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Branding of Traditional Chinese Medicine (TCM) through E-partnership in USA and Denmark

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Abstract

People are caring more about mental and physical health when they must confront a treatment. Since research and development for Traditional Chinese Medicine (TCM) and western medicine is based on completely different metrics, this research aims to find a better path for TCM regarding how the proposed set of branding strategies play roles in the international branding ecosystem in the digital era. For international branding in TCM to enhance the brand performance (*price*) in the era of digitalization, this research looks at ways to strategize *prospect, prescription, partnership, patent, place, product, professionalism, people* and *philosophy* (indicated as10P) for traditional Chinese medicine. This research first examines the brand performance of 404 TCM products available at Amazon in USA and 260 TCM products available at Amazon in Denmark. In order to test the relationships between performance and product, professionalism as well as people through e-partnership, this research further investigate 439 products data collected from the website of Best Chinese Medicine in USA and 1265 products from the website of Ebay in Denmark to evaluate the effective path of the strategy of E-partnership for TMC product . The significance of regression on the relationship between brand performance (price) and product sort types and product review (people) are proved at the significant level in USA. Dissimilarly, the positive ratio (professionalism) plays a significant role in brand performance in Denmark in stead of the product related dimensions such as storage, sales or comments no. (people).

Keywords: digital, herbs, patent, people, prescription

1. Introduction

For international branding in TCM to enhance the brand performance (*price*) in the era of digitalization, this research looks at ways to strategize *prospect, prescription, partnership, patent, place, product, professionalism, people* and *philosophy* (indicated as10P) of traditional Chinese medicine.

Regionally, 47% of North Americas and 6% of Europeans were treated with traditional medicine before 2014 (Mikulic,2014).It is expected that the United States might overtake Hong Kong and Japan to become China mainland's largest TCM export market(Sohu,2016).In addition, in the Chinese patent medicine and health care products market, domestic TCM also occupies a considerable share. In countries such as Russia, Vietnam and Australia, TCM is sold as medicine while in many other countries and regions, TCM is approved as health products, or dietary supplements for sale (Lin et al., 2018).

With the continuous development of modern science and technology, the quality identification, extraction and separation, analytical detection and other technologies of Traditional Chinese Medicine (TCM) are becoming more and more mature, and the mechanism of action and the role of active ingredients are becoming clearer (Lin et al., 2018).

2. Strategies of 10Ps

Prospect. The strategy of prospect is the process of diagnose and pinpointing the necessary prerequisites of 1) a reasonably articular theory, 2) scientific evidence of effectiveness and security, and 3) steps for quality control (Greten, 2008).TCM focuses on the physical signs and symptoms of the patient, which indicate the condition of the inner system(Andrei,1998). The pinpointing process of Chinese medicine is founded on four processes: observation, sniffing or hearing, interrogation, and touch (Luo et al., 2015).The highest accuracy and smallest up to index were achieved using the four tests, while those with explanations and descriptions of symptoms had higher diagnostic accuracy than those without (Ferreir, 2009).

Prescription. Herbs have a variety of properties and the properties are related to the physicochemical properties of the main components that make up the herb will be related to human reactions(Wang et al.,2005).However, it is difficult to determine the variation of components through human response, i.e., it is difficult to reflect the compatibility of herbal medicines. Only through the exhaustive study of multiple methods, indicators and components can we better understand herbal medicine and the components therein(Zhou et al.,2017).With contemporary technological advances and the increasing integration of TCM

with modern medicine, it has become feasible to determine the pathology and mechanisms of action of many herbal medicines (Zhang, 2011).

Product. Because of its ancient Chinese origins, extensive literature and comprehensive clinical applications covering thousands of years of history, there are many evidences that TCM can safely treat specific diseases, whose purpose and core issue is to improve the body's ability to heal itself (He, 2019). However, there is a lack of uniform cultivation, production and quality standards to monitor and manipulate the TCM industry (Lqbal, 2014). In order to achieve international branding, the TCM industry requires regulatory management, which helps to align with international production systems and improve Good Manufacturing Practice (GMP) management (Cong, 2019).

