Influence of Digital Technology on Roadmap Development for Digital Business Transformation

Iryna Strutynska
Department of Computer Science
Ternopil Ivan Puluj National Technical University
Ternopil, UKRAINE
ringtons999@gmail.com

Galina Kozbur
Department of Computer Science
Ternopil Ivan Puluj National Technical University
Ternopil, UKRAINE
kozbur.galina@gmail.com

Lesia Dmytrotsa
Department of Computer Science
Ternopil Ivan Puluj National Technical University
Ternopil, UKRAINE
dmytrotsa.lesya@gmail.com

Olena Sorokivska
Department of Management and Administration
Ternopil Ivan Puluj National Technical University
Ternopil, UKRAINE
soroka220996@gmail.com

Liliya Melnyk
Department of Management and Administration
Ternopil Ivan Puluj National Technical University
Ternopil, UKRAINE
liliana.mel0512@gmail.com

***Abstract*—In a highly competitive information economy, business structures require continuous introduction of innovation, effective information technology to ensure sustainable long-term market benefits, as well as their rational functioning. The implementation of the digital business model is one of the promising areas, which makes it possible to realize the activity of enterprises even more productively. The digital business model allows businesses to react more responsibly to the needs of potential buyers and customers, and also helps adapt and optimize business processes over a certain period of time to certain market conditions. That is why, the purpose of the article is to identify the peculiarities of the influence of digital technology on the transformation of existing business models of organizations. In view of this, an in-depth analysis of the main stages of the development of a roadmap for the digital transformation of business has been carried out; business process management software products and the most suitable ones have been examined. The article studies digital technologies in the context of enterprise business groups and reflects how relevant technologies affect the transformation of the existing linear business model into the digital business model and reflects the most significant effects for business.**

Keywords—information technology, digital economy, digital technologies, information management system, digital business model, business processes, BPM, business process management, CRM, ERP.

I. Introduction

In this digital era, the pace of change is extremely frustrating and each organization encounters existential threats from new and existing competitors. In the era of the Industrial Revolution 4.0, technology is the right of any company to change its own business model so as to differentiate itself from the entire world market.

The competitiveness of business structures is shaped by the use of digital technologies, the application of the information management system, reengineering and the transformation of existing business processes into new digital business models.

Digitalization is the use of digital technologies to change the business model and provide new revenue and value-producing opportunities; it is the process of moving to a digital business [1-7].

The problem of the development of the digital economy and the transformational processes taking place in society under the influence of digitization has received a lot of attention among both foreign authors [1-2, 10-12] and Ukrainian researchers [3, 5-6], etc.

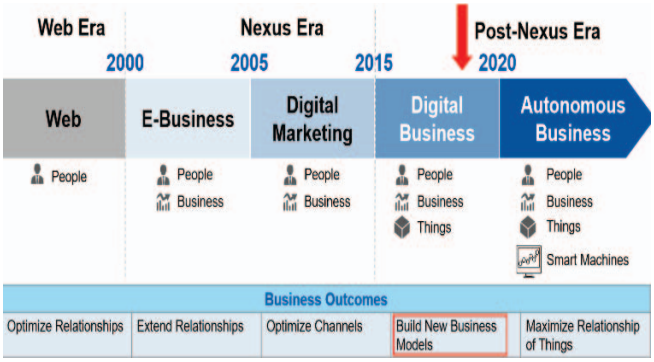

Fig. 1. The evolution Digital Business Development Path (Source: Author's interpretation based on: Gartner)

Despite numerous scientific studies on the development of information and communication technologies and the digital economy, we consider that the issues of the impact of digital technology on the transformation of existing business models of the organization are insufficiently examined.

II. Problem Analysis and Market Trends

On the one hand, in the market of information technologies and services, there are already a lot of software products (world and domestic) that are largely able to fill the gaps in information technology companies. Domestic business is in search of suitable technologies for business automation, is familiar with the best European and world practices of digital transformation.

The development of information technology (systems) of management for a particular business is a project for the development of a roadmap for the digital transformation of business. This is a very important project that requires significant financial support, highly trained specialists and knowledge-intensive technology, knowledge in many areas, namely, project management, digital development management and others (fig. 2).

