

Lecture Notes in Networks and Systems 487

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Allam Hamdan *Editors*

Sustainable Finance, Digitalization and the Role of Technology

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The Application of Planned Behavior Theory to the Adoption of Food Bank Program Among University Students



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Abstract College meal plan for students is often too expensive, especially for low-income students. To overcome this problem, providing a food bank significant to help food insecurity among students in campus; hence, universities have come up with a food bank program to alleviate student hunger. This study aims to examine the influence of attitudes, subjective norm, and perceive behavior control on the adoption of food bank program at universities. The research population includes Malaysian public university students. The study employed an online survey instrument and received 380 responses from university students. For data analysis, the partial least square (PLS) was utilized by analysing the data using SmartPLS version 3.3 and the findings revealed that the data supported all of the direct relationships. This study adds to the body of knowledge in relation to the influence of attitudes, subjective norm, and perceived behavior control on the adoption of the food bank program. Therefore, universities are anticipated to become a catalyst that improves the attitudes, subjective norm, as well as perceived behavioral control towards the adoption of food bank program to help ease student hunger.

Keywords Food bank · University student · Planned behavior theory · Attitudes · Subjective norm · Perceive behavior control

1 Introduction

Nowadays, the concept of food bank (FB) has spread around the globe. FB acts as social public assistance that gathers and distributes extra food that is donated by manufacturers, farmers, or retailers and distribute it to the people who have no financial means to purchase the food. The FB program makes a major contribution to the resolution of food loss problems, the food availability for people with low

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income, including environmental degradation as a result of food waste. According to Mejia et al. (2015), FBs (above 500) that operate in more than 30 countries (Global Food Banking Network 2013), they found that the countries have served beyond 20 million people across the globe.

Due to scarce financial resources, students at higher institutions are facing food insecurity due to the increase in tuition fees, housing rental costs, and food price. The increased living standards and price of goods and the increasing issues of diet-related health are one of the factors that influence food insecurity among university students (Yasin et al. 2019). Besides, college meal plan for students is often too expensive, especially for low-income students. As such, some university students are doing part-time jobs to gain extra income in order to spend money on food and other things. Thus, to overcome this problem, providing a food bank is significant to help food insecurity. As such, college and universities around the world have taken the initiative to open food pantries in an effort to alleviate student hunger.

The introduction and existence of programs such as food bank at public universities may help students from the low-income group or B40 by providing them food. This program is very helpful for those in need, especially students with financial constraints. The food bank is also the best initiative for university students, considering that some of them may have to find part-time jobs during their studies to fulfill their daily needs such as food expenses. However, since student life often comes with a limited time, some of the students are unable to locate their time for any part-time work. Thus, the food bank program will help the students acquire food for their daily need. Among the successful milestones achieved by the food bank program is Food Bank Malaysia, which was launched in August 2019 and had benefited about 45,850 households. The higher institutions saw this as one of the initiatives to help their students acquire food. Thus, public universities such as University Malaya, Universiti Teknologi Mara (UiTM) Permatang Pauh, Universiti Teknologi Malaysia (UTM) Skudai, Universiti Sultan Zainal Abidin (UniSZA), Universiti Putra Malaysia (UPM) Serdang, and Universiti Malaysia Kelantan (UMK) are among the public universities that have implemented this program.

Therefore, the current study aims to investigate this issue further. The general scope of the study is to focus on the application of Ajzen's (1991) theory of planned behaviour (TPB) toward the adoption of food bank program among university students. According to Ajzen (2011), the theory of planned behavior is an essential model that can be used to predict human social behavior. The TPB model indicates that intention is significantly influenced by three main constructs of attitudes, subjective norm, and perceived behavioral intention in which when the intention is stronger, an individual is more likely to perform the behavior (Ajzen 1988). Therefore, this study further aims to extend the exploration of the theory of planned behavior by investigating the influence of attitudes, subjective norm, as well as perceived behavioral control on the adoption of food bank program among university students.

