Innovating brand strategy development using integration of data mining and the CBBE model

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Abstract: In salon and hairdressing industry, driven by growing awareness to embrace the concept of the 'Lifestyle of health and sustainability' (LOHAS) and fiercer competition in its business, innovating brand management strategy is important for sustaining business. The aim of this study was to utilise the integration of brand equality pyramid and data mining toward innovative learning in developing service brand strategy. Association rule of data mining and the results from customers' survey data are used to develop the integrated model. An example using Taiwanese beauty salon and hairdressing industry is provided to illustrate the utilisation of the model in practice.

Keywords: brand building phase; consumer-oriented brand equity pyramid; brand equity; data mining; association rules; innovation; learning; salon and hairdressing industry; brand status analysis; brand strategy.

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1 Introduction

In the beauty industry, the embracement of the 'Lifestyle of health and sustainability' (LOHAS) concept among global consumers, along with the improvement of living standards and the prevalence of products' information have also created new trends of demands in terms of fashion and self-value promotion for consumers. While the output value grew for the beauty salons, the competition has grown throat-cuttingly fierce. Some salons adopted the strategy of giving out price busting deals to appeal to consumers, but it did not increase much profit as expected. For chain salons or non-chain salons, devising new long-term strategies to increase and sustain their competitive advantages is more important than short-term promotions. These new strategies shall create unique niches that satisfy the demands of customers, and promotes a positive profile of customer relationship management.

Considering that brand development is crucial for the beauty salon and hairdressing industry in today's competitive industry environment, the application of the information technology (IT) system is a common and convenient way to retrieve access to a variety of information that will help enterprises to develop their brand image. In the past, many

enterprises have employed data storage or data mining, but they lack a comprehension of the status their own brand development. Whether these information technologies can be combined with an analysis of a brand's current status to assist the companies to polish brand development is a genuine research approach that merits more discussion and attention for academia and the businesses. Therefore, in this study, the researchers take the customer-based brand equity (CBBE model) proposed by Keller (2001) as the foundation for combining the association rules of data mining with the measurement factors of brand equity. The purpose is to build the ability of innovation (Dobni, 2011; Stevens and Dimitriadis, 2011; Brown and Hyseni, 2012; Brix and Lauridsen, 2012; Tripathi and Ranjan, 2013). The aim is to help enterprises understand the status quo of their brands based on mining their transactional data and to provide suggestions for enterprises to develop the weak sectors of their brand image. Another goal of this study is to explore the linkage between data mining and CBBE model to increase business practitioners' brand knowledge by employing consumer questionnaire.

2 Literature review

2.1 Data mining

Following Fayyad et al. (1996) and Han and Kamber (2000), data mining can be defined as the process and tool for discovering the unknown, correct, easily comprehensible and useful rules, information or knowledge from a large amount of data. Companies using data mining can determine customer needs and purchasing patterns so as to provide customised services that enhance their connection, communication and interaction with customers. Moreover, the results of data mining could be used in devising new strategies to attract new customers so as to survive in market competition.

There are six functions of data mining: classification, estimation, prediction, affinity grouping, clustering, description and profiling. The first three are directed data mining, which help users find valuable information from specific target variables when user wants to examine the relationship among a few specific variables. Affinity grouping and clustering are undirected data mining and there is no specific target for a few variables; rather, the purpose is to discover certain connection among all the variables (Berry and Linoff, 2004; Fernandez et al., 2010).
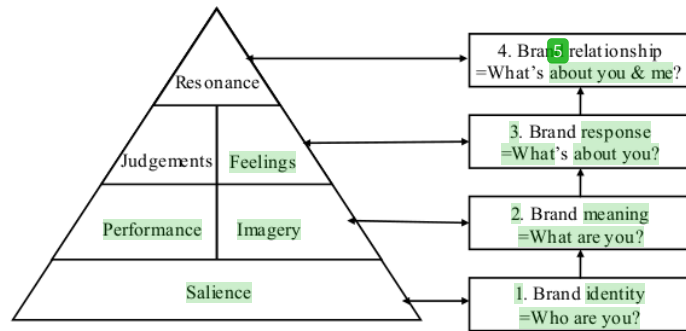
2.2 Brand equity pyramid

The customer-based brand equity, or CBBE model, suggested by Keller (2001) clearly describes four phases and steps of brand-building, including

1   brand identity

2   brand meaning

3   brand response

4   brand relationship.

