The Effects of Co-Creation Efforts on Unfavourable Experience and Response Behaviour: A Hybrid of Rasch Measurement and PLS-SEM Analysis

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Abstract. This paper aims to verify the constructs validity, and to investigate the relationship between variables understudy by combining the Rasch Measurement Analysis and PLS-SEM approach. A number of 350 self-administered structured questionnaires were distributed to mobile telco subscribers in Klang Valley, Malaysia. Using the hybrid method of data analysis, items were quantitatively examined using WINSTEPS software based on Rasch Model Theorem to ascertain the fitness of items. Then, the PLS-SEM method was used to evaluate convergent and discriminant validity of the reflective model, prior to assessing the structural model. None of the items were omitted from the data set to produce valid logit measures. All four constructs fulfilled the unidimensionality and quality criteria based on Rasch indices. Further, the PLS-SEM analysis confirms and supports all four hypotheses developed for the study

Keywords: Co-creation effort, MALAYSIA, Rasch Model, Unfavourable Experience

1   Introduction

The experience economy (Gilmore & Pine, 1998) has emerged as a concept that has captured the attention of many marketing scholars. It refers to the situation where organizations engaged customers in a personal memorable way through their service offerings. It entails offering consumers a good blend of tangible (e.g., service stimulus) and intangible (e.g., emotion) service elements. Verhoef et al., (2009) stated that customer experience involves elements such as cognitive, affective, emotional, social and physical responses towards an organization. Therefore, it is incomplete to just only focus on the hard elements such as the stimulus when investigating customer experience. Focus should also be emphasized on the soft elements such as emotional experience.

In an emerging economy like Malaysia, customers are more informed of their rights as consumers. They knew that they could complain via the various channels provided by the service providers such as through the management, and sales personnel. They are also aware of the existence of other unofficial mediums which are more effective

for them to channel their complaints. These platforms may in fact reach wider audience, spread faster, and could sometimes give greater impact. However, this issue has yet to be fully explored in Malaysia, as many of the past studies were just focusing on the profiling complaining behaviour, and its link to factors of service failures (Ndubisi & Ling, 2005; Norazah, 2011; Osman, 2011; Tam & Chiew, 2012; Ahmad et al., 2017; Mazhar, Hooi Ting, et al., 2022; Mazhar, Ting, et al., 2022; Nor Irvoni & Rosmimah, 2016a; Nordin et al., 2018; Rahman et al., 2016; Syed Khalid & Abd Rahman, 2023; Ting et al., 2020). Studies conducted in Malaysia have yet to dwell on issues pertaining to customers' emotional experience and their actual response behaviour. Other than that, studies in Malaysia also did not look at customers' role as the co-creator of service in understanding their complaining behaviour.

To address this gap, the present study attempts to examine customers' unfavourable experience by combining the service experience stimuli, and emotional experience, and investigates how it affects their actual behavioral responses taking into consideration of their role as co-creator of service. Therefore, the objectives of this study are two-folds; i) to verify the research instrument using Rasch method of analysis, and, ii) to investigate link between subscribers' unfavorable experience (UFx), emotional experience (EMx), co-creation effort (CCE), and how it influences their actual dissatisfied response behaviour (DRB).

2   Theoretical Background

2.1   Conceptualization of Customer Unfavourable Experience (UFx)

Customer experience is a combination of the direct and indirect experience, while dealing with service provider. Unfavourable service experience is the unpleasant experience that a customer has to go through in the process of acquiring services from a provider, and can be attributed to various factors. In the past, researchers have look into factors such as atmospheric, service convenience, service process, core service, and service employees (Walter et al., 2010) in investigating unfavourable situation due to service failures. These factors have been proven to influence the customers' overall evaluation of service and are in line with the suggestion made by Crosby and Johnson (2007) that all touch points in a service delivery process, should be embedded when creating customers' experience. Therefore, for this study, these factors will be operationalized as service experience stimuli (SES).

However, in assessing customer unfavourable experience, focusing on the service experience stimuli alone is not enough. This is because as human, there are other implicit factors that may contribute to the situation. For example, a customer who uses a service may have to deal with an emotional episode when faced with unfavourable situation. This will trigger emotional related reaction which is then translated into emotional experience (EMx) by the customer (Nor Irvoni & Rosmimah, 2016c). The emotion experienced due to unfavourable service episodes, which is often in negative form, will eventually have some impact on how they would response towards the service provider. Therefore, to have a better picture on the concept of unfavourable experience, this study will also include emotional experience as part of the unfavourable experience

construct.

Service Experience Stimuli (SES).

