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Re-Evaluating Predictive Validity of the Theory of Planned Behavior in Transport Mode Choice: A Case of Dry-Commodity Export Shippers in Malawi.

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ABSTRACT

The Theory of Planned Behavior has been a widely used model in understanding and predicting human behavior in sectors of health, mining, agriculture, public transportation and water management. Despite its extensive usage, its application has hardly been made in commodity transportation sector as it is expected to. Therefore, the purpose of the study was to re-evaluate the predictive validity of the Theory of Planned Behavior on transport mode choice from the perspective of dry-commodity export shippers in Malawi. The study employed quantitative approach and explanatory research design in which a closed-ended questionnaire was used to collect data from a sample of 104 respondents drawn from a population of 141 dry-commodity export shippers by using simple random probability sampling technique. The study found that the Theory of Planned Behavior has the foretelling capabilities and able to predict shippers' behavior when choosing a transport mode for their goods. The study therefore recommends that policy makers, transporters and commodity shippers to start utilizing this theory to understand and predict human behavior, especially those in supply chain sector.

Keywords: Theory of Planned Behavior, Theory of Reasoned Action, Transport, Dry-Commodity, Malawi.

INTRODUCTION

For many years, the Theory of Planned Behavior has been used as a model for understanding and predicting human behavior in the field of management, health, public transport, agriculture and information technology (Gimenez et al., 2023; Hussain, 2020; Nickell & Hinsz, 2023; Yakasai & Jusoh, 2015). Besides its wide usage, not adequate application has been made in the field of commodity transportation in the determination of how shippers make transport mode choices for their goods. Therefore, the study aimed at assessing if the Theory of Planned Behavior remains an adequate model in the field of supply chain in understanding and predicting dry-commodity export shippers' behavior when selecting transport mode in Malawi.

Four transport mode choice factors were pre-selected and put to test to assess their influence on the transport modal choices that the commodity export shippers make. These were, shipment travel time, freight cost, transport mode availability and transport mode reliability. Anchored by the Theory of Planned Behavior, these factors were tested to determine their influence on shippers' transport modal choice.

Purpose of the Study

The purpose of the study was to re-evaluate the predictive validity of the Theory of Planned Behavior in transport mode choice from the perspective of dry commodity export shippers in Malawi.

The following hypotheses were put forward for testing:

1. H_1: Shipment travel time has a correlation with transport modal choice

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2. H_0: Transportation cost has no association with transport modal choice

3. H_1: Transport mode availability has a relationship with transport modal choices

4. H_1: Transport service reliability has a link with transport modal choice

Conceptual framework

Adapting the Theory of Planned Behaviour which is the theory that informed this research, the following conceptual framework guided the study:

