ICMEM

The 9th International Conference on Management in Emerging Markets

Box Packaging Vendor Selection for Educational Toy Using Weighted Sum Model: Case of Eduture

Farrel Fadlurrahman*, Liane Okdinawati

School of Business and Management, Bandung Institute of Technology, Bandung, Indonesia

Abstract - *Eduture is a startup focused on educational toys with local Indonesian value. Eduture faces the growing Indonesian educational toy industry, which is projected to exceed USD 2 billion by 2029. Currently, Eduture's vendor selection, especially for packaging boxes, remains a challenge. The main problems faced are a 30% defect rate in the initial 50 production batches and high costs that reach 43.2% of the total cost of production (COGS). Therefore, this research aims to evaluate and select the best vendor using the Weighted Sum Model (WSM) as a Multi-Criteria Decision-Making (MCDM) approach. This research was conducted through a literature review, FGDs with internal company members from Eduture. The FGDs resulted in eight main criteria: quality, cost, durability, safety, flexibility, delivery, color accuracy, and reliability. Each vendor was evaluated based on a score of 0–100. The final WSM calculation results showed that VBG was the best alternative with the highest score of 84.438, followed by RPI with a score of 77.416, and CAI as the last choice with a score of 43.895. These findings are expected to help Eduture in managing production more efficiently*

Keywords - *Eduture, packaging box vendor, Weighted Sum Model (WSM), Multi-Criteria Decision-Making (MCDM), vendor criteria*

I. INTRODUCTION

The Indonesian educational toy industry has shown consistent growth, with Statista (2025) projecting total revenue to exceed USD 2 billion by 2029. This trend is driven by growing parental awareness of early childhood development and increased spending on educational aids. Globally, the non-digital educational toy market is also growing, with an estimated compound annual growth rate (CAGR) of 8.54% from 2023 to 2030 (Grand View Research, 2023), reflecting the growing demand for learning-based play experiences.

Eduture, a startup producing educational toys based on Indonesian cultural values, faces production challenges for children aged 3–5 years, demanding durable, safe, visually appealing, and pedagogically effective products. Packaging is a crucial component, not only as protection but also as part of the play experience, requiring high standards of materials, color accuracy, and assembly safety, which impact costs and operations. To address this, Eduture outsources packaging production to external vendors to focus on product innovation and market development. The success of this strategy relies heavily on selecting the right vendor, considering quality, delivery reliability, flexibility, cost efficiency, safety, and visual accuracy. This study uses the Weighted Sum Model (WSM) method to identify the packaging vendor that best aligns with the company's operational goals and educational mission.

II. LITERATURE REVIEW

A. Toy Box Packaging

Toy packaging design and durability play a critical role in meeting functional standards and consumer expectations, influencing criteria such as quality, print accuracy, and ease of assembly. To remain competitive, packaging must be cost-effective, child-safe, and adaptable to design changes, while also addressing sustainability and shipping efficiency. Consistency across these factors not only enhances product performance but also supports consumer trust and operational efficiency (Suzianti et al., 2019).

B. Outsourcing And Vendor Selection

Outsourcing improves efficiency in creative and toy manufacturing, but vendor selection involves balancing cost, lead time, and quality (Wadhwa & Ravindran, 2007). For Eduture, packaging impacts product protection and brand image, so vendor selection must consider color accuracy, safety, and sustainability. A structured decision framework helps ensure alignment with functional, regulatory, and branding priorities.

C. Multi-Criteria Decision Making (MCDM)

Multi-Criteria Decision Making (MCDM) provides a structured approach to complex vendor selection,

*Corresponding author. Email:farrel_fadlurrahman@sbm-itb.ac.id

considering factors such as cost, quality, delivery, safety, and sustainability. Common methods include AHP, fuzzy logic, and hybrid models such as fuzzy-AHP (Zhu et al., 2021), which integrates quantitative and qualitative aspects such as child safety and environmental compliance for objective packaging evaluation (Taherdoon & Mandanchian, 2013).