Patent. It is quite important to improve the international branding of TCM because it is an intangible asset that can increase the value of the company and is reflected in the knowledge base of the company(Hall, 2005).In order to promote international branding, an innovative CPM patent system based on TCM theoies and covering all TCM fields including Chinese acupuncture should be constructed (Bai and Liu, 2003). Fortunately, as more new technologies are introduced into CPM (Zhang et al, 2013), the ability to develop innovative patents and to modernize TCM has been improved, combining with the product aspect. In this case, TCM can embrace appropriate modern elements and differentiate itself from fully traditional products through patent innovation, which facilitates TCM to attract new potential customers.

Price. The comparably low cost gives TCM products an advantage in price competition (Tang, 2018).While branding TCM helps with the value of a company and product, patent value would be added to the price of final sale. To establish the international branding pricing system of TCM, firms should control the cost of TCM raw materials production, configuration, and processing while comprehending the purchasing regulation of consumers and segregating them to differentiated categories respectively such as people with distinct purchasing power (Harith et al.,2015).

Place. Place branding for TCM refers to the selection and interpretation of the value of a location, such as reputation management (Boisen, 2018), which not only highlight the ecological quality of the places where TCM are planted but also the philosophy of TCM practice and prescription are from as a heritage. A framework is presented on four key sociological factors that use social media to exert influence over others, specifically mobilities, performance, performativity and storytelling, which in turn influences the online users (Lund,2017). Ultimately, these techniques can make the TCM brand more complete and effective because of the added social interaction, sensibility, and discourse(Morgan, 2004).

Partnership. Due to the lack of international experience and local availability of relevant information(Samiee,2019), imitating the strategies of other medicine enterprises can reduce unnecessary expenses and increase effectiveness (Eric,1993). Over time, Chinese medicine

enterprises gradually gain information and initiative abroad, which is difficult for other medicine enterprises to imitate, thus giving them a continuous advantage (Grant,1996).Combined with digital developments, this can be done to help gather customer-related data (i.e.,their tastes, shopping behavior, product preferences, etc.)(Javalgi et al., 2005), and also allow foreign customers to tailor personalized services and products(Sheth and Sharma, 2005), which is meaningful for marketing. It is also important to know information related to the industry and other medicine enterprises, using digital marketing strategies to identify potential customers and consolidate existing ones, finding partner companies, and adopting a pre-emptive policy against rivals(Yip et al., 2005).

Professionalism. To understand the professionalism of the whole TCM industry, the standardization of the industry (Xie et al.,2015) and data all contribute to the improvement of the industry (Padberg, 2015) . Chinese herbal medicine has been used for thousands of years to treat diseases (Xu and Yang, 2009).The standardization process of Chinese herbal medicines requires their properties, stable values, defined characteristic values and quantitative values to ensure their quality, efficacy, safety and reproducibility, which facilitates quality control of herbal medicines(Garg,2012). The professionalism of the TCM industry can be reflected to develop TCM enterprises and fulfil their social responsibility can promote the corporate competitiveness (Wang and Zhang, 2019).

People. The product procedures of TCM brands require experts to adapt to both TCM theory and intellectual property protection regulations for management and research. Consumers' behaviors can be influenced by reference groups and people are able to gain knowledge of certain brand by increasing their brand understanding and awareness of the brand image (Lqbal, 2014).The level of brand knowledge that people achieve has a positive impact on their reaction to the brand. Consumer awareness can also be changed to some extent through advertising (Alhaddad, 2015). Customers' reactions to brands are defined based on customers' perceptions, preferences and behavior of mixed activities (Moghadam,2012).

Philosophy. TCM aims at treating the un-diseased, which means treating the disease before it occurs and preventing changes after the disease, in order to enhance the person's self-healing power and to maintain or improve the body health (Wang et al., 2020). TCM considers the human body as a whole with body, mind and spirit integrated into nature, which constitutes the holistic theory of TCM (He,2019).Therefore, when branding TCM worldwide, it is also important to popularize the concept of TCM theory so that people's self-healing become an outcome of an ecosystem of TCM.

