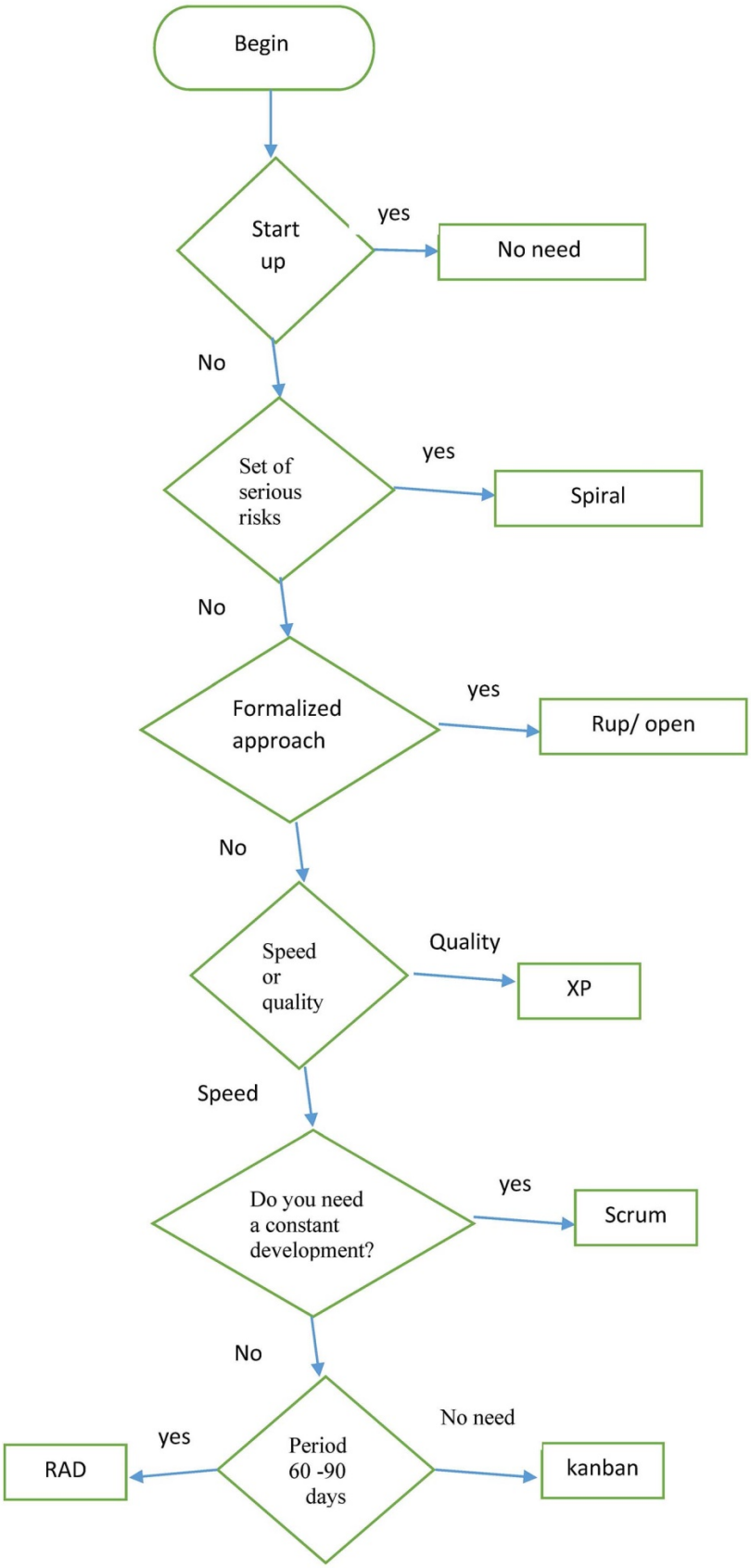

Figure. 2. Scheme for choosing an appropriate Agile methodology.
Source: generated by the authors

After the user history are generated, if necessary, they are detailed in the form of user scenarios. As a rule, such a need exists. Scenarios interact well with previously prepared user stories and cover them. Scenario development is collaborative with the designer and describes the future behavior of the system that needs to be reflected to the designer. There are many different options for generating requirements and describing user scenarios. The most popular are:

– a numbered list of stages, arranged in the form of a table;
– Virfs-Brock two-column table;
– Free description;
– Tabular presentation;
– Full Coburn format;
– Diagrams of activities, state transitions, use cases,
– Sequences; etc (Westland, J. (2006).).