Figure 1 Multi-Criteria Decision-Making Step (Taherdoon & Mandanchian, 2013)

D. Weighted Sum Model

The Weighted Sum Model (WSM) is a simple and practical MCDM method (Chagas & Wagner, 2020). It calculates each alternative's score by multiplying criterion weights with performance ratings, then summing the results (Suzianti, Hidayat & Indrawati, 2019). Suitable for comparable units, WSM is resource-efficient, transparent, and easily implemented, making it ideal for SME vendor selection (Chourabi, Dakhli & Aloui, 2018).

E. Previous Research Studies

Table I Previous Research Study

Author	Publish Year	Factor
Ahmed & Amir	2021	Flexibility to design changes
Li & Chung	2010	Reliability, Cost, Flexibilit.
Patel	2023	Packaging quality, regulatory compliance, environmental safety, production consistency, print durability
Götz & Stich	2015	Packaging cost, resource efficiency,
Puspita & Retnowati	2025	Material durability, recyclability
Guo	2008	Color printing accuracy, image clarity, material surface interaction,
Papageorgiou, Teochari et al.	2023	bio-based materials, recyclability, compostability, carbon impact of packaging

F. Criteria Definition

Table II Criteria Definition

Criteria	Author	Definition
Quality	Ahmed & Amir, (2021)	Meets material, size, and design specs.
Cost	Patel (2023)	Affordable pricing and logistics.
Durability	Puspita et al (2025)	Withstands child use and pressure
Safety	Li and Chung (2010)	Complies with child-safe standards.
Flexibility	Li and Chung (2010)	Adapts to changes in design and order.
Delivery	García-Arca et al (2017)	On-time and consistent fulfillment.
Sustainability	Papageorgiou et al (2023)	Uses eco-friendly materials.
Color Accuracy	Guo (2008)	Matches visual design precisely.

G. Conceptual Framework

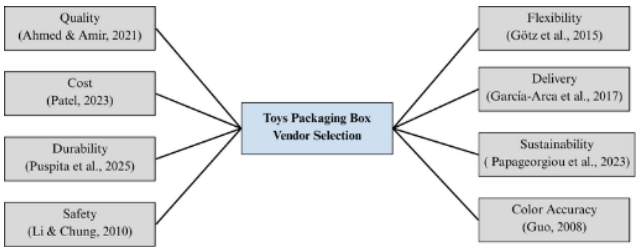

Figure 2 Conceptual Framework

This study focuses on the selection of Eduture packaging box vendors, using eight criteria: quality, cost, durability, security, flexibility, delivery, sustainability, and color accuracy, identified through a literature review. These criteria reflect Education's operational and brand priorities, which formed the basis for the evaluation using the Weighted Sum Method (WSM).

III. METHODOLOGY

A. Research Design

This study adopted a case study approach focusing on Education's vendor selection for packaging boxes used in its educational toy product, Getting to Know Indonesian Animals. A mixed-methods strategy was employed: qualitative data was collected through Focus Group Discussions (FGDs) and interviews with C-level executives (CEO, CMO, CFO), while quantitative input included data on cost, defect rates, and lead times.

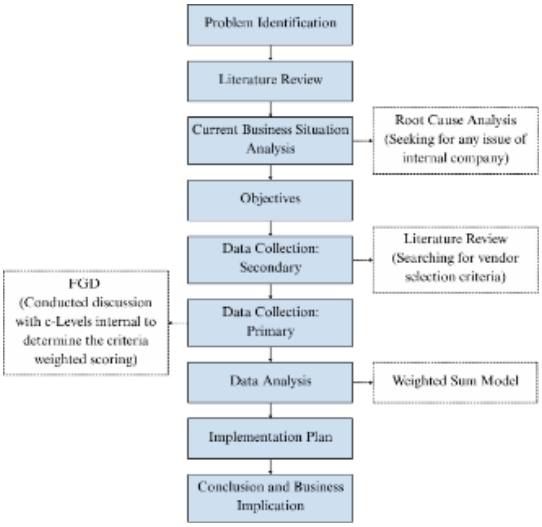

Figure 3 Research Design

Eight key criteria were derived from previous studies and validated through expert discussions. These criteria were then prioritized using a questionnaire, resulting in weighted scores the vendor evaluation used the Weighted Sum Method (WSM) because it aligns with the company's current needs, is transparent, and relies on the expertise of experts who are still in the early stages of building businesses in the related industry. The analysis was conducted in Microsoft Excel. The results provide a decision framework and implementation plan for selecting an outsourcing partner that aligns with Eduture's standards.

