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Sustainable Transportation Systems Analysis using WASPAS MCDM Method

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Abstract. In this form of analysis the WASPAS method is the most ideal solution Short-distance and negative-best The solution with the longest distance from the solution Determines, but the comparison of these distances Does not consider importance. From the result it is seen that Reliability is the first rank whereas is the Safety is having the lowest rank. Sustainable transportation systems are the need of modern times. There has been an unexpected growth in the number of transportation activities over years and the trend is expected to continue in the coming years. This has obviously associated environmental costs like air pollution, noise, etc. which is degrading the quality of life in modern cities. To cope with this crisis, municipal administrations are investing in sustainable transportation systems that are not only efficient, robust and economical but also friendly towards the environment. Sustainability has become an overarching concern for transportation policy and planning around the world. This article presents an approach for urban transport sustainability performance evaluation using fuzzy logic. This article presents a model for transport sustainability performance evaluation. Appropriate transport sustainability indicators were identified based on literature. Recently, sustainability has become a very important research area in transportation because of the dependencies between transportation, economic, and environmental systems. Alternative: Safety, Security, Reliability, Air pollutants, Noise. .Evaluation Preference: Cost benefits analysis optimization models, Life cycle analysis, Data analysis. WASPAS-Weighted Aggregated Sum Product Assessment. In this method from WASPAS in Sustainable Transportation Systems. From the result it is seen that Reliability and is the first rank whereas the Safety got is having the lowest rank.

1. Introduction

Sustainability, sustainable development, sustainable communities, and sustainable transportation systems are several terms presently used to describe the concept of being able to use the transportation system as needed in the present while at the same time ensuring its availability for future generations. This essay identifies two basic themes, human nature and the means-ends relationship, that can both advance philosophical reflection on technology and potentially serve as a basis for Askewest collaboration in philosophy. What are central to the philosophy of technology and engineering are questions of how technical activity is related to human nature, both as founded in human nature and contributing to its realization. The most widely used definition of sustainable development, from the Brundtland Commission, is the basis of most definitions for sustainability in various national economies: Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. Travelers with heterogeneous characteristics interact in both temporal and spatial dimensions. The complexity also lies in interactions among various transportation modes when we evaluate certain strategies in terms of transportation policy, planning, management and operations. One example is that an increased congestion toll may transfer some private car users who are sensitive to road pricing to other modes. In the operations research, mathematical modeling and sophisticated statistical analysis have been used for solving a number of business and organizational problems and improving a decision-making process. Due to the increasing complexity of the business environment, companies rely on analysis to make decisions, which were formerly based on managers' intuition. Operations research provides the required tools for government agencies and large companies to make better decisions to reduce risks and to enhance the quality of their performance. Challenges associated with the development of technology and the global economy complicated the business environment even more. Represented by smart phones, wireless devices are becoming more and more important in our daily life. In wireless device research and development (R&D) engineering, accurate and efficient measurement plays a fundamental and crucial role in both radio troubleshooting and final certification. More importantly, during the R&D process the engineers rely often on measurement data to seek optimized solutions for the engineering problems. The traditional power stepping based time consuming radio sensitivity sweep is repeatable applied on the daily R&D process.

2. Sustainable Transportation Systems

The idea of platooning means that each vehicle in the platoon has to control its velocity and the relative distance to the vehicle in front. The platoon can drive automatically by following the leader's vehicle, which can be controlled automatically by communicating with the infrastructure or manually by the driver. Vehicle platoon can drive on a single lane by using a

control strategy for each vehicle, but the situation that vehicles must enter or leave the platoon can also be considered. A shuttle system that currently runs on diesel operated buses presents a situation where advances in sustainability can be made. If there are ways to limit the amount of fuel burned, decrease the carbon-footprint, and increase the sustainability of the UNO shuttle system - then a proposed change satisfying these requirements would be widely accepted. In this section, the existing literature is reviewed in two parts; the first part deals with the different dimensions of sustainability related to freight transportation and the second part deals with the literature related to performance assessment. This chapter looks at how intelligent transportation systems can help create a sustainable transportation plan for a city through improvements in the efficiency of the system. The chapter attempts to argue that a proper measure of efficiency of transportation systems will lead to a more sustainable system. The chapter also highlights the issues that need attention in order to create a sustainable urban mobility plan. Sustainable transportation might be considered by examining the sustainability of the transport system itself, focusing on the positive and negative values and externalities of traffic and transport as they are apparent now or in the near future. The hydrogen has been recognized as a fuel for transportation and a vector for the energy system. The hydrogen fleet and refueling infrastructure are expected to gradually diffuse from the major cities to less urbanized or rural areas. It is critical to start with isolated and captive fleet demonstrations and progressively builds up these clusters for the precommercial stage.