Furthermore, Keller (2001) divided six items of brand-building phase from those four stages so as to compose a brand equity pyramid, expounded in Figure 1 as follows:

Figure 1   CBBE model

Source: Keller (2002), summarised by the researchers

Keller (2001) considered that brand holds two dimensions: functions and feelings. Among the six items in brand equity pyramid, those to the left belong to functional dimension, while those to the right are relevant to feelings dimension. For instance, the results of brand performance, which is relevant to product function, would influence brand judgements. On the other hand, the results of brand imagery, relevant to product feelings, have an impact on brand feelings. The collective responses of brand judgements and brand feelings would impinge on the resonant relationship between the brand and its consumers, in other words, the establishment of brand resonance.

2.3   Brand equity factors

For business owners, each brand equity assets could generate values for them; for consumers, brand equity could influence their purchase decisions. Chen and Chang (2008) research on international airlines in Taiwan showed that if consumers have positive cognitions for brand equity of certain airline, they would like to use the services of the airline again in the future and recommend it to others. Besides, Wang et al. (2012) also explore the factors contributing to the brand values of Taiwan's financial service companies and examine the value relevance of their brand equity. They found that larger banks in Taiwan should focus more on branding and the more brand equity assets the more values the bank's firm can generate. Meanwhile, the degree of consumers' recognition for brand equity of certain enterprises would impose some influences on the enterprise. Therefore, to successfully manage one's own brand equity, an enterprise must understand the source of its value so as to manage more efficiently. However, the constructive dimension of brand equity and the way to measure it are still under debates between different scholars.

In Table 1, the researchers collected scholarly literature about brand equity measurement to distinguish factors, items and definition of brand equity.

Table 1   Factors and definition of brand equity measurement

| Factors	Scholars	Definition (as the study defined)
Brand depth	Keller (1993)	It means how easy could consumers recall or discern the brand.
Brand breadth	Keller (2003)	It means whether the brand would exist in consumers' minds whenever they are shopping or consuming.
Perceived quality	Aaker (1991)	It refers to consumer's cognitive level of the whole product of certain brand, or consumer's objective satisfaction in contrast with other brands.
Brand loyalty	Kim et al. (2003)	It means even if there are better appearance, value or convenience in other products of certain brands, consumers would still continue to buy the products they originally purchased.
Brand awareness	Aaker (1991)	It is consumers' abilities to discern remember or recall the brand among certain category of products.
Brand association	Aaker (1996)	It is anything related with the brand in consumer's memories, including product salience, customers' benefits, usage, user, life-style, category of products, competitors and options, etc.
Brand image	Kim et al. (2003)	It is the association in consumer's mind, which consumers use to connect the correspondent brand name.
Familiarity	Aaker (1991)	It means the frequencies of brand contact experiences cumulated in consumer's memories.
Brand identity	Aaker (1996)	It means that consumers could easily recall the brand and put it into options when they are consuming.
Price/value	Keller (1993)	It means that common consumers would get the balance between the price and value of the product. Therefore, a brand with high brand equity generally holds high value.
Identification/ attachment	Kim et al. (2003)	It refers to the attitudes of identity or feeling consumers developed to certain brands.
Trustworthiness	Aaker (1991)	It is resulted from consumer's trust in the brand to make the brand more valuable.
Market behaviour	Aaker (1996)	It does not comes from consumer's information, but the status of market, which could be measured by market share, market price and channels.
Social image	Biel (1992)	It is a kind of added value resulted from the brand's reputation in society being connected with users.
Performance	Keller (1993)	It means that consumers think the brand having function and quality which consumers identify and are willing to buy it.

3   Research methodology

Following Yin (1994) and Huang and Co P.H. (2009), a case example is chosen since this study is intended to answer 'why' and 'how' research questions. The data of the study came from a salon named 'Chu-Hsin' which provides beauty and hair dressing services in Taiwan. The salon has already used the IT system since 1998 until date. There are two update approaches for the system: for the online version, it is updated directly on the internet website, while the single computer version is updated by downloading from the webpage of information technology system developer. Since the software which developed by IT developer is commonly used in beauty and hairdressing industry, with a market share of about 90% in Taiwan. Thus, the transaction data from system developer is highly reliable.

3.1   Research framework

After visits and received consent of Chu-Hsin, the researchers interviewed with the employees of the salon and collected 446 transactional data of 12 months, starting from August 2008 to July 2009. The 446 transactional data, or cases, were analysed by association rules. The study basically applied SPSS Clementine 11.0 to engage the analysis and fumble for association rules of beauty and hairdressing consumption.

