

Digital Identities In The Context of Blockchain and Artificial Intelligence

JOURNAL OF SELÇUK
COMMUNICATION 2021;
14(2): 529-548
doi: 10.18094/ JOSC.865641



Sevgi Kavut

ABSTRACT

Digital identity is an identity which involves from records and cultural capital, personal profiles created by interactions between individuals, commented " I connect therefore I am" with expression, celebrity tag of Descartes " I think therefore I am" by updating with social media platforms, in YouTube videos. A digital identity is comprised in time by users of technologies such as e-mail, text messaging, social media and so on electronic communication tools. Digital identity is defined in nine dimensions as digital access, digital law, digital communication, digital commerce, digital health, digital security, digital rights and digital responsibilities, digital literacy and digital ethic. The aim of this article is to reveal importance of digital identity concept and elements of digital identities and to explore roles of blockchain and artificial intelligence in development process of digital identities. This article is written as the theoretically. Therefore, in study has been used descriptive analysis method. Consequently, blockchain contributes increasing security measures of digital identity. In case artificial intelligence contributes development of digital identity with face recognition systems and algorithms. Moreover, digital identity got more secure thanks to blockchain systems while digital identities is defined more quickly and easily by means of developed technologies with artificial intelligence.

Key Words: Digital Identity, Elements of Digital Identity, Artificial Intelligence, Blockchain, Communication Technologies

SEVGİ KAVUT

Lecturer Dr.

Istanbul Gelisim University

sevgikavutt@gmail.com

ORCID ID: 0000-0002-0253-3906

SELÇUK İLETİŞİM DERGİSİ 2021; 14(2): 529-548

doi: 10.18094/ JOSC.865641

Geliş Tarihi: 21.01.2021 Kabul Tarihi: 24.03.2021 Yayın Tarihi: 25.04.2021

Blockchain ve Yapay Zeka Bağlamında Dijital Kimlikler

SELÇUK İLETİŞİM

DERGİSİ 2021;

14(2): 529-548

doi: 10.18094/ JOSC.865641



Sevgi Kavut

ÖZ

Dijital kimlik; Descartes'in ünlü 'Düşünüyorum öyleyse varım' sözünün dijital medya araçlarının YouTube'daki videoların yaygınlaşmasıyla 'Bağlantıdayım öyleyse varım' olarak dönüştürülmesi, bireyler arasındaki online etkileşimler yoluyla yaratılan bireysel profiller, kültürel sermaye ve kayıtlardan oluşturulmuş olan bir kimlik olarak tanımlanmıştır. Dijital kimlikler e-mail, metinler, sosyal medya ve benzeri dijital iletişim araçlarının kullanılmasıyla bireyler tarafından oluşturulmuştur. Dijital kimlik; dijital erişim, dijital hak ve sorumluluklar, dijital iletişim, dijital kanun, dijital sağlık, dijital ticaret, dijital etik, dijital güvenlik ve dijital okuryazarlık olmak üzere dokuz bölümden oluşmaktadır. Bu makalenin amacı, dijital kimlik kavramının önemini, dijital kimliğin boyutlarını açıklamak ve dijital kimliklerin gelişiminde yapay zeka ve blockchain teknolojilerinin rolünü açığa çıkarmaktır. Bu makale teorik, kuramsal bir makaledir. Bu nedenle çalışmada betimsel bir analiz kullanılmıştır. Sonuç olarak blockchain dijital kimliklerin güvenli ölçümlenebilmesine katkıda bulunmaktadır. Yapay zeka uygulamaları ise yüz tanımlama sistemleri ve algoritmalar ile dijital kimliklerin gelişimine fayda sağlamaktadır. Aynı zamanda yapay zeka ile geliştirilen teknolojiler sayesinde dijital kimlikler daha hızlı ve kolay bir biçimde tanımlanırken blockchain sistemleri sayesinde daha güvenli dijital kimlikler oluşturulmaktadır.

Keywords: Dijital Kimlik, Dijital Kimlik Boyutları, Yapay Zeka, Blockchain (Blokzincir), İletişim Teknolojileri

SEVGİ KAVUT

Öğr. Gör. Dr.

İstanbul Gelişim Üniversitesi

sevgikavutt@gmail.com

ORCID ID: 0000-0002-0253-3906

JOURNAL OF SELÇUK COMMUNICATION 2021; 14(2): 529-548

doi: 10.18094/ JOSC.865641



INTRODUCTION

It is stated that societies in the digitalized world require to identity protection. So far, identity protection concerns were dealt by identity and reputation management topics (Shibuya, 2020, s. 73). With the advent of the internet based services has been constituted an energetic new area for sharing economy. From all over the world millions of users share personal services, views, liking and disliking with others (Islam & Kundu, 2020, s. 33).

Today's in the digital world, new technologies ever-increasingly mediate to identification and identity verification of people. Combination of biometric (such as name, surname, domicile, fingerprint, iris scan etc.) and blockchain technologies present the new and alternative solutions for digital identification owing to the blockchain uses decentralized distributed ledger technology which have the advantage to digital identity providers (Beduschi A. , 2019, s. 2).

It is explicated that along with participation of more than five billion people to virtual world increasing of in digital connection will bring in such as health, education, life quality, re productivity and to other some situation in physical world and everybody will get in touch with another in the near future. Nowadays identity has always online. In other words, individuals present as online own identities via digital platforms like social media, blog and so on. Internet users have impressed internet and the internet based all technologies by using with own studies and shares in these digital environment (Kavut, 2020, s. 989).