3. Research Methodology

The quantitative approach for this research includes the assumption whether the independent variables, such as storage, rating, positive ratio, product type, sales number, comments number and so on, are related to the dependent variable, price. This research will analysis the relationship between independent and dependent variables which are linear or not. The optimal linear regression to minimize the error terms through minor calculation of independent variables combination as below (see Figure 1). The reason to analyze the relationship between price and independent variables is to get insights which factors are significantly driving the price and TCM business.

Figure 1: Linear Regression Mathematical Expression

$$y_i = \beta_0 + \beta_1 x_{i1} + \cdots + \beta_p x_{ip} + \varepsilon_i = \mathbf{x}_i^{\mathsf{T}} \boldsymbol{\beta} + \varepsilon_i, \qquad i = 1, \ldots, n,$$

$$\mathbf{y} = \begin{pmatrix} y_1 \\ y_2 \\ \vdots \\ y_n \end{pmatrix} \quad \boldsymbol{X} = \begin{pmatrix} \mathbf{x}_1^{\mathsf{T}} \\ \mathbf{x}_2^{\mathsf{T}} \\ \vdots \\ \mathbf{x}_n^{\mathsf{T}} \end{pmatrix} = \begin{pmatrix} 1 & x_{11} & \cdots & x_{1p} \\ 1 & x_{21} & \cdots & x_{2p} \\ \vdots & \vdots & \ddots & \vdots \\ 1 & x_{n1} & \cdots & x_{np} \end{pmatrix},$$

$$\boldsymbol{\beta} = \begin{pmatrix} \beta_0 \\ \beta_1 \\ \beta_2 \\ \vdots \\ \beta_p \end{pmatrix}, \quad \boldsymbol{\varepsilon} = \begin{pmatrix} \varepsilon_1 \\ \varepsilon_2 \\ \vdots \\ \varepsilon_n \end{pmatrix},$$

3.1 Variables

Price: price of the product, which is used to analyze the brand Performance;

Product Sort type: three types of product sorting available online such as best review or price from lowest to highest through E-partnership. It is used to demonstrate how specifically e-partnership arrange the Product for customers' preferences since different consumers use different methods to search products. Type1: Best Review; Type 2: highest price to lowest; Type3: means lowest price to highest.

Review/comment No.: the website shows the number of people who have rated the product after purchase, which is used to analyze the dimension of People;

Rating: rating of each customer for the purchased medicine, full score is 5 points, which is used to analyze the dimension of Product;

Sales: the number of products sold shown on the website, which is used to analyze the brand Performance;

Storage: the inventory of the product displayed on the website. It is generally used to facilitate buyers to determine the quantity to purchase, which is used here to analyze the dimension of Product;

Positive ratio: customers rate all products and services in the store, which is used to analyze the dimension of Professionalism;

3.2 Data Collection & Processing

Stage 1: Investigating worldwide famous e-partnership platform Amazon

This research first collects data of 404 TCM products available at Amazon in USA and 260 TCM products available at Amazon in Denmark through a python technology named Bazhuayu for regression analysis on brand performance (price or ranking) and dimensions of review no., rating scores, product amazon price.

Stage 2: Investigating other e-partnership platforms for TCM

This research further collects data of 439 products from the website of Best Chinese Medicine in USA to evaluate the effective path of the strategy of E-partnership for TMC product. The data covers the dimensions of price, product sort types, review no., and rating scores. This research also collects data of 1265 products from the website of Ebay in Denmark to evaluate the effective path of the strategy of E-partnership for TMC product. The data covers the dimensions of sales, storage, reviews no., positive ratio, and price. Price is the dependent variable. sales, storage, reviews, positive ratio are all independent variables.

