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Problems and constraints of the local herbs and medicinal plants (HMP) processing industry

(Masalah dan halangan industri pemprosesan herba dan tanaman ubatan tempatan)

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Key words: herbs, processing industry, growth and development, factor analysis

Abstract

A study on market structure, demand and potential of the herbal and medicinal plants (HMP) processing industry was conducted throughout Peninsular Malaysia. Respondents were interviewed using structured questionnaires. One of the objectives of this study was to identify problems and constraints faced by local HMP processors. A multivariate factor analysis using the principal component method in estimating the correlation matrix, communalities, eigenvalues, factor coefficients or loading, and residuals was used on the HMP processing plants. A varimax rotation algorithm was performed to induce an orthogonal factor dimension. The results of the analysis showed that capital/finance, workers, technology, raw materials and marketing were the five significant underlying factors hampering the growth and development of the local HMP processing industry. It is important that efforts are taken to facilitate local HMP processors in overcoming these problems and constraints in order to ensure that the growth and expansion of the industry can be accelerated.

Introduction

Herbal and medicinal plant-based (HMP) products have been widely accepted by the majority of the world population as alternatives to conventional medicines. World Health Organization (WHO) estimated that about 80% of the world population depend on traditional medicines for their healthcare (Anon. 1993). In developing countries such as China, India, Sri Lanka and others in Asia as well as Africa, traditional medicines are officially recognised in their healthcare system (De Silva 1997). In developed countries such as the United States, Canada, the EU and Japan, studies showed that the majority (more than 50%) of their populations have intentions to use traditional medicines (Emerich 1996; Larsen 1996).

World trade and the consumption of HMP-based products in 1996 was estimated at US$294 billion, with health foods and drinks being the main product category, representing 85% of the total market value. Product categories such as herbal remedies, phytomedicines and biopesticides represented only 3–5% of the world consumption of HMP-based products. Annual increase in demand for health foods and drinks is expected to be at the rate of 15%, and 10% respectively for herbal remedies, phytomedicines and biopesticides. In Malaysia, the demand for herbs and herbal-based products showed an increasing trend. Industry experts have estimated that the current market value of HMP products in Malaysia is about RM4.5 billion and is expected to increase at the rate of about 20% per annum. The ever-increasing growth in medicinal herb production and consumption worldwide suggests encouraging prospects for this industry with good potential for investment.

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The increasing demand in both domestic and world markets is reflected by the trade data which showed that Malaysia's imports of HMP increased from RM140.7 million in 1986 to RM653.0 million in 2001 (Anon. 2003). This amounts to an increase of more than four times within the time period, thus registering an average growth rate of 10.2%. Realising the vast potential of the HMP industry, the processing sub-sector had shown a significant number of new entrants. In 1995, a total of 62 new manufacturing licenses were processed by the National Pharmaceutical Control Bureau (NPCB). This rose to 237 in 1999, a three-fold increased over a five-year period. The number of processing premises of HMP also increased to 264 in 1999 as compared to 103 in 1995, an increase of 156% for the 1995–99 period (Anon. 2001). Despite clear indication of strong domestic market demand for HMP products, the local HMP processing industry is relatively undeveloped. Many HMP firms are small and operating below their production capacity. Muhamad Setefarzi et al. (2001), in their study on the HMP processing industry, found that 55% of the firms operated less than 70% of their full production capacity, an indication that the local HMP processing firms were facing constraints in their business achievements. This study was therefore primarily aimed at identifying factors that affect the growth and development of the local HMP processing industry, and to consequently suggest recommendations in overcoming these constraints.

Methodology

A cross-sectional survey on 163 local HMP processors throughout Peninsular Malaysia was conducted by personal interviews using structured questionnaires. A set of 20 items measuring the processors' perceptions of problems were developed (*Table 1*). Respondents were requested to express their degree of attitudes or opinions on these items listed through a four-point scale: 4 = strongly agreed, 3 = agreed, 2 = disagreed and 1 = strongly disagreed. As suggested by Ahmad Mahdzan (1992), the responses of 'uncertain' or 'not sure' were not included in the questionnaire. This four-point scale was used to estimate the degree or values of the respondents' perceptions. The collected data were analysed using Factor Analysis to identify the underlying factors facing the HMP.

