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DEVELOPMENT OF THE STRUCTURE OF THE REFERENCE MODEL FOR E-BUSINESS

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Abstract. The e-business reference model is a conceptual framework designed to assist organizations in strategic planning and implementation of digital business initiatives. Based on the model, a categorization is presented that reflects the various components to ensure e-business success, including business layers, digital strategies, customer segmentation, and key business objects. The study uses the Design Science Research approach. This approach facilitated the identification and selection of relevant theories and concepts from scientific publications, which were then used to develop and validate a reference e-business model. A digital strategy that is aligned with organizational goals and incorporates customer-centric approaches, data-driven decision-making, and integration of multiple platforms is critical to e-business success. Understanding customer segments across industries is essential to customize marketing strategies and improve customer satisfaction. Business objects such as digital products, revenue streams, key partnerships and resources are critical to business performance. Application components and technology infrastructure, including digital channels and customer relationship management systems, are critical to optimize service delivery and customer engagement. The e-business reference model is a comprehensive and structured framework that supports an organization through digital transformation. By leveraging digital strategies, understanding customer needs and optimizing business processes, organizations can achieve sustainable growth and competitive advantage. The model's emphasis on collaborative business analysis, virtual collaboration tools, and conceptual modeling techniques makes it highly effective in an increasingly digital environment.

Keywords: digital transformation, reference model, digital strategy, customer segmentation, business objects

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РАЗРАБОТКА СТРУКТУРЫ РЕФЕРЕНТНОЙ МОДЕЛИ ДЛЯ Е-БИЗНЕСА

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Аннотация. Референтная модель электронного бизнеса представляет собой концептуальную основу, призванную помочь организациям в стратегическом планировании и реализации инициатив в области цифрового бизнеса. На основе модели представлена классификация, отражающая различные компоненты для обеспечения успеха электронного бизнеса, включая бизнес-слои, цифровые стратегии, сегментацию клиентов и ключевые бизнес-объекты. В исследовании использовался проектный подход DSR (Design Science Research). Этот подход способствовал выявлению и отбору соответствующих теорий и концепций на основе научных публикаций, которые затем использовались для разработки и проверки референтной модели электронного бизнеса. Цифровая стратегия, соответствующая целям организации и включающая клиентоориентированные подходы, принятие решений на основе данных и интеграцию нескольких платформ, имеет решающее значение для успеха электронного бизнеса. Понимание сегментов потребителей в различных отраслях имеет важное значение для адаптации маркетинговых стратегий и повышения удовлетворенности клиентов. Бизнес-объекты, такие как цифровые продукты, потоки доходов, ключевые партнерские отношения и ресурсы, крайне важны для эффективности бизнеса. Компоненты приложений и технологическая инфраструктура, включая цифровые каналы и системы управления взаимоотношениями с клиентами, имеют решающее значение для оптимизации процесса предоставления услуг и вовлеченности клиентов. Референтная модель электронного бизнеса является комплексной и структурированной основой, которая обеспечивает поддержку организации в процессе цифровой трансформации. Используя цифровые стратегии, понимая потребности клиентов и оптимизируя бизнес-процессы, организации могут добиться устойчивого роста и конкурентных преимуществ. Акцент модели на совместном бизнес-анализе, инструментах виртуального сотрудничества и методах концептуального моделирования делает ее крайне эффективной в условиях всевозрастающего влияния цифровых технологий.

Ключевые слова: цифровая трансформация, референтная модель, цифровая стратегия, сегментация клиентов, бизнес-объекты

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Introduction

Reference models are tools that help optimize the information systems design process by offering enterprises a flexible framework for specific domains. While helping in the design and selection of new applications, they also facilitate the validation of existing solutions [1].

In an environment of universal digitalization, these models facilitate and accelerate the adoption of digital transformation strategies and enable effective value realization. The models facilitate the effective reuse of knowledge by formalizing, organizing and structuring it according to digital business processes. Through reference models, the impact of digital technologies on business becomes transparent and manageable. This article describes the unique qualities that reference models must possess to be successful in digital transformation. The application of these reference models in the context of digital transformation is also explained. The practical relevance of such models is demonstrated in [2].