The assumption of this model is whether the response variable and the independent variables are linear relationship. And the main idea of optimal linear regression is to minimize the error terms. The error terms can be calculated by response variables minor calculation of in dependent variables combination.

4. Research Results

After collecting the datasets from E-partnership platform, there are several steps that need to be done before applying these to the linear regression model, such as omitting the outliers, supplementing blank cells with mean of that columns .When the clean and useful dataset has already been prepared, the R language are used for data analysis.

4.1 TCM Products from Amazon

This research first examines the brand performance of 404 TCM products available at Amazon in USA and 175 TCM products available at Amazon in Denmark (see figure 2-1). Based on the calculation of correlation of each variable, the variables are not correlated with each other, which will not influence the model building (see figure 2-2). After using some functions, there are some outliers that need to be deleted (see figure 2-3). In the end, using prepared dataset into linear regression model is efficient to build accurate model. However, the regression analysis shows no relationship between brand performance (either price or unit price) and other dimensions (see figure 2-4 and figure 2-5).

4.2 TCM Products from Best Chinese Medicines (USA)

After collecting the data from Best Chinese Medicines, variables such as product type, rating and review number are considered as the independent variables. Below (Figure 3) is the dataset. The next step will be considering the correlation of each variables, which prevent the highly correlated variables influencing the final linear regression. From the Figure 4, the result shows that the variables are not quite related, which is useful to apply them to the linear regression model.

When using the r standard function, there are some outliers in this dataset (Figure 5). After deleting these data, the new dataset can be used to build the linear regression model.

Figure 2-2: Relationship between Each Variable (Amazon)

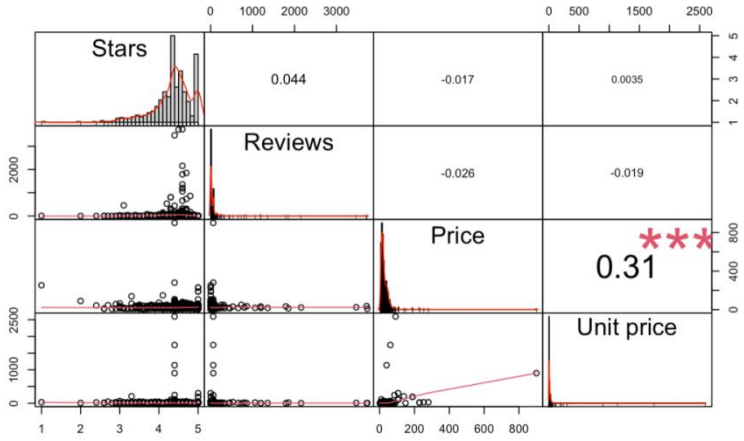


Figure 2-3: Graph Identifying the Outliers (Amazon)

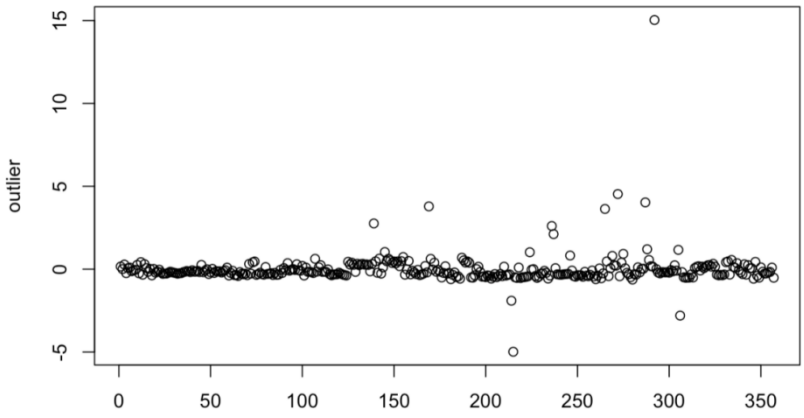


Figure 2-4: Amazon TCM Analysis Result I

	Estimate	**Std. Error**	**T- value**	**Pr(>|t|)**
Intercept	0.17480	0.08474	2.063	**0.0399***
Review	-0.04019	0.06012	-0.668	0.5043
country	-0.19729	0.12006	-1.643	0.1012