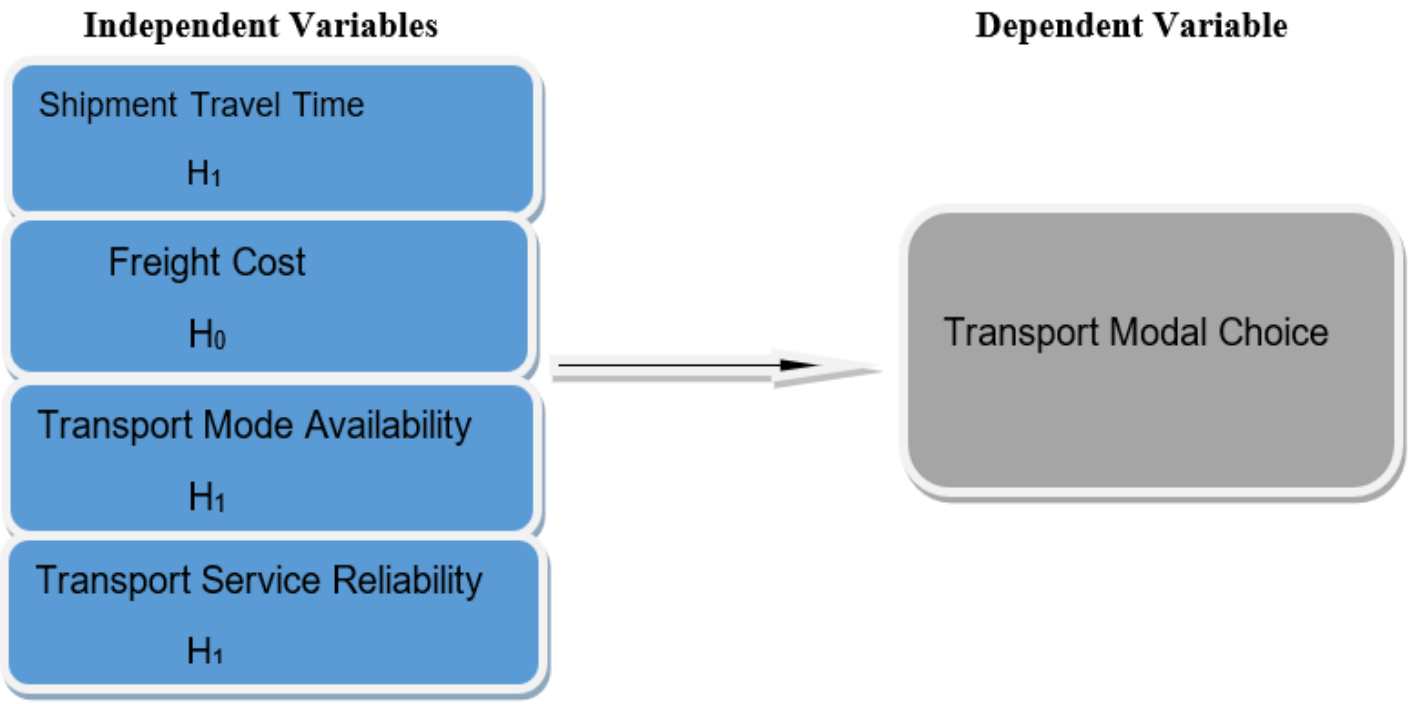

Figure 1: Conceptual Framework

LITERATURE REVIEW

Origin and Evolution of the Theory of Planned Behaviour

The Theory of Planned Behavior (TPB) evolved from the Theory of Reasoned Action (TRA) (Ajzen, 1991; Ajzen & Fishbein, 2000). The Theory of Reasoned Action, which is a general theory of behavior, was first introduced in 1967 by Martin Fishbein (Ajzen & Fishbein, 2000; Hu et al., 2021; Ke, 2018). The Theory of Reasoned Action assumed that behaviour intention of an individual is determined by their attitude and subjective norm. The theory suggests that humans' behaviours are influenced by their intention to perform the behaviour and that this intention is in turn, a function of their attitude towards the behaviour and subjective norm (Ajzen & Fishbein, 2000). Compactly, the Theory of Reasoned Action posits that a person's actual behaviour is influenced by how he or she perceives the outcome of the decision one plans to make, thus, attitude and also what other people that are important to him or her think about that decision, thus, subjective norm. While the model was able to predict human behaviour, it had some weaknesses which lead to some criticism. The theory was criticized not to consider volitional control and that it had difficulty accounting for situations in which one's behaviour does not match intent.

The discovery that human behaviour is not entirely voluntary and that it cannot always be controlled, the third factor, namely perceived behaviour control was added to the theory for the purpose of improving the predictability of the model (Ajzen, 1991). This departure from the Theory of Reasoned Action to Theory of Planned Behavior was backed by Fishbein and Icek in 1975. The perceived behaviour control is the perceived ability to control one's specific behaviours.

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Theory of Planned Behaviour

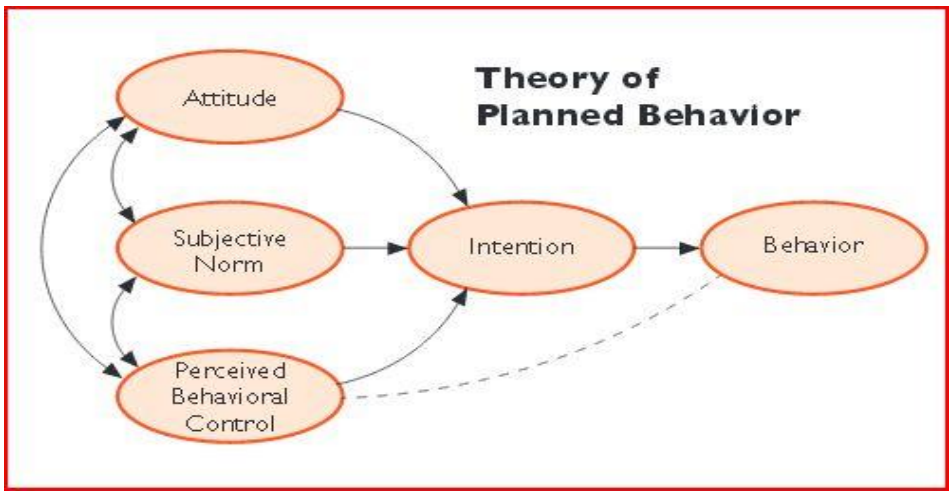

Figure 2: Theory of Planned Behaviour (Ajzen, 1991)

The Theory of Planned Behavior postulates that an individual's behaviour is a function of three factors namely attitude, subjective norm and perceived behaviour control. These factors lead to an intention and one's desire to perform a behaviour (Ajzen, 1991).