Digital identities has been an attempt which increases in importance in many countries. It can be understood influence of digital identities as management skill to develop national security in developing and developed countries, to provide increasing expectations of citizen, to enhance productivity and activity of public services, to manage population (Atick, 2014, s. 1). Digital identities can be used diversely. Digital identities are an identity type using in -a lot of field such as education, digital security, digital banking, e-health, online shopping, digital privacy, e-commerce, e-government and so on. Therefore, especially after Covid-19 pandemic digital identities has been increased in importance day by day. Usage of digital identities have been compulsory both in Turkey and throughout the world. It can be exemplified digital applications like -chip identities, personal codes, hes codes, e-pulse, e-signature, e-health, e-government information.

The aim of this article is to reveal importance of digital identity concept and elements of digital identities and to explore roles of blockchain and artificial intelligence in development process of digital identities. This article is written as the theoretically. Therefore, in study has been used descriptive analysis method. As part of descriptive analysis firstly it is explicated that concepts of digital identity, blockchain and artificial intelligence and elements of digital identity. Then it is stated views about importance and elements of digital identities and contributions of blockchain and artificial intelligence on digital identities. In study in accordance with descriptive analysis method concepts of digital identities it is described and interpreted.

DIGITAL IDENTITY

According to Laurent, Denouel, Levallois-Barth and Waelbroeck the concepts and features concerning digital identity may describe as -identifier, uniqueness, authentication, anonymity, unlinkability, linkability, pseudonymous trust and reputation (Laurent, Denouel, Levallois-Barth, & Waelbroeck, 2015, s. 31). Digital identity had been used in two different meaning as nym and partial identities. Partial identities involve individuals of a set of features and their attributes such as name, birth date, credit card numbers, biometric, transaction histories while a nym is defined that individuals comprise user identities when they communicated with other users in all online environment (Bertino, Paci, & Shang, 2009). Digital identity is an identity which involves from records and cultural capital, personal profiles created by interactions between individuals, commented “-I connect therefore I am” with expression, celebrity tag of Descartes “ -I think therefore I am” by updating with social media platforms, in YouTube videos” (Kavut, 2020, s. 991).

Today new smart identity cards have enabled contacting with between the digital identity and the physical identity. The usage of biometric and new smart identity cards have provided identity security and ease of use. Meanwhile, the smart identity cards allow an essential basic for confidence provide remote transactions on the internet and from mobile phones (Al-Khouri, 2014, s. 189).

A digital identity is comprised in time by users of technologies such as e-mail, text messaging, social media etc. electronic communication tools (Shavers & Bair, 2016, s. 187). Shavers and Bair describe that biometric identity is the basis of a person’s physical identification. According to Shavers and Bair biometric identifiers may be exemplified such as retina, iris, fingerprint, DNA, voice, ear,

keystroke dynamics, signature, odour, hand/finger geometry, facial recognition etc. (Shavers & Bair, 2016, s. 188,189). In case Feher is stated that the number of articles about digital identity and the online self has been increasing rapidly in last two decades (Feher, 2019, s. 1). Digital identity is an increasingly important issue in communication technologies field. The advantages of digital identity systems are often take shaped around the six core fields such as financial inclusion, gender equality, access to health and education services, social protection and safety, developed governance and greater proficiency (Beduschi, Cinnamon, Langford, Luo, & Owen, 2017, s. 15). According to ID2020 need for digital identity is defined that as Private, Portable, Persistent and Personal features of digital identities in four dimensions. Private dimension has involved which data who with will be shared, identities of individuals just control of themselves. Persistent dimension has comprised to live from birth till death while Portable dimension has included accessibility from all points. In case personal dimension is explained as be special to and unique for the only person (Kavut, 2020: 991).

Digital identity can be come in variety of diversity forms. According to Figure 1, digital identity forms can be defined differently as single digital identity and fragmented digital identity. Nowadays digital identities involve less security and reliability, instead of collectively more than fragmented attributes. Digital identity application areas may be illustrated social media, e-commerce, e-finance, e-government and so on. However, it is aimed at that single digital identity consist of which is high security level and reliability level (PWC , 2019, s. 5).

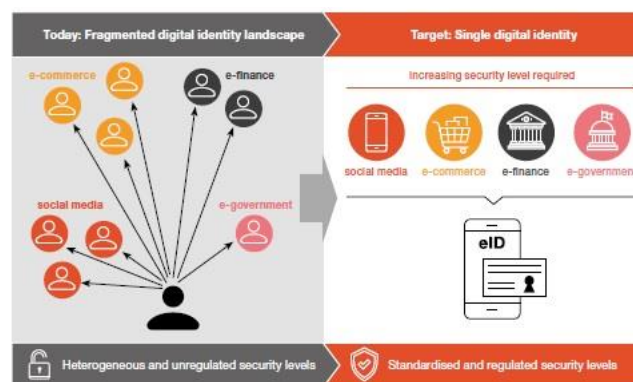


Figure 1. Digital Identity Forms

As it is seen in the Figure 1 digital identity forms are differed from between single digital identity and fragmented digital identity scape. Nowadays digital identities' application areas such as social media, e-commerce, e-finance, government and so on are correlated with compared to single digital

identity. However, security measures are increased in new digital identity forms. Therefore, new digital identities can be used in heterogeneous groups easily and safely.

According to International Telecommunications Union digital identity concept can be defined in the three basic categories private personality traits which assist to insulate although it is defined as a private object.

