Satisfactions and Purchasing Factors of Manufacturing Machines in Food Factories

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Abstract

This research aimed to investigate the satisfactions in current machines using in manufacturing processes and the purchasing factors when food factories plan to purchase new machines. The data was collected by questionnaire survey from 58 food factories in Nakorn Pathom Privince, Thailand. The results indicated that the difference in experience of using machines in manufacturing processes and the size of factories affected the satisfactions in current machines and the purchasing factors for new machines significantly. The experience and size of factories also affect the type of machine and the payment method when buying the new machine. The result should be useful for the businesses related to manufacturing machine such as developer, supplier, distributors, and so on.

Keywords: Satisfactions, purchasing factors, food factories, manufacturing machines, Thailand

Introduction

The Gross National Product (GNP) of Thailand has shown that the manufacturing segment produced $117,173 million in 2012. This was 34% of overall GDP of Thailand, and it grew up 7.3% from the previous year (Office of the National Economic and Social Development Board, 2012). The Manufacturing Production Index (MPI) of food product and beverage in 2012 was 161.2% changed compared with 151.0% changed in 2011 (Bank of Thailand, 2012). This data shows that the food and beverage manufacturing sector is important for the economics of Thailand and grows up related to the global demands. A machine is one of the important factors in manufacturing (4M: Man, Method, Machine, and Material) (Lean Enterprise Institute. Inc., 2008). Machines can improve productivity, reduce the waste in processes, and decrease the manufacturing cost (Suzuki, 2000). In 2012, machines included equipment were the second imported product of Thailand, while the first one was the crude oil. The total imported value of machines was $24,793.4 million, and increased 25.5% from the previous year. Most of the machines were imported from Japan (46.0%) and China (15.2%) (Ministry of Commerce, 2012). Since the machines are expensive and have many technical details such as capacity, efficiency, safety, and maintenance; therefore, factories have to carefully consider before make the decision to purchase these operating assets (Ji et al., 2012). The business developing and producing machines or business trading them should consider in the customer's satisfaction (Gomez et al., 2004; Singh and Ranchhod, 2004) and purchasing factors apart from just focus on only performance and technology (Tax and Stuart, 1997; Chang et al., 2002).

The objective of research was to investigate the satisfaction in current machines that food factories used in manufacturing processes and the purchasing factors when they plan to purchase the new machines.

Research Framework

The research framework as shown in Figure 1 was separated into three main parts. The first was general information of food factories such

as an experience of using machines in manufacturing processes *(EXP)*, size of factories depended on the number of employees *(SIZE)*, the main product. This information could define the characters of factories. The second part was the satisfaction in current machines *(SS)*, and the country that current machines were imported from. The satisfaction in current machines *(SS)* was classified into various items (Gomez et al., 2004; Suzuki, 2000) such as productivity, processes time, waste reduction, safety, warranty, and after-sale service. The final part was the purchasing factors *(PF)* for new machines, country that factory plan to buy the new machines, type of machine when buying the new machines *(TYPE)*, and payment method when buying the machines *(PAY)*.

Effect of the experience of using machines in manufacturing processes (EXP)

Since the machine is the operating asset that needs a lot of skills to operate and maintenance (Singh and Ranchhod 2004), the different in experience affect not only the satisfaction in the current machines (Gomez et al., 2004) but also the purchasing factor of the new machines (Ji, Yu and Zhong, 2012). The higher experience factories have faced and solved problems than the lower one. Experiences can make them clearly define the main problems; therefore, the difference on experience should define benefits and satisfactions differently (Ilies and Judge, 2002; Bennett et al., 2005). These make them have difference purchasing factors when buying the new machines. Moreover, the financial availability is related to the experience of company (Kaplan et al., 2007); therefore, the type of machine when buying the new machines and the type of purchasing should be related to the experience of using machines in manufacturing processes *(EXP)*. As shown in Figure 1, the hypotheses were set based on the ideas as follows:

H1: The experience of using machines in manufacturing processes *(EXP)* affects to the satisfaction in current machines *(SS)*.

H3: The experience of using machines in manufacturing processes

(EXP) affects to the purchasing factors for the new machines *(PF)*.

H5: The experience of using machines in manufacturing processes *(EXP)* affects to the type of machine when buying the new machines *(TYPE)*.

H7: The experience of using machines in manufacturing processes *(EXP)* affects to the type of purchasing when buying the machine *(PAY)*.

