

DIGITAL TRANSFORMATION AND INTRODUCTION OF ARTIFICIAL INTELLIGENCE IN A BULGARIAN COMMERCIAL BANK IN THE CONTEXT OF BUSINESS PROCESS IMPROVEMENT

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Abstract: The purpose of this paper is to conceptualize the relationship between Business Process Improvement (BPI) and digital transformation and introduction of AI in a Bulgarian commercial bank. Using the theoretical framework of Business Process Management this paper aims to examine the role of digitalization in improving the business processes in a bank. Furthermore, the paper discusses the idea of Business Process Improvement aimed to ensure that organizations systematically integrate emerging opportunities, such as those brought about by digital technologies and artificial intelligence. Thus, a BPI method for proactively integrating opportunities like AI and digitalization into business processes is presented and analytically discussed. The methodology in the paper combines Business Process Management methods with Innovation Management methods, provides possibilities to identify opportunities resulting from digital technologies, AI and changing customer needs, and to integrate these opportunities into improved business processes with added value propositions. The application of digital transformation and AI is observed, studied and tested in a Bulgarian commercial bank in the context of business process improvement. The business processes covered in the AI implementation relate to: providing personalized banking information in a digital environment; selling certain banking, insurance, investment and non-financial products in the bank's mobile application; after sales service to individual customers; customer contact management in a digital environment, both in the branch network, as well as in the bank's customer service call centre; automation of internal banking processes with focus on management of communication and sales offers. The fully personalised digital assistant builds on automated banking processes and leverages the full range of data available to the bank to create digital experience that is entirely focused on the customer and their needs. The findings of this paper suggest that there is a need for banks to adjust the management of their business processes with innovation management if they are deliberate to foster innovations and to be sustainable. The implementation of AI in a commercial bank requires radical changes in the bank concept of BPM and a new methodology of business process improvement should be established and experimented. The conclusions of the paper confirm that a commercial bank basing on business process management can implement innovation management and AI thus fulfilling customers' expectations of digitalization and new value proposition.

Keywords: Digital Transformation, Artificial Intelligence, Business Process Management, Banking

1. INTRODUCTION

Business process improvement (BPI) is the highest value-added activity in the Business process management (BPM) lifecycle. Despite mature knowledge, many approaches are criticized for lacking guidance on how to apply process improvement in practice when rapid innovations should be implemented. Given the diversity of emerging digital technologies, organizations face great uncertainty regarding BPM methodologies. Therefore, this study discusses some BPI methods that assist bank organizations in leveraging the digitization and the AI potential of their business processes. The volatility of the interaction between the external environment and the bank often leads to understanding bank management not as a set of its various functions, but as a system of business processes that determine the meaning of its overall activities. The process approach in big commercial banks however encounters greater challenges in a dynamic technological environment aiming to develop digital innovation in each of its business processes. On the other hand, new technologies, such as blockchains, IoT, process mining, robotic process automation, artificial intelligence, virtual reality and 4D printing, have the potential to disruptively change business processes (Ahmad, Van Looy, 2020). With the rapid boom of new technologies (e.g., blockchains, Internet of Things (IoT) or artificial intelligence), organizations are struggling to take maximum advantage of new IT.

This research aims at studying the digital transformation and introduction of AI in a Bulgarian commercial bank based on theoretical research in the context of methodologies of Business process improvement such as Agile BPM, Intelligent BPM, Cognitive BPM. This context allows bank organizations to use both exploration and exploitation processes equally in improving their business processes and to introduce flexible methods for process improvement. Based on theoretical study, bank documentation, strategical papers and expert analysis exploration, the author examines three possible research hypotheses, as follows:

1. The implementation of AI in a commercial bank requires radical changes in the bank concept of BPM and a new methodology of business process improvement should be established to dramatically simplify processes through intelligent automation.
2. The implementation of AI in a commercial bank requires slight changes into the bank concept of BPM and the existing methodology of business process improvement should be corrected in a way to meet the innovation challenges.
3. The implementation of AI in a commercial bank follows the concept of BPM and the existing methodology of business process improvement should be strictly executed.