Figure 2-5: Amazon TCM Analysis Result II

	Estimate	Std. Error	T- value	Pr(>|t|)
Intercept	0.153519	0.096101	1.597	0.111
Stars	0.009004	0.059948	0.150	0.881
Review	-0.037138	0.068123	-0.545	0.586
country	-0.208192	0.135989	-0.1531	0.127

Figure 3: Dataset of Best Chinese Medicines (USA)

Price	Product type	Review	Rating
2.48	3	11.15926	4.79
3	1	8	4.88
3.49	3	1	5
3.5	1	4	4.75

Figure 4: Relationship between Each Variable (USA)

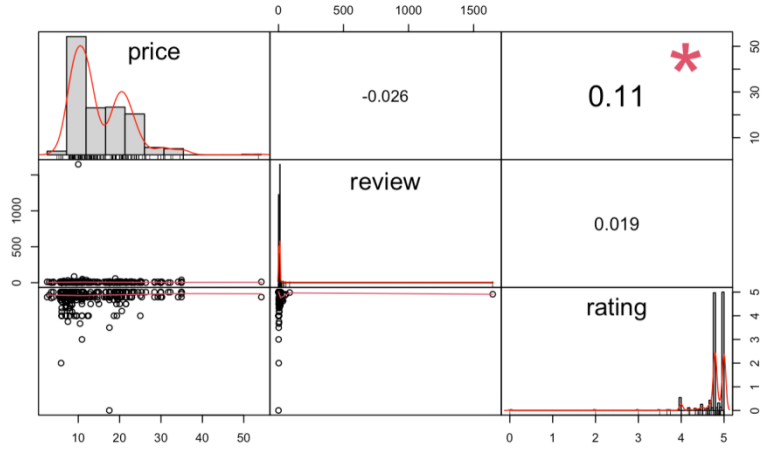
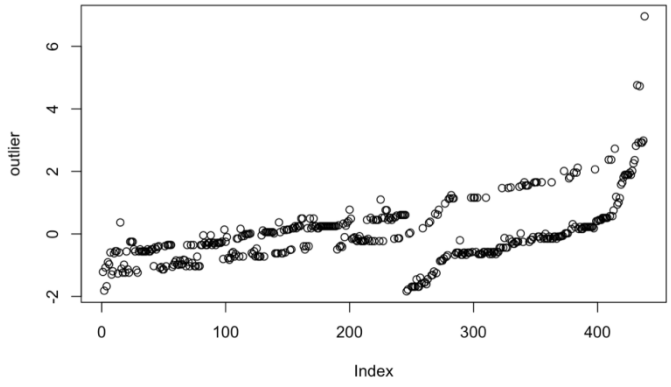


Figure 5: Graph Identifying the Outliers (USA)



From the summary of linear regression, the scale function needs to be used to minimize the error terms by standardizing the data. The summary shows that product sort type and rating independent variables are significant which means that they are important to influence the price since online customers' TCM shopping habits are to sort products by price and pay attention on product prices more than by best reviews. Regarding the product sorting types, both significantly affects the brand performance (price). Moreover, rating also plays a role. When the rating of the product is high, the price level will increase, which is positive relationship. However, product type 3 category sorting from lowest price to highest will negatively influenced the price (see Figure 6).

4.3 TCM Products from Ebay (Demark)

For this part, variables such as sales number, storage number comment number, positive ratio and price are covered (Figure 7). In order to get the insights from this dataset, there are several steps that need to be done before applying these to the linear regression model, such as omitting the outliers, supplementing blank cells with mean of that columns. When the clean and useful dataset has already been prepared, the R language are used to do data analysis. From the Figure 8, it is easy to see these variables not very corelated, perfect to be applied into linear regression model. There are also some outliers that need to be deleted (Figure 9).