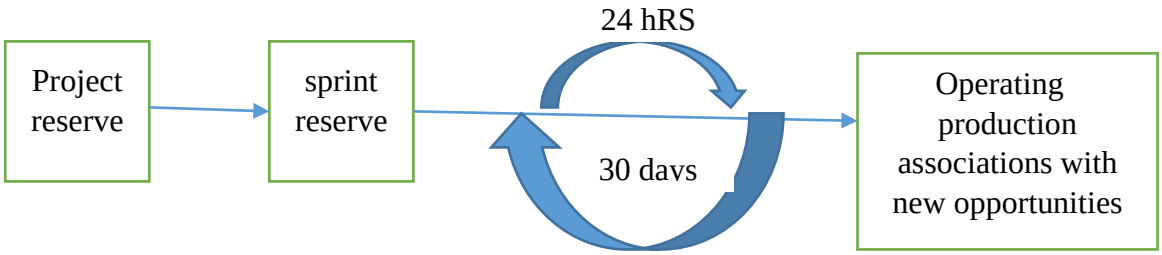

Figure 3. Scrum processes
Source: generated by the authors

The choice of requirements format depends on a number of factors, in particular, the size of the enterprise, the size and importance of the project, historical traditions, the wishes of the developers, and much more. It is worth considering that the method of continuous improvement of the service using Business Intelligence for SaaS does not imply the choice of any specific requirements description format. After the Product Owner has described all the necessary requirements to eliminate those identified at the stage of analyzing the existing state of the service and at the stage of analyzing the possible causes of problems, the requirements, together with the sprint and project reserves (backlogs), are transferred to development. And at the end of the sprint, the changes will be implemented into the system (Peter, P.W., Namusonge, M., Waema, C., & Ngonzo, C.L. (2014)). The development team in the continuous service improvement method using the Scrum development methodology has the following characteristics: 1. they are self-organized. No one (not even the Scrum Master) can tell the Team how to create Increments of working functionality from the Product Backlog. 2. Development Teams - Cross functional, have all the skills needed to develop a Product Increment. 3. Scrum does not recognize any other positions in the Development Team other than Developer, regardless of the type of work performed by the person; this rule has no exceptions. 4. The Development Team does not have sub-teams that would perform separate functions, such as a testing team or a business analysis team. 5. Individual members of the Development Team may have specialized knowledge in various areas, but the responsibility lies with the entire Development Team as a whole.

6. Optimal composition: 3-9 people. If there are less than three people in the Development Team, the interaction decreases, which leads to a decrease in productivity. A small team may run out of skills during the Sprint, preventing them from completing work on a potentially release-ready Product Increment. If there are more than nine people in the Team, more efforts will be required to coordinate their work. Large Development Teams create too many complexities to manage the empirical process. The Product Owner and Scrum Master roles do not count towards the size of the Development Team unless they are performing work from the Sprint Backlog (Solomon, Michael, R., Marshall, Greq, W., & Stuart, Elnora, W., " (2009)). The team is responsible for developing the product in iterations (sprints). The team determines independently: - the duration of the sprint; –

