Customer Preference Analysis on Attributes of Toyota's EV Shuttles Using Conjoint Approach: A Business Case of the Stones Hotel Bali Collaboration Project

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ABSTRACT: This study examines Indonesia's efforts to achieve Net Zero Emissions (NZE) by 2060, with a specific focus on Bali's pioneering initiatives to reach NZE by 2045. The research primarily investigates sustainable mobility solutions in the tourism sector as an approach to accomplish this goal. The study analyzes customer preferences for Toyota's xEV (BEV/PHEV/HEV) shuttle services at The Stones Hotel Bali. The objective is to support the hotel in differentiating itself through sustainable practices and support Toyota Indonesia to develop xEV products that are suitable for the market. The study employs Choice-Based Conjoint (CBC) analysis to assess five key attributes: EV rent price, capacity, technology, CO2 emission reduction, and baggage capacity. The results indicate that the most significant attributes affecting customer choices are EV rent price (33.18%), capacity (24.97%), and CO2 emission reduction (18.84%) are the most influential factors in customer decision-making, followed by baggage capacity (15.63%) and EV technology (7.38%). These insights provide a foundation for developing targeted marketing programs and product offerings that align with customer preferences and Bali's NZE goals, while supporting the broader transition to sustainable transportation in Indonesia's tourism industry.

KEYWORDS: Choice-Based (CBC), Customer Preference, Conjoint Analysis, Electrification, Electric Vehicle Shuttle.

I. INTRODUCTION

Carbon emissions are a shared enemy for the global population. According to the International Energy Agency (IEA), global CO2 emissions grew in 2022 by 0.9%, or 321 million tonnes, reaching a new high of more than 36.8 billion tonnes [1]. CO2 emissions in transportation sector increased by 254 Mt, highlighting the challenges of decarbonizing this sector. Rising demand for transportation services, increased travel, and gradual transition to low-emission vehicles may explain this growth [1]. To cope with global challenges, Indonesia is committed to enhance its emission reduction targets from 29% to 31.89% unconditionally and from 41% to 43.20% conditionally through Enhanced NDC (ENDC) to reach Net Zero Emission by 2060 [2].

The energy sector contributes 43% of greenhouse gas emissions in 2021, followed by industry (25%), and transportation (23%). Climate Transparency Report 2022, reported in 2021, the energy sector is still the biggest source of GHGs (43%), followed by the industry sector (25%) and transportation sector (23%) as illustrated detail in Figure 1, with than 90% of all GHG emissions in the transportation sector come from land transportation [3]. Decarbonizing the transportation system by speeding up the adoption of environmentally friendly, low-emission electric vehicles become one of the key answers, as is switching the power sector to renewable energy [4].
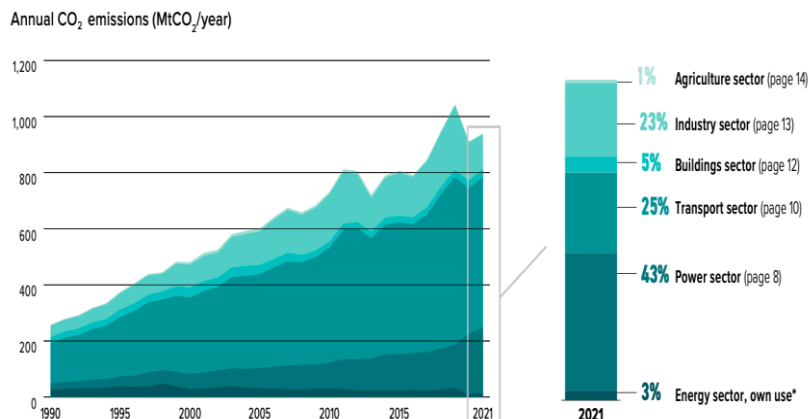
Figure 1. CO2 Emission Result by Sector. Adapted from: [3]

As part of the transformation towards NZE, Indonesia government has included the use of low carbon emission vehicle as one of the mitigation strategies in the ENDC. According to Indonesia Automotive Roadmap from Ministry of Industry, since 2019 the government has been intensively pushing for regulations on industrial development and the use of EVs [5]. In this roadmap, Indonesia government regulates eco-friendly vehicle development through LCEV policy involving multiple technology range from electrified vehicle HEV, PHEV, BEV, FCEV, and other flexy-engine, biofuel, ethanol with below target.

