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ANALYSIS AND RESEARCH OF BARRIERS TO CLOUD TEHNOLOGIES IMPLEMENTATION IN SMALL AND MEDIUM-SIZED ENTERPRISES

Master's project

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ABSTRACT

Cloud computing is a major technological innovation that has revolutionized the way organizations and individual users manage, store and access data and IT resources. Essentially, cloud computing enables access to technology resources such as servers, storage, databases, networks and software applications over the internet, without the need for investment in expensive physical infrastructure. This brings a number of significant benefits, including **reduced** operational **costs**, high flexibility in the use of resources, scalability to meet changing requirements and better data security. For small and medium-sized enterprises (SMEs), these benefits are essential, enabling them to compete in global markets without the high costs associated with maintaining a traditional IT infrastructure. In addition, access to cloud solutions makes it easier for teams to collaborate, regardless of location, and ensures that data is accessible at all times, facilitating decision-making.

However, implementing cloud technologies in SMEs is not without its challenges. It is important to **investigate the implementation barriers** that may arise, as these can have a major impact on decisions to adopt new technology solutions. These barriers include upfront infrastructure costs, investments required to train human resources, difficulties in integrating cloud solutions with existing systems, and concerns about data security and privacy. Analyzing these barriers is necessary to understand how SMEs can reap the long-term benefits of cloud computing. This research helps to identify **success factors** and **possible risks**, enabling companies to make decisions and develop appropriate strategies for adopting cloud technologies. In this way, SMEs can be better prepared to deploy cloud solutions that help increase efficiency, reduce costs and ensure competitiveness.

REZUMAT

Cloud computing reprezintă o inovație tehnologică majoră care a revoluționat modul în care organizațiile și utilizatorii individuali gestionează, stochează și accesează date și resurse IT. În esență, cloud computing permite accesul la resurse tehnologice precum servere, stocare, baze de date, rețele și aplicații software prin intermediul internetului, fără a fi nevoie de investiții în infrastructură fizică costisitoare. Aceasta aduce o serie de avantaje semnificative, printre care se numără **reducerea costurilor** operaționale, flexibilitate ridicată în utilizarea resurselor, scalabilitate pentru a răspunde cerințelor în schimbare și o mai bună securitate a datelor. Pentru întreprinderile mici și mijlocii (IMM-uri), aceste beneficii sunt esențiale, oferindu-le posibilitatea de a concura pe piețele globale fără a suporta costurile mari asociate cu menținerea unei infrastructuri IT tradiționale. În plus, accesul la soluții cloud permite o colaborare mai ușoară între echipele de lucru, indiferent de locație, și asigură accesibilitatea la date în orice moment, facilitând astfel procesul decizional.

Cu toate acestea, implementarea tehnologiilor cloud în IMM-uri nu este lipsită de provocări. Este important să se **cerceteze barierele de implementare** care pot apărea, deoarece acestea pot avea un impact major asupra deciziilor de adoptare a noilor soluții tehnologice. Printre aceste bariere se numără costurile inițiale de infrastructură, investițiile necesare pentru instruirea resurselor umane, dificultățile legate de integrarea soluțiilor cloud cu sistemele existente, precum și preocupările privind securitatea datelor și confidențialitatea informațiilor.Analizarea acestor bariere este necesară pentru a înțelege cum pot IMM-urile să beneficieze pe termen lung de avantajele oferite de cloud computing. Această cercetare ajută la identificarea **factorilor de succes** și a **posibilelor riscuri**, permițând companiilor să ia decizii și să dezvolte strategii adecvate pentru adoptarea tehnologiilor cloud. În acest fel, IMM-urile pot fi mai bine pregătite pentru a implementa soluții cloud care să contribuie la creșterea eficienței, reducerea costurilor și asigurarea competitivității.

CONTENTS

INTRODUCTION

Small and medium-sized enterprises (SMEs) are a vital component of both the global and local economies, driving innovation, job creation, and economic growth. Globally, SMEs account for over 90% of businesses and contribute significantly to employment, especially in developing and emerging markets. In the European Union, for instance, SMEs provide approximately 75 million jobs and are responsible for nearly 55% of GDP. The global economy increasingly relies on the agility and innovation of SMEs to adapt to market changes, foster competition, and address new consumer demands.