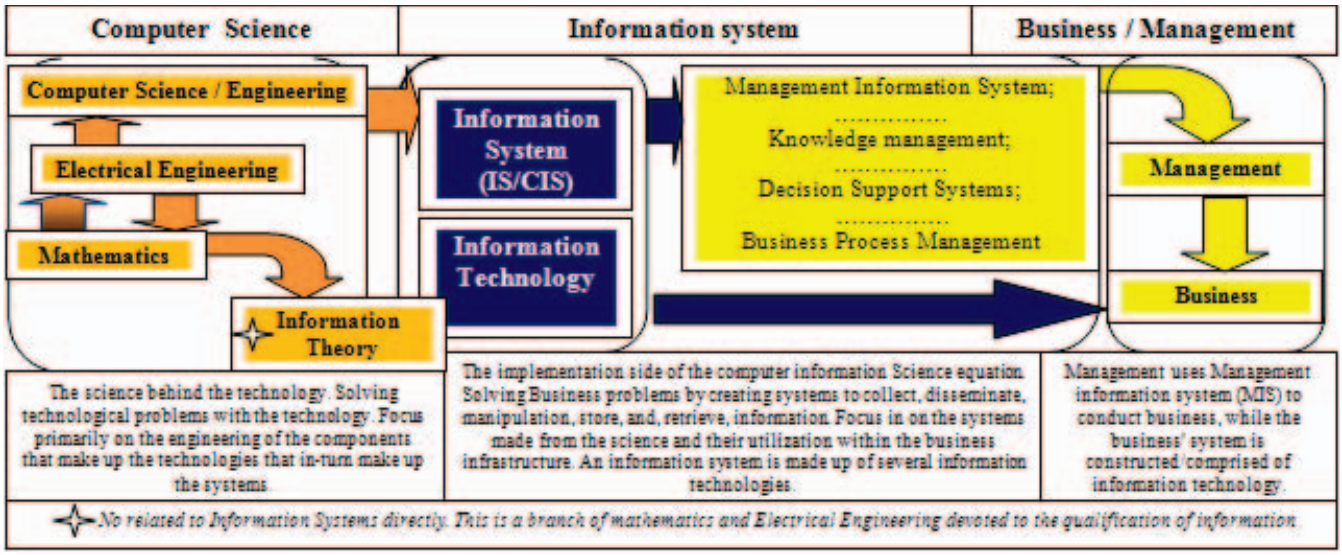

Fig. 2. Relationships Computer Science, Information Systems with Business World

Before deciding on the use of any information technology in business, it is necessary to analyze the current business model (fig. 3) and the business processes of the organization, to understand the problems that are encountered by the relevant stakeholders, and only then integrate into the digital transformation.

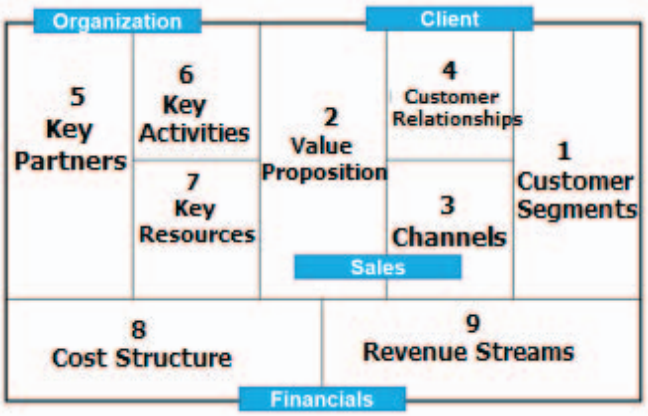

Fig. 3. Elements of the business model canvas (Source: Author's interpretation based on: Osterwalder, 2010)

In general, modern business solves the triple strategic task for strengthening their competitive positions:

- first, it is necessary to establish closer relations with suppliers and clients (the sector of work with clients, increase sales);
- second, to increase the level of own operational efficiency (the sector of effective operational activity of the organization);
- third, to increase the competitiveness of products produced (consolidation of certain sectors of the business model).

The fulfilment of all these tasks is impossible without the integration of information systems and technologies into the business sphere.

We offer to consider achievement of these three tasks through the prism of business processes of the organization using certain information technologies (digital instruments) (Table 1).