Effect of the size of factories depended on the number of employees (SIZE)

Since the machine is one of the main factors of manufacturing, size of factories relates to the number of employees and the number of machines. The larger factories mostly has many types of machines in many manufacturing processes; therefore, these can make them more understand the benefits and define the purchasing factors clearly than the smaller one. The difference in size should affect the satisfaction in current machines. Moreover, size of factory also relates to the financial ability (Huang et al., 2011; Beck et al., 2013); therefore, the size of factories depended on the number of employees *(SIZE)* should affect the type of machine when buying the new machines and the type of purchasing. As shown in Figure 1, the hypotheses were set based on the idea as follows:

H2: The size of factories depended on the number of employees *(SIZE)* affects to the satisfaction in current machines *(SS)*.

H4: The size of factories depended on the number of employees *(SIZE)* affects to the purchasing factors for the new machines *(PF)*.

H6: The size of factories depended on the number of employees *(SIZE)* affects to the type of machine when buying the new machines *(TYPE)*.

H8: The size of factories depended on the number of employees *(SIZE)* affects to the type of purchasing when buying the machine *(PAY)*.

Data Collection

The data was collected via questionnaire survey. The questionnaire was separated into three parts based on the research framework as follows: the first one was the general data of respondents, the second was satisfaction in current machines, and the third was the purchasing factors for the new machines. To assess the characteristics of food factory in the first part of questionnaire: the experience of using machines in manufacturing processes *(EXP)*; size of factories depended on the number of employees *(SIZE)*; and the main product, the check list questions were used. In the second part for assessing the satisfaction in current machines *(SS)* in term of productivity, processes time, waste reduction, safety, warranty, and after-sale service (Gomez et al., 2004; Suzuki, 2000), the five-point Likert scale was used. Moreover, the check list question was used to assess the country that current machines were imported from. In the last part for assessing the purchasing factors *(PF)* for new machines in term of price, productivity, safety, warranty, after-sale service, and delivery period (Ji et al., 2012), the five-point Likert scale was used. Finally, the check list question was used to assess the country that factory plan to buy the new machines, type of machine when buying the new machines *(TYPE)*, and payment method when buying the machines *(PAY)*.

The first draft questionnaire was commended by three stakeholders and score in each question. The index of Item Objective Congruence (IOC) of each question was calculated and used to select or revise the questions to become the second draft (Sharpe et al., 2012). Form calculation the IOC of every questions were 1.00; therefore, the questions was not needed to be changed. The questionnaire was used in pilot study to collect data from thirty factories and the data was analyzed to investigate the reliability of measurement with Cronbach's alpha (Bravo and Potvin, 1991). The overall Cronbach's alpha of the questionnaire was 0.826, the item loading and the reliability analysis are shown in Table 1.

Data Analysis

Table 2 shows the type of question for each items in the framework, type of data, and the statistic for testing the hypotheses. For hypotheses H1 and H2, the effect of experience of using machines in manufacturing processes *(EXP)* and size of factories depended on the number of employees *(SIZE)* on satisfaction in current machines *(SS)* was considered by ANOVA. For hypotheses H3 and H4, the effect of experience of using machines in manufacturing processes *(EXP)* and size of factories depended on the number of employees *(SIZE)* on purchasing factors when buying the new machines *(PF)* was also tested by ANOVA. For hypotheses H5 and H6, the effect of experience of using machines in manufacturing processes *(EXP)* and size of factories depended on the number of employees *(SIZE)* on the type of machine when buying the new machines *(TYPE)* was tested by Chi-square test. Finally, for hypotheses H5 and H6, the effect of experience of using machines in manufacturing processes *(EXP)* and size of factories depended on the number of employees *(SIZE)* on the payment method when buying the machines *(PAY)* was tested by Chi-square test.