Table I. CO2 Target of Low Emission Vehicle – Electrified Vehicle (xEV) from: [5]

Year	Four-wheeled Vehicles		Two-wheeled Vehicles	
	Projected Sales	CO2 Reduction (in ton CO2)	Projected Sales	CO2 Reduction (in ton CO2)
2025	400.000	5 mio barel / 1.84 mio	1.76 mio	2.2 mio barel / 0.8 mio
2030	600.000	7.5 mio barel / 2.76 mio	2.45 mio	3 mio barel / 1.1 mio
2035	1.000.000	12.5 mio barel / 4.6 mio	3.22 mio	4 mio barel / 1.4 mio

Looking at current situation, according to GAIKINDO, in 2023 national EV sales reached 69.865 units, with HEVs accounting for 52,833 (76%) and BEVs 16,962 (24%). Toyota sells the most HEVs, 38,000 (72% of the total) [6].This figure is still far from the national target to have 400,000 xEV sales in 2025. To support Indonesia government's target for more effective CO2 emission reduction, Toyota is committed to have all the technologies available through multi-pathway strategy ranging from electrification technologies, HEV, PHEV, BEV, flexy-engine, hydrogen, biofuel, ethanol, and LCGC so that customers can choose based on their needs, this multi-pathway strategy also to ensure a smooth transition into the era of electrification and maintain the industry remains a key contributor to economic growth and automotive transformation in Indonesia [7]. Toyota believes that the path to net zero emissions in Indonesia's automotive sector hinges on a synergistic 'triple helix' collaboration between government, industry, and consumers, emphasizing the interdependence of the three parties and the collective benefits of their coordinated efforts towards NZE.

Aiming for substantial acceleration, Indonesian government has identified the tourism industry as a pivotal sector in achieving NZE with Bali is expected to achieve NZE by 20245, signaling a proactive stance towards sustainability with more advance target compared national target by 2060 [8]. Bali Province Manpower and Energy and Mineral Resources (ESDM) Service head Ida Bagus Setiawan. stated that commitment to Bali NZE 2045 requires cooperation and collaboration from all parties, including the central government, regional governments in Bali, industries, key players, and potential regional partners, with one of focus on transitioning to electric vehicles (EV) in the tourism sector [9]. This context creates an urgent need for research into sustainable efforts in Bali, including in sustainable mobility solutions in tourism area, particularly through collaboration multisector between key player in tourism and automotive sector related.

In this context, The Stones Hotel Bali and Toyota Indonesia have begun a collaboration to explore the possibilities of xEV utilization in the tourism sector, starting with hotel shuttle services. The Stones Hotel Bali is striving to differentiate itself in a competitive market through sustainable practices, particularly in mobility solutions, to align with Bali's Net Zero Emissions (NZE) goals and meet guests' eco-friendly expectations. However, the hotel faces uncertainty in selecting the most suitable electrified vehicle (xEV) technology, Battery Electric Vehicles (BEV), Plug-in Hybrid Electric Vehicles (PHEV), or Hybrid Electric Vehicles (HEV) - that best satisfies both guest preferences and operational needs. Simultaneously, Toyota Indonesia, with its 50-year market leadership in Indonesia, has to deal with electrification transition while staying competitive. The company's challenge is to develop xEV products that not only cater to the Indonesian market, but also align with the country's large-scale sustainability goals. To facilitate this transition, Toyota is focusing on understanding customer preferences and acceptance levels for various xEV models in key sectors, such as tourism, before ramping up the production with the most preferred models and features based on customer insights.

According to United Nations World Tourism Organization, as the global tourism industry increasingly focuses on sustainability, understanding tourist preferences for EVs can guide the development of eco-friendly transportation options that align with sustainable tourism goals [10]. World Travel & Tourism Council stated that the tourism sector needs to adapt to changing consumer preferences and environmental regulations. Insights into EV preferences can help businesses make informed decisions about fleet upgrades and infrastructure investments [11].

Based on a questionnaire distributed to 172 tourists in the city of Rhodes in Greece conducted by Nikiforiadis, the creation of charging stations network was found to be the most important factor influencing travelers' intentions to use electric vehicles. This was followed by information regarding the locations of charging stations and car-sharing platforms or stations. The battery's range is another crucial factor in getting to the intended destinations [12].

From the sample surveyed in Martin, J.M. et al., the result found that of the users of rental vehicles enter and leave the island from the airport (Lanzarote Airport). This has clear impacts for planning the pick-up and drop-off points for the vehicles. The attributes that received the highest point values were those related to the vehicle type, accessibility, parking, and heavy road traffic. The attributes that received the lowest evaluation were related to quality of infrastructure and intermodal transportation [13].