The next part of this study covers the hypothesis and related concepts and research framework. Then, it includes the research method, followed by the empirical results and discussion of the research findings. Finally, the paper conclude with the research implication, limitation and recommendation for future research.

2 Hypothesis and Related Concepts

2.1 *Theory of Planned Behaviour*

According to Jaffar and Musa (2014), the Theory of Planned Behavior is one of the most influential and common frameworks in studies on behavior prediction from the attitude variable. The Theory of Planned Behaviour is made up of three constituents: a) behavioral attitude, b) subjective norm, and c) perceived behavioral influence that connect beliefs and actions (Yunos et al. 2014). As outlined in the TPB, the three types of beliefs influencing human behavior are the beliefs regarding the potential effects of behavior (behavioral beliefs), the perceptions of others (normative beliefs), as well as the influences that ease or obstruct a behavior (control beliefs). Behavioral beliefs establish positive or negative behavioral attitudes, while normative beliefs may cause perceived subjective norm or social pressure and perceived behavioral influence is created by control beliefs (Fishbein and Ajzen 1985). ATT, SN, and PBC altogether contribute to the development of a behavioral goal that is referred to as the immediate behavioral antecedent (Ajzen 2012).

2.2 *The Influence of Attitudes on the Adoption of the Food Bank Program*

Attitudes refer to the extent to which an individual positively or negatively evaluates a behavior, while the subjective norm is the degree to which an individual perceives the importance of behavior's execution or not execution including the individual's motivation to perform what is deemed important, which denotes the individual's extent of perceived easiness or difficulty in conducting the behavior. Studies have previously revealed that attitudes have a direct relationship with the perceptions of food insecurity among college students (Afendi et al. 2014). Phillips et al. (2018) study also contributes to the dialogue about the rising and changing role of student affairs in addressing food insecurity among college students as the help that students need. Specifically, the shift refers to the need for food among students that they may not procure elsewhere. Researchers are also beginning to recognize that food insecurity such as missing classes and not buying textbooks is critical for academic disruptions (Dubick et al. 2016). Food bank is mainly related to whether people deem it a significant problem, thereby attempting to minimize such an issue. This seems to be one of the strongest determinants in the sense of the TPB as described in the literature (Graham-Rowe et al. 2014). Accordingly, the first hypothesis is proposed as follows:

H1: There is a positive association between attitudes and the adoption of the food bank program.

2.3 The Influence of Perceived Behavioral Control on the Adoption of the Food Bank Program

As stated by Ajzen (1991), perceived regulation of behavior is determined by a person's beliefs about the power of situational and internal factors to promote behavioral success. This also applies to the idea that the conduct of interest is simple or difficult to execute (Ajzen 1991). Perceived behavioral control has implications for circumstances such as the behavior of students who do not have enough resources to purchase food, including budgetary pressures and other variables. This reasoning serves as the basis for the development of the second hypothesis as follows:

H2: There is a positive association between perceived behavioral control and the adoption of the food bank program.

2.4 The Influence of Subjective Norm on the Adoption of the Food Bank Program

The social norm is a subjective norm that is meant to quantify social pressures such as the perceptions of family members and friends on the actions of an individual. Subjective norm refers to the views that individuals deem important, particularly those who advise others regarding whether or not to perform certain behaviors or motivation, along with one's willingness to perform or not to perform what was deemed important (Wedayanti and Giantari 2016). The greater the mood, the greater the goal will be, which will be reflected in the actions and vice versa (Ajzen 2012). In this study, students who are dealing with food insecurity stem from issues such as low family income, lack of financial resources, high tuition and/or living costs, or personal emergencies (Cady 2016). As such, subjective norm refers to the social pressure that students experience while using the food bank program on their campus. Hence, this study formulates the following hypothesis:

H3: There is a positive association between subjective norm and the adoption of the food bank program.

2.5 Research Framework

To overcome the previous limitations, a research framework has been developed by examining the development of hypotheses in relation to several relevant concepts (Fig. 1).