command capacity; the size of its focus factor (coherence coefficient); the complexity of the requirements that will be implemented in the sprint; - sequencing of tasks and much more. The use of Scrum for development is especially relevant for SaaS applications, both in the early stages, when it is possible to launch a project with the implementation of only minimal functionality, and in later stages, after improving a small part of the project without developing all other parts of it. Sprint consists of four processes: 1. planning. At this stage, the backlog is checked and determines what tasks can be completed during the sprint, and determines the composition of the development team for the current sprint. 2. Implementation. At this stage, the code for the required functionality is written. In an ideal team, many processes occur in parallel, for example, the developer writes the code, and the tester simultaneously tests the application. 3. Release. At the current stage, the implemented functionality is deployed, after which this functionality becomes visible to the end user. To improve the quality of the release in the enterprise, it is recommended to implement a release management process. The parts of the release management process are – the reference software library, which stores copies of all software in use; – a stock of accessories and documentation for quick resolution of hardware problems. The implementation of the Release Management process allows you to: – make changes to the IT environment without compromising the quality of service; – reduce the number of incidents caused by the incompatibility of new systems with installed hardware and software; - thorough testing of new IT solutions allows you to identify and prevent potential questions and problems among users; – reduce the number of uncontrolled versions of software in the IT environment and thereby prevent the risks associated with the use of unlicensed software; – prevent loss of original software files (Majed Mahbashi, (2007)).

4. Retrospective. The team discusses the sprint and the problems encountered during the implementation. This process is about deciding how to improve performance in the next sprint. Summing up, we can say that the method of continuous improvement of service using Business Intelligence for SaaS applications does not impose requirements on technical support. This means that the method is not tied to any programming language, does not impose requirements on the server side of the application, or on the Data Base Management System (DBMS) (Majed Mahbashi, (2007)).

Analysis of the results of the implemented changes. This phase should only begin after sufficient time has elapsed so that it can be assessed whether the problem has been eliminated, whether efficiency has been improved or not. This means that this process should proceed independently of how the rest of the stages of this method of continuous improvement of services go. In other words, this process is carried out in parallel with other processes. The timing of when this process begins should be determined by the project manager and depends on a number of factors including the subject area, the size and scope of the change, how many users are affected, and many others. This is done for the reason that in SaaS the effectiveness of the received changes can be found out only on a sample sufficient for analysis. That is, it is necessary to conduct analytical monitoring of the reaction of as many users as possible. The methods used to analyze the results obtained after implementation may be the same as those used in the first stage of the continuous improvement method McCabe, S. (2014).

As a rule, this process is as follows: the same indicator is selected that was taken into account at the stage of analysis of the existing service organization, but now this indicator includes the sample that was after the implementation of the change. If the situation is better than it was before the implementation of the changes, then an analysis is carried out in the context of the entire service, as was done at the first stage. If the analyst sees that the efficiency of the entire system does not fall from this process, then it is concluded that the problem has been eliminated, otherwise, the problem has not been eliminated and another attempt will be made to eliminate it. The ideal option is one in which the efficiency of an IT service not only does not fall, but, on the contrary, increases, but this may not always happen, due to various specific features of a particular module that has been

processed. If we talk about the technical implementation of this step, then, most often, it begins directly with the construction of an OLAP cube. However, if the developers have reworked certain data in the database that were affected in the OLAP cube before the changes were implemented, then it is necessary to use the ETL tool to convert the data to bring it to its current form and only after that proceed to building the OLAP cube and analytical monitoring. In parallel with the analysis of the results of the implemented changes, the presented method of continuous improvement of the IT service returns to the first step. At the same time, it should be noted that the current stage begins only after a new version of the IT service is released, and in parallel with the analysis of the results obtained, after the problem is eliminated, it is necessary to analyze the system again to identify problems. But it is worth mentioning that at this stage, the part that was implemented in the last release should be thrown out of the general consideration, since it is impossible to determine its effectiveness on such a small sample. In other words, there is a formation of a constant cycle (circle) of continuous improvement of the service. That is, if we have released a new version of the product, then the next step will be to return to the first step of the method, where we must re-determine the current state of the service and identify all problems. However, we should not consider the just released part of the functionality of the service. It is thanks to this step that the continuity of service improvement is formed (Naliaka, V.W., & Namusonge, G.S. (2015)).

The results of this study are summarized as follows:

1) This study presents a clear and simplified concept for solving all the tasks mentioned in this study;

2) Submitting a proposal to solve the problem of improving services within the company by using business intelligence tools;

3) This study presents a data flow diagram that selects the appropriate agile process for that purpose;

4) This study presented a partial development of the system in force in the company.