Business process management can be defined as a systematic approach to improving an organisation's business processes (including their design, implementation, control, analysis and optimisation) that combines management methods and techniques with IT tools. New banking technologies allow: customers to meet new needs for prompt, high-quality and affordable services at all levels; banks to minimize costs, attract new customers and increase the loyalty of existing customers; and the financial system to ensure dynamic development and stability. The concept of banking technologies unites such subsystems of the bank as "Information support", "Security and risks", "Optimization of business processes", "Management and marketing". These include: software that ensures daily implementation of current banking operations; special computer programs designed to manage communications with customers, other banks, market partners, state and fiscal authorities; elements of internal and external systems of information protection, databases, ATMs and self-service terminals; cash discipline and work of departments; internal procedures and models related to risk management; electronic document management systems linking the processes of planning, organization, and control of activities and ensuring continuous monitoring of executive discipline; procedures and regulations structuring individual operations and product sales; development of new channels of customer service, etc.

Innovations are carried out covering the following structural elements: existing formal and interpersonal business processes prescribed in the form of instructions, procedures, flow charts or diagrams; organizational structure, staffing and functional responsibilities of departments and employees involved in implementation; software and hardware, which serve to automate the conducted transactions and their accounting. Financial innovations affect all spheres of customer service - both retail business, working with individuals and individual entrepreneurs, and the sector of small and medium-sized enterprises, as well as work with large corporate clients - legal entities and budgetary organizations.

Examples of innovations for customers of different levels and needs include transition to new technologies of remote customer service. The share of transactions conducted in the bank's subdivisions (cash desks and operational centers) continues to steadily decline. A steady growth is demonstrated by the number of transactions in other service channels, which are more convenient for consumers: via Internet Bank, mobile applications, chats. Other banking innovations include confirmation of cooperation between the bank and the client through an offer, which opens up wide opportunities for further non-contractual relations, including lending among large clients. Banks are seeking to move away from low-margin non-standardized operations and to simplify product lines and business processes as much as possible in order to minimize their staff maintenance and training costs and reduce the labor intensity of transactions. Commercial banks develop opportunities to use artificial intelligence and machine learning to build CRM systems, analyze credit risks and improve scoring models.

Information technology-based solutions are key to business process improvement initiatives. With the traditional focus on process analysis and process modeling, IT solutions related to business process management are increasingly manifesting in the form of process-aware information systems (Dumas et al., 2013). Process awareness suggests that the software has an explicit match to the process to be executed. This whole category of software is often referred to as "information tailored to processes and in systems" (Dumas et al., 2013). The recent increase in information processing capacities of PAIS, e.g. through in-memory databases, enables the application of new process design principles, including real-time and context-aware process management (vom Brocke et al., 2014).

2. METHODOLOGY

Since the Commercial Bank Business Process Improvement Methodology (CBBPIM) is primarily a management and improvement tool, it includes the structure and content of the bank's core management systems. The bank's activities are viewed as a complete system, and its digitalization and AI introduction should follow the laws of a complex systems. The transformation of a system by solving exclusively local problems is not possible, it can take place only if the system is not always in a stable state and is considered as a whole.

The design and implementation of the process improvement approach in banking is quite a labour and resource intensive task. The AI implementation is executed by application of the process improvement approach to a large number of business processes at once. Thus the bank faces the lack of resources and the complexity of managing

such a large-scale project. A significant disadvantage of the process approach is the increased dependence of the bank's performance on the qualifications, personal and business qualities of employees and contractors. The classification of the bank's business processes is equally important. Its importance stems from the fact that management always needs a clear understanding of what processes are found in the activities of bank departments, what their functions are, and how they should be allocated by type in order to design a flexible system of business processes. One of the main approaches to classify all the processes performed by the bank in its activities is based on the role of these processes in creating new value.

Some authors propose to develop an agile BPM methodology to allow for efficient process analysis, flexibility, readiness for change and responsiveness. Thiemich and Puhlmann (2013) propose an integrated BPM project methodology framework that combines BPM with Scrum and focusses on the technical implementation of business processes. Martins and Zacarias (2017) propose an agile BPM methodology that contains three main steps – process discovery, supervision and assessment – and compare various BPM methodologies such as AGILIPO and Agile BPM Project.

