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Identification of Key Selection Criteria for Transportation Service Providers in Vietnam with Content Validity Ratio

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Abstract

This paper aims to develop a shortlist of the most relevant criteria for the selection of transportation service providers in Vietnam. Opinions from local experts are gathered and analyzed using the Content Validity Ratio method. Specifically, their qualitative judgments are converted into quantitative data, with which the most essential factors can be identified. The results highlight that in the context of choosing a partner for transportation service, cost, client relationships, responsiveness, service quality, ease of communication, awareness of ethics, awareness of health and safety, delivery performance, and information sharing are top priorities for decision makers, while environmental factors, such as the adoption of green technologies, are less critical.

Keywords

Transportation Service Provider (TSP) Selection, Content Validity Ratio (CVR), Sustainability, Vietnam.

1. Introduction

Transportation is the backbone of global supply chains. It plays an integral role in logistics management by facilitating the movement of products from production facilities to end customers, which rarely occurs at the same location (Chopra and Meindl 2001). Given its part in supply chains, transportation significantly impacts overall supply chain costs and efficiency (Paul et al. 2020). As a result, choosing the right transportation service provider has become more important to businesses these days. The selection process usually involves numerous qualitative and quantitative criteria, which can vary in importance and be difficult to consider for inclusion.

While economic factors such as cost, financial performance, and experience remain central to decision-making (Yayla et al. 2015; Paul et al. 2020; Dursun 2021), the rising importance of sustainability has introduced new dimensions, including environmental, social, and operational aspects (Zarbakhshnia et al. 2018; Karbassi Yazdi et al. 2023). Factors like carbon emissions, green technologies, and operational efficiency now play a pivotal role in evaluating providers of transportation (Paul et al. 2020). Furthermore, social aspects, such as client relationships and

communication efficiency, are critical for long-term partnerships, ensuring that the choice of transport providers aligns with organizational values and operational needs (Dubey et al. 2017; Paul et al. 2020).

The main goal of this study is to create a concise set of criteria for choosing transportation service providers in Vietnam. To accomplish this, the Content Validity Ratio (CVR) method is applied to pick criteria from a set. The set is derived from a detailed review of the selection problem regarding transportation service in existing research. Each criterion in our set is evaluated by a group of experts from Vietnam. The expert opinions are turned into CVR values, which are later compared to a threshold for inclusion as the necessary criteria for evaluating different transport providers in the next phase. Through this process, key factors like cost, client relationships, responsiveness, and service quality are identified as the most crucial criteria, especially for choosing providers of transport in Vietnam. While environmental factors, such as the use of green technology, are less preferable. This reveals an interesting insight into how sustainability considerations differ across regions of the world.

2. Methods

The objective of the study is to apply the CVR method to identify essential criteria, based on which the transportation service providers can be selected. To achieve this, experts are asked to evaluate a set of predefined criteria relevant to the selection problem of interest. These evaluations are then used to quantify the importance of each criterion, which in turn leads to a shortlist of criteria. This approach allowed the capture of a broad and representative view of the key factors influencing the selection of transportation providers in Vietnam. Lawshe (1975) outlined the evaluation of items based on three scales, namely (1) Essential, (2) Useful but not essential, and (3) Not necessary. The CVR of an item is determined by Equation (1).

$$CVR = \frac{n_e - \frac{N}{2}}{\frac{N}{2}} \tag{1}$$

Where n_e is the number of panelists indicating essential and N is the total number of panelists. CVR values range from -1.0 to $+1.0$. The value of 1 indicates full agreement among experts on the importance of an item, leading to its retention. On the contrary, a CVR value closer to -1.0 suggests that more than half of the experts disagree on the item's relevance, and hence, the item is likely to be removed from the pool. For this study, a cut-off threshold of 0.60 is applied for accepting a criterion. This value is proposed by Ayre and Scally (2014) and Dib et al. (2020).

3. Results and Discussion

3.1 Data Collection

A preliminary set of twenty-eight criteria for selecting TSPs was developed based on an extensive review of relevant academic literature. These criteria were systematically categorized into four main sustainability dimensions: economic, social, environmental, and operational. The complete list of criteria is provided in Table 1.