Service experience stimuli is a concept that combines the various factors that makes up a service. It comprises of dimensions adapted from past research such as, eService environment, service process, service interaction, and service convenience (Nor Irvoni & Rosmimah, 2016a). A well-crafted service experience stimuli is pertinent to overall customer service experience as it provides functional and physical benefits for customers (Hightower et al., 2002; Patrício et al., 2011; Teixeira et al., 2012; Wong, 2013). Further, conducive service experience stimuli would also help subscribers to better evaluate services that are being rendered (Wong & Fong, 2012). Indeed, the ability of the service provider to present attractive and efficient service stimuli, will hike their popularity among customers.

However, service providers must also take note of the opposite situation that may hit them in their preparation for excellent service. Past researchers have proven that there are many factors that can contribute to unfavourable service encounters (Bigne et al., 2008). For example, a service provider is considered as not performing well, when any of their service experience stimuli fall short of expectation. This will contribute to the overall evaluation of customers' experience. Therefore, service suppliers must pay attention to these factors if they wish to stay competitive and attractive in the customers' radar. Emphasize should be put on providing a good blend of service experience stimuli if they wish to avoid bad experience, hence, leading to the following hypothesis:

> **H1.** *Unfavourable experience is positively driven by subscribers' dissatisfaction of service experience stimuli.*

2.2   Negative Emotional Experience (EMx).

Past researchers have examined positive emotion as a central focus when investigating customer responses. A number of researchers have pointed out the significant relationship between customer emotion and their positive behavioral outcome such as loyalty (Burns & Neisner, 2006; Han & Jeong, 2013; Romani et al., 2012). Research that focuses on pleasant emotions frequently yields positive outcomes. However, inquiries into negative emotions might produce positive results for service providers. (Nor Irvoni & Rosmimah, 2016c).

In contrast to positive emotion, negative emotion may assist businesses in comprehending the consequences of failing to meet consumers' service expectations. This is due to the fact that negative emotions are not simply reflexes; rather, they have the potential to significantly impact customers' comprehensive assessment of a service (Svari & Olsen, 2012), which subsequently can affect their behavioral reactions (Mattila & Ro, 2008). Exploring negative emotions is valuable, especially for service providers. Studying negative emotions can offer valuable insights into consumer discontent, the underlying reasons for service breakdowns, and the intricate factors that impact customer attitudes and actions. Service providers can enhance their tactics for managing client experiences, addressing concerns, and minimizing undesirable consequences

by comprehending the nature and influence of negative emotions. This method allows for the discovery of possible enhancements in service provision, the creation of strategies to promote customer contentment, and the establishment of stronger and more flexible service frameworks. Therefore, the ability of an organization to understand how negative emotions affect overall experience is significantly critical to the understanding of consumer behaviour (Watson & Spence, 2007). This leads to the second hypothesis:

> **H2.** *Unfavourable experience is positively driven by subscribers' negative emotional experience.*

2.3   Dissatisfied Response Behaviour (DRB)

Dissatisfied response behaviour is an area that has received great deal of attention from practitioners, and scholars in the marketing literature. It is known as complaining behaviour and sometimes is also termed as customers' misbehavior (Fullerton & Punj, 2004). In order for customers to misbehave, it requires both the internal and external triggers. These triggers exist implicitly in the overall evaluation of their service experience.

Past researchers have proven that dissatisfied customers will complain directly to service providers (Blodgett & Granbois, 1992; Jin, 2010; Mattila & Wirtz, 2004). However, there are also instances where dissatisfied customers may use other avenues such as spreading negative words of mouth, complaining to external party, or complaining online   (Garin-Munoz et al., 2014; Ngai et al., 2007; Nor Irvoni & Rosmimah, 2016b; Reynolds et al., 2005) as a way of coping in venting their dissatisfaction. Thus, customer complaint behaviour appears to be a complex phenomenon that needs to be empirically studied. Therefore, the third hypothesis is:

> **H3.** *Unfavourable service experience will positively influence dissatisfied response behaviour.*

2.4   Co-Creation Effort (CCE).

In a study, Mccoll-kennedy et. al (2015) provided a precise definition of co-creation as the advantageous outcome achieved by combining and engaging all available resources through contact and activities with the many partners participating in the customer service network. In a much earlier study conducted by Yi and Gong, (2013), the concept of co-creation behaviour is defined as a multidimensional concept comprising two distinct dimensions. The first dimension is referred to as participation behaviour, encompassing activities such as information sharing, information seeking, personal interactions, and demonstrating responsible behaviour. Citizenship behaviour, often known as the second dimension, encompasses actions such as helping, advocacy, providing feedback, and demonstrating tolerance.