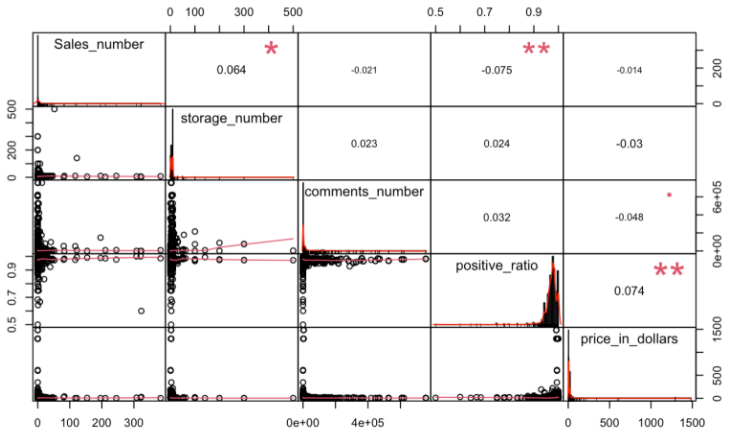
Figure 6: TCM Brand Performance Linear Regression Model (USA)

	Estimate	**Std. Error**	**T- value**	**Pr(>|t|)**
Intercept	-0.29843	0.05534	-0.5393	**1.15e-07*** **
Product type 2	-1.32400	0.07682	17.234	**<2e-16*** **
Product type 3	-0.44403	0.07705	-5.763	**1.58e-08*** **
review	-0.01426	0.03112	-0.458	0.6470
Rating	0.07975	0.03121	2.556	**0.0109***

Figure 7: Dataset Overview (Demark)

Sales number	**Storage number**	**Comments number**	**Positive ratio**	**Price(dollars)**
43	10	2564	0.974	4.4896
2	8	1347	0.986	2.2080
2	7	1351	1.000	15.9900
2	10	4039	0.5959	4.9532

Figure 8: Correlation with Each Variable (Demark)



TCM products variables collected from Ebay Denmark include price (dollars), storage number (product), sales number (performance), comments no. (people) and positive ratio (professionalism). Three scenarios show the summary results that sales number is not significant for affecting brand performance. But the positive ratio and comments number remain very important, which will influence the price (brand performance). The positive ratio is positively related to the price and the comments number is negatively related to the price (see figure 10).

As a summary, this research first examines the brand performance of 404 TCM products available at Amazon in USA and 260 TCM products available at Amazon in Denmark. However, the regression analysis only shows the relationship between brand performance (ranking) and people (review no.) is at the significant level of 0.1% . Meanwhile, TCM products at Amazon both in USA and Denmark are in a limited variety. In order to test the relationships between performace and product, professionalism as well as people through e-partnership, this research further investigate 439 products data collected from the website of Best Chinese Medicine in USA and 1265 products from the website of Ebay in Denmark to evaluate the effective path of the strategy of E-partnership for TMC product . The significance of regression on the relationship between brand performance (price) and product sort types and product review (people) are proved at the significant level in USA.

Dissimilarly, the positive ratio (professionalism) plays a significant role in brand performance in Denmark in stead of the product related dimensions such as storage, sales or comments no. (people) .

Figure 9: Outlier Checking (Demark)

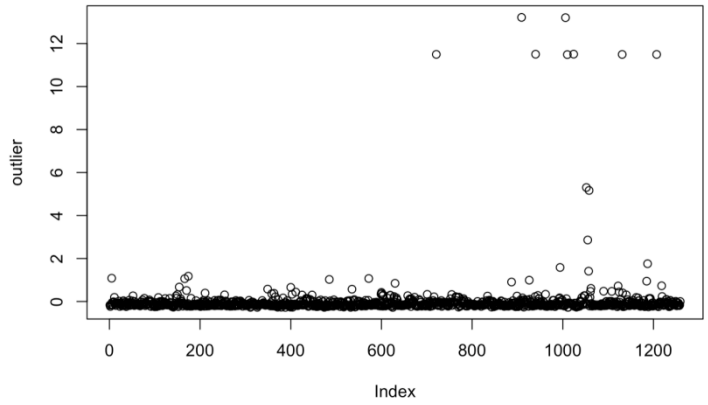


Figure 10-1: TCM Brand Performance Linear Regression Model (Demark)

