FACTORS INFLUENCING INVESTMENT DECISION MAKING IN SWIFTLET RANCHING INDUSTRY: THE CASE OF GUA MUSANG AND JOHOR BAHRU

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Abstract: Edible bird nest industry is an entry point project under the Malaysian Transformation Plan. The number of swiftlet houses has increased three and a half folds from 2011 to 2016 but with this trend swiftlet houses, failure ranged from 70 to 80 percent. This study focuses on understanding the investors' behavior in this industry and on determining factors that are influencing their investment decision. The basic framework of analysis is the investor behavior theory by applying for the formative first order Partial Least Squares-Structural Equation Modelling model. The data collected from 180 ranchers randomly interviewed from two districts namely Johor Bahru and Gua Musang. The result revealed that heuristic is a first decision construct that has the highest impact on investment decision making followed by market, herding and prospect decision construct.

Introduction

The swiftlet industry is listed among the twelve Entry Point Projects (EPP) under the Agricultural national key economic area (NKEA) which is one of the cores of the Malaysian economic transformation programmes (ETP). The industry is seen as one promising income generation that has a high growth potential to be developed into a major industry for the Malaysian economy. This will enable Malaysia to tap a large global market that is rapidly expanding. The world demand for edible bird nest (EBN) is flourishing and not all countries can produce EBN because of the differences in climate. Although the production of the bird nest takes a long time, but the returns received are very encouraging and can be highlighted as one of the country's future sources of income if full attention is given to it and all parties are willing to cooperate together. Hence, with the encouragement from the Malaysian government, the number of swiftlet house increase from 6,048 swiftlet houses in 2011 to 21,421 until the end of 2016.

However, even though the number of swiftlet houses increase from year to year, about 70 to 80 percent of these houses have failed to attract the swiftlets to nest (Alias et al, 2013). An important reason provided is the lack of understanding and knowledge on how to manage the swiftlet houses. The low figure of success should not be ignored by forthcoming investors. Given this quandary this leads to the question of what behavioral factors are influencing investors to continue investing in the swiftlet ranching. Therefore, the objective of this study is to to identify factors that influence investors to invest in swiftlet ranching industry. In addition, this study will provide a comprehensive understanding of the investors' behavior in this industry and how these factors influence their investment decision is needed. It will be useful for investors to understand common behaviors from which to justify their reactions for better returns.

The scope of this study seeks to know the factors that influence investors to invest in this industry eventhough they alert that this industry is unpredictable and the number of inefficient swiftlet house increase simultaneously with the increasing number of swiftlet house year by year. The rising investments in swiftlet ranching although welcome, have to be understood and monitored by potential investors and the Department of Veterinary Services (DVS), the agency licensing and managing the swiftlet industry. This is necessary to ensure a healthy and sustainable development of the industry. Potential investors have to be provided with a clear understanding of what factors are influencing existing investors. In this way a clear understanding of what factors are influencing existing investors. In this way decisions to be maddecisions to be made by potential investors are guided with appropriate knowledge. e by potential investors are guided with appropriate knowledge. For cater this objective, the investor behavioural theory was applied which have 4 factors namely heuristic, prospect, market and herding in order to study the behavioral factors influencing decision making by using Partial Least Squares Structural Equation Modeling (PLS-SEM).

Literature Review

Several behavioral factors have been put forth to explain human decision making. Among them heuristics, prospects, market and herding. Heuristics are defined as the rules of thumb, which make decision making easier, especially in complex and uncertain environments by reducing

the complexity of assessing probabilities (Ritter, 2003). According to (Waweru et al., 2008) generally, these heuristics are quite useful, particularly when time is limited however, sometimes it led to biases (Kahneman & Tversky, 1974; Ritter, 2003). In investigating factors belonging to heuristic theory, Kahneman & Tversky (1974) studied and introduced representativeness, availability bias, and anchoring as being influential while Waweru *et al.* (2007) introduced two alternative factors of gambler's fallacy and overconfidence. In property investment decision making, Waweru *et al.*, (2008) suggested that heuristic is the major behavioural factors of influence. Kengatharan (2014) further agreed that heuristic variables have a positive impact on investment decision. Kimeu *et al.*, (2016) revealed that heuristic factors such as an individual trust and confidence in their skills and knowledge can help in outperforming market, dependence on previous experience and future forecasted changes of price on investment decisions.

