Strategy-Aligned Channel Location Selection by a Multiple Criterion Decision-making Mechanism: A Perspective of Franchising System Assessment

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"Location, location, location", is a common proverb in real estate, especially for small-scale food and beverage business owners. The existing literature on location choice tends to over-emphasise large-acreage positions or additional location selection, rather than strategically oriented channel expansion in the pre-initial stage of firm development. The present study therefore uses a multiple decision-making method (MCDM) to infer numerous implications from the ranking results. Although this case study focusses on a franchising system expansion project for a handmade beverage franchise in numerous markets, the method is widely applicable to location selection procedures in entrepreneurial contexts, thanks to reduced costs, simplicity of use, and arithmetic simplicity. Several research directions for subsequent study are offered.

Keywords: *Strategic management process (SMP), VIKOR, Channel development, Location selection.*

Introduction

In recent years, the food and beverage industry has set its sights on the vertical integration of the handmade drinks business. An essential consumer channel, the handmade drinks business has seen a flourish of shop development in many Asian Pacific Rim countries. Indeed, one of the largest food and beverage manufacturers boosts its bottom-line by selling bottled tea, coffee, milk, and mineral water at handmade drinks shops for the purpose of customer penetration (Lue, 2003). Despite the promising status of the handmade drinks market due to

demand increases, individual operators dominate the business, leading to intense competition. A robust supplier environment improves the industry product quality, development, flexibility, delivery time, and structure of cost. The performance of manufacturers can be strengthened via a variety of operating styles involved in the supplier innovativeness (Sørensen & Mattsson, 2016; Jermsittiparsert & Rungsrisawat, 2019). Multi-channel marketing, which includes choosing appropriate channel operating locations, is becoming a top-priority issue, since the location is considered to strongly influence the future performance (Yang & Lee, 1997). Moos and Botha (2016) argue that the small business location (i.e., the metropolitan municipality where the business is located) has a statistically significant effect on the objectives, outputs, and outcomes of small business plans. Additionally, existing literature emphasises the importance of location selection across contexts. For example, international tourist hotels (Chou et al., 2008), plant sites (Yong, 2006), internal facilities and equipment (Kahraman et al., 2003), large warehouses (Demirel et al., 2010), hospitals (Lin et al., 2008), and high-tech corporations (Chen and Yu, 2008). However, these studies seldom discuss channel-oriented location selection at small acreages in the pre-opening stage.

At the organisational and individual levels, decision problems have been complicated by an ever-greater degree of complexity, forcing decision makers to seek out newly and easy-to-use techniques that facilitate the processes that support decision making (Ferreira et al. 2019). The multiple-criteria decision-making (MCDM) technique, in the past two decades, has seen numerous utilisations in location selection contexts. Representative studies in the decision theory field, such as that of Yang and Lee (1997), have used the Analytical Hierarchy Process (AHP) for the estimation of suitable facility and equipment positions, with each criterion considered independently. Subsequently, Kapoor et al. (2008) developed a fuzzy clustering method to rank short-listed locations, while also solving the problem of each criterion's interdependence. Yang et al. (2008) extended Yang and Lee's (1997) study, adding the Analytic Network Process (ANP) to optimise location selection conditions. Chakraborty (2018) utilised MCDM in wave energy power plants selection, and Kabak and Keskin (2018) sought hazardous materials warehouse selection by MCDM. These aforementioned articles, however, scarcely covered the essential strategy-aligned factors for firms undertaking strategic planning using the MCDM technique.

To fill in the blanks in the existing MCDM location selection literature, the present study pervasively emphasises the notion of the strategic management process (SMP) in the MCDM expert choice steps. In accordance with the definition of Barney and Hesterly (2006), the SMP is a continuous assemblage of choices or decisions that can strengthen the chance for a firm to select an optimal strategy. Hence, the selected strategy itself generates a given firm's competitive advantages.