3. WASPAS

In this paper, PARAMICS was used to realistically model the traffic flow of the selected test network. Its API was also used to continuously collect traffic measurements and to synchronize command control and data exchange with ns-2. On the other hand, the real-time vehicle-to-vehicle and vehicle-to infrastructure communications, including addressing, routing, and scheduling solutions, were modeled in the ns-2 environment. The proposal that organizations should gather data about actual communication practices is still relatively novel in the UK. It owes much to participative concepts of management that have gained credibility over the past decade These approaches emphasize teamwork, coaching rather than instruction, delegation and the consequent widespread ownership of corporate goals. In recent years, research on the MCDM utility determining approaches has been continued, and many applications of these approaches have been found in several fields. MCDM provides effective decision making approaches for the domains, where the selection of the best alternative is highly complicated. The current study provides a detailed review of the main trends of considering the MCDM theory and practice. The main purpose of the review is to introduce two new MCDM utility determining approaches used in previous studies and to suggest approaches, which could be most effectively applied to identifying the best alternative. MCDM utility determining approaches were used in many areas. MCDM methods help to choose the best alternatives based on multiple criteria. The best alternative can be determined by analyzing the scopes and weights of the criteria and selecting the optimum ones by using any MCDM technique. The current review closely shows the process of enhancing WASPAS and SWARA and their applications in various fields from different perspectives. In total, 55 papers were classified according to two MCDM utility determining approaches including; SWARA, WASPAS and integrating of two approaches. Following sections discuss literature and developments of these two techniques. Represented by smart phones, wireless devices are becoming more and more important in our daily life. In wireless device research and development (R&D) engineering, accurate and efficient measurement plays a fundamental and crucial role in both radio troubleshooting and final certification. More importantly, during the R&D process the engineers rely often on measurement data to seek optimized solutions for the engineering problems. The traditional power stepping based time consuming radio sensitivity sweep is repeatable applied on the daily R&D process.

TABLE 1. Sustainable Transportation Systems

	Cost benefit analysis	**optimization models**	**Life cycle analysis**	**Data analysis**
Safety	4.00000	6.25000	4.25000	4.75000
Security	4.50000	4.25000	4.75000	4.50000
Reliability	4.25000	5.00000	6.00000	4.50000
Air pollutants	3.25000	4.00000	5.25000	2.75000
Noise	2.75000	5.50000	3.25000	5.25000

Table 2 shows the various Weight ages for Safety, Security, Reliability, Air pollutants, Noise. Normalized value is obtained by using the weighted normalized decision matrix 1. Table 3 shows weighted normalized decision matrix 2 used for the analysis. We taken same weights for all the Sustainable Transportation Systems analysis

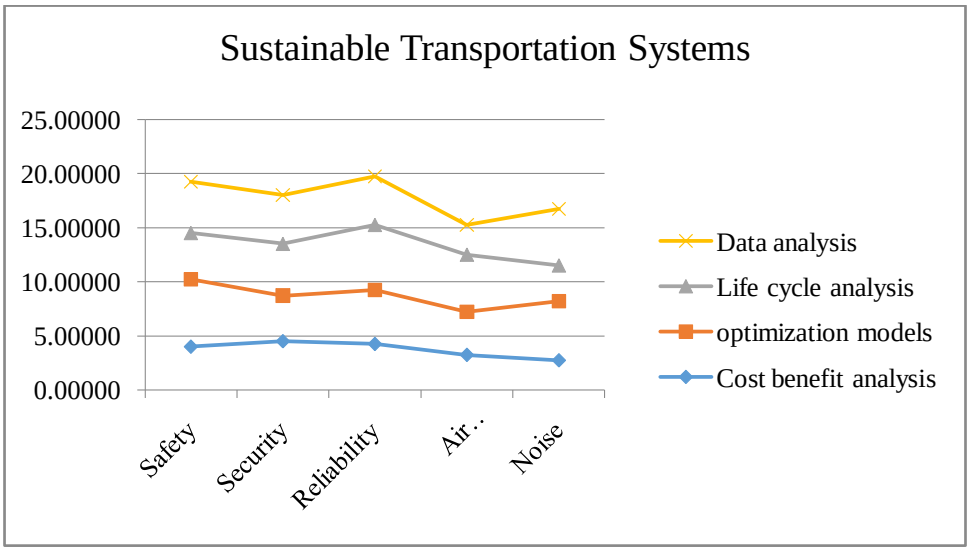

FIGURE 1. Sustainable Transportation Systems

TABLE 2. Weight age

	Cost benefit analysis	optimization models	Life cycle analysis	Data analysis
Safety	0.25	0.25	0.25	0.25
Security	0.25	0.25	0.25	0.25
Reliability	0.25	0.25	0.25	0.25
Air pollutants	0.25	0.25	0.25	0.25
Noise	0.25	0.25	0.25	0.25