The results of interviews with its employees as well as the association rules of beauty and hairdressing consumption were incorporated with the six items of brand equity pyramid to compose the questions of questionnaire, which was then used to investigate the opinions of consumers in the most recent six months about the relationship between the association rules of beauty and hairdressing consumption and the six items in brand equity pyramid.

Figure 2   Research framework (see online version for colours)
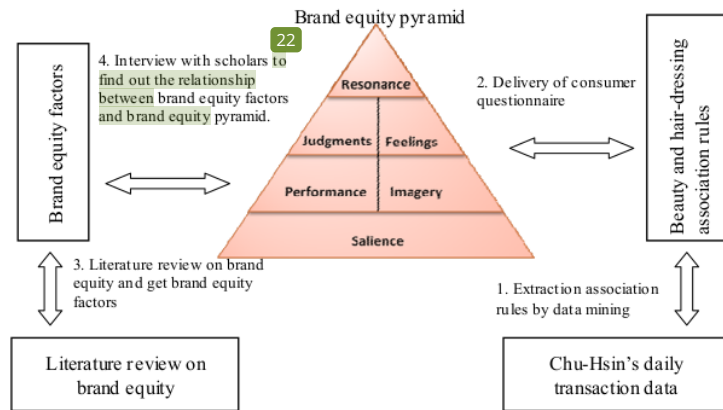
The study reviewed the past studies on brand equity and other brand relevant issues to distinguish 15 most important factors about brand equity to measure the brand values.

With reference to Keller's (2001) brand equity pyramid, these factors were used to compose expert questionnaire to interview with scholars and consultants of marketing and brand related domains. The main research framework of the study is shown in Figure 2.

3.2 Extraction methods of association rule

Based on the results of association 13 analysis, managers can see the relationship between different data. These results can help decision-makers easily analyse the data and make good decisions regarding the domains concerned (Jesus et al., 2010). Association rules are generated in two steps; the first step is to find out which frequent itemsets meet supported count limits from the complex data. As the first step must constantly scan data, there will be repeated reorganization of itemsets, support validation, and deletion to produce frequent itemsets. This means the first step is time consuming, and more so than the second step.

Before doing association rule analysis, the user must set two parameters: minimum support and minimum confidence. Because the result must meet these two constrains set by the user, the association rules are meaningful for users. After setting the minimum support and minimum confidence, the user can decide the antecedents and consequents of analysis.

We can set parameters as follows:

X   antecedent

Y   consequent

S   minimum support: in mathematics, this is expressed as $P(X \cap Y)$. It refers to the probability of simultaneous X and Y, and S from 0 to 1. This is usually expressed as a percentage, such as 10%, which might be a setting for the minimum support.

C   minimum confidence: in mathematics, this is interpreted as $P(Y \mid X)$. It refers to the probability of the case of itemset X existing, and then itemset Y existing at the same time. C is from 0 to 1, and is usually expressed as a percentage, such as 30%, which might be the minimum confidence setting.

This study uses Chu Shin's 446 transactions data from August 2008 to July 2009 to explore the association rules of beauty and hairdressing through association rule analysis. In other words, we hope to find potential rules from frequent rules. The details of association rule analysis are addressed in the next section.

3.3 Association rule analysis

During the process of deleting ineffective association rules, the first step was to determine index value, so as to eliminate those rules that did not reach the index value. If the support and reliability were set up too low, it still could get more rules. But when there were too many association rules, those nonsense and ineffective rules would instead impinge users to discern. Generally, the average minimum support would be 10%–30%, and the average minimum reliability would be 20%–60%. This study tested minimum support from 30% to 10% and minimum confidence from 60% to 30% by ranging 10%. Therefore, the total number of combinations is 12. The researchers discovered 14 rules at

the combination of 10% (the minimum support), and 30% (the minimum confidence). The amount of association rules extracted were reasonable and meaningful, including six product rules and eight service rules.

The software used in the study was SPSS Clementine 11.0, while the analytic method was Apriori algorithm. The study set up the minimum support at 10%, and the minimum reliability at 30%, while those did not reach the standard index of association rules were deleted. The data used were 169 transaction records from August 2008 to July 2009 provided by company. The association rules emerged was divided into two types of such rules for the products and services of beauty and hairdressing.