The factor analysis is both exploratory and confirmatory. This technique has been discussed at length in many statistical books (Harman 1970; Mardia et al. 1979; Seber 1984; Haris 1985; Johnson and Wichern 1988; Tabachnick and Fidell 1989). Relationships among sets of many interrelated variables are examined and represented in terms of few underlying factors. The purpose of utilising the factor analysis is to explain or create a model of internal dependencies among a set of variables, by constructing a set of latent variables called common factors which are presumed to manifest themselves through the observed measurements. Mathematically, the factor analysis is expressed as a linear

Table 1. The list of problems faced by local HMP processors

Code	Variable	Code	Variable
X1	Low quality of local raw materials	X11	Lack of working capital
X2	High prices of local raw materials	X12	Difficulty in getting loans/credits
X3	Dependence on imported raw materials	X13	High capital cost/interest rate
X4	High rate of product deterioration	X14	Difficulty in getting skilled workers
X5	Frequent machine breakdown	X15	Difficulty in getting unskilled workers
X6	Stiff competition	X16	High rate of employee turnover
X7	Difficulty in getting distributors	X17	Demand of increased pay by workers
X8	Lack of domestic market information	X18	Lack of training facilities
X9	Lack of foreign market information	X19	High import tax/tariffs
X10	High cost of production	X20	High marketing costs

combination of underlying factors. The number of variance a variable shares with all other variables included in the analysis is referred to as the communality. The covariation among the variables is described in terms of a small number of common factors, plus a unique factor for each variable. These factors are not overtly observed. The factor model can be represented as:

$$X_i = a_{i1}F_1 + a_{i2}F_2 + a_{i3}F_3 + \ldots\ldots + a_{im}F_m + e_j$$

Where,

X_i = jth standardise variable
a_{ij} = standardise multiple regression coefficient of variable *i* on a common factor *j*
F = common factor
e_j = unique residual factors
m = number of common factors

The unique residual factors are uncorrelated with each other and with the common factor.

The common factors themselves can be expressed as linear combinations of the observed variables.

$$F_i = w_{i1}X_1 + w_{i2}X_2 + w_{i3}X_3 + \ldots\ldots + e_{ik}X_k$$

Where,

F_i = estimate of ith factor
w_i = weight or factor score coefficient
k = number of variables

The first factor explains the largest portion of the total variance, and then a second set of weights can be selected, so that the second factor accounts for most of the residual variance, subject to being uncorrelated with the first factor. This same principle is applied to select additional weights for the additional factors. Unlike the values of the original variables, factor scores are not correlated. The first factor accounts for the highest variance in the data, the second factor the second highest, and so on.

Statistical analysis on data

The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was utilised in order to determine the appropriateness of the analysis. This index compares the magnitude of the observed correlation coefficients to the magnitude of the partial correlation coefficients. A high value of KMO (between 0.5 and 1.0) indicates that the factor analysis is appropriate. A correlation matrix is used to show the simple correlation, *r*, between all possible pairs of variables included in the analysis. In practice, the Kaiser criterion i.e. the eigenvalue greater than unity is used to extract the factor. Only factors with eigenvalues greater than 1.0 were retained, while factors with less than 1.0 were not included in the model. Malhotra (1993) and Aaker et al. (2003) recommended that the factors extracted should account for at least 60% and 70% of the variance respectively. Furthermore, the model fit is determined through residuals or the differences between the observed correlations (as given in the input correlation matrix) and the reproduced correlations (as estimated from the factor matrix). Small residuals indicate an acceptable model fit.

Results and discussion

Results of the survey showed that the majority (76%) of the entrepreneurs were involved in local HMP processing activities for more than five years while some of them (29%) exceeded 20 years. This showed that the local HMP processing industry have been in existence in this country for quite sometime. Only 24% (38) of the respondents can be considered as new players, with their involvement of less than five years. The results of the study also revealed that 70% (114) of the respondents were full time HMP processors, while the remaining 30% were part-timers. The latter had other activities as their main source of income, and most of them operated HMP processing as a backyard industry.