Research has revealed that customers experience pleasure when they are able to generate value for themselves (Prebensen et al., 2015). This holds especially true in the realms of service experience consumption, where heightened participation and active

collaboration in co-creation amplify overall levels of happiness (Mathis, 2013). This emphasizes the importance of involving customers in the service development process to have a deeper understanding of their behaviors and actions (So et al., 2016). For instance, active co-creation by telco subscribers is likely to amplify satisfaction with the relationship, potentially extending positive impacts to their overall experience and, consequently fostering loyalty behaviour.

Conversely, if the experience is poor, it may result in undesirable results, such as customer misbehavior, including complaints, and, in severe cases, the eventual degradation of the service. Therefore, it is critical for service providers to understand how customers' involvement in service creation can help mitigate these negative effects. This situation calls for further investigation into the role of subscribers' co-creation efforts in moderating the relationship between unfavourable experiences and negative customer reactions to service faults. In this view, our final hypothesis is:

H4. The relationship between UFx and DRB is positively moderated by CCE, such as the higher the co-creation effort, the stronger the dissatisfied response behaviour.

Therefore, in line with the above discussions, the researcher would like to examine the constructs understudy with regards to their relationship and the moderation effect as depicted in our hypothesized research model (Figure 1).
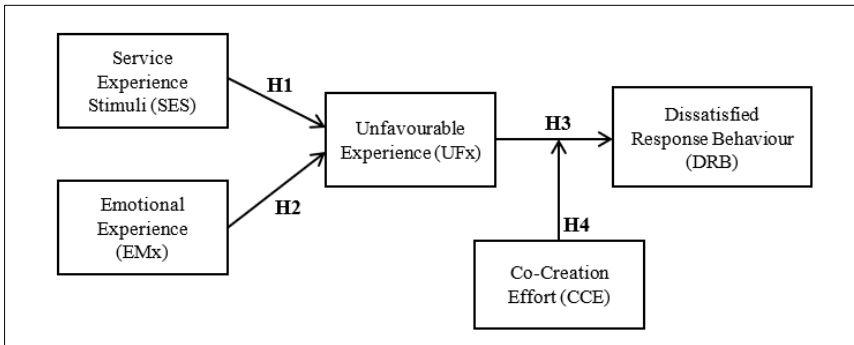
Fig. 1. The Hypothesized Research Model

3   Methodology

The study utilized a sample of 293 subscribers, representing the three predominant telecommunications operators in the Klang Valley, Malaysia. However, to achieve adequate response rates, 350 questionnaires were disseminated. According to the G*Power analysis (Faul et al., 2009), the minimum sample size required for the model's structure to achieve a power of 95% with a medium effect size ($f^2 = 0.15$) is 119 samples. This exceeds the minimum threshold recommended by Cohen (1992, 2007) of 0.8. Consequently, the final sample of 293 usable responses is deemed sufficient for the purposes of this initial study.

A comprehensive analysis was conducted on 60 items using a hybrid approach that incorporates the Rasch and PLS-SEM method. The items were rated on a 4-point Likert scale. The Rasch model is employed during the initial stage of data analysis to evaluate the appropriateness of items for construct verification. PLS-SEM was employed in the second stage of data analysis to examine the hypothesized relationship for the study. By integrating the two distinct methodologies, researchers can strengthen the validity and significance of their findings, yielding more robust and meaningful results (Nor Irvoni & Rosmimah, 2016c).

4   Data Analysis Conclusion

4.1   Rasch Measurement Analysis

For the present study, there are five constructs. One of the construct (UFx) is measured using single item, while the other four main constructs are measured by sub-constructs that comprises of four to five items each. The constructs are service experience stimuli (SES), emotional experience (EMx), dissatisfied response behaviour (DRB), and co-creation effort (CCE). Three of the constructs (SES, EMx and DRB) are measured by four sub-dimensions, while CCE is measured by two sub-dimensions. These constructs were diagnosed separately, and items were put through a series of rigorous Rasch tests.

Rasch Construct Reliability Diagnosis.
Rasch analysis uses a default value of μ item = 0.0 logit, indicating a 50:50 chance of a respondent endorsing an item at a given difficulty level. For this study, the construct reliability assessment revealed that the mean item difficulty (μ_{item} = 0.00 logits) slightly exceeds the mean of individual agreement across all constructs: SES (μ_{person} = -1.03 logits), EMx (μ_{person} = -0.36 logits), DRB (μ_{person} = -0.91 logits), and CCE (μ_{person} = -0.37 logits). When the person mean is slightly lower than the item difficulty mean, it indicates that respondents generally find it difficult to endorse items in the study's constructs, suggesting difficulty in agreeing with the instrument's items.