As trade secrets, the company's purchase transactional data was refrained from access. However, during face-to-face interviews, the employees told us that 90% of salon's products came from the same supplier. In terms of the definitions of minimum reliability and minimum support, even after deletion, the concentrative phenomenon of suppliers still existed. Therefore, the study would put the phenomenon of salon's purchase side into one of the association rules of beauty and hairdressing products. The rules were illustrated as follows:

> "The supply of beauty and hairdressing products was focused on few suppliers, or even the same one."

Because there were several similar descriptions of the rules of beauty and hairdressing rules existed, the study would base on the basic attributions of consumers to merge those rules with the same consumer attributions, and re-described it as in Table 2 and Table 3.

Table 2   Association rules of Chu-Hsin's beauty and hairdressing products

No.	Content
1	The supply of beauty and hairdressing products focused on few suppliers, if not the same one.
2	The transaction records indicate that among those married customers, they bought hair-care products more often than other products.
3	The transaction records indicate that female customers bought hair-care products more often than other products.
4	The transaction records show that customers of 51 years old or above bought hair-care products and shampoos more often among all products.

Table 3   Association rules of company's beauty and hairdressing services

| No.	Contents
1	Married customers emphasised more about hair-care services.
2	Transaction records show that female customers consumed hair-care services more often.
3	Customers at the age of 51 years old or above, focused consumptions on hare-care and hair-dyeing services.
4	Customers groups whose age range between 31 to 40 and between 41 to 50 both focused on consuming hair-care services.
5	The main customer groups for hair-dyeing services include three age ranges, '21–30 years old', '31–40 years old' and '51 years old and above'.

4 Questionnaire analysis

Novella et al. (2001) contends it is acceptable when the reliability value is between 0.5 and 0.7. Also (Nunnally, 1978) suggests that it is acceptable when the Cronbach α is between 0.5 and 0.6 in pilot studies or understudied topics. (Fang-Ming, 2004) believes it is acceptable when the value of reliability is between 0.5 and 0.7. In our study, the whole reliability of expert questionnaire is 0.648, while the whole reliability of consumer questionnaire comes to 0.653. Both indicate that the reliabilities of the two questionnaires are trustworthy.

4.1 Expert questionnaire

The study distributed the expert questionnaire to the experts and scholars who are the consultants and lecturers of Branding Taiwan Plan, an organisation under the Bureau of Foreign Trade. The informants, as professional consultants of leading brand companies in the industry or of marketing and brand research in academia, provided valuable feedbacks for this research. The size of required minimum effective sample was calculated in accordance with the principles of simple random sampling of the sampling theory so as to support the reliability of the study. After calculation, at least nine samples are required, and in the study the research team invited ten experts (six males and four females) to participate in this research, and our research team members interviewed them face-to-face and recorded their answers one by one from April 28 2010 to June 15 2010.

Figure 3 Correspondents of brand equity pyramid items and brand equity factors
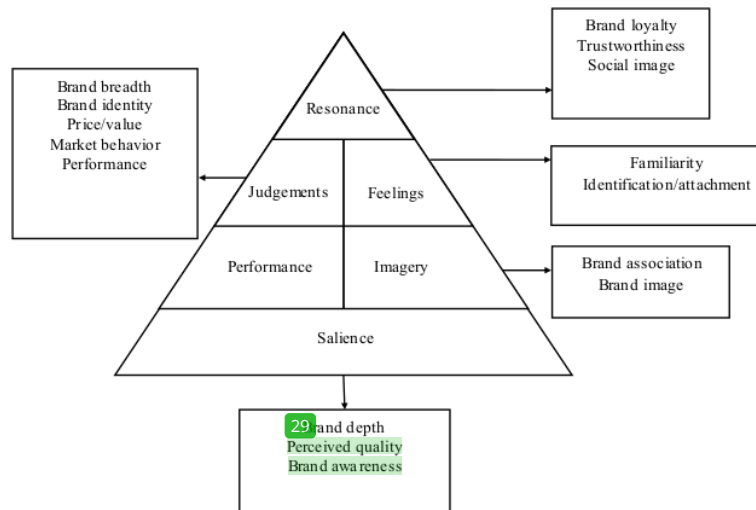
The relationship between brand equity factors and brand equity pyramid discussed above does not include brand performance. There are two explanations: first, what brand

performance emphasises is the attributes of products or services related to the brand, i.e., the products or services intended to meet the functional requests among consumers, while the brand equity factors in past studies are more abstract and difficult to measure the functional request concretely. Second, when the expert questionnaire in the study did not describe the object as a company or indicates its category, which makes it difficult for experts to recall any factors of functional level in their answers, resulting into the non-correspondent measur factor of brand equity to brand performance. In the following Figure 3, the six items of brand equity pyramid and the 15 brand equity factors are portrayed.