The scientific addition to this study lies in clarifying the role of business intelligence in shaping the company's development strategy and Submitting a proposal to solve the problem of improving services within the company by using business intelligence tools; in same time this study presents a data flow diagram that selects the appropriate agile process for that purpose.

Discussion. The study of quality management in various sectors of the economy, particularly in healthcare, is becoming increasingly relevant in the context of the development of modern information technologies and business analytics. Mansour, Yasser Mansour Haj Rashid [1] provides a detailed analysis of quality management in Jordan's healthcare sector, emphasizing the need for modern approaches to improve the efficiency and quality of medical services. He highlights that business analytics can facilitate the optimization of healthcare processes through data systematization and the implementation of innovations.

Other authors, such as Abu Nabaa, Abdel Aziz and Massad, Fawzia [2], Banday, Shabir Hassan and Nusair, Talal [3], Paul, F. [6], and Goetsch, David L. and Davis, Stanley B. [8], expand on the topic of quality management in various business and industrial sectors using business analytics tools. These studies show how analytical tools can help identify key performance indicators, improve the quality of products and services, and make data-driven management decisions.

In particular, Bezverkhyi, K., Hnylytska, L., Yurchenko, O., and Poddubna, N. [4] examine the analytical procedures of integrated reporting audit of corporate enterprises in the context of business analytics. They emphasize the importance of integrating financial and non-financial indicators into the reporting system for a comprehensive assessment of enterprise performance.

Jeamoon, M.J. [5] explores the application of business analytics in public administration to improve the efficiency of organizational commitments. The use of these technologies helps enhance the transparency of management processes and increase the effectiveness of public institutions.

Jun, M., Cai, S., & Shin, H. [7] analyze the implementation of Total Quality Management (TQM) in maquiladora production processes, highlighting the importance of integrating quality management approaches with modern technologies and business analytics.

Nazarova, K.O., and others [22] study risk management in companies based on non-financial and financial reports using business analytics, which allows for a more detailed examination of the impact of external and internal factors on a company's operations. Shygun, M.M., and others [23] focus on digital formats for presenting financial information as the basis for analysis and audit of business activities. This underscores the importance of modern technologies for improving quality management and auditing.

Thus, the application of business analytics in various sectors and contexts, from healthcare to public administration, is a key element for enhancing the quality and efficiency of management processes and decision-making.

Conclusion. Because of the work of the authors, the concept of the method of continuous improvement of the service using Business Intelligence technology was formed, taking into account the specifics of enterprises offering SaaS solutions. It was also found that when using this method, the recommended development methodology is SCRUM. The result of this scientific work is a method for continuous improvement of IT services using Business Intelligence for enterprises offering SaaS solutions, which solves the identified problems in existing methods of continuous improvement. The method presented in the paper consists of the following steps: – analysis of the existing state of the service and identification of bottlenecks; – analysis of possible causes of problems; formation of requirements for the improvement of the service; development of a part of the system, including troubleshooting; – analysis of the results of the implemented changes; – definition of new measurable criteria and data collection. The developed method was used at one company. During the practical testing of this method, the identified problem of training manuals in the company SaaS platform was eliminated. In addition, a number of positive effects from the introduction of this method in the enterprise were identified. These include the following: – increasing the quality of requirements formation; – improved response to business needs; – reduction of costs and negative impact on the implementation of changes;

– improving the quality of information on the status of services, as well as improving various metrics. – improving the quality of personnel work;

- increasing the competitiveness of the enterprise, for and maintaining the service up to date. As a further development of the proposed method of continuous improvement of the service using Business Intelligence for enterprises offering SaaS solutions, Data Mining technologies can be used to better analyze the current state of the service and identify bottlenecks, as well as to analyze the results of the implemented changes through continuous improvement. Moreover, keeping the service up to date. As a further development of the proposed method of continuous improvement of the service using Business Intelligence for enterprises offering SaaS solutions, Data Mining technologies can be used to better analyze the current state of the service and identify bottlenecks, as well as to analyze the results of the implemented changes.