TABLE 3. Weighted normalized decision matrix 1

	Cost benefit analysis	optimization models	Life cycle analysis	Data analysis
Safety	0.22222	0.25000	0.19118	0.14474
Security	0.25000	0.17000	0.17105	0.15278
Reliability	0.23611	0.20000	0.13542	0.15278
Air pollutants	0.18056	0.16000	0.15476	0.25000
Noise	0.15278	0.22000	0.25000	0.13095

TABLE 4. Weighted normalized decision matrix 2

	Cost benefit analysis	optimization models	Life cycle analysis	Data analysis
Safety	0.97098	1.00000	0.93513	0.87229
Security	1.00000	0.90809	0.90949	0.88416
Reliability	0.98581	0.94574	0.85789	0.88416
Air pollutants	0.92187	0.89443	0.88702	1.00000
Noise	0.88416	0.96855	1.00000	0.85073

TABLE 5. Preference Score 1, Preference Score 2 and WASPASS coefficient and rank

	Preference Score 1	Preference Score 2	lambda	WASPAS Coefficient	RANK
Safety	0.80814	0.79204	0.5	0.80009	1
Security	0.74383	0.73022		0.73703	4
Reliability	0.72431	0.70718		0.71574	5
Air pollutants	0.74532	0.73138		0.73835	3
Noise	0.75373	0.72852		0.74113	2

Table 5 shows for Preference Score 1, Preference Score 2, WASPAS Coefficient, and RANK. To figure out the Preference Score 1, Preference Score 2, used

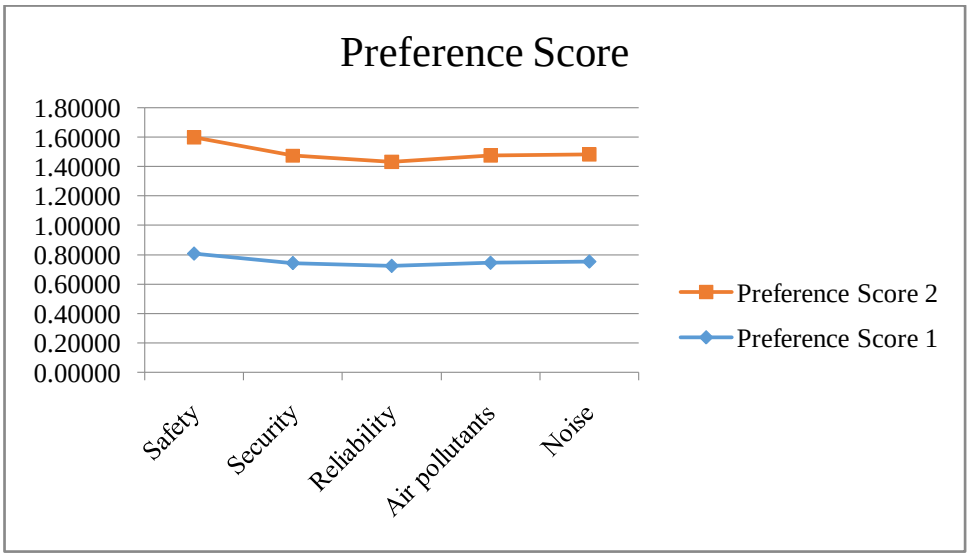

FIGURE 2. Preference Score 1, Preference Score 2.

FIGURE 2 Shows that From the Preference Score it is seen that Safety and is got the first Score whereas is the Reliability got is having the lowest Score.