TABLE I. GROUPS OF BUSINESS-PROCESSES OF ORGANIZATION AND DIGITAL TECHNOLOGIES OF THEIR TRANSFORMATION

#	**Groups of business-processes of organization**	**Digital instruments (systems, products, digital decisions)**
Task 1. Establishing closer relations with suppliers and customers		
1	Interaction with suppliers	Systems SCM (Supply Chain Management)
2	Interaction with customers (consumers)	Systems CRM (Customer Relationships Management)
Task 2. Increase the level of own operational efficiency		
3	Resources management	ERP (Enterprise Resources Planning)
4	Management of Business Process	BPM-system (Business process management)
5	Analytical component management (data analysis)	Technologies Big Data, Data mining, OLAP-cube, cloud computing, Google Analytics, ін.
6	Providing modern technologies to employees of the company to effectively carry out daily work	Office 365, Google doc, use of CRM system, dashboards for evaluation of key indicators
Task 3. Increase the competitiveness of products		
7	Product management (control, storage and provision of necessary information)	Systems PLM (Product Lifecycle Management) and PDM (Product Data Management), digital sensors, GIS technology and others.
8	Marketing activity, including: New ways to attract customers; Search for effective sales channels for a particular consumer; Changing products or services using technology.	Digital Internet Marketing Tools Google Analytics, Google AdWords; SEO and SMM Using chat bots to communicate with customers; Forming funnel sales; Connecting a virtual or complementary reality to a shopping mall, collecting customer data.

One of the possible options for an effective and efficient organizational information support system for the enterprise is a system that is integrated with the technology of operational management of business processes.

III. SOFTWARE TOOLS FOR MODELING BUSINESS PROCESS

It is necessary to use informational products that enable us to simulate business business processes, the so-called "As Is" model (the “How It Is” Business Processes Model), which will allow you to see “weak areas” in business, build a new business model of business-processes, that is, model “To Be”. These information products will allow you to structure and automate business processes (reengineering business processes) of the enterprise.

In the IT market there is a differentiated set of BPM systems. That is why as the basis for the study «Gartner magic quadrant bpm tools, 2018» [13] was considered and other researches [11, 14]. All the information is systematized in table 2 where TOP 10 BPM-systems are listed and their characteristics are provided.

TABLE II. TOP 10 BPM-SYSTEMS AND THEIR CHARACTERISTICS

BPM Systems	Vendor Details	Easy to use	Standards support	License and cost	Integration with other corporate applications	Ability to dynamically change the business process
ELMA BPM	Founded 2007 Luxembourg	Cloud, SaaS, Web Installed - Mac Installed - Windows Mobile - Android Native, Mobile - iOS Native	BPMN	Paid, Free Demo and free version for five jobs	Ability to integrate with "1 C: Enterprise"	Yes
Bizagi BPM	Founded 1989 United Kingdom	Cloud, SaaS, Web Installed - Windows Mobile - Android Native, Mobile - iOS Native	BPMN, XPDL	Paid, Free Demo and free version	Wide possibilities of integration with CRM and ERP systems	Yes
Bitrix24	Founded 1998 United States	Cloud, SaaS, Web Installed - Mac Installed - Windows Mobile - Android Native Mobile - iOS Native	IDEF, BPMN	Paid (Starting Price $39.00/month), Over 10,000 intranets created already! Up to 12 users free!	Wide possibilities of integration with CRM and ERP systems	Yes
Oracle BPM	Founded 1977 United States	Convenient and simple, realization of violin tasks	BPMN, BPEL	Paid, Free Demo	Wide integration possibilities	Yes
erwin Business Process	Founded 1988 United States	Deployment Cloud, SaaS, Web Installed - Windows	IDEF0, IDEF3, DFD	Paid, Free Demo, free version	Wide integration possibilities	Yes
Appian	Founded 2004 United States	Convenient and simple, realization of violin tasks	BPMN	Paid (Starting Price $75.00/month), Free Demo	To store ARIS models, an object database is used	No
IBM Blueworks Live	IBM	Cloud-based BPM platform. Simple and straightforward	BPMN	Paid, Free Demo	Wide integration possibilities	Yes
Bpm’online	Founded 2011 Ukraine, United States	Is ideal for middle-sized companies and enterprises	BPMN	Paid, Free Demo	Wide integration possibilities	Yes
Bonita BPM	Founded 2001 France	Convenient and simple, realization of violin tasks	BPMN	Bonita open solution	Wide integration possibilities	Yes
Pegasystems	Founded 1983 United States	Convenient and simple, developed on Java and OOP concepts	BPMN	Paid, Free Demo and free version	Wide integration possibilities	Yes

Each of the above systems deserves attention. However, we offer in practical examples a more detailed analysis of the most suitable software products. The following perspectives are taken into account: the features of the system, prices and simplicity of its use (Erwin Business Process, Bitrix24, Bizagi BPM, ELMA BPM, Pegasystems, Bonita BPM). (Erwin Business Process, Bitrix24, Bizagi BPM, ELMA BPM, Pegasystems, Bonita BPM).

