ЭКОНОМИКА

PROCESS MINING AS THE LATEST TOOL OF PROCESS MANAGEMENT

K. M. Antonov, V. A. Ivanova

The article is focused on the Process Mining technology as a tool for the analysis and optimization of business processes. The principles of Process Mining, its main forms and methods are discussed, and the maturity of this technology in the context of the current development of science and practice is assessed. Particular attention is paid to identifying the areas in which Process Mining is the most effective, including manufacturing, finance, healthcare, logistics and telecommunications.

Keywords: business process analysis, manual optimization, event logs, automated process.

In today's highly competitive environment, business needs to constantly evolve and adapt to today's standards. The pandemic and the trend toward digitalization have changed consumer behavior, making online interactions mandatory for many companies. Therefore, it is important to maintain and improve service quality, convenience and personalization, as well as reduce the number of clicks before receiving a service to meet the fast-growing consumer demands of the pandemic. Companies are now trying to quickly improve their business models to successfully adapt to new market demands.

Many companies that are actively addressing the issue of business process optimization face the challenge of obtaining information about their current processes. It can be proved with the survey conducted by the authors of the paper. In that survey specialists in the field of business process optimization have been asked several questions, one of them being: "What problems do companies face in manual optimization of business processes?". The results of the survey are presented in Figure 1.
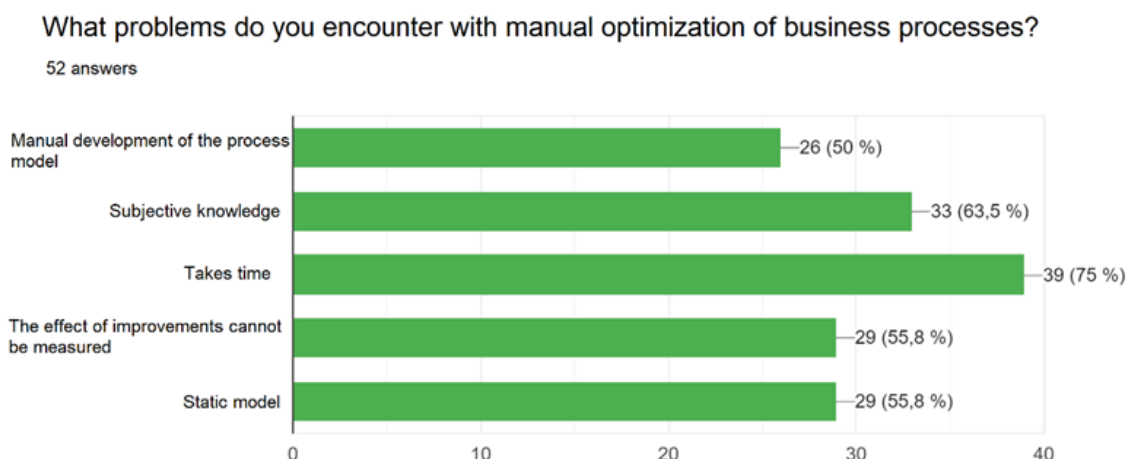

Fig. 1 - The results of the survey of the specialists in the field of Business Process Optimization

The analysis of these results shows that manual optimization of business processes has many limitations, such as the need for detailed documentation, the employees limited knowledge, the difficulty of

the improvements effect measuring and the rapid obsolescence of process models.

In this context, Process Mining is an innovative solution that automates the analysis and optimization of business processes, making them more transparent, measurable and efficient. Application of Process Mining in companies can significantly improve the management of business processes, reduce costs and increase competitiveness in the market.

Process Mining is a relatively young field of research that deals with the extraction, monitoring and improvement of real processes. It combines the principles of computational intelligence, data mining, and process modeling, providing new opportunities for automating and optimizing business processes.

The essence of Process Mining is the analysis of the event logs available in modern information systems. These events are sequentially recorded actions related to the execution of a process. The analysis of event logs reveals new knowledge that can be used to automate, monitor and improve processes.