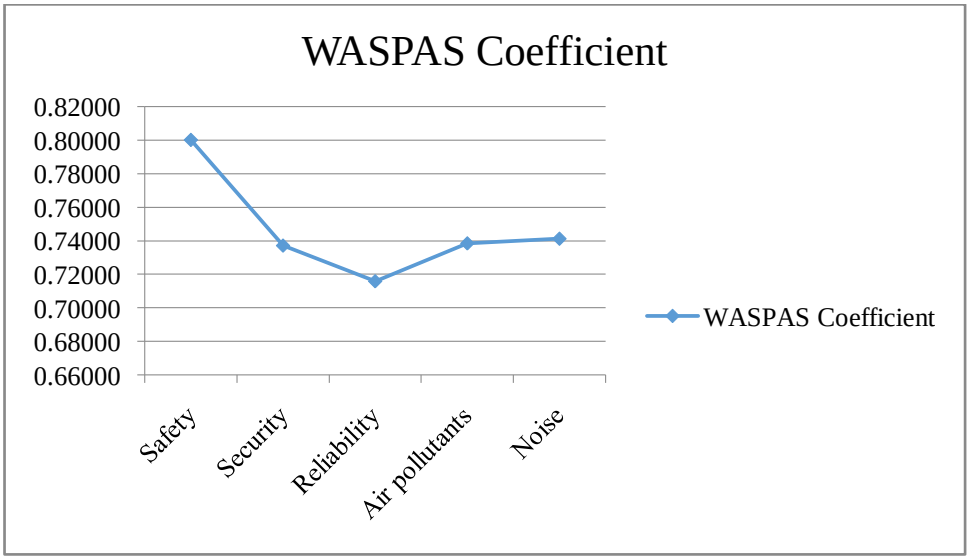

FIGURE 3. WASPAS Coefficient

FIGURE 3 Shows that From the WASPAS Coefficient it is seen that Safety and it got the first whereas is the Reliability got is having the lowest.

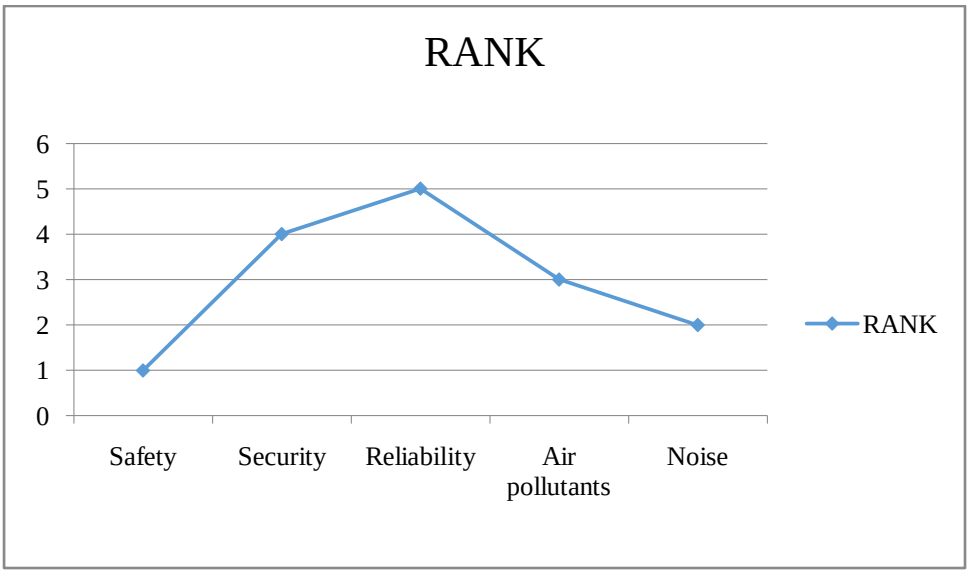

FIGURE 4. Rank

From the result it is seen that Reliability and is got the first rank whereas is the Safety got is having the lowest rank.

4. Conclusion

This paper was conducted in a simulation environment, because a field test is costly and difficult and cannot be conducted before a system is actually deployed. Simulation, on the other hand, provides a cost-effective and efficient alternative. As previously mentioned, the developed simulation models for this paper were carefully calibrated and validated to realistically represent the real world, which should increase confidence in the study's conclusions. A bidirectional chaos communication system, which permits long-distance optical-fiber transmission, is proposed, and its communication performances are simulated. For this system, good chaos synchronization between two RLs can be achieved while low correlation between the outputs of RLs and that of DL is kept under suitable operation conditions. Based on a novel message encryption and decryption scheme, two 10 Gb/s messages can be effectively encoded and decoded over 60 km standard SMF channel. This paper has proposed a rationale for organizations to examine the effectiveness of their communication systems. It has been argued that effective communication is a vital ingredient of attempts to increase participation, secure the widespread ownership of corporate goals and implement such programmers as Total Quality Management. It can therefore be anticipated that managers will become increasingly interested in analytical instruments which facilitate a detailed analysis of current communication practices within their organizations. This review paper presents a comprehensive overview of the theory and applications with recent fuzzy developments of WASPAS and SWARA as two new MCDM utility determining approaches. Because of the ability of WASPAS and SWARA approaches to evaluate the criteria, rank the alternatives and comparative analysis, recently, WASPAS and SWARA related papers have increased in several MCDM problems. From the result it is seen that Reliability and is the first rank whereas the Safety got is having the lowest rank.

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