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Construct Specification and Misspecification within the Application of Push-Pull-Mooring Theory of Switching Behaviour

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Abstract This paper principally addresses the issue of construct specification and misspecification within the context of the application of Push-Pull-Mooring (PPM) theory of consumer switching behaviour (CSB), and what implications it has for practicing marketing researchers. Despite the prospects of the PPM framework as a dominant paradigm for current and future research, there is evidence of divergent specification of constructs for the PPM framework in empirical studies. This study addresses this problem by applying empirical guidelines to determine the correct specification for the PPM framework, and uses an empirical illustration to demonstrate the potential consequence of misspecifying the PPM constructs in business. The findings indicate that about 67% level of construct misspecification exist in available research applying the PPM model in CSB literature. Pull, Push, and Mooring effects are identified as multi-dimensional construct that should follow a first-order reflective, second-order formative specification in the application of the full model. The findings also indicate that misspecification has potentially negative consequence on the validity, content and parsimony of measurement models in the PPM framework. Recommendations for practicing researchers are discussed. The paper furthers our understanding of construct specification and misspecification in theory development in business research.

Keywords: *formative construct, reflective construct, Push-Pull-Mooring Theory, construct misspecification, switching behaviour, structural Equation Modelling*

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1. Introduction

Marketing theories enable us to predict and explain marketing phenomenon for the purpose of impacting marketing strategy and practice. The Push-Pull-Mooring (PPM) Theory is a pre-dominant theory that has been applied to the study of consumer switching behaviour (CSB) in many business research areas [a detailed discussion of the PPM theory follows later]. In the application of the PPM theory to consumer switching behaviour, there seems to be divergent and opposing approaches taken by researchers as to the specification of the constructs in the PPM model. In this regard, while some authors adopt a first-order reflective and second-order reflective specification approach [4,13,37,60] others take a first-order reflective and second-order formative construct specification [11,33]. These conflicting approaches could be resolved through proper application of guidelines on construct specification that are immensely provided in the extant literature [15,35,48,52]. This could help practicing researchers overcome the potential negative effects of construct misspecification which has gained considerable attention in the literature [15,35,48,52,55]. Construct specification issues in empirical theory development and testing have generated considerable academic interest in the past two decades. Past studies have discussed misspecification of constructs such as export coordination [15], end user computing satisfaction, information systems quality assessment and user Satisfaction with business to employee portals [58], supply chain management [52], and integration responsiveness and market orientation [14]. The call for practicing researchers to pay attention to construct specification in theory development and testing has been sounded long ago [10,15,35,48,52,55]. Therefore, due to the potential dangers in construct misspecification, it becomes critically important for researchers to follow empirical guidelines in order correctly specify the theoretical relationships between constructs and their indicators in a research model. Given that the Push-Pull-Mooring (PPM) framework is a promising model in the study of CSB applicable to many business and management contexts, it becomes important to address the issue of construct specification in the application of the PPM theory in business research. Therefore, the main purpose of this paper is three-fold:

1. To apply empirical guidelines on construct specification to justify the correct construct specification implied in the PPM framework as applied to the study of CSB.
2. To provide evidence of apparent construct misspecifications in previous studies that applied the PPM framework to CSB study.
3. To demonstrate, through an empirical illustration, the potential consequence of construct misspecification when applying the PPM framework to CSB.

The rest of the paper is organized as follows: discussion of construct specification and misspecification, theoretical foundation for the PPM model, followed by conceptual analysis of the construct specification for PPM framework, then followed by an empirical illustration to demonstrate potential consequence of misspecification of PPM constructs, and the theoretical implications and recommendations to practicing researchers.

2. Theoretical Framework for Construct Specification and Misspecification

2.1. Construct and its Specification

A construct is a variable that is not directly observable (latent). "It is a social construction, represented by a set of intellectually-derived measures that are not self-evident or inherently "true" measures. Measures are, therefore, indirect; they are surrogates to a greater or lesser extent, of the underlying research construct," [55]. Constructs are abstractions that "describe a phenomenon of theoretical interest" [21]. Constructs, therefore, emerge from theory, form the building blocks for concretising theoretical abstractions and provide the boundaries for defining and operationalizing measurement of theoretical concepts [2], [27,44]. Construct specification involves defining the causality of interrelationships that exist between a construct and its measures or indicators. This is a pre-requisite for theory and model testing in business and social research.

Guidelines for construct specification and identification in research are well documented in the literature [8,10,15,35,48,52,55]. First of all, one condition that is required to be able to determine whether a construct's indicators should be reflective or formative is a clear conceptual definition of the concept or construct [15,16]. The conceptual (in some case operational) definition of a construct provides an insight into the key variables and the direction of their interrelationships that are implied. Without this, it becomes extremely difficult to tell what type of construct specification is appropriate for a latent variable. The literature identifies that the choice of a reflective verses a formative specification depends on the causal priority between the indicators and the construct [7]. Basically, a reflective construct is one in which the construct gives rise to or manifests the indicators (see Figure 1a), while a formative construct (see Figure 1b), is one in which the indicators give rise to or combines to form the construct [48,52]. Thus, in a formative construct, "in many cases, indicators could be viewed as causing rather than being caused by the latent variable measured by the indicators" [41]. Generally, this choice will be straightforward as the causal priority between the construct and the indicators is very clear. Example of constructs that are usually viewed as reflective are constructs such as ''personality'' or ''attitude'' as they are underlying factors that manifest in something that is observed [16,21]. Similarly, constructs such as socio-economic status are typically conceived as combinations of education, income and occupation [28] and, thus, their indicators should be formative; after all, 'people have high socio-economic status because they are wealthy and/or educated; they do not become wealthy or educated because they are of high socio-economic status' [46]. A summary of the differences (see Table 1) has been created in [35] as guidelines for deciding whether a measurement model should be interpreted as being reflective or formative.

Within the framework of reflective and formative constructs, the extant literature identifies several categories of undimensionality and multidimensionality of constructs, resulting in different situations of construct specification [20,21,38,39,52].

Table 1. Summary of the Decision Rules Provided by [35]

Point of difference	Formative model	Reflective model
1. Direction of causality from construct to indicators implied by the conceptual definition	Direction of causality is from indicators to construct	Direction of causality is from construct to indicators
2. Interchangeability of the indicators	Indicators need not be interchangeable	Indicators should be interchangeable
3. Covariation among the indicators	Not necessary for indicators to covary with each other	Indicators are expected to covary with each other
4. Nomological net of the construct indicators	Nomological net for the indicators may differ.	Nomological net for the indicators should not differ.