Most of the firms (75%) have 10 and less workers, 18% between 11–50 and the remaining 7% employed more than 50 workers. The value of the annual sales of the firms ranged between RM960 and RM27 million, with an average of RM1.024 million. However, the values of the annual sales for most of the firms (65%) were less than RM250,000. Based on the value of annual sales and the number of employees, the majority (98%) of local firms involved in HMP processing industry are under the small-scale category with annual sales of less than RM10 million and the number of employees of less than 50. Only 2% can be considered as medium scale firms (number of employees are between 50 and 150 and with annual sales of RM10–RM25 million), and none of them can be classified as a big scale firm.

Fifty-five and 45% of the local HMP processing firms operated at less and more than 70% of their full production capacities respectively. Among the factors affecting the level of production of the firms were low product demand, lack of skilled workers and insufficient supply of raw materials. Other factors such as lack of working capital, newness in business, lack of machines/tools and under utilised plants also influenced the level of production.

The products from the local HMP processing firms can be classified into three main categories, namely medicines for internal and external use, health foods/drinks and cosmetics. About 900 types of the products in these categories were produced by the 163 entrepreneurs. Most of them claimed that their products could be used for either one specific disease or illness or for multi-purpose. Most of these products are traditionally prepared. These simple processings include such as hot or cold water extraction, crushing, powdering of dried materials, formulation of powder into paste through blending with water, oil or honey, as well as fermentation. The products from most of these small-scale firms are mostly marketed to consumers in the surrounding areas or to other processors as intermediate goods. However, for the medium scale firms which produce more complex products, their markets include other regions or states in Peninsular Malaysia. This involved about 26% of the firms surveyed. Only 4% of the firms are involved in the export market.

Results of the factor analysis

The overall KMO was found to be 0.6161 (>0.5), indicating that the use of the factor analysis was an appropriate technique for analysing the correlation matrix of the 20 problems faced by the local HMP processors. The correlation matrix, constructed from the data obtained, is shown in *Table 2*, and the communalities are presented in *Table 3*. There are relatively high correlations between 'high prices of local raw materials' (X2) with 'dependence on imported raw materials' (X3); 'high rate of product deterioration' (X4) with 'frequent machine break down' (X5); 'high cost of production' (X10) with 'lack of working capital' (X11), 'difficulty in getting loans/credits' (X12), 'high capital cost/interest rate (X13) and 'high import tax/tariffs' (X19); 'lack of working capital' (X11) with 'difficulty in getting loans/credits' (X12), 'high capital cost/interest rate' (X13) and 'high import tax/tariffs' (X19); 'difficulty in getting loans/credits' (X12) with 'high capital cost/interest rate' (X13) and 'high import tax/tariffs (X19)'; 'high capital cost/interest rate' (X13) with 'high import tax/tariffs (X19)'; 'high rate of employee turnover (X16) with 'demand of higher pay by workers' (X17) and 'lack of training facilities (X18); and 'demand of higher pay by workers' (X17) with 'lack of training facilities (X18). The communalities (*Table 3*) show that over 80% of the variances of two variables (X4 and X16) are accounted for, and the same is indicated by over 70% in 13 other variables (X1, X3, X5, X7, X8, X10, X11, X112, X13, X14, X17, X18 and X19), while less than 70% is accounted for in five variables (X2, X6, X9, X15, and X20).

The eigenvalues which accounted for the variances of the factor pattern are presented in *Table 4*. The eigenvalues can be equal, zero or negative. If the eigenvalues are equal, the standard error of the coefficients of the

Table 2. Correlation matrix for 20 problems faced by local HMP processing industry