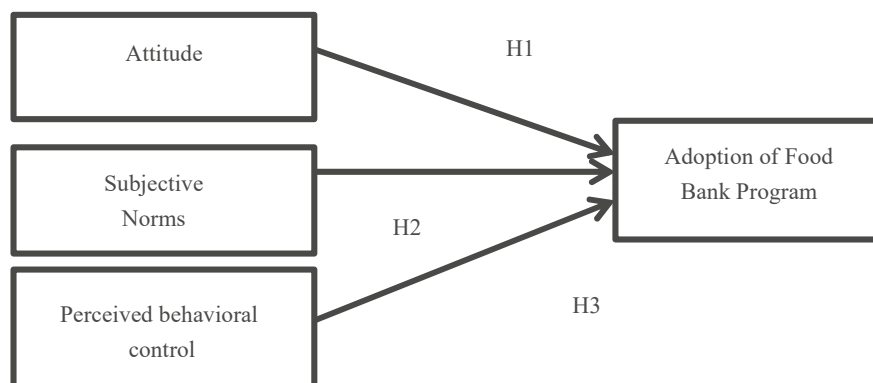


Fig. 1 Research framework

3 Research Method

The public university students in Malaysia are the unit of analysis in this study and the current study used a convenience sampling method to select the participants. According to Kumar et al. (2013), convenience sampling is a process that involves collecting data from a particular population that the researcher can easily access. Generally, a non-probability technique is suitable in examining the theoretical influence grounded research by a conceptual framework (Hulland et al. 2018). Therefore, this study employed this method because it matches the research context.

The data collection was conducted using an online survey; however, to lessen the probable risk of poor return rate, the researcher decided to call on the public university students in Malaysia online to help the researcher distribute the questionnaires to the potential respondents. Besides, to minimize common method variance (CMV), a few procedural remedies were also implemented. Firstly, a description of the research project was written in the questionnaire to outline the purpose and significance of the study to the community. Additionally, the respondents were given written instructions and assured that all responses and personal details would be treated with the utmost confidentiality. Besides, their participation in the study was entirely voluntary and they were also encouraged to answer all questions honestly since the questions do not specify any right or wrong answers. Based on Mackenzie et al.'s (2016) suggestion, distinct anchor scales were used to analyse the variables through a five-point Likert scale.

An analysis using Green's (1991) table was carried out before collecting the data in order to identify the minimum sample size needed to sufficiently accomplish statistical power for explaining the relationships within the model (Hair et al. 2017). Research finding shows minimum sample size of 76 required for this study for the three predictors, with a medium effect size of 0.15 at a 0.05 confidence level. Thus, the data were deemed sufficient for the research model based on the 331 responses received.

4 Results and Discussion

4.1 Respondent's Profile

The respondents' demographic background comprising 331 undergraduate students from local universities throughout Malaysia is shown in Table 1. The respondents consist of 49 (14.7%) male and 282 (85.2%) female undergraduate students. The majority of the respondents are come from low-income households (below RM3,000) with 68%.

To analyze the data, the SmartPLS version 3.2.8 software was applied to experiment on complex models that involve latent variables. This software is suitable to be used as a tool because it can better explain the underlying constructs including their relationships. SmartPLS is also appropriate for the data that did not meet the normality distribution.

In line with Hair et al.'s (2017) recommendation, a normality test has been carried out before examining the measurement model. The WebPower software was also used to calculate multivariate skewness and kurtosis and the results revealed both Mardia's multivariate skewness ($\beta = 10.308$, $p < 0.01$) and multivariate kurtosis ($\beta = 97.402$, $p < 0.01$). This indicates the non-normality encompassed within the data including its significant application for regression analysis via Smart PLS.