It is important to note that event logs can include additional event data. Process Mining methods use these additional event attributes to perform more in-depth analysis of processes. For example, the attributes may contain information about resources such as set of tools or equipment, event timestamps, or specific event-related data such as order amount. The use of these additional attributes allows for more accurate and detailed analysis of processes in order to optimize them [5].

As shown in Figure 2, event logs can be used to perform three forms of Process Mining: process discovery, conformance checking, and process enhancement:

1. Process discovery refers to as automatically building process models based on event logs with no a priori information. Organizations quickly and accurately obtain models of existing processes, which facilitates process improvement.

2. Conformance checking is mapping the process model to the event log, assessing their conformance. It is applicable to different models and identifies outliers, which in its turn allows for model adjustments or process changes.

3. Process enhancement is defined as improving process models using information from event logs. In contrast to conformance checking, here models are adapted to new conditions and optimized based on current data.
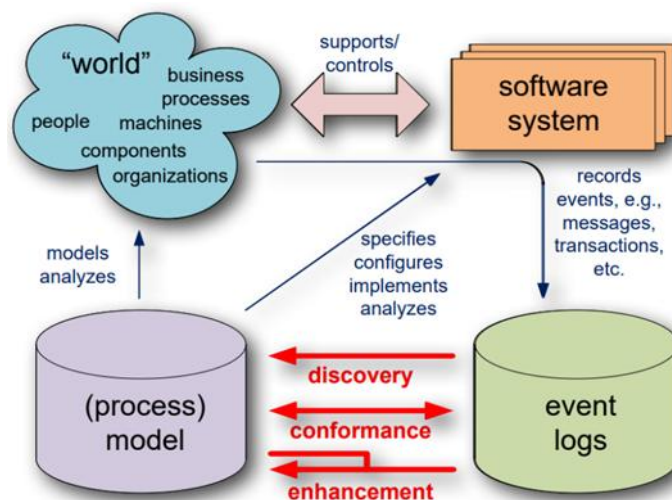

Fig. 2 - Positioning of the three main forms of Process Mining [5].

Process Mining technology offers organizations a powerful tool for automated process learning and optimization based on event log analysis. It identifies and eliminates bottlenecks, improves processes and organizational structure, and reduces

costs and increases the efficiency of business processes.

According to a joint study by PwC and ABBYY [3] the level of penetration of Process Mining in Russia may reach 50% by 2024. Sixteen per cent of the respondents already use the technology for at least one process or are in the process of implementation, 6% of the companies surveyed are already running pilot projects using the Process Mining technology, and 29% of the companies are going to start using it in the next three years. The results of the survey are shown in Figure 3.
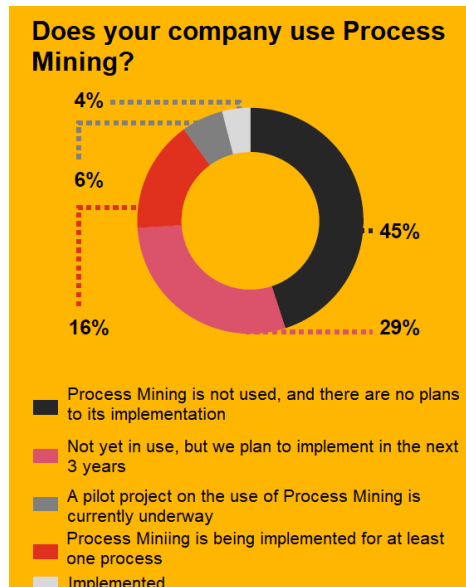

Does your company use Process Mining?

- 4%
- 6%
- 16%
- 29%
- 45%

■ Process Mining is not used, and there are no plans to its implementation

■ Not yet in use, but we plan to implement in the next 3 years

■ A pilot project on the use of Process Mining is currently underway

■ Process Miniing is being implemented for at least one process

■ Implemented

Fig. 3 - A detailed survey of the use of Process Mining technology in Russia [3].