B. Data Analysis Method

In this study, the Weighted Sum Method (WSM) was applied to determine the most suitable packaging vendor for Education's educational toy products, along with its essential selection criteria. According to Fishburn (1967), WSM is one of the simplest and most effective Multi-Criteria Decision Making (MCDM) methods for evaluating alternatives when all criteria can be expressed in comparable or normalized units. The implementation of WSM in this study followed four main steps:

1. Structuring the decision problem into a weighted scoring model:
   The vendor selection problem was modeled with eight primary criteria as influencing factors. These criteria reflect Education's operational needs and brand value.

2. Gathering expert input to assign weights to each criterion:
   A questionnaire was distributed to Eduture's C-level executives (CEO, CMO, and CFO) following a Focus Group Discussion (FGD). Expert ranked the importance of the criteria, and weights were calculated based on the average score.

Fuzzy Numbers	Value
Very Low (SR)	0.0
Low (R)	0.25
Enough (C)	0.5
High (T)	0.75
Very High (ST)	1.0

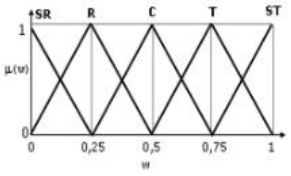

Figure 4 Fuzzy Number Value

3. Vendor assessment based on criteria:
   Three alternative vendors were assessed using qualitative assessments and quantitative data (such as cost, lead time, and defect rate). Each vendor received a score for each criterion on a normalized scale from 0 to 1.

$$w_j = \frac{x_j}{\sum_{i=1}^{n} x_i}$$

Eq. 1 Normalization Formula

- wj is the normalized weight of the jth criterion,
- xj is the average fuzzy value of the jth criterion,
- n is the total number of criteria (in this case, 8 criteria).

Table III Criteria Definition

Criteria (1)	Weight (2)	Alternatives A (1)	Alternatives B (2)	Alternatives C (3)
Criteria 1	0.2	50	60	70
Criteria 2	0.15	70	80	90
Criteria 3	0.25	80	70	50
Criteria 4	0.25	60	70	70
Criteria 5	0.15	90	80	70
Total	1			

4. Calculation of total weighted scores and ranking of alternatives:
   Each vendor's final score was calculated by summing the product of the normalized performance scores and the weights for each criterion. The vendor with the highest total weighted score was selected as the most suitable partner for Education.

$$\text{Total Score}_{Vendor} = \sum_{i=1}^{n} (Weight_i \times Score_i)$$

Eq. 2 Weighted Sum Calculation

- *i* refers to the index of the evaluation criteria (e.g., cost, quality, delivery).
- $Weight_{(i)}$ represents the relative importance of each criterion, determined based on strategic priorities and expert input. The total weight of all criteria must equal 100% or 1.0.
- *Score* is the vendor's performance rating for the *i*-th criterion, usually on a scale (e.g., 1–5 or 1–10) where a higher score indicates better performance.

IV. FINDINGS AND DISCUSSION

A. Minimum Alternative Selection

From the 5 packaging vendors that have been contacted by the author, 3 suppliers were selected that met Eduture's minimum criteria as potential production suppliers. The initials of the vendors that have been initially selected are CAI, RPI and VGB. These are the candidate vendors that were selected and used as alternatives and vendor selection was carried out to meet Eduture's needs based on WSM method.

