Chapter 36
New Tools for Cyber Security Using Blockchain Technology and Avatar-Based Management Technique

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ABSTRACT

The chapter introduces the perspectives on the use of avatar-based management techniques for designing new tools to improve blockchain as technology for cyber security issues. The purpose of this chapter was to develop an avatar-based closed model with strong empirical grounding that provides a uniform platform to address issues in different areas of digital economy and creating new tools to improve blockchain technology using the intelligent visualization techniques. The authors show the essence, dignity, current state, and development prospects of avatar-based management using blockchain technology for improving implementation of economic solutions in the digital economy of Russia.

INTRODUCTION

Management in Digital Economy is concerned with the design, execution, monitoring, and improvement of business processes. Systems that support the enactment and execution of processes have extensively been used by companies to streamline and automate intra-organizational processes. Yet, for inter-organizational processes, challenges of joint design and a lack of mutual trust have hampered a broader uptake. Emerging blockchain technology has the potential to drastically change the environment in which inter-organizational processes are able to operate. Blockchain offer a way to execute processes in a trustworthy manner even in a network without any mutual trust between nodes. Key aspects are specific algorithms that lead to consensus among the nodes and market mechanisms that motivate the nodes to progress the network. Through these capabilities, this technology has the potential to shift the discourse in management research about how systems might enable the enactment, execution, monitoring or improvement of business process within or across business networks. By using blockchain technology, untrusted parties can establish trust in the truthful execution of the code. Smart contracts can be used to implement business collaborations in general and inter-organizational business processes in particular. The potential of blockchain-based distributed ledgers to enable collaboration in open environments has been successfully tested in diverse fields ranging from diamonds trading to securities settlement *(Mendling, 2018)*.

But at this stage, it has to be noted that blockchain technology still faces numerous general technological challenges. In this chapter, we describe what we believe are the main new challenges and opportunities of blockchain technology for Digital Economy in Russia. Our study in Russia showed that the Russian research community has not addressed a majority of these challenges, albeit we note that blockchain developer communities actively discuss some of these challenges and suggest a myriad of potential solutions. Some of them can be addressed by using private or consortium blockchain instead of a fully open network. In general, the technological challenges are limited at this point, in terms of both developer support (lack of adequate tooling) and end-user support (hard to use and understand). Our recent advances on developer support include efforts by of the towards model-driven development of blockchain applications sliding mode in intellectual control and communication, help the technological challenges and created tools *(Mkrttchian and Aleshina, 2017)*.

Avatars today may communicate with each other by utilizing a variety of communications methods. This, however, has not always been the case *(Mkrttchian, 2012)*. For example, early generations of virtual worlds traditionally only supported text-based chatting features. What you "heard" another avatar "say" was really just text in a chat box within a 3-D user interface. While text- based chat is not new per se, current virtual world text-based chat is fairly sophisticated in implementation, allowing abilities such as enabling communication sender(s) to vary and tailor messages for recipient(s). For example, avatars may communicate one-on-one or one-to-many with other avatars depending on the rules of the virtual world (i.e., personal messages between avatars, zone-wide shouting, and cross-world messaging). In addition, multiple, simultaneous personalized chat channels may be utilized that can be decomposed by group membership (e.g., ad-hoc groups, teams, raids, or guilds) and governed (e.g., password protected or user-moderated chat channels). Text- based chatting in virtual worlds, like other text-based communications media, also allow for senders to edit their message prior to sending it (e.g., chat buffers) and keep extensive logs of their in-world experiences for later recall *(Mkrttchian, 2012)*. Finally, while individual keyboarding skills and network latency may be issues, text-based chat, in general, within virtual world environments is relatively quick *(Mkrttchian, 2012)*.

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