A summary of these concepts is presented in Table 2. It shows that a construct may have a single dimension (unidimensional) that is either reflective (Figure 1a) or formative construct (Figure 1b). And a construct may have multiple sub-dimensions (multidimensional) that consists of different combinations of reflective and formative specifications, described as a first-order reflective, second-order reflective model (Figure 1c), a first-order reflective, second-order formative model (Figure 1d), a first-order formative, second-order reflective model (Figure 1e) and a first-order formative, second-order formative model (Figure 1f).

2.2. Construct Misspecification

Construct misspecification has been a concern to scholars in the current stream of research. several attempts have been made by scholars to address the issue of theoretical and domain related errors resulting from model misspecification in contemporary research in different disciplines, from Psychology, Management and Organization studies, Operations research to Marketing [9,15,16,34,35,43,52]. From these studies model misspecification is deemed to have occurred when a reflective (or formative) construct is wrongly modeled as formative (or reflective). Past studies have discussed misspecification of constructs such as export coordination [15], the end user computing satisfaction, information systems quality assessment and user Satisfaction with business to employee portals [58], supply chain

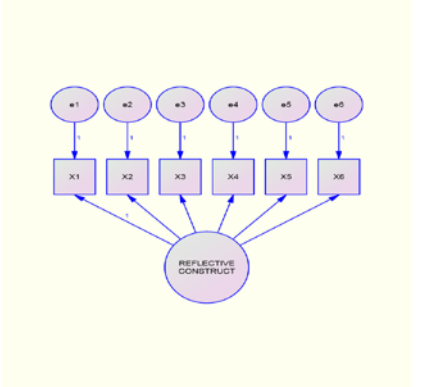
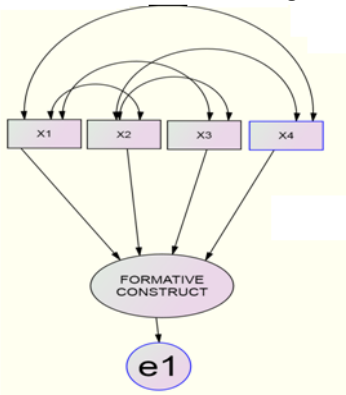
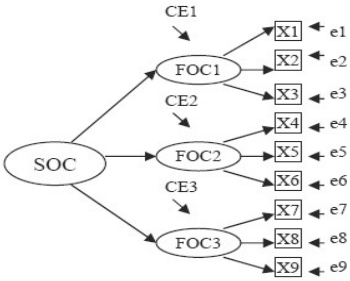
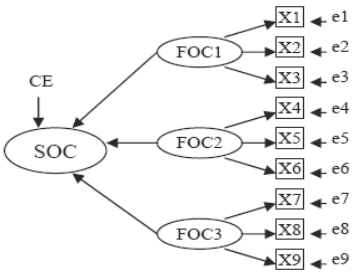
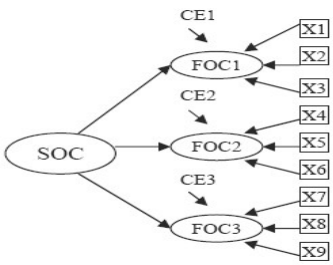
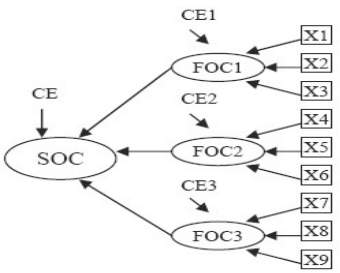
management [52], and integration responsiveness and market orientation [14].

In the extant literature, Reference [15] provide a framework for understanding construct misspecification in research. According to the authors four possible outcomes emerge when contemplating the choice of measurement perspective as indicated in Table 3. Specifically, a Type I error occurs when a reflective approach has been adopted by the researcher, although given the nature of the construct in question, the correct operationalization should have been formative. In contrast, a Type II error occurs when a formative specification has been chosen by the investigator, although a reflective approach would have been theoretically appropriate for the particular construct concerned.

The use of the terms 'Type I' and 'Type II' errors in [15] had nothing to do with the use of these terms in the context of conventional significance testing procedures [30]. The authors provided conceptual and empirical evidence on the effect of construct misspecification in three key stages in measure development: item generation (content), measure purification (parsimony) and measure validation (validity).

The following section discusses existing specification of the PPM model in the extant marketing literature, and argues for the appropriate construct specification for PPM model to identify the category of construction specification typology the full PPM model represents.

Table 2. Major Typologies of Construct Specification

		Reflective	**Formative**
	Unidimensional	Reflective Unidimensional model **Figure 1a**	Formative Unidimensional model. **Figure 1b**
			
	Multidimensional	*Second-Order*	*Second-Order*
Reflective	*First-Order*	First-Order Reflective, Second-Order Reflective model. **Figure 1c**	First-Order Reflective, Second-Order Formative model. **Figure 1d**
			
Formative	*First-Order*	First-Order Formative, Second-Order Reflective model **Figure 1e**	First-Order Formative, Second-Order Formative model **Figure 1f**
			

Source: Based on references [20,21,38,39,52]

2.3. The PPM Theory and its Application in Business-Related Discipline

The Push-Pull-Mooring (PPM) theory of migration was first developed by [40] and [45] as Push-Pull model, and later extended by [6] to include mooring dimension. The basic assumption of this theory is that negative factors at

the origin push people away, while positive factors at the destination pull people toward them. These push and pull factors do not work in isolation but interdependently with the mooring factors. The mooring factors are equivalent to the moderating variables, and act to either encourage migration or to deter the potential migrants from leaving their home or origin. Though mooring factors in migration literature were identified as personal and social factors that impact migration decisions as well as migration intentions and actions [45], it could be extended to include any variable that has the potential of encouraging or deterring the process of migration.

Following the pioneering application of PPM model (see Figure 2] to the study of CSB by [4], the PPM theory promises to be very useful theoretical framework in predicting consumer switching intention and behaviour and other related social phenomena in business related disciplines. Table 4 presents available empirical studies that adopted the PPM model as a theoretical framework in business related disciplines. It summaries the data analysis technique used, research context, focus of study, constructs' specification and its justification in each research article.