Process Mining technology, despite its relative novelty, has shown maturity due to active research in the field of computational intelligence, data analysis and process modeling. Numerous methods and algorithms have been developed to work with event log data, enabling the discovery, control and improvement of real-world processes.

One of the indicators of technology maturity is the ability to automatically retrieve processes without prior information. This provides fast and accurate reconstruction of the models of existing processes, which confirms the applicability and effectiveness of the technology in various areas of activity, but the successful use of Process Mining requires the development of professional competencies and the creation of standards for the application of the technology.

Despite the current maturity of the technology, additional research and innovation can enhance the capabilities and applicability of Process Mining, making it an even more powerful tool for analyzing and managing business processes.

Process Mining technology has proven its effectiveness in a variety of industries where processes are well structured and easily traceable. Manufacturing, finance, healthcare, logistics, telecommunications, and the public sector are examples of areas where this technology has been successfully used to optimize processes and increase efficiency.

A major factor in the success of Process Mining is the availability of detailed and structured process data. However, it is also important that the organization is prepared to change, adapt and integrate the results of the analysis into its operations. This can include changing the corporate culture, training employees, and implementing new technologies [2].

In the future, improvements in Process Mining algorithms and tools will make the technology even more accessible and applicable to a wide range of industries, thus significantly improving the effi-

ciency of business processes and helping organizations achieve their goals. The application of Process Mining in various industries helps companies strengthen their market position, improve their competitiveness and adapt to the changing world. Effective use of technology can be the key to success in modern business [1, 4]. With rapidly changing external and internal factors, organizations are adapting by improving information systems and transforming business processes. A dynamic business requires qualitative changes to improve competitiveness.

In conclusion it should be emphasized that manual improvement of business processes is a very long and time-consuming work, which entails many problems, and after some time can lose relevance. Despite the fact that Process Mining is a relatively new technology, it is already capable of helping to improve business processes. The conducted studies show that Process Mining technology confirms its maturity and can be confidently applied to improve business processes of various enterprises.

References

1. *Vorob'ev V. V.* Business Process management using Process Mining technology / V. V. Vorob'ev // Nauchnye issledovaniya, razrabotki i prakticheskie vnedreniya: materialy VII Mezhdunarodnoj nauchno-prakticheskoj konferencii, Stavropol', 31 yanvarya 2022. CHast' 1. [Scientific research, development and practical implementation: materials of the VII International Scientific and Practical Conference, Stavropol, January 31, 2022. Vol. 1.]. – Stavropol': Obshchestvo s ogranichennoj otvetstvennost'yu "Stavropol'skoe izdatel'stvo "Paragraf", 2022. – P. 397-400. (In Russ.)

2. Issledovanie «Strah oblakov» [Research "Fear of clouds"]. [Electronic resource] // abbyy.com. – URL: https://www.abbyy.com/ru/cross-industry-conference-may-2021 (last request: 08.10.2023). (In Russ.)

3. Issledovanie «Process Mining: preodolenie bar'erov na puti k uspekhu» [Research "Process Mining: overcoming barriers to success"]. [Electronic resource] // pwc.ru. – URL: https://www.pwc.ru/ru/publications/process-mining-2021.html (last request: 10.10.2023). (In Russ.)

4. *Novoshinskij S. G.* Smart-tekhnologii i business process Mining kak novye mekhanizmy resheniya biznes-problem [Smart technologies and business process Mining as new mechanisms for solving business problems]. / S. G. Novoshinskij, L. N. Korpacheva, A. V. Fedorova // Industriya 5.0, cifrovaya ekonomika i intellektual'nye ekosistemy (EKOPROM-2021) : Sbornik trudov IV Vserossijskoj (Nacional'noj) nauchno-prakticheskoj konferencii i XIX setevoj konferencii s mezhdunarodnym uchastiem, Sankt-Peterburg, 18–20 noyabrya 2021. [Industry 5.0, Digital Economy and Intellectual Ecosystems (ECOPROM-2021) : Proceedings of the IV All-Russian (National) Scientific and Practical Conference and the XIX Network Conference with International Participation, St. Petersburg, November 18-20, 2021]. – Sankt-Peterburg: POLITEKH-PRESS, 2021. – P. 702-705. – DOI 10.18720/IEP/2021.3/202. (In Russ.)

