Evaluation of Wireless Network radio frequency and using ARAS MCDM method

C. Kalpana N. Rameshkumar
SSt College of Arts and Commerce, Maharashtra, India
ckalpana@sstcollege.edu.in

Abstract

A wireless network is a network radio frequency (RF) between nodes a computer network that uses connections indicates. Homes, businesses and telecommunications wireless networks are a popular solution for networking. Wireless networks with any type of cables unconnected computer networks. Wireless use of networks, cables inside buildings introducing or different equipment expensive like inter-location connectivity it helps companies to avoid the process. The basis of wireless systems is radio waves are the structure of the network it takes place at the physical level. This paper is the additional rate assessment (ARAS) method. The ARAS method is also tested for assumed problems. From this analysis ARAS method is the best solution a short distance and a negative-ideal are a long distance from the solution determines the solution with, but the comparison of these distances not considered significant. Alternative: Receiver sensitivity, Modulation technique, output power, Bandwidth, frequency, Cost. Evaluation Preference: Wireless LAN, Wireless MAN, Wireless PAN, Wireless WAN. From the result it is seen that Wireless WAN factors is got the first rank where as is the Wireless LAN is having the lowest rank. In this paper Wireless WAN is got the first rank where as is the Wireless LAN agency regulations are having the lowest rank.

1. Introduction

A wireless network is a flexible data communication system, it is a radio frequency technology, that means sending data over the air and wireless like receiving using media, reduces the need for wired connections. Wireless lan, white paper wireless networks are wired instead of switching networks are used to increase, and mobile in general between the user and the wired network to provide the last few links in are used. Wireless networks using electromagnetic waves without any physical dependence information from one point to another link exchange mostly radio waves referred to as radio carriers, which are remote since they are for the receiver they provide energy perform the function. Will be sent the data resides on the radio carrier is exaggerated, thus at the receiving end can be accurately extracted. Data on a radio carrier once superimposed (modulated), a radio signal is more than a single frequency occupies more because modulating the frequency or included in the carrier bit rate of information. Radio waves are different radios if transmitted over frequencies, multiple radio carriers stay in the same place without interfering with each other can be. To extract data, a radio a radio is when the receiver rejects all other frequencies tunes into the frequency. Thus obtained after the modulated signal demodulated and in the signal data is extracted.

2. Wireless Network

A wireless network is a network radio frequency (RF) between nodes a computer network that uses connections indicates. Homes, businesses and telecommunications for networks, wireless networks are a popular solution. Wireless network virtualization a popular solution. Enables wireless network virtualization compression and sharing, wirelessly of network deployment and operation overall costs will be significantly reduced. Also, the wireless network is virtualized by isolating a portion of the network easy new products to migrating or technologies provides of wireless network virtualization despite the possible view, wireless for widespread deployment of network virtualization a number of significant research challenges remain ahead these include isolation, control signaling, resource discovery and provisioning, mobility management, network management and operation and security and their absence. Technical like administrative regulations problems. In this article, wireless network some have already been done to achieve virtualization we have a brief survey of jobs presenting, and some research problems and we discuss the challenges [1]. A wireless access network is fully wireless considered the most important part of the network. There are two reasons for this: first, wireless a radio used in access networks the interface technology is supported in a single cell area service data rates, geographical coverage and computing capacity determines the hence, wireless the differences between the standards are important includes wireless access network. Second, wireless access networks the main components are base stations (BSS), usually associated with mobile networks represents huge cash investment. Generally, this investment is more than 40% of the total investment. In today's wireless access networks proprietary hardware designs deployment and exclusive standard support have wireless network while improving, almost all network equipment should be replaced. Also, during the transition, new standards like Mcdm an in 3g and 2g over GSM older integration standards. To complement, the old network of mobile operators keep and make another one to the new standard. Hence, huge funding for wireless network improvements investment is required and growing limited wireless technologies [2].