Results and Discussion

The questionnaire was sent to 68 food and beverage factories in Nakorn Pathom province, Thailand (Ministry of Industry, 2012) via mail. In the cover letter, the researcher notes that the respondent for answering the questionnaire should be the owner or the top manager of factory. There are 58 factories that reply the questionnaire which reach the sample size of Krejcie and Morgan (1970). The respond rate of this research was found to be 85.29%. As shown in Table 3, the characteristics of food factories in Nakorn Pathom Province, Thailand were small food factories (46.55%) (Ministry of Industry, 2012) that have used the machines in manufacturing processes more than 20 years (50.00%), and the main product was food (60.34%). There are two factories that have experience of using machines in manufacturing

processes less 2 years, and eight factories that have experience between 5 to 10 years. Because of small size, these two groups were combined for further analysis as shown in Table 3. Therefore, there ten factories that have experience of using machines in manufacturing processes less 10 years As shown in Figure 2, most of the current machines were imported from Germany and China (34.48% and 27.59%) while the factories plan to buy the new machine from Japan, China, and Germany (48.28%, 20.69%, and 18.97% respectively). The data showed that the main supplier of manufacturing machine change from Germany to Japan.

The average score of satisfaction in current machines *(SS)* and the detail classified by experience of using machines in manufacturing processes *(EXP)* and size of factories depended on the number of employees *(SIZE)* were shown in Table 4. The top three were the after-sale service (mean=4.43, sd=0.75), warranty (mean=4.29, sd=0.75), and productivity (mean=4.02, sd=0.55) (Verhoef et al., 2001; Ji et al. , 2012). The average score of purchasing factors when buying the new machines *(PF)* and the detail classified by experience of using machines in manufacturing processes *(EXP)* and size of factories depended on the number of employees *(SIZE)* were shown in Table 5. The top three purchasing factor for the new machines that the factories most consider were after-sale service (mean=4.31, sd=0.68), productivity (mean=4.16, sd=0.81), and safety (mean=4.09, sd=0.78) of the machine. From the results, the suppliers of manufacturing machine should consider in two main strategies as follows: the after sale service that included the warranty (Gomez et al., 2004), and the performance of the machine (Ji et al., 2012).

Effect of the experience of using machines in manufacturing processes (EXP)

For the hypothesis 1, the effect of the experience of using machines in manufacturing processes *(EXP)* on the satisfaction in current machines *(SS)* was tested by one-way ANOVA. The result in

Table 4 showed that the difference of experience significantly affected the satisfaction of current machine in term of process time ($F=3.18$, $p=0.05$), waste reduction ($F=6.01$, $p<0.01$), and safety ($F=4.24$, $p=0.02$) (Ilies and Judge, 2002). By post-analysis, it was found that the factories that have experience more than 20 years more satisfy than the other groups in waste reduction (3.55 and 2.93) and safety (4.10 and 3.65). From these result, the hypothesis 1 was supported.

> *There were significantly difference on the satisfaction in current machines between the factories that had the different experience of using machines in manufacturing processes. The higher experience factories had higher score of satisfaction in term of process time, waste reduction, and safety.*

For the hypothesis 3, the effect of the experience of using machines in manufacturing processes *(EXP)* on the purchasing factors when buying the new machines *(PF)* was test by on-way ANOVA as shown in Table 5. The result showed that the difference of experience significantly affected the purchasing factors of new machine only in term of delivery time ($F=4.95$, $p=0.01$). The post analysis indicated that the factories that have high experience (more than 20 year) more considered in this factor than the other groups (4.24 and 3.65 respectively). From these result, the hypothesis 3 was supported.

> *There were significantly difference on the purchasing factors when buying the new machines between the factories that had different experience of using machines in manufacturing processes. The higher experience factories more consider in delivery time.*

For hypothesis 5, the effect of the experience of using machines in manufacturing processes *(EXP)* on the type of machine when buying the new machines *(TYPE)* was tested by Chi-square

test. As shown in Figure 2(a), the low experience factories planned to buy both new and used machine, while the higher experience factories tended to by only the new machine (van Dolen et al., 2007). From Chi-square test, the different experience *(EXP)* affected the type of machine when buying the new machines *(TYPE)* significantly (Pearson Chi-square=3.87, p=0.14); therefore, the hypothesis 7 was supported.

> *There were significantly difference on the type of machine when buying the new machines between the factories that had different experience of using machines in manufacturing processes. The higher experience factories tended to buy the new machine instead of used machine.*

For hypothesis 7, the effect of the experience of using machines in manufacturing processes *(EXP)* on the payment method when buying the machines *(PAY)* was tested by Chi-square test. The result in Figure 3(b) showed that the factories that have low experience in using machine (less than 10 years) tended to buy machine by installment only, while some of the factories that have higher experience tended to buy machine by cash. From Chi-square test, the different experience *(EXP)* affected the payment method when buying the machines *(PAY)* significantly (Pearson Chi-square=13.35, $p<0.01$); therefore, the hypothesis 5 was supported.