1. *Corporate digital identity*: -It is defined as piece of national identity schema ceremoniousness of identity that endure by examining of attributive documentary such as generally registers of birth, marriage certificate, social security documents.
2. *Functional digital identity*: -It is constituted to supply specifically requirements of private sector such as insurance, health, transportation sector and so on.
3. *Transactional digital identity*: -It is composed with the intention of paving the way for other transactions or financial products' face to face and on the internet environment all across a lot of sectors (International Telecommunication Union (ITU), 2018, s. 5).

ELEMENTS OF DIGITAL IDENTITY

Ribble defines that elements of digital identity composed of -nine dimensions as digital etiquette, digital communication, digital access, digital literacy, digital law, digital commerce, digital right and responsibility, digital health and wellness and digital security (Ribble, 2012, s. 150).

Digital Access

Technology provides opportunities to communicate and interact with many people (Ribble & Bailey, 2007, s. 14). In this sense, digital access is defined to allow to infrastructures electronic participations in society that everyone has equal access to technology (Hui & Campbell, 2018). It is known that play an important role in digital technology in digital age. As a result, it is needed comprise to access opportunity to technology to provide equality and to close the gap access to digital communication tools. However, it is made difficulties to not reach and to not know how will be used these type technologies in education and learning process (Kaeophanuek, Na-Songkhla, & Nilsook, 2018, s. 292).

Digital Commerce

Digital commerce involves transactions of the electronic buying and selling of goods (Hui & Campbell, 2018). Digital commerce is Web 2.0 version of electronic commerce which involve complete bandwidth of relations with customers through multiple digital channel including social media and mobile to produce permanent employment, to create significant change, to comprise long-term relations (Riemer, Brunk, Gal, Gilchrist, & Ord, 2013, s. 6).

Digital commerce and e-commerce have been comprised from -four dimensions as informative, interactional, relational and social (Riemer, Brunk, Gal, Gilchrist, & Ord, 2013, s. 7).

Informative digital commerce: Informative digital commerce presents the basic feature category of digital commerce. It involves giving information ways to customers about shopping experiences and product portfolios.

Interactional digital commerce: Interactional digital commerce has been transformed to e-commerce websites. The features in this dimension enable to ensure of transaction and via the web transact of business. Therefore, this dimension comprises financial features, payment, shopping cart and delivery and so on (Riemer, Brunk, Gal, Gilchrist, & Ord, 2013, s. 10).

Relational digital commerce: Relational digital commerce has included website personalization which aim maintaining relationships with customers, different user interaction features, recommendation systems, loyalty and benefit schema and other features.

Social digital commerce: This dimension has attached to digital commerce as the latest. It has contained a variety of social media platforms and features that enable to customers seeing and creating friend recommendations, content comments with integration process (Riemer, Brunk, Gal, Gilchrist, & Ord, 2013, s. 11).

Digital Communication

Digital communication is an interactive communication type that communicates using the internet, text, e-mail or to share content and video on social media by interconnected networks. Briefly, digital communication defines that the electronic exchange of information (Hui & Campbell, 2018). In technology fast improvement is changed that life style of people and conduct of jobs in recent years.

Development of the internet and mobile telephones are contributed to transformation of habits and preferences of customers who called into play digital communication tools and digital media to share knowledge about themselves, to online shopping, to communicate with companies, to use new applications (Alkhowaiter, 2020, s. 1).

Digital Literacy

According to Eshet-Alkalai, along with rapid and constant improvement of digital technologies, individuals are need to use a developing variety of technical, mental, social abilities so as presenting tasks and solve the problems in digital environments. Eshet-Alkalai describes that these skills is digital literacy (Eshet-Alkalai, 2004, s. 93). Technology-based learning has been increased in importance more and more every year. Digital literacy is used to ability digital technology and learning basic digital concepts such as browser, search engines, download engines, e-mail etc. (Ribble & Bailey, 2007, s. 21-22). Besides, digital literacy describes that it is a multidimensional, interactive ability to understand digital communication tools and digital information (Pool, 1997). Eshet-Alkalai defines that digital literacy involves both uses a variety of complex cognitive, motor, sociological and emotional abilities and use software or operate a digital tools (Eshet-Alkalai, 2004, s. 93). The concept of digital literacy incorporates five types of literacy as photo-visual literacy, reproduction literacy, information literacy, branching literacy and socio-emotional literacy. Studies in both industry and academia have shown that these types of digital literacy involve most of mental skills applied when using in digital environments (Eshet-Alkalai, 2004, s. 94). For example digital literacy takes advantage with flipped learning system to all students and all teachers (Ribble, 2012, s. 150).

As it is seen in figure 2 digital literacy skills comprises -comment, communicate, create, use of digital content while simultaneously engage a process of critical evaluation (Spires, Paul, & Kerkhoff, 2018, s. 2236).

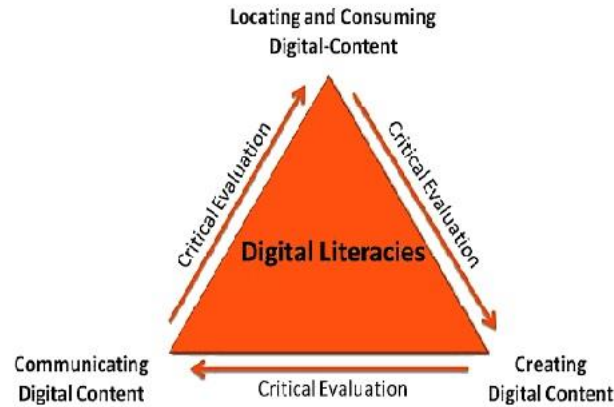


Figure 2. Digital Literacy Practices

According to digital literacy practices in Figure 1 it is stated that digital literacy plays an important role to improve the ability to communicate, create, locate and consume digital content on the online environment and on the internet (Spire, Paul, & Kerkhoff, 2018, s. 2236).