5. Process Mining Manifesto. [Electronic resource] // researchgate.net. – URL: https://www.researchgate.net/publication/221585990 (last request: 20.09.2023).

Antonov Kirill Maximovich — Master's student, gr. BI-21m, The Bonch-Bruevich Saint-Petersburg State University of Telecommunications (St. Petersburg, Russia), antonov.kirill.bi83@gmail.com

Ivanova Viktoriia Alexandrovna — Senior Lecturer of the Foreign and Russian Languages Department, The Bonch-Bruevich Saint-Petersburg State University of Telecommunications (St. Petersburg, Russia), victoriia-888@yandex.ru

ИНТЕЛЛЕКТУАЛЬНЫЙ АНАЛИЗ ПРОЦЕССОВ КАК НОВЕЙШИЙ ИНСТРУМЕНТ УПРАВЛЕНИЯ ПРОЦЕССАМИ

К. М. Антонов, В. А. Иванова

Статья посвящена технологии Process Mining как инструменту анализа и оптимизации бизнес-процессов. Обсуждаются принципы Process Mining, его основные формы и методы, а также оценивается зрелость этой технологии в контексте современного развития науки и практики. Особое внимание уделяется выявлению областей, в которых анализ процессов наиболее эффективен, включая производство, финансы, здравоохранение, логистику и телекоммуникации.

Ключевые слова: анализ бизнес-процессов, ручная оптимизация, журналы событий, автоматизированный процесс.

Список источников и литературы

1. *Воробьев В. В.* Business Process management using Process Mining technology / В. В. Воробьев // Научные исследования, разработки и практические внедрения: материалы VII Международной научно-практической конференции: в 2 ч., Ставрополь, 31 января 2022 года. Vol. Часть 1. – Ставрополь: Общество с ограниченной ответственностью "Ставропольское издательство "Параграф", 2022. – С. 397-400.

2. Исследование «Страх облаков». [Электронный ресурс] // abbyy.com. – URL: https://www.abbyy.com/ru/cross-industry-conference-may-2021 (дата обращения: 08.10.2023).

3. Исследование «Process Mining: преодоление барьеров на пути к успеху.» [Электронный ресурс] // pwc.ru. – URL: https://www.pwc.ru/ru/publications/process-mining-2021.html (дата обращения: 10.10.2023).

4. *Новошинский С. Г.* Smart-технологии и business process Mining как новые механизмы решения бизнес-проблем / С. Г. Новошинский, Л. Н. Корпачева, А. В. Федорова // Индустрия 5.0, цифровая экономика и интеллектуальные экосистемы (ЭКОПРОМ-2021) : Сборник трудов IV Всероссийской (Национальной) научно-практической конференции и XIX сетевой конференции с международным участием, Санкт-Петербург, 18–20 ноября 2021 года. – Санкт-Петербург: ПОЛИТЕХ-ПРЕСС, 2021. – С. 702-705. – DOI 10.18720/IEP/2021.3/202.

5. Process Mining Manifesto. [Электронный ресурс] // researchgate.net. – URL: https://www.researchgate.net/publication/221585990 (дата обращения: 20.09.2023).

Антонов Кирилл Максимович — магистрант, группа БИ-21м, Санкт-Петербургский государственный университет телекоммуникаций им. проф. М. А. Бонч-Бруевича, antonov.kirill.bi83@gmail.com

Иванова Виктория Александровна — старший преподаватель кафедры иностранных и русского языка, Санкт-Петербургский государственный университет телекоммуникаций им. проф. М. А. Бонч-Бруевича, victoriia-888@yandex.ru

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