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### RESEARCH ARTICLE

## PERCEPTION OF TAX OFFICE EMPLOYEES FOR THE USE OF BLOCKCHAIN TECHNOLOGY IN TAX OFFICE.

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### Abstract

The blockchain technology, which is expected to find a wide range of applications in the years to come, is remarkable in recent years in terms of private and public sectors with the ability to record many data, provide data security, and provide transparency through decentralized recording. In addition to the private sector, this technology can be found in the literature in the public sector. It is thought that blockchain technology, which can be used at various stages of public administration, will provide convenience for taxpayers and tax office in tax transactions. For this purpose, the opinions of the employees of the tax office were applied to the implementation of the blockchain technology in various stages of the taxation system. In this direction, a scale was conducted for employees of the Tax Office in Afyonkarahisar and Kütahya. According to the results of the study, employees of the tax office have a positive perception about blockchain technology. In addition, this perception differs according to employees' position, seniority and level of knowledge about blockchain technology. No significant difference was determined according to gender variable.

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### Introduction:-

In today's world, information and communication technologies are developing rapidly. The impact of globalization require states to take necessary policies to ensure that they comply with technological progress. In the 21st century, many processes are carried out over the internet, which is shown as the most important invention of the era. In addition to many fields of application such as interpersonal communication, social sharing areas, finance, banking, and trade through the Internet, various e-government applications are now in the public sphere. In addition to these, technological advances such as digitalization and artificial intelligence emerge which are foreseen to be expanded by the states in the 2020s. Developments in this direction are called the Industry 4.0 or 4th Industrial Revolution and include data exchange and various automation systems. Blockchain application is an important part of these developments.

### Description And Characteristics Of Blockchain Technology

1. Blockchain is a system that ensures decentralized, invariance and tracking of various transaction records. Although blockchain application comes up with bitcoin application, it includes a technology that can be applied in various fields as a method. Testing of e-government applications by various countries shows that this technology can be applied. The block chain can be expressed as multiple digital notebooks that are stored and encoded with data records and blocks in a public or private network. It is not possible to change or delete the

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blocks after they are collected in the chain. This application is verified by using automation and shared management protocols (Durğay & Karaaslan, 2018). The way in which Blockchain technology is applied has five basic principles (Iansiti & Lakhani, 2017: 9):

2. With a distributed database, access to the entire database and all past processes is possible by people on the blockchain side. It is not possible to control information and data by a single party. All parties can verify the transaction records of the other party without an intermediary.
3. Interpersonal communication takes place directly between the parties instead of a central node. Each network can transmit information to all other networks and has the ability to store information.
4. Via transparency for the parties, each transaction and the values related to these transactions can be seen by people with access to the system. Blockchain has a descriptive numerical address for users and for each node. Whether users share their public identities depends on their preferences. Also, transactions are performed via blockchain addresses.
5. Failure to revert records, can update the database and accounts after a transaction record has been created and the records cannot be changed. Because each transaction is linked to the previous record. Various algorithm accounts and transaction entries are distributed to keep the record in the database permanent, sorted chronologically, and accessible to all users on the network.
6. With computational logic, the nature of the digital notebook can be attributed to the computable logic and intrinsic programming of the blockchain operations. This allows users to automatically initiate transactions between nodes.
7. Table 1 shows the comparison of the block chain and the central database and the distributed database in terms of various properties.

**Table 1:-Blockchain vs Legacy Centralized and Distributed Databases**

Features	Blockchain	Centralized Database	Distributed Database
Record Integrity	High	Medium	Medium
Availability	High	Low	Medium
Fault Tolerance	High	Low	High
Confidentiality	Low	High	Medium
Computing Time	Low	High	Medium
Trustless Nodes Collaboration	High	Low	Low

**Reference:** Bozic, N., Pujolle, G., & Secci, S. (2016). A tutorial on blockchain and applications to secure network control-planes, in: 2016 3rd Smart Cloud Networks Systems (SCNS).

Blockchain contains an ever-growing data structure sorted by time. The blocks keep the operations done and the address of the previous block. In this respect, the block chain can be expressed as a registry in which an unchangeable list of transactions is kept (Karaaslan & Akbaş, 2017). Thanks to the operations performed in the blockchain system and hash algorithms, the reliability of the transactions is maintained. In addition, while the system is resistant to attacks, it is not possible to capture the system. Storing information about transactions in the system by all parties increases system security further (Durğay & Karaaslan, 2018).