Digital literacy skills have been explicated in this section as information skills, digital tool using and digital transformation (Kaeophanuek, Na-Songkhla, & Nilsook, 2018, s. 293).

1. *Information skills:* It involves methods and technical related to information management and the basic concepts of information management. In this section has discussed information applications for definition of problem, searching topic, commenting, methods and technical for accessing analysis, evaluation, syntheses, studying appropriately and solving problem.
2. *Digital Tool Usage:* It comprises topics essential skills and talents for learning, using various software applications, daily life conversations and digital tool utilization for meetings, solving the basic computer problems and management ability, communication skills, personal knowledge management ability in social networks, technology applications for ethic and open running.
3. *Digital Transformation:* It involves presenting new figures of information, designing, developing, producing, constituting new information, producing inventively digital innovations, evaluation skills with aim of production, reinforcing of information usage (Kaeophanuek, Na-Songkhla, & Nilsook, 2018, s. 293).

Digital Etiquette

Digital etiquette describes that electronic standards of good and norms (Wang & Xing, 2018, s. 189). Digital etiquette means internet users to behave appropriately, safely, reliable, carefully, ethically and responsibly in all online platforms. Users must be aware how behavior internet working activities (Choi, 2016, s. 9).

Digital Law

Individuals are to having an awareness of digital rules, policies and digital laws that manage the use of digital technologies and digital tools (Ribble, 2012, s. 150). It is seen that new developments in digital law issue both in Turkey and in the world. First of all, in Turkey is accepted Social Media Law on 29th July 2020. In case on 31th July 2020 it is taken effect by publishing in the official gazette.

Digital Rights and Responsibilities

Digital rights and responsibilities encompass both defending individual rights and protecting the rights of other individuals. These rights and responsibilities involve everyone in a digital world (Ribble, 2012, s. 150). Digital rights and responsibilities is emphasized that as a central part of presenting of responsible and ethic behaviours of users in online environment. It is indicated that rights such as intellectual property right, preserve privacy, come into the open, to preserve community and the others, themselves self and duplicating across cyberbullying and other damages in digital right and responsibilities (Choi, 2016, s. 12-13).

Digital Health and Wellness

Digital health is defined that patient and caregiver of in common decision-making process and democratization of patient care doctor-patient relationship which bring about in equality level and as cultural transformation of innovative technologies which both provide objective and digital data access (Mesko, Drobni, Benyei, Gergely, & Gyorffy, 2017). In this day and age in health is the most used expression mobile and e-health. However, patient and doctor or between different doctors have been also used telemedicine and telehealth methods to communicate with face to face online communication (Thümmeler, 2015, s. 13).

Digital Security

It is stated that identity security offers peer to peer identity management, third-party authentication and verification services and federated identities so as protecting the integrity, the privacy of applications and data (Takabi & GhasemiGol, 2019, s. 8).

As a result, digital identity elements is associated with called digital citizens notion. The digital citizen is new concept that it is day by day grew in importance in online environment and virtual world. Digital citizenship comprises not only intelligently technology use and digital responsibilities and digital ethics use in all online environment (Spires, Paul, & Kerkhoff, 2018, s. 2236).

BLOCKCHAIN AND DIGITAL IDENTITY

Blockchain presents an impressive development for the area of information collection, distribution and governance in the world of technology users (Bambara & Allen, 2018, s. 1). Blockchain is defined as decentralized, immutable ledger that keeps records of digital transactions (Islam & Kundu, 2020, s. 34). It is indicated that blockchain records is more reliable than the central database of existing application providers such as Sun Exchange, TransActive Grid and Grid Singularity (Bambara & Allen, 2018, s. 28).

Need for blockchain-based identity authentication is especially stood out on the internet era. Blockchain technologies may be suggested solving the problems such as privacy and security worries by delivering a reliable solution without the need for centralized authority. For example, ShoCard may show as an instance to using blockchain for digital identity because it protects consumer privacy (Shrier, Wu, & Pentland, 2016). In the future all data may be verified through a blockchain (Bambara & Allen, 2018, s. 29). Following in figure 2 by Boston Consulting Group (Rose, Rehse, & Rober, 2012, s. 35). Digital identity defines that in three dimensions as personal preferences, acquired attributes, related to birth characteristic. Individual preference dimension comprises whether what people like or what people dislike such as favorite brands, taste in music, interests. Acquired attributes dimension involves what did of people such as address, themselves medical records, purchase history and so on. In case inherent characteristics dimension consist of who themselves such as date of birth, gender, age, nationality.

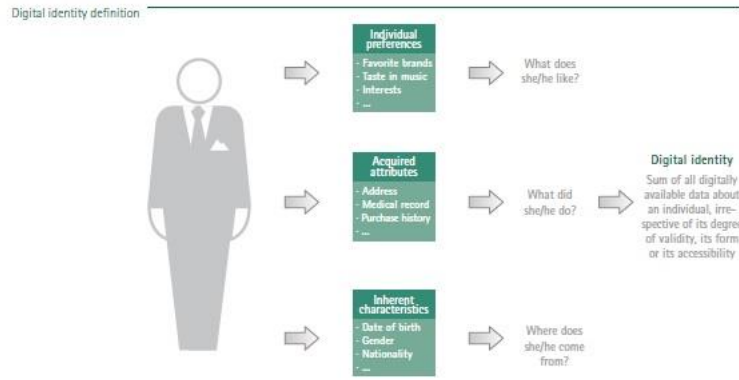


Figure 3. Digital Identity Definition (Rose, Rehse, & Rober, 2012, s. 35).