For Indonesia case Gunawan et al. conducted a study related to customer intention to use electric vehicle in Indonesia. Based on customer preferences survey of 562 respondents from 15 major cities in Indonesia, the findings show that only perceived functional risk and financial risk variables have a substantial effect on attitudes toward the use of electric vehicles, but perceived physical risk, time risk, and social risk factors contradict previous research [14]. To get more in-depth reference of customer preference on electric vehicle in tourism area, specific research in Bali region is conducted by Dwipayana et al.to investigate the Balinese people's interest in using electric vehicles. The results revealed that the price variable had a positive and significant effect on interest, just as the income level variable did. EV interest also positively and significantly influenced by the mileage variable, as well as the availability of charging stations. Meanwhile, the vehicle tax variable had a negative and insignificant impact on interest [15].

Rizki, M. et al. conducted further research related to EV mobility in Bali. The survey indicates that rental costs have a significant influence on how attractive electric vehicles are to tourists in Bali, while operational cost is not a significant attribute. The choice of EV is also influenced by electricity with two important factors to consider are the charging speed and distance to the location of charging [16]. According to a study, parking fees have no significant effect on the use of EVs. Additionally, this study discovered that Bali's EV policy may potentially cut CO2 emissions by up to 1.9 million kg, which plays significant impact to support the sustainability of Bali's tourism industry.

In order to differentiate between the vehicles, specific attributes must be selected. The criteria selection was derived from an interview with a practitioner and previous studies, with the objective of identifying the key attributes that consumers prioritize when considering an EV shuttle. The responses were assessed to ascertain the frequency at which each criterion was mentioned, even when various designations were used to refer to the same aspect. Based on customer preference to use xEV Shuttle in tourism areas, the study selected certain attributes, such as rent price, vehicle capacity, and electric vehicle technology (BEV/PHEV/HEV/FCEV). These results were derived from a previous study based on Martin, J.M. et al. [13] and Gunawan et al.[14]. Meanwhile environment aspects such as CO2 emission reduction attribute is emphasized by Rizki, M. et al. [16] and Martin, J.M. et al. [13]. Other important attribute,

such cargo or baggage capacity, are rarely included in the chosen qualities list in addition to the previously stated attributes but becomes a concern from hotel as operator for hotel shuttle. Therefore, this research is concentrating on five essential attributes: (1) EV rent price, (2) capacity, (3) technology, (4) CO2 emission reduction, and (5) baggage capacity. Figure 2 illustrates the conceptual framework for this research.
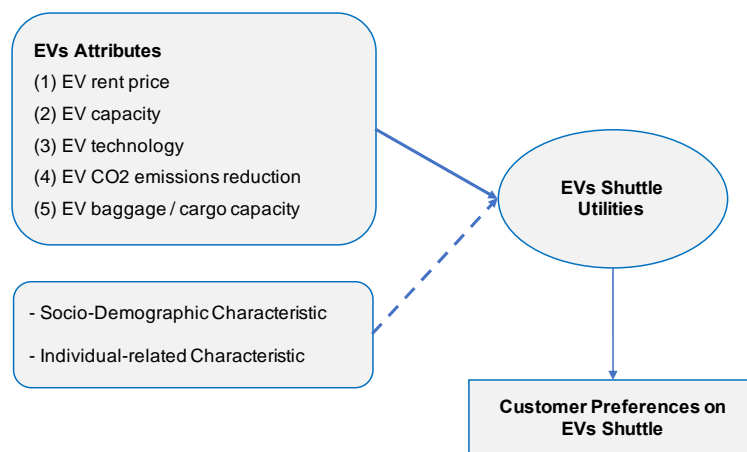

Figure 2. Conceptual framework for xEV Shuttle Preferences. Adapted from: [13 - 16]

The research employs Conjoint Approach with Choice-Based Conjoint (CBC) method. According to Cambridge Handbook of Marketing and the Law, conjoint analysis is a powerful survey method used to identify customer preferences and understand consumer decision-making processes by analyzing the impact of various product attributes [17]. This methodology has wide applications across industries, particularly in marketing, aiding in product development, pricing strategies, and design [17].

Lebeau et al. describe conjoint analysis as a multivariate method within the stated preference approach. It assesses respondent trade-offs between multi-attribute options to determine customer utility functions. The method maps preference structures based on customers' evaluations of product features, assuming they select options that maximize their utility [18]. Al-Omari et al. emphasize that the primary goal of conjoint analysis is to understand consumer decision-making by examining the impact of various product qualities on preferences [19].