Table 1. Transportation service provider selection criteria from literature review

	No.	Criteria	Definition	References
Economic aspect	1	Cost for the service	The expenses involved in transporting materials include the cost per kilometer, hiring costs, and fixed costs.	Menon et al. (1998); Jharkharia and Shankar (2007); Liu and Wang (2009); Falsini et al. (2012); Hsu et al. (2013); Aguezzoul (2014); Dursun (2021); Sarabi and Darestani (2021)
	2	Financial performance	Evaluation based on revenues, expenses, profit or loss, assets, liabilities, cash flows, and equity.	Zailani et al. (1997); Menon et al. (1998); Gl and Catay (2007); Jharkharia and Shankar (2007); Liu and Wang (2009); Aguezzoul (2014); Dursun (2021); Sarabi and Darestani (2021)
	3	Experience in the same industry	The duration of time a provider has operated within the transportation sector.	Bottani and Rizzi (2006); Gl and Catay (2007); Tsai et al. (2007); Liu and Wang (2009); Dursun (2021)

	No.	Criteria	Definition	References
	4	Market share of the company	The percentage of the industry's total business held by the transportation service provider.	Gl and Catay (2007); Jharkharia and Shankar (2007); Liu and Wang (2009); Dursun (2021)
Environmental aspect	5	Use of green technology	The implementation of environmentally friendly technologies in transportation fleets and facilities, such as solar energy or electric vehicles.	Lee et al. (2017); Zailani et al. (2017); Evangelista et al. (2018); Dursun (2021)
	6	Awareness of environment	The company's commitment to environmental sustainability and practices.	Seuring and Müller (2008); Tozanli et al. (2017); Evangelista et al. (2018)
	7	Recycling policy	The existence and enforcement of structured policies for reusing or recycling resources and materials.	Tozanli et al. (2017); Evangelista et al. (2018); Dursun (2021); Sarabi and Darestani (2021)
	8	Environmental legal and policy framework	The existence of legal policies and frameworks for environmental protection.	Seuring and Müller (2008); Tozanli et al. (2017); Deng et al. (2018); Evangelista et al. (2018); Dursun (2021)
	9	Use of energy-efficient transportation	Adoption of energy-efficient methods in transportation to reduce environmental impact.	Deng et al. (2018); Evangelista et al. (2018); Dursun (2021)
Social aspect	10	Client relationship	The strength and quality of the company's interaction and collaboration with its customers.	Jharkharia and Shankar (2007); Briggs et al. (2010); Chu and Wang (2012); Hsu et al. (2013); Aguezzoul (2014); Dursun (2021)
	11	Ease of communication	The efficiency and responsiveness of communication systems between the service provider and customers.	Işiklar et al. (2007); Jharkharia and Shankar (2007); Liu and Wang (2009); Hsu et al. (2013); Aguezzoul (2014); Dursun (2021)
	12	Labor relations	The relationship between the service provider and its employees.	Gl and Catay (2007); Hsu et al. (2013); Dursun (2021)
	13	Awareness of ethics	Commitment to ethical behavior, clear rules, and handling of ethical issues.	Paul et al. (2020); Dursun (2021)
	14	Awareness of health and safety	The strength and quality of the company's interaction and collaboration with its customers.	Paul et al. (2020); Dursun (2021)
	15	Awareness of employee welfare	The extent to which the provider offers benefits, support services, and welfare initiatives to its workforce.	Carter and Rogers (2008); Gopalakrishnan et al. (2012); Dursun (2021)
	16	Awareness of human rights	The provider's recognition and respect for human rights, equality, and non-discrimination within the organization.	Paul et al. (2020); Dursun (2021)
	17	Level of diversity	The inclusivity of the workforce across various dimensions such as gender, ethnicity, age, and socio-economic background.	Jharkharia and Shankar (2007); Hsu et al. (2013); Aguezzoul (2014)
Operational aspect	18	Service quality	The standard of transport service provided, including cargo handling, service reliability, and condition of delivery.	Andersson and Norrman (2002); Gl and Catay (2007); Jharkharia and Shankar (2007); Chu and Wang (2012); Aguezzoul (2014); Sarabi and Darestani (2021); Dursun (2021)
	19	Location of the service provider	The geographic position of the provider and the accessibility of supporting infrastructure at that location.	Gl and Catay (2007); Liu and Wang (2009); Aguezzoul (2014); Dursun (2021)

