Communication in Digital-Based Public Services in Regional Government of West Java Province

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Abstract

In digital era, all activities including services to the community certainly use digital media. In addition, the use of digital media is currently the main backbone of communication and change in the economic, social, cultural, and political fields. Therefore, this study aimed to analyze the application of digital-based government communication in public services in West Java Provincial Government, specifically regional government websites and social media, such as Facebook and Twitter. This was based on the dimensions of Content, Services, and Technical Qualities. A qualitative descriptive method was used, and the data analysis was conducted through documentation, observation, in-depth interviews, and social network analysis. The results showed that public services with information and communication technology have been adequately implemented in all West Java Provincial Government agencies. However, there were still several factors that need to be improved, including the discovery of website channels that could not be accessed even though the website is very important in providing official information and communication. In general, the menus that function as information providers were still oneway and have not provided public access to interactive services.

Keywords: government communication; digital; public services

Abstrak

Saat ini pada era digital, hampir dipastikan semua kegiatan pelayanan publik menggunakan media digital, Penggunaan media digital pada saat ini adalah tulang punggung utama komunikasi dan perubahan dalam segala bidang (ekonomi, sosial, budaya, politik). Artikel ini bertujuan untuk menganalisis penerapan komunikasi pemerintahan dalam pelayanan publik berbasis digital di Pemerintah Provinsi Jawa Barat terutama website dan media sosial facebook, dan twitter pemerintah daerah berdasarkan dimensi 1. Content Quality (Kualitas Kontent), 2. Service Quality (Kualitas Service) dan 3. Technicall Quality (Kualitas Teknis), menggunakan metode deskriptif kualitatif, analisis data penelitian melalui dokumentasi, observasi, wawancara mendalam dan social network analysis dapat disimpulkan bahwa pelayanan publik dengan teknologi informasi dan komunikasi secara garis besar telah diterapkan di seluruh instansi Pemerintah Provinsi Jawa Barat dengan baik, namun masih ada beberapa hal yang perlu ditingkatkan yaitu, ditemukan kanal website yang tidak dapat dibuka padahal website tersebut sangat penting dalam memberikan informasi dan komunikasi resmi dari Pemprov Jawa Barat, selain itu secara umum menu-menu yang berfungsi sebagai pemberi informasi sifatnya masih satu arah dan belum memberikan akses pelayanan yang sifatnya interaksi kepada publik.

Kata kunci: komunikasi pemerintahan; digital; pelayanan publik

INTRODUCTION

Digital media is an important factor in human life globally and has an impact on the way people communicate (Sawyer & Chen, 2012). Currently, almost all activities including services to public use digital media, such as shopping, learning, communicating with friends, as well as dealing with government. Digital media including websites, Facebook, Twitter, and YouTube, have experienced a surge in facilitating human communication. Facebook was founded in 2004 and it had about 1.35 billion users in 2014. Meanwhile. Twitter was founded in 2007 and had about 287 million active users in 2014, with over 500 billion tweets, and YouTube had approximately 1 million users monthly (LC Grinvald, 2014). This digital media usage cannot be separated from the evolution of the internet, which is the main backbone of communication and change in economic, social, cultural, and political fields.

O'Relly (2005) showed social media is a network platform that allows users to control, create, design, as well as share content and services with public. Meanwhile, Chu (2009) showed social media focused on its users. According to Mayfield (2008), the basic characteristics of social media include participation, openness, discussion, and community. The of existence humans involves communication because it is a daily habit, hence very few people appreciate the importance. Communication only becomes important when there is a crisis, which usually occurs suddenly. Studies on government communication in digital public services have not been widely conducted, and only 50 journal titles have been found

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since 2014 as shown in the following diagram:

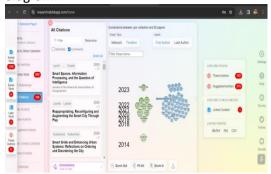


Figure 1. Researchrabbitapp.com timeline
The

https://researchrabbitapp.com/home tool can show the studies on Digital-Based Government Communication and Public Services which started in 2014. These include Government Communication in Digital Era: The Influence of Social Media on Regional Government Public Relations by Melissa W Graham in Sage Journal, and the final study in 2023 with the title Digital Transformation of Public Life in Russia and Belarus: Dialogue Between Government and Citizens on New Media Platforms written by Aleksandr A. Hradziushka; Olga Y. Vikhrova; Hanna F. Velikaborats in IEEE Journal.