In addition, digital transformation of e-business is a reference model and operational framework that uses digital technologies to help organizations move from traditional to innovative or digital business



process systems. To cope with this challenging task and create their own models, modelers and organizations can take inspiration from reference models [3]. In addition, a reference model for e-business serves as a structured framework for organizational leaders to align their digital strategies with business processes, leveraging information technology (IT) innovations to improve efficiency and competitiveness. By integrating IT resources with business areas, organizations can form collaborative alliances to implement IT-based systems as suggested in [4]. Process reference models play a crucial role in digital transformation by enabling organizations to formalize and structure knowledge of digital business processes, accelerating the realization of the value of digital technologies [5].

Collaborative business intelligence methodologies emphasize knowledge sharing and collaboration among stakeholders to gain insights into business operations, which emphasizes the importance of virtual collaboration tools in business intelligence platforms [6]. Conceptual modeling through ontologies such as DI-BPM-Onto and extensions to standard tools such as ArchiMate support the modeling of digital transformation and innovation initiatives, improving the understanding and implementation of e-business strategies [7].

Using this reference model, organizations can better align their digital strategies with business processes, optimize technology infrastructure, and improve customer engagement and satisfaction. The research aims to provide a structured framework that categorizes the various components required for e-business success, including business layers, digital strategies, customer segmentation, and key business objects such as digital products, revenue streams, key partnerships, and resources [10].

In order to develop the e-business reference model, relevant theories and concepts from academic publications had to be identified and incorporated. In addition, the role of digital strategies in successful digital business transformation was described, focusing on customer-centric approaches and data-driven decision-making. Finally, the importance of business objects such as digital products, revenue streams, key partnerships and resources in driving business performance was emphasized. Finally, it was shown how robust application components and technology infrastructure can optimize digital channels and customer relationship management systems. Finally, the aim of the paper was to validate the research findings.

Materials and Methods

The fundamental idea serves as the basis for selecting a particular theory, which in turn will be based on literature research and scientific publications. That is why in this study the authors applied the DSR (Design Science Research) approach, which is illustrated in Fig. 1.

Results and Discussion

The e-business reference model is a conceptual framework that categorizes and describes the various mechanisms of inter-organizational information coordination and control in the context of e-business [8]. The purpose of the model is to provide a structured approach to understanding and analyzing the dynamics of e-business strategic planning and implementation, and to enable e-business to function more effectively.

1. Business layer

1.1. Business actor

The business actor ensures that the business environment is interconnected with the system and that it operates correctly.

1.1.1. Customer segments

Customer segments represent certain groups and organizations with specific needs, purchase algorithm, actions targeted by the business. In addition, marketing strategies, customer satisfaction allows to identify their needs and predilections [19].

Customer segmentation includes the following stages:

- identification;
- characterization;

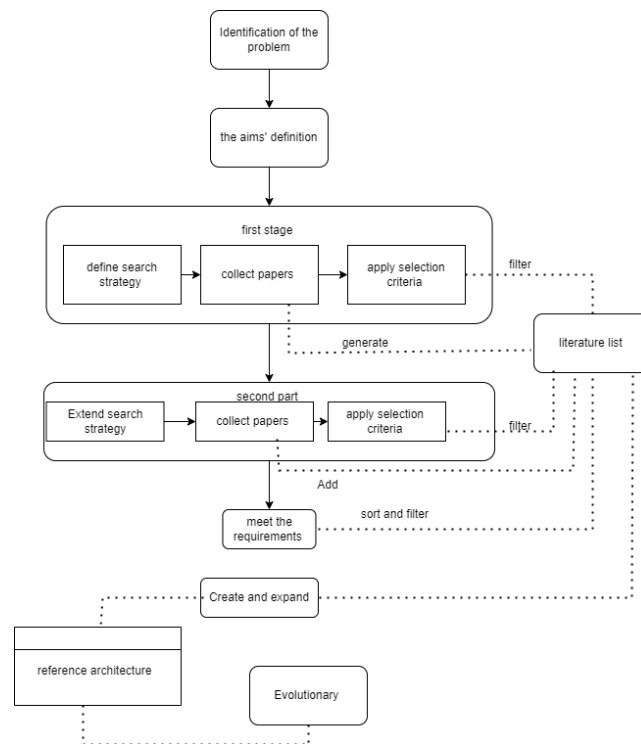


Fig. 1. Methodology process

- aims;
- benefit statement;
- business communication;
- personalized approach;
- customer satisfaction;
- dissemination strategies.