Kowalska, A. stated tha among various conjoint methodologies, the Choice-Based Conjoint (CBC) approach has gained prominence. CBC collects customer preferences using discrete choice models, where respondents choose the most suitable product from competing alternatives. This method enhances the realism of the decision experiment and improves projection accuracy, particularly in market simulations [20]. She also added that CBC methodology is widely used for electric vehicle preference analysis. Factors such as price, policy, emissions, consumption level, driving range, and safety have been shown to significantly influence consumers' decisions when choosing alternative fuel vehicles.

For Indonesia case, Silaen, R.V. also applied conjoint analysis and a choice-based survey design to determine respondents' preferences for hybrid electric vehicle (HEV) attributes, including vehicle pricing, driving range, consumption level, emission level, and HEV policies [21]. The respondent in the CBC experiment is presented with a range of options. A choice-set is the collection of any potential choices into a competitive setting with each alternative is referred to as a profile.

II. METHODOLOGY

A. Respondents

This study employs a mixed-method approach to investigate consumer preferences for electrified vehicle (xEV) shuttles at The Stones Hotel Bali. The methodology is designed to ensure comprehensive data collection and analysis. For survey, the sample size and its guideline following Malhotra recommendation, stating a minimum sample size of 200 respondents was targeted to ensure statistical reliability and robust findings [22]. This sample size allows for capturing a diverse range of consumer preferences and

enables meaningful subgroup analysis. Sampling Method for this study utilizes non-probability sampling according to Etikan et al., combining purposive and convenience sampling techniques [23]. Purposive sampling targets individuals with specific experiences or intentions related to The Stones Hotel, while convenience sampling involves surveying readily available guests or visitors.

Providing geographical information about respondents at The Stones Hotel and its surrounds is essential for survey relevance and effectiveness. In the center of Legian Beach, Bali, The Stones Hotel attracts people from around the world. Tourism is thriving in the area, with several hotels, resorts, restaurants, and entertainment facilities.

The main target demographic for the survey includes guests and visitors who have direct experience with The Stones Hotel and are likely to be aware of its amenities and services, including the EV shuttle service. The study seeks insights from guests who have stayed at the hotel or used its facilities for meetings, dinners, club or pool use, or other purposes. Additionally, addressing local residents means that those who took the survey have contextually relevant experiences to draw on when providing feedback, providing useful insights for this study.

From 402 evaluated surveys, 290 were initiated. These included 45 dropped in the middle and 245 completed. It was determined that 14 guests and tourists who had no direct experience at The Stones Hotel and no intention of using its services were eliminated from the survey after data validation. Consequently, they are unlikely to be familiar with the hotel's amenities, including the EV shuttle service as mentioned detail in Table II below.

Table II. Survey Recapitulation & Summary

Type	Number of Respondents
Total Respondents (survey started)	290
Survey Fully Completed	245
Didn't meet requirements	36
Completed & Verified Respondents	**209**

B. Conjoint Approach and CBC Design

A simplified choice-set of xEV shuttle service in The Stones Hotel, Bali based on 5 selected attributes is shown in Table III. Each characteristic has more than two levels to reflect nonlinear utility functions. In this study, CBC asked respondents to choose their greatest and least wanted alternative from a set of three, ranking the combination of three levels of attribute xEV shuttle in each pair. Five major features are compared to each possibility level in this study.

Table III. Attributes levels for EV shuttle choice-set

Attribute	Level 1	Level 2	Level 3
EV rent price *(K – thousand)*	IDR 310 K	IDR 375 K	IDR 400K
EV capacity *(without driver)*	3 passengers	4 passengers	6 passengers
EV technology	Hybrid Electric Vehicle (HEV)	Plug-in Hybrid Electric Vehicle (PHEV)	Battery Electric Vehicle (BEV)
EV CO2 emissions reduction	30-50% reduction	50-70% reduction	100% reduction
EV baggage / cargo capacity	363 Liter (1-2 Luggages / small size)	646 Liter (2-3 Luggages / medium size)	993 Liter (3-4 Luggages / large size)