In Table 1, the Rasch analysis also revealed that these constructs successfully categorize persons or respondents into 4 to 5 separate groups for SES (separation = 3.9), EMx (separation = 4.1), and DRB (separation = 3.33). In the case of CCE, it can differentiate between two distinct groups of subscribers (separation = 1.77) who put in differing amounts of co-creation effort: high and low. This suggests that, with appropriate sample size, the instrument is sensitive enough to detect variations across the various groups in the sample.

Table 1. Rasch Reliability Indices

Index	SES	EMx	DRB	CCE
Item Reliability	0.89	0.93	0.97	0.78
Person Reliability	0.94	0.94	0.92	0.76
Item Separation	2.80	3.67	6.03	1.89

Index	SES	EMx	DRB	CCE
Person Separation	3.90	4.10	3.33	1.77
Mean of item difficulty	0.00	0.00	0.00	0.00
SD	0.31	0.42	0.30	0.20
Mean of person agreement	-1.03	-0.36	-0.91	-0.37
SD	1.80	2.21	1.81	1.32

Note: SES = Service Experience Stimuli, EMx = Emotional Experience, DRB = Dissatisfied Response Behaviour, CCE = Co-creation Effort

Rasch Unidimendionality Diagnosis.

In Table 2, the Principal Component Analysis (PCA) reveals that the raw variance for each construct ranges between 40.4% and 62%, similar to the model's predictions. The eigenvalue for unexplained variances in the first contrast for all the constructs is 3.0 and below, indicating unidimensionality (Linacre, 2005).

Table 2. Results of Principal Component Analysis

Constructs	Raw variance explained by measures (%)		Unexplained variance in 1st contrast (eigenvalue)
	Empirical	Modelled	
SES	53.2%	53.1%	3.0
EMx	62.0%	61.8%	2.3
DRB	57.5%	57.0%	2.8
CCE	40.4%	40.3%	2.1

Note: SES = Service Experience Stimuli, EMx = Emotional Experience, DRB = Dissatisfied Response Behaviour, CCE = Co-creation Effort

Rasch Item Misfits Diagnosis.

The study examined each construct individually, revealing fit statistics and PTMEA correlation values as depicted in Table 3. The infit MnSq of all items is within the acceptable range of 0.6 - 1.4, as recommended by Bond and Fox (2015). Similarly, most of the items exhibit acceptable outfit and infit z-std values, with the exception of two items (Dis_4 and PAtt_2), which were recorded to be slightly misfitting. However, Linacre (2015) suggests that when there are more than 300 observations and the MnSq values are within the acceptable range, z-std indices can be ignored, as they may signal oversensitivity, resulting in overall misfits. Furthermore, the PTMEA correlation with positive values implies that the items were carefully developed (Bond, 2003), confirming that it is measuring what it intends to measure. As a result, the two items are maintained for further investigation.