Once a new block has been added to the blockchain system, the new block cannot be deleted for a long time, and transactions performed over the block can be accessed by others on the network. In this way, records on computers on the network are permanent (Wright & Filippi, 2015: 8). The crypto technology behind blockchain is based on asymmetric encryption or public-key. This encryption uses two different switches that are related to each other. A party that takes an account in blockchain has two keys, private and general. Only the person can know and use the private key; the transactions with the public key are sent to the blockchain network. The other parties can also check the accuracy of this process at the same time. If the public key is approved on the network, it will be authenticated (Brandon, 2016: 34).

It can be said that the most important innovations brought by blockchain technology are having a open network, that the parties do not need to know each other and that the parties do not have trust problems with each other. Electronic transactions are automatically recorded by the nodes of the network. No human intervention, central authority

control or a third party is required, since it can be recorded and verified by means of a calibrated algorithm. While some nodes are not secure, the network protects the process by performing a process called mathematical mechanism called proof-of-work that is independent of human intervention and requires no centralized control. The documents of the public documents, which cannot be recycled and cannot be recycled in this way, can be protected with the wide range of applications owned by the geniş blockchain ulam (Atzori, 2015: 2-3).

It is also possible to make smart agreements in the block chain with Ethereum project, which introduces itself as a block chain application platform. It is possible to develop applications that record values and data and run blocks for various calculation tasks by means of agreements (Karaaslan & Akbaş, 2017). In this context, smart contracts can perform two-sided or multilateral agreements, called automated, while approval by the parties within the block chain is required to perform transactions with multiple signatures. Smart contracts can also be called digital ownership of material, and immaterial things can be recorded with the blockchain. In this respect, it can be said that the blockchain offers advantages in terms of trust. Blockchain technology envisages protecting participants against fraud or any risk with a cryptographic code that does not require a third party to provide confidence, such as a notary public. Blockchain technology provides transparency, control, cost efficiency and automation. In this respect, the blockchain can provide a destructive innovation in many commercial activities and contracts (Atzori, 2015: 2-3).

### **Application Of Blockchain System In Public Area**

The blockchain system, announcing its name with the bitcoin application, has attracted researchers' attention with its features such as design and personal privacy. Especially after bitcoin application, payment systems and alternative models have been proposed and the blockchain system has become more attractive (Khalilov, Gündebahar & Kurtulmuşlar, 2017). In this respect, the implementation of the blockchain system in the public area and the implementation stages such as e-government have been discussed and some countries have begun to be tested by pilot applications.

In this context, it can be stated that public sector can develop blockchain technology in various application areas. This application can be in the form of a special block chain system or it can also be made public. In addition to being an application that can make a significant benefit to the special block chain application, the publicly developed block chain application is a more convenient application for decentralized, interoperable and security systems. Blockchain can be applied in public area as an example of the payment systems, execution of check fraud detection, local and central government to link a set of data, records management and for the prevention of fake records, identity management and personal information protection, electricity, telecommunications, water and land monitoring of physical assets such as registration. In addition, customs and border control, digital passport application, digital voting and taxation process in relation to the abolition of human-induced errors in this system is possible with the implementation (Durtek & Karaaslan, 2017).

Zyskind, Nathan and Pentland (2015: 184) developed a blockchain application model for the protection of personal data in their study. In the study, because of the confidentiality of personal data, data owners have implemented a system in which blockchain users are secured. With the applications provided by blockchain in these areas, public information can be protected with a password and citizens can be provided with the authority to access these critical information (Kirbaş, 2018: 81).

However, blockchain applications also appear in the field of health. The blockchain in this area provides benefits such as keeping medical records of patients, detecting drug fraud. As an example, the Estonian government has launched blockchain technology in the health sector in the Guardtime project launched in 2011 (Mettler, 2016). In addition, Yue, Wang, Jin, Li and Jiang (2016: 218), in their study, developed a model based on the blockchain platform on the concern that patients' health data were scattered and could violate confidentiality. Although this model is not centralized, it has a simpler structure and reliability, and patient privacy is ensured through the relevant model. It is also the purpose of this model to provide a smart health service that includes the storage of data on health services. In the fields of agriculture, RFID systems as well as distributed database based approaches are used in the follow-up and approval of cultivation, spraying and packaging processes (Tian, 2016).