> *There were significantly difference on the payment method when buying the machines between the factories that had different experience of using machines in manufacturing processes. The low experience factories tended to buy machine by installment, while some of higher experience factories tended to buy machine by cash.*

Effect of the size of factories depended on the number of employees (SIZE)

For the hypothesis 2, the effect of the size of factories depended on the number of employees *(SIZE)* on the satisfaction in current machines *(SS)* was tested by one-way ANOVA. The result in Table 4 showed that the difference of size significantly affected the satisfaction of current machine in term of process time ($F=10.09$, $p<0.01$) and robustness ($F=4.33$, $p=0.02$). From post-analysis, the medium and large factories had higher satisfaction score in processes time than the small one (3.84 and 3.26), and the large factories have higher score in robustness than the other (4.23 and 3.64). From these result, the hypothesis 2 was supported.

> *There were significantly difference on the satisfaction in current machines between the factories that had the different size of factories depended on the number of employees. The larger factories had higher score of satisfaction in term of process time and robustness*

For the hypothesis 4, the effect of the size of factories depended on the number of employees *(SIZE)* on the purchasing factors when buying the new machines *(PF)* was test by on-way ANOVA. The result in Table 5 showed that the difference of size significantly affected the purchasing factors of new machine in term of safety ($F=3.75$, $p=0.03$) and delivery time ($F=4.13$, $p=0.02$). The post-analysis indicated that the medium and large factories more focused than the small factories in both safety (4.29 and 3.85) and delivery time (4.16 and 3.70). From these result, the hypothesis 4 was supported.

> *There were significantly difference on the purchasing factors when buying the new machines between the factories that had the different size of factories depended on the number of*

employees. The larger factories more consider in safety and delivery time.

For hypothesis 6, the effect of the size of factories depended on the number of employees *(SIZE)* on the type of machine when buying the new machines *(TYPE)* was tested by Chi-square test. As shown in Figure 2(c), some small factories planned to buy used machine, while the larger factories tended to buy only the new machine (Huang et al., 2011). From Chi-square test, the difference on size of factories *(SIZE)* affected the type of machine when buying the new machines *(TYPE)* significantly (Pearson Chi-square=8.22, p=0.16); therefore, the hypothesis 6 was supported.

There were significantly difference on the type of machine when buying the new machines between the factories that had the different size of factories depended on the number of employees. The larger factories tended to buy the new machine instead of used machine.

For hypothesis 8, the effect of the size of factories depended on the number of employees *(SIZE)* on the payment method when buying the machine *(PAY)* was tested by Chi-square test. As shown in Figure 3(d), the small factories mostly planned to buy the machine by installment, while the larger factories tended to buy the machine by cash (Becke et al., 2013). From Chi-square test, the difference on size of factories *(SIZE)* affected the payment method when buying the machines *(PAY)* significantly (Pearson Chi-square=6.45, p=0.04); therefore, the hypothesis 8 was supported (Verhoef et al., 2001).

There were significantly difference on the payment method when buying the machines between the factories that had the different size of factories depended on the number of employees. Most of small factories tends the buy the machine by installment while some larger factories tended to buy the machine by cash.

Graphical Summary

The conceptual graphical summary was generated to overview the satisfactions of the food factories on using current machines in manufacturing processes and the purchasing factors when purchasing the new machine as shown in Figure 4. The experience of using machines in manufacturing processes *(EXP)* related to the satisfaction in waste reduction and safety, and related to the purchasing factor in delivery time positively. The size of factories depended on the number of employees *(SIZE)* related to the satisfaction in process time and robustness, and related to purchasing factor in safety and delivery time positively. The most important factor when buying the new machines for the lower experience factories was the after-sale service, and become the performance for the higher experience factories (van Dolen et al., 2007). Most of small factories aimed to purchase the machine by installment, while the large factories trend to buy the machines by cash (Verhoef et al, 2001). The small and low experience factories mostly aimed to purchase the used machines, while the large and high experience tended to buy only the new machines.

Conclusions

In case of the food factories in Nakorn Pathom province, Thailand, the difference in experience of using the machines in manufacturing processes and the size of factories affected the satisfaction in current machines and the purchasing factors for the new machines significantly. The small and low experience factories focused on after-sale service, and aimed to purchase used machines by installment method, while the large and high experience factories more considered in performance of the machines. Moreover, some of them tended to purchase the new machine by cash.