Table 3. Choosing a Measurement Perspective

		Correct' Auxiliary Theory	
		Reflective	Formative
Researcher's Choice of Measurement Perspective	Reflective	Correct Decision	Type I
	Formative	Type II Error	Correct Decision

Source: Reference [15]

Table 4. Empirical Studies Applying the PPM Model in Business

Author (s)	Focus and Research context	Specification of PPM constructs	Data analysis technique	Journal
Reference [4]	To explain service switching using consumers from auto-repair service and hairstyling services	First-Order Reflective, Second-Order Reflective	CB-SEM	Journal of the Academy of Marketing Science
Reference [11]	To understand Factors that Affect Users' Switch Intentions in Social Networking Sites (Cyber Migration)	First-order reflective, Second-order Formative	PLS	Proceedings of the 42nd Hawaii International Conference on System Sciences
Reference [32]	To explain the switching intentions of online gamers in gaming services.	First-Order Reflective, Second-Order Reflective	CB-SEM	Computers in Human Behavior
Reference [60]	To explain post-adoption switching of personal communication technologies.	First-Order Reflective Constructs. PPM effects implied.	PLS	Communications of the Association for Information Systems
Reference [23]	Using PPM framework to understand IT professionals' commitment.	First-order reflective, Second-Order Formative	PLS	International Journal of Information Management
Reference [13]	To examine the antecedents of consumer switching in multichannel services	First order reflective, Second-order Reflective	CB-SEM	Electronic Commerce Research and Applications
Reference [37]	To investigate CSB towards mobile shopping	First-order reflective Second-order Reflective	CB-SEM	Int. J. of Mobile Communications
Reference [33]	To explain bloggers' post-adoption switching behaviour for online service substitutes.	First order reflective, Second-order Formative, well-explained	PLS	Computers in Human Behavior
Reference [61]	Used PPM to understand online blog service switching.	First-Order Reflective constructs. PPM effects implied	CB-SEM	Journal of Electronic Commerce Research

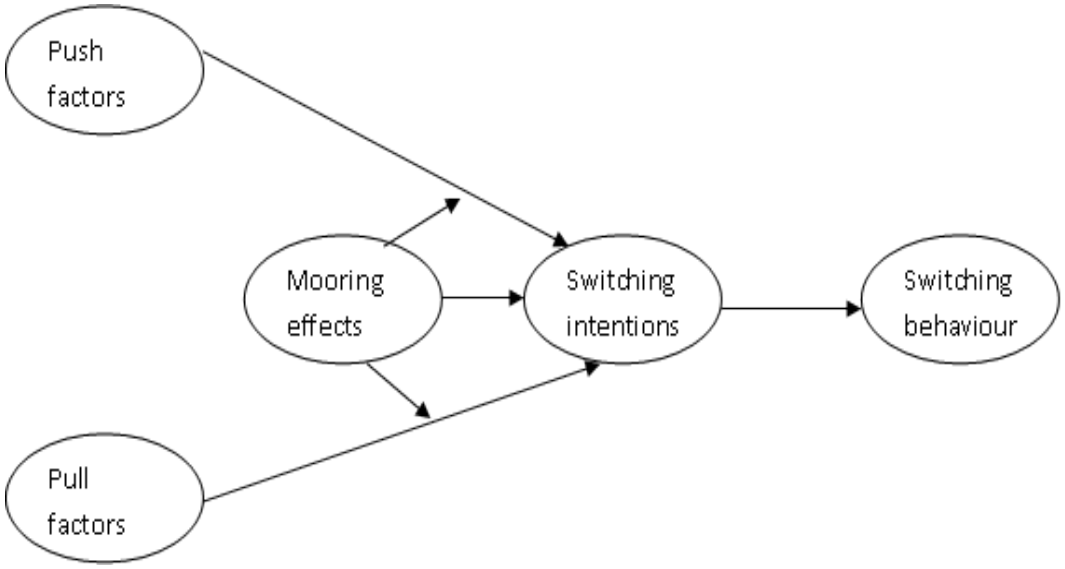


Figure 2. Push-Pull-Mooring (PPM) Migration Model of Service Switching. Source reference [4]

2.3.1. Construct Specification for PPM model in the extant literature

In order to objectively prove the prevalence of diverse construct specification approaches for the PPM framework in the extant literature, a literature search was conducted to find research articles that applied the PPM model in business-related areas like Marketing, Information Systems and Operations Management and Organisational Studies, published between 2005 and 2013, following a similar approach taken by [48]. This period was chosen because the pioneering article that applied the PPM model to study CSB was published in 2005 by [4]. We used key words like Push-Pull-Mooring Theory and its combinations. We searched over 300 business journal databases on the Internet, aside Google Scholar. We also followed up for cited papers some research articles that applied PPM framework. This yielded many papers in non-business disciplines, and nine (9) papers (see Table 4) related to business areas that quantitatively tested or applied the PPM model. These were selected for our purpose, which was to prove the divergent construct specification approaches in the extant literature. Out of the nine studies, three specified the PPM framework as first-order reflective, second-order formative, while six specified it as either first-order reflective, second-order reflective or just the first-order reflective to imply overall PPM effects.

2.4. Appropriate Specification for PPM Constructs

Following the guidelines for construct specification in the extant literature [15,20,21,38,39,52], we proceed to discuss the appropriate theoretical specification for the PPM framework based on the theoretical definitions of Push effect, Pull effect and Mooring effect in the study of consumer switching behaviour in the extant literature.

2.4.1. Push effects

"Push factors" has been conceptually defined as the factors that motivate people to leave an origin [54], and are assumed to have a negative influence on the quality indicators of life [45]. Push factors are generally perceptions of place variables characteristics of the place of origin that influence the migration decision [6,40]. Generally, in these PPM models, push effects are believed to be negative factors that compel or push people away from an original location, such as a lack of jobs, loss of employment, or natural disasters [6]. According to [4], there is a conceptual similarity between the construct of push factors from the migration literature and many evaluative drivers of service-switching intentions, such as satisfaction, quality, value, trust, commitment and price perceptions.

Based on the conceptual meaning of push factors or push effect, the push construct is perceived to be an effect caused by a combination of negative factors existing at the origin. This strongly suggests that the indictors, negative factors, are causing the construct, push effect, rather than being caused by the construct. Thereby making the push effect a formative construct.

Relating this to the CSB literature, customers are pushed to switch because of low satisfaction, low perceived service quality, low perceived value, and the like; they do not experience low satisfaction or poor service quality because of push factors. Therefore, push effect is better understood theoretically as a combination of indicators or factors that give rise to or cause consumers to switch service providers, making it a formative construct rather than a reflective construct.