One factor that influences a customer's decision is the rental cost of an electric vehicle (EV). The rental rates for an electric vehicle (EV) are IDR 310,000, IDR 375,000, and IDR 450,000. In addition to pricing, it is important to consider the vehicle's capacity. Various vehicle types are available with varying passenger capacities, including 3, 4, and 6 passengers (without the driver). This provides travellers with a wider range of alternatives to suit their specific requirements. Customers have the option to choose from

various EV technologies, such as Hybrid Electric Vehicles (HEV), Plug-in Hybrid Electric Vehicles (PHEV), and Battery Electric Vehicles (BEV). The significant reduction in CO_2 emissions is a compelling factor that is driving an increasing number of individuals to option for environmentally conscious options, such as those that offer emission reductions of 30-50%, 50-70%, or even 100%. Finally, the quantity of luggage or cargo space is a crucial practical consideration, particularly for those who require ample capacity for their belongings or cargo (measuring 363 liters, 646 liters, and 993 liters).

C. Statistical Analysis

The survey took place from May 12 to June 1, 2024, utilizing the Survey Analytics® online platform. This platform provided structured tools for Conjoint Analysis, a method employed to identify customer preferences and understand how consumers make choices by analyzing the impact of different product attributes based on The Cambridge Handbook of Marketing and the Law, 2023 [17]. Survey Analytics® through QuestionsPro dashboard, the fractional factorial design specifically decreased the number of variations in attribute levels to a moderate amount, resulting in 21 distinct versions of the survey. Each participant was randomly allocated one of these 21 variants, guaranteeing that the survey remained thorough yet feasible to handle. In order to enhance the survey design, the 21 versions were categorized into six sets, with each set consisting of three option options. Additionally, one fixed version (fv) was included as a continuous reference point. As seen in Table IV, the outcome is provided in detail.

Table IV. Iterations of a Stated Preference Scenario

Vers.	Rent Price	Capacity	Technology	Emission Red.	EV Baggage / Cargo
1 (fv)[a]	IDR 310K	3 passengers	Hybrid Electric Vehicle	30 – 50% reduction	363 Liter (1-2 Luggages / small size)
2 (fv)[a]	IDR 375K	4 passengers	Plug-in Hybrid Electric Vehicle	50 – 70% reduction	646 Liter (2-3 Luggages / medium size)
3 (fv)[a]	IDR 400K	6 passengers	Battery Electric Vehicle	100% reduction	993 Liter (3-4 Luggages / large size)
4	IDR 310K	3 passengers	Plug-in Hybrid Electric Vehicle	30 – 50% reduction	646 Liter (2-3 Luggages / medium size)
5	IDR 375K	6 passengers	Hybrid Electric Vehicle	30 – 50% reduction	646 Liter (2-3 Luggages / medium size)
6	IDR 400K	6 passengers	Hybrid Electric Vehicle	100% reduction	363 Liter (1-2 Luggages / small size)
7	IDR 375K	3 passengers	Battery Electric Vehicle	100% reduction	646 Liter (2-3 Luggages / medium size)
8	IDR 375K	6 passengers	Hybrid Electric Vehicle	50 – 70% reduction	363 Liter (1-2 Luggages / small size)
9	IDR 375K	3 passengers	Hybrid Electric Vehicle	50 – 70% reduction	993 Liter (3-4 Luggages / large size)
10	IDR 400K	3 passengers	Plug-in Hybrid Electric Vehicle	50 – 70% reduction	363 Liter (1-2 Luggages / small size)
11	IDR 310K	4 passengers	Battery Electric Vehicle	100% reduction	363 Liter (1-2 Luggages / small size)
12	IDR 400K	3 passengers	Plug-in Hybrid Electric Vehicle	50 – 70% reduction	646 Liter (2-3 Luggages / medium size)
13	IDR 310K	6 passengers	Plug-in Hybrid Electric Vehicle	30 – 50% reduction	363 Liter (1-2 Luggages / small size)
14	IDR 310K	4 passengers	Plug-in Hybrid Electric Vehicle	30 – 50% reduction	646 Liter (2-3 Luggages / medium size)

Vers.	Rent Price	Capacity	Technology	Emission Red.	EV Baggage / Cargo
15	IDR 400K	6 passengers	Battery Electric Vehicle	30 – 50% reduction	363 Liter (1-2 Luggages / small size)
16	IDR 375K	6 passengers	Battery Electric Vehicle	50 – 70% reduction	363 Liter (1-2 Luggages / small size)
17	IDR 310K	3 passengers	Plug-in Hybrid Electric Vehicle	100% reduction	993 Liter (3-4 Luggages / large size)
18	IDR 400K	3 passengers	Plug-in Hybrid Electric Vehicle	30 – 50% reduction	363 Liter (1-2 Luggages / small size)
19	IDR 400K	4 passengers	Hybrid Electric Vehicle	30 – 50% reduction	363 Liter (1-2 Luggages / small size)
20	IDR 400K	3 passengers	Battery Electric Vehicle	100% reduction	993 Liter (3-4 Luggages / large size)
21	IDR 310K	4 passengers	Plug-in Hybrid Electric Vehicle	30 – 50% reduction	363 Liter (1-2 Luggages / small size)