Digital identity and especially blockchain based digital identity has been revolutionized advent of e-government. Modern identities have been comprised by way of illustrators of digital identity such as national identity numbers and digital identity credentials while classic identities have been constituted government based documents such as identity card, passport and identification cards (Sullivan & Burger, 2019, s. 256).

It is seen that as probable to change life of people of digital identity called as enabled by blockchain technologies. Thanks to benefits digital identities which seen as innovation of blockchain 3.0 can be stored themselves identities more than 2 billion people not bank account on blockchain and such as Know Your Client (KYC) with systems can be allowed from banks by fulfilling regulatory requirements. Meanwhile, these users is found that access enablement to bank accounts and other financial services (Kavut, 2020, s. 999).

Blockchain has to protect potential security and privacy of sensitive data. At the same time it can be also utilized to develop responsibility of security substructures (Zheng, Xie, Dai, Chen, & Wang, 2018, s. 366). In digital identity management system based a typical blockchain have distributed several networks. It can be passed over to provide calculation abilities, distributed storage and secure access from these networks. A user pulls out as the network within network in this system. Therefore, blockchain allows storing sensitive user data changing from servers from conventional identity management solutions to user devices or user networks namely to based blockchain new approaches. This enable to have self sovereign identity (SSI) type since user have recovery opportunity their own

identity. As a result, this decrease various risks inherent of traditional identity management systems (Liu, ve diğçerleri, 2020, s. 2).

DIGITAL IDENTITY AND ARTIFICIAL INTELLIGENCE

Digital identity management is a complex area of practice that it has many properties such as technical, economic, social and cultural (Al-Khourı, 2014, s. 184). Artificial intelligence is described as the multifaceted type of intelligence increasingly improving towards the cognitive machines that have the abilities to remember, understand context, communicate and learn (Hippman, Klingner, & Leis, 2019, s. 14). It has been indicated that artificial intelligence algorithms will be able enable to compose personal digital identities to every person to performing actions on the internet. Forming the digital identity is a continuous updated interactive process so long as people get in touch on the internet (Latar & Nordfor, 2010, s. 18).

Artificial intelligence or AI is defined that as technology of machine development which form with artificial devices and can be realized movements and behaviours whose people have (Sayar & Yalaz, 2019, s. 56). Improved face recognition system with artificial intelligence technologies may be also evaluated that to describe more truly and fast of identities such as a different contribution which for security of digital identity provided. It is think that dual usage are, measurable and suitability to quick propagation features of artificial intelligence can be contributed to fast and interactive solutions to digital identity security (Kavut, 2020, s. 1000). In future usage of biometric technologies and other applications in identity schedules will become more widespread (Gelb & Metz, 2018, s. 96).

Artificial intelligence strengthens gradually technologies which -constitute quickly essential for society communicational, analytic and even legal substructures. Algorithm affects day by day life area of people such as communication, shopping, online dating, surveillance of employees, recruitment processes via smart telephones. Meanwhile, algorithms affects user what content saw on the internet and social media platforms (ESPAS, 2018, s. 6). It is estimated that in case global artificial intelligence market will be 26.4 billions US dollars with annual percent forty growth rate up to 2023 (Hassani, Huang, & Silva, 2019, s. 107).

CONCLUSION

The aim of this article is to reveal importance of digital identity concept and elements of digital identities and to explore roles of blockchain and artificial intelligence on digital identities. This article is written theoretically. Therefore, in this study has been used descriptive analysis method.

Taken together in this study it is seen that digital identity have in two different meanings. First meaning of digital identity is defined as online reputations, digital self reputations of individuals in digital environments such as social media, blog, websites and so on. In case the other digital identity definition comprises all the information of online platform users such as biometric information, name, surname, age, education levels, social media preferences, behaviours, attitudes, success and so on. Digital identity is like the footprint of individuals -in social media platforms, digital banking, online shopping, e-commerce, government and as a matter of fact in every sphere of life.

Blockchain contributes increasing security measures of digital identity. In case artificial intelligence contributes development of digital identity with face recognition systems and algorithms.

Finally, digital identity got more secure thanks to blockchain systems while digital identities is defined more quickly and easily by means of developed technologies with artificial intelligence. Nowadays digital identity usage is become widespread progressively. It is predicted that in near future digital identity, artificial and blockchain market will be proceeded gradually. Especially after coronavirus pandemic in all the world digital communication tools usage has been increased. Therefore, it is believed that digital identity application areas will be evolved and new digital identity areas will be found out.

GENİŞLETİLMİŞ ÖZET

GİRİŞ

Dijitalleşmiş dünyada toplumların kimlik korumaya ihtiyaç duyduğu belirtilmektedir. Bu nedenle kimlik koruma kaygıları kimlik ve itibar yönetimi konuları yoluyla ele alınmaktadır (Shibuya, 2020, s. 73). İnternet tabanlı uygulama ve hizmetlerin ortaya çıkışı ile paylaşım ekonomisi için dinamik, yeni bir alan oluşturulmuştur. Dünyanın her yerinden milyonlarca kullanıcı kişisel görüşlerini paylaşmakta, diğerlerinin paylaşımları ile ilgili beğenilerini veya eleştirilerini dile getirmektedir (Islam & Kundu, 2020, s. 33).