2.4.2. Pull Effects

Pull factors are positive factors drawing prospective migrants to the destination [45] and attributes of distant places that make them appealing [19]. Similar to the push factors, these are place attributes, not characteristics associated with the migrant himself or herself. According to the push-pull paradigm, positive or attractive factors at the destination pull the migrant to this destination. Pull factors have been described as factors at the destination that attract people to move away to the destination [4].

By this definition, pull factors also strongly suggest that the construct is an effect construct. Positive factors can cause the effect of customer attraction to another service provider. It must again be understood that these positive factors are not in themselves attraction, they can cause attraction. Therefore, pull effect is better understood theoretically as a combination of indicators or factors that give rise to or cause consumers to switch a competitor service provider, making it a formative construct rather than a reflective one.

2.4.3. Mooring Effects

Conceptually, mooring factors are understood to be situational or contextual constraints [40] that are usually personal and social factors which can operate to constraint or moderate the effect of push and pull factors [4]. Mooring factors may be positive or negative factors that influence migration intention and behaviour directly or indirectly. According to [4] variables from the service and brand switching literature that fit this conceptualization of mooring effects include switching costs, subjective norms (social influences), attitudes toward switching, past behaviour and variety-seeking tendencies.

Thus, mooring construct is understood as a combination of negative and positive personal and social factors that influence either positively or negatively the switching intention, and moderate the push and pull effects. Following the same argument for the Push and Pull effect constructs, mooring effect strongly suggests that the indicators give rise to the construct (mooring effect) and not the mooring effect causing or reflecting the various indicators. Similarly in the CSB literature, mooring factors such as switching costs, subjective norms (social influences), attitudes toward switching, past behaviours, and variety-seeking tendencies [4] combine to cause a mooring effect on switching intention and behaviour. Therefore, mooring effect is better understood theoretically as a combination of indicators that influence switching behaviour and intention, making it a formative construct rather than a reflective one.

Taken together, by the theoretical definitions of constructs in the PPM model, a formative perspective is implied rather than a reflective perspective. The PPM appropriately captures factors that cause either a push, pull or mooring effect in the migration (or switching) process. The negative, positive and moderating factors are not, in themselves, manifestations of push, pull or mooring

abstract concepts. The problem of constructs misspecification occurs where the push, pull and mooring effects are specified as reflective constructs instead of formative as their theoretical definitions fundamentally identify them.

However, the indicators that cause the PPM effects are first-order constructs that could be modelled reflectively.

For example, the presence of customer satisfaction could manifest or give rise to several indicators, making it reflective. In the light of the major typologies of construct specification identified in the literature (see Table 2), the PPM model, therefore, falls in the first-order reflective, second-order formative category (Figure 1d).

2.5. Effects of Misspecification of the PPM Constructs

Construct misspecification is likely to affect three key stages in measure development: item generation, measure purification and measure validation [15]. It has been noted in previous studies that construct misspecification could negatively affect the validity of the result, thereby providing misleading findings to scholars and practitioners [15,42,48]. According to [15], most of the research (95%) which they examined had wrongly specified constructs. Reference [48] also found that 30% of research articles in information systems literature have been misspecified, which was similar to that of 29% level of model misspecification found by [35] in the marketing literature. Our analysis in Table 4 suggests that about 67% misspecification level exists in the application of the PPM model in the consumer switching behaviour literature, where empirical studies including the pioneering article by [4], wrongly specified the PPM framework as first-order reflective, second-order reflective and others simply used first-order reflective to imply the PPM effects. In the next section, we use an empirical illustration to demonstrate the potential effects of misspecification of PPM constructs on content, parsimony and validity of results of structural model.

3. An Empirical Illustration Using PPM

We followed the relevant steps used in previous studies on construct misspecification that used illustrative examples [14,15,35,48,52,59]. We use data drawn from a survey of consumers of mobile telecommunication services regarding their CSB. The population consisted of individual subscribers of mobile telecommunication operators in Ghana. A convenient sample size of 1000 respondents was chosen for the study. In order to collect data of high quality that reflect customers' opinion, a survey was conducted using a self-administered structured questionnaire to collect data from subscribers of mobile telecom service providers in April 2013. Out of the 1000 questionnaire administered, a usable 756 were obtained representing 75.6% response rate.

To investigate potential non-response bias, we compared responses from early and late respondents [1]. Early respondents were described as the usable questionnaires returned within the first week and late respondents were those who responded in the second week. At the 5% level of significance, no significant differences were observed, thus indicating that response bias was unlikely to be a major problem in the present study.

3.1. Data Analysis Approach

Since this paper focuses on comparing reflective and formative models in many respects, we appropriately adopted covariance-based structural Equation Modelling (CB-SEM) methodology that have, among its advantages, fit statistics for model comparison, unlike Partial Least Squares [12,26]. Moreover, Maximum Likelihood Estimation method was chosen since the data was significantly normally distributed when we examined the underlying distribution using normal plots, normality test in AMOS 18.0 and skewness and kurtosis statistics that ranged between +/- 1.96 [47,49]. Following a two-step approach to SEM, a confirmatory factor analysis was done followed by a structural model analysis [27].

3.2. Reflective Specification of PPM Model

Following the methodological guidelines of [24,53], a two-stage approach was used to investigate the dimensionality of the PPM construct items. First, ten unidimensional constructs that are considered key drivers of switching intention and behaviour, from the origin (current service provider) were identified in the literature [4,25,36,50,51,60,61] and subsequently refined based on focus group interview to reflect the research context. These first-order constructs are price (PX), customer service (CS), satisfaction/dissatisfaction (SAT), perceived value (PV), perceived corporate reputation (REP), inconveniences (INCOV), anger incidence (ANG), perceived service quality (PSQ), perceived network quality (PNQ) and network coverage (NC). These constitute the push sub-dimensions modelled as first-order reflective constructs. For the second-order pull construct, two unidimensional first-order constructs were derived, being perceived attraction from competitor offerings (COFF) and perceived attraction from competitor reputation (CREP), the former was derived from previous studies [4,61] and the latter from preliminary focus group interview. For the second-order mooring construct, seven first-order constructs were derived from the literature and the preliminary focus group interviews, namely: peer influence (PINF), switching cost (SC), Attitude towards switching (ATT), religiosity (RL), consumer's general curiosity (GC), commitment to service provider (CMT), and mobile number portability facilitator (MNPF).