Attitude

This refers to the degree to which a person has a favourable or unfavourable evaluation of the behaviour of interest. It entails a consideration of the outcomes of performance of a behaviour if it is beneficial or not. A person's attitude towards the behavior will affect how likely one is to perform that behaviour. If one believes that the behavior will be beneficial, one is more likely to perform that behavior. Simply put, attitude answers the question "*what do I think about the behaviour*" (Ajzen, 1991; Ajzen & Fishbein, 2000).

Subjective Norm

This factor looks at what others in one's social circle think about your behaviour. A person's behavior is somehow shaped by what others are expecting you to do. If people that are close and important to you think that it is beneficial to make a certain decision, you are more likely to perform that behavior. Subjective norm will answer the question "*what do others think"* (Ajzen, 1991; Ajzen & Fishbein, 2000)

Perceived Behavior Control

This factor looks at whether one believes he or she has the tools or means required to exhibit the behavior. If one believes that he or she has no control or resources to make a decision about something, he or she is less likely to perform that behavior. In the same way, when one believes that he or she has control or resources to make a particular decision, one is more likely to perform that behavior. Perceived behavior control answers the question "*can I do it"* (Ajzen, 1991; Ajzen & Fishbein, 2000).

All these three factors, combined, form an intention and this intention is a desire to perform a behavior. To sum it up, the Theory of Planned Behavior suggests that individuals are more likely to engage in a positive behavior if they believe that the behavior will lead to a particular outcome that will be beneficial to them. By the same token, an individual is more like to perform a behavior if they believe that people whose views they value think they should carry out the behavior and also if they feel that they have the necessary resources, control or opportunity to perform the behavior (Ajzen, 1991; Ajzen & Fishbein, 2000).

Applicability of the Theory of Planned Behavior

The Theory of Planned Behavior has been applied to various fields of study in trying to understand social behaviors of individuals. In public transport sector, the theory has been used to predict the commuters'

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willingness to use Light-Rail Transit (LRT) (Hussain, 2020). To understand the willingness of the commuters to use the train system in Klang valley in Malaysia, the researcher studied four predictors which were trust, situational factors, novelty-seeking and external influence. The results indicated that the perceived behaviour control, attitude and subjective norm of the Theory of Planned Behaviour displayed positive effects on the commuters' behavioural intention to use the train system (Hussain, 2020).

In water management sector, the theory was applied to assess the intervention to address deteriorating water quality. The study investigated the factors which influenced illegal miners' intention to choose an alternative job. The attitude of the Theory of Planned Behavior was found to be the only dominant significant antecedent of the behavioural intention (Duncan et al., 2022). The theory also proved to be useful in the food production sector in which the study was carried out to understand workers' production of safe food. The theory worked well in understanding how to prevent foodborne contamination (Nickell & Hinsz, 2023).

The application of the theory was also made by Suntornsan and others in 2022 in which the authors tried to assess the role of the Theory of Planned Behavior in explaining the energy saving behavior of high school students with physical impairment (Suntornsan et al., 2022). The study looked at how people with physical deficiency could help solve energy problems by participating in diverse energy saving behavior such as switching off lights and also turning of air conditioners when not in use. Owing to the fact that these physically challenged students would have difficulties to participate in some behaviors due to mobility impairment, the study examined the factors that impact the energy-saving behaviours of these students and the Theory of Planned Behavior was employed to assist in predicting the behaviors. The results of the study suggested that the Theory of Planned behavior variables can predict energy saving behaviors but their power to predict the behavior varies (Suntornsan et al., 2022).

The Theory of Planned Behavior has also been utilized in health sector (Alhamad & Donyai, 2021). The predictive validity of the theory was tested to understanding people's beliefs and intentions towards reusing of medicines (Alhamad & Donyai, 2021). The study examined people's intentions to engage in medicines reuse, i.e. accepting medicines that are returned unused to a pharmacy to be reused. The paper examined the validity of the theory against other health-related psychological theories of behavior change and the results of the study showed that the Theory of Planned Behavior proved to have more accurate defined constructs and ideal in studying medicines reuse behavior (Alhamad & Donyai, 2021). The theory has also been used by Pourmand and other authors in 2020 in their study *"Application of the Theory of Planned Bahavior to self-care in Patient with Hypertension"*. For a successful control and management of hypertension, self-care and positive changes in life style have been important factors. The study therefore used behavior model based on the Theory of Planned Behavior to assess the factors that influence self-care behaviors for controlling hypertension. The theory successfully predicted that group-specific behavior barriers are important when improving self-care behavior in patients with hypertension (Pourmand et al., 2020).