Günümüz dijital dünyasında yeni iletişim teknolojileri insanların kimlik tanımlama ve kimlik doğrulamasına artan oranda aracılık etmektedir. Ad, soyad, retina, parmak izleri, ikametgah adresi vb. biyometrik bilgilerinin birleştirilmesi and geliştirilen blockchain (blok zinciri) teknolojileri dijital kimlik tanımlama için yeni ve alternatif çözümler sunmaktadır. Bu anlamda blockchain dijital kimlik sağlayıcılarına avantajlar sunan merkezsizleşmiş dağıtık hesap defteri teknolojilerini kullanmaktadır (Beduschi A., 2019, s. 2).

Bu makalenin amacı, dijital kimlik kavramının önemini, dijital kimliğin boyutlarını açıklamak ve dijital kimliklerin gelişiminde yapay zeka ve blockchain teknolojilerinin rolünü açığa çıkarmaktır. Bu makale teorik, kuramsal bir makaledir. Bu nedenle çalışmada betimsel bir analiz kullanılmıştır. Dijital kimlikler çeşitli şekillerde kullanılabilir. Dijital kimlikler; eğitim, dijital güvenlik, dijital bankacılık, e-sağlık, online alışveriş, dijital gizlilik, e-ticaret, e-devlet ve benzeri birçok alanda kullanılan bir kimlik şeklidir. Bu yüzden özellikle Covid-19 pandemisinin ardından dijital kimliklerin önemi her geçen gün artmıştır. Dijital kimliklerin kullanımı hem Türkiye’de hem de dünyada zorunlu hale gelmiştir. Çipli kimlikler, kişisel kodlar, Hes kodları, e-nabız, e-devlet, e-sağlık bilgileri gibi dijital uygulamalar örnek verilebilmektedir.

DİJİTAL KİMLİK

Laurent, Denouel, Levallois-Barth and Waelbroeck’a göre dijital kimlik ile ilişkili kavramlar ve özellikler tanımlayıcı, benzersizlik, doğrulama, anonim, bağlantısallık, bağlantısızlık, dürüstlük, itibar, takma ad olarak tanımlanabilmektedir (Laurent, Denouel, Levallois-Barth, & Waelbroeck, 2015, s. 31). Dijital kimlikler takma isimler ve kısmi kimlikler olarak iki farklı anlamda kullanılmaktadır. Takma isimler bireylerin diğer kişilerle online ortamlarda iletişim kurduğunda oluşturdukları kullanıcı kimlikleri olarak tanımlanırken kısmi kimlikler bireylerin ad, doğum tarihleri, kredi kartı numaraları, biyometrik bilgileri, işlem geçmişleri gibi niteliklerini ve bir dizi özelliğini içermektedir (Bertino, Paci, & Shang, 2009).

Dijital kimlik; Descartes’in ünlü ‘Düşünüyorum öyleyse varım’ sözünün dijital medya araçlarının yaygınlaşmasıyla ‘Bağlantıdayım öyleyse varım’ olarak dönüştürülmesi, bireyler arasındaki online etkileşimler yoluyla yaratılan bireysel profiller, kültürel sermaye ve kayıtlardan oluşturulmuş olan bir kimlik olarak tanımlanmıştır. Dijital kimlikler e-mail, metinler, sosyal medya ve benzeri dijital iletişim araçlarının kullanılmasıyla bireyler tarafından oluşturulmuştur (Kavut, 2020, s. 991).

Uluslararası Telekomünikasyon Birliği (ITU)'ne göre dijital kimlik kavramı özel bir obje olarak tanımlanmasına rağmen özel kişilik özelliklerini izole etmeye yardım eden üç ana kategoride tanımlanabilir.

1. *Kurumsal dijital kimlik:* Genellikle doğum kayıtları, evlilik cüzdanı ve sosyal güvenlik dokümanları gibi nitelenen belgelerin incelenmesi yoluyla kimliklerin resmi oluşumuna dayanan ulusal kimlik şemasının bir parçası olarak tanımlanır.
2. *Fonksiyonel dijital kimlik:* Sigorta, sağlık, ulaşım sektörü gibi özel sektörün spesifik ihtiyaçlarını ele almak için oluşturulmuştur.
3. *Transaksiyonel (Etkileşimsel) dijital kimlik:* Birçok sektör çapında yüz yüze ya da internet ortamında finansal ürünleri veya diğer işlemleri kolaylaştırma niyetiyle oluşturulmuştur (International Telecommunication Union (ITU), 2018, s. 5).

DİJİTAL KİMLİĞİN BOYUTLARI

Ribble dijital kimliğin dijital erişim, dijital hak ve sorumluluklar, dijital iletişim, dijital kanun, dijital sağlık, dijital ticaret, dijital etik, dijital güvenlik ve dijital okuryazarlık olmak üzere dokuz bölümden oluştuğunu belirtmiştir (Ribble, 2012, s. 150).

BLOCKCHAIN (BLOK ZİNCİRİ) VE DİJİTAL KİMLİK

Blockchain; teknoloji kullanıcılarının dünyasında bilgi toplama, dağıtım ve yönetimin alanları için etkileyici bir gelişme sunmaktadır (Bambara & Allen, 2018, s. 1). Blockchain dijital işlemlerin kayıtlarını tutan merkezsizleştirilmiş, sabit hesap defteri olarak tanımlanır. Blockchain (blok zinciri) kayıtlarının mevcut uygulamaların sağlayıcılarının merkez veri tabanlarından daha güvenli olduğu belirtilmektedir (Bambara & Allen, 2018, s. 28).