Prospect theory focuses on subjective decision-making whereby decisions are influenced by the investors' value system (Filbeck, Hatfield &Horvath, 2005). Theory of prospect described some of the effective mental conditions on the decision making process such as loss aversion, regret aversion, and mental accounting (Waweru et al., 2008). Kahneman & Tversky (1979)best describes the prospect theory in economic psychology phenomena whereby people have an irrational tendency to be less willing to gamble with profits than with losses. People tend to under-weigh probable outcomes over certain ones and they response differently to similar situations depending on the context of losses or gains in which they are presented. Kengatharan (2014) identified that loss aversion and regret aversion tended to have a moderate impact on investment decision making.

Waweru et al. (2008) identified the market as having an impact on investors' decision making. Among these market variables include price changes, market information, past trends, customer preference, over-reaction to price changes, and fundamentals of underlying investment. It is believed that changes in market information, fundamentals of the underlying market and changes in price empirically proved to have the high influence on decision-making behavior of investors.

Herding effect in financial market is identified as the tendency of investors' behaviors to follow the actions of others. Investors may prefer herding if they believe that herding can help them to extract useful and reliable information. Herding can contribute to the evaluation of professional performance because low-ability individuals may mimic the behavior of their high-ability peers in order to develop their professional reputation (Kallinterakis, Munir & Markovic, 2010).

As seen above, behavioral factors impact the investment decisions of investors in both financial and property markets. The four behavioral factor groups of heuristic, prospect, market and herding could be used to recognize individual swiftlet ranching business decision makings. Given the above, the following hypotheses are proposed:

H1: Heuristic will have positive effect to investment decision making in swiftlet ranching
H2: Prospect will have positive effect to investment decision making in swiftlet ranching
H3: Market factor will have positive effect to investment decision making in swiftlet ranching
H4: Herding will have positive effect to investment decision making in swiftlet ranching

The above sets of hypotheses on behavioral factors could be applied into decisions of individual investors in the swiftlet ranching business.

Methodology

In light of the aforementioned, the research model of the study is developed as shown in Figure 1 below. This approach uses five-point likert scale to gather the independent and dependent variable data. All instruments were adapted and modified from previous literatures to answer the objective of the study. The questionnaire was adapted from previous research namely by Luong and Ha, (2011). Formative first order in PLS-SEM was used to cater the behavioral factor influencing investment decision making. There are few assessments of formative measurement model need to test which are convergent validity, collinearity issues and significance and relevance of the formative indicators.

There are several assessments need to be fulfill for measurement model (outer model).

a) **Convergent validity**: The minimum path coefficient linking the two constructs is 0.70 and above.

b) **Collinearity Assessment**: In order to check the collinearity issues, the variance inflation factor (VIF) need to be check. The value of VIF must be below than 3.3 (Diamantopoulus and Siguaw, 2006). According to Hair, Ringle and Sarstedt (2011), the value of VIF not more than 5 can be accepted.

c) **Significance and relevance of the indicators**: This assessment wants to confirm whether formative indicators contribute to forming the construct. This study using bootstrapping to know if the outer weights in formative measurement model are significantly difference from zero. If the outer weight is significant, the interpretation of the outer weight can be continued.

After all assessment of measurement model (outer model) are completed, then the structural model (inner model) need to be examined. There are several assessments need to fulfil.

a) **Assess structural model for collinearity issues**: To assess collinearity, the same measure as in evaluation formative measurement model which is VIF can be applied. Again, if VIF > 5 and higher, respectively indicate a potential collinearity problem (Hair, Ringle and Sarstedt, 2011). A more stringent criteria by Diamantopoulos and Sigouw (2006), says that where VIF ≥ 3.3 and higher, it respectively indicates a potential collinearity problem.

b) **Assess the significance and relevance of the structural model relationship (path coefficient, *P*):** The significance test will be conducted by using bootstrapping procedure in order to determine t-value and p-value.