METHODOLGY

Research Design

The purpose of the study was to validate the predictive ability of the Theory of Planned behavior through the lens of dry-commodity export shippers in Malawi. It was for this reason that the study employed explanatory research design. This design helped the investigator to understand why shippers prefer some modes of transport more than the other modes of transport (Bryman, n.d.; Greener & Martelli, 2015; Saunders et al., 2007).

Study Site

This study was conducted in Blantyre city in Malawi. Being a commercial hub of Malawi, the city has a large number of manufacturing and exporting companies and it is served by all modes of transport available in Malawi viz, rail, air, road and it is also closer to the sea through Nacala and Beira ports.

Target Population

The target population of the study was all dry-commodity export shippers in Blantyre city of Malawi. Given the

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fact that different types of commodities have different shipping requirements, only dry commodity export shippers were considered in this study. All export shippers of wet and perishable cargo were excluded from taking part in the study.

Sample Size and Sampling Technique

Using Yamane (1967) sample calculation method, a sample size of 104 dry-commodity export shippers was drawn from a population of 141. The sampling frame of the study was all dry-commodity export shippers registered by the Malawi Export Promotion Council of Malawi in the year 2022. Simple random probability sampling technique was utilized for the purpose of allowing all cases of the population having an equal chance of being selected into the study (Disman et al., 2017; Leedy & Ormrod, n.d.; Saunders et al., 2007).

Data Generation and Procedure

A questionnaire was used to collect primary data from 104 dry-commodity export shippers. The data collection tool had closed-ended questions for the purpose of generating precise answers for the study. In designing the questionnaire, a five-point Likert scale was considered to measure the respondents' level of perception (Saunders et al., 2007).

Data Analysis

An SPSS version 20.0 was used to arrange data and logistic regression analysis was performed to determine the behavior of the dependent variable. To avoid multi-collineality, SPSS was utilized to conduct exploratory factor analysis (EFA) on variables. The analysis tool was also used to assess the suitability for factor analysis using Kaiser-Meyer-Olkin (KMO) test. The rationale to perform KMO test was to measure the sampling adequacy of the study. The study also utilized Durbin-Watson test in the SPSS to detect the presence of autocorrelation (Saunders et al., 2007).

FINDINGS AND DISCUSSION

Using logistic regression analysis, the study found the following as shown in Table 1:

Table 1: Logistic Regression Predicting the Likelihood of Transport Modal Choice

							95% CI OR	
	B	**SE**	**Wald**	**df**	***p***	**OR**	**LL**	**UL**
Shipment Travel Time	**.144**	**.783**	**.034**	**4**	**.155**	**1.155**	**.249**	**5.360**
Freight Cost	**1.217**	**.245**	**24.757**	**4**	**.001**	**3.376**	**0.045**	**1.159**
Transport Mode Availability	**1.320**	**1.823**	**.524**	**4**	**.874**	**3.745**	**.105**	**133.452**
Transport Service Reliability	**2.001**	**.620**	**10.419**	**4**	**.001**	**7.395**	**.248**	**.712**
Constant	**-1.912**	**2.519**						

Source: Field Data, 2023

The first objective of the study was to analyze the correlation between shipment travel time and transport modal choice in Malawi. The study found that shipment travel time had no correlation with transport modal choice that shippers make when shipping out their goods. As discussed, the Theory of Planned Behavior stipulates that human behavior towards decision making is a function of three factors which are attitude, subjective norm and perceived behavior control. When shippers transport their goods to international market, the consignments are subjected to numerous check controls such as customs, immigration formalities on drivers, random traffic police

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check and also weigh bridges. These processes and procedures affect adversely the shipment travel time. These procedures being conducted in transit countries; the shippers do not have any control over the shipment travel time. Theoretically, the shippers do not have the perceived behavior control which is a function of a belief about having control over your behavior and decision. In this study, therefore, the perceived behavior control of the Theory of Planned Behavior correctly predicted the behavior of shippers when selecting a transport mode in relation to shipment travel time factor.