Tate, Johnstone and Fielt (2017) refer to a new study area, called crowdwork that includes online paid work. It has been determined that this working platform has various problems based on the experience of its employees. Blockchain technology can be used to solve some of these problems. It was emphasized that the blockchain system

could bring justice with transparency in this working platform and could solve the structural problems related to the management of the business by not requiring overload expenses.

With the development of blockchain technology and the validity of digital public opinion, states and towns can move to systems that can be directly managed. For example, in a prospective town, it may be possible for a mayor to present a budget proposed by the mayor through a blockchain application. In this way, residents can rate the proposed budget via their mobile devices; if the voting has been concluded in a positive manner, budgeting may take place in line with the demands of the public. However, if the budget-related voting results in negative results, the public sources and the budgetary resources can be reviewed again. In this way, political insecurity can be reduced, the voting cost can be reduced and an increase in efficiency can be achieved in local governments. As blockchain technologies develop, governments will replace their place with a decentralized system. With this technology, people can set rules for their own governance, collect taxes and use resources in any direction. To be able to realize them will be possible through various algorithmic rules and smart contracts. In this way, a self-governing state system can be developed by a techno-democratic formation (Wright & Filippi, 2015: 39).

Technological developments not only affect entrepreneurs or investors, but also affect governments. Governments are also encouraging technologies in the light of new developments. Given the recent actions of governments, blockchain technology has been promoted in several ways. The state of Delaware (SB 69 21.07.2017) among US states has authorized the use of electronic networks to companies in this region. In addition, in Arizona (HB 2417 29.03.2017), blockchain technology is secured by an electronic signature and is specified in the law to be recognized as an electronic record containing the contract. In Turkey, the Central Bank who has followed closely Bitcoin and thinks that the crypto-currency can contribute to the financial stability, announces the formation of the “Blockchain Working Group” in this regard (Ar & Ge Bulletin, 2017).

#### **Status Of Blockchain Application Against Tax Applications**

Tax reforms are necessary for taxpayers to improve the current situation. In particular, applications in the digital age reduce record keeping and verification times and make these processes more transparent. Records kept in digital form aim to store more tax-related data. There are also many digitalized transactions such as direct debit and online payment via digital form. In this way, the amount of tax payable by the taxpayer can also be calculated on time. Taxpayers will be provided with a digital tax account for the convenience of individuals and businesses. In fact, the digital tax account can replace the tax return process (Nellen, 2018: 30-31).

The application area of Blockchain technology in various tax types can be expanded. Wijaya, Liu, Suwarsono and Zhang (2017) developed a blockchain-based taxation model for the Value Added Tax (VAT) system. They stated that this technology could be implemented in the Value Added Tax system and that corruption in this way could be reduced. Accordingly, the VAT payer acquires a blockchain account in the new system and each transaction made on the taxation process is carried out through this account. The VAT system is based on the tax invoice system and ends the use of paper by electronic invoicing, which is called “e-faktur” through the developed model. The system also prevents counterfeit billing. In addition, a blockchain-based tax system can be used to determine where and when transactions occur in the taxation process. In this way, quality data can be provided to the authorities in relation to the taxation process. In this model, the tax office has more control over the VAT process. Ainsworth and Viitasaari (2017) stated that payroll tax will be implemented by blockchain technology until 2021. In another study, it was stated that the government will collect taxes with the blockchain system in the expected technological developments in 2025 (Chung & Kim, 2016).

The blockchain, which contains a decentralized notebook system, offers many convenience over the centralized system. The centralized data storage system of a modern tax office includes tax activities, such as a declaration, payment and audit, covering a period of three years or more. Centralized tax management with the Blockchain system will be replaced by decentralized blockchain technology. In the World Economic Forum held in Davos between 20<sup>th</sup> and 23<sup>rd</sup> of January 2016, it was stated that governments could collect taxes with blockchain technology by 2023 (Ainsworth & Alwohaibi, 2017). With the Blockchain based automatic tax regime, one hundred percent success in tax compliance can be achieved. Because all wallets can be seen by the authority and the flow of money can be monitored. In addition, many people will be covered by the tax network and the tax network will be expanded. In this case, tax collection can be increased. In parallel with the expansion of the tax network, since more people will be covered by tax, the tax burden will be reduced for each taxpayer in order to reach the tax potential of the government and each individual will pay less tax. In this way, disposable personal income and savings will

occur. The authority can take a certain percentage under the name of the transaction tax from each transaction carried out through the blockchain (Kartik & Yatish, 2017: 17-18).