Figure 1. The strategic management processes
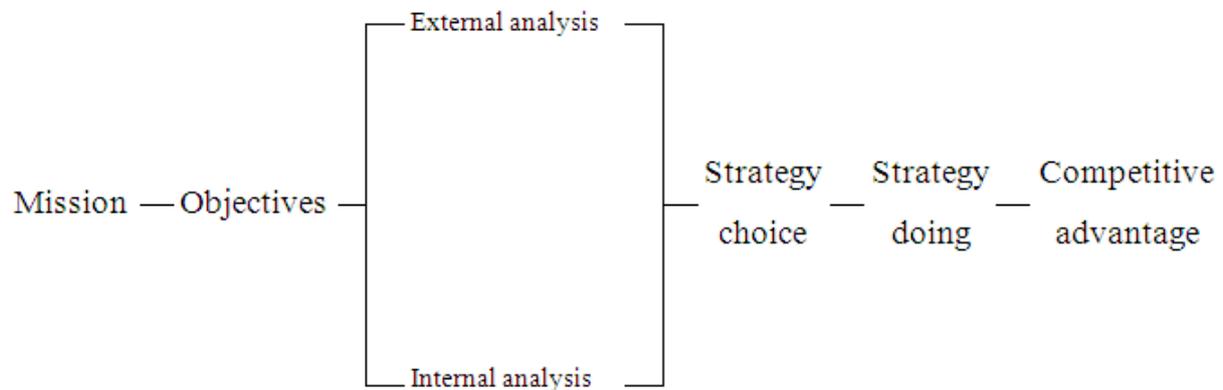
The SMP contains three elements: objective, external/internal analysis, and strategic choice (see Figure 1). Ideally, the criterion setting in the business location selection fundamentally refers to Moore's (1959) dimensions: market, raw material, transportation, power, labour and wages, laws and taxation, climate and fuel, community service and attitude, and water and waste. To more closely match the actual situation of the handmade drinks channel industry, some criteria have been modified in this study for decision-makers' consideration.

The remainder of this paper is organised as follows. The next section briefly presents the VIKOR — an MCDM method — to deal with multiple-attribute decision-making problems that emphasise "compromise" issues. The subsequent section introduces the handmade drinks industry and a location selection procedure for new participants in that industry, in terms of VIKOR. The final section discusses the inferences revealed by the results.

Methodology

The Delphi method and Nominal Group Technique (NGT) is commonly utilised as a tool for optimising compromise in decision-making. In that context, the Delphi method is used for ascertaining and analysing data, as well as the NGT for gathering information from a group face-to-face to make decisions (Muridan et al. 2019). The results consist of numerous interspersed responses from experts interested in the issue. The Delphi and NGT method can be summed up as follows: (1) an expert survey on a particular issue is conducted in multiple (n≥2) rounds; (2) starting from the second round, feedback is offered concerning the results of previous rounds; and (3) the same experts assess the same issue once more, influenced by the opinions of the other experts. In practical terms, the Delphi method aims to discover the true group opinion on the issue. However, diverging opinions often appear in the decision-making procedure due to conflicting interests and unnecessary time and cost increases (Häder & Häder, 1995). The present study therefore uses the VIKOR method in actual case interpretations to remedy these disadvantages of the Delphi method.

(1) Determine all the criterion functions, denoted as positive ideal A_i^* and the negative ideal: A_i^- $i = 1, 2, 3, ...n$.

$$A_i^* = \max_j A_{ij}, \quad A_i^- = \min_j A_{ij}.$$

(2) Calculate the values S_j and R_j, $j=1, 2, 3,…, J$, the relations revealed as:

$$S_j = \sum_{i=0}^{n} w_i (f_i^* - f_{ij}) / (f_i^* - f_i^-),$$

$$R_j = \max_i \left[w_i \left(f_i^* - f_{ij} \right) / \left(f_i^* - f_i^- \right) \right],$$

Where w_i is the weights of criteria, expressing the relative importance by the analytic hierarchy process (AHP).