	No.	Criteria	Definition	References
	20	Reputation	Customer feedback and brand image of the service provider.	Gl and Catay (2007); Jharkharia and Shankar (2007); Liu and Wang (2009); Dursun (2021)
	21	Responsiveness	The ability to promptly react to service demands, disruptions, or customer inquiries.	Menon et al. (1998); Gl and Catay (2007); Liu and Wang (2009); Dursun (2021)
	22	Optimization capability	The use of advanced tools and technologies to enhance planning, routing, and operational efficiency.	Gl and Catay (2007); Liu and Wang (2009); Dursun (2021)
	23	Delivery performance	The consistency and reliability of delivery timelines, including metrics such as on-time and delayed deliveries.	Menon et al. (1998); Yeung (2006); Jharkharia and Shankar (2007); Hsu et al. (2013); Aguezzoul (2014); Sarabi and Darestani (2021); Dursun (2021)
	24	Use of information technology systems	Integration of digital platforms and tools for tracking, communication, and data management.	Jharkharia and Shankar (2007); Hsu et al. (2013); Sarabi and Darestani (2021); Dursun (2021)
	25	Risk management policies	The presence of a risk management framework to ensure business sustainability.	Jharkharia and Shankar (2007); Hsu et al. (2013); Sarabi and Darestani (2021); Dursun (2021)
	26	Information sharing	The willingness and capacity to exchange relevant operational data with stakeholders for improved coordination.	Paul et al. (2020); Dursun (2021)
	27	Capacity of the company	The provider's physical and human resources, such as the number of vehicles and staff, to meet customer demand.	Liu and Wang (2009); Dursun (2021)
	28	Level of flexibility	The ability to adapt services to changing customer needs and operational uncertainties.	Jharkharia and Shankar (2007); Hsu et al. (2013); Dursun (2021)

To validate the relevance of each criterion, expert inputs are collected through structured interviews using an online questionnaire. Each expert is provided with a detailed explanation of the meaning and intent of each criterion. The evaluation employed a 3-point scale, with which the experts are asked to rate each criterion as (1) Essential, (2) Useful but not essential, or (3) Not necessary. Fifteen experts with at least ten years of professional experience in logistics, supply chain management, or senior executive roles are recruited for the experiment. Each has been informed regarding the purpose of the recruitment and has also been asked to give their consent to participate. The responses from these experts are securely stored without their personal information. The details are presented in Table 2.

3.2 Numerical Results

The CVR values were determined by applying Equation (1) to the responses of the 15 experts, and a summary of the CVR scores for all criteria are presented in Table 2**.**

Table 2. CVR results for transportation service provider criteria selection

No.	Criteria	F1					F2			F3			F4		F5		n_e	CVR	Result
		Expert																	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15			
Economic aspect																			
1	Cost for the service	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	15	1.00	Accepted
2	Financial performance		x	x	x	x	x	x	x	x	x	x	x	x	x	x	14	0.87	Accepted