IV. PRACTICAL RESULTS

After the practical use of these six BPM systems, we have chosen two systems that are cost-effective, the most simple and easy to use.

The advantages of BPM system Erwin Business Process:

1. Clear, standard, and concise representation of the elements. To ensure the unity of representing elements of data models in ERwin, standardized representations of object names, standardized data types, and standard model samples (reference models) are used. Visual representation of large data arrays. Due to the powerful graphic system and navigation system (IDEF0, IDEF3, DFD);

2. The ability to interact with users. ERwin provides various opportunities for sharing information among all members within an organization. Collaborative work with Depositary Users. ERwin provides automatic version control, access control, conflict management, and model modification to work together effectively. At the expense of the web portal, business analysts, technical specialists and others can access data models in understandable configurations for them;

3. Application of open architecture. ERwin provides extensive integration opportunities with other process modeling and information system development tools (more than 120 different tools).

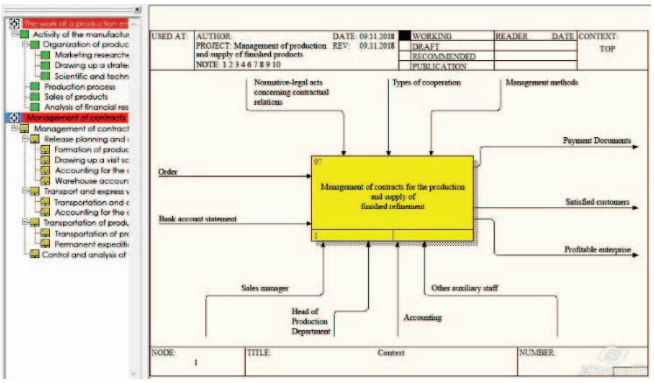

Fig. 4. BPM for Agroholding Mriya (IDEF0, IDEF3)

BPM ELMA system has a sophisticated yet clear interface. It is distributed in three versions intended for organizations with different needs and staff numbers. In addition, there is a free version for five jobs, which makes it possible to use it fully in the activities of small businesses (Fig. 5).

When an enterprise establishes the necessary configuration of all business processes and coordinates it with the organizational system, it is at this stage that makes it possible to decide on the application of certain digital technologies in the context of different groups of business processes.

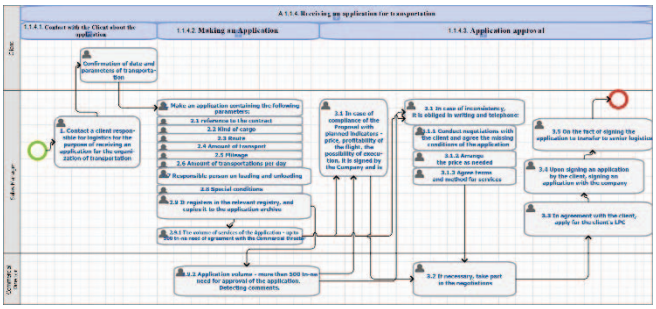

Fig. 5. BPM «Receiving an order from a client» (Agroholding Mriya» (system BPM ELMA, BPMN)

It is precisely the implementation of certain information management systems in the existing business model that will lead to data transformation and the emergence of a new digital business model (Fig. 6).