c) **Assess the level of R2**: To evaluate the predictive power of the research model, it is a need to examine the explained variance (R^2) of the endogenous constructs. Using R^2 to assess the structural model is consistent with the objective of PLS to maximize variance explained in the endogenous variables. The literature suggests that R^2 values of 0.67 (substantial), 0.33 (moderate), and 0.19 (weak) respectively by Chin (1998b). Importantly, R^2 should be high enough for the model to achieve a minimum level of explanatory power (Urbach and Ahlemann, 2010). However, Falk and Miller (1992) recommended that R^2 values should be equal to or greater than 0.10 in order to show the variance explained of a particular endogenous construct to be deemed adequate.

d) **Assess the effect sizes of f2:** The effect size of the predictor construct can be evaluated by using Cohen's f2 (Cohen, 1988). The effect size (f2) is a measured used to assess the relative impact of a predictor construct on an endogenous construct (Cohen, 1988). Specifically, it analysed how much predictor construct contributes to the R2 value of a target construct in the structural model. Initially, R2 value is estimate with a particular predecessor construct and if one of the predecessor constructs is excluding, the result for R2 value will be lower. Hence, based on the difference of the R2 value for estimating the model with and without the predecessor construct, is known as the effect size (f2). According to Cohen (1988) the effect size of f2 are:

- f2 values of 0.35 – considered large
- f2 values of 0.15 – considered medium
- f2 values of 0.02 – considered small

e) **Assess the predictive relevance Q2:** Stone and Geisser's Q2 (Geisser, 1975; Stone, 1974) is often used to assess the predictive relevance and can be calculated using blindfolding procedure. Blindfolding procedure is a resampling technique that systematically deletes and predicts every data point of the indicators in the reflecting measurement model of endogenous construct. Note that, if Q2 > 0 the model has predictive relevance and if Q2 < 0 the model has a lack of predictive relevance

In this study, simple random sampling is used to collect the data. Data will be collected through face to face interview with swiftlet ranchers. Structured questionnaire will be used to collect primary data on the respondents' perspective in ranching investment. A total of 180 ranchers have been randomly interviewed which is currently engaged in ranching activities from two districts namely Johor Bahru and Gua Musang, Malaysia. This face to face interview were done in the May 2016 until September 2016 and two enumerators were involved in this data collection.
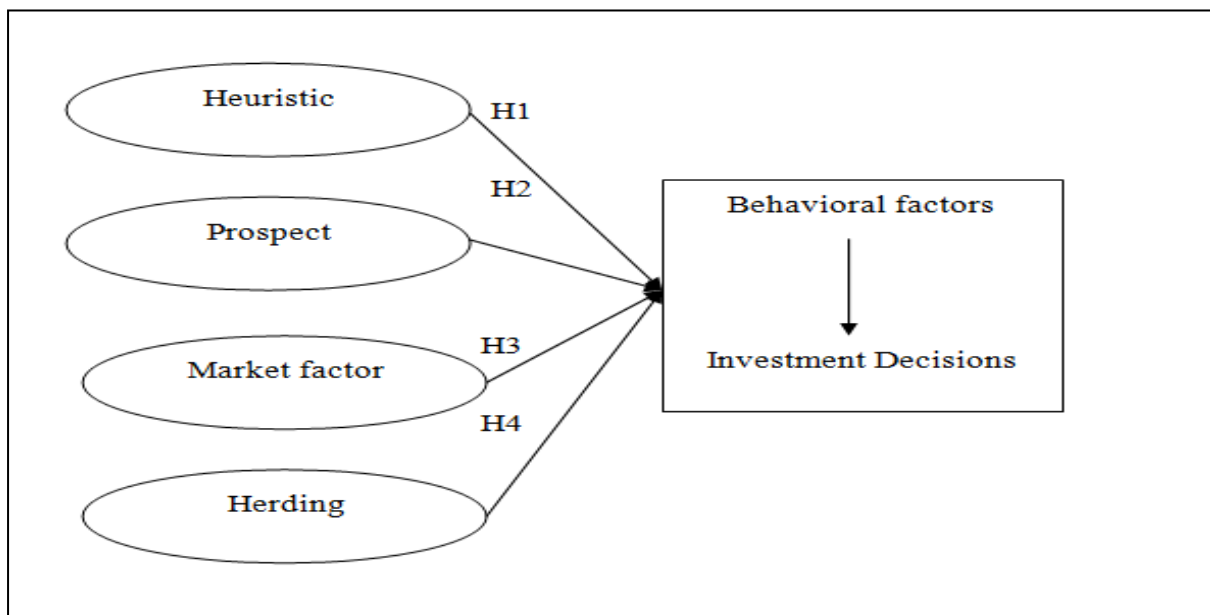