(3) Calculate the values Q_j, $j=1, 2, 3,…, J$, by the relation:

$$Q_j = v \left(S_j - S^* / S^- - S^* \right) + (1-v) \left(R_j - R^* \right) / \left(R^- - R^* \right)$$

Where:

$$S^* = \min_j S_j,$$
$$= \min[(S_j) \mid j = 1, 2, 3, ..., n]$$
$$S^- = \max_j S_j,$$
$$= \max[(S_j) \mid j = 1, 2, 3, ..., n]$$
$$R^* = \min_j R_j,$$
$$= \min[(R_j) \mid j = 1, 2, 3, ..., n]$$
$$R^- = \max_j R_j,$$
$$= \max[(R_j) \mid j = 1, 2, 3, ..., n]$$

and v is introduced as the weight of the strategy of the maximum group utility (or most criteria), according to the definitions by Kackar (1985), Opricovic (1998), and Chang (2010); $v = 0.5$.

(4) Ranking the alternatives by Q_j. If the value of Q_j is the minimum, the alternative is the better solution. Once it offers a maximum group utility and a minimum participant regret (or disappointment), the obtained compromise solution is the consent of the majority by decision makers.

Hypothetical Case Study

Group K, a well-known manufacturer of cold beverages, has held a market share of more than 60 per cent for the past five years. The management of Group K is intent on market penetration by developing handmade drink channel visibility, to stimulate the sales of refreshing beverages and accompanying hot products: bubble tea, coffee, juice, smoothies, and variety Yakult drinks. After a fierce debate on the new strategy, Group K decides to enter the handmade drinks market by establishing a franchising system. In terms of the location selection, Group K is very optimistic about the development potential of City Z, which is a booming city with more than 300,000 residents, as well as numerous job opportunities due to the prosperity and the growth of the local economy. In particular, large-scale manufacturing in City Z has accounted for 72 per cent of industrial production. Thanks to high labour demand, strong labour force participation has spurred regional economic growth and grown the potential customer base of Group K. An increasing flow of business travellers in City Z has simultaneously activated the city's taxi market, with taxi drivers becoming the main consumers of Group K products. In addition, restaurants, karaoke bars, nightclubs, and ballrooms in the downtown area offer high-quality entertainment, further stimulating demand for handmade drinks. Through local real estate agent arrangements, Group K aims to select three optimal sites for their new handmade drink franchising system from nine suitable locations (see Table 1). Afterwards, five decision participants will discuss the location selection: two members from regional business associations, one City Council representative, one business academician, and Group K's channel development manager (see Table 2).

Table 1: Alternatives for Group K location selection decision

Location alternatives	Site condition
L_1	Adjacent to city railway station and within two metres, $3.31m^2$
L_2	Near an entrance of the industrial park and within 3.5 metres, $13.24m^2$
L_3	Located in the city traditional market, $4.13m^2$
L_4	Close to a famous seafood restaurant, $8.26m^2$
L_5	Located in the national highway interchange exit and within 50 metres, $16.53m^2$ (included a warehouse)
L_6	Adjacent to the national highway bus stop at the interchange entrance and within 100 metres, $14.21m^2$ (included a warehouse)
L_7	Near a military base and within 30 metres, $19.83m^2$ (included a warehouse)
L_8	Near the City's largest middle school and within 5 metres, $13.22m^2$
L_9	Located downtown in a popular karaoke bar, $4.10m^2$

Table 2: Expert fields

Experts	Field
Group K channel development office	Business
Local transportation association	Business
Regional retail market management association	Business
City Z Council representative	Government
Channel development researcher	Academic

The criteria to be used in the analysis reflect the whole strategic management process (SMP), i.e., the external and internal business environment of the pre-initial stage in which Group K enters the handmade drinks market. The weight of each criterion is derived from the five discussion participants' pairwise criterion comparisons using the Analytical Hierarchy Process (AHP). Regarding the external factors, the decision participants are offered seven criteria, as defined below, distributed in three dimensions: supply chain (Es), market targeting (Em), and local enforcement policy intent (Ep).

E_{s1}－**Raw Material Input:** this refers to the degree of development of the proposed location in terms of road width, truck parking space, and delivery systems. These geographic conditions also determine the extent to which upstream suppliers offer discounts.

E_{s2}－**Equipment Service Maintenance:** a commercial freezer is one example of a key piece of equipment required for the storage of cold drinks, food, and additional materials. Therefore, location considerations should include the geographic distance between the proposed location and relevant equipment suppliers.