Table IV Alternatives Candidate

Initial Vendor	Customize Box Packaging	MOQ Level in 50 Pcs	Adjustment Sample Before Agreement	Candidate Approval
CAI	V	V	V	APPROVED
RPI	V	V	V	APPROVED
RDK	V		V	REJECT
VBG	V	V	V	APPROVED
MHD	V			REJECT

B. Criteria Validation

Through two rounds of focus group discussions (FGDs) with Eduture's top management (CEO, CMO, CFO) using an Executive Opinion Jury approach, eight final vendor selection criteria were established. The first round resulted in five key criteria: quality, cost, durability, safety, and color accuracy, with flexibility maintained despite challenges for smaller vendors. Differing views on delivery and sustainability led to the second round, which decided to retain delivery as a separate criterion, remove sustainability, and add reliability to assess vendor professionalism, communication, and consistency. These criteria will form the basis for evaluating packaging vendors using the Weighted Sum Method (WSM).

Table V Detailed Criteria

No	Criterion	Previous Study	Definition Based on
1	Quality	(Ahmed & Amir, 2021)	This criterion assesses the supplier's ability to deliver high-quality packaging that meets material specifications, durability, and visual requirements.
2	Cost	(Patel, 2023)	This criterion evaluates the fairness of supplier pricing, including unit cost, hidden fees, and discount flexibility for bulk or repeat orders.
3	Durability	(Puspita et al., 2025)	Durability refers to the packaging's resistance to pressure, humidity, and repeated use, ensuring the product maintains its form and function.
4	Safety	(Li and Chung, 2010)	This criterion ensures that packaging materials meet child-safety standards such as being non-toxic, non-sharp, and safe to handle.
5	Flexibility	(Götz et al., 2015)	Flexibility refers to the vendor's capability to adjust production volume, timelines, and designs based on Eduture's evolving needs.
6	Delivery	(García-Arca et al., 2017)	Delivery encompasses the timeliness of order fulfillment and adherence to delivery schedules critical to seasonal product launches.
7	Color Accuracy	(Guo, 2008)	This criterion refers to how accurately the vendor can replicate design color standards, crucial for visual branding and child learning experiences.
8	Reliability	(Katsikeas et al., 2004)	Reliability encompasses order fulfillment, timeliness, honest communication, and the ability to honor commitments in vendor cooperation.

C. Weighted Sum Model Method

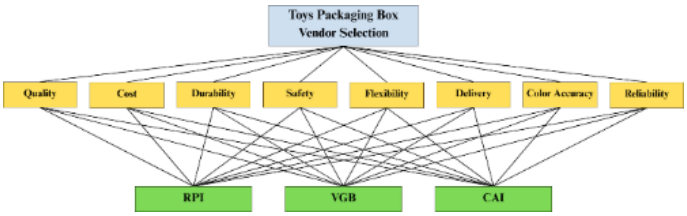

Figure 5 Decision Tree

After collecting data in the previous chapter, three alternative vendors and eight key criteria were identified for the vendor selection process that met Eduture's production needs. All of these elements were then summarized into one primary objective: determining the best manufacturing partner for Eduture's educational toy packaging. To simplify the assessment process, a decision hierarchy model will be developed, as shown in the following figure. The first level (topmost) represents the ultimate goal: selecting the best vendor. The second level contains eight selection criteria validated in Focus Group Discussions (FGDs), including quality, cost, durability, safety, flexibility, delivery, color accuracy, and reliability. The third level contains three alternative vendors, which will be evaluated based on these criteria.

This model serves as the basic framework for the calculation process using the Weighted Sum Model (WSM). Through this approach, each vendor will be scored based on a combination of criteria weights and performance assessments, thus determining the vendor that best meets Eduture's strategic needs.

1. Criteria Weighting Calculation

The criteria weighting process was based on the results of a Focus Group Discussion (FGD) involving three C-Level Executives from Eduture. Each expert was asked to rate the importance of each vendor criterion using a fuzzy numeric scale, ranging from 0 for "Very Unimportant" to 1 for "Very Important." This assessment aims to measure the relative weight of each criterion, which will later be used in the WSM calculation.