For simplicity of analysis, we summarize the steps taken in the reflective model specification: (1) The initial original pool 19 constructs with 42 items (shown in Appendix 1 as PX1 to LTY2) were subject to a CFA and purification procedure [27] for both first-order and second-order reflective constructs, and (2) An SEM was conducted testing structural relationships between each of the second-order PPM constructs and two conceptually linked variables, switching intention and loyalty, which are depicted in Figure 3.

For CFA, after purification procedure involving deletion of insignificant parameters and those with low standardized loadings less than 0.50, the results (see appendix 3) for the first-order constructs showed good mode fit statistics: X^2 = 614.573, df = 343, CMIN/DF = 1.792, GFI = 0.950, AGFI = 0.928, NFI = 0.947, CFI =

0.976, TLI = 0.967, RMR = 0.037, RMSEA = 0.032. This process yielded a remaining 14 first-order constructs with 31 measurement items. Construct validity was assessed through convergent and discriminant validity results, with correlations (see Appendices 2, 4 and 5). Composite reliability values are all higher than 0.80 and discriminant validity is evidenced since square root of Average variance extracted (AVE) values are above 0.60 and are greater than the respective inter-construct correlations for each construct. This indicates that a higher amount of variance in the indicators is captured by the construct compared to that accounted for by measurement error, and that each item loads better on their respective constructs than with other constructs [22].

After this, we proceeded to perform a CFA for the second-order reflective PPM constructs before fitting the structural model. After similar purification process, the model fit indices indicated good model fitness: X^2 = 678.958, df = 263 CMIN/DF = 2.582, GFI = 0.931, NFI = 0.932, CFI = 0.957, TLI = 0.951, RMR = 0.056, RMSEA = 0.046. The final model consisted of 11first-order constructs with 25 measurement items and three second-order constructs (i.e. PPM effects). Construct (composite) reliability for the second-order PPM constructs also revealed high internal consistency for Push (0.911), Pull (0.965) and Mooring (0.795). Lastly the AVE for Push was 0.686, that of Pull was 0.699 and for Mooring was 0.747, which were each greater than their inter-construct correlations to indicate discriminant validity [22].

Finally, the results of the structural model involving relationships between each of the second-order PPM constructs and two conceptually linked variables, switching intention and loyalty, were analyzed as displayed in Figure 3. The final overall structural model of reflective specification of PPM showed satisfactory model fit indices, X^2 = 741.670, DF = 309 CMIN/DF = 2.400, GFI = 0.931, AGFI =0.916; NFI = 0.934, CFI = 0.960, TLI = 0.955, RMR = 0.056, RMSEA = 0.043. The results of the standardized parameter estimates and their significance for the reflectively specified PPM model are presented in Table 5 for further comparative analysis.

Table 5. Comparison of results of reflective and formative specifications of PPM model

Relationships assessed			Std.β (St. Error)		t-value		P-value		Test for difference in Beta
			Reflective Model	*Formative Model*	*Reflective Model*	*Formative Model*	*Reflective Model*	*Formative Model*	*z-value*
Switching Intention	<---	Push	0.051 (0.109)	0.094 (0.032)	0.830	0.334	0.406	0.738	0.379 (NS)
Switching Intention	<---	Mooring	0.719 (0.130)	-0.652 (0.039)	8.431	-3.560	***	***	10.108*** (S)
Switching Intention	<---	Pull	-0.095 (0.090)	-0.166 (0.237)	-1.815	-3.535	0.070	***	-
Mooring	<---	Push	0.588(0.061)	-0.312 (0.474)	11.329	-0.355	***	0.723	-
Mooring	<---	Pull	-.312 (0.057)	-0.029 (.136)	-6.193	-0.772	***	0.440	-
Loyalty	<---	Mooring	0.879 (0.059)	-0.859 (0.046)	18.190	-3.758	***	***	23.247***(S)
Model Fit Statistics			756						
CMIN/DF			2.315	1.814					
Goodness-of-Fit Index			0.927	0.972					
Adjusted Goodness-of-Fit			0.912	0. 953					
Comparative Fit Index			0.960	0.982					
RMR (badness of fit)			0.054	0.033					
RMSEA (badness of fit)			0.042	0.033					
Switching Intention (R^2)			0.681	0.633					0.679
Mooring Effects (R^2)			0.660	0.895					3.326
Loyalty (R^2)			0.773	0.895					1.726

Notes: ***Significant at 0.001, Model Fit Statistics are for the overall model containing the mediation (but not moderation) effects, S – Significant difference, NS – Non-significant difference.

Despite these attractive and highly reliable measurement model with excellent overall structural model, it should be recalled that this measure of PPM constructs is based on the *wrong* measurement perspective, given the nature of the construct. The measurement perspective that ought to be applied is the *formative perspective* for the second-order PPM constructs. The next section examines the formative specification of the PPM model.

3.3. Formative Specification of PPM Model

The approach used in this study for formative specification of PPM constructs follows the steps applied in previous studies [15,29,48]. We start with the 14 first-order constructs with 31 measurement items that resulted from the CFA for the first-order sub-dimensions (see Appendix 2 for construct reliability and validity) to fit the structural model. First, we assessed multi-collinearity through the variance inflation factor (VIF), using a cut-off of 3.5. Second for formative model identification, we followed the 2+ emitted paths rule [15,16,17,41,57]. Third, we estimated each of the Push, Pull and Mooring models separately, each at a time, before combining all into one model. Fourth, non-significant parameters (t-value less than 1.96) were excluded from the model in an iterative process that deleted one item at a time, starting with the lowest t-values [27].

Following the above procedure, the final combined formatively specified PPM framework displayed good fit indices and significant parameter estimates: X^2 = 201.330, df = 111, CMIN/DF = 1.814, GFI = 0.972, AGFI = 953, NFI = 0.962, CFI = 0.982, TLI = 0.973, RMR = 0.033, RMSEA = 0.033; the results of the structural relationships are presented in Table 5 for further analysis. In summary, the formative specification resulted in three factors (PNQ, SAT, CS) that combine to create push effect, one factor (COFF) causes pull effect and three factors (GC, ATT,

CMT) combine to create mooring effect in influencing CSB in the research context.

3.4. Discussion of Findings

The findings from the empirical illustration are discussed by comparing results of the reflective and formative specifications PPM models in terms of model content, parsimony and validity, using data presented in Figure 3a and Figure 3b, and Table 5.