The network of journals that raise the topic of government communication in digital public services is shown as follows



Figure 2. Network researchrabbitapp.com
The

https://researchrabbitapp.com/home tool can show the relevance of journals that explored government communication in digital-based public services. Based on the network, there are no similar studies in Indonesia, hence the topic becomes important since (1) digital-based public services are a current need, and (2) public services cannot be provided without government communication.

Rhenald Kasali in the book entitled Disruption (2017) stated that there was a major revolution in society regarding communication. This change is driven by increasingly sophisticated communication technology, and the phenomenon cannot be avoided. Therefore, it cannot be denied that public services provided government need to adopt information technology. E-Government services are important and an option that cannot be negotiated by all government components, both central and regional. Moreover, it can be interpreted as an internet-based information and public services management system for recording and tracking public information and providing access to public services (Hasibuan, 2002)

The primary aim of regional government adopting e-government is to promote and simplify administration for all levels of society and enhance good governance. The development of egovernment is the main choice for both central and regional governments in optimizing improvements in services quality in Indonesia (Rusadi and Rahmadany, 2023) This is an effort to develop electronic-based administration in order to improve the quality of public services. Moreover, egovernment is a way to adopt the advantages of communication technology in public services sector. By adopting information technology, it will be easier to provide information and services to citizens, businesses, and other matters. The major delivery models are Government-to-Citizen

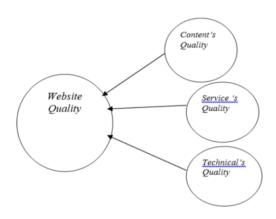
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(G2C), Government-to-Business (G2B), and Government-to-Government (G2G). In addition, the most expected benefits from e-government are increased efficiency, convenience, and better accessibility of public services (Alzahrani, 2011)

Presidential Instruction Number 3 of 2003 concerning National Policy and Strategy for E-Government Development is manifestation of government's seriousness in carrying out its functions by utilizing information technology infrastructure. Government instructed several agency officials including governors and Regents/Mayors to implement egovernment nationally, prepare follow-up plans, coordinate with the State Minister for Communication and Information, as well as carry out instructions through regulations. Several documents related to implementation of e-government have been published, including (1) Documents containing a blueprint for implementation in regional government, (2) Guidelines for preparing a master plan for e-government institutional development, and Guidelines for developing government portal infrastructure.

Websites are the first step in developing e-government in central and regional governments (Shareef., et al. 2012). Several regional government websites such as DKI Jakarta Province and Surabaya City seem to be quite advanced. This can be observed in services content, which is always up-to-date and contains information. This study examined digitalbased government communication in public services in the West Java Provincial Government. Álvaro Rocha (2014) in the article published in the Emerald Journal entitled "Framework for a Global Quality Evaluation of a Website" stated that website quality is determined by three dimensions, namely Content, Services, and Technical Qualities.

Diagram 1 Rocha Website Dimensions, 2014



Rocha (2014) further showed the first dimension that government needs to address in managing a website is the content quality. Adequate attention should be given to accuracy, completeness, relevance, consistency, coherence, relevancy, syntax, and updating of website content. This should be evaluated frequently by the manager.

In the second dimension, the focus is on the quality of services offered on the website. In this case, several important factors should be considered, namely attributes of security, reliability, privacy, performance, efficiency, accuracy, opportunity, availability, response duration, time-saving, empathy, reputation, and personalization. The third dimension focuses on the technical quality of the website, which includes the quality attributes usually found in software standards, such as ISO/IEC 9126 (ISO/IEC, 2001) and its successor ISO/IEC 25010 (ISO, 2011). Other attributes are navigation paths, search engines, download times, browser compatibility, broken links, and accessibility.