E_{s3}－**Talent Recruitment:** though highly skilled employees are not needed for handmade drink shops, the clerk is required to package and sell products. To increase sales, handmade drink shop owners usually hire young, attractive staff. Thus, handmade drink shop site selection must consider the likelihood of the location to attract a young labour force for the clerk job.

E_{m1}－**Geographical Position:** shop success is expected to be affected by the situated place characteristics (e.g. metropolitan/county/village), since the customer base is determined to some extent by the location. For this reason, geographic position is included among the criteria for handmade drink shop site selection.

E_{m2}－**Road Traffic Flow:** in reality, many customers buying handmade drinks use the drive-thru option, since such shops are typically roadside businesses. Naturally, these shops see car and truck drivers as their main customers. Road traffic volume therefore matters, and thus is among the criteria for handmade drink shop site selection.

E_{m3}－**Crowd Flow:** dense populations of workers in the city area (e.g., construction site workers, traditional street vendors, students, and male white-collar workers) also constitute key customers of handmade drink shops. Therefore, each proposed location must consider the volume of the crowd.

E_p－**Law Policy Enforcement:** handmade drinks may be socially perceived as unhealthy because of the product's characteristics and effects; the product is harmful to health and is a known cause of obesity. Due to this stigma, the frequency of enforcement of local law and code enforcement (e.g., police, fire brigade, public health inspection) therefore depends strongly on the public health authority's attitude and on its access to the location. Local law enforcement intensity therefore must be included among the criteria for handmade drink shop site selection.

On the other hand, for internal factors, the decision participants are offered four criteria, as defined below, distributed in two dimensions: financial support (I_f), and organisational adoptive capacity (Io). In order to ensure the accurate estimation of these parameters by experts from outside of Group K, these internal criteria must consider Group K's business reputation.

I_{f1}－**Rental Cost** and **If2－Initial Opening Cost:** these two criteria are strongly determined by each proposed site's position, acreage, shop decoration, interior design, and expected ability to attract customers.

I_{o1}－**Training and Education:** prior to evaluating the competence of Group K's franchising strategy, Group K is required to propose an employee training and education plan as reference material for the five experts. To ensure franchisor and employer homogeneity of Group K's newly developing handmade drink shop franchise, the plan should fully consider every proposed location's human resource conditions. In this way, the experts can make meaningful assessments of effective training and education levels.

I_{o2}－**Culture Consistency of Franchising System:** to maintain a consistent corporate culture, Group K must proactively assure product quality and quantity for each franchised handmade drink shop. This criterion examines whether Group K is able to guarantee a high consistency in commercial identity, logistic support service, goodwill maintenance, and improvement. Figure 2 illustrates each judgment criterion.