How do users use wireless networks? To better understand what is being used, local area wireless throughout the building we trace the network's twelve-week period let's explore. Mobile laptop users more institutions to support the growing population schools install wireless networks. Motivation for these installations a portion reduces cable operating costs. With the network of users who want to stay connected fulfilling requests is another important motivation, communication with others and them access information online from anywhere. This answers to questions, wireless hardware and how software traffics wireless networks must be optimized to handle build volume it helps to determine that [3]. In wireless local-area networks (wlans) understanding application patterns wlan for technology developers, for deplorers and administrators, settings for wireless networks and also for developers of application software important. Data related to wireless networks although nothing is with them, their results are nature of internet and p2p traffic, especially kazaa and a remarkable insight into gnutella provide high volume of outbound traffic they found that dominating; in contrast, our results for gaza and cunutella are inbound show dominance of traffic. Content that most wireless users want spend more time than it takes to get or cunutella bear won't quit running, thus pierre is a net consumer. Our study and all previous probes were wireless classified only the network. Wired and concurrent use of wireless networks information gathering is unique to the wireless environment determining properties is useful (but more difficult in switched networks). Of motion we like to study geological formations. Presumably most users are from dorm to class they have regular habits while visiting the dining hall [4]. A linear additive gaussian channel model is wireless signal across channels in general used to capture contacts. Over the past two decades, of gaussian networks efficiency study research active. However, the the complexity of the gaussian model is one-to-many gaussian broadcast channel and many-to-one gaussian multiple due to the nature of the access channel except for simple networks like the efficiency gaussian networks are still unknown. The efficiency of gaussian single-relay network is also, through this point-to-point communication, through relay open for over 30 years. In this problem to track progress, we take a two-step approach. Rather than noise in signal communications in wireless networks first we focus. Than the gaussian model a new deterministic that is analytically simple we offer a channel model, but more three important aspects of wireless communication channel strength, broadcast and overhead capture [5]. This distinction is especially true for wireless networks research on new protocol sets encouraged. Wired networks error although the characteristics are well-documented, wireless-less testing data is available for lans. It is, on paper, 2 mb/s in-building wireless networks a commercial product designed to create one that characterizes the error environment provided by At&T wave lan we report the results of the study. Will interfere radiation sources have effects, distance and packet loss rate and bit error due to bottlenecks we also evaluated the defects in ratio. Many the under conditions comparable to wired connection the error rate of this physical layer is today's csma/ca wireless lans and future pico-cellular basically found based on shared medium reservation of our results in wireless networks we analyze the implications [6]. All of these probes, including ours, are wireless located on the wired side of the network. That is, this all probes are infrastructure 802.11 sees networks, and wireless aps monitoring over connected wired Ethernet takes place. Mahajan et al. 2004 sigcomm see wireless mac-layer behavior in conference and clues from multiple sniffers present techniques for integration. Wireless they see the media being used inefficiently found, nodes are often redundant are retreating. Jigsaw project wireless at UCSD CSE department looking at page traffic, and traces also provides merge methods. 1026 in one day unique MAC addresses and our education with everyday patterns similar to buildings the CSE building is busy [7]. Many papers cover wireless network behavior, indoor and outdoor external links, campus-wide user behavior have studied up to how do real-world networks work? To improve our understanding of what works these documents have helped, as a result simulators, debugging tools and protocols are improving. However, wireless lan networks or a large group over a long period of time there are few studies that analyze jumper and many people. University of wisconsin wireless over 32,000 devices connected to the network examined, from hostname analysis specific to the intended use of the application with vision. Like this mother, force transit and streaming media is the biggest application found as a source, and of portable devices they noticed that it was becoming popular. This paper is the same examining sampled data, but much larger from the pool of users and for five years then as applications and types of devices both change [8]. Wireless networks o n different with 4g to design a functional user terminal want and the size of the device, its price and electricity design issues such as consumption must be overcome. This using software radio approach the problem can be solved, i.e. the user terminal to the wireless interfaces of the network transforms itself [9]. In multi-hop wireless networks, as the number of hops decreases significantly, passing performance is the fundamental issue. Unidirectional and unidirectional radio ranges in networking with nodes, going from 1 hop to 2 hops is the flow reduces efficiency by half, because wireless interference 2 at a time only one of the hops can be functional. Interference in wireless networks to capture, conflict flow contention a graph is called a diagram use a structure like however, as the name suggests, defined in flows rather than connections instead of obtaining optimal performance limits, mac is about studying fair problems [10]. Wireless LAN (WLAN) technology within a building or to connect within a defined external area provides access. First offices and WLAN technology used in homes now also used in shops and restaurants. Wireless metropolitan area networks, outside the office or home network worldwide to provide access to those with established in cities. Wireless personal area networks, such as bluetooth and zigbee most commonly using protocols a maximum of 100 meters is too much for applications covers a defined area. Bluetooth hands enables free phone calls, phone connects to earphones or smart devices sends signals between wireless LAN or access outside the confines of the metropolitan network wireless wans to provide cellular technology are using these networks are wireless wan or connecting through a wired telephone system enables users to make phone calls to others.