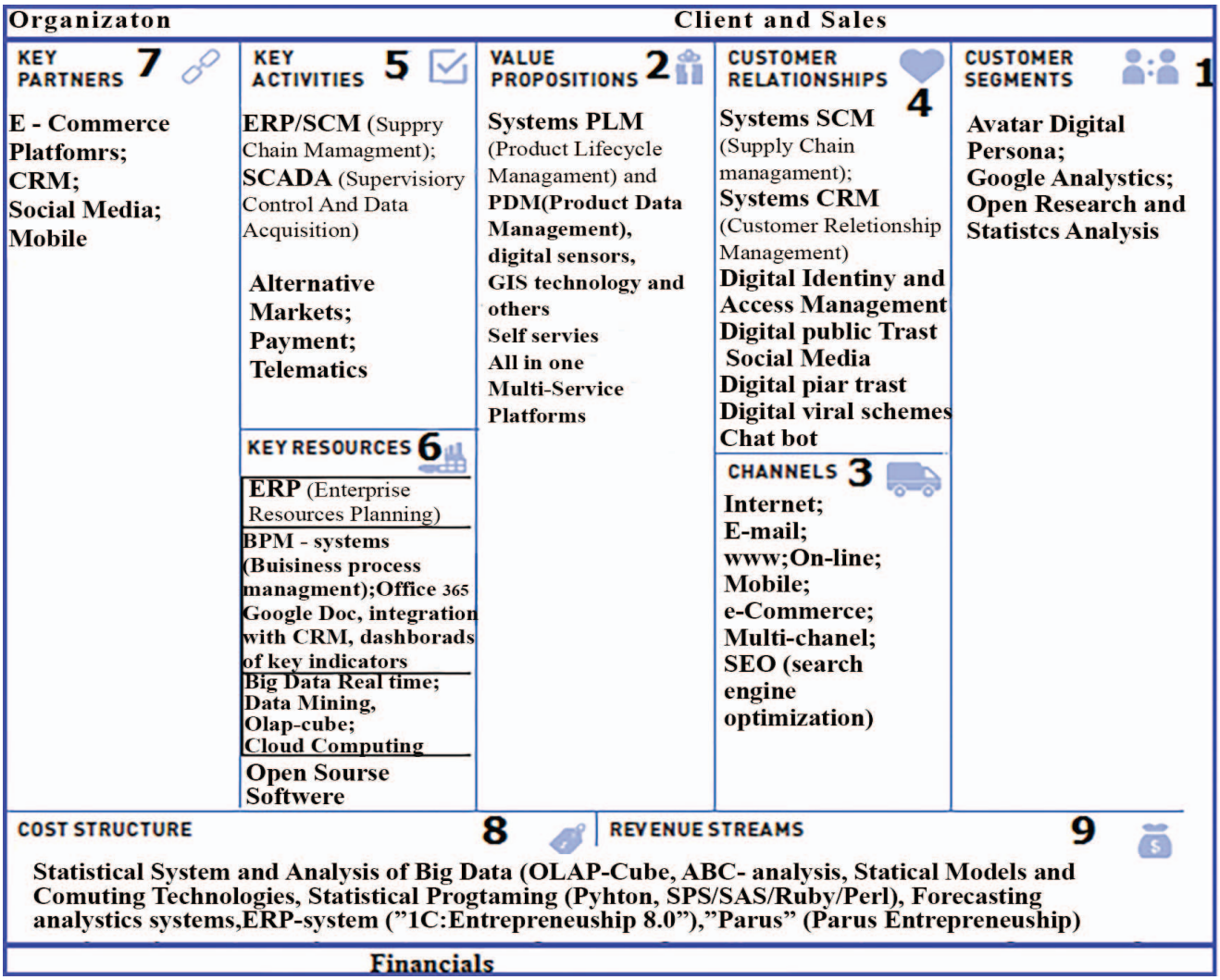

Fig. 6. Digital focus areas are drivers for transforming existing business models (Source: structured by the authors on the basis of the conducted in-depth analysis)

With the use of modern information technology business transforms into a new business model and receives significant benefits:

- access to new markets;
- added value of the product through technology
- intensification and automation of existing business processes;
- consolidation of key resources (6), key activities (5), customer relationships (4) and sales channels (3) in integrated digital business processes based on certain digital systems (platforms);
- change of business culture;
- formation of a single ecosystem;
- intelligent analytics and forecasting;
- effective cooperation with clients, customers and partners;
- optimization of system management (including reduction of funds);
- acceleration of economic cycles;
- efficient use and release of production and warehouse capacities as a result of reduction.

V. Conclusions

It is determined that the emergence of the digital economy has opened new opportunities for the development of business structures.

New digital technologies have affected the transformation of existing business models of organizations. Digital business models have begun to penetrate large and small companies in different sectors.

That is why in the article the features of application of modern information technologies in the context of groups of business. That is why in the article the features of application of modern information technologies in the context of groups of business processes and components of business models of the organization are explored. In view of this, an in-depth analysis of the main stages of the development of a roadmap for the digital transformation of business has been carried out; business process management software products and the most suitable ones have been examined. The research reflects how relevant technologies affect the transformation of the existing linear business model into the digital business model and discovers the most significant effects for business.

In a future version of this article, we intend to propose to consider current models and methodologies for calculating the digital transformation index of EU countries and the world. We will analyze the general structure of the indicators, we will pay special attention to the analysis of indicators of the index of digital transformation of business structures and, based on this, we will work towards adapting and developing our own methods and methodologies for digital transformation for the domestic economy and business structures.

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