Figure 2. The structure of SMP-aligned location selection
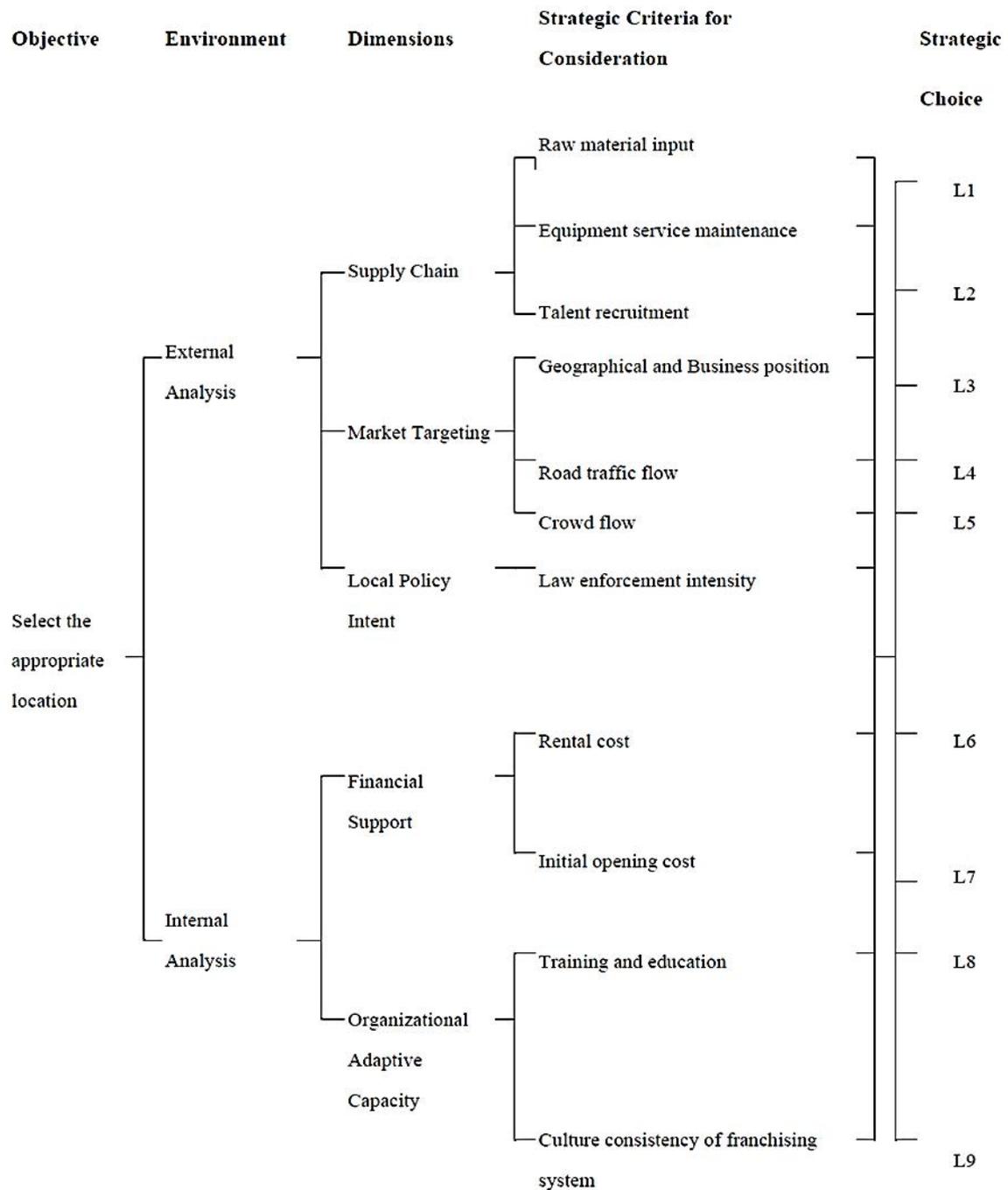
Once every criterion is identified, the five experts' business environment analysis accounts for 50 per cent of each external or internal construct utilised by the AHP. Table 3 shows each dimension and criterion in the AHP weighted averages.

Table 3: Each dimensions and criteria AHP weights

Objective	Environment	Dimensions	Strategic Criteria for Consideration	Average
Select the appropriate location	External Analysis 0.5000	Supply Chain 0.1577	Raw material input	0.0724
			Equipment service maintenance	0.0338
			Convenience talent recruitment	0.0515
		Market Targeting 0.3172	Geographical and Business position	0.1137
			Road traffic flow	0.1086
			Crowd flow	0.0949
		Local Policy Intent 0.0251	Law enforcement intensity	0.0251
	Internal Analysis 0.5000	Financial Support 0.1946	Rental cost	0.1178
			Initial opening cost	0.0768
		Organizational Adaptive 0.3054	Training and education	0.1415
			Culture consistency of franchising system	0.1639

For qualitative criteria, Srivastava et al. (2002) stated that the geometric mean among expert scores would ascertain the optimal result in a study of qualitative measurement. For example, if a 1–5 ordinal qualitative scale is used by the five experts, then the collection of qualitative scores for criterion Es1 might be ｛5,4,5,5,4｝, with the geometric mean value calculated as follows (see Tables 4 and 5):

$$Es1 = \sqrt[5]{5 \cdot 4 \cdot 5 \cdot 5 \cdot 4} = 4.57$$

Thereafter, eight criteria are classified as qualitative criteria which are highly dependent on location characteristics: Es1, Es2, Es3, Em1, Ep, Io1, and Io2. Meanwhile, Em2, Em3, If1, and If2 are classified as quantitative criteria. In this stage, the quantitative criteria are sourced from the local real estate agent. Table 4 reveals the corrected data for each location, which decision-makers can use to make subjective judgments.