Fig.1 Agile Methodology – The Agile Process



Von Rosing et al. (2015) connect agility and BPM by proposing an agile BPM method that includes four main areas – analysis, planning, design and building – where business goals, application goals and technology goals are part of analysis and planning. This method introduces the Kaizen principles of improvement to BPM with the goal that the BPM centre of excellence works quickly. Meziani and Magalhães (2009) propose AGILIPO as an agile BPM that facilitate rapid adoptions to a changing business environment.

3. RESULTS

Under case-study research is the Business process improvement methodology in the implementation of the first Digital AI Assistant in a leading Bulgarian commercial bank. The project implementation included business process improvement by Agile BPM methodology of the following processes:

- a. Providing personalized banking information in a digital environment;
- b. Selling certain banking, insurance, investment and non-financial products in the bank mobile application;
- c. After sales service to individual bank's customers;
- d. Customer contact management in a digital environment, both in the bank's branch network, as well as in the bank's customer service call centre;
- e. Automation of internal banking processes with focus on management of communication and sales offers.

The personal digital assistant in the Mobile app changed completely the customer banking model. Developed using state-of-the-art AI technology, it provided 24/7 personalised service in a digital environment through constantly self-learning artificial intelligence and use of data. As an important part of banks strategy the Digital AI Assistant played an important role in leveraging and implementing the latest technology solutions, such as artificial intelligence and cloud technology, in day-to-day customer communication and in key banking processes.

The fully personalised digital assistant built on automated banking processes and leveraged the full range of data available to the bank to create digital experience that is entirely focused on the customer and their needs. In response to the increasing digitalization and the need for a perfect customer experience, the Digital AI Assistant empowered customers for a personalized, independent and independent way to perform basic banking transactions and purchase

certain banking products entirely in a digital environment. At the same time, it started to communicate with bank employees through the operational CRM, again using machine learning based models, giving customer service advice and quotes on the most appropriate banking product.

The Digital AI Assistant's strategic goal was to unify all channels into one, setting the vision for digital banking of the future - a new super channel that combined direct and comprehensive sales, customer service and consulting processes across points in the customer journey. The development of the new generation personalised digital assistant stepped entirely on STP (Straight-through) processes, without the need for any human intervention. In this way, the latest technological advances were implemented in the organisation, leading to automation and higher efficiency in operational processes. As a true digital assistant, it started to communicate in Bulgarian through voice and text messages. In real time, it converted both speech-to-text at client's interaction, as well as "Text-to-Speech" when giving a response. The relationship with clients is two-way - in addition to the fact that they can contact her 24/7 at the app, she can also initiate communication with them at various points in the of their customer experience, again based on the data the bank has. Because of its proactivity and autonomy, in most scenarios, the customer can get the desired service entirely within one conversation in the mobile app, without visiting a bank branch or speaking to a Contact Centre. If necessary and desired on the customer's part, the AI Assistant can help schedule a day and time to visit an office or transfer to a chat with a bank employee. Clients can get assistance from it not only for banking, insurance, pension products and investment solutions, payments and use of cards, but also make banking transactions through the AI Assistant. The digital assistant helps not only customers but also employees in organising daily tasks, analysing information and allocating time in order to improve customer experience, not only in digital but also in physical channels.

The AI Assistant greatest strength was the personal assistance to be provided to each and every customer in the bank's Mobile's secure environment after logging into the app. It started to provide specific and accurate individual information to the client such as their IBAN, available account balance, date and amount of upcoming consumer installment loan and/or credit card, pending utility bill payments to his personal accounts, expiring debit/credit card, e-voucher, missed Systematic payment Investment Plan, verification of accumulated points to a credit card, etc. It can also be of assistance in other personal situations such as verification of earned income and expenditures made on a bank account for a client's desired period, or important ones, requiring quick action - blocking and unblocking cards.

This completely differentiates the AI Assistant from ordinary chat bots, which only give generic information and point to generic product data on the website, which lacks personal customer detail. Another feature of the AI Assistant is its ability to self-learn and understand more and more thanks to each new conversation, which is impossible with chat bots, which respond only to and on the basis of a preset script.