In the Republic of Moldova, as in many developing economies, SMEs also play a pivotal role in economic activity, making up nearly 98% of all registered enterprises and contributing around 40% to the country's GDP. However, despite their importance, SMEs face a range of challenges that hinder their ability to grow and compete effectively, both locally and internationally. These challenges include limited access to financing, regulatory burdens, and difficulties in adopting new technologies—issues shared by SMEs across the globe.

One key solution to these challenges is the adoption of cloud computing, a transformative technology that offers SMEs the opportunity to enhance their operational efficiency, improve scalability, and access advanced technologies without heavy upfront investments. Cloud computing allows SMEs to manage resources more effectively, streamline workflows, and improve customer engagement, making them more competitive in an increasingly digital global market. Moreover, cloud-based platforms provide SMEs with access to real-time data and analytics, which are critical for making informed decisions and adapting to market fluctuations.

Cloud computing is a revolutionary technology that has transformed how organizations and individual users manage, store, and access data and IT resources. Once considered an experimental technology, cloud computing has rapidly evolved over the past two decades to become an essential component of modern business. The concept of the cloud became prominent with the rise of industry giants like Amazon Web Services (AWS), Microsoft Azure, and Google Cloud Platform. These providers introduced widely accessible cloud services, enabling organizations to focus on innovation without relying on traditional IT infrastructure. At its core, cloud computing provides access to resources such as servers, data storage, databases, networks, and software applications over the internet, eliminating the need to invest in often costly physical infrastructure that may not fully meet a company's needs. This model offers significant flexibility, leading to greater efficiency and the ability to adapt quickly to the changing demands of users.

Cloud , arguably, the springboard for the emergence of various other significant topics of interest. The scale of storage and computational capability available supports the treatment of big data, not only of large static collections but also of the kinds of streaming sensor data important in the Internet of Things and

the combination of big and streaming data. In turn, Cloud acts as an enabler for activities in so-called smart cities and in supporting operation of connected and autonomous vehicles.

Although software, platform and infrastructure remain the mainstay of service models, these also now address containers (e.g. with Docker in Amazon's Elastic Container Service, Microsoft Container Service, Google Container Engine and IBM Containers)and microservices (AWS Lambda, Microsoft Azure Functions, Google Cloud Functions and IBM OpenWhisk); the latter abstracts away from the lower levels of the stack, as well as offering pricing based on compute time used as multiples of milliseconds rather than hours. With the relative maturity of such offerings, as well as the emergent next generations of mobile telecommunications related to network function virtualisation and mobile edge Cloud computing, increased focus on distributed computation and computational offloading may also be anticipated.

The importance of cloud computing is evident through its numerous advantages. Beyond enhancing efficiency and flexibility, cloud computing offers lower service costs, greater accessibility, real-time collaboration capabilities, and advanced data security. This last point is particularly crucial in today's environment, where individuals and organizations are increasingly concerned about personal data privacy and secure data sharing with third parties, whether individuals or businesses. In addition to simplifying IT resource management, cloud technologies drive innovation by providing rapid access to new technologies and advanced capabilities for data collection, storage, processing, and analysis.

Today, companies can optimize IT resource costs by paying only for what they use, avoiding the high initial expenses often associated with traditional infrastructure. Users can access information and applications from anywhere with an internet connection, facilitating remote work and global collaboration.

However, the adoption of cloud technologies is not without barriers. Globally, SMEs face financial constraints, data security concerns, and a lack of digital literacy, all of which limit the full implementation of cloud solutions. These issues are also prevalent in Moldova, where many SMEs are hesitant to invest in cloud computing due to limited capital and concerns about data privacy. The lack of a clear digital strategy and insufficient government support further complicate the adoption of such technologies in developing economies.

This thesis explores the impact of cloud computing on SMEs in both the global economy and the economy of the Republic of Moldova. By analyzing statistical data, global trends, and local market conditions, this research will provide a comprehensive understanding of how cloud computing can drive SME growth, identify the obstacles to its adoption, and propose strategies for overcoming these barriers. In doing so, this study aims to offer practical recommendations for policymakers and business owners to support the digital transformation of SMEs, enhancing their competitiveness and sustainability in the modern economy.

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