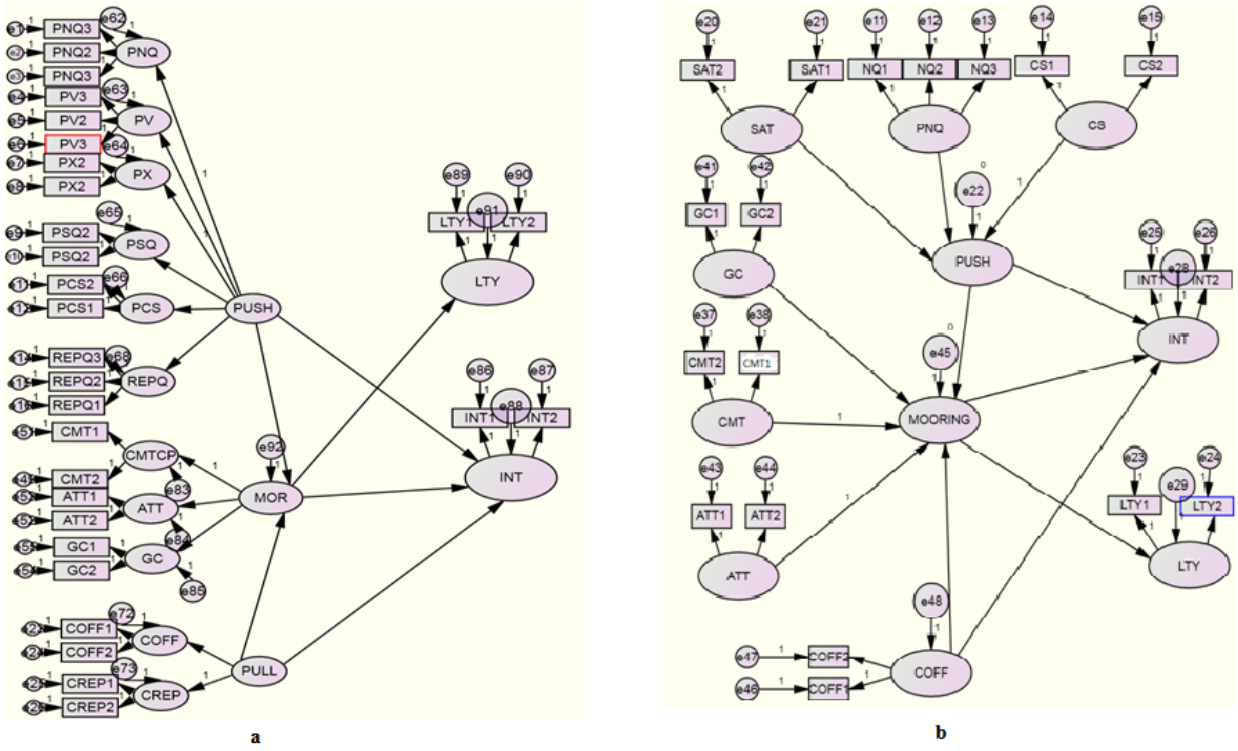


Figure 3. First-order reflective, second-order formative model

3.4.1. Content

From Figure 3a and Figure 3b, only two indicators, which were first-order reflective constructs (PNQ, CS) were found to be common to both specification approaches for the Push and Pull models derived by the procedures described above; thus the formative and reflective specification resulted in distinctly different second-order construct sub-dimensions. More specifically, one construct (SAT) which was discarded during the CFA for the second-order reflective Push model was included in the second-order formative Push model.

This finding is consistent with the findings of [15] who in a similar study found that, "Out of the 14 items discarded during scale purification, three (X4, X7, and X10) were subsequently included in the formative index." This results in committing a Type I error [15], which impacts upon the content of the derived indictors (or first-order constructs) of each of the push, pull, and mooring effects.

3.4.2. Parsimony

The results show that the formative specification consisted of seven main factors that influence switching intentions while the reflective specification consisted of eleven. With fewer factors, the formative PPM model provides a more concise and precise measure of critical factors that cause push, pull and mooring effects in the CSB process in the research context. This indicates that a model specification may also affect the parsimony of the measure. The practical implication is that service providers in the telecommunication industry in the research context may have to focus on few critical factors that create push, pull and mooring effects in influencing CSB. Therefore, the quality of PPM should be assessed in its ability to generate parsimoniously few negative, positive and moderating factors that significantly matter in the CSB process for the focus of managerial strategy.

3.4.3. Validity

Table 5 provides analysis for the criterion validity of the two model specifications. In this study the second-order PPM constructs would be expected to positively influence switching intention and negatively influence loyalty (except Mooring effects that also have positive influence) as have been established in the extant CSB literature [4,11,32,50,51,61].

From Table 5, some significant similarities and differences are discussed. For similarities, first, out of the three instances where both models returned similar significant results, two relationships were significant (Mooring-Switching intention and Mooring-loyalty relationships) and one non-significant relationship (between Push-switching intention).

For the differences, in all, there are three out of the six relationships tested where the two models yielded different results. More specifically, we observe that the relationship between Mooring and switching intention, and Mooring and loyalty appear to be negative with the formative model specification but positive with its reflective counterpart; the difference was found significant ($z = 10.108$, $p < 0.001$; $z = 23.247$, $p < 0.001$) respectively. This gives different interpretations to the results from each

analysis in terms of their practical managerial and theoretical implications.

In terms of the magnitude of the standardised estimates and predictive power, the reflective model appears to have greater values than the formative model in almost all the relationships assessed. This overestimation could be misleading as noted in previous studies [15,16]. Moreover, an important observation from Table 5 is that in terms of model fit statistics, the formative model comparatively produces better goodness-of-fit indices than the reflectively specified model. Given that the two models come from the same pool of measurement items (indicators), a comparison of the fit statistics of the two models could be useful [27,31].

Thus, it is evident the consequence of misspecifying the PPM model as second-order reflective model instead of second-order formative model can also be manifested in criterion validity of the derived higher-order constructs. More worryingly, different substantive conclusions would have been drawn as a result of having erroneously specified the second-order PPM constructs.

4. Conclusion and Recommendations

4.1. Conclusion

The purpose of this article was to apply empirical guidelines on model specification to construct specification in the PPM framework of consumer switching and to demonstrate the potential consequence of misspecifying the PPM model. This is an attempt to inform practicing researchers when fully applying the PPM framework of consumer switching in business research areas. The findings indicate that construct specification for the full PPM framework consists of Push, Pull and Mooring effects that represent higher-order formative constructs, each of which has first-order reflective constructs. Consequently, the appropriate construct specification for the full PPM model is *first-order reflective, second-order formative specification* perspective. Moreover, it was found that about 67% level misspecification level exists in the application of the PPM framework in the CSB literature. Furthermore, it was evident that misspecification of the PPM effects resulted in adverse consequence in terms of content, parsimony and criterion validity of the overall structural model; thus the choice of reflective versus formative measurement perspective does matter from a practical point of view.