Figure 1: The Research Model of Behavioral Factors' Impacts on Investment Decisions of Individual Investors

Findings and Discussion

Assessment of Measurement Model (outer Model)

Three validity assessment of formative measurement model using experts' assessment are convergent validity, collinearity and significance of each formative indicator. Table 1 below depicts the assessment of formative first order construct of this study. To establish convergent validity, a redundancy analysis was carried out for each latent variable separately. This involves the use of an existing formative latent variable as an exogenous latent variable to predict an endogenous latent variable operationalized through global single item that summarize the essence of the construct. As illustrated, the convergent validity values of the constructs are 0.836 (Heuristic), 0.704 (Prospect), 0.773 (Market) and 0.952 (Herding). Hence, these correlations (path coefficient) between the latent variables achieve the minimum threshold value of 0.7 which indicate that convergent validity is established (Hair et al., 2013).

The evaluation of collinearity is crucial in order to ensure that the construct do not measure the same behavioral factors. From the table, the variance inflation factor (VIF) values for each of the formative constructs are lower than the threshold value of 3.3, suggesting that these constructs are distinct and are measuring different aspects of behavioral (Diamantopoulous and Siguaw, 2006).

Table 1: Convergent Validity and Variance Inflation Factor (VIF)

Construct	Item	CV	VIF
Hueristic	H1	0.836	1.494
	H2		1.176
	H3		1.566
	H4		1.344
	H5		1.413
	H6		1.422
	H7		1.144
	H8		1.465
Prospect	P1	0.704	1.015
	P2		1.188
	P3		1.412
	P4		1.320
	P5		1.054
	P6		1.097
Market	M1	0.773	2.001
	M2		1.670
	M3		1.535
	M4		1.740
	M5		1.636
	M6		1.229
Herding	HER1	0.946	3.283
	HER2		3.135
	HER3		1.827
Performance	PER1	0.661	3.202
	PER2		2.411
	PER3		2.657

The significance of weight of each of the formative construct is subsequently assessed in explaining the first order constructs. Table 2 depicts the bootstrapping result of the outer weight for each of the formative first order constructs. The bootstrapping result shows that all behavioral factors are found to be significantly related to prospect, market, herding and heuristic (except H1 and H3). Heuristics indicator (H1) was considered valid as their outer loadings were above 0.5 and were significant (Hair et al., 2017). Although the outer weight for H3 was insignificant and the outer loading was relatively low (0.465), this item was retained, as the outer loading was significant and the indicator is theoretically relevant to the heuristic construct (Hair et al., 2017).

Table 2: The Significance and Relevance of the Indicators

Construct	Item	Outer weight	T-statistic	p-value
Heuristic	H1☐Heuristic	0.033	0.757	0.450
	H2☐Heuristic	0.118	2.008	0.045
	H3☐Heuristic	0.078	1.012	0.312
	H4☐Heuristic	0.149	2.916	0.004
	H5☐Heuristic	0.775	13.463	0.000
	H6☐Heuristic	0.163	2.955	0.003
	H7☐Heuristic	0.125	2.520	0.012
	H8☐Heuristic	0.152	2.887	0.004
Prospect	P1☐Prospect	0.162	1.643	0.101
	P2☐Prospect	0.313	4.089	0.000
	P3☐Prospect	0.359	4.322	0.000
	P4☐Prospect	0.391	4.785	0.000
	P5☐Prospect	0.312	4.023	0.000
	P6☐Prospect	0.281	3.544	0.000
Market	M1☐Market	0.430	5.529	0.000
	M2☐Market	0.233	3.258	0.001
	M3☐Market	0.231	2.020	0.028
	M4☐Market	0.281	3.780	0.000
	M5☐Market	0.127	2.009	0.044
	M6☐Market	0.362	4.550	0.000
Herding	HER1☐Herding	0.646	11.822	0.000
	HER2☐Herding	0.245	4.345	0.000
	HER3☐Herding	0.197	6.456	0.000
Performance	PER1☐Performance	0.231	1.595	0.111
	PER2☐Performance	0.030	0.256	0.798
	PER3☐Performance	0.788	7.639	0.000