The normalised decision matrix with each criterion's weighted average is shown in Table 5. S_j, R_j, and Q_j can then be computed from this matrix to confirm the optimal three location selections for handmade drink shops in City Z. Table 6 illustrates each location's S_j, R_j, and Q_j values. According to Table 6, L2, L5, and L9 are the three optimal locations for handmade drink shop opening sites, according to the VIKOR ranking.

A post hoc examination of the criteria that differentiates these three locations shows that they differ in just a few key dimensions. These three locations are characterised as gathering more traffic and crowd flow and are more likely to attract male labourers as the main customer segment. These ranking results also demonstrate that consumption habits during leisure activities are also considered.

Table 4: Raw data of each proposed locations

Criteria	Locations for consideration								
	L_1	L_2	L_3	L_4	L_5	L_6	L_7	L_8	L_9
Raw material input (E_{s1})	4.57	4.78	3.95	4.13	4.51	5.00	2.86	3.57	4.32
Equipment service maintenance (E_{s2})	4.13	4.51	4.37	4.57	5.00	4.32	2.86	3.44	4.78
Talent recruitment (E_{s3})	4.37	4.57	3.95	4.13	3.81	3.13	1.43	1.74	4.78
Geographical position (E_{m1})	4.78	4.51	4.37	3.76	5.00	4.57	2.17	1.64	4.32
Road traffic flow (PCU) (E_{m2})	19994	32518	12932	23068	29697	29323	11414	17327	27468
Crowd flow (E_{m3})	20376	8728	19508	9253	814	1069	449	1036	16544
Law enforcement intensity (E_p)	4.32	2.49	3.57	1.89	4.57	4.51	1.15	1.00	4.78
Rental cost (EUR/m2) (I_{f1})	78.2	30.1	88.9	60.5	32.0	33.4	14.6	25.0	71.3
Initial opening cost (EUR) (I_{f2})	6,591.2	2,908.6	5,263.5	6,296.9	2,824.8	2,836.5	941.6	1,129.9	6,570.5
Training and education (I_{o1})	3.59	4.13	4.57	3.90	5.00	4.78	1.89	1.52	4.37
Culture consistency of franchising system (I_{o2})	4.32	5.00	3.37	2.61	4.78	4.13	2.17	1.43	3.90

Table 5: Normalised matrix with AHP weights

Criteria	Attributes						
	L_1	L_2	L_3	L_4	L_5	L_6	L_7
E_{s1}	0.0145	0.0074	0.0355	0.0294	0.0166	0.0000	0.0724
E_{s2}	0.0137	0.0077	0.0100	0.0068	0.0000	0.0107	0.0338
E_{s3}	0.0063	0.0032	0.0128	0.0100	0.0149	0.0254	0.0515
E_{m1}	0.0074	0.0166	0.0213	0.0420	0.0000	0.0146	0.0958
E_{m2}	0.0644	0.0000	0.1008	0.0486	0.0145	0.0164	0.1086
E_{m3}	0.0000	0.0555	0.0041	0.0530	0.0932	0.0919	0.0949
E_p	0.0220	0.0099	0.0171	0.0059	0.0237	0.0233	0.0010
I_{f1}	0.1009	0.0246	0.1178	0.0728	0.0276	0.0298	0.0000
I_{f2}	0.0000	0.0501	0.0180	0.0040	0.0512	0.0510	0.0768
I_{o1}	0.0573	0.0354	0.0175	0.0447	0.0000	0.0089	0.1265
I_{o2}	0.0312	0.0000	0.0748	0.1097	0.0101	0.0399	0.1299

Table 6 illustrated each location's S_j, R_j, and Q_j value. According to Table 6, the three optimal priorities of handmade drink shop opening sites in each location by the VIKOR ranking were revealed as L_2, L_5, and L_9.