Acknowledgement

We would like to thank the reviewer and the editor of the Silpakorn University Journal of Social Sciences, Humanities, and

Arts for their helpful comment on this article. We also would like to thank the Department of Mechanical Engineering, Faculty of Engineering and Industrial Technology, Silpakorn University, Thailand for supporting our research facilities.

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Satisfaction and Payment Equity on Cross-Buying: A Dynamic Model for a Multi-Service Provider. *Journal of Retailing* 77(3): 359-78.

Figure 1 Research conceptual framework

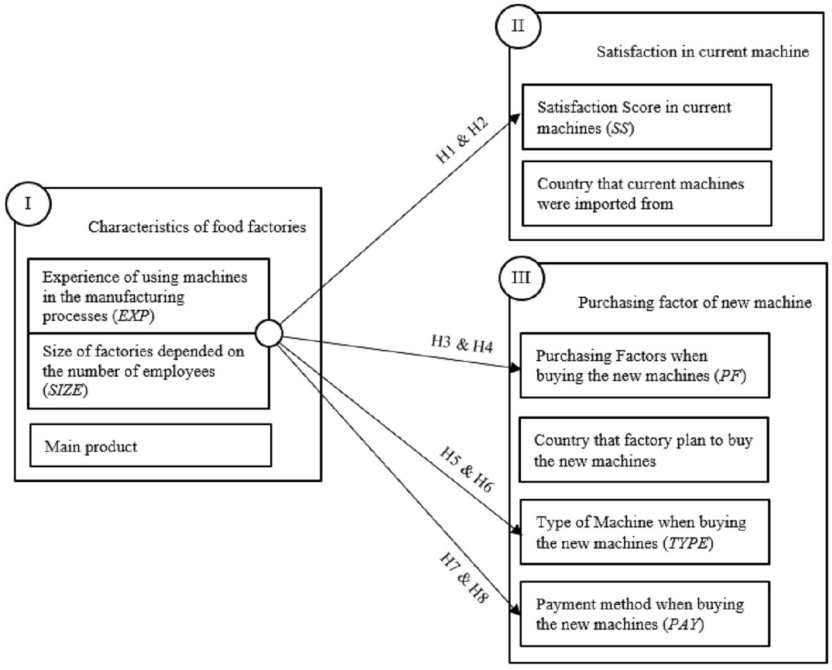


Figure 2(a) The country that current machines were imported from
Figure 2(b) The country that factories plan to buy the new machines

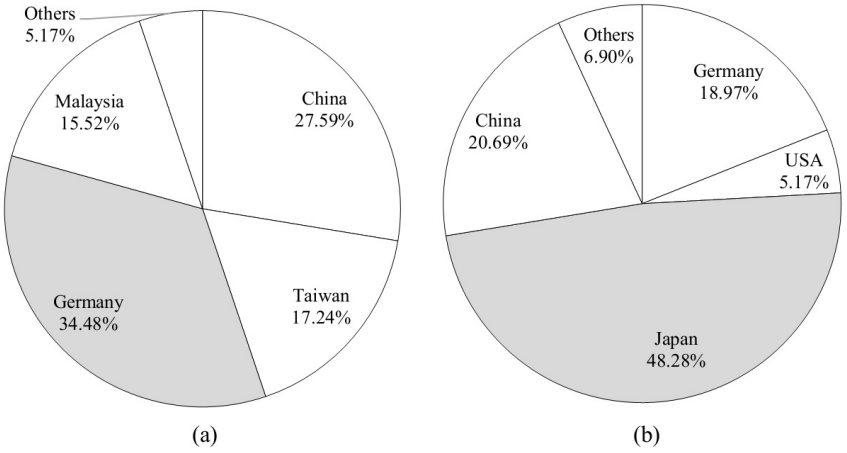


Figure 3 Type of machine when buying the new machines *(TYPE)* and payment method when buying the new machines *(PAY)* classified by experience of using machines in manufacturing processes *(EXP)* and size of factories depended on the number of employees *(SIZE)*

(a) Type of machine when buying the new machines (TYPE) classified by experience of using machines in manufacturing processes (EXP) (Pearson Chi-square=3.87, p=0.14, **H7 supported)**

(b) Payment method when buying the new machines (PAY) classified by experience of using machines in manufacturing processes (EXP) (Pearson Chi-square=13.35, p<0.01, **H5 supported**)