III. FINDINGS

The Choice-Based Conjoint (CBC) analysis reveals that customers prioritize EV rent pricing (33.18%) as the most crucial factor in selecting Toyota xEV shuttle services, followed by EV capacity (24.97%), emission reduction (18.84%), freight capacity (15.63%), and EV technology (7.38%) as detail mentioned on Table V. This grading of preferences suggests that consumers are primarily cost-sensitive but also value spacious vehicles that can accommodate groups or families. Environmental considerations play a significant role, indicating an opportunity to attract eco-conscious tourists by highlighting the service's sustainability features. While EV technology is deemed least important, it still contributes to the overall customer experience. Based on these findings, The Stones Hotel should focus on offering competitively priced xEV shuttles with various capacities, emphasize environmental benefits, ensure adequate luggage space, and integrate innovative technology to enhance safety, efficiency, and comfort. By aligning their services with these customer preferences, the hotel can maximize user satisfaction and increase adoption of the Toyota xEV shuttle service.

Table V. Averaged importance level

Attribute	Importance Level
EV Rent Price	33.18%
EV Capacity	24.97%
CO2 Emission Reduction	18.84%
EV Baggage / Cargo Capacity	15.63%
EV Technology	7.38%

Table VI. Part-worth utilities

Attribute	Part-Worths Level		
EV Rent Price	310,000 IDR **0.74**	375,000 IDR **-0.03**	400,000 IDR **-0.71**
EV Capacity	3 passengers **-0.55**	4 passengers **0.02**	6 passengers **0.54**
EV Technology	Hybrid Electric Vehicle	Plug-in Electric Vehicle	Battery Electric Vehicle

Attribute	Part-Worths Level		
	-0.15	**-0.03**	**0.17**
CO2 Emission Reduction	30 – 50% reduction	50 – 70% reduction	100% reduction
	-0.37	**-0.09**	**0.46**
EV Baggage / Cargo Capacity	363 Liter (1-2 Luggage's / small size)	646 Liter (2-3 Luggage's / medium size)	993 Liter (3-4 Luggage's / large size)
	-0.35	**0.02**	**0.33**

The Choice-Based Conjoint (CBC) analysis of Toyota's xEV shuttle service at The Stones Hotel Bali reveals several positive preferences among customers. The most significant positive part-worth (0.74) is associated with the lowest rent price of 310,000 IDR, indicating a strong preference for affordable options. In terms of vehicle capacity, six-passenger vehicles are highly favored with a positive part-worth of 0.54. Environmental considerations also play a crucial role, with 100% emission reduction receiving a substantial positive part-worth of 0.46. Customers show a preference for larger cargo capacity, with the 993-liter option having a positive part-worth of 0.33. Among EV technologies, Battery Electric Vehicles (BEVs) are the most preferred, with a positive part-worth of 0.17. These positive values suggest that customers value affordability, larger vehicle capacity, environmental sustainability, ample luggage space, and fully electric vehicle technology.

Conversely, the analysis also highlights several negative preferences. Higher rent prices are less favoured, with 375,000 IDR and 400,000 IDR showing negative part-worths of -0.03 and -0.71 respectively. This indicates a strong aversion to higher-priced options. Regarding vehicle capacity, three-passenger vehicles are significantly less preferred, with a negative part-worth of -0.55. Lower levels of emission reduction also receive negative part-worths, with -0.37 for the lowest reduction and -0.09 for the middle option. In terms of cargo capacity, the smallest option is less desirable, showing a negative part-worth of -0.35. Among EV technologies, Hybrid Electric Vehicles (HEVs) are less preferred compared to BEVs, with a negative part-worth of -0.15. These negative values suggest that customers are averse to higher prices, smaller vehicle capacities, lower emission reductions, limited cargo space, and hybrid technology in comparison to fully electric options.

Through the analysis of a wide range of attribute combinations, CBC rankings offer significant insights into the preferences of customers for the Toyota xEV shuttle. Table VII provides a description of the ranks for all 21 combinations that were considered for evaluation by the respondents.