Table 6: The value of Sj, Rj, and Qj in each proposed location

	L$_1$	L$_2$	L$_3$	L$_4$	L$_5$	L$_6$	L$_7$	L$_8$	L$_9$
S$_j$	0.0912	0.0000	0.1860	0.1836	0.0351	0.0862	0.4926	0.5000	0.0634
R$_j$	0.1706	0.0000	0.2273	0.2001	0.1447	0.1404	0.2680	0.3821	0.1336
Q$_j$	0.2618	0.0000	0.4133	0.3838	0.1798	0.2266	0.7605	0.8821	0.1970

These three places were characterised as gathering more traffic and crowd flow, and mainly for male labour, as the major customer segment. The ranking result, therefore, also considered the consumption habits during the leisure activities.

Concluding Remarks

This study demonstrates location selection with the SMP in the context of the important issue of franchise expansion. This approach considers corporate resource constraints, both external environment factors (e.g. supply chain convenience, market targeting, regional law enforcement intent) and internal environment factors (e.g. financial resources support and organisational adaptive capacity).

In order to select the appropriate franchise locations and optimise resource allocation in the initial stage, the AHP weighting assessment is quite effective. This assessment considers every expert subjective judgment, revealing that the market targeting, and the organisational adoptive capacity are the most significant factors. Through VIKOR rating procedures, such an approach reveals the priority of opening locations in geographic proximity to the main customer base. From a practical perspective, handmade drink shop performance is most strongly boosted by high traffic and crowd flows. In this scenario, in which young, attractive staff in shop doorways catch drivers passing by, a more concentrated crowd clearly helps. Due to the significant differences in conditions among locations, firms should focus on market targeting in order to meet real consumer demand. As another critical success factor, organisational adoptive capacity allows firms to enter the new market regardless of a vertical or horizontal integration strategy. Consequently, the rating result of each proposed location illustrates that VIKOR increases the decision-making effectiveness in all dimensions.

Much work remains to be done to analyse and empirically test these new ideas. Future research can use the MCDM approach to further explore the factors influencing the success of handmade drink shop locations in multinational performance comparisons.

REFERENCES

Barney, J.B., & Hesterly, W.S. (2006). Strategic Management and Competitive Advantage: Concepts and Cases, New Jersey: Pearson Prentice Hall.

Chakraborty, T. (2018). A MCDM-NBO Approach for Selection of Installation Location for Wave Energy Power Plants. In Application of Geographical Information Systems and Soft Computation Techniques in Water and Water Based Renewable Energy Problems (pp. 121-140). Springer, Singapore.

Chang, C.L. (2010). A Modified VIKOR Method for Multiple Criteria Analysis, Environmental Monitoring and Assessment, 168, 339-344.

Chen, H.C., & Yu, Y.W. (2008). Using a Strategic Approach to Analysis the Location Selection for High-tech Firms in Taiwan, Management Research News, 31, 4, 228-244.

Chou, T.Y., Hsu, C.L., & Chen, M.C. (2008). A fuzzy multi-criteria decision model for international tourist hotels location selection, International Journal of Hospitality Management, 27, 293-301.

Demirel, T., Demirel, N.C., & Kahraman, C. (2010). Multi-criteria Warehouse Location Selection Using Choquet Integral, Expert Systems with Applications, 37, 3943-3952.

Ferreira, F. A., Ilander, G. O. P. B., & Ferreira, J. J. (2019). MCDM/A in practice: methodological developments and real-world applications. Management Decision, 57(2), 295-299.

Häder, M., & Häder, S. (1995). Delphi und Kognitionspsychologie: Ein Zugang zur theoretischen Fundierung der Delphi-Methode, in: ZUMA-Nachrichten.

Jermsittiparsert, K., & Rungsrisawat, S. (2019). Impact Strategic Sourcing, Supplier Innovativeness, and Information Sharing on Supply Chain Agility. International Journal of Innovation, Creativity and Change, 5(2), 397-415.

Kabak, M., & Keskin, İ. (2018). Hazardous materials warehouse selection based on GIS and MCDM. Arabian Journal for Science and Engineering, 43(6), 3269-3278.

Kacker, R.N. (1985). Off-line Quality Control, Parameter Design and the Taguchi Method, Journal of Quality Technology, 17, 176-188.