	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14	X15	X16	X17	X18	X19	X20
X1	1.0000																			
X2	0.1994	1.0000																		
X3	0.4256	0.5542*	1.0000																	
X4	0.0236	–0.2353	–0.0395	1.0000																
X5	0.2670	–0.1856	–0.0701	0.7291*	1.0000															
X6	0.0827	0.1240	0.2605	0.1182	0.0000	1.0000														
X7	0.2601	–0.0143	0.2222	0.0681	0.2908	0.2287	1.0000													
X8	–0.0936	0.0566	0.0730	0.3280	0.3494	0.2748	0.4069	1.0000												
X9	–0.2165	0.2539	0.2041	0.0017	0.0016	0.1392	0.3890	0.4776	1.0000											
X10	0.1130	0.2136	0.1204	0.1882	0.2184	–0.0759	0.1891	0.4647	0.4404	1.0000										
X11	0.0922	0.2874	0.1197	–0.1234	0.0746	0.1569	0.1004	0.3309	0.2609	0.5147*	1.0000									
X12	–0.0290	0.3497	0.2977	0.0995	0.1612	0.2321	0.2492	0.4573	0.4905	0.5332*	0.6082*	1.0000								
X13	–0.0234	0.2473	0.1825	0.1728	0.2004	0.1389	0.1777	0.3994	0.3674	0.7050*	0.6360*	0.7469*	1.0000							
X14	0.3718	0.3154	0.4557	–0.1056	0.0664	0.2558	0.1897	0.1390	0.2736	0.1547	0.1244	0.2154	0.1047	1.0000						
X15	0.1852	0.3770	0.3712	–0.2245	–0.1728	0.0877	0.3477	–0.1958	0.2380	0.1733	0.1342	0.2268	0.1583	0.2430	1.0000					
X16	0.1837	–0.1019	–0.1019	0.0562	0.2417	–0.0762	0.0246	0.0522	0.0962	0.4226	0.1871	0.3551	0.3310	0.3750	0.1737	1.0000				
X17	0.1892	–0.2297	–0.0816	0.3615	0.4590	0.1506	0.2699	0.2683	0.2433	0.3166	0.2225	0.3504	0.3257	0.4068	0.0429	0.5716*	1.0000			
X18	0.1459	–0.0377	–0.0383	0.2141	0.3051	–0.0335	0.0464	0.2354	0.2075	0.4661	0.2308	0.4264	0.4084	0.3891	0.1530	0.8289*	0.5156*	1.0000		
X19	–0.2618	0.0389	0.1273	0.2749	0.1623	0.2420	0.0207	0.3439	0.3806	0.5781*	0.5028*	0.5739*	0.6401*	–0.0561	0.0788	0.2755	0.2133	0.3260	1.0000	
X20	0.1634	0.3887	0.1812	–0.1302	0.1049	–0.0467	0.4479	0.1348	0.2368	0.1792	–0.0432	0.0440	0.0922	0.1842	0.4261	–0.0581	–0.1904	0.0009	–0.1689	1.0000

*Highly correlated

Table 3. Communalities of different local HMP processing variates

Attribute	Communality	Attribute	Communality
X1	0.74532070	X11	0.70481414
X2	0.67960088	X12	0.72377060
X3	0.72786228	X13	0.76017754
X4	0.83128409	X14	0.71875716
X5	0.78868033	X15	0.66311333
X6	0.46109100	X16	0.84833305
X7	0.73893347	X17	0.71075642
X8	0.73264172	X18	0.77915847
X9	0.61713998	X19	0.76947704
X10	0.74225566	X20	0.66509111

Table 4. Eigenvalues or accounted for variances of the factor dimensions

Factor	Eigenvalues	Difference	Proportion of variance explained	Cumulative proportion of variance
1	5.13007365	2.49424626	0.3581	0.3581
2	2.63582740	0.69206569	0.1840	0.5421
3	1.94376171	0.35090472	0.1357	0.6777
4	1.59285699	0.53744591	0.1112	0.7889
5	1.05541108	0.15966696	0.0737	0.8626
6	0.89574412	0.30641231	0.0625	0.9251
7	0.58933181	0.02407959	0.0411	0.9663
8	0.56525222	0.27316981	0.0395	1.0057
9	0.29208241	0.05124440	0.0204	1.0261
10	0.24083801	0.08591837	0.0168	1.0429
11	0.15491964	0.07439940	0.0108	1.0537
12	0.08052024	0.03770923	0.0056	1.0593
13	0.04281101	0.06120936	0.0030	1.0623
14	–0.01839834	0.05617284	–0.0013	1.0610
15	–0.07457119	0.04988227	–0.0052	1.0558
16	–0.12445346	0.01604362	–0.0087	1.0472
17	–0.14049708	0.01843493	–0.0098	1.0373
18	–0.15893201	0.01451765	–0.0111	1.0263
19	–0.17344966	0.02919902	–0.0121	1.0141
20	–0.20264868		–0.0141	1.0000