3. ARAS- Addition Ratio Assessment (MCDM)

Multicriteria decision making (MCDM) methods in human used in many regions of operations. Each in a multicriteria choice-making problem an opportunity also can be described via a criterion. Criteria can be qualitative or quantitative. They typically have different units of size and feature a specific optimization path. Normalization comparable portions of criterion values aims to get the article are a new one admission ratio assessment (ARAS) method introducing. Aras technique described to illustrate, the microclimate in workplace rooms a actual case study of assessment is presented [11]. A new combination ratio in

multi-criteria decision making assessment (ARAS) system is sustainable development and the environment can be affected by essential injuries. Multiple construction processes are machines working together by and by creating technical systems are carried out. Process design purposes, arising from computer use performance in relation to profits and losses ratios are very important. Alternatives to sort and pick out the first-rate alternative the new ARAS machine can be used. Conventional Mcdm the problem is finite numbers with the venture of ranking decision alternatives relately, each of these accounts simultaneously different decision to be taken obviously based on criteria are described. According to ARAS method, possible one that determines the relative effectiveness of complex alternatives utility functional value is the main consideration in the project values and weights of criteria is immediately proportional to the associated effect [12]. Integrated with new ARAS hybrid gadget a multi-standards choice-making model is used. Of renewable strength systems (polysilicon sun power, strong oxide gas) sustainability power to assess the importance of indicators a number of criteria are used to make decisions with input from experts model and extended ARAS hybrid approach phosphoric acid fuel mobile, and offshore wind improved SWARA in combination with ARAS method based [13]. Aras method is easy to solve Mcdm problems to use a process that can be used easy, this time by normal users even if used. Several criteria are used to make the decision (Mcdm) problem. The objective of this thesis is to an easy to use yet effective Mcdm model creating is a faculty for decision maker's website with websites of other faculties provides an opportunity for comparison. So, this model relatively known as the Aras method for creating a simple but effective Mcdm method selected. Regarding e-commerce websites, evaluation of faculty websites is theirs contains specifications. Hence, the section of this paper 2, as identified by gaboon (1998). Criteria for measuring the quality of websites we discuss about then, in section 3 of this paper, we present the basic components of the Aras method. After that, faculty in numerical example to assess and measure website quality using the Aras method [14]. Aggregate rate assessment (Aras) method the Aras method microclimate in office rooms for illustration a case study describing an authentic assessment is provided. Newly proposed Aras methodology is the key criteria considered in the project complexity of possible alternative use function value of values and weights to determine performance is directly proportional to the relative impact. A case have a look at to check the described Aras technique will be considered. Construction technologies and development of creation materials, growing population requirements are the interior of a building, which is climate it raises the issue of evaluation as a final product. Freshly price of constructed or existing houses, maintenance costs, space, location, climate etc parameters are ignored and evaluated, it's about residents, how many of you want to be healthy and fit (kalibatas and turskis 2008). Real estate appraisal indoor the climate need to be taken into consideration, due to the fact some of the statistics received inside the studies monitor extensive defects and construction defects, this results in low quality, expensive assets [15]. For evaluation, seven different buildings are theirs selected according to purpose religious, administrative and residence. Such buildings, especially replacements listed buildings, dated 1387 early on, they have an impressive architectural history have however, and historical data sources many fires suggest permanent provide restoration data of the building. Such history of buildings is many protecting cultures traits and is therefore multi-criteria the use of methods, the influence of other indicators taking into account, phenomena in a complex world Aras is simple in terms of argumentation it can be understood using simple comparisons. [16].