In order to encourage the implementation of Blockchain, in the US state of Nevada in 2017 the blockchain will be recognized as an electronic form of registration and the prohibition on the use or blockage of the blockchain is prohibited by the Uniform Electronic Transaction Act. It was also stated that the information and transactions obtained with the blockchain could be included in the scope of jurisdiction.

However, the use of blockchain in tax transactions has started to attract worldwide attention. This technology is intended to be implemented in the United Arab Emirates due to the reduction of taxation errors and tax compliance. As of the year 2020, the UK Tax Office has been working for the use of this technology in the tax system (<http://www.fintricity.com/blockchain-tax-fraud/>). Italy, a member state of the European Union, introduced the e-invoice tax reporting regime as of January 1, 2017 in order to speed up reporting and reduce counterfeiting. In this way, the details of the invoices for the purchase and sale of VAT will be presented electronically (<https://www.vatlive.com/vat-news/how-blockchain-could-shape-tax-automation/>).

However, the Republic of China also announced that it will be implementing blockchain in the tax system until the year of 2023 in the 13th Five Year Development Plan. According to the European Commission, there is a deficit of € 160 billion in VAT in 2014. This deficit can be associated with tax fraud. The implementation of blockchain will enable concrete plans for future tax revenue for tax authorities. In this way, a guaranteed high and error-free tax system can be created with intelligent contracts. Taxpayers will also be able to see the purpose for which taxes are used (<http://www.fintricity.com/blockchain-tax-fraud/>).

## Method:-

### RESEARCH MODEL

In this study, the survey model of descriptive research models was used to examine the perception of the tax office employees on the use of blockchain technology in tax offices. Descriptive research is an approach aiming to describe a situation that exists in the past or the present as it is (Krathwohl, 1993). In this case, the researcher can examine the subject or the individual directly, as well as interpret the scattered data that will be obtained by referring to various records and the source persons in the field by systematic integration according to their observations (Karasar, 2005: 77). In survey model, it is important to gather evidence and to evaluate them in order to find cases, make relationships and make judgments about past events (Kincal, 2010: 109). For this purpose, it can be said that the survey model is in the form of scanning arrangements on the whole of the universe or the sample taken from it in order to make a general judgment about the universe (Bailey, 1982).

### Universe And Sample

In order to determine the opinions of the tax office personnel on the use of the blockchain technology for tax procedures, the universe of the study was determined as the employees of the Afyonkarahisar Tax Office and the Kütahya Tax Office. The sample of the study consisted of 154 tax office employees using convenience sampling method. In the convenience sampling method, the researcher starts to create the sample starting from the most accessible respondents until they reach a group of the size they need, or they work on a situation or a sample that will provide the most accessible and maximum savings (Ural and Kılıç, 2013: 42). The distribution of the sample according to some variables is given in the Table 2.

**Table 2:-**Distribution of Sample

Variable	Value	n	%
<i>Gender</i>	Female	51	33,1
	Male	103	66,8
<i>Position</i>	Revenue Specialist/Ass. Revenue Specialist	74	48,1
	Other	80	51,9
<i>Seniority</i>	1-5 year	33	21,4
	6-15 year	29	18,8
	16 years and above	92	59,7
<i>Level of Knowledge</i>	Inadequate	112	72,7
	Intermediate	32	20,7
	Adequate	10	6,4

	<b>TOTAL</b>	<b>154</b>	<b>100</b>
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Table 2 shows that 51 of the participants were female and 103 of them were male. However, when the distribution of position of the participants is examined, 74 participants are composed of revenue specialists and assistant revenue specialists, and 80 of them are composed of other officers. The seniority of the participants was 33 people in the range of 1-5 years, 29 people in the range of 6-15 years and 94 persons in the 16 years and above. Among the participants, there are 112 people with inadequate level of knowledge about the blockchain, 32 people with intermediate level of knowledge and 10 people with adequate level of knowledge.

### Data Collection Tool

In this study, which is used to measure the perceptions of the employees of the tax office about the use of block chain technology in tax offices, the survey method was used as data collection tool. During the survey design phase, national and international literature has been reviewed and preliminary checks have been made by experts in the field.

In the first part of the questionnaire, there were questions about the employees' demographic information. The second part of the questionnaire consists of 27 likert questions which are graded by five for the purpose of the research. Likert questions were created to determine the perception of the use of block chain technology in tax offices. The rating is determined as "Totally Agree, Agree, Undecided, Disagree and Totally Disagree".