**p<0.01, *p<0.05 (two tailed)

Assessment of structural model (inner model)
Prior to assessing the structural model, it is important to ensure that there are no collinearity issues in the inner model of the study. Table 3 presents the outcome of collinearity test of the model. The VIF values below 3.3 for each of the constructs show that collinearity is not a concern (Diamantopoulous and Siguaw, 2006).

Table 3: Collinearity Assessment

Construct	VIF (inner)
Heuristic	1.085
Prospect	1.146
Market	1.101
Herding	1.032

Table 4 illustrates the result of path coefficient assessment using bootstrapping procedure for the hypothesized relationship. The relationships are found to be all significant (Heuristic> Investment Decision Making, $\beta = 0.396$, p< 0.000; Prospect >Investment Decision Making, $\beta = 0147$, p< 0.026; Market factor > Investment Decision Making, $\beta = 0.376$, p< 0.000; Herding Investment > Decision Making, $\beta = 0.166$, p< 0.048). Hence, it is concluded that all four hypotheses are supported.

Table 4: Path Coefficient Assessment

	Direct effect	Standard Error	T-statistic	P-value
Heuristic → Investment Decision Making	0.396	0.082	4.810	0.000
Prospect → Investment Decision Making	0.147	0.066	2.228	0.046
Market factor → Investment Decision Making	0.376	0.072	5.207	0.000
Herding → Investment Decision Making	0.166	0.084	1.978	0.048

**p<0.01, *p<0.05 (two tailed)

Heuristic is the first construct that has the highest impact to investment decision making and it is composite within the combinations of representativeness, overconfidence, anchoring, gambler fallacy and ability bias. These five variables are significant in heuristic because they influence the investor decision making.

Overall, from the result it is shown that heuristic have positive significant impact on decision making. This result implies that the high price of EBN is influencing investors to be involved in this business proportional directly to the expected high returns of investment. In addition, investors' decisions are driven by the available information and depending on the right sources of available information that may lead to good performance and vice versa. Most of the ranchers get information regarding the management of swiftlet house from their close friends in this industry and also from the member of swiftlet association. The information sharing in swiftlet house management in the association is strong. There is the case when ranchers have full confidence on the consultant in building and managing their swiftlet house. Gambler's fallacy also has been proved as a reliable variable impacting the decision making of investors. Investors associate the changes of the EBN prices to be related to the grading system and they anticipate the market returns based on the bird nest that they harvest. Hence, having confidence and advice from experts have positive impacts to investment decision making, and the more confident they are, the more decisive actions are taken. In business, those who are confident utilize their skills and knowledge in making decisions that could improve their investment results (Luong and Ha, 2011). Although overconfidence is good, investor should be careful as it may also lead to unexpected impact on investment performance.

Market factor is a second construct that has high impact to the investment decision making. In this study, most of the ranchers took due considerations on the price changes, fundamental of

industry, past trend of EBN market, market information, and EBN demand before making investment decision. It indicates that individuals tend to consider the information of EBN market such as general information, past trend of EBN price and current EBN price changes carefully before making their investment. Price changes influence investor decision making. The existing ranchers stated that the embargo imposed by China caused them to postpone their intention to build another swiftlet house because of the price of EBN dropped drastically. Most of the responding ranchers have at least 5 years of experience in this business. Before starting investing, they studied the swiftlet ranching business carefully. Some of the ranchers have taken courses concerning this industry organized by DVS and also engage in knowledge sharing with swiftlet association and close members in this industry. They admit that knowledge regarding the management of swiftlet house is important to increase EBN productivity. Besides that, they also consider the past trend of EBN market such as the lucrative profit made by existing ranchers before them and the encouraging development of this industry. Both of these matters have influence them to invest in swiftlet ranching business. Most of the ranchers reacted to the changes in the price of EBN. Any price decline will delay the breakeven point as they need to pay the loan to bank. Market information is also important for ranchers in making their decisions to invest. When the government announced that the swiftlet industry was one of the 12 NKEAs which are the core of the EPP, this has given positive impression to the potential investors. In addition, in the year 2016, Malaysia and China set an export protocol agreement regarding the exportation of raw uncleaned EBN (RUCEBN) directly to China. This news has indirectly contributed to the increasing number of swiftlet house from 1590 to 2022 houses in Johor and 181 to 351 houses in Kelantan. Ranchers also see the opportunity that can be grabbed from this industry in term of domestic and international demand. There is another 70 percent of unfulfilled demand and South East Asian has the suitable climate for swiftlet habitat.