Eight factors will be retained by PROPORTION criterion

unobserved latent factors is inflated. The vector orientation is undefined. The inferences on the factor loading are unwise. The covariances of the categorical variates are not in full rank if the eigenvalues are singular or zero. This implies that there exists a linear relationship of categories on linear combinations of latent factors. It might lead to problems in the interpretation of the factor dimension (Jackson 1991). On the other hand, the negative eigenvalues, which exhibit the vector orientation are undefined and the factor coefficients, which are imaginary communality estimates, such as the square of the multiple correlation coefficients, may result in non-Gramian matrices. This implies that some negative eigenvalues could be found. The factor loadings based on positive eigenvalues are inflated. However, the factor score estimates computed from such loadings will

be deflated. Subsequently the existence of negative eigenvalues can be determined. First sum all the eigenvalues and then compare with the trace of the correlation matrix. If the sum of eigenvalues is greater than the trace, the correlation matrix is non-Gramian, and some negative eigenvalues are obtained (Rummel 1970). In the light of this information, it has been decided that the five-factor model is adequate to describe the attributable problems, there being five eigenvalues greater than unity.

In this analysis, the cumulative proportion of variance showed that the first five factors account for 86.26% (factor one = 35.81%, factor two =18.40%, factor three = 13.57%, factor four =11.12%, and factor five = 7.37%) of the total variation, which was greater than that suggested by Malhotra (1993) and Aaker et al. (2003). Other factors with eigenvalues less than 1.0 were not included in the model.

The varimax rotated factor matrix of 20 items is shown in *Table 5*. The factor matrix contains the *factor loadings* or coefficients used to express the standardized variables in terms of the factors. These factor loadings represented the correlations between the factors and the variables. A loading with large absolute value (equal or more than 0.5) indicates that the factor and the variable are closely related. Factor one is accounted by 35.81% of the total variation which seems heavily loaded (loading >0.80) on 'high capital cost/interest rate' (loading = 0.83463), and highly loaded (loading = 0.70−0.79) on 'lack of working capital' (0.78246), 'difficulty in getting loans/ credits' (0.74364), 'high import tax/tariff' (0.73228) and 'high cost of production' (0.72178). This factor is related to *capital* or *finance*. Factor two is heavily loaded on 'high rate of employee turnover' (0.86209) and 'lack

Table 5. Varimax rotated factor pattern – A matrix of factor loadings for local HMP categorical problem data