Table VII. Choice-Based Conjoint Result

Ver.	Rent Price	Capacity	Technology	Emission Reduction	EV Baggage/ Cargo	Total Part-Worths	Rank
1	310	3	HEV	30-50%	363	-0.623	186
2	375	4	PHEV	50-70%	646	-0.160	137
3	400	6	BEV	100%	993	0.782	53
4	310	3	PHEV	30-50%	646	-0.228	144
5	375	6	HEV	30-50%	646	0.098	106
6	400	6	HEV	100%	363	-0.054	133
7	375	3	BEV	100%	646	0.015	120
8	375	6	HEV	50-70%	363	0.004	122
9	375	3	HEV	50-70%	993	-0.569	177
10	400	3	PHEV	50-70%	363	-1.752	239
11	310	4	BEV	100%	363	1.063	31
12	400	3	PHEV	50-70%	646	-1.412	231

Ver.	Rent Price	Capacity	Technology	Emission Reduction	EV Baggage/ Cargo	Total Part-Worths	Rank
13	310	6	PHEV	30-50%	363	0.596	62
14	310	4	PHEV	30-50%	646	0.377	81
15	400	6	BEV	30-50%	363	-0.643	189
16	375	6	BEV	50-70%	363	0.249	95
17	310	3	PHEV	100%	993	0.858	41
18	400	3	PHEV	30-50%	363	-1.998	242
19	400	4	HEV	30-50%	363	-1.447	232
20	400	3	BEV	100%	993	-0.381	162
21	310	4	PHEV	30-50%	363	0.037	111

IV. ANALYSIS

The Choice-Based Conjoint (CBC) analysis of Toyota's xEV shuttle service at The Stones Hotel Bali reveals a complex tapestry of customer preferences, weaving together considerations of cost, capacity, technology, and environmental impact. At first glance, the data seems to paint a straightforward picture: customers overwhelmingly prefer the lowest price point of 310,000 IDR. However, a closer examination unveils a more nuanced reality, where value proposition often trumps mere affordability. Consider, for instance, the profile ranking third in customer preference. Despite its higher price tag of 400,000 IDR, this option garners significant favor due to its combination of desirable attributes: a six-passenger capacity, Battery Electric Vehicle (BEV) technology, 100% emission reduction, and ample baggage space. This finding challenges the simplistic notion that price is the sole determinant of customer choice. Instead, it suggests that travellers are willing to invest more for a service that aligns closely with their needs and values.

The strong preference for larger vehicle capacities emerges as a recurring theme throughout the analysis. Six-passenger vehicles consistently rank highly, even when paired with higher prices. This preference likely reflects the nature of tourism in Bali, where group travel and family vacations are common. It's a reminder that the xEV shuttle service isn't just about transportation; it's about facilitating shared experiences and group dynamics. Equally striking is the clear inclination towards environmentally friendly options. The highest-ranking profiles invariably feature 100% emission reduction and BEV technology. This isn't merely a nod to eco-consciousness; it's a resounding endorsement of sustainable travel practices. In an era where climate change concerns are paramount, tourists are evidently seeking ways to minimize their environmental impact, even in their choice of local transportation. Yet, the analysis also reveals potential pitfalls. Profiles combining higher prices with smaller capacities and less advanced technology rank at the bottom of customer preferences. A shuttle priced at 400,000 IDR with only three-passenger capacity and Plug-in Hybrid Electric Vehicle (PHEV) technology is met with strong aversion. This underscores the importance of balancing various attributes – a high price must be justified by corresponding benefits in capacity, technology, or environmental impact. Interestingly, while baggage capacity is a factor in customer preference, it doesn't seem to carry the same weight as other attributes. Profiles with smaller baggage capacities can still rank highly if they excel in other areas. This suggests a hierarchy of needs among travellers, where the ability to travel together and do so in an environmentally friendly manner often supersedes luggage space considerations.

The optimal configuration emerging from this analysis, a shuttle priced at 310,000 IDR, accommodating six passengers, utilizing BEV technology, offering 100% emission reduction, and providing 993 liters of baggage space, represents a confluence of all the most desired attributes. It's a blueprint for success, balancing affordability with capacity, advanced technology, and environmental responsibility. However, the diversity of high-ranking profiles suggests that there's no one-size-fits-all solution. While this optimal configuration sets a benchmark, there's clearly room for a range of offerings that cater to different customer segments and needs. Some travellers might prioritize lower costs, while others are willing to pay more for additional space or cutting-edge technology.