The third construct is prospect. When ranchers see their swiftlet, houses are producing birdnests with good quality, they have more confident and motivated to invest further in another swiftlet house. However, ranchers tend to be more risk averse after a loss. These are normal reaction of investors because successful prior investment encourages them whereas any failure depresses them. Mental accounting also has impact on decision making of the ranchers. This result confirms that the lucrative profit raises their interest to involve in this business. On the other hand, failure discourages ranchers into regrets when their swiftlet house could not attract swiftlets to nest. This will result in low returns to investment.

The last construct that have a significant influence on the investment decision making is herding. The result implies that ranchers are influenced by the other investors' decision making regarding additional investments in this business. Ranchers are influenced either to make new investment decisions, as well as additional reinvestments to build another swiftlet house. According to ranchers, when they see the successful of other ranchers, they believe that they also can be success as long as they have capital to start up the business and someone are willing to share knowledge regarding the management of swiftlet houses. This study is in line with Chen, Rui & Xu (2003) which argue that herding is more likely to happen in emerging markets than in developed ones as the quality of information disclosure is low.
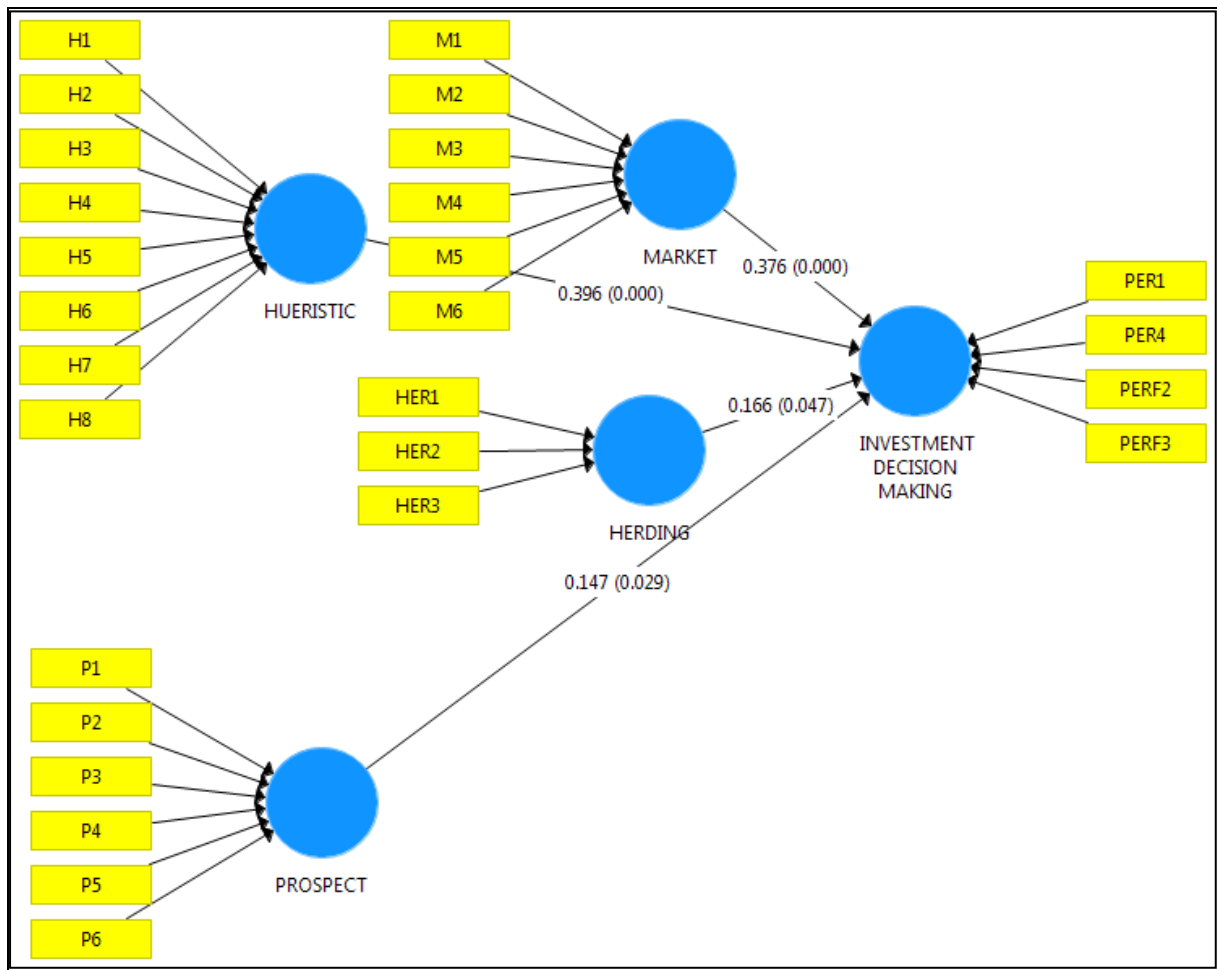
Figure 2: Path Coefficient Assessment of Overall Model