Table VI Criteria Weighting Calculation

Criteria Weighting Calculation

Expert	Quality	Cost	Durability	Safety	Flexibility	Delivery	Color Accuracy	Reliability
Saputra Dewa	1	1	0.75	1	1	1	1	1
Restu Kurrotul Ayun	1	1	1	1	0.75	0.75	1	1
Alldyo Novan	0.75	1	1	0.75	1	0.75	0.75	1
Average	0.9166666667	1	0.9166666667	0.9166666667	0.9166666667	0.8333333333	0.9166666667	1

2. Normalize the value

After the assessment data from the three C-Level Edutures was collected, a simple average calculation with equal weighting (1:1:1) was performed to determine the final weighting of each criterion. The result was that Cost and Reliability received the highest weighting (1.00), followed by Quality, Durability, Security, Flexibility, and Color Accuracy (0.9167), while Delivery received the lowest (0.8333). The next stage was to normalize the average score by dividing the fuzzy value of each criterion by the total fuzzy value of all criteria, so that the total weighting was 1. For the example, following normalization weight for Cost (7.416) is:

$$w_{\text{Cost}} = \frac{1.000}{7.416} = 0.1348$$

Eq.3 Normalization Weight

The fuzzy value of each criterion is divided by the total fuzzy value ($\sum x = 7.4167$) to obtain the normalized weight. As a result, Cost and Reliability have the highest weight (0.135) which indicates the top priority on cost efficiency and vendor professionalism. Quality, Durability, Security, Flexibility, and Color Accuracy are equally weighted (0.124) as important aspects of maintaining product quality standards, while Delivery has the lowest weight (0.112), still considered but not the top priority. These weights are the basis for the final WSM calculation to determine the best Eduture vendor.

Table VII Normalization Weighting Calculation

Normalization Weighting Calculation

Criteria (1)	Fuzzy Average *x* (2)	Normalization Value (4)		Weighted Value *wj* (5)
		xj (2) / total *x* (3)	Results	
Quality	0.9166666667	0.916666666666667 / 7.416666667	0.1235955056	0.124
Cost	1	1 / 7.416666667	0.1348314607	0.135
Durability	0.9166666667	0.916666666666667 / 7.416666667	0.1235955056	0.124
Safety	0.9166666667	0.916666666666667 / 7.416666667	0.1235955056	0.124
Flexibility	0.9166666667	0.916666666666667 / 7.416666667	0.1235955056	0.124
Delivery	0.8333333333	0.833333333333333 / 7.416666667	0.1123595506	0.112
Color Accuracy	0.9166666667	0.916666666666667 / 7.416666667	0.1235955056	0.124
Reliability	1	1 / 7.416666667	0.1348314607	0.135
Total *x* (3)	**7.416666667**		1	**1.000**

3. Alternative Weight Calculation

In an alternative calculation using the Weighted Sum Model (WSM), experts assess each vendor based on agreed-upon criteria through a questionnaire using a score of 0–100. Low scores indicate low suitability, and high scores indicate high suitability. Each expert receives comprehensive vendor information, including physical box samples, price proposals, production timelines, and the completeness of production facilities.

Table VIII Expert 1 Scoring Table

Dewa (Expert 1)				
Criteria (1)	Weight (2)	RPI Vendor (1)	VGB Vendor (2)	CAI Vendor (3)
Quality	0.124	70	70	50
Cost	0.135	90	80	20
Durability	0.124	70	70	90
Safety	0.124	90	100	50
Flexibility	0.124	70	90	10
Delivery	0.112	80	100	10
Color Accuracy	0.124	70	90	20
Reliability	0.135	70	90	10

Table IX Expert 2 Scoring Table

Ayun (Expert 2)				
Criteria (1)	Weight (2)	RPI Vendor (1)	VGB Vendor (2)	CAI Vendor (3)
Quality	0.124	90	90	60
Cost	0.135	80	60	30
Durability	0.124	80	75	40
Safety	0.124	100	100	80
Flexibility	0.124	90	90	70
Delivery	0.112	75	90	70
Color Accuracy	0.124	70	100	70
Reliability	0.135	60	100	70

Table X Expert 3 Scoring Table

Alldyo (Expert 3)				
Criteria (1)	Weight (2)	RPI Vendor (1)	VGB Vendor (2)	CAI Vendor (3)
Quality	0.124	70	80	40
Cost	0.135	75	70	20
Durability	0.124	80	90	60
Safety	0.124	80	80	70
Flexibility	0.124	60	80	40
Delivery	0.112	80	75	20
Color Accuracy	0.124	90	80	50
Reliability	0.135	70	80	10

The tables reflect expert preferences based on Eduture's needs and will be used in the final WSM calculation to select the best packaging vendor.