For Toyota and The Stones Hotel, these findings offer a roadmap for developing and marketing program for their xEV shuttle service. The emphasis should be on communicating the value proposition – not just the price, but the combination of spacious interiors, advanced electric technology, and environmental benefits. There's an opportunity to position the service as a leader in sustainable tourism transportation, aligning with the growing trend of eco-conscious travel.

Moreover, the analysis points to the potential for tiered service offerings. By providing options at different price points, with varying combinations of capacity and features, the xEV shuttle service can cater to a broader range of customer needs and preferences. As the electric vehicle market continues to evolve rapidly, it will be crucial for Toyota and The Stones Hotel to maintain a finger on the pulse of customer preferences. Regular market research and customer feedback mechanisms will be essential to ensure that the xEV shuttle service continues to meet and exceed traveler expectations.

A. Contributions

This study offers significant contributions to multiple stakeholders in the sustainable tourism and transportation sectors of Bali, Indonesia. For The Stones Hotel Bali, it provides actionable insights into guest preferences for xEV shuttle services, enabling the hotel to enhance its transportation offerings, improve guest satisfaction, and differentiate itself in the competitive Bali tourism growing market. For Toyota Motor Manufacturing Indonesia (TMMIN), the research delivers valuable market intelligence on customer acceptance of various xEV models in the tourism sector, informing product development insights and facilitating the strategic introduction of sustainable mobility solutions. This collaboration between The Stones Hotel and TMMIN serves as a model for business partnerships in advancing eco-friendly transportation options. Furthermore, the study contributes to the broader goals of the Indonesian and Bali governments by supporting their sustainability initiatives, particularly Bali's aim to achieve Net Zero Emissions by 2045. By identifying consumer preferences and potential barriers to xEV adoption, the research provides a foundation for policymakers to refine incentives and regulations, potentially accelerating the transition to electric vehicles in Bali's tourism sector. Ultimately, this study bridges the gap between hospitality services, automotive innovation, and government sustainability goals, offering a holistic approach to promoting eco-friendly practices in Bali's tourism industry while providing a replicable model for sustainable transportation initiatives in other regions.

B. Limitations and Future Research

This study explores sustainable mobility options in hospitality, focusing on Toyota's xEV shuttle models (BEV, PHEV, and HEV) at The Stones Hotel Bali, employing Choice-Based Conjoint (CBC) analysis to identify key attributes influencing customer preferences. While the research provides valuable insights into consumer acceptance and operational considerations for integrating xEVs into hotel shuttle services, it has several limitations. The study relies on online surveys distributed primarily to individuals who have visited The Stones Hotel, potentially limiting the representativeness of the sample. It exclusively examines selected Toyota xEV models, which may restrict the applicability of findings to other manufacturers or contexts. The selection of vehicle characteristics is based on the author's experience and literature review, possibly overlooking other relevant factors. Despite these constraints, the research contributes significantly to understanding customer preferences for xEV shuttles in Bali's tourism sector, aligning with the region's 2045 Net Zero Emissions goal. However, future studies could benefit from broadening the scope to include a wider range of EV models, characteristics, and a more diverse sample population to provide a more comprehensive understanding of consumer preferences in the evolving electric vehicle market.

V. CONCLUSION

In conclusion, this study on Toyota's xEV shuttle service at The Stones Hotel Bali provides crucial insights into the complex interplay of customer preferences in the evolving landscape of sustainable tourism transportation. The Choice-Based Conjoint analysis reveals that while price remains a significant factor, customers are willing to pay more for vehicles that offer larger capacity, advanced BEV technology, and complete emission reduction. This finding underscores a growing environmental consciousness among travelers and a demand for sustainable yet practical transportation solutions. The research not only offers actionable programs for The Stones Hotel to enhance its guest experience and differentiate itself in Bali's competitive tourism market but also provides TMMIN with valuable market survey to refine its xEV product offerings.

Furthermore, it contributes to the broader sustainability goals of the Indonesian and Bali governments, particularly in achieving Net Zero Emissions by 2045. While the study has limitations in terms of sample representation and the range of vehicles examined, it lays a solid foundation for future research and practical applications in sustainable mobility. Ultimately, this research exemplifies how collaborative efforts between the hospitality industry, automotive manufacturers, and government bodies can drive innovation in sustainable practices, potentially setting accelerated standards for eco-friendly transportation in tourism sectors.

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