Customer segmentation in various industries:

- Retail: customers are divided into luxury and economy shoppers.
- Healthcare: segmentation should take into account patients with specific medical situations as well as the key healthcare systems available.
- Electronic Industry: includes IT services, developer equipment, enterprise resource solutions, and software systems.

By reviewing customer segments, a business can increase customer connectivity, increase revenue, and scale [20].

1.1.2. Digital strategy

A company's journey towards digital transformation is described in its digital strategy, which also serves as a roadmap, procedure and guide. A digitalization strategy, on the other hand, means investing in and integrating digital technologies into all areas of an organization, including management systems, business operations, corporate, business and functional initiatives. Since many variables and mechanisms influence the adoption and implementation of digitalization strategies, it can be difficult to guarantee their success. In addition, some companies lack the expertise needed to select and develop effective digitalization strategies, as well as the skills needed to resolve conflicts (e.g., between advanced and established systems [9]) throughout the adoption and implementation process.

A component of a digital strategy can be:

- business goals;



- customer-centricity;
- multi-platform;
- inbound marketing;
- data-driven decision-making;
- e-infrastructure;
- acceleration of innovation;
- corporate culture;
- cooperative ecosystem;
- accumulation and measurement.

1.2. Business object

Business objects provide the basic information that the business use and control.

1.2.1. Digital products

Business role: sales, product formation to create, market, sell or carry digital products.

Business function: the process for developing a product, selling and helping customers.

Application components: which are stored, controlled, and delivered through systems such as Content Management System (CMS) or Product Information Management (PIM).

Technology components: help through infrastructure such as servers, databases, and networks for hosting and issuance.

1.2.2. Revenue streams

Business role: evaluation and control through the role of finance, revenue management.

Business function: desegregates to processes related to billing, invoicing and financial announcements.

Application components: assist through systems such as Enterprise Resource Planning (ERP) or billing systems for track revenue budget.

Stakeholders: influence the financial well-being of stakeholders such as shareholders or partners.

1.2.3. Key partnerships

Key partnerships influence revenue creation through contribution journey or link enterprise.

Business role: overseeing the partnership development, customer management, strategic partnership.

Business function: consolidate into processes related to partner recognition and contribution.

Stakeholders: including external parties such as vendors, suppliers, entrepreneur or strategic partners.

Business objects: contribution through the partner and change the resource, competence or information to approach the joint object.

1.2.4. Key resources

Business role: employ the role and management for the resource allocations, procurement or help management.

Business function: consolidate process for resource planning, optimization and continuation.

Application components: control and capture through the system such as Enterprise Asset Management (EAM) or resource planning systems.

Technology components: contribute to infrastructure to control and help resources, such as tools, intelligent features.

Requirements: influence resource allocation, decision-making according to factors such as budget constraints, technology availabilities, resource capabilities.

To link the business objects that help the organization in different elements through applications, technology and stakeholder layers, which include activities and objective.

1.3. Business interface

Business interface provide the connection by which business services access external or internal actors and the functionality of a business service to appear ins its environment. Business interface in the digital era provides a digital point of reference through which businesses interact with customers, stakeholders and inventors such as websites, mobile applications, etc. [21].

1.3.1. Digital channels interface

Business actors: this part involves a platform for communication between customers, employees and organization's digital assets.

Business role: connects stakeholders, applies transactions.

Application components: carry functionality, such as mobile applications, e-commerce platforms.

Technology components: connects to infrastructure such as servers, CDNs or API gateways.

Stakeholders: connects to information for buying and connection with organizations.

1.4. Business function

1.4.1. Digital channels function

Business role: responsible for maintenance and optimization of digital channels.

Business function: processes that connect digital market, purchase, customer service.

Application components: depend on digital channel management for CMS, CRM platform, media equipment [22].