Table XI Weighted Sum Calculation

Weighted Sum Calculation

Dewa (Expert 1)							
Criteria (1)	Weight (2)	RPI Vendor (3)	VBG Vendor (4)	CAI Vendor (5)	(2)x(3)	(2)x(4)	(2)x(5)
Quality	0.124	70	70	50	8.652	8.652	6.180
Cost	0.135	90	80	20	12.135	10.787	2.697
Durability	0.124	70	70	90	8.652	8.652	11.124
Safety	0.124	90	100	50	11.124	12.360	6.180
Flexibility	0.124	70	90	10	8.652	11.124	1.236
Delivery	0.112	80	100	10	8.989	11.236	1.124
Color Accuracy	0.124	70	90	20	8.652	11.124	2.472
Reliability	0.135	70	90	10	9.438	12.135	1.348
Total	1.000				**76.292**	**86.067**	**32.360**

Ayun (Expert 2)							
Criteria (1)	Weight (2)	RPI Vendor (3)	VBG Vendor (4)	CAI Vendor (5)	(2)x(3)	(2)x(4)	(2)x(5)
Quality	0.124	90	90	60	11.124	11.124	7.416
Cost	0.135	80	60	30	10.787	8.090	4.045
Durability	0.124	80	75	40	9.888	9.270	4.944
Safety	0.124	100	100	80	12.360	12.360	9.888
Flexibility	0.124	90	90	70	11.124	11.124	8.652
Delivery	0.112	75	90	70	8.427	10.112	7.865
Color Accuracy	0.124	70	100	70	8.652	12.360	8.652
Reliability	0.135	60	100	70	8.090	13.483	9.438
Total	1.000				**80.449**	**87.921**	**60.899**

Alldyo (Expert 3)							
Criteria (1)	Weight (2)	RPI Vendor (3)	VBG Vendor (4)	CAI Vendor (5)	(2)x(3)	(2)x(4)	(2)x(5)
Quality	0.124	70	80	40	8.652	9.888	4.944
Cost	0.135	75	70	20	10.112	9.438	2.697
Durability	0.124	80	90	60	9.888	11.124	7.416
Safety	0.124	80	80	70	9.888	9.888	8.652
Flexibility	0.124	60	80	40	7.416	9.888	4.944
Delivery	0.112	80	75	20	8.989	8.427	2.247
Color Accuracy	0.124	90	80	50	11.124	9.888	6.180
Reliability	0.135	70	80	10	9.438	10.787	1.348
Total	1.000				**75.506**	**79.326**	**38.427**

Each vendor was evaluated based on eight weighted criteria using expert scores. **VGB** emerged as the top choice with the highest total score from all three experts, demonstrating its overall strength in key criteria of quality, cost, durability, flexibility, delivery, and reliability.

4. Ranking the Alternative

VGB achieved the highest ranking with a score of 84.438, excelling in most key criteria and making it the best choice for Education packaging needs. RPI followed with a score of 77.416 as a backup candidate, while CAI achieved the lowest score with a score of 43.895, indicating a poor fit. VGB is an ideal vendor for improving production efficiency and packaging quality.

Table XII Alternative Final Rank

Alternative Priority Ranking

No.	Expert	RPI (1)	VGB (2)	CAI (3)
1	Dewa	76.292	86.067	32.360
2	Ayun	80.449	87.921	60.899
3	Alldyo	75.506	79.326	38.427
Average Score		**77.416**	**84.438**	**43.895**

RPI	**FINAL RESULTS**	**77.416**	**RANKING**	**2**
VBG		**84.438**		**1**
CAI		**43.895**		**3**

V. CONCLUSION

Eduture experienced operational issues with its initial packaging vendor, such as high defect rates and cost overruns that disrupted production efficiency and customer satisfaction. To address these issues, this study used the Weighted Sum Model (WSM) method to select the best packaging vendor.