Blockchain hassas verilerin gizliliğini ve güvenliğini koruma potansiyeline sahiptir. Aynı zamanda güvenlik alt yapılarının güvenilirliğini geliştirmek için de kullanılabilir (Zheng, Xie, Dai, Chen, & Wang, 2018, s. 366). Tipik bir blockchain tabanlı dijital kimlik yönetim sisteminde dağıtık birçok ağ bulunmaktadır. Bu ağlardan dağıtık depolama, güvenli erişim ve hesaplama yetenekleri sağlamak için yararlanılabilmektedir. Bu sistemde bir kullanıcı ağ içerisinde bir ağ olarak hareket etmektedir. Bu nedenle sunuculardan değişen geleneksel kimlik yönetim çözümlerinden kullanıcı cihazları veya ağlarına

(yeni blockchain tabanlı yaklaşımlara) hassas kullanıcı verilerinin depolanmasına izin vermektedir. Bu kullanıcıların kendi kimliklerinin kontrolünü geri kazanma kapasitesine sahip olduğundan beri kendi kendini yöneten kimlik (SSI) biçimine olanak sağlamaktadır. Sonuç olarak bu geleneksel kimlik yönetim sistemlerinin doğasında olan çeşitli riskleri azaltmaktadır (Liu, ve diğerleri, 2020, s. 2).

YAPAY ZEKA VE DİJİTAL KİMLİK

Yapay zeka, öğrenme, iletişim kurma, içerikleri anlama, hatırlama yeteneklerine sahip olan zihinsel makinelerle doğru giderek gelişen zekanın çok yönlü türü olarak tanımlanır. Yapay zeka algoritmalarının internette eylemlerini, sunumlarını sergilemesi için her bir kişiye kişisel dijital kimlikler oluşturmak için olanak sağlayabileceği açıklanmıştır. Dijital kimlik oluşturma, bireyler internette bağlantıda oldukları sürece devamlı güncellenen, interaktif bir süreçtir (Latar & Nordfor, 2010, s. 18).

Yapay zeka toplumlar için gerekli iletişimsel, analitik ve hatta yasal alt yapıları hızlı bir biçimde oluşturan teknolojileri giderek güçlendirmektedir. Algoritmalar akıllı telefonlar yoluyla işe alım süreçleri, işçilerin gözetlenmesi, online buluşmalar, online alışverişler, iletişim gibi insanların yaşam alanlarını her geçen gün etkilemektedir. Aynı zamanda algoritmalar kullanıcıların internette ve sosyal medya uygulamalarında hangi içeriklerini gördüklerini etkilemektedir (ESPAS, 2018, s. 6). Küresel yapay zeka pazarının ise 2023'e kadar yıllık yüzde 40 büyüme oranı ile 26.4 milyar US dolar olacağı tahmin edilmektedir (Hassani, Huang, & Silva, 2019, s. 107).

SONUÇ

Dijital kimlik kavramına ilişkin tanımlamalar değerlendirildiğinde iki kavramsal yaklaşıma sahip olduğu görülmüştür. Birincisi dijital kimlikler; bireylerin sosyal medya uygulamaları, dijital platformları, blogları, web siteleri gibi tüm online ortamlarda gösterdikleri davranış biçimleri, benlik sunumları ve online itibarları olarak açıklanmıştır. Dijital kimliğin bir diğer tanımı ise bireylerin ad, soyad, biyometrik bilgileri, eğitim düzeyleri, parmak izleri, işleri, başarıları vb. gerçek kimlikleri ile yer aldıkları tüm bilgilerinin online ortamlarda gösterildiği bir kimlik biçimi olmasıdır.

REFERENCES

4 Elements of Good Digital ID. (2019). 06 28, 2019 tarihinde <https://blog.privacy.id/4-elements-of-good-digital-id-explained/> adresinden alındı

- Al-Khouri, M. (2014). Digital identity: Transforming GCC economies,. *Innovation*, 16(2), 184-194. doi:http://dx.doi.org/10.1080/14479338.2014.11081981.
- Alkhowaiter, W. A. (2020). Digital payment and banking adoption research in Gulf countries: A systematic literature review. *International Journal of Information Management*, 53. doi:10.1016/j.ijinfomgt.2020.102102
- Atick, J. (2014). *Digital Identity: The Essential Guide*. ID4Africa.
- Bambara, J. J., & Allen, R. P. (2018). *Blockchain A Practical Guide to Developing Business, Law and Technology Solutions*. McGraw-Hill Education.
- Beduschi, A. (2019). Digital Identity: Contemporary Challenges for Data Protection, Privacy and Non-Discrimination Rights,. *Big Data&Society*, 1-6.
- Beduschi, A., Cinnamon, J., Langford, J., Luo, C., & Owen, D. (2017). *Building Digital Identities, University of Exeter&Coelition*. .
- Bertino, E., Paci, F., & Shang, N. (2009). Digital Identity Protection-Concepts and Issues. *4th International Conference on Availability, Reliability and Security*. .
- Choi, M. (2016). A Concept Analysis of Digital Citizenship for Democratic Citizenship Education in the Internet Age. *Theory & Research in Social Education*,. doi:10.1080/00933104.2016.1210549
- Eshet-Alkalai, Y. (2004). Digital Literacy: A Conceptual Framework for Survival Skills in the Digital Era. *Jl. Of Educational Multimedia and Hypermedia*, 13(1), 93-106.
- ESPAS. (2018). *Global Trends to 2030: Identities and Biases in the Digital Age*. ESPAS Ideas Paper Series.
- Feher, K. (2019). Digital identity and the online self: Footprint strategies – An exploratory and comparative research study. *Journal of Information Science*, 1-14.
- Gelb, A., & Metz, A. (2018). *Identification Revolution- Can Digital ID Be Harnessed for Development?* Center For Global Development.
- Hassani, H., Huang, X., & Silva, E. (2019). *Fusing Big Data, Blockchain and Cryptocurrency*. Palgrave Macmillan.
- Hippman, S., Klingner, R., & Leis, M. (2019). Digitization–Areas of Application and Research Objectives . R. Neugebauer içinde, *Digital Transformation* (s. 9-18). Springer.
- Hui, B., & Campbell, R. (2018). *Discrepancy between Learning and Practicing Digital Citizenship*. J Acad Ethics, Springer.
- International Telecommunication Union (ITU). (2018). *Digital Identity Roadmap Guide*. İsviçre. http://handle.itu.int/11.1002/pub/81215cb9-en. adresinden alındı
- Islam, M., & Kundu, S. (2020). IoT Security, Privacy and Trust in Home Sharing Economy via Blockchain. A. D. Kim-Kwang Raymond Choo içinde, *Blockchain Cybersecurity, Trust and Privacy* (s. 33-50).