Technology components: assist through web servers, databases, analytics platforms.

Requirement: depend on factors such as security, access, etc.

1.5. Business role

1.5.1. Business

This part of the model represents the overarching plan that guides the business in achieving its goals and objectives.

1.5.2. Customer relation

This part of the model focuses on how the business interacts with and manages its relationships with customers.

1.5.3. Key activities

This component of the model represents the critical tasks and operations that business must perform to successfully implement its strategy and deliver its value proposition.

1.5.4. Value Proposition

This component of the model represents the unique value that business offers to its customers, distinguishing it from competitors.

2. Digital solutions layer

2.1. Application component

This part provides software and technology for e-business support and operation. As part of digital transformation, it includes customer relationship management, digital marketing applications, e-commerce platforms. This section provides opportunity for marketing campaign, data analysis for online transactions [23].

2.1.1. Customer Relationship Management (CRM)

Business role: supports customer communication, sales, customer service, manage and data.

Business object: handles the customer, which connects the seller's history and preferences.

Business interface: the business user connects the CRM system through user interface and APIs.

Technology components: runs the server, database and network resource.

Stakeholders: influence the customer, management supporting the customer relationship management.

2.1.2. Analytics tools

Business role: contains data analysis and decision-making to control insight data.

Business object: various data, such as sales data.

Business interface: user interface and APIs connection to analytical insight.

Technology components: server, database.

Stakeholders: influence strategic decision-making by managers, analysts.

2.1.3. Digital marketing tools

Business role: advertising, analysis of the digital marketing.

Business object: collect data from customer profile and content aids.

Business interface: connects digital marketing channels and platforms.

Technology components: web servers, database.

Stakeholders: influence on the marketing team, customer.

2.2. Application service

Application service represents business functionality for an environment and connects the component and the service.

2.2.1. Marketing automation tools service

Business role: marketing to automation, such as e-mail, social media.

Business object: facilitates data such as customer profile, marketing.

Business interface: contains controlling the marketing automation and work operation.

Application components: depends on infrastructure components, such as servers, database.

Stakeholders: influence on the marketing team, sales team.

2.2.2. Analytics processing service

Business role: data analysis, reporting and decision-making for operation and analysis of the big data.

Business object: operates and processes different data such as customer data, sensor data.

Business interface: facilitate querying, analytic insight.

Application components: algorithms for data analysis, statistical data.

Technology components: database, analytics machine.

3. Technology layer

Technology layer supports the digital technology and application, which influence the e-business system operation, nodes that provide part of the resources.

3.1. System software

Middleware: influencing communication and exchange with diverse software components and operations that provide interoperability and integration.

Virtualization software: optimizing hardware resources and physical hardware facilities for resources and creation of virtual system.

Security system: protecting data from threats, principle and accessibility of data resource in technology systems.

3.2. Technology infrastructure

Network connection: connecting hardware device, software components and user, and providing data link and connection.

Data storage: providing service for accessibility and resolution that store and manage data.

3.3. Hardware devices

This part of the model provides physical instruments for hosting and running the software and system, which provide servers, storage devices and network tools such as IoT devices.

3.4. Application programming interface

Application programming interface provides connection between various software and application systems, which enable to communicate and share data and operation.

3.5. Technology service

Cloud service: provides connection with computing resources such as servers, databases through network, provides for organization desire resources.

Data warehouse: enables the centralized storehouse, and manages big data, provides for organization to analyze complex data and decision-making.

4. Motivation layer

Motivation layer provides for the digital transformation of e-business by setting goals, performing the assessments, and addressing the requirements that form the basis of the enterprise architecture.