The second objective of the study was to establish whether freight cost had influence on the decisions that shippers make on transport mode choice. The study found that freight cost surely had an influence on transport modal choice. It was revealed that freight cost was an important factor which dry commodity export shippers consider when shipping out their goods to international markets. The study found a strong positive correlation between freight cost and the transport mode selection. The attitude as one of the factors in the Theory of Planned Behavior posits that one's decision is dependent on his or her positive or negative evaluation of the outcome. It is more likely for an individual to make a decision towards a positively evaluated outcome. Thus, when the outcome is beneficial, a decision is more likely to be made towards that outcome. Same could be the case with subjective norm of the Theory of Planned Behavior, which is a person's perception of the social expectation to behave in a certain way. Subjective norm is influenced by a person's normative beliefs combined with the person's motivation to comply. In application to how shippers behave when choosing a mode of transport for their goods, normatively, a transportation mode that offers lower freight cost would be preferred. Subjective norm being a belief about whether people important in one's circle approve or disapprove of the behavior, stakeholders, which in this regard are shareholders of the exporting firms and their customers, would put a pressure on a shipper to choose a mode of transport that offers lower transportation costs. Choosing a transportation mode with lower freight cost would be a normative behavior. The study finding therefore validates the Theory of Planned Behavior.

The third objective of the study was to assess whether transport availability had an influence on transport mode choice made by shippers in Malawi. The study found that transport availability had no any influence on modal selection. It was discovered that dry commodity export shippers did not care about the availability of transport for them to select it for the transportation of their goods. Modal availability was found not to be a transport mode selection factor. Perceived behavior control as a factor of the Theory of Planned Behavior is based on the belief in one's capacity or proficiency to perform a specific task or reach a specific goal. In this study, the ability to make a transport mode available rests with the transport service provider and not a commodity shipper and this therefore makes the shipper not to have perceived behavior control. This inability of a shipper to make transport mode available when a need to ship goods arises renders them unable to perform a specific task which, according to the theory, will have an influence on the intention to their behavior. As the study finding showed, shippers do not choose a mode of transport based on its availability and applying the theory, this could be attributed to the fact that shippers do not have the ability to provide their own transport mode for their goods. It is therefore concluded that the perceived behavior control of the theory of Planned Behavior is supported.

The fourth objective of the study was to establish the effect of transport reliability on transport mode choice. In other studies, transport reliability has been found to be an important factor when choosing a transport mode (Brooks et al., 2012; Nugroho et al., 2016; Thompson et al., 2022). Tested in this study, it was found that transport reliability had indeed an influence on transport mode choice, thus, re-affirming the findings of prior studies. As the Theory of Planned Behavior postulates, an attitude towards an outcome has a bearing on a decision one makes. One would assess whether the outcome of the decision is beneficial or deleterious and the theory states that it is more likely for one to make a decision which has a positive or beneficial outcome. Applying the theory, a shipper is more likely to choose a transport mode which is reliable. Reliable transport mode would be beneficial to the shipper and also consignee and this being the case, the shipper is more inclined to select that mode of transport which is reliable. Similarly, it is suggested that subjective norm as a factor in the Theory of Planned Behavior has a bearing on the decisions that shippers make when selecting transport mode. Subjective norm, being a belief about whether most people approve or disapprove of the behavior, shareholders of the manufacturing and exporting firms and their customers would compel a shipper to choose a transport mode that is reliable. Choosing a reliable transport mode would be considered a normative behavior. The study finding therefore, supports the Theory of Planned Behavior.

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CONCLUSION

The purpose of the study was to test the predictive validity of the Theory of Planned Behavior from the perspective of dry-commodity export shippers in Malawi. The theory has been used in many sectors such as health, agriculture, and public transport and proved to correctly predict the intentions and behaviors. While the theory has its shortfalls, based on the analysis conducted and the findings in this study, it can be concluded that the Theory of Planned Behavior has the ability to understand, predict and explain a wide range of behaviors in a wide range of contexts.

RECOMMENDATION

The engagement with literature revealed that the Theory of Planned Behavior, despite it's widely usage, has not been fully utilized in the commodity shipping industry. As revealed in this study, the theory helps to understand and predict how the behavior of people can change based on the prevailing psychological factors. The theory assumes that behavior is planned, hence it predicts deliberate behavior. The theory can therefore be used to assess commodity shipping behaviors in which policy makers would be able to understand, explain and correctly predict the behavior of shippers and then be able to formulate deliberate policies. With the theory, the government would be able to understand and predict what the shippers want when planning to transport their goods and with that knowledge, the government would be able to invest in transport infrastructure accordingly. It is therefore recommended that the Theory of Planned Behavior be utilized in the goods shipping industry as it has proved to be a good behavior predicting model.

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