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This study will be used to test the three dimensions in dissecting government communication using websites in the West Java Provincial Government. According to Rocha (2014), when the three dimensions are implemented by government, it will become easier and improve the quality of services to the community. Rocha's (2014) study was conducted in Western countries where government and society are wellestablished using information in Therefore, this technology. study is expected to explore two factors, namely evaluating information technology-based government communication (websites) within the West Java Provincial Government. The second is to test the three dimensions proposed by Rocha (2014). Currently, all regional governments in Indonesia have adopted information technology in the form of e-government. These efforts can be seen on websites created by regional governments, both city, district, and provincial, totaling 549 (Jawa Post 19 April 2017). Moreover, with the COVID-19 pandemic, regional governments have shifted public services to technological information channels, such as education, health, shopping, social, political, cultural, and more, switching from the real to the virtual world. The terms online (on the network) and offline (outside the network) are known, and COVID-19 is a major disruption that forces all nations to immediately switch to digital world. Revolution 4.0 forced all governments in the world to adopt digitalization in almost all fields.

The latest report from the Hootsuite-Report-2020-compressed.pdf site shows that in 2020, the human population in the world amounted to 7.75 billion, with details of internet users amounting to 4.54 billion or 59%.

Meanwhile, social media users amounted to 3.80 billion or 49% of the world's total population. For social media users via cell phone, it was 5.19 billion or 67%. Data showed that the population of Indonesia in 2020 was 272 million, with internet users being 175 million or 64%, social media users of 160 million or 59%, and cellphone owners of 338.2 million or 124%. Other interesting Hootsuite-Report2020data from compressed.pdf showed that Indonesian population spent 7 hours 59 minutes a day accessing the internet and using social media for 3 hours 26 minutes.

Presidential Instruction Number 3 of 2003 concerning National Policy and Strategy for E-Government Development is a manifestation of the seriousness to carry functions through information technology (IT) infrastructure. Several agency officials including governors and Regents/Mayors were instructed implement e-Government nationally, prepare follow-up plans, coordinate with the State Minister for Communication and Information. well as as carry effectively. Through instructions regulation, government issued several documents related to the implementation of e-government, including (1) Documents containing a blueprint for implementation in regional governments, (2) Guidelines for preparing a master plan for e-government institutional development, and Guidelines for developing government portal infrastructure.

Out of the 548 provincial and district/city governments recorded, 543 have official websites. A total of 483 websites can be accessed, while the remaining 60 cannot be accessed for various reasons. This means 88% of provincial and district/city government

already have websites that can be accessed when conducting assessments.

METHOD

This study aimed to analyze the application of government communication in digital-based public services in West Java, specifically regional government websites and social media, as well as Facebook and Twitter. A descriptive qualitative method was used to describe, illustrate, or systematically, factually, and accurately show the facts, characteristics, and relationships between the phenomena investigated (Kim., et al. 2016)

To observe the phenomena, this study used the concept of Website Quality, Rocha, 2014. This concept has three dimensions, namely Content, Services, and Technical Qualities. In addition, the participants were determined using a purposive sampling method.

Table 1 Informant Map

No	Informant	Total
1.	West Java Provincial	1 person
	Government	
	Secretary	
2.	Head of	1 person
	Communication and	
	Information	
	Services	
3.	Head of Section	1 person
	who handles IT and	
	E-Government	
4.	Head of Section	2 person
	who handles IT and	
	E-Government	
5.	Communication and	3 person
	Informatics	
	Department staff	
	who handle IT and	
	E-Government	

6.	Public Relations	1 person
	Department	
7.	People who access	-
	Websites and Social	
	Media	

Secondary data were obtained from literature studies, news, and documents, specifically "Regional Regulations on IT and E-Government within the West Java Provincial Government".

RESULTS AND DISCUSSION

Analysis of the West Java Provincial Government Website Portal

The official West Java Provincial Government portal can be accessed through https://jabarprov.go.id with a display that can change backgrounds. In the initial appearance of the interface, users will be presented with the jargon "Answering Public Information Needs of West Java Residents" accompanied by an information search access column.



Figure 3. West Java Provincial Government Website

When users search on the website, they will get the latest news containing information about the province, including details on awarding 61 MSMEs actors and the community as well as other regional news. The interface also provides information about superior programs and the most popular programs in West Java Province. Some of the Provincial Featured Programs on the website include (1) West

Java Saber Hoax, (2) One Islamic Boarding School, One Product, and (3) Citarum Harum. Meanwhile, the most popular services are divided into three clusters, namely services for the community, business world, and tourists.

After information on featured programs and popular services, there is quick access to information at the bottom of the website. Eight items sources of information can be accessed directly and quickly, namely Financial reports, Public Services Mall, Check Social Assistance, Food Commodity Price Information, Export Development, Open Data, Saber Extortion, and Public Complaint Report.

2. Website Main Menu

a. West Java News

The main menu of the West Java Provincial Government website is located at the top of the website.



Figure 4. Website Main Menu When the menu is clicked, information about seven sub-menu items will appear which can be accessed through the page shown in the following Table.

Table 2. List of Sub Menu Displays News at a Glance for West Java Province

NO	ITEMS	DESCRIPTION OF CONTENTS
1	2	3
1	Fconomy	Contains

1 Economy Contains information on

		economic development articles in West Java Province
2	Health	Contains information on news and the latest health situation in West Java
3	Education	Contains educational and cultural update information
4	Government	West Java update officially
5	Infrastructure	Contains information about infrastructure development articles in West Java
6	Social	Contains updated information on social welfare conditions
7	Technology	Contains information on technological developments in West Java

Source: West Java Province Website, 2022

b. Public Services

Items on public services menu can be seen in Figure 6 which consists of eight items.



Figure 5. Public Services Menu Several items show services that provide space for users to interact. A more detailed explanation of the items on the general services menu can be seen in Table 4.2.

Table 3 List of Sub Menu Displays News at a Glance for West Java Province

NO	ITEMS	DESCRIPTION OF CONTENTS
1	2	3
1	Population and Residence	Contains information about population and residence permits easily
2	Education and Learning	Contains information on government programs for pupils and students
3	Health	Contains information on access to STR and STRK legalization services for Health Workers

			in West Java Province
	4	Тах	Contains exposure information in West Java
	5	Social and Family	Contains information on access to various services for children, women, and the community
	6	Employment	Contains job vacancy information
	7	(PIKOBAR) West Java COVID-19 Information and Coordination Center.	One-stop communication and information media for handling COVID- 19 in West Java
	8	Online Licensing	Contains information on online licensing services and management
Source: West Java Province Website, 2022			

c. Public Dashboard

Public dashboard menu consists of six items, namely health, population, industry, education, COVID-19 information, and Monthly National Child Immunization (BIAN) information.



Figure 5. Public Dashboard

A more detailed explanation of the items on the general services menu can be seen in Table 4.3.

No	Items	Description
1	2	3
1.	Health	Contains West Java
		health and Covid-19
		information
2.	Population	Contains
		population
		information on
		West Java
3.	Industry	Contains economic
		information ranging
		from MSMEs to
		regional finance
4.	Education	Contains
		information about
		education in West
		Java
5.	Covid-19	Contains
	Information	information related
		to the development
		of Covid19 in West
		Java
6.	Bian	Contains
		information related
		to the National
		Child Immunization
		Monthly

d. West Java Profile

As the name suggests, the items on the profile menu contain information about West Java Province which consists of five items:

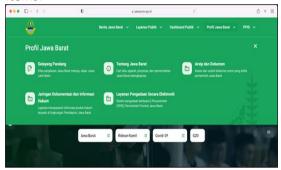


Figure 6. Public Dashboard
The explanation of information per item can be seen in Table 4.4 below:

Table 4 4 Sub Menu (Item) West Java Profile

No	Items	Des
1	2	3
1.	Overview	Contains brief
		information on the
		journey of West
		Java Province
		towards West Java,
		the Inner Born
		Champion
2.	About West	Contains
	Java	information on the
		history, leadership,
		and government in
		West Java
3.	Archives and	Contains access to
	Documents	official document
		information for
		West Java Province
4.	Legal	Contains
	Information	information on
	Documentation	integrated legal
	Network	product
		information
		services for West
		Java

 $\textbf{DOI:}\ https://doi.org/10.33701/jtp.v16i1.3778$

5.	Electronic	Contains
	Procurement	information on the
	Services	West Java
		Provincial
		Government's E-
		Procurement
		(SPSE) based
		procurement
		system.

e. PPID

On the PPID menu, there are at least nine items related to PPID information and those relevant to public requests.

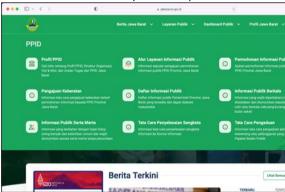


Figure 7. West Java Provincial PPID

The explanation of the items on the
PPID menu can be seen in Table 4.5.

Table 5 PPID Sub Menu Table (Items).

No	Items	Des
1	2	3
1.	PPID profile	Contains profile
		information,
		information
		structure, vision
		and mission, West
		Java PPID job
		description
2.	Public	Contains
	Information	information on
	Services Flow	submitting PPID

		public information
		requests
3.	Public	Contains
	Information	information on
	Request	submitting public
		information
		requests to PPID
		West Java
4.	Filing	Contains
	Objections	information on
		procedures for
		submitting
		objections
		regarding requests
		for public
		information
5.	List of public	Contains a list of
	information	publicly available
		and accessible
		information
6.	Periodic public	Contains regularly
	information	updated
		information
7.	Immediate	Contains
	public	information related
	information	to the needs of
		many people
8.	Procedures for	Contains
	resolving	information on
	disputes	procedures for
		resolving
		information
		disputes with the
		Information
		commission
9.	Complaint	Contains
	Procedures	information on
		procedures for
		complaints of abuse
		of authority or
		violations
		committed by
		public agency
		officials
	I .	

4. Analysis of the West Java Provincial Government Facebook Account

The official Facebook account managed by the West Java Provincial Government is https://www.facebook.com/jabarprov. The account is well managed with an attractive initial appearance and the tagline "West Java is Champion". There is also information on the official complaint channels including public complaint telephone number (022) 2502898, Twitter, Facebook, SMS, and more.



Figure 8. West Java Provincial Facebook

The number of followers on the Facebook account is 5.6 thousand, which is quite small because the population of West Java Province was around 49.94 million in 2020. Furthermore, the account followed 127 others such as the OPD, Regencies, Cities, and Ministries.

The page is quite active in sharing various information, such as news regarding the earthquake in Cianjur Regency. Also, the information showed is about West Java Governor Ridwan Kamil who will launch digital platform Pisodapur or the Cianjur Earthquake Information and Coordination Center to meet the various logistical needs of residents.

5. SNA Analysis of West Java Provincial Government Twitter Account

The official Twitter address is https://twitter.com/jabarprovgoid. page contains information on Covid-19 Vaccination and the #Ayo5M movement, an initiative to slow the spread of the virus. Furthermore, there is a link to access official information and news from the West Java Provincial Government. the link jabarprov.go.id |@jabarprovgoid, offline address Street. Taman Sari No. 55 Bandung 40132, Tel/Fax: 022-2502898/022-2511505 info@jabarprov.go.id, email: link instagram.com/jabarprovgoid.



Figure 9. West Java Provincial Twitter

The Twitter account has a larger number of followers, namely 27.5 thousand and 748 following compared to Facebook.

Twitter is a social media based on micro-blogging which prioritizes speed in providing information. The users can post pictures and videos by adding narratives, as well as retweet or participate in spreading (forwarding) existing information. Another advantage is that there is a hashtag #, hence it is easy to search for information or topics that are currently discussed, also known as trends.

The contents of the Twitter account are not much different from Facebook, but there is no response to the information shared on the Twitter account. The social media analysis was carried out using Social

Network Analysis (SNA) with the program from 76 Netlytic which can be used to analyze Twitter. In the text analysis, various words emerged that were discussed by netizens on the Twitter account, for the top 10 words, namely 1. Ridwan Kamil, 2. Aldi Neno, 3. Jabarprovgoid, 4. Ridwan Kamil President 2024, 5. President, 6. Indonesia, 7. Leader, 8. West Java, 9. Champion, 10. Governor. From the text analysis, it can be concluded that Ridwan Kamil was the most prominent. This showed Twitter can be used to provide support for the candidacy of Mr. Ridwan Kamil in the 2024 presidential election as seen from Aldi's Twitter account Neno.

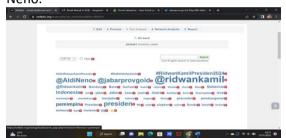


Figure 10. West Java Provincial Twitter SNA



Figure 11. West Java Provincial Twitter SNA

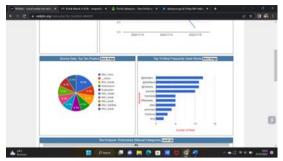


Figure 12. West Java Provincial Twitter SNA

The Twitter account interacts with netizens on various discussion topics, but the account network is quite dominant in communication carried out, with only one network color, namely red, and no other colors.

The data obtained from 13th to 15th November 2022 showed dynamic graphs, and the account appeared to have posted the most tweets (7) on the 14th, while the lowest was on the 15th with 1 tweet. The data source was the West Java Provincial Government account, and the issue that appeared most frequently on Twitter was support for the West Java Governor to contest for President in 2024. The platform is one of the channels for official information and communication from the Provincial Government. This makes it easier for public, specifically netizens to report policies and public problems.

CONCLUSION

In conclusion, public services with information and communication technology have been adequately implemented in all West Java Provincial Government agencies, but there are still several factors that need to be improved. It was found that the website channel could not be accessed even though it was very important in providing official information and communication. Furthermore, menus

that function as information providers are still one-way and do not provide access to interactive services for public.

The contents on the Facebook and Twitter social media are good and informative but have low engagements as shown by the lack of retweets, forwards, and likes. According researchtoolrabbitapp.com, there are still limited surveys on government communication in digital-based public services, specifically for locus in Indonesia. Therefore, future studies need to explore government communication in digitalbased public services.

REFERENCES

- Alzahrani, A. I. (2011). Web-based e-Government services acceptance for G2C: A structural equation modelling approach.
- 2. Chu, S. (2009). Determinants of consumer engagement in electronics word-of-mouth in social networking sites .dissertation. *Austin: University of Texas*. http://hdl.handle.net/2152/6585
- 3. Grinvald, L. C. (2014). Social Media, Sharing, and Intellectual Property Law.https://heinonline.org/HOL/LandingPage?handle=hein.journals/deplr64&div=44&id=&page=
- 4. Hasibuan, Z. (2002). Electronic Government for good governance" studi dalam jurnal dan amanjemen teknologi informasi Vol 1. https://lib.ui.ac.id/detail.jsp?id=69 591
- Kim, H., Sefcik, J. S., & Bradway, C. (2017). Characteristics of qualitative descriptive studies: A systematic review. Research in

- nursing & health, 40(1), 23-42. https://doi.org/10.1002/nur.21768
- 6. Mayfield. (2008). What is Social Media.
- 7. Ndraha, T. (2003). *Kybernology* (*Ilmu Pemerintahan Baru*). Rineka Cipta.
- 8. Neuman. (2006). Social Research Methods: Qualitative and Quantitative Approach (Sixth Edition). Pearson Education, Inc.
- Nimmo, D. (1993). Komunikasi Politik: Komunikasi, Pesan, dan Media. Dalam Jalaluddin Rahmat (Terj.). Remaja Rosdakarya.
- O'Relly. (2005). What is Web 2.0
 Design patterns and Business Model
 for the Next Generation of
 Software.
 http://www.oreillynet.com/pub/a/
 oreilly/../whatis-web2.0.h,
- 11. Rauf, M. (1993). *Indonesia dan Komunikasi Politik*. Gramedia.
- 12. Rusadi, B. P., & Rahmadany, A. (2023). Analyzing Supporting and Inhibiting Factors in the Optimization of E-Government in Pontianak City. Journal of Computer Science and Technology Studies, 5(4), 22-31. https://doi.org/10.32996/jcsts.202 3.5.4.3
- 13. Rocha, A. (2014). Framework For A Global Quality Evaluation Of A Website. University Fernando Pessoa, Porto. www.emeraldinsight.com/1468-4527.htm
- 14. Sawyer, R., & Chen, G. M. (2012). The impact of social media on intercultural adaptation.

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Faculty of Government Management, Governance Institute of Home Affairs (IPDN)

- https://digitalcommons.uri.edu/com_facpubs/15/
- 15. Shareef, S. M., Jahankhani, H., & Dastbaz, M. (2012). E-government stage model: Based on citizencentric approach in regional government in developing countries. International Journal of Electronic Commerce Studies, 3(1), 145-164.

https://doi.org/10.7903/ijecs.1020