Code	Item/Problem	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
X13	High capital cost/interest rate	**0.83463**	0.17382	0.11986	0.10024	0.08248
X11	Lack of working capital	**0.78246**	0.05738	–0.16791	0.03590	–0.00613
X12	Difficulty in getting loans/credits	**0.74364**	0.24347	0.03637	0.19914	0.12054
X19	High import tax/tariff	**0.73228**	0.09646	0.21759	–0.00969	–0.12566
X10	High cost of production	**0.72178**	0.28622	0.15681	0.12786	0.19037
X16	High rate of employee turnover	0.24169	**0.86209**	0.03170	–0.08818	–0.03466
X18	Lack of training facilities	0.29676	**0.80456**	0.16208	0.02396	–0.00034
X17	Demand of increased pay by workers	0.20432	**0.65082**	0.26201	–0.22131	0.09251
X14	Difficulty in getting skilled workers	–0.04828	**0.56651**	–0.11087	0.47964	0.15594
X4	High rate of product deterioration	0.06490	0.06688	**0.89243**	–0.07654	–0.06849
X5	Frequent machine breakdown	0.11489	0.20572	**0.77667**	–0.12435	0.17382
X3	Dependence on imported raw materials	0.12159	–0.04585	0.01429	**0.74352**	0.11333
X2	High prices of local raw materials	0.25292	–0.10837	–0.20850	**0.73501**	0.12202
X7	Difficulty in getting distributors	0.11170	0.05056	0.12684	–0.03916	**–0.77789**
X20	High marketing cost	–0.01986	–0.05906	–0.01264	0.32911	**0.69039**
X6	Stiff competition	0.11378	–0.02898	0.05469	0.14937	0.04643
X1	Low quality of local raw materials	–0.06943	0.19750	0.11478	0.30660	0.14104
X9	Lack of export market information	0.36799	0.17034	–0.0492	0.18449	0.41894
X8	Lack of domestic market information	0.41891	0.05631	0.28877	0.01853	0.29833
X15	Difficulty in getting unskilled workers	0.12543	0.15880	–0.21454	0.31199	0.44550
Eigenvalues		5.1301	2.6358	1.9438	1.5928	1.0554
Proportion of variance (%)		35.81	18.40	13.57	11.12	7.37
Cumulative proportion of variance (%)		35.81	54.21	67.77	78.89	86.26

Significant loading criterion:

a_{im} < 0.50 = not significant; 0.51 < a_{im} < 0.69 = moderate loading; 0.70 < a_{im} < 0.79 = higher loading;
a_{im} => 0.80 = heavy loading (highly significant)

of training facilities' (0.80456), and moderately loaded (loading = 0.51–0.69) on 'demand of higher pay by workers' (0.65082) and 'difficulty in getting skilled workers' (0.56651). Therefore, factor two can be labeled as a *worker* factor. The coalitions of the two variables forming the third factor are 'high rate of product deterioration' (0.89243) and 'frequent machine break down' (0.77667). Thus, this factor can be considered as the *technological* factor. The fourth factor can be categorized as a *raw material* factor with variables of 'dependence on imported raw materials' (0.74352) and 'high prices of local raw materials' (0.73501). The fifth and final factor can be interpreted as the *marketing* factor with variables of 'difficulty in getting distributors' (–0.77789) and 'high marketing cost' (0.69039). These five significant underlying factors can be considered as important factors affecting the growth and development of the local HMP industry.

Five other problems or variables namely 'stiff competition' (X6), 'low quality of local raw materials' (X1), 'lack of export market information' (X9), 'lack of domestic market information' (X8), and 'difficulty in getting unskilled workers' (X15) were found not to be significant. These do not mean that these problems are completely unimportant in the growth and development of the local HMP processing industry, but they do not seem to have a common underlying factor that is sufficiently significant. The differences between the observed correlations and the reproduced correlations or residuals with the uniqueness on the diagonal are shown in *Table 6*. There is no residual larger than 0.10 and only 11 residuals are greater than 0.05, indicating an acceptable model fit.

Conclusion

The multivariate factor analysis helps revealed the significant underlying factors encountered by the local HMP processing industry. From the analysis, it can be concluded that the five significant underlying factors affecting the growth and development of the local HPM processing industry were related to capital/finance (high capital cost/interest rate, lack of working capital, difficulty in getting loans/credits, high import tax/tariff, and high cost of production); followed by workers (high rate of employee turnover, lack of training facilities, demand of higher pay by workers, difficulty in getting skilled worker); technology (high rate of product deterioration and frequent machine breakdown); raw materials (dependence on imported raw materials and high prices of local raw materials); and marketing (difficulty in getting distributors and high marketing cost). It is important that efforts are taken to help the local HMP processors in overcoming these problems and constraints in order to ensure that the growth and expansion of the industry can be accelerated.