The questionnaire is divided into five dimensions: block chain management, "loyalty management in blockchain", "blockchain and software security", "wallet application in blockchain", "blockchain and artificial intelligence" and "blockchain and bureaucracy". As a result of the Cronbach Alpha test, the coefficient was found to be .91. These values were accepted as an indicator that the scale is highly reliable for use in research. The Cronbach alpha coefficients of the sub-dimensions were calculated as .87, .73, .84, .61 and .91, respectively. (Tavşancıl, 2006: 29).

The responses of the researchers to the scale questions were averaged and the averages obtained were graded according to the intervals in Table 3.

**Table 3:-Five-point Likert Scale Score Range**

Options	Points	Score Range
Totally Disagree	1	1,00-1,79
Disagree	2	1,80-2,59
Undecided	3	2,60-3,39
Agree	4	3,40-4,19
Totally Agree	5	4,20-5,00

### Data Collection And Analysis

During the data collection process, the application was carried out by the researcher in accordance with the necessary permissions taken from the tax offices in Afyonkarahisar and Kütahya. In this respect, 154 tax office employees were reached and 154 questionnaire forms were collected and these questionnaire forms were included in the analysis process. The data obtained from the application of the questionnaire were analyzed through the computer statistical analysis program.

First of all, the normality test was performed to determine whether the data showed normal distribution and it was determined that the data showed normal distribution except for the position variable. Independent samples t-test to determine whether the tax office employees' perceptions of using block chain technology in tax offices differ significantly according to gender variable; one-way ANOVA to determine whether there is a significant difference according to seniority and level of knowledge variables; Kruskal Wallis test was used to determine if there was a significant difference according to position variable. .05 significance level was used in all analyzes.

### Findings

In the first problem of the study, the frequency and percentage table of the responses to the questionnaire items were formed to determine the level of participation of the tax office employees in the scale items. Then, the levels of responses are determined by the range of values in Table 3.

**Table 4:-**Frequency and Percentages of Responses to Scale

Item	Avarage	Level
Loyalty management in blockchain application increases the tax confidence to tax office of taxpayers who pay their taxes regularly	2,93	Undecided
Loyalty management in blockchain application encourages taxpayers to pay taxes who do not pay their taxes regularly	2,88	Undecided
Loyalty management in blockchain application taxpayer's voluntary compliance	2,93	Undecided
Loyalty management in blockchain application can be counted as tax exemption type	2,61	Undecided
Loyalty management in blockchain application increases the commitment of the taxpayer to the state	2,80	Undecided
In tax transactions blockchain application may become vulnerable to cyber threats in terms of data security	2,49	Disagree
Blockchain application in tax transactions does not provide adequate security for taxpayers' personal data	2,59	Disagree
Blockchain application in tax transactions poses a threat to tax security	2,74	Undecided
Blockchain application in tax transactions shows that the system is safe to be accessible in terms of all taxpayers	2,68	Undecided
Blockchain implementation in tax transactions may become vulnerable to malicious taxpayers	2,63	Undecided
Our country has the potential to provide secure software in the case of transitioning to blockchain in tax transactions	2,87	Undecided
In case of transitioning to the blockchain application in tax transactions, there are problems that need to be solved more for our country than software security	2,49	Disagree
Taxpayers in the tax payment system are provided with the personal security of the taxpayers by presenting the blockchain wallet account	2,90	Undecided
Transparency increases with the submission of blockchain wallet account to taxpayers in tax payment system	3,09	Undecided
With the submission of the blockchain wallet account to the taxpayers in the tax payment system, the taxpayers carry out their transactions without going to the tax office and provide opportunity cost	3,44	Agree
With the submission of the blockchain wallet account to taxpayers in the tax payment system, the transaction cost is reduced in terms of the tax office	3,48	Agree
It is easier for taxpayers to follow the transactions of the taxpayers with the introduction of the blockchain wallet account	3,44	Agree
Blockchain application and artificial intelligence application will be used in future tax offices	3,13	Undecided
Future-proof tax estimation with blockchain implementation and artificial intelligence application provides convenience for tax policies	3,18	Undecided
Transactions using blockchain can be an alternative source of tax revenue in the future	3,20	Undecided
Artificial intelligence application in tax offices does not satisfy the taxpayers in the future	3,02	Undecided
It is difficult to find an application area of artificial intelligence in tax offices in the future	2,90	Undecided
Blockchain application significantly reduces stationery expenses in tax offices	3,48	Agree
Blockchain application contributes to the solution of bureaucratic problems	3,26	Undecided

in tax offices		
Blockchain application minimizes human-induced errors in tax offices	3,27	Undecided
Blockchain application allows transactions in tax offices to be performed faster	3,35	Undecided
In our country, e-government applications in taxation process is an important step for transition to blockchain application	3,50	Agree