(c) Type of machine when buying the new machines (TYPE) classified by experience of using machines in manufacturing processes (EXP) (Pearson Chi-square=8.22, p=0.16, **H8 supported**)

(d) Payment method when buying the new machines (PAY) classified by size of factories depended on the number of employees (SIZE) (Pearson Chi-square=6.45, p=0.04, **H6 supported**)

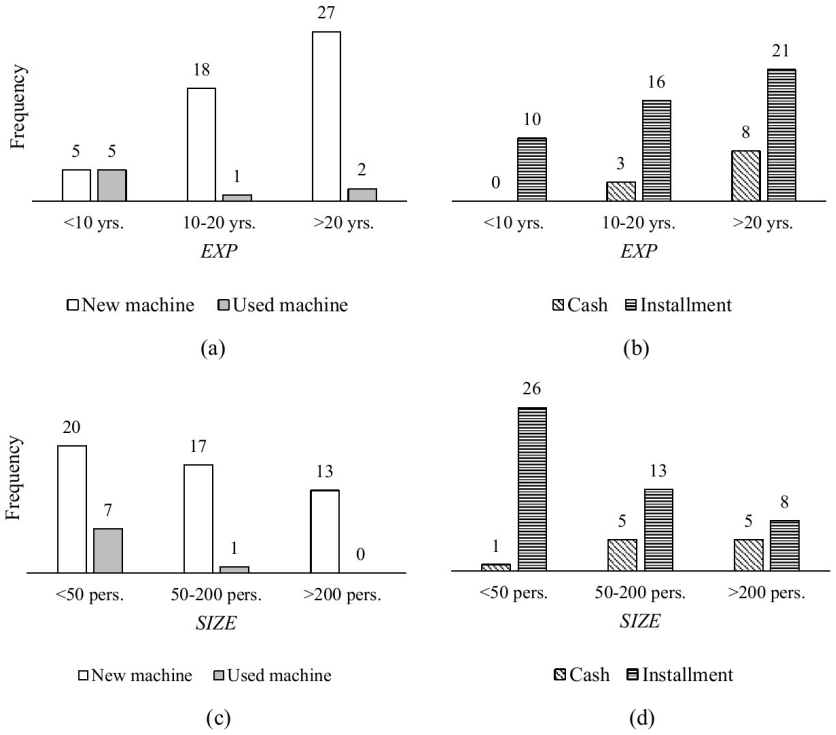
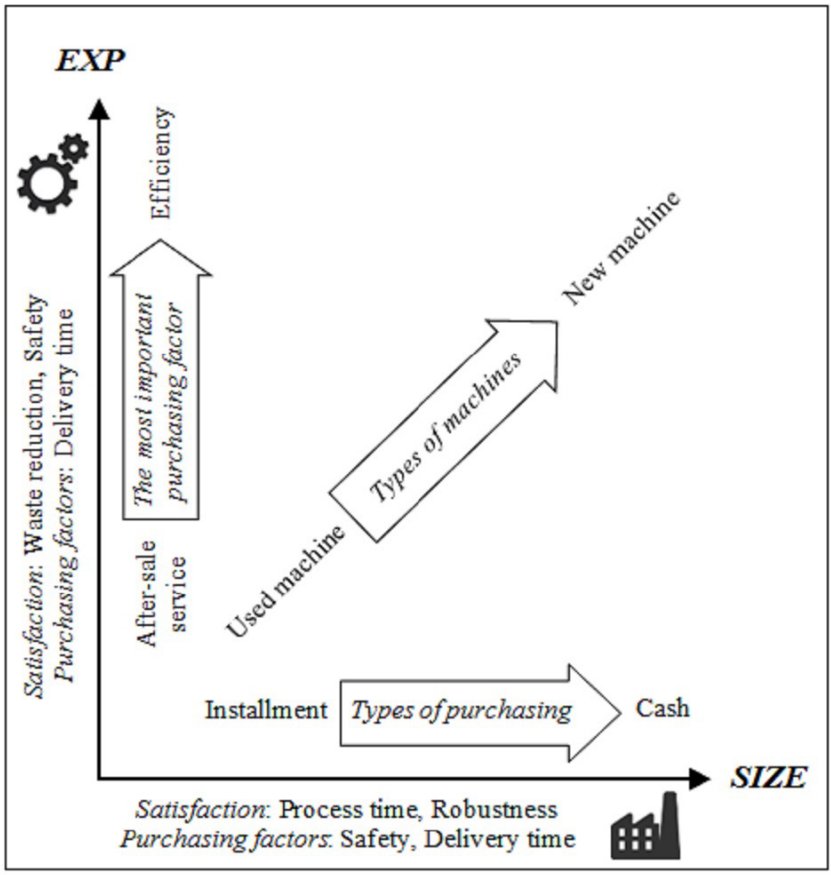