4.2   Consumer questionnaire

Consumer questionnaire were distributed as e-mail file attachment or as in hard copy to the consumers who visited Chu-Hsin salon over the past half-year. From May 8 to May 18, 2010, 29 effective electronic questionnaires were conducted, while other 336 consumers filled in questionnaire in paper format, coming to a total of 365 effective questionnaire recoveries. Among them, 116 questionnaires were filled by male consumers (31.7%) and 249 of them were filled by female customers (68.22%). The gender distribution of our interviewees matches the general gender distribution of customers to most beauty and hairdressing salons, according to salon workers' experiences.

The results of consumer questionnaire indicated association rules between beauty and hairdressing and brand equity pyramid. We refer the associations and highly relevant items as 'prime correspondence'. Between association rules of beauty and hairdressing and brand equity factors, direct correspondences are found. Parting addition, some other rules show sub-correspondent association with items of the brand equity pyramids, and they are referred as 'sub-correspondent', as illustrated in Figure 4 as follows.

Figure 4   Correspondence of beauty and hairdressing association rules and brand equity factors
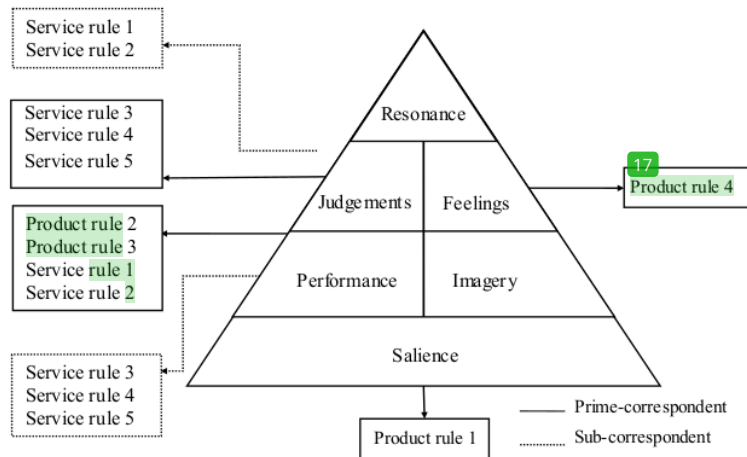
4.3 Brand status analysis of the salon

From the analysis the above section, two major parameters in the salon's status quo of brand development are known:

1 it was in the early stage of brand development

2 the salon has emphasised the brand development emphasised on a rational route, and the emotional route is left to be achieved.

Based on Figure 4, the researchers provide three strategies for brand development and brand ladder building:

1 Future establishment goal of 'brand resonance'

Keller (2001) mentioned that in building a brand ladder, sequent steps should be followed. If the first stage is not be finished, then, one cannot proceed to the next step. Therefore, the first step in brand development, known as 'brand salience', is very imperative. In the scenario of the salon's first stage of brand development, our evaluation of total correspondent volume of association rules shows that the foundation is not solid enough. From the results of our expert questionnaire, our research team suggests the salon to improve brand equity factors, including 'brand depth', 'perceived quality' and 'brand awareness'. Both brand depth and brand awareness could improve the brand recognition of consumers, while perceived quality is related to consumers' subjective perception of quality.

As to brand depth and brand awareness, at present, Chu-Hsin has coined an image of consistent quality and stability through centralisation of no more than a few suppliers of its hairdressing products. That said, as the consumptions of beauty and hairdressing takes place inside the salon, an investigation of the environment and creation of comfortable consumptive experiences could impose a positive image on Chu-Hsin's consumers in terms of promoting perceived quality. And brand identity could be promoted by marketing and propaganda tactics (such as advertisement and merchandising) to improve brand recognition by consumers.

2 It is recommended to emphasise both brand functional level (i.e., rational route) and emotional level (i.e., emotional route) of brand development.

As mentioned earlier, the left side of pyramid represents a rational route that focuses on rationality, cost management and transaction. The right side of pyramid is emotional route that focuses on consumers' feelings for a brand, like royalty and preference. Brand-building should be conducted step by step, and when moving into the third stage, the routes are divided into the functional level (rational route) on the left side of brand equity pyramid and the emotional level (emotional route) on the right side. Theoretically, a brand developer could choose either route to successfully achieve the final goal of 'brand resonance', but most of the strong brands would manage to emphasise on both rational and emotional routes.