4. Analysis and Discussion

Wireless network table 1 the Alternative: Receiver sensitivity, Modulation technique, output power, Bandwidth, frequency, Cost. Evaluation Preference: Wireless LAN, Wireless MAN, Wireless PAN, Wireless WAN. Showing the highest value, lowest value this table. Receiver sensitivity it is seen that Wireless WAN is showing the highest value for Wireless LAN is showing the lowest value. Modulation technique it is seen that Wireless WAN is showing the highest value for Wireless PAN is showing the lowest value. Output power it is seen that Wireless WAN is showing the highest value for Wireless LAN is showing the lowest value. Bandwidth it is seen that Wireless WAN is showing the highest value for Wireless LAN is showing the lowest value. Frequency it is seen that Wireless WAN is showing the highest value for Wireless LAN is showing the lowest value. Cost it is seen that Wireless WAN is showing the highest value for Wireless LAN is showing the lowest value. Wireless network types are Personal area network (PAN), Local area network (LAN), and Metropolitan area network (MAN), Wide area network (WAN).

Table 1 -Wireless Network

	Receiver sensitivity	Modulation technique	output power	Bandwidth	frequency	Cost
Max or Min	99	70	97	90	100	25
Wireless LAN	82	47	46	60	75	25
Wireless MAN	85	50	63	90	87	30
Wireless PAN	89	40	83	75	95	40
Wireless WAN	99	70	97	90	100	45

Table 1 shows the Alternative: Receiver sensitivity, Modulation technique, output power, Bandwidth, frequency, Cost. Evaluation Preference: Wireless LAN, Wireless MAN, Wireless PAN, Wireless WAN. max or min show the value this table.
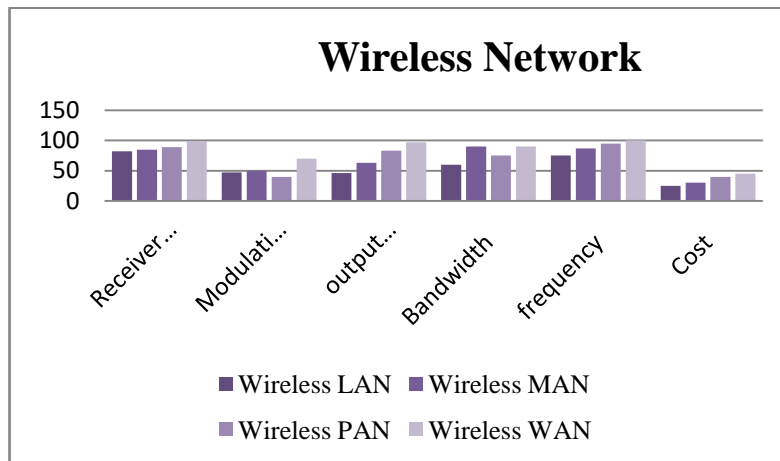
Figure 1 -Wireless Network

Figure 1 shows the graphical representation wireless network Alternative: Receiver sensitivity, Modulation technique, output power, Bandwidth, frequency, Cost. Evaluation Preference: Wireless LAN, Wireless MAN, Wireless PAN, Wireless WAN.

Table 2 -Wireless Network (Max or Min)

	Receiver sensitivity	Modulation technique	output power	Bandwidth	frequency	Cost
Max or Min	**99**	**70**	**97**	**90**	**100**	**0.04**
Wireless LAN	82	47	46	60	75	0.04
Wireless MAN	85	50	63	90	87	0.03333333
Wireless PAN	89	40	83	75	95	0.025
Wireless WAN	99	70	97	90	100	0.02222222

Table 2 shows the Wireless Network Max or Min value Receiver sensitivity=99, Modulation technique=70, output power=97, Bandwidth=90, frequency=100, Cost=0.01=4 Divide formula.

Table 3 -Normalization of DM

Normalization of DM						
	Receiver sensitivity	Modulation technique	output power	Bandwidth	frequency	Cost
Max or Min	**0.218062**	**0.252708**	**0.251295**	**0.222222**	**0.218818**	**0.249135**
Wireless LAN	0.180617	0.169675	0.119171	0.148148		0.249135
Wireless MAN	0.187225	0.180505	0.163212	0.222222	0.190372	0.207612
Wireless PAN	0.196035	0.144404	0.215026	0.185185	0.207877	0.155709
Wireless WAN	0.218062	0.252708	0.251295	0.222222	0.218818	0.138408

Table 3 shows the Normalization of DM Alternative: Receiver sensitivity, Modulation technique, output power, Bandwidth, frequency, Cost. Evaluation Preference: Wireless LAN, Wireless MAN, Wireless PAN, Wireless WAN. These values are calculated using by formulas.