4.2. Recommendations for Researchers

For practicing business researchers, the implications are four-fold with particular reference to the application of PPM model to the consumer switching literature. First, it is of paramount importance to consider carefully the causal link between the latent variable (or construct) and its indicators at the construct definition stage in order to avoid theoretical errors in the choice of model specification approach [15,20,21].

Second, it is not enough to correctly specify the PPM model as a multidimensional second-order formative, it is equally important to correctly follow the appropriate guidelines for identification of the constructs in order to realise the essence of correct construct specification. *The essence of correct construct specification is not just to correct misspecification, but for correct construct identification and validation*. In this regard, several scholars have provided useful guidelines toward the identification, estimation and interpretation of formative construct in general, and for second-order formative construct in particular [15,16,20,43,48,56].

Third, like all other models, formatively specified PPM models should pass the validity tests. Even though internal validity tests may not be a concern, expected or desirable for formative constructs, nomological and external validity are required to examine the theoretical soundness and criterion validity of the proposed model [16,26,48]. Fourth, practicing researchers can follow the systematic methodology used in the empirical illustration to assess the formatively specified model of the PPM using CB-SEM approach.

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Appendix

Appendix 1

Measurement Items for Push, Pull and Mooring Factors

Measurement scale

Apart from the few different scales for certain variables, all others were measured on a five-point disagreement-agreement scale, coded 1-5.

Push Factors

Price (PX)

1. The charges for XYZ mobile telecom services are reasonable. PX1
2. The price/rate I pay for calls on XYZ mobile telecom services is affordable. PX2

Perceived Network Quality (PNQ)

3. I believe that the quality of XYZ network services is……..PNQ1
    1. Very poor
    2. Poor
    3. Good
    4. Very good
    5. Excellent
4. Generally, on XYZ network, there is high speed for telecom services. PNQ2
5. Overall, I experience high network clarity when making calls on XYZ network. PNQ3

Customer Service (CS)

6. The staff at XYZ customer service are respectful in receiving me. CS1
7. I have cordial relationship with the staff of XYZ customer service centre CS2
8. Generally, when I call XYZ help lines or numbers, I am able to get help. CS3

Inconvenience (INCOV)

9. Generally, there is a lot of inconveniences (time wasting, congestion) at XYZ's customer service centre. INCOV1
10. I receive too many text messages are sent by XYZ to my mobile phone that inconveniences me. INCOV2

Perceived Service quality (PSQ)

11. To me, the general quality of services provided by XYZ mobile telecom is…….PSQ1
    1. Very poor
    2. Poor
    3. Good
    4. Very good
    5. Excellent
12. I believe XYZ provides superior mobile network services. PSQ2

Overall Satisfaction/dissatisfaction (SAT)

13. To what extent did the services you received from XYZ meet your expectations? SAT1
14. Overall, how satisfied are you with the services of XYZ mobile network? SAT2
    1. Very dissatisfied
    2. Dissatisfied
    3. Neutral
    4. Satisfied
    5. Very Satisfied

Perceived value (PV)

15. I enjoy a lot of bonuses and free calls/services with XYZ promotions. PV1
16. Generally, I get more value for my money in using XYZ network services. PV2
17. I believe that I get more benefits than cost for using XYZ telecom services. PV3

Reputation quality (REPQ)

18. XYZ mobile network seems to have good reputation for quality REPQ1
19. XYZ mobile network is well known as a good and socially responsible. REPQ2
20. Which one of these words best describes how you see XYZ telecom network?

Anger incidence (ANG)

21. The behaviour of staff of XYZ makes me angry when I complain to them about their services. ANG1
22. Sometimes, I encounter network connectivity problems with XYZ service that makes me feel angry. ANG2

Network Coverage (NC)

23. I can get XYZ network services where I stay in Ghana. NC1
24. XYZ network is not available in some places in Ghana where I travel to. NC2

Pull Factors

Competitor (alternative) offer attractiveness (COFF)

25. I consider that I would be much more satisfied with services available from other mobile telecom networks than XYZ's services. COFF1
26. I am attracted by the benefits offered by other mobile telecoms. COFF2

Competitor Reputation (CREP)

27. Other mobile networks seem to have better reputation for quality than XYZ. CREP1
28. Other mobile networks seem to be more socially responsible than XYZ. CREP2

Mooring Factors

Attitude toward switching (ATT)

29. For me switching from one mobile network to another is ……. ATT1
30. For me changing from one mobile network to another is a decision that is……. ATT2

Peer influence (PINF)

31. My friends and colleagues who use other mobile networks encourage me to switch to other telecom networks services. PINF1
32. I usually want to use the mobile network of important people in my life (family, friends, business parties, etc.) PINF2

Mobile Number Portability facilitator (MNPF)

33. The Mobile Number Portability policy (MNP) can help me to switch easily to use other mobile network services in Ghana. MNPF1
34. I belief that in Ghana, with the MNP, now I have every opportunity to switch to any mobile telecom network I like. MNPF2

Religiosity (RLG)

35. To what extent dos religious beliefs influence many aspects of your life? RLG1
36. To what extent are your religious beliefs very important to you? RLG2
    1. Very little extent

2. Little extent
3. Neutral
4. Large Extent
5. Very large Extent

Commitment to service provider (CMT)

37. I am really committed to XYZ as my mobile network company. CMT1
38. I feel a strong sense of "belonging" to XYZ network. CMT2

General curiosity (GC)

39. I usually like to try out new services of another mobile service provider. GC1
40. I have strong interest to experience the services of other mobile telecom networks. GC2

Switching cost (SC)

41. I think it would cost me a lot of time, money, effort trying to switch to another telecom network. SC1
42. Generally, I will lose a lot of important contacts (or phone numbers) if I switch from XYZ to another network. SC2

Measurement Items for Constructs added for the purpose of formative model identification and structural model testing

Switching intention (INT)

43. Do you have the intention of switching to use a better mobile network services in the next year? INT1
    1. Definitely Yes
    2. A bit Yes
    3. Neutral
    4. A bit No
    5. Definitely No
44. How likely are you to switch from XYZ network to a different network in the next two years? INT2
    1. Very Unlikely
    2. Unlikely
    3. Neutral
    4. Likely
    5. Very likely