4.1. Stakeholder

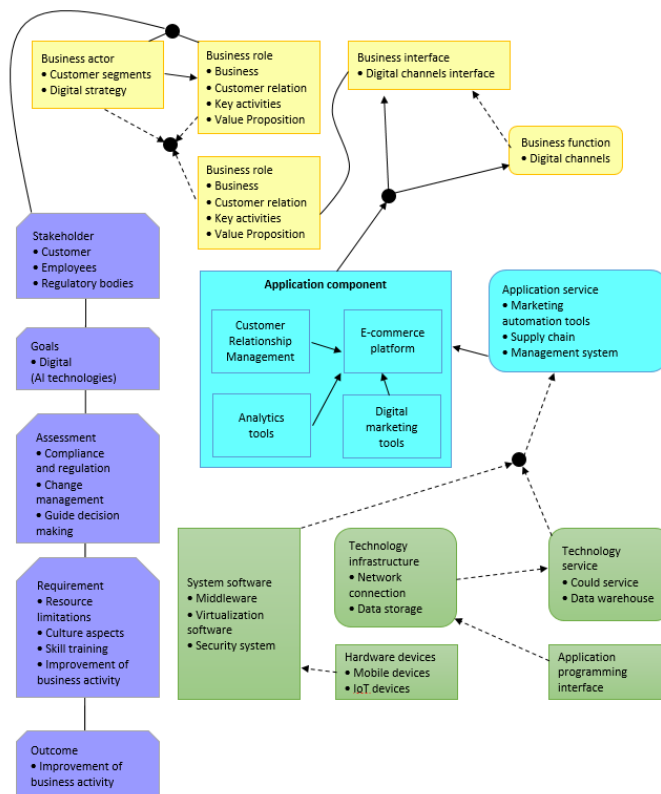


Fig. 2. Structure of the reference model of e-business

Customer: individuals and legal entities, that directly benefit from the impact on the organization service, activities.

Employees: all individuals working for organization, who contribute to its innovation and success.

Regulatory bodies: government agencies, industries and authorities that oversee the establishment and enforcement of administration, standards, and roles related to the organization’s process and industry.

4.2. Goals

Digital (AI technologies): provide strategies, goals for implementation of AI technologies to improve the process for business and innovation.

Focus on the business layer goals that provide for the business operational promotion, increase customer experience.

4.3. Assessment

4.3.1. Compliance and regulation

This part describes and regulates the organization’s required equipment and its operation and maintenance requirements.

4.3.2. Change management

This part helps the people, system, technology, and culture of the organization, which provide the strategy and risks to facilitate change.

4.3.3. Guide decision making

This part provides the process of how the enterprise architecture influences the design and implementation of the solution.

4.4. Requirement

Resource limitations: defining the specific budget, time and other resources that influence the design and performance of technology solution and strategy.

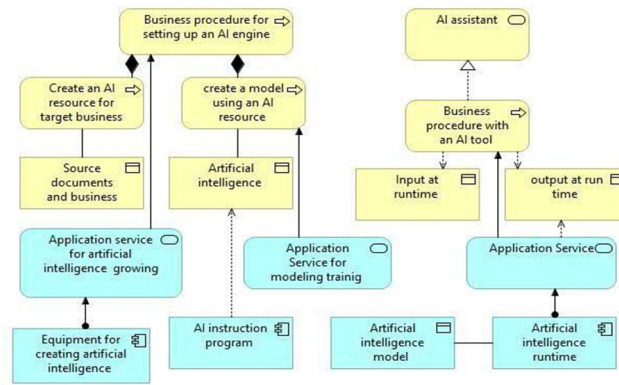


Fig. 3. AI service system

Culture aspects: influencing the adoption of new technologies and operations that are processed by organizational culture, values, beliefs.

Skill training: identifying the skills, which employees need and use to control the technology solutions to be implemented in the organization.

Improvement of business activity: contains the opportunities, and development that need to be implemented in the organization’s business processes, operations and performance.

4.5. Outcome

Improvement of business activity: the result of the implementation of technology solutions for strategic enterprise within organization as improved efficiency and customer desire.

Measurable and achievable, the result that are specified for measurement and monitoring to define the effectiveness of the solutions and to approach the desire result [24, 25].

AI technology

AI technologies are being implemented to support human activities in various business domains [17, 18]. By collecting training data about the intended business area, it is possible to apply AI technologies to that activity. Representatives from the business unit should be involved in the project, as having domain knowledge or expertise is crucial in such circumstances. It was suggested that some system evaluation issues should be addressed when implementing predictive algorithms, such as machine learning technologies, as a practical social system. In particular, it is important to evaluate the project on the totality of business goal, business process, and the application to be implemented. The relationship between business goal, business process and IT system is defined by introducing the concept of business-IT alignment in enterprise systems management. The relationship of IT system with business and IT organizations is discussed using the concept of business-IT alignment in an attempt to reduce organizational uncertainty and increase enterprise agility. Aspects of human skills that can replace AI technologies and a list of tasks that AI service systems will perform on behalf of the business are described. However, in a particular case, it is unclear how accurately such methods result in the business activities that the system actually performs.