The process began with secondary data analysis, then validated through an Executive Opinion Jury method in two stages of focus group discussions (FGDs) and a questionnaire with Eduture's CEO, CFO, and CMO. The results identified eight key criteria basd on WSM analysis ranked cost and reliability as the highest priorities (weighted at 1.35).

Of the three alternatives, VBG emerged with a score of 84.438, followed by RPI and CAI. VBG's advantages in reliability, cost efficiency, and consistent quality make it an ideal choice to support Eduture's.

Recommendation

To ensure long-term success and continuous improvement in packaging outsourcing, the following actions are recommended:

1. Establish Standard Operating Procedures (SOPs) for vendor selection to institutionalize decision-making and ensure consistency in future procurement processes.
2. Regularly monitor vendor performance, focusing on error rates, fulfillment schedules, and communication standards, especially given Eduture's repetitive production cycle.
3. Reinvest cost savings from improved packaging efficiency into product development and marketing to strengthen Eduture's competitive advantage.
4. Avoid reliance on a single vendor by periodically reviewing vendor options and maintaining data backups to minimize supply chain risk.

5. Expand future research by involving more diverse stakeholders, comparing WSM with other MCDM methods (e.g., TOPSIS, PROMETHEE), and exploring more in-depth sub-criteria for each vendor attribute.

While this study provides a structured, data-driven foundation for Eduture's vendor strategy, it also leaves room for continuous refinement as the company grows.

REFERENCES

[1] Ahmed, A., & Amir, S. (2021). Children's packaging between interactive and sustainability. Journal of Packaging Design.

[2] Ameriza. (2023). Multi-criteria decision making analysis for SME supplier selection. Journal of Industrial Systems, 12(1), 45–56.

[3] Chagas, M. F., & Wagner, C. (2020). Comparison of MCDM methods in supplier selection: Simplicity and applicability in SMEs. Journal of Decision Systems, 29(3), 176–185. https://doi.org/10.1080/12460125.2020.1748712

[4] Chopra, S., & Meindl, P. (2001). Supply chain management: Strategy, planning, and operation. Prentice Hall.

[5] Chourabi, H., Dakhli, H., & Aloui, H. (2018). A weighted sum model approach for vendor selection in Tunisian SMEs. International Journal of Supply Chain Management, 7(5), 98–106.

[6] Deretarla, M., Ozkan, C., & Demir, T. (2022). Integrated AHP-COPRAS method for supplier evaluation and selection. Journal of Management Engineering, 10(1), 25–34.

[7] Feng, D., Chen, L., & Jiang, M. (2005). Vendor selection in supply chain system: An approach using fuzzy decision and AHP. Proceedings of ICSSSM, 1, 721–725. https://doi.org/10.1109/ICSSSM.2005.1499571

[8] García-Arca, J., González-Portela, A., & Prado-Prado, J. C. (2017). Improving packaging logistics by using lean thinking. International Journal of Physical Distribution & Logistics Management, 47(3), 227–248.

[9] Götz, T., & Stich, V. (2015). Improving resource and energy efficiency of packaging machines. Procedia CIRP, 26, 424–429. https://doi.org/10.1016/j.procir.2014.07.032

[10] Grand View Research. (2023). Educational toys market size report, 2023–2030. https://www.grandviewresearch.com

[11] Guo, Z. (2008). Effect of printability of flexible packaging material on printed image quality. Journal of Imaging Science and Technology, 52(3), 1–8.

[12] Harahap, F., Nasution, R. A., & Hasibuan, H. (2023). Implementation of weighted sum method for vendor evaluation in SME manufacturing. International Journal of Business Analytics, 8(2), 53–63.

[13] Hidayat, R., & Falahah. (2023). Integrating local culture in educational product design. Journal of Educational Technology and Development Studies, 4(2), 67–79.

[14] Katsikeas, C. S., Morgan, N. A., Leonidou, L. C., & Hult, G. T. M. (2006). Global Sourcing Strategy and performance: A resource-based perspective. Journal of International Business Studies, 37(2), 279–300. https://doi.org/10.1057/palgrave.jibs.8400216

[15] Kumar, R., Sinha, S., & Tiwari, M. (2019). Lego & Flextronics: A case of outsourcing pitfalls. Operations Management Review, 15(1), 41–48.