Since this analysis applied single-source data through a simultaneous collection of the dependent and independent variables from the same person, this study renders CMV a potential issue (Mackenzie et al. 2016). Hence, a statistical approach was applied to solve this issue. According to Podsakoff et al. (2003), CMV is troublesome if the bulk of the explained variation is found in a single latent factor. It has also been reported that CMV is a concern if more than 50% of the total variance is clarified by the first factor (Fuller et al. 2016). Therefore, to determine the degree of the bias, the

Table 1 Demographic profile

	Demographic		Frequency	Percent
1	Gender	Male	49	14.7
		Female	282	85.2
2	Student status	Have parents	272	82.2
		Have only mother/father	58	17.5
		Orphan	0	0
3	Family income	Below RM1000	113	34.1
		RM1001–RM2000	113	34.1
		RM2001–RM3000	47	14.2
		RM3001–RM4000	19	5.7
		RM4001–RM5000	12	3.6
		RM5000 and above	27	8.2

Harman single factor test was carried out as per Hair et al.'s (2017) suggestion. The unrotated factor analysis further revealed that 27.33% of the balance was carried out by the first factor. Therefore, CMV of current research is not an issue.

4.2 Measurement Model Assessment

Anderson and Gerbing's (1988) approach called the two-step approach was introduced in this study, which evaluates the calculation model and the structural model. Firstly, the associations between the items and constructs were measured based on the measurement model. Secondly, the association between the independent and dependent variables was measured in the structural model. The convergent and discriminant validity conditions must also be met in the measurement model. Table 2 depicts the measurement model of this study.

Convergent validity is used to measure the extent of consensus between various item measuring the same concept. Firstly, to determine the convergent validity of each construct in the measurement model, the study tested the loading values as well as composite reliability (CR) and average variance defined (AVE). According to Hair et al. (2017), to ensure the presence of convergent validity in the model, the loading and AVE values should be greater than 0.5 and the CR value should be at least 0.7. As can be seen in Table 2, the loading, AVE, and CR values exceeded the suggested values; hence, the convergent validity of each model is deemed sufficient. The loading values were recorded to range from 0.588 to 0.844, specifically from

Table 2 Convergent validity

Construct	Items	Loading	AVE	CR
Attitude	BV1	0.881	0.684	0.895
	BV2	0.884		
	BV3	0.859		
	BV4	0.664		
Subjective norm	NOS1	0.838	0.507	0.804
	NOS2	0.870		
	NOS3	0.826		
	NOS4	0.858		
	NOS5	0.845		
Perceived behavioral control	KTL1	0.689	0.719	0.927
	KTL2	0.672		
	KTL4	0.717		
	KTL6	0.767		
On-campus food bank program	FB1	0.720	0.543	0.824
	FB2	0.822		
	FB3	0.796		
	FB4	0.588		

Note: KTL3, KTL5, FB5 were deleted due to low loading

Table 3 Discriminant validity

	Attitude	On-Campus Food Bank Program	Perceived Behavioral Control	Subjective Norm
Attitude				
On-Campus Food Bank Program	0.634			
Perceived Behavioral Control	0.216	0.412		
Subjective Norm	0.62	0.698	0.124	

0.507 to 0.719 for AVE and from 0.804 to 0.927 for CR. Therefore, these findings suggested that convergent validity is achieved.

After achieving the criteria for convergent validity, discriminant validity was further achieved by model's testing using the presence of discriminant validity through the correlation criteria heterotrait-monotrait (HTMT) ratio in deciding whether all constructs in the established model varied from other constructs. Resultantly, each construct was unique and not described in the model by other constructs (Hair et al. 2017). In line with Henseler et al.'s (2015) recommendation, all HTMT scores were smaller than the threshold score of 0.90 (see Table 3); therefore, this shows that the model has fulfilled the suggested criteria and that all structures of the analysis were validated via discriminant validity.

Additionally, the study conducted a lateral collinearity analysis in order to ensure that collinearity problems did not exist in the model prior to examining the structural model upon verifying the convergent and discriminant validity of the measurement model. Based on Hair et al.'s (2017) suggestion, collinearity problems can be analyzed by measuring the values of variance inflation factor (VIF) of all research model's construct. In this study, the values for VIF must not be greater than the threshold score of 3.3 to ensure no collinearity problems among the predictor variables (Diamantopoulos and Siguaw 2006). The results indicated that the VIF values were less than 3.3 for all variables, suggesting no collinearity problems that exist within the predictor variables.