Figure 4 The satisfaction and the purchasing factors of food factories in manufacturing machines



Note: EXP is experience of using machines in manufacturing processes.
SIZE is size of factories depended on the number of employees.

Table 1: Reliability analysis

Items	*Item loading* (λ)	*Cronbach's alpha* (α)
Part II: Satisfactions in current machines		
Please score the level of your satisfaction in the current machines that using in manufacturing processes:		0.745
• Productivity	0.734	
• Processes time	0.725	
• Waste reduction	0.692	
• Safety	0.740	
• Convenience	0.755	
• Technology	0.737	
• Robustness	0.697	
• Warranty	0.714	
• After sale service	0.688	
Part III: Purchasing factors for new machines		
Please score the important level of purchasing factors when you decide to buy the new machines:		0.754
• Price	0.735	
• Productivity	0.767	
• Safety	0.690	
• Warranty	0.698	
• After sale service	0.719	
• Delivery time	0.699	
The overall reliability analysis		0.826

Note: The questions were five-point Likert scale

Table 2: Data analysis

Item	Question	Data
Characteristics of food factories		
Experience of using machines in manufacturing processes (*EXP*)	Check-list	Ordinal
Size of factories depended on the number of employees (*SIZE*)	Check-list	Ordinal
Main product	Check-list	Nominal
Satisfaction in current machine		
Satisfaction in current machines (*SS*)	Likert scale	Interval
Country that current machines were imported from	Check-list	Nominal
Purchasing factor of new machine		
Purchasing factors when buying the new machines (*PF*)	Likert scale	Interval
Country that factory plan to buy the new machines	Check-list	Nominal
Type of machine when buying the new machines (*TYPE*)	Check-list	Nominal
Payment method when buying the new machines (*PAY*)	Check-list	Nominal

H1, H2: ANOVA

H3, H4: ANOVA

H5, H6: Chi-square test

H7, H8: Chi-square test

Table 3: Characteristics of food factories

Characteristics of food factories	Frequency	Percentage
Experience of using machines in manufacturing processes (*EXP*)		
Less than 10 years[a]	10	17.24%
10 to 20 years	19	32.76%
More than 20 years	29	50.00%
Size of factories depended on the number of employees (*SIZE*)		
Less than 50 persons. (small)	27	46.55%
50 to 200 persons (medium)	18	31.03%
More than 200 persons (large)	13	22.41%
Main product		
Snack	7	12.07%
Food	35	60.34%
Beverage	16	27.59%

Sample size (n) =58,

a: EXP less than 5 year = 2, EXP between 5 to 10 year = 8

Table 4: Satisfaction in current machines *(SS)* classified by experience of using machines in manufacturing processes *(EXP)* and size of factories depended on the number of employees *(SIZE)*

Experience of using machines in manufacturing processes (*EXP*)						
	Average	<10 yrs.	10-20 yrs.	>20 yrs.	H1 testing by ANOVA F value (p value)	
Satisfaction in current machines (*SS*): mean (standard deviation)						
Productivity	4.02 (0.55)	3.90 (0.32)	4.05 (0.52)	4.03 (0.62)	0.28 (0.76)	
Processes time	3.57 (0.60)	3.20 (0.42)	3.53 (0.51)	3.72 (0.65)	3.18 (0.05)	**H1 supported**
Waste reduction	3.24 (0.76)	2.80 (0.79)	3.00 (0.58)	3.55 (0.74)	6.01 (<0.01)	**H1 supported**
Safety	3.88 (0.62)	3.60 (0.52)	3.68 (0.48)	4.10 (0.67)	4.24 (0.02)	**H1 supported**
Convenience	3.72 (0.64)	3.70 (0.48)	3.58 (0.61)	3.83 (0.71)	0.86 (0.43)	
Technology	3.83 (0.73)	3.90 (0.32)	3.84 (0.83)	3.79 (0.77)	0.08 (0.92)	
Robustness	3.78 (0.73)	3.50 (0.71)	3.79 (0.53)	3.86 (0.83)	0.93 (0.40)	
Warranty	4.29 (0.75)	4.20 (0.63)	4.32 (0.82)	4.31 (0.76)	0.09 (0.91)	
After sale service	4.43 (0.75)	4.20 (0.63)	4.37 (0.89)	4.55 (0.69)	0.91 (0.41)	