Therefore, it is recommended that Chu-Hsin should embark on building brand imagery and brand feelings of the emotional route at present. As to the part of brand imagery, Chu- Hsin could search for certain vocabularies to connect to the brand name, such as 'stable', 'familiar', 'customary', 'assurance' and so on, so as to make customers recall Chu-Hsin whenever they think of such vocabularies. Besides, many in the major

consumer group are those at the age of 51 or above; if they could share about positive consumptive experiences, this could create shared memories between the brand and customers. Brand feelings could be achieved by combining consumers' feelings with brands in accordance with consumers' self-concept. Suppose during the stage of building brand feelings, Chu-Hsin has been able to make consumers recall Chu-Hsin from the vocabularies of familiar and assurance, then, it could further integrate all those concepts of familiarity and assurance with customers' consumptive experiences so as to deepen consumers perceptions. After a customer visit the salon for a few times, the staff should be able to greet the customer by his or her name and understand the preference of products in the service process.

3   Reinforcing and developing 'brand salience' for Chu-Hsin

When examining the brand development of Chu-Hsin, it is found that its rational route has reached the third stage and close to the final step of 'brand resonance'. However, in terms of the establishment of relationship between brand and consumers, there is space for improvement for building psychological connection, behavioural loyalty and community identity. In order to achieve the brand resonance, both influences of rational and emotional routes should be reinforced. Keller (2001) and Lassar et al. (1995) also mentioned that in order to attain one's brand resonance, besides building consumer's brand loyalty, building consumers' psychological attachment, reputation of the brand and a community identity are also crucial. In beauty and hairdressing industry, the interaction and association mostly focused on practical service process, and the first line staffs are hair-dressers and beauticians. Therefore, Chu-Hsin could emphasise the educational training for the staff. Besides service quality, good interactions between the staff and consumers should also be emphasised so as to give consumers positive consumptive experiences.

    This study is aimed to narrow down research gap in organisational learning process based on integrated data mining and the CBBE model in brand management. To facilitate business practitioners' with fast and up to dated learning mechanism, association rule of data mining is combined with expert questionnaires. To demonstrate the procedures in practice, an illustrative example from salon and hair dressing industry is presented. By utilising the proposed model based on case example, benefits for theoretical and managerial purposes are described in the followings. First, our study attempted to fill the knowledge gap by providing steps in integrating data mining and the CBBE as means to organisational learning to improving brand management with case example from salon and hair dressing industry. Using the proposed model, investigation on the product/service brand status can be determined in quickly and non trivial way, thus fast and more reliable business decisions can be made in advances. Second, the framework and procedures present an exemplary for practitioners on how to use data mining tool and CBBE model to guide practitioners in improving learning mechanism through their high voluminous transactional data.

    Besides having beneficial implications to the theoretical and managerial purposes, the present study is also having limitations. Before everything else, since based on single case example, validity of the brand development tactics based on our exemplar is low, thus warrant for replications using various industrial settings. Next, despite enable to handle voluminous data, the use of data mining as means of intelligent learning tool is probably limited by the availability of the infrastructure and the expertise needed that very often is not available especially in small companies.

5 Conclusions

In the beauty and hairdressing market where the present competition is intense, brands can help enterprises to succeed. It is necessary to understand the market environment to determine how to build a relationship between consumers and the brand in addition to satisfy consumers' demands for products. A successful company also needs to convey the brand message by way of various marketing activities with time. Keller (2001) considered that no shortcut should be taken to brand building, since a great brand is not born by accident. Instead, it requires a number of steps to connect the brand to consumers. This study combines brand tools and data mining tools to help enterprise investigate their brand image, understand the status quo of their brand development and plan the next stage of brand development using the rules generated from consumer behaviour in accordance with tools of brand development. The purpose was to provide enterprises a recommendation for brand development strategies and directions.

There are two suggestions for future studies: first, future researchers could expand the internal business questionnaire for internal staff to find the views of employee with regard to the development of brand status. A comparison of the results of internal business questionnaire with the results of the consumer questionnaire could help the owner understand the differences between their own perceptions and the consumer's conceptions.

Second, the results and methodology of the study could be compared with studies of brand ladder for other companies of different scope or those in other industry category: This study's consumer questionnaire is based on Chu-Hsin's daily transaction data and the results of the association rule analysis. However, the transaction data is not limited to the beauty and hairdressing industry. One could also choose a different industry to study the differences in brand strategies and the problems at each stage of brand development.

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