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Table 6. Residual correlations with uniqueness on the diagonal

	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14	X15	X16	X17	X18	X19	X20
X1	0.2547																			
X2	–0.0107	0.3204																		
X3	0.0475	–0.0292	0.2721																	
X4	–0.0052	0.0150	–0.0048	0.1687																
X5	–0.0160	0.0288	–0.0252	0.0296	0.2113															
X6	0.0126	0.0259	–0.0697*	0.0153	–0.0248	0.5389														
X7	0.0348	–0.0655*	0.0410	–0.0252	0.0008	–0.0067	0.2611													
X8	–0.0016	–0.0089	0.0135	0.0051	–0.0203	0.0458	0.0384	0.2674												
X9	–0.0163	0.0125	0.0221	–0.0004	–0.0070	–0.0660*	0.0250	–0.0107	0.3829											
X10	0.0668*	–0.0333	0.0173	0.0204	–0.0733	–0.0408	–0.0002	0.0321	0.0397	0.2577										
X11	–0.0012	0.0335	–0.0476	–0.0273	0.0479	0.0039	–0.0207	0.0038	–0.0053	–0.0219	0.2952									
X12	–0.0336	0.0515	0.0136	–0.0025	0.0288	–0.0187	0.0167	0.0030	0.0013	–0.0865*	0.0083	0.2762								
X13	–0.0265	–0.0010	0.0032	0.0095	–0.0137	0.0125	0.0009	–0.0249	–0.0346	0.0091	–0.0025	0.0420	0.2398							
X14	–0.0180	0.0052	0.0245	–0.0176	0.0188	0.0202	–0.0268	–0.0195	0.0192	0.0083	0.0185	–0.0433	0.0024	0.2812						
X15	–0.0163	0.0313	–0.0047	0.0232	–0.0153	0.0104	0.0172	–0.0465	0.0058	0.0046	0.0294	–0.0036	–0.0227	–0.0108	0.3369					
X16	0.0102	–0.0050	–0.0107	–0.0324	0.0079	0.0212	0.0056	0.0138	–0.0351	–0.0011	–0.0285	0.0234	–0.0095	–0.0028	–0.0073	0.1517				
X17	–0.0073	0.0080	–0.0314	0.0358	0.0168	–0.0396	–0.0074	–0.0452	0.0547*	0.0191	0.0108	0.0110	0.0264	0.0480	0.0314	–0.0204	0.2892			
X18	0.0152	–0.0149	–0.0148	0.0081	–0.0088	0.0237	–0.0058	0.0467	–0.0258	–0.0349	0.0008	0.0212	–0.0006	–0.0029	0.0126	0.0449	–0.0615*	0.2208		
X19	–0.0081	–0.0447	0.0377	–0.0151	0.0174	0.0414	–0.0028	–0.0036	0.0184	0.0565*	0.0200	–0.0535*	–0.0210	–0.0035	–0.0037	0.0272	–0.0465	0.0037	0.2305	
X20	–0.0223	0.0419	–0.0617*	–0.0129	0.0429	0.0517*	0.0086	0.0108	–0.0365	–0.0212	–0.0055	–0.0158	0.0356	0.0283	0.0233	0.0118	–0.0511	0.0150	–0.0050	0.3349

*$p \geq 0.05$

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Abstrak

Kajian struktur pemasaran, permintaan dan potensi industri herba dan tanaman ubatan telah dijalankan di seluruh Semenanjung Malaysia. Responden kajian terdiri daripada pemproses herba dan tanaman ubatan (HTU) yang telah ditemu bual menggunakan soal selidik berstruktur. Salah satu daripada objektif kajian adalah untuk mengenal pasti masalah dan halangan yang dihadapi oleh pemproses HTU tempatan. Analysis faktor multivariate dimanfaatkan dengan menggunakan kaedah komponen utama untuk menganggarkan matriks korelasi, 'communalities', nilai-eigen, pemberat model faktor dan residual. Algoritma putaran 'varimax' diguna untuk mengurangkan dimensi faktor yang berotogonan. Hasil kajian menunjukkan modal/kewangan, pekerja, teknologi, bahan mentah dan pemasaran merupakan lima faktor bersignifikan yang menghalang pembangunan dan pertumbuhan industri pemprosesan (HTU) tempatan. Usaha bagi membantu pengusaha HTU tempatan mengatasi masalah dan halangan yang dihadapi perlu diambil bagi memastikan pertumbuhan dan pembangunan industri.