4.3 Assessment of the Structural Model

Path analysis has been performed to assess the three hypotheses after testing the measurement model. The beta value direction, the t- and p-values for determining

the significance levels, as well as the lower level (LL) and upper level (UL) confidence intervals were analyzed in the evaluation of the structural model (Hair et al. 2017). To assess the direct effect, the study performed a bootstrapping procedure using bootstrap 5,000 replicates. Specifically, it was proposed in H1 that attitudes positively influence the adoption of the on-campus food bank program. The findings then revealed the significance of the relationship ($b = 0.228$, $t = 4.094$; $LL = 0.114$, $UL = 0.334$, $p < 0.001$); hence, H1 was accepted. As for H2, which suggests that PBC has a positive influence on the adoption of the on-campus food bank program, the beta result recorded a positive value and a significant relationship ($b = 0.223$, $t = 4.972$; $LL = 0.139$, $UL = 0.317$, $p < 0.001$); thus, H2 was also accepted. Finally, in terms of H3, which proposes that subjective norm has a positive influence on the adoption of the on-campus food bank program, the results demonstrated a positive and significant relationship ($b = 0.426$, $t = 7.502$; $LL = 0.314$, $UL = 0.526$, $p < 0.001$); hence, H3 was likewise accepted (Table 4).

The coefficient of determination (R^2) of the independent variables against the dependent variable is provided in Table 5. It is followed by as well as the effect size (f^2) values. The dependent variable's variance as described by the independent variables in the research model is represented by the R^2 value. As shown in the table, the R^2 value is 0.427, which shows that 42.7% of the variation in the endogenous variable (adoption of food bank program) was clarified by the independent variables, namely attitude, subjective norm, as well as perceived behavioral control. With regard to the effect size, f^2 , the R^2 value was reported to change when omitted from the model. In line with Cohen's (1988) suggestion, the effect size impact is deemed small if the f^2 value denotes 0.02, medium if the value denotes 0.15, and high if the value denotes 0.35. Based on Table 5, attitudes with $f^2 = 0.063$ and PBC with $f^2 = 0.084$ have a small effect size along the dependent variable (adoption of food bank

Table 4 Hypothesis testing

Relationship		Std Beta	Std error	t value	p values	CI		VIF	Decision
						LL	UL		
H1	Attitude → FB	0.228	0.057	4.094	0.000	0.114	0.334	1.441	Supported
H2	Perceived behavioral control → FB	0.223	0.045	4.972	0.000	0.139	0.317	1.024	Supported
H3	Subjective norm → FB	0.426	0.054	7.502	0.000	0.314	0.526	1.433	Supported

Note: CI = Confidence Interval, LL = Lower Level, UP = upper level, FB = food bank program

Table 5 Coefficient of determination (R^2), and effect size (f^2), and predictive relevance (Q^2)

	Relationship	R^2	f^2	Q^2
H1	Attitude → FB	0.427	0.063 (small)	0.063
H2	Perceived behavioral control → FB	0.427	0.084 (small)	0.084
H3	Subjective norm → FB	0.427	0.221 (medium)	0.221

program), whereas subjective norm with $f^2 = 0.221$ has a medium effect size along the endogenous variable.

This analysis employed a blindfolding technique to determine the test model's statistical relevance. This technique was applied to the endogenous construct (Hair et al. 2016). The Q^2 values (SEE Table 5) for attitudes (0.063), PBC (0.084), and subjective norm (0.221) are more than 0; hence, the model has adequate predictive relevance.

5 Discussion

The research aims is to explore the incorporated influence of attitudes, subjective norm, as well as perceived behavior control towards the adoption of food bank program among university students. The research results will add new evidence to the adoption of the food bank program through the TPB theory. Briefly, the study found that factors such as attitudes, subjective norm, including perceived behavioral control can influence the adoption of food bank program among university students. The positive relationship between attitudes and the adoption of the food bank program was supported by Afendi et al. (2014) and Lwin et al. (2020). Phillips et al. (2018) also stated that food insecurity will affect academic performance and academic disturbances if the university does not fight food insecurity among students. Therefore, positive attitudes towards the adoption of food bank program among university students are crucial and the food bank program is clearly important to university students.