No.	Criteria	F1					F2			F3			F4		F5		n_e	CVR	Result
		Expert																	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15			
3	Experience in the same industry	x	x	x	x	x	x	x	x	x	x	x	x	x		x	14	0.87	Accepted
4	Market share of the company			x		x			x	x	x	x					6	-0.20	Rejected
Environmental aspect																			
5	Use of green technology			x	x	x		x		x	x	x	x	x			9	0.20	Rejected
6	Awareness of environment	x	x	x	x	x	x	x	x	x	x	x		x	x	x	14	0.87	Accepted
7	Recycling policy			x	x	x		x	x	x	x	x		x	x	x	11	0.47	Rejected
8	Environmental legal and policy framework	x	x	x	x	x	x	x	x	x		x	x	x	x	x	14	0.87	Accepted
9	Use of energy-efficient transportation			x	x	x		x	x	x	x	x		x	x	x	11	0.47	Rejected
Social aspect																			
10	Client relationship	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	15	1.00	Accepted
11	Ease of communication	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	15	1.00	Accepted
12	Labor relations	x	x	x	x	x		x	x	x	x	x	x	x	x	x	14	0.87	Accepted
13	Awareness of ethics	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	15	1.00	Accepted
14	Awareness of health and safety	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	15	1.00	Accepted
15	Awareness of employee welfare		x	x	x	x		x	x	x	x	x	x	x	x	x	13	0.73	Accepted
16	Awareness of human rights			x	x	x		x	x	x	x	x	x	x	x	x	12	0.60	Accepted
17	Level of diversity			x	x	x		x		x			x	x			7	-0.07	Rejected
Operational aspect																			
18	Service quality	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	15	1.00	Accepted
19	Location of the service provider	x	x	x	x	x	x	x		x	x	x	x	x	x		13	0.73	Accepted
20	Reputation	x	x	x	x	x		x	x	x	x	x	x	x	x	x	14	0.87	Accepted
21	Responsiveness	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	15	1.00	Accepted
22	Optimization capability	x		x	x	x	x	x	x	x	x	x	x	x		x	13	0.73	Accepted
23	Delivery performance	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	15	1.00	Accepted
24	Use of information technology systems	x		x	x	x	x		x	x	x	x	x		x		11	0.47	Rejected

No.	Criteria	F1					F2			F3			F4		F5		n_e	CVR	Result
		Expert																	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15			
25	Risk management policies	x		x	x	x	x	x	x	x	x	x	x	x	x	x	14	0.87	Accepted
26	Information sharing	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	15	1.00	Accepted
27	Capacity of the company	x	x	x	x	x	x	x	x	x	x	x	x	x	x		14	0.87	Accepted
28	Level of flexibility	x	x	x	x	x	x	x	x	x	x	x	x	x			13	0.73	Accepted
Note: F1: Garment; F2: LSP; F3: Food; F4: Academic; F5: Manufacturing																			

The results illustrate that 22 out of 28 criteria are chosen for evaluating transportation service providers. Specifically, three criteria are selected under economics, two under environmental, seven under social, and ten under operational. These criteria met the minimum CVR threshold of 0.6, which requires at least 12 out of 15 experts to rate an item as essential (Ayre and Scally 2014; Dib et al. 2020), resulted in the elimination of six criteria, indicating a sufficient level of consensus. In other words, these selected criteria reflect expert agreement on the most relevant factors for evaluating transportation service providers. In particular, a group of criteria, including the cost of the service, client relationship, awareness of ethics, awareness of health and safety, service quality, and delivery performance, was regarded as the most important factor, achieving unanimous agreement among experts.

The CVR analysis revealed that several environmental and social criteria do not meet the acceptance threshold. This implies a limited emphasis on sustainability considerations in the Vietnamese context. The finding underscores the need to elevate environmental awareness among experts. Additionally, the consistently high CVR scores observed for criteria such as information sharing, responsiveness, and ease of communication highlight the strategic importance of investing in integrated digital platforms and formalized communication protocols to strengthen operational coordination.

4. Conclusion

In this study, the CVR method from Lawshe (1975), with critical values from Ayre and Scally (2014) and Dib et al. (2020) is applied to identify key selection criteria for choosing transportation service providers in Vietnam. By using a panel of 15 experts from various industries and a set of 28 criteria derived from the literature, 22 criteria were shortlisted as the most essential by the majority of the expert panel. The results highlight the dominance of economic, social, and operational criteria, with social and operational factors accounting for the largest share. In contrast, environmental concerns received comparatively less emphasis, as only two of the five environmental criteria met the acceptance threshold. This suggests that, while some aspects of environmental sustainability are acknowledged, they are not yet prioritized as strongly as other dimensions in the Vietnamese context. Future research may consider alternative approaches, such as Item-level CVI, Scale-level CVI, or a measure of agreement, to screen the criteria and perform a comparative analysis with the proposed method in this research.

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