References

1. Mansour, Yasser Mansour Haj Rashid (2020). Total Quality Management in the Jordanian Health Sector: A Comparative Field Study, PhD thesis in Public Administration, University of Baghdad, unpublished.
2. Abu Nabaa, Abdel Aziz and Massad, Fawzia (2010). Towards the Application of Total Quality Management: An Exploratory Study of the Opinions of a Sample of Deans and Students of Al-Ahliyya Amman University, *Journal of Administration and Economics*, Al-Mustansiriya University, Issue 27.
3. Banday, Shabir Hassan & Nusair, talal (2020). Application of total Quality management in Educational institutions, *Economic Horizons*, Vol. 23, No. 90.
4. Bezverkhyi, K., Hnylytska, L., Yurchenko, O., & Poddubna, N. (2023). Analytical procedures of the audit of integrated reporting of corporate enterprises. *Financial and Credit Activity Problems of Theory and Practice*, № 3(50), pp. 87–101. https://doi.org/10.55643/fcaptp.3.50.2023.4045.
5. Jeamoon, M.J. (2000). Organizational commitment revisited in new publicmanagement: motivation, organizational culture, sector, and managerial level, *Public Performance & Management Review Journal*, 24 (2), pp. 177-194.

6. Paul, F. (2004). Quality management as a systematic management philosophy for Use in non-profit organizations, (Unpublished masterthesis), Capella University, USA.
7. Jun, M., Cai, S., & Shin, H. (2006). TQM practice in Maquiladora: antecedents of employee satisfaction and loyalty, *Journal of Operations Management*, 24 (6), 791-812.
8. Goetsch, David L. & Davis, Stanley B. (1997). Introduction to total Quality, Quality management for production processing and services (2nd ed.), New Jersey, Prentice Hall.
9. Bounds,Greg & yorks, Lyle & Adams, meland & Ranney, Gipsie (1994). Beyond Total Quality management, U.S.A, MC Graw- HiLL.
10. Al-Qazzaz, Ismail Ibrahim and Abdul-Malik, Adel (2004). Self-evaluation and the process of continuous improvement, according to the guidelines of ISO 9004: 2000, 1st Edition, Baghdad, Al-Mashhadani Office for Printing and Reproduction.
11. Ranjith,V. (2016). Business Models and Competitive Advantage. *Procedie Economics and Finance*, Volume 37, pp. 203-207. https://doi.org/10.1016/s2212-5671(16)30114-9.
12. Russell, S, Roberta & Taylor, W, Bernard. (2009). Operations Management: Focusing on Quality & Competitiveness. 6th edition. New Jersey. Prentice – Hall Inc.
13. Sekaran, & Bougie, (2010). Research Methods for Business A Skill-Building Approach. 4th Edition, John Wiley & Sons, New York.
14. Solomon, Michael, R., Marshall, Greq, W., & Stuart, Elnora, W. (2009) Marketing: Real People, Real Choices. 6th edition, New Jersey. Prentice – Hall Inc.
15. Jassar, A. T. A. (2023). Forming commands for voice control in kaldi environment based on jspeech grammar format technology. *Journal of Theoretical and Applied Information Technology*, Volume 101(13). Pp. 5085-5093. URL: http://www.jatit.org/volumes/Vol101No13/2Vol101No13.pdf.
16. Westland, J. (2006). The project management life cycle: A Complete Step-By-Step Methodology for Initiating, Planning, Executing & Closing a Project Successfully (1 ed.). United Kingdom: Kogan Page Limited.
17. Peter, P.W., Namusonge, M., Waema, C., & Ngonzo, C.L. (2014). Competitive Strategies' Effects on the Market Share of Independent Petroleum Companies in Kenya. *International Journal of Innovative Research and Development*, Volume 3(5), pp. 149-153.
18. Majed Mahbashi, (2007). Benefits & Difficulties in Implementing TQM in the Construction Industry, College of Environmental Design, King Fahd University of Petroleum & Minerals.
19. McCabe, S. (2014). Quality improvement techniques in construction: principles and methods: Routledge.
20. Nee, P.A. (1996). ISO 9000 in construction: John Wiley & Sons.
21. Naliaka, V.W., & Namusonge, G.S. (2015). Role of Inventory Management on Competitive Advantage among Manufacturing Firms in Kenya: A Case Study of UNGA Group Limited. I*nternational Journal of Academic Research in Business and Social Sciences*, Volume 5(5), pp. 87-104.
22. Nazarova, K., Bezverkhyi, K., Hordopolov, V., Melnyk, T., & Poddubna, N. (2021). Risk analysis of companies' activities on the basis of non-financial and financial statements. *Agricultural and Resource Economics: International Scientific E-Journal*, Volume *7*(4), pp. 180-199. https://doi.org/10.51599/are.2021.07.04.10.
23. Shygun M., Bezverkhyi K., Pylypenko O., Yurchenko O., & Poddubna N. Presenting financial information in digital formats as a base for analysis and audit of business activities of enterprises. *Financial and Credit Activity Problems of Theory and Practice*, 2023, Volume 6(53), pp. 233–246. https://doi.org/10.55643/fcaptp.6.53.2023.4165.
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Бізнес-аналітика та її роль у підвищенні рівня корпоративних послуг