When the data in Table 4 are examined, it is seen that the tax office employees respond to the questionnaire items at "Undecided" level in general. The items with highest participation are "In our country, e-government applications in taxation process is an important step for transition to blockchain application", "Blockchain application significantly reduces stationery expenses in tax offices" and "With the submission of the blockchain wallet account to taxpayers in the tax payment system, the transaction cost is reduced in terms of the tax office" and the items with lowest participation are "In tax transactions blockchain application may become vulnerable to cyber threats in terms of data security", "In case of transitioning to the blockchain application in tax transactions, there are problems that need to be solved more for our country than software security" and "Blockchain application in tax transactions does not provide adequate security for taxpayers' personal data".

Secondly, it was tried to determine whether the tax office employees' perception of the use of blockchain technology in tax offices and their sub-dimensions differed significantly by gender, position, seniority and level of knowledge. Before starting the analysis, according to the normality test to determine whether the data showed normal distribution according to these variables, it was determined that the data showed normal distribution with the exception of the position variable. The data obtained from the independent samples t-test to determine whether there is any difference according to gender is given in Table 5.

**Table 5:-Distribution of Data on Perception Levels of Employees According to Gender**

Dimension	Gender	N	$\bar{x}$	SD	df	T	p
SCALE	Female	51	83,35	12,11	152	1,146	,25
	Male	103	80,48	15,69			
LOY. MAN.	Female	51	14,78	3,88	152	1,237	,21
	Male	103	13,87	4,48			
SOF. SEC.	Female	51	18,82	3,56	152	,796	,42
	Male	103	18,34	4,06			
WALLET	Female	51	16,72	3,63	152	,790	,43
	Male	103	16,21	3,85			
AI	Female	51	15,72	2,45	152	,812	,41
	Male	103	15,33	2,91			
BUR.	Female	51	17,25	3,85	152	,722	,47
	Male	103	16,70	4,44			

When the data in Table 5 were examined, it was determined that the tax office employees' perception of the use of block chain technology in tax offices and their sub-dimensions did not differ according to the gender variable. However, it can be stated that the averages determined in all sub-dimensions of the scale are high in favor of female employees.

The results of the Mann Whitney U test to determine whether the tax office employees' perceptions and sub-dimensions of the use of block chain technology in tax offices differ significantly according to the position variable are given in Table 6.

**Table 6:-Distribution of Data on Perception Levels of Employees According to Position Variable**

Dimension	Position	N	Mean Rank	Sum of Ranks	U	Z	p
SCALE	R.S./Ass.R.S.	74	84,34	6241,00	2454,00	-1,831	,06
	Other	80	71,18	5694,00			



LOY. MAN.	R.S./Ass.R.S.	74	85,85	6353,00	2342,00	-2,244	*,02
	Other	80	69,78	5582,00			
SOF. SEC	R.S./Ass.R.S.	74	75,69	5601,00	2826,00	-,488	,62
	Other	80	79,18	6334,00			
WALLET	R.S./Ass.R.S.	74	83,59	6185,50	2509,50	-1,640	,10
	Other	80	71,87	5749,50			
AI	R.S./Ass.R.S.	74	81,17	6006,50	2688,50	-,993	,32
	Other	80	74,11	5928,50			
BUR.	R.S./Ass.R.S.	74	85,11	6298,00	2397,00	-2,052	*,04
	Other	80	70,46	5637,00			

p<.05

When the Table 6 is examined, the perceptions of the employees of the tax office differ significantly in the sub-dimensions of “loyalty management” and “bureaucracy” according to the position variable. When the averages are considered, it can be stated that the averages are high in favor of revenue specialists and assistant revenue specialists.