	Estimate	**Std. Error**	**T- value**	**Pr(>|t|)**
Intercept	-0.0028001	0.0281593	-0.099	0.920808
Storage number	-0.0558054	0.0281731	-1.981	**0.047834***
Sales number	0.0003004	0.0282403	0.011	0.991514
Comments number	-0.1071263	0.0281290	-3.808	**0.000147*****
Positive ratio	0.0827379	0.0282771	2.926	**0.003497****

5. Discussion and Conclusion

The proven effectiveness of Chinese medicine in a variety of diseases and its mild therapeutic effect give it a strong advantage in reducing side effects. The multi-targeting and good safety of Chinese medicine makes it an effective and safe drug for the prevention and treatment of complex diseases (including cardiovascular diseases) (Leung & Xu, 2020). Natural products from Chinese herbs have the potential to modulate certain essential signals in cancer cells (Huang et al., 2018). Many anti-cancer natural products were isolated and identified from Chinese herbal medicine (Tan et al., 2011), including many natural compounds, such as alkaloids(Lu et al., 2012) , saponins (Xuet al., 2016), etc., have been proved to deliver potential anti-cancer effects. Meanwhile, Chinese herbal medicine has good

clinical efficacy and safety in the treatment of adenoid hypertrophy in children (Sun et al., 2019). Compared with western medicine treatment, TCM treatment can significantly improve the clinical efficacy and quality of life. For example, it significantly improved snoring and oral breathing with a stuffy nose(Sun, et al. 2019).

Some scientists claim that the quantity and subcategory of diagnostics for TCM are subjective and not repeatable (Roman, 2008). Chinese medicine is considered less reliable based on a holistic method compared to the reductionistic method (Zhang et al., 2013). Moreover, many global communities cannot accept Chinese medicine theory (Zhong, 2014) not only because people claimed that western medicine is more convenient than Chinese one (Zollman, 1999), but also because the doctor needs more time to quantify the quality of the medicine in order to help patients recover properly (Kraut, 1990). The traditional Chinese medicines taste bitter, which is not acceptable for a lot of patients (Brewer, 2000). The global communities have not yet received enough data, thus, there is a long journey for TCM to achieve the international standard (Martins et al., 2014).

Some biomedical scientists illustrate that WHO approves some TCM sales in countries but neglects the toxicity of some herbal medicine that scientists have not approved to be acceptable for people (CNN, 2019). While every country has specific regulations for TCM, many countries need a long time to perform a strict assessment in order to protect their consumers (Zhong, 2014). Chinese medicine is a large and complex system which is totally different from western medicine. Chinese medicine is experience-based practice and it does not have a regulation to check the quality (Li et al., 2004). The cultivation, harvesting and processing are affected by many factors, such as weather, temperature and so on (Lianget al., 2004). Many TCM enterprises use outdated technology to produce medicine, which cause a huge gap between TCM practices and global advanced technology (Singhuber et al., 2009). Meanwhile, there is a lack of studies on material basis, active ingredients, and mechanism of action and no scientific and reasonable quality control indicators and methods (Wang et al., 2005). Some components of TCM are not from herbal medicine itself because they are transformed by the technology of extraction and concentration, which cause a lot of problems to identify the component of TCM (Wang et al., 2012).

Therefore, TCM try to build brands and strengthen consumers' sense of identity belonging to their products (Zhang et al., 2013). Managers can also improve service performance by tracking the level of service quality. For international branding in TCM to enhance the brand performance (*price)* in the era of digitalization, this research encourages TCM industry to strategize *prospect, prescription, partnership, patent, place, product, professionalism, people and philosophy* (indicated as10P) for Traditional Chinese medicine.

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