The second research question addresses the relationship between perceived behavioral control and the adoption of the food bank program. The results indicated that perceived behavior has a positive and significant influence on the adoption of the food bank program. This was supported by Stefan et al. (2013) who seconded the influence of PBC on good food management, which coincides with the current study. Additionally, Stancu et al. (2016) also verified that PBC strongly and significantly influences the adoption of good food management including the provision of a food bank on campuses.

The last research hypothesis deals with the relationship between subjective norm and the adoption of the food bank program. The study revealed that subjective norm is positively related to the adoption of food bank program; hence, the third research hypothesis (H3) was supported. The findings also coincide with many previous studies, which reported that subjective norm has a significant influence on the adoption of food bank program. Similar to the findings reported by Sirieix et al. (2017), the findings in the current study highlighted subjective norm as a factor that drives individual intention and food behavior. However, Graham-Rowe et al. (2014) reported that subjective norm does not influence student intention. Besides, students also receive encouragement and support from those who are important to them, thereby influencing the adoption of food bank programs. This shows a positive sign and a promising step in relation to facilitating food insecurity via the food bank

program. As such, social influence may have a particular influence on the adoption of food program among university students. The findings were as anticipated because the students who deal with food insecurity are likely to stem from issues such as low family income, lack of financial resources, high tuition and living costs, or personal emergencies (Cady 2016). Additionally, social pressure is also one of the critical issues faced by students because referents by certain important individuals or groups may influence one's attitudes, feelings, and behavior (Ajzen and Fishbein 1980). This finding coincides with the theory of planned behavior by which subjective norm including individual intentions and behaviors are a result of the subjective evaluation of events taking place in the environment.

6 Conclusion and Recommendation

Overall, universities should be a catalyst that enhances attitudes, subjective norm, as well as perceived behavioral control towards introducing an on-campus food bank program to alleviate student hunger. This study extends the understanding of researchers and practitioners in terms of fighting food insecurity among university students.

6.1 *Theoretical Implications*

The results supported the predictions derived from the TPB theory. The current research adds to the theoretical contribution by highlighting attitudes, subjective norm, including perceived behavioral control as the key factors influencing the adoption of the food bank program on campus. Additionally, this study further enlightens the relationship between the adoption of food bank program and related variables from the perspective of TPB. By developing a multi-component model that involves variables such as attitudes, subjective norm, as well as perceived behavioral control, this study verifies that these variables are indeed the important factors influencing the adoption of the food bank program.

6.2 *Practical Implications*

Apart from the theoretical contributions, this study also provides practical implications regarding the key factors in the on-campus food bank program in universities. In terms of practical perspective, the research findings may have several important implications. Firstly, it is clear that the food bank program is required by university students to fight hunger on campus. This finding adds to the importance of taking a wider subjective norm such as the social context in the adoption of food

bank programs among students. Finally, the results also showed that attitudes and behavioral control are important factors to address because they ease the students in adopting the on-campus food bank program in their universities. Food banks are significant in the food aid industry because they directly distributed donated and purchased groceries to fight food insecurity among students. The public health implications concerning food insecurity are also important to fight food insecurity among students in needs. Instead of being a one-off or an ad hoc program that happens occasionally or only once, this program rather becomes a continuous effort to assist poor students in coping with the increased living standards.

6.3 *Limitations and Recommendations for Future Research*

Overall, it is noteworthy to address that the current study implies two drawbacks. First of all, the respondents in this study primarily include students from Malaysian public universities; hence, there was no participation from those in private universities. The data can be improved by adding more participants and covering more parts of the student body with a larger geographical region. The information from this study also contributes to the understanding of an increasingly prevalent problem of food insecurity. Thus, future studies should aim for a larger sample. Secondly, the results were only based on the data obtained from online questionnaires; hence, this may question the agreement between self-reported responses and actual behavior. As such, interviews and observations may offer a more detailed approach in the future in examining the adoption of the food bank program on campus.

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