Table 7 presents the data for the one-way ANOVA test conducted to determine whether the perceptions and sub-dimensions of the tax office employees regarding the use of block chain technology differ significantly according to the seniority variable

**Table 7:-**Distribution of Data on Perception Levels by Employees' According to Seniority Variable

Dimension	Seniority	N	$\bar{x}$	SD	F	p	Dif.
SCALE	1-5 year	33	84,66	13,66	1,619	,20	
	6-15 year	29	78,00	17,72			
	16 year and above	92	81,35	13,78			
	Total	154	81,43	14,62			
LOY. MAN.	1-5 year	33	14,66	4,06	,365	,69	
	6-15 year	29	14,34	4,77			
	16 year and above	92	13,94	4,26			
	Total	154	14,17	4,30			
SOF. SEC.	1-5 year	33	18,15	4,38	1,959	,14	
	6-15 year	29	17,44	4,53			
	16 year and above	92	19,00	3,44			
	Total	154	18,52	3,90			
WALLET	1-5 year	33	17,69	3,29	3,385	*,03	1-2
	6-15 year	29	15,27	4,58			
	16 year and above	92	16,26	3,56			
	Total	154	16,38	3,78			
AI	1-5 year	33	15,87	3,22	1,462	,23	
	6-15 year	29	14,72	3,12			
	16 year and above	92	15,55	2,44			
	Total	154	15,46	2,77			
BUR.	1-5 year	33	18,27	3,77	2,378	,09	
	6-15 year	29	16,20	4,37			
	16 year and above	92	16,59	4,30			
	Total	154	16,88	4,25			

p<.05

As a result of the ANOVA test, in “wallet application in blockchain” sub-dimension [F (2,151) = 3,385; (p <.05)], there was a significant difference according to the seniority variable. According to the Post-Hoc tests conducted to

determine which units have the significant difference, it can be stated that there is a significant difference between officers who have 1-6 years seniority and 6-15 years seniority in favor of those who have 1-6 years seniority.

Table 8 presents the data for the one-way ANOVA test conducted to determine whether the perceptions and sub-dimensions of the tax office employees for the use of block chain technology differ significantly according to the level of information variable

**Table 8:-**Distribution of Data on Perception Levels by Employees' According to Seniority Variable

Dimension	Level of Knowledge	N	$\bar{x}$	SD	F	p	Dif.
SCALE	Inadequate	112	82,73	13,49	1,968	,14	
	Intermediate	32	79,00	17,99			
	Adequate	10	74,70	13,54			
	Total	154	81,43	14,62			
LOY. MAN.	Inadequate	112	14,54	4,04	3,141	*,04	1-3
	Intermediate	32	13,84	4,87			
	Adequate	10	11,10	4,35			
	Total	154	14,17	4,30			
SOF. SEC.	Inadequate	112	18,98	3,70	2,990	,05	
	Intermediate	32	17,46	4,23			
	Adequate	10	16,80	4,23			
	Total	154	18,52	3,90			
WALLET	Inadequate	112	16,50	3,56	,362	,69	
	Intermediate	32	16,21	4,37			
	Adequate	10	15,50	4,37			
	Total	154	16,38	3,78			
AI	Inadequate	112	15,68	2,50	1,453	,23	
	Intermediate	32	14,75	3,60			
	Adequate	10	15,30	2,45			
	Total	154	15,46	2,77			
BUR	Inadequate	112	17,00	4,03	,286	,75	
	Intermediate	32	16,71	5,02			
	Adequate	10	16,00	4,34			
	Total	154	16,88	4,25			

\*  $p < .05$

Yapılan ANOVA testi sonucunda, vergi dairesi çalışanlarının algılarında sadakat yönetimi [ $F(2,151)=3,141$ ; ( $p < .05$ )] alt boyutunda, bilgi düzeyi değişkenine göre anlamlı farklılığa rastlanmıştır. Tablo 8’de ifade edildiği gibi, bulunan anlamlı farkın hangi birimler arasında olduğunu belirlemek amacıyla yapılan Post-Hoc testlerine göre, az ve çok bilgi düzeyine sahip olanlar arasında az bilgi sahibi olanlar lehine anlamlı farklılık bulunduğu ifade edilebilir.

As a result of the ANOVA test, in “loyalty management” [ $F(2,151) = 3,141$ ; ( $p < .05$ )] there was a significant difference according to information level variable. As stated in Table 8, according to Post-Hoc tests, it can be stated that there was a significant difference between who has inadequate knowledge level and adequate knowledge level in favor of those inadequate knowledge level

## Results:-

Blockchain system refers to an application that can provide centralized data in case of use in decentralized and public areas, and to provide data security by recording various data. However, the application of this system in various areas such as e-government in the public sphere shows the applicability of this technology. Countries such as Estonia and China are particularly prominent in the implementation of this technology in public spaces. It also shows that the use of this system in the public sphere can minimize human based error.