The AI Assistant high added value and uniqueness was due to the latest technological innovation solutions - its artificial intelligence used algorithms, powered by data based on customer interactions combined with information from different stored in the bank against regulatory requirements of the Bulgarian and European legislation.

The agile BPI methodology used in implementation of the AI Assistant was divided into phases for launch and subsequent continuous upgrading:

- a. Launch phase of AI Assistant for individual clients - selection and development of an initial set of processes, competencies and topics on which to assist clients, building cloud architecture, integrating with core banking systems, implementing technology to manage data, understanding natural language and developing cognitive skills.
- b. AI Assistant's development phase for individual clients - building on existing and adding new functionality to enhance and extend its capabilities, perform continuous monitoring and improvements to its responses to client needs
- c. Development and Deployment Phase for branch network colleagues and Contact Center as part of the bank's CRM solution for organizing daily tasks, information analysis and distribution of time
- d. Phase Development and implementation of AI Assistant for business customers - preliminary research of user attitudes and expectations, selection and development of topics on which it can assist business customers, integration with internal bank systems
- e. Growth phase (externally and internally) - promotion and adoption of the AI Assistant as a modern solution with real added value, part of the corporate culture and values of the organisation

Experts in the organisation with different profiles were involved at different stages:

- a. Technical development - product owners, scrum masters, programmers, IT architects, AI engineers, testers, IT experts, consultants;
- b. Business development - product and sales managers, business development managers, marketing and communications experts;

- c. Administrative and legal services - lawyers, regulatory experts compliance, GDPR and risk assessment;
- d. Change management - branch and customer service experts contact centre.

The leanly defined timeframe of the project required perfect communication and coordination of the work to accomplish individual tasks and micro phases of the project by engineering, business and consulting expert teams. An organization of work based on Agile best practices - clearly defined tasks and expected results, specific deadlines and people responsible for implementation, opportunities for management and resolution of obstacles. As a result, the different phases of project were delivered and implemented according to the set framework.

4. DISCUSSIONS AND CONCLUSIONS

In examining a particular case of implementation of artificial intelligence in Business process improvement in a commercial bank, it was observed the need to combine new knowledge and traditional activities that predetermines the consideration of any business process. The launch of the personal AI assistant was combined with big changes in business process management, especially at the phase of improving the business processes. The overall research verified the first hypothesis of the author that the implementation of AI in a commercial bank requires radical changes in the bank concept of BPM and a new methodology of business process improvement should be established and experimented. The application of BMI methodology for the purpose of this study to business process improvement in the banking sector is a contribution of the author, as well as in terms of the usage of agile methods. The findings of this paper suggest that the involvement of agile methodologies in the alignment between daily work practices and business process improvement provide banking organizations with powerful tools for encountering changes, running fast with self-managing teams for process problem-solving. Moreover, the findings confirm that a commercial bank basing on agile business process management can successfully implement innovation management, digitalization and AI towards becoming an agile and ambidextrous organization thus fulfilling customers' expectations of digitalization and other value propositions. Implementations of information, documentary, computer technological innovations ensure optimization of the working process, allows organizing a productive dialogue with the client. Due to investment in development of funds to improve service provision, modern large banks also expand the geography of service provision. New technologies in banking appear under the influence of general technological changes, improvement of the legislative base, introduction of advanced technologies in contactless payment methods, development of clients' needs and inheritance of world experience. Artificial intelligence will help banks automate processes and improve the quality of customer service. Organizations begin to dramatically simplify processes through intelligent automation, which in turn is helping to uncover corporate data that has traditionally been buried deep in complex core systems. Thanks to data, it becomes possible to create services and experiences that take into account the characteristics and needs of each individual. It won't be possible to completely replace humans, and we shouldn't expect AI-controlled banking systems anytime soon. However, AI can help automate repetitive processes and improve customer service satisfaction. The Bank's innovations should permeate all these processes in order to meet the requirements dictated by the dynamically developing market, to remain competitive and to claim leadership in the industry. The research is basely theoretical and provides mainly a theoretical tool in some of aspects of business process improvement forced by the implementation of artificial intelligence. The theory of agile BPM can find significant application in business process improvement in view of the fact that in the improvement of any business process there is a need for new knowledge, research and innovation to be in balance with the flow of the routine, traditional executive process itself.

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