- Kaeophanuek, S., Na-Songkhla, J., & Nilsook, P. (2018). How to Enhance Digital Literacy Skills among Information Sciences Students. *International Journal of Information and Education Technology*, 8(4), 292-297.
- Kavut, S. (2020). Kimliğin Dönüşümü: Dijital Kimlikler. *Selçuk İletişim Dergisi*, 987-1008.
- Latar, L. N., & Nordfor, D. (2010). *The Future of Journalism: Artificial Intelligence and Digital Identities*.
- Laurent, M., Denouel, J., Levallois-Barth, C., & Waelbroeck, P. (2015). Digital Identity. *Digital Identity Management*, 1-45.
- Liu, Y., He, D., Obaidat, M.S., Fellow of IEEE and Fellow of SCS, Kumar, N., Khan, M.K., Raymond Choo, K.-K. (2020). Blockchain-based identity management systems: A review. *Journal of Network and Computer Application*. doi:<https://doi.org/10.1016/j.jnca.2>
- Mesko, B., Drobni, Z., Benyei, E., Gergely, B., & Gyorffy, Z. (2017). Digital Health is a Cultural Transformation of Traditional Healthcare. *mHealth*. doi:10.21037/mhealth.2017.08.07.
- Pool, R. (1997). A New Digital Literacy: A Conversation with Paul Gilster. *Integrating Technology into Teaching*, 55(3).
- PWC . (2019). *Digital Identity- Your key to Unlock The Digital Transformation*. <https://www.pwc.ch/en/publications/2019/digital-identity-whitepaper-web.pdf>. adresinden alındı
- Ribble, M. (2012). Digital Citizenship for Educational Change . *Kappa Delta Pi Record*, 48(4), 148-151. doi:10.1080/00228958.2012.734015.
- Ribble, M., & Bailey, G. (2007). Digital Citizenship in Schools. *International Society for Technology in Education (ISTE)*.
- Riemer, K., Brunk, J., Gal, U., Gilchrist, B., & Ord, R. (2013). *Australian Digital Commerce: A Commentary on the Retail Sector*. Capgemini Consulting Technology Outsourcing & The University of Sydney Business School.
- Rose, J., Rehse, O., & Rober, B. (2012). *The Value of Our Digital Identity*. Boston Consulting Group Liberty Global Policy Series.
- Sayar, K., & Yalaz, B. (2019). *Ağ-Sanal Dünyada Gerçek Kalmak*. İstanbul: Kapı Yayınları.
- Shavers, B., & Bair, J. (2016). *Hiding Behind the Keywords-Uncovering Covert Communication Methods with Forensic Analysis*. Syngress, Elsevier.
- Shibuva, K. (2020). *Digital Transformation of Identity in the Age of Artificial Intelligence*. Springer.
- Shrier, D., Wu, W., & Pentland, A. (2016). Blockchain&Infrastructure (Identity, Data Security). *Massachusetts Institute of Technology*, 1-19.

- Spires, A. H., Paul, M., & Kerkhoff, N. (2018). Digital Literacy for the 21st Century . *Encyclopedia of Information Science and Technology*. içinde IGI Global.
- Sullivan, C., & Burger, E. (2019). Blockchain, Digital Identity, E-government. H. Treiblmaier, & R. Beck içinde, *Business Transformation Through Blockchain Volume II*, (s. 233-258). Palgrave Macmillan.
- Takabi, H., & GhasemiGol, M. (2019). Introduction to the Cloud and Fundamental Security and Privacy Issues of the Cloud. L. Chen, H. Takabi, & N.-A. Le-Khac içinde, *Security, Privacy and Digital Forensics in the Cloud*. Higher Education Press.
- Thümmmler, C. (2015). Digital Health. C. A. S.A. Fricker içinde, *Requirements Engineering for Digital Health*. Springer.
- Wang, X., & Xing, W. (2018). Exploring the Influence of Parental Involvement and Socioeconomic Status on Teen Digital Citizenship: A Path Modeling Approach. *Educational Technology & Society*, 21(1), 186-199.
- Zheng, Z., Xie, S., Dai, N., Chen, X., & Wang, H. (2018). Blockchain Challenges and Opportunities: A Survey. *In International Journal of Web and Grid Services*, 14(4), 352-375.