Table 3. Item misfit and Item Polarity

Main Constructs	Sub-constructs	Items	Infit		Outfit		PTMEA correlation
			MnSq	Z-std	MnSq	Z-std	
Service Experience Stimulus (SES)	Service Convenience (SC)	SC_1	1.14	1.60	1.13	1.50	0.70
		SC_2	1.06	0.70	1.06	0.70	0.71
		SC_3	0.91	-1.10	0.97	-0.30	0.72
		SC_4	1.11	1.40	1.13	1.50	0.70
		SC_5	1.00	0.00	0.99	-0.10	0.73
	eService Environment (eSE)	eSE_1	1.04	0.50	1.01	0.20	0.71
		eSE_2	1.00	0.10	1.00	0.00	0.74
		eSE_3	1.03	0.30	0.99	-0.10	0.71
		eSE_4	1.06	0.70	1.12	1.40	0.69
		eSE_5	0.95	-0.50	0.95	-0.60	0.72
	Service Process (sPRO)	sPRO_1	1.13	1.60	1.13	1.30	0.69
		sPRO_2	0.79	-2.70	0.77	-2.90	0.79
		sPRO_3	0.98	-0.30	0.94	-0.80	0.76
		sPRO_4	1.01	0.10	1.01	0.10	0.73
		sPRO_5	0.87	-1.70	0.87	-1.50	0.73
	Service Interaction (SINT)	SInt_1	0.96	-0.50	0.95	-0.60	0.73
		SInt_2	1.02	0.30	1.00	0.00	0.72
		SInt_3	0.99	-0.10	0.98	-0.20	0.73
		SInt_4	0.93	-0.80	0.93	-0.80	0.74
		SInt_5	0.95	-0.50	0.87	-1.30	0.73
Emotional Experience (EMx)	Angry	Ang_1	1.08	1.00	1.13	1.50	0.75
		Ang_2	0.89	-1.30	0.91	-1.10	0.79
		Ang_3	1.09	1.10	1.07	0.80	0.75
		Ang_4	0.93	-0.80	0.90	-1.20	0.81
	Sad	Sd_1	0.90	-1.20	0.88	-1.30	0.78
		Sd_2	1.21	2.50	1.19	2.10	0.77
		Sd_3	0.90	-1.20	0.93	-0.80	0.80
		Sd_4	0.87	-1.60	0.89	-1.40	0.82
	Rage	Rg_1	0.86	-1.80	0.85	-1.80	0.80
		Rg_2	0.91	-1.10	0.87	-1.50	0.81
		Rg_3	0.92	-0.90	0.89	-1.30	0.83
		Rg_4	1.18	2.10	1.17	1.90	0.78
	Disappointed	Dis_1	1.05	0.70	1.11	1.30	0.75
		Dis_2	0.89	-1.30	0.89	-1.30	0.80
		Dis_3	0.92	-0.90	0.89	-1.30	0.82
		Dis_4	1.27	**3.10***	1.24	**2.70***	0.76
Dissatisfied Response Behaviour (DRB)	Word Of Mouth (WOM)	WOM_1	1.04	0.50	1.07	0.80	0.71
		WOM_2	0.87	-1.60	0.86	-1.60	0.75
		WOM_3	0.99	0.00	0.95	-0.50	0.75
		WOM_4	1.07	0.80	1.02	0.20	0.77
	Vindictive	Vin_1	0.97	-0.30	0.92	-0.80	0.77

Main Constructs	Sub-constructs	Items	Infit		Outfit		PTMEA correlation
			MnSq	Z-std	MnSq	Z-std	
	Complaining	Vin_2	0.83	-2.10	0.87	-1.40	0.76
	(VIN)	Vin_3	0.86	-1.80	0.82	-1.80	0.76
		Vin_4	0.76	-3.10	0.78	-2.40	0.79
	Personal Attack	PAtt_1	1.01	0.20	1.07	0.70	0.73
	(PAtt)	PAtt_2	1.22	**2.50***	1.23	2.00	0.69
		PAtt_3	1.06	0.70	1.03	0.30	0.72
		PAtt_4	1.07	0.80	1.08	0.70	0.71
	Social Media	SMC_1	1.01	0.20	0.95	-0.40	0.74
	Complaining	SMC_2	1.09	1.10	1.12	1.20	0.75
	(SMC)	SMC_3	0.89	-1.40	0.82	-1.90	0.76
		SMC_4	1.11	1.30	1.12	1.10	0.73
Co-creation Effort (CCE)	Participation Behaviour (PtB)	PtB_1	0.81	-2.70	0.82	-2.40	0.69
		PtB_2	0.80	-2.80	0.80	-2.70	0.67
		PtB_3	1.13	1.60	1.14	1.70	0.61
		PtB_4	1.09	1.20	1.09	1.10	0.62
	Citizenship	CtB_1	1.12	1.50	1.12	1.60	0.61
	Behaviour	CtB_2	0.96	-0.50	0.94	-0.70	0.66
	(CtB)	CtB_3	1.01	0.10	0.99	-0.20	0.67
		CtB_4	1.07	0.90	1.09	1.10	0.62

In conclusion, results of the Rasch analysis suggests that the items in the instruments are fairly reliable to measure the constructs as intended, and the test is almost certainly unidimensional (Linacre, 2005). Other than that, none of the items are excluded. All items are used for further analysis using the PLS-SEM approach. In preparing the data for PLS-SEM, the researchers extract the anchored person logit measures for each of the constructs and imputes it to the smartPLS3 software.

4.2   Analyzing Using Rasch Interval Logits and PLS-SEM

The PLS measurement model also known as outer model, is an element of path model that contains indicators and their relationship with the constructs, whilst the structural model defines the relationships between latent variables (Hair, Hult, Ringle, & Sarstedt, 2014). However, hypothesis tests involving the structural relationship among constructs will only be reliable and valid when the measurement model explains how these constructs are measured. The constructs in this study are considered as hierarchical components model (HCM), which involves testing of second-order structure that contains two layers of components (Hair, Hult, Ringle, & Sarstedt, 2017). This modelling approach improves theoretical parsimