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Evaluating Quality of Hospitals Websites for Medical Tourism in Indonesia

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Abstract: The trend of medical tourism in Indonesia is still relatively low compared to other Southeast Asian countries, considering that the hospitals' service promotion through websites is ineffective. Website quality testing is needed to evaluate each hospital so that they have more advanced marketing in a more competitive digital world. This study aimed to see the difference between the scores of four dimensions: accessibility, experience, marketing, and technology, on hospital websites based on province, class, accreditation, and hospital ownership. This study used a quantitative approach in testing score differences in website quality with the Nibbler tools application. The secondary data are taken from the hospital website under the Ministry of Health in the Capital City of Jakarta and Banten, Indonesia. Data bivariate analysis was performed using the Kruskal-Wallis test. The result shows that accessibility significantly differed in accreditation; in the marketing dimension, significant differences were found between province, class, accreditation, and hospital ownership. Significant differences in experience dimension were also discovered between class, accreditation, and hospital ownership. Further, the dimension of technology had a significant difference in terms of hospital ownership.

Keywords: medical tourism; Nibbler; hospital website; quality; marketing.

JEL Classification: I11; L10; L15; L86; M31; Z33.

Introduction

The development of information technology is increasing (Huriyah and Hidayat 2022; Supriatin *et al.* 2022). Data on the development of information technology in Indonesia show that around 175.4 million Indonesian (64% of the Indonesian population) are internet users (Ariansyah *et al.* 2021). Promotion and marketing are essential to business sustainability (Dhameria *et al.*, 2021; Nasir *et al.*, 2022). With increasing internet users, websites have become the fastest non-conventional promotional media (Kawashima 2006). As healthcare facilities, hospitals utilize information technology development to market their products. Nowadays, patients surf hospital websites to decide on a hospital they prefer (Behmane, Rutitis, and Savicka 2019). Because of the COVID-19 pandemic, Indonesia and almost all countries use hospital websites to seek healthcare services. Hence, hospitals must be able to adapt to the increasing need to display their services effectively on a website (Huerta, Walker, and Ford 2016). Hospital websites have a wider reach than other promotional media that are not limited to space and time (Aufa *et al.* 2023). For example, even patients who live outside the hospital's working area can access the services (Sethi *et al.* 2020).

One of the strategic promotional plans is that hospital websites must be continuously updated with information to reach a global audience (Kusumawati 2018; Mason *et al.* 2023). Hospitals need to make their website easily accessible among prospective patients interested in content and services (Anthony Jnr 2021; Maurer, Bansal, and Bansal 2022).

Medical tourism has been a positive trend in the global industry (Ratnasari *et al.* 2022; T.-H. Cham *et al.* 2021; T. H. Cham *et al.* 2021). However, it is still relatively low in Indonesia compared to other Southeast Asian countries, considering that the hospital's service promotion on websites is ineffective (Kusumawati 2018). It is estimated that about 1 million Indonesian citizens perform health care abroad and are dominated by the upper middle class, who have more resources in choosing quality healthcare facilities. For example, 80% of medical tourists in Malaysia are Indonesian citizens (Norsiah Kadir and Sabri Nayan 2021). In 2017 every hospital was equipped with world-class facilities with 176 beds which cost US$ 14.95 million. However, this change does not affect its popularity compared to hospitals in Singapore, Thailand, and Malaysia, known to offer state-of-the-art technology, international accreditation, competent medical personnel, and competitive prices and to promote their services on their hospital websites (Mahendradhata 2019).

Meanwhile, hospital websites among hospitals in the Capital City of Jakarta show below grade level compared to the digital health service startup websites (Yudasubrata *et al.* 2019). People likely access websites and applications from health service startups more than hospital websites. The Capital City of Jakarta, as the center of technological development in Indonesia, will undoubtedly affect the other surrounding provinces, namely West Java and Banten. Therefore, it is interesting to test the quality of their hospital websites to evaluate the hospitals' readiness for technological development in a more competitive digital world.

Various website assessment applications include Google Analytics, an online website analysis service owned by Google Inc that tracks and checks usage patterns and traffic and perform visual and statistical analyses. Besides, Readable.io help assess the quality of website content based on readability, grade level, text content, and presentation. The GT matrix tool evaluates the loading speed and performance of a website. Further, Qualidator is a tool to review the utility, accessibility, Search Engine Optimization (SEO), and technical quality of a website by running several automated tests (Derezińska and Kwaśnik 2020). Nibbler testing tool, in addition, can be used to measure the functional quality of a website. Nibbler testing tool, an online website testing application accessible on nibbler.silktide.com site (Sik-Lanyi and Orbán-Mihálykó 2019; Ara and Sik-Lanyi 2022), will test parameters by looking at the scores obtained and improving the scores. Nibbler can assess a website with four main dimensions of testing: 1) accessibility (how all users can access the website), 2) experience (how satisfying the website is for users), 3) marketing (how well the marketing and popularity of the website), and 4) technology (how well the website design) (Randy Joy 2018).

With this background, the research gap is to see the score differences in the four dimensions (accessibility, marketing, experience, technology) regarding hospital websites based on province, class, accreditation, and hospital ownership.

1. Methodology

This study used a quantitative approach in testing score differences in website quality with the Nibbler tools application (https://nibbler.silktide.com). Secondary data were taken from hospitals in Jakarta, West Java, and Banten on http://sirs.yankes.kemkes.go.id, containing hospitals accredited by Hospital Accreditation Commission (*Komisi Akreditasi Rumah Sakit*) based on province, class, ownership, and accreditation. The search showed 162 hospitals in Jakarta Province, 309 in West Java Province, and 84 in Banten Province. After being grouped by province, the authors searched for the hospital's website address and entered the URL into the Nibbler application to test its accessibility, marketing, experience, and technology. The data were processed in statistical software and analyzed univariately and in a bivariate way. Each dimension was assessed by the independent variables, i.e., province, class and accreditation, and hospital ownership, using a one-way ANOVA test to see the mean score differences in the quality of the hospital websites between accessibility, marketing, experience, and technology dimension. The one-way ANOVA test is a parametric test where the unmet normal distribution of the data will need to be further tested using a non-parametric test, namely the Kruskal-Wallis test. The accessibility dimension is the ease of accessing and navigating the hospital's website among the public, especially people with disabilities and computer-illiterate people. The experience dimension relates to user satisfaction with the website. Additionally, the marketing dimension refers to information, popularity, ranking, and technical aspects related to Search Engine Optimization (SEO). The technology dimension is the website programming performance, such as download speed, programming code quality, and website infrastructure quality (Huerta, Walker, and Ford 2016).

The dimensions are categorized as having very good scores at a range of 9.0-10; good scores at 7.0-8.9; quite good at a range of 5.0-6.9; poor scores at a range of 3.0-4.9; and very poor scores at a range of 1.0-2.9.

2. Result and Discussion

The hospital websites were evaluated based on four aspects consisting of province, class, accreditation category and hospital ownership as suggested by the Indonesian Ministry of Health. From 162 hospitals in Jakarta Province, only 143 were tested because most of the websites were under maintenance, or the hospitals did not create any website. Meanwhile, West Java Province has only 211 eligible hospitals out of 309, and Banten Province has only 61 eligible hospitals out of 84. This indicates that hospitals in Jakarta Province have more awareness of digital marketing because they are located in the center of information technology development that enables the community to switch from conventional promotional media to digital media. Nowadays, the global community tend to prefer internet access to access various health information for handy use; therefore, health care facilities should be more aware of this change (Alhuwail, AlMeraj, and Boujarwah 2018).

Based on province, the highest proportion of hospital websites that could be tested came from West Java (50.8%), followed by Jakarta (34.5%) and Banten (14.7%). According to hospital class, the highest proportion was hospitals with C class (52.5%), followed by hospitals with B class (32.1%), hospitals with D class (10.6%) and hospitals with A class (4.8%). Hospital class is determined based on the services provided, human resources, available equipment, facilities and administration and management.

The majority of hospitals have high quality level (54.2%), and the rest have first pass level (15.4%), advanced level (15.0%), intermediate level (10.6%) and basic level (4.8%). In terms of hospital ownership, the hospital websites are owned by companies (27.0%), social organization (12.0%), and provincial government (7.5%). The others belong to private parties, other private, Ministry of Health, other ministries, regional government (district and city), state-owned enterprises, religious organization such as Islamic, Catholic, Protestant organizations, Indonesian forces and police departments.

Table 1. Univariate Analysis Results of Accessibility, Experience, Marketing, and Technology

Dimensions	Mean	Max	Min
Accessibility	8.56	10.00	4.50
Marketing	4.97	8.90	1.60
Experience	7.23	9.40	2.20
Technology	8.02	9.80	4.80

Table 1 presents the average score of 415 hospital websites based on accessibility, marketing, experience, and technology dimensions. Three dimensions have a categorized average score, where accessibility has the highest average score (8.56) and the highest score in the very good category. Meanwhile, only the marketing dimension is in the poor category (4.97) likely because it has the lowest score (1.6) which is included in the very poor category. This result is in accordance with previous research where hospital websites in DKI Jakarta have lower promotion performance than digital health service startups (Yudasubrata *et al.* 2019). A website will get a high accessibility dimension if it is easily accessible by all users, including people with disabilities. Websites that can satisfy user needs have a tendency to get high scores on the experience dimension while reaching target users have a tendency to get high scores on the marketing dimension and those that can build and develop better technology have a tendency to get high scores on the technology dimension (Jain and Purandare 2021).

The data normality testing was completed first, and then bivariate analysis with one-way ANOVA test followed. The results showed that the normality scores of all dimensions meet the estimation (p value <0.005) as obtained from the results of Kolmogorov-Smirnov (K-S) and Shapiro-Wilk (S-W): (accessibility dimension: K-S = 0.000 and S-W = 0.000); (marketing dimension: K-S = 0.001 and S-W = 0.000); (experience dimension: K-S = 0.000 and S-W = 0.000) and (technology dimension: K-S = 0.000 dan S-W = 0.000). Thus, the analysis was continued using the Kruskal-Wallis test.

The results of the bivariate analysis using the Kruskal-Wallis test are shown in Table 2 and Table 3. Table 2 shows that the significant differences in the accessibility dimension were only found in terms of the hospital accreditation (p = 0.003). This means that users found it easy to access the websites of highly accredited hospitals indicated by the highest average rating. The accessibility dimension is measured according to the Web Content Accessibility Guidelines which contain perceivable, operable, understandable, robust criteria. Perceivable means that the information and website interface elements must be understandable. Operable websites with

easy-access content should also have understandable and robust materials that can be opened and utilized using a supporting technology (Alhadreti 2021). Hospital websites that have advanced accreditation are considered able to implement the guidelines perceivable, operable, understandable, robust principles. Websites that meet accessibility needs can open up wider market opportunities. Patients aged 50 years and over as well as patients with disabilities experienced better accessibility to health service websites. Inadequate accessibility of websites will put hospitals at risk of losing their patients (Sik-Lanyi and Orbán-Mihálykó 2019).

Table 2. Results of Kruskal – Wallis Analysis of Accessibility and Marketing Dimensions by Province, Class, Accreditation and Hospital Ownership

Variables		N	Accessibility Dimensions		Marketing Dimensions	
			Mean Ranks	p values	Mean Ranks	p values
Province	Capital City of Jakarta	143	202.84	0.572	255.89	0.003*
	West Java	211	207.41		188.64	
	Banten	61	222.12		233.02	
Class	A	20	232.35	0.484	297.25	0.000*
	B	133	211.56		266.48	
	C	218	208.07		182.80	
	D	44	158.81		115.51	
Accreditation	Highly Advanced Level	225	218.06	0.003*	253.06	0.000*
	Advanced Level	62	228.88		200.52	
	Intermediate Level	44	148.33		127.51	
	Basic Level	20	221.24		107.97	
	First Pass	64	191.02		144.01	
Hospital Ownership	Ministry of Health	14	203.93	0.286	296.39	0.000*
	Other's Ministry	3	175.00		143.33	
	State-Owned Enterprises	6	193.50		343.42	
	Islamic Organization	7	316.79		304.79	
	Catholic Organization	6	278.58		258.80	
	Protestant Organization	3	84.50		216.00	
	Social Organization	50	197.26		186.35	
	Provincial Government	31	175.37		148.56	
	District Government	21	217.00		197.29	
	City Government	9	200.44		225.89	
	Private Parties	5	196.20		287.00	
	Companies	112	210.69		200.21	
	Indonesian Armed Forces	6	161.42		107.00	
	Indonesian Navy	3	105.83		192.83	
	Indonesian Air Force	4	239.50		61.13	
	Police Department	3	173.50		141.50	
	Other Private Parties	132	216.92		223.42	

Table 2 displays that marketing dimension differs significantly for all aspects: province (p = 0.003), class (p = 0.000), accreditation (p = 0.000) and hospital ownership (p = 0.000). Hospital quality is influenced by the regional development index and the number of beds. Hospitals that have high quality level have more support and resources from the owners to improve the quality of their websites. Hospitals with good quality websites use them to promote their services online instead of direct communication with patients or evidence-based information (Alhuwail, AlMeraj, and Boujarwah 2018; Roche and Jones 2021).

Table 3. Results of Kruskal – Wallis Analysis of Experience and Technology Dimensions by Province, Class, Accreditation and Hospital Ownership

Variables		N	Experience Dimensions		Technology Dimensions	
			Mean Ranks	p values	Mean Ranks	p values
Province	Capital City of Jakarta	143	202.84	0.572	255.89	0.003*
	West Java	211	207.41		188.64	
	Banten	61	222.12		233.02	
Class	A	20	232.35	0.484	297.25	0.000*
	B	133	211.56		266.48	
	C	218	208.07		182.80	
	D	44	158.81		115.51	
Accreditation	Highly Advanced Level	225	218.06	0.003*	253.06	0.000*
	Advanced Level	62	228.88		200.52	
	Intermediate Level	44	148.33		127.51	
	Basic Level	20	221.24		107.97	
	First Pass	64	191.02		144.01	
Hospital Ownership	Ministry of Health	14	203.93	0.286	296.39	0.000*
	Other's Ministry	3	175.00		143.33	
	State-Owned Enterprises	6	193.50		343.42	
	Islamic Organization	7	316.79		304.79	
	Catholic Organization	6	278.58		258.80	
	Protestant Organization	3	84.50		216.00	
	Social Organization	50	197.26		186.35	
	Provincial Government	31	175.37		148.56	
	District Government	21	217.00		197.29	
	City Government	9	200.44		225.89	
	Private Parties	5	196.20		287.00	
	Companies	112	210.69		200.21	
	Indonesian Armed Forces	6	161.42		107.00	
	Indonesian Navy	3	105.83		192.83	
	Indonesian Air Force	4	239.50		61.13	
	Police Department	3	173.50		141.50	
	Other Private Parties	132	216.92		223.42	

Table 3 shows that a significant difference in the experience dimension was found between hospital classes (p = 0.005). For example, class A hospitals have the highest average rating value (p = 0.000). Further, based on ownership, hospitals owned by Catholic organizations have the highest mean rating. Easy access to the website makes users quickly decide the product or service preferred (Cai *et al.* 2018). Class A hospitals, hospitals with highly advanced accreditation level, and hospitals owned by Catholic organizations satisfied website users. In other words, their websites can bridge between hospitals and patients. In improving the quality of the websites, hospitals need a certified website designer (Tarcan, Yalcin Balcik, and Sapaz 2020). Hospital website in China have a focus on promoting their basic services and information rather than patient participation and communication (Zhong *et al.* 2021). Little difference was found between China and Indonesia in terms of a gap between hospitals, website developers and patients. Most of the time, website developers only focus on quality indicators at the system level while patients need response from the website in satisfying their needs. However, they little focus on considering user preferences and on thinking about ways to increase patient satisfaction (Hung *et al.* 2022).

Table 3 also shows that a significant difference in the technology dimension was found only for hospital ownership ($p = 0.005$) where hospitals owned by Catholic organizations have the highest mean rating. The technology dimension relates to the quality of website design which consists of internal links, URL formats, headings, printing capabilities, server behavior, and meta tags (Randy Joy 2018)

Hospitals with the highest average score owned by Catholic organizations have better website designs. Quality private hospital websites in the technological dimension are dominated by private hospitals. This is in line with a study comparing the website quality of public hospitals and private hospitals in Turkey. Privat hospital websites in Turkey are of very high quality due to the superiority of private hospital infrastructure compared to public hospitals (Boydak and Yalçın İleri 2021). Research in Iran also confirms that there is a gap in the quality of the websites between public and private hospitals assessed from the WebMedQual approach. Public hospitals have low quality, especially in terms of website design (Saghaeiannejad-Isfahani *et al.* 2019). Ideally the quality of the hospital website can be assessed from accessibility, experience, marketing and technology dimensions manually through quantitative and qualitative methods. However, with the Nibbler tool, website quality testing can be done automatically through the same dimensions (Reichenpfader *et al.* 2020).

The Covid-19 pandemic has forced hospitals to focus more on promoting their services on websites (Sulaiman *et al.* 2020; Kumar *et al.* 2020). Hospitals in Jakarta, West Java and Banten have more opportunities to expand their market share to attract foreign patients through medical tourism; therefore, evaluation of website quality could make an improvement. Websites that use English as instructions have better quality scores in accessibility, experience, marketing and technology dimensions.

In order to guarantee equal rights in obtaining digital health information on a website, evaluation and monitoring are needed to ensure the standards of online health information (Sheikh *et al.* 2021; Aiello, Renson, and Zivich 2020). Not all website developers put attention on website quality testing applications to increase the traffic of that website. Some of the free and paid website quality testing applications are reliable. Evaluation of website accessibility, marketing, experience and output technology can be used to improve the website quality to the next stage (Azad-Khaneghah *et al.* 2021; Domínguez Vila, Alén González, and Darcy 2019). Hospitals that have not maximized their website quality can find the efficiency difference between the results of Nibbler testing where website users' responses are collected online, and results of questionnaires distributed manually to patients.

Involving users or patients directly in assessing the quality of the website can give more insights on accessibility, marketing, experience, and technology dimensions. Future studies should be able to involve users or patients in hospital website assessment on accessibility, marketing, experience, and technology dimensions. Patients' or users' responses are good input for website developers and hospital management in Indonesia to improve the website quality so that it can open new markets to foreign tourists. The development of medical tourism in Indonesia lags other Southeast Asia countries such as Singapore, Thailand and Malaysia.

Hospitals in Jakarta, West Java and Banten have the potential to serve medical tourism targeting foreign and domestic patients who have affordability to pay for medical tourism abroad.

The expansion of the hospital target market in Indonesia requires investment in information technology, especially for developing hospital websites. Public hospitals under the Indonesian Ministry of Health already will have excellent services that can be promoted to attract foreign patients once transforming their websites based on accessibility, marketing, experience, and technology dimensions. The gap between website target users and hospitals as health service providers can be eliminated through active engagement on a website. The synergy between the Ministry of Health and Ministry of Tourism is necessary for establishing medical tourism in Indonesia to increase patient visits as well as tourists despite the COVID-19 pandemic.

Hospitals in Indonesia have not developed their websites and some are under repair. If these conditions happen continuously, hospitals in Indonesia will not be able to catch up on medical tourism services. Intensive promotion on the hospital websites likely further introduces the prevailing services of each hospital to domestic and foreign patients. The market segment of medical tourism in Indonesia is the upper middle class who have good financial capabilities. It is done to provide alternative funding for hospitals that may have cash flow difficulties during the Covid-19 pandemic. By looking at the strengths and weaknesses of each hospital's website, short-, medium- and long-term strategies should be considered. Hospitals in Indonesia are expected to be able to use the information technology to increase their market considering tight needs for Social Health Agency.

Conclusion

In conclusion, some hospital websites of hospitals in West Java Province had highly advanced accreditation level and were owned by other private parties. Hospital websites have good accessibility, experience, and technology

dimensions. A significant difference in the accessibility dimension was only found in terms of hospital accreditation. Significant differences in marketing dimension occurred between provincial groups, class, accreditation, and hospital ownership. Significant differences in the experience dimensions were found between class, accreditation, and hospital ownership. Finally, a significant difference in the technological dimension was only found in terms of hospital ownership.

Hospitals in Jakarta, West Java, and Banten should carry out periodic website quality testing with the Nibbler tool or other applications. Hospitals should also conduct annual self-administered surveys among internal and external customers to test the quality of the website and compare the results of test using the application.

Globally, the results of medical tourism evaluations must improve accessibility, experience, and better technology. The medical tourism industry needs to be improved to meet customer needs and get timely and affordable services. Especially in Indonesia, expanding the hospital target market necessitates investment in information technology, particularly in developing hospital websites. It is important to verify website quality on a regular basis to increase the quality of medical tourism.

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Credit Authorship Contribution Statement

Ari Nurfikri: The contributions of first author are Conceptualization, Investigation, Methodology, Project administration, Software, Formal analysis, Writing – original draft, Supervision, Data curation, Validation, Writing – review and editing, Visualization.
Elsa Roselina: The contributions of the second author are Conceptualization, Investigation, Methodology, Project administration, Software, Formal analysis, Writing – original draft, Supervision, Data curation, Validation, Writing – review and editing, Visualization.
Abas Hidayat: The contributions of the third author are Conceptualization, Investigation, Methodology, Project administration, Software, Formal analysis, Writing – original draft, Supervision, Data curation, Validation, Writing – review and editing, Visualization.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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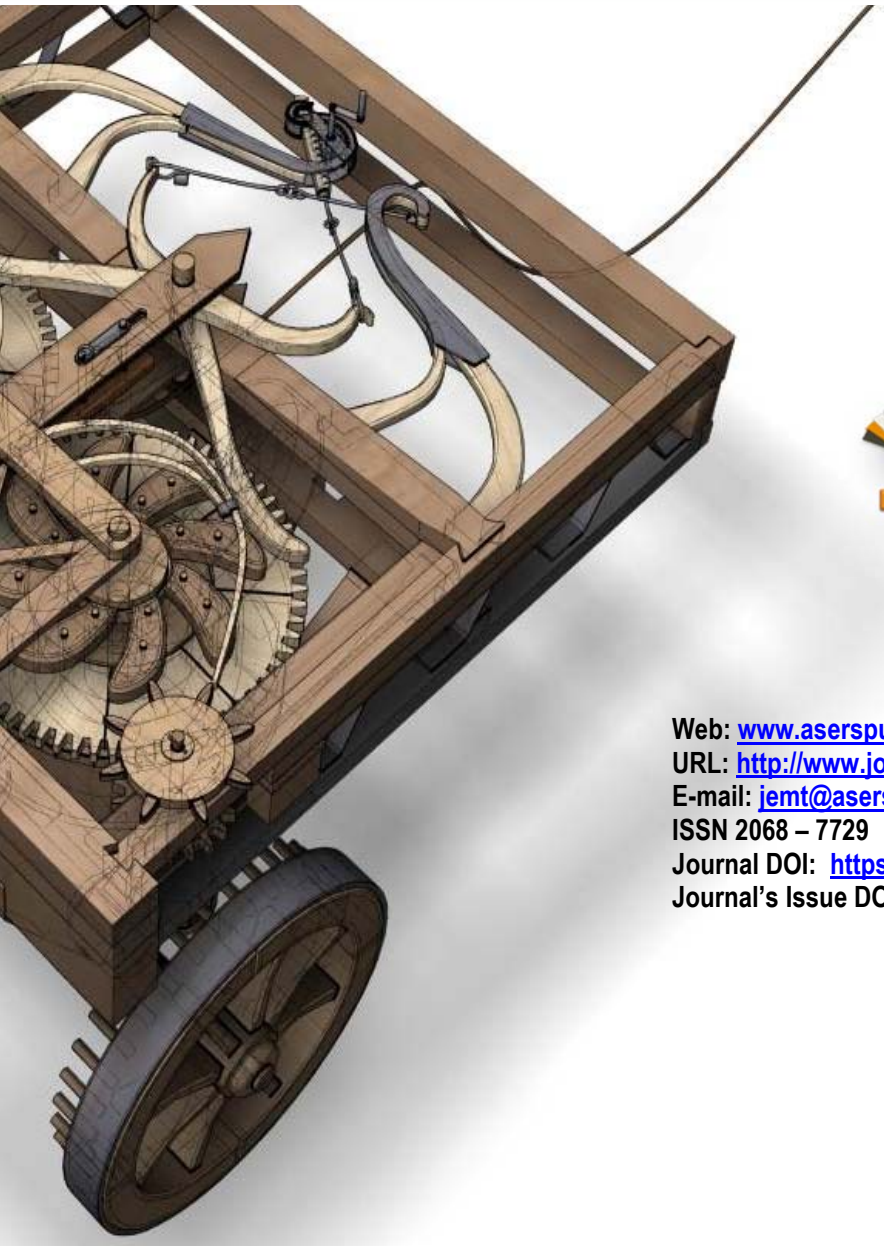

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