Kahraman, C., Ruan, D., & Doğan I. (2003). Fuzzy Group Decision-making for Facility Location Selection. Information Sciences, 157, 135-153.

Kapoor, V., Tak, S.S., & Sharma, V. (2008). Location Selection – A Fuzzy Clustering Approach, International Journal of Fuzzy Systems, 10, 2, 123-128.

Ko Y.C., Chiang, T.A., Chang, S.J., & Hsieh, S.F. (1992). Prevalence of Betel Quid Chewing Habit in Taiwan and Related Socio-demographic Factors. Journal of Oral Pathology and Medicine. 21. 261-264.

Ko Y.C., Y.L. Huang, Lee, C.H., Chen, M.J., Lin, L.M., & Tsai, C.C. (1995). Betel Quid Chewing, Cigarette Smoking and Alcohol Consumption Related to Oral Cancer in Taiwan. Journal of Oral Pathology and Medicine. 24. 450-453.

Lin, C.T., Wu, C.R., & Chen, H.C. (2008). The Study of Construct Key Success Factors for the Taiwanese Hospitals of Location Selection by Using the Fuzzy AHP and Sensitivity Analysis, Information and Management Sciences, 19, 1, 175-200.

Mohammed, A., Harris, I., & Dukyil, A. (2019). A trasilient decision making tool for vendor selection: A hybrid-MCDM algorithm. Management Decision, 57(2), 372-395.

Moore, J. M. (1959). Plant Layout and Design, New York: The Macmillan Company.

Moos, M., & Botha, M. (2016). How do age and location affect a business? Evaluating the objectives, outputs and outcomes of small business policy. South African Journal of Economic and Management Sciences, 19(3), 344-357.

Muridan, N. D., Rasul, M. S., Yasin, R. M., Abd Rauf, R. A., Yahaya, N., & Nor, A. R. M. (2019). Using nominal group technique to identify career decision elements for TVET entrepreneurs. International Journal of Innovation, Creativity and Change, 7(6), 211-226.

Opricovic, S. (1998). Multicriteria Optimization of Civil Engineering Systems, Faculty of Civil Engineering, Belgrade.

Opricovic, S., & Tzeng, G.H. (2004). Compromise Solution by MCDM methods: A Comparative Analysis of VIKOR and VIKOR, European Journal of Operational Research, 156, 445-455.

Opricovic, S., & Tzeng, G.H. (2007). Extended VIKOR Method in Comparison with Outranking Methods, European Journal of Operational Research, 178, 514-529.

Sørensen, F., & Mattsson, J. (2016). Speeding up innovation: Building network structures for parallel innovation. International Journal of Innovation Management, 20(02), 1650024.

Srivastava, U.K., Shenoy,G.V. and Sharma, S.C. (2002). Quantitative Techniques for managerial Decisions, New Age International Pvt. Ltd., 2nd edition.

Tong, L.I., Chen, C.C., & Wang, C.H. (2007). Optimization of Multi-response Processes Using the VIKOR Method, International Journal of Advanced Manufacturing Technology, 31, 1049-1057.

Tzeng, G.H., Tsaur, S.H., Laiw, Y.D., & Opricovic, S. (2002). Multicriteria Analysis of Environmental Quality in Taipei: Public Preferences and Improvement Strategies, Journal of Environmental Management, 65, 109-120.

Wen, C. P., Tsai, S. P., Cheng, T. Y., Chen, C.J., Levy, D.T., Yang, H.J. & Eriksen, M. P. (2005). Uncovering the Relation between Betel Quid Chewing and Cigarette Smoking in Taiwan. Tobacco Control, 14, i16-i22.

Yang, J., and Lee, H. (1997). An AHP Decision Model for Facility Location Selection, Facilities, 15, 241-254.

Yang, C.L., Chuang, S.P., Huang, R.H., & Tai, C.C. (2008). Location Selection Based on AHP/ANP Approach, Industrial Engineering and Engineering Management (IEEM), Proceedings of the 2008 IEEE, 1148 -1153.

Yong, D., (2006). Plant location selection based on fuzzy TOPSIS, The International Journal of Advanced Manufacturing Technology, 28, 839–844.