[16] Li, K., & Chung, T. (2010). Sustainability in gravure packaging printing. Packaging Technology and Science, 23(4), 225–232.

[17] Market Research Future. (2024). Early childhood education market report. https://www.marketresearchfuture.com

[18] Mesran, M., Hidayanto, A. N., & Alamsyah, A. (2017). The use of fuzzy logic in vendor selection: A study of decision-making under uncertainty. Journal of Information Systems Engineering and Business Intelligence, 3(2), 112–119.

[19] Munich Business School. (2024). Applying weighted sum method in small business procurement. MBS Working Paper Series.

[20] Narkhede, G. (2023). Strategic supplier selection and order allocation for SMEs. Journal of Global Operations and Strategic Sourcing, 16(4), 601–618. https://doi.org/10.1108/jgoss-06-2023-0060

[21] Papageorgiou, A., Teochari, S., & Kapsalis, V. (2023). Sustainable materials in the flexible packaging industry. Journal of Cleaner Production, 356, 131879.

[22] Paramadita, T., & Hidayat, R. (2022). Strategic challenges in Indonesia's toy industry. Jurnal Manajemen Industri, 18(2), 211–223.

[23] Patel, A. (2023). Harmonizing sustainability, functionality, and cost in packaging. International Packaging Journal, 12(1), 39–48.

[24] Puspita, A. N., & Retnowati, E. (2025). Sustainable redesign of plastic packaging in the Indonesian toy industry. Jurnal Rekayasa Industri, 16(1), 10–22.

[25] Sanders, N. R. (2020). Supply chain management: A global perspective. Wiley.

[26] Saragih, R., Sitorus, H., & Tamba, F. (2023). Design efficiency in packaging manufacturing. Jurnal Teknologi dan Manufaktur, 5(1), 41–50.

[27] Sitanggang, R. (2015). Metode Weighted Sum dan aplikasinya pada pemilihan vendor. Jurnal Sistem dan Teknologi Informasi, 3(1), 35–42.

[28] Sorooshian, S., & Parsia, A. (2019). Applying MCDM to vendor decision in manufacturing.

International Journal of Advanced Engineering and Management, 4(2), 10–17.

[29] Statista. (2025). Toys & hobby market in Indonesia. https://www.statista.com/outlook/cmo/toys-hobby/indonesia

[30] Suhono, J., & Fibriani, P. (2023). Risk mitigation in supply chain vendor dependence. Jurnal Manajemen Rantai Pasok, 6(1), 77–88.

[31] Suzianti, A., Hidayat, A., & Indrawati, R. (2019). Toy packaging design preferences based on Indonesian consumer behavior. International Journal of Industrial Engineering and Management Systems, 18(2), 201–214.

[32] Taherdoon, I., & Mandanchian, M. (2013). Decision making using multi-criteria decision making (MCDM) techniques: A review. International Journal of Engineering Research and Applications, 3(6), 2251–2257.

[34] Wadhwa, S., & Ravindran, A. R. (2007). Vendor selection in outsourcing. Computers & Operations Research, 34(12), 3725–3737. https://doi.org/10.1016/j.cor.2006.01.017

[35] Wang, J., & Chaovalitwongse, W. (2011). Executive opinion jury forecasting method: Relevance in strategic planning. Journal of Business Forecasting, 30(1), 10–19.

[37] Widiyanti, T., Hamida, M., & Wicaksono, A. (2019). Vendor evaluation and strategic sourcing in SMEs. Jurnal Logistik Indonesia, 7(2), 133–141.

[38] Yfanti, S., & Sakkas, T. (2024). Technology readiness level in product development. Journal of Product Innovation Research, 12(1), 55–67.

[39] Zhu, J., Li, W., & Wang, Y. (2021). A review of MCDM methods in construction decision making. Journal of Civil Engineering and Management, 27(6), 433–450.

[40] Zulfiandri, M., Hartono, B., & Kurniawan, A. (2018). Material supply fluctuation in vendor management. Jurnal Teknik Industri, 20(2), 122–130.