Table 4 -Weighted Normalized DM

Weighted Normalized DM						
	0.21	0.18	0.22	0.15	0.13	0.11
	Receiver sensitivity	Modulation technique	output power	Bandwidth	frequency	Cost
Max or Min	0.045793	0.045487	0.055285	0.033333	0.028446	0.027405
Wireless LAN	0.03793	0.030542	0.026218	0.022222	0	0.027405
Wireless MAN	0.039317	0.032491	0.035907	0.033333	0.024748	0.022837
Wireless PAN	0.041167	0.025993	0.047306	0.027778	0.027024	0.017128
Wireless WAN	0.045793	0.045487	0.055285	0.033333	0.028446	0.015225

Table 3 shows the Weighted Normalized DM 0.21, 0.18, 0.22, 0.15, 0.13, 0.11 value Alternative: Receiver sensitivity, Modulation technique, output power, Bandwidth, frequency, Cost. Evaluation Preference: Wireless LAN, Wireless MAN, Wireless PAN, Wireless WAN. Weighted normalised matrix values are derived by using the formula.

Table 5 -Si & Ki

Si	Ki
0.23575	1
0.165651	0.702654
0.188634	0.800145
0.186396	0.790651
0.22357	0.948335

Table 5 shows the Si & ki value using the Sum formula.

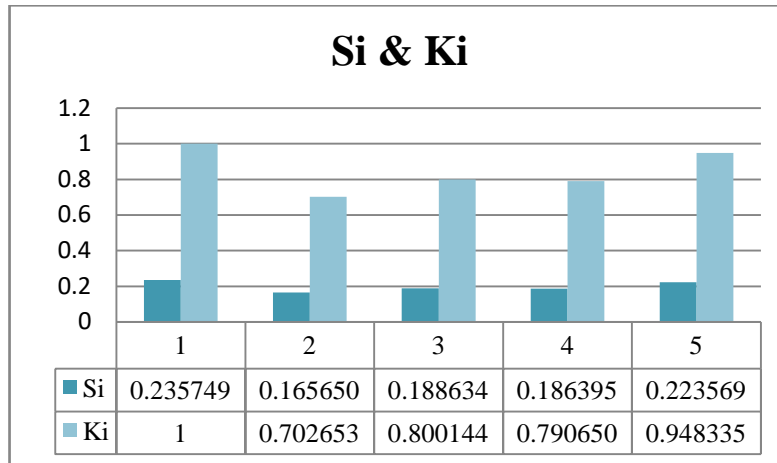|	1	2	3	4	5
■ Si	0.235749	0.165650	0.188634	0.186395	0.223569
■ Ki	1	0.702653	0.800144	0.790650	0.948335

FIGURE 2. Si & Ki

Figure 2 shows the graphical representation Wireless Network Si & ki value.

Table 6 -Rank

	Rank
Wireless LAN	4
Wireless MAN	2
Wireless PAN	3
Wireless WAN	1

Table 6. shows the final result of this paper the Wireless LAN is in fourth rank, the Wireless MAN is in Second rank, the Wireless PAN is in Third rank, the Wireless WAN is in First rank.
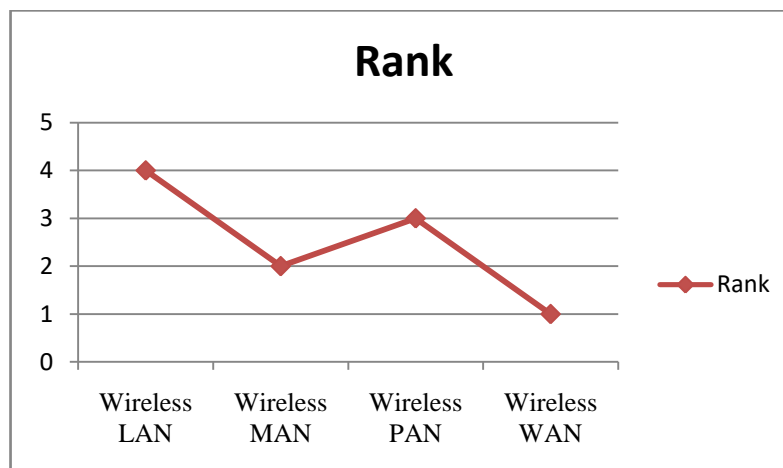

Figure 3 -Rank

Figure 3 shows the graphical view of the final result of this paper the Wireless LAN is in 4th rank, the Wireless MAN is in 2nd rank, the Wireless PAN is in 3rd rank, the Wireless WAN is in 1st rank. The final result is done by using the ARAS (MCDM) method.