Table 5 presents the assessment of coefficient of determination (R2), the effect of size (f2) as well as the predictive relevance (Q2) of exogenous variables on endogenous variables in this study. The value for the coefficient of determination (R2) is 0.489. This suggests that the exogenous variables in this study, namely heuristic, prospect, market and herding explain 48.9% of the variance in the investment decision making. Overall, the Q2 value of 0.288 which is larger than 0, suggest that all exogenous variables possess predictive capacity over investment decision making (Hair, et al., 2014).

According to Cohen (1988), f2 is assessed as large when it is 0.35 and above, medium when it is between 0.15 to 0.34 and small when it is 0.02 and below. Thus, the results of heuristic (f2=0.283) and market factor (f2=0.251) have a medium effect on decision making than prospect and herding. This indicates that the former factors are more important than the latter in explaining and predicting performance.

Table 5: Effect size (f2) on Performance of Decision Making

Relationships	Effect size (f2)	Conclusion	R2	Q2
Heuristic □ Decision Making	0.283	medium	0.489	0.288
Prospect □Decision Making	0.037	small		
Market factor □Decision Making	0.251	medium		
Herding □Decision Making	0.052	small		

Conclusion
There is ample opportunities for new entrants and investors to explore in the swiftlet house industry. Due to the fact that people are not always rational, their financial decisions may be driven by preconceived behaviors. Thus, studying behavioral factors plays an important role in decision making, in which cognitive psychology is employed to understand human behaviors. There are four behavioral factors that impact the investment decisions of individual investors in swiftlet ranching: Heuristic, Herding, Market and Prospect. The heuristic factor includes five variables which are representativeness, overconfidence, anchoring, gambler's fallacy and availability bias. Prospect consist of three variables; loss aversion, regret aversion and mental accounting. Market factor possesses six variables; price changes, over-reaction to price changes, market information, past trends of EBN market, customers' preferences and fundamental of industry. The last factor is herding which consists of three behavioral variables: following the decisions of the other investors (choice of ranching business; number of swiftlet house; speed of herding). The findings suggest that all the hypotheses (H1, H2, H3, and H4) are supported.

Heuristic construct has the highest impact to investment decision making followed by market, herding and prospect constructs. The findings correspond to past findings that heuristic, market factor, herding and prospect influence the investor decision makings (Ritter (2003); Waweru, (2008); Wamae (2013); Aziz B. & Khan M. A. (2016).

In spite of the magnitude of the present study from theoretical, methodology and empirical standpoint, there exist a few limitations which underscore the need for further investigation. Firstly, this study is limited to looking at two districts. Secondly, this study is limited to the behavioral factors of investors rather than the other factors such as financial, and demographic factors. Hence, further studies could be suggested to delve into other additional factors as to broaden the study.

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