The use of blockchain technology in tax transactions has been a practice that has started to attract worldwide attention in recent years. In this context, in this study, the tax office employees' perception were investigated. In

terms of the level of responses to the questionnaires, the tax authorities have shown a moderate positive approach when a blockchain-based loyalty management application is included in the tax system.

They stated that they did not agree with the expression which blockchain technology may become vulnerable to cyber threats for its implementation in the tax system and that the taxpayers do not provide adequate security for their personal data. This shows that the blockchain system is considered safe for the employees. In addition, the tax office employees have a positive perception of the wallet application of the blockchain system for the taxpayers in tax transactions. This practice is thought to enable taxpayers to carry out their transactions without going to the tax office, to provide opportunity cost, to reduce transaction costs in terms of tax office and to keep track of taxpayers' transactions easily.

The tax office employees have a moderate positive perception on the implementation of the blockchain system and artificial intelligence systems in tax offices in the future. Most respondents have noted that the blockchain system will significantly reduce stationery and is an important step for transition to the blockchain system of applications such as e-government.

In the study, it was tried to determine whether the perception of the employees of the tax office regarding the use of block chain technology in tax offices and their sub-dimensions differed significantly according to the variables of gender, position, seniority and level of knowledge. As a result of analysis of employees' perceptions according to gender variable, it was determined that female employees' had a more positive perception of blockchain application but this difference was not statistically significant.

The perceptions of the employees differ significantly in the sub-dimensions of loyalty management and bureaucracy according to position variable. When the averages are considered, it can be stated that the averages are high in favor of revenue specialists and assistant revenue specialists. The fact that the of revenue specialists and assistant revenue specialists have a clearer view of the theory of the taxation system than other employees and this view may have led to a more positive perception of blockchain technology in assessing the impacts of this process. However, the fact that other employees are specialized in taxation processes rather than whole, may have resulted in more abstinence in evaluating the effects of this technology.

In the study, it can be stated that there is a significant difference in terms of perceptions between who have 1-6 years seniority and 6-15 years seniority in favor of those who have 1-6 years seniority. It may be that employees with fewer working hours are more open to innovations and in a situation that follows developments, in terms of their age and educational level. At this point, they have a more positive perception of the consequences of the integration of taxation with this new technology.

Vergi dairesi çalışanlarının algılarının sadakat yönetimi alt boyutunda, bilgi düzeyi değişkenine göre anlamlı şekilde farklılaştığı tespit edilmiştir. Farkın az ve çok bilgi düzeyine sahip olanlar arasında az bilgi sahibi olanlar lehine anlamlı farklılık bulunduğu ifade edilebilir. Bu noktada blockchain teknolojisinin bağlamı ve işleyişi ile ilgili ayrıntılı bilgiye sahip olmayan çalışanları özellikle gelişmiş ülkelerde ortaya çıkan bu yeni uygulamanın sınırlılıklarına dair net bilgilere sahip olmamasının algıların daha olumlu olmasına neden olduğu ifade edilebilir. Çalışanlar daha üst bir teknoloji olarak düşündükleri bu yeni teknolojinin hayatımızı kolaylaştıran diğer birçok teknolojik uygulama gibi olumlu etkiler oluşturacağına daha çok katılmaktadır. Ancak bilgi düzeyi yüksek olanlar bu teknolojinin doğurabileceği dezavantajları da göz önüne alarak değerlendirmede bulunmuşlar ve daha olumsuz bir algı ortaya koymuşlardır.

It has been determined that the perceptions of the employees of the tax office differ significantly in the "loyalty management" sub-dimension according to the level of information variable it can be stated that there was a significant difference between who has inadequate knowledge level and adequate knowledge level in favor of those inadequate knowledge level. At this point, it can be stated that the lack of clear information about the limitations of this new practice that emerged in developed countries caused the perceptions to be more positive. Employees agree that this new technology, which they consider to be a higher technology, will create positive effects like many other technological applications that make our lives easier. However, those with high level of knowledge have been evaluated by taking into account the disadvantages of this technology and have presented a more negative perception.

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