Size of factories depended on the number of employees (*SIZE*)						
	Average	<50 pers.	50-200 pers.	>200 pers.	H3 testing by ANOVA F value (p value)	
Satisfaction in current machines (*SS*): mean (standard deviation)						
Productivity	4.02 (0.55)	3.93 (0.47)	4.11 (0.68)	4.08 (0.49)	0.71 (0.49)	
Processes time	3.57 (0.60)	3.26 (0.45)	3.72 (0.58)	4.00 (0.58)	10.09 (<0.01)	**H3 supported**
Waste reduction	3.24 (0.76)	3.07 (0.62)	3.39 (0.92)	3.38 (0.77)	1.26 (0.30)	
Safety	3.88 (0.62)	3.85 (0.53)	3.94 (0.72)	3.85 (0.69)	0.14 (0.87)	
Convenience	3.72 (0.64)	3.56 (0.64)	3.72 (0.46)	4.08 (0.76)	3.09 (0.06)	
Technology	3.83 (0.73)	3.96 (0.81)	3.72 (0.57)	3.69 (0.75)	0.87 (0.42)	
Robustness	3.78 (0.73)	3.74 (0.71)	3.50 (0.71)	4.23 (0.60)	4.33 (0.02)	**H3 supported**
Warranty	4.29 (0.75)	4.52 (0.58)	4.06 (0.80)	4.15 (0.90)	2.47 (0.09)	
After sale service	4.43 (0.75)	4.41 (0.69)	4.56 (0.62)	4.31 (1.03)	0.43 (0.65)	

Table 5: Purchasing factors when buying the new machines *(PF)* classified by experience of using machines in manufacturing processes *(EXP)* and size of factories depended on the number of employees *(SIZE)*

	Experience of using machines in manufacturing processes (*EXP*)					
	Average	<10 yrs.	10-20 yrs.	>20 yrs.	H2 testing by ANOVA F value (p value)	
Purchasing factors when buying the new machines (*PF*): mean (sd)						
Price	3.71 (0.73)	3.70 (0.82)	3.53 (0.70)	3.83 (0.71)	0.99 (0.38)	
Productivity	4.16 (0.81)	3.70 (0.82)	4.11 (0.74)	4.34 (0.81)	2.52 (0.09)	
Safety	4.09 (0.78)	3.80 (0.63)	4.00 (0.74)	4.24 (0.83)	1.39 (0.26)	
Warranty	4.05 (0.76)	4.00 (0.67)	3.89 (0.81)	4.17 (0.76)	0.79 (0.46)	
After sale service	4.31 (0.68)	4.10 (0.74)	4.21 (0.63)	4.45 (0.69)	1.29 (0.28)	
Delivery time	3.95 (0.76)	3.70 (0.67)	3.63 (0.68)	4.24 (0.74)	4.95 (0.01)	**H2 supported**
	Size of factories depended on the number of employees (*SIZE*)					
	Average	<50 pers.	50-200 pers.	>200 pers.	H4 testing by ANOVA F value (p value)	
Purchasing factors when buying the new machines (*PF*): mean (sd)						
Price	3.71 (0.73)	3.59 (0.64)	3.83 (0.86)	3.77 (0.72)	0.65 (0.53)	
Productivity	4.16 (0.81)	4.04 (0.90)	4.00 (0.77)	4.62 (0.51)	2.88 (0.06)	
Safety	4.09 (0.78)	3.85 (0.77)	4.11 (0.76)	4.54 (0.66)	3.75 (0.03)	**H4 supported**
Warranty	4.05 (0.76)	3.93 (0.78)	4.17 (0.79)	4.15 (0.69)	0.69 (0.51)	
After sale service	4.31 (0.68)	4.30 (0.67)	4.17 (0.71)	4.54 (0.66)	1.14 (0.33)	
Delivery time	3.95 (0.76)	3.70 (0.61)	4.33 (0.77)	3.92 (0.86)	4.13 (0.02)	**H4 supported**