Loyalty (LTY) (measured strongly disagree to strongly agree, coded 1 to 5 respectively)

45. I consider XYZ my first choice of mobile network in the next two years. LTY1
46. I shall continue to use the services of XYZ telecom in the next few years. LTY2

Appendix 2

Reliability and Validity: first-order reflective constructs and indicators

Construct	Indicators	Factor loadings	Composite Reliability
Perceived network quality	PNQ1	0.692	0.867
	PNQ2	0.69	
	PNQ3	0.882	
Perceived value	PV1	0.804	0.896
	PV2	0.862	
	PV3	0.747	
Price perception	PX1	0.777	0.921
	PX2	0.924	
Overall Perceived service quality	PSQ1	0.753	0.893
	PSQ2	0.844	
Perceived customer service	PCS1	0.749	0.863
	PCS2	0.739	
Image/Reputation quality	REPQ1	0.739	0.882
	REPQ2	0.812	
	REPQ3	0.784	
Overall Satisfaction/dissatisfaction	SAT1	0.804	0.885
	SAT2	0.762	
Perceived competitor reputation	CREP1	0.69	0.877
	CREP2	0.852	
Perceived attractiveness of competitor offering	COFF1	0.716	0.853
	COFF2	0.741	
Mobile Number Portability facilitator	MNPF1	0.655	0.844
	MNPF2	0.773	
Peer influence	PINF1	0.876	0.932
	PINF2	0.862	
Attitude towards switching	ATT1	0.745	0.862
	ATT2	0.74	
General curiosity	GC1	0.787	0.878
	GC2	0.756	
Commitment to service provider	CMT1	0.848	0.924
	CMT2	0.86	

Note: Recommended factor loading is 0.50 and composite reliability is 0.70 [27].

Appendix 3

CFA Model Fit Summary for first-order reflective model

Goodness-of-fit Indices	Benchmark	Value
Absolute goodness of fit measure		
Chi-square (CMIN)	P ≥ 0.5 (N<250)	0.000
Chi-square /degree of freedom	≤ 3	614/343= 1.792
Goodness-of-fit Index (GFI)	≥ 0.90	0.950
Adjusted Goodness-of-fit Index (AGFI)	≥ 0.80	0.928
Absolute badness of fit measure		
Root Mean Square Residual (RMSR/RMR)	≤ 0.1	0.037
Root mean Square Error of Approximation (RMSEA)	≤ 0.08	0.032
Incremental fit measure		
Normed Fit Index (NFI)	≥ 0.90	0.947
Comparative Fit Index (CFI)	≥ 0.90	0.976
Turker Lewis Index (TLI)	≥ 0.90	0.967
Parsimony fit measure		
Parsimony Goodness-of-Fit index (PGFI)	≥ 0.50	0.657
Parsimony Comparative of Fit index (PCFI)	≥ 0.50	0.720
Parsimony Normed of Fit index (PNFI)	≥ 0.50	0.699

Note: Appendix 3 shows the goodness-of-fit indices for the proposed model against the benchmark [27].

APPENDIX 4 Convergent and Discriminant validity of first-order reflective constructs

Implied (for all variables) Covariances (Group number 1 - Default model)														
	CMT	GC	ATT	PINF	MNPF	COFF	CREP	SAT	REPQ	PCS	PSQ	PX	PV	PNQ
CMT	**0.97**													
GC	-0.27	**0.82**												
ATT	0.37	-0.27	**0.77**											
PINF	-0.20	0.25	-0.04	**0.96**										
MNPF	0.06	0.04	-0.04	0.06	**0.65**									
COFF	-0.38	0.39	-0.23	0.11	0.01	**0.79**								
CREP	-0.34	0.34	-0.21	0.14	-0.01	0.54	**0.79**							
SAT	-0.34	0.15	-0.13	0.02	-0.04	0.20	0.17	**0.87**						
REPQ	0.49	-0.22	0.23	0.01	0.05	-0.31	-0.33	-0.32	**0.78**					
PCS	0.36	-0.10	0.12	0.03	0.09	-0.11	-0.18	-0.18	0.33	**0.81**				
PSQ	0.51	-0.25	0.24	-0.01	0.06	-0.34	-0.34	-0.34	0.59	0.38	**0.82**			
PX	0.40	-0.25	0.21	-0.02	0.04	-0.30	-0.29	-0.24	0.45	0.26	0.46	**0.84**		
PV	0.53	-0.29	0.26	-0.01	0.04	-0.38	-0.34	-0.31	0.59	0.33	0.57	0.58	**0.91**	
PNQ	0.46	-0.23	0.23	-0.02	0.05	-0.31	-0.31	-0.29	0.55	0.32	0.62	0.45	0.51	0.78

Note: The covariance are below the diagonal, AVE estimates are in diagonal (bold). Recommended AVE is 0.50 [22]

APPENDIX 5 Correlations for first-order reflective constructs

Implied (for all variables) Correlations (Group number 1 - Default model)														
	CMT	GC	ATT	PINF	MNPF	COFF	CREP	SAT	REPQ	PCS	PSQ	PX	PV	PNQ
CMT	1													
GC	-0.344	1												
ATT	0.49	-0.424	1											
PINF	-0.20*	0.325	-0.058*	1										
MNPF	0.088*	0.078	-0.088	0.103	1									
COFF	-0.501	0.604	-0.379	0.151	0.025*	1								
CREP	-0.446	0.529	-0.34*	0.187	-0.017*	0.873	1							
SAT	-0.4	0.208	-0.189	0.024	-0.065	0.295	0.243	1						
REPQ	0.64	-0.35	0.382	0.013	0.098*	-0.507	-0.537	-0.476	1					
PCS	0.459	-0.156	0.189	0.044	0.18*	-0.175	-0.277	-0.257	0.524	1				
PSQ	0.632	-0.368	0.374	-0.015	0.112*	-0.527	-0.528	-0.47	0.923	0.574	1			
PX	0.486	-0.369	0.323	-0.029*	0.065*	-0.451	-0.438	-0.335	0.692	0.389	0.664	1		
PV	0.602	-0.384	0.373	-0.014*	0.066*	-0.533	-0.478	-0.397	0.825	0.453	0.754	0.761	1	
PNQ	0.605	-0.358	0.378	-0.028*	0.095*	-0.505	-0.509	-0.434	0.904	0.511	0.972	0.693	0.725	1

Note: *correlations are significant at 0.05, all other correlations are significant at either 0.01 or 0.001