Conclusion

The e-business Reference Model is a comprehensive framework designed to analyze and improve the strategic planning and implementation of e-business initiatives. The model addresses the various components critical to e-business success, including business layers, digital strategies, customer segmentation and key business objects. By integrating digital technologies and utilizing structured approaches, companies can improve their business performance and customer interactions.

Key findings include the importance of a robust digital strategy that aligns with overall company goals and incorporates customer-centric approaches, data-driven decision-making, and multi-platform integration. The model also emphasizes the importance of understanding customer segments across industries to effectively tailor marketing strategies and improve customer satisfaction.

The e-business reference model provides a comprehensive and structured framework that helps organizations in the digital transformation process. By leveraging digital strategies, understanding customer needs and optimizing business processes, organizations can achieve sustainable growth and competitive advantage.

The usefulness of the model in helping to effectively capitalize on digital technologies is further enhanced by its emphasis on collaborative business analysis, virtual collaboration tools, and conceptual modeling methodology.

The conceptual framework created to support companies in strategic planning and implementation of digital business initiatives is known as the e-business reference model. It categorizes many elements necessary for e-business success such as customer segmentation, digital strategies, business layers and important business objects such as digital products, revenue streams, important partnerships and resources.

E-business success depends on having a strong digital strategy that integrates multiple platforms, uses customer-centric methodologies, and aligns with the organization's goals.

Understanding multiple customer segments across industries is essential to tailor marketing tactics and increase customer satisfaction.

In addition, the framework emphasizes the role of business objects such as digital products, revenue streams, key partnerships, and resources in driving business performance. It describes how application components and technology infrastructure support these business objects, ensuring that digital channels and customer relationship management systems are optimized to improve customer experience and engagement.

The development of the e-business reference model framework is a comprehensive framework designed to analyze and improve the effectiveness of strategic planning and implementation of e-business initiatives. The study yielded several key findings, which are listed below:

1. Importance of a robust digital strategy:

A well-developed digital strategy is critical to align with the overall goals of the organization. It should incorporate customer-centric approaches, promote data-driven decision making, and support multi-platform integration to improve operational efficiency and market responsiveness [11].

2. Importance of application components and technology infrastructure:

Robust application components and technology infrastructure are the foundation for optimizing digital channels and customer relationship management (CRM) systems. Effective utilization of these technology assets ensures better service delivery and increases customer engagement, contributing to overall business success.

3. Role of Key Business Objects:

Critical business objects such as digital products, revenue streams, key partnerships and resources play a vital role in business performance. These elements are necessary to build a sustainable digital business model that can adapt to changing market conditions and customer requirements.

4. Strategic integration:

Aligning digital strategies with overall business objectives ensures that digital transformation efforts are not isolated projects, but an integral part of the strategic roadmap of the business. This integration is necessary to leverage digital technologies to achieve long-term business goals [14–16].

5. Sustainable business models:

The study emphasizes the need for companies to continuously innovate and adapt their digital offerings. Such adaptation is vital to remain relevant and competitive in rapidly changing markets [12].

6. Technology Optimization:



The focus on application components and technology infrastructure highlights the need for companies to invest in and optimize technology resources. Effective CRM systems and digital channels not only improve service quality but also provide valuable data and insights for further business improvement [13].

7. Understanding customer segments:

Identifying and understanding customer segments across industries is essential to effectively develop marketing strategies and improve customer satisfaction. This understanding helps the business to strengthen customer relationships and increase revenue.

Overall, the e-business reference model serves as a vital tool for organizations seeking to navigate the complexities of digital transformation by providing a clear roadmap for integrating digital strategies, understanding customer needs, and optimizing business processes to achieve sustainable growth and competitive advantage.

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