Анотація. Штучний інтелект почав проявляти себе у всіх сферах мінливого бізнес-світу. З впровадженням нових технологій в цифрову епоху, бізнес-структури повинні адаптуватися до нових проектів і підвищувати продуктивність бізнес-процесів. Метою цього дослідження є з'ясування шляхів використання інструментів бізнес-аналітики для підвищення та збільшення рівня послуг всередині компаній. В результаті поставленої мети нами були визначені наступні завдання: 1) з'ясувати роль бізнес-аналітики у формуванні стратегії розвитку компанії; 2) подати пропозиції щодо вирішення проблеми вдосконалення послуг всередині компанії за допомогою засобів бізнес-аналітики; 3) розкрити схему побудови бізнес-аналітики (BI) в компанії.

Це дослідження представляє концепцію бізнес-аналітики та її значення для підвищення рівня надання послуг у компаніях. З цією метою був використаний курс Демінга, щоб знайти і запропонувати деякі рішення, представлені в процесі прийняття кінцевих рішень щодо процесу покращення та надання послуг компаніям. Іншими словами, допомога генеральному менеджеру побачити те, що приховано від ока, залежно від даних та методів їх обробки. На додаток до вищесказаного, етапи, які беруть участь у процесі розробки, були показані у вигляді діаграми потоків даних, відомої як Data Flow Diagram (DFD) для системи, яка використовується всередині компанії.

Результати цього дослідження узагальнені наступним чином: а) це дослідження представляє чітку та спрощену концепцію для вирішення всіх завдань, згаданих у цьому дослідженні; б) подання пропозиції щодо вирішення проблеми покращення послуг всередині компанії за допомогою інструментів бізнес-аналітики; в) це дослідження представляє діаграму потоків даних, яка обирає відповідний гнучкий процес для цієї мети; г) це дослідження представило часткову розробку системи, що діє в компанії.

Ключові слова: *аналіз, BI-аналіз, бізнес-аналітика, вдосконалення, процес, важливість, сервіс, рішення, корпоративна соціальна відповідальність.*

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Список літератури

1. Mansour, Yasser Mansour Haj Rashi. Total Quality Management in the Jordanian Health Sector: A Comparative Field Study, PhD thesis in Public Administration, University of Baghdad, unpublished. 2020.
2. Abu Nabaa, Abdel Aziz and Massad, Fawzia. Towards the Application of Total Quality Management: An Exploratory Study of the Opinions of a Sample of Deans and Students of Al-Ahliyya Amman University, *Journal of Administration and Economics*, Al-Mustansiriya University, 2010. Issue 27.
3. Banday, Shabir Hassan & Nusair, talal. Application of total Quality management in Educational institutions, *Economic Horizons*, 2020. Vol. 23, No. 90.
4. Bezverkhyi, K., Hnylytska, L., Yurchenko, O., & Poddubna, N.. Analytical procedures of the audit of integrated reporting of corporate enterprises. *Financial and Credit Activity Problems of Theory and Practice*, 2023. № 3(50), pp. 87–101. https://doi.org/10.55643/fcaptp.3.50.2023.4045.
5. Jeamoon, M.J. Organizational commitment revisited in new publicmanagement: motivation, organizational culture, sector, and managerial level, *Public Performance & Management Review Journal*, 2000. 24 (2), pp. 177-194.
6. Paul, F. Quality management as a systematic management philosophy for Use in non-profit organizations, (Unpublished masterthesis), Capella University, USA. 2004.
7. Jun, M., Cai, S., & Shin, H. TQM practice in Maquiladora: antecedents of employee satisfaction and loyalty, *Journal of Operations Management*, 2006. 24 (6), 791-812.
8. Goetsch, David L. & Davis, Stanley B. Introduction to total Quality, Quality management for production processing and services (2nd ed.), New Jersey, Prentice Hall. 1997.