5. Conclusion

A wireless network is a network radio frequency (RF) between nodes a computer network that uses connections indicates. Homes, businesses and telecommunications for networks, wireless networks are a a popular solution. Any type of wireless networks is computer networks that are not connected by cables. Use of wireless networks inside buildings introducing cables Or different equipment expensive likes inter-location connectivity it helps companies to avoid the process. This paper

additional rate assessment (Aras) method. Considered the Aras system is also tested for complications. In this the Aras method narrows to the best solution from the analysis distance and negative are better and longer distance from the solution determines the solution with, but the comparison of these distances not considered significant. Of this paper the final result is wireless LAN ranked fourth, wireless MAN is ranked second, wireless PAN is ranked third and wireless WAN is ranked first.

6. References

[1].Liang, Chengchao, and F. Richard Yu. "Wireless network virtualization: A survey, some research issues and challenges." *IEEE Communications Surveys & Tutorials* 17, no. 1 (2014): 358-380.

[2].Lin, Yonghua, Ling Shao, Zhenbo Zhu, Qing Wang, and Ravie K. Sabhikhi. "Wireless network cloud: Architecture and system requirements." *IBM Journal of Research and Development* 54, no. 1 (2010): 4-1.

[3].Tang, Diane, and Mary Baker. "Analysis of a local-area wireless network." In *Proceedings of the 6th annual international conference on Mobile computing and networking*, pp. 1-10. 2000.

[4].Kotz, David, and Kobby Essien. "Analysis of a campus-wide wireless network." *Wireless Networks* 11, no. 1 (2005): 115-133.

[5].Avestimehr, A. Salman, Suhas N. Diggavi, and N. C. David. "Wireless network information flow: A deterministic approach." *IEEE Transactions on Information theory* 57, no. 4 (2011): 1872-1905.

[6].Eckhardt, David, and Peter Steenkiste. "Measurement and analysis of the error characteristics of an in-building wireless network." In *Conference proceedings on Applications, technologies, architectures, and protocols for computer communications*, pp. 243-254. 1996.

[7].Henderson, Tristan, David Kotz, and Ilya Abyzov. "The changing usage of a mature campus-wide wireless network." In *Proceedings of the 10th annual international conference on Mobile computing and networking*, pp. 187-201. 2004.

[8].Biswas, Sanjit, John Bicket, Edmund Wong, Raluca Musaloiu-e, Apurv Bhartia, and Dan Aguayo. "Large-scale measurements of wireless network behavior." In *Proceedings of the 2015 ACM Conference on Special Interest Group on Data Communication*, pp. 153-165. 2015.

[9].Khan, Afaq H., Mohammed A. Qadeer, Juned A. Ansari, and Sariya Waheed. "4G as a next generation wireless network." In *2009 International conference on future computer and communication*, pp. 334-338. IEEE, 2009.

[10].Jain, Kamal, Jitendra Padhye, Venkata N. Padmanabhan, and Lili Qiu. "Impact of interference on multi-hop wireless network performance." *Wireless networks* 11, no. 4 (2005): 471-487.

[11].Zavadskas, Edmundas Kazimieras, and Zenonas Turskis. "A new additive ratio assessment (ARAS) method in multicriteria decision-making." *Technological and economic development of economy* 16, no. 2 (2010): 159-172.

[12].Zavadskas, Edmundas Kazimieras, Zenonas Turskis, and Tatjana Vilutiene. "Multiple criteria analysis of foundation instalment alternatives by applying Additive Ratio Assessment (ARAS) method." *Archives of civil and mechanical engineering* 10, no. 3 (2010): 123-141.

[13].Stanujkic, Dragisa, and Rodoljub Jovanovic. "Measuring a quality of faculty website using ARAS method." In *Proceeding of the International Scientific Conference Contemporary Issues in Business, Management and Education*, vol. 545, p. 554. 2012.

[14].Kutut, Vladislavas, E. K. Zavadskas, and M. Lazauskas. "Assessment of priority alternatives for preservation of historic buildings using model based on ARAS and AHP methods." *Archives of civil and mechanical engineering* 14, no. 2 (2014): 287-294.