9. Bounds,Greg & yorks, Lyle & Adams, meland & Ranney, Gipsie. Beyond Total Quality management, U.S.A, MC Graw-HiLL. 1994.
10. Al-Qazzaz, Ismail Ibrahim and Abdul-Malik, Adel. Self-evaluation and the process of continuous improvement, according to the guidelines of ISO 9004: 2000, 1st Edition, Baghdad, Al-Mashhadani Office for Printing and Reproduction. 2004.
11. Ranjith,V. Business Models and Competitive Advantage. *Procedie Economics and Finance*, 2016. Volume 37, pp. 203-207. https://doi.org/10.1016/s2212-5671(16)30114-9.
12. Russell, S, Roberta & Taylor, W, Bernard. Operations Management: Focusing on Quality & Competitiveness. 6th edition. New Jersey. Prentice – Hall Inc. 2009.
13. Sekaran, & Bougie. Research Methods for Business A Skill-Building Approach. 4th Edition, John Wiley & Sons, New York. 2010.
14. Solomon, Michael, R., Marshall, Greq, W., & Stuart, Elnora, W. Marketing: Real People, Real Choices. 6th edition, New Jersey. Prentice – Hall Inc. 2009.
15. Jassar, A. T. A. Forming commands for voice control in kaldi environment based on jspeech grammar format technology. *Journal of Theoretical and Applied Information Technology*, 2023. Volume 101(13). Pp. 5085-5093. URL: http://www.jatit.org/volumes/Vol101No13/2Vol101No13.pdf.
16. Westland, J. The project management life cycle: A Complete Step-By-Step Methodology for Initiating, Planning, Executing & Closing a Project Successfully (1 ed.). United Kingdom: Kogan Page Limited. 2006.
17. Peter, P.W., Namusonge, M., Waema, C., & Ngonzo, C.L. Competitive Strategies' Effects on the Market Share of Independent Petroleum Companies in Kenya. *International Journal of Innovative Research and Development*, 2014. Volume 3(5), pp. 149-153.
18. Majed Mahbashi, Benefits & Difficulties in Implementing TQM in the Construction Industry, College of Environmental Design, King Fahd University of Petroleum & Minerals. 2007.
19. McCabe, S. Quality improvement techniques in construction: principles and methods: Routledge. 2014.
20. Nee, P.A. (1996). ISO 9000 in construction: John Wiley & Sons.
21. Naliaka, V.W., & Namusonge, G.S. Role of Inventory Management on Competitive Advantage among Manufacturing Firms in Kenya: A Case Study of UNGA Group Limited. I*nternational Journal of Academic Research in Business and Social Sciences*, 2015. Volume 5(5), pp. 87-104.
22. Nazarova, K., Bezverkhyi, K., Hordopolov, V., Melnyk, T., & Poddubna, N. Risk analysis of companies' activities on the basis of non-financial and financial statements. *Agricultural and Resource Economics: International Scientific E-Journal*, 2021. Volume *7*(4), pp. 180-199. https://doi.org/10.51599/are.2021.07.04.10.
23. Shygun M., Bezverkhyi K., Pylypenko O., Yurchenko O., & Poddubna N. Presenting financial information in digital formats as a base for analysis and audit of business activities of enterprises. *Financial and Credit Activity Problems of Theory and Practice*, 2023, Volume 6(53), pp. 233–246. https://doi.org/10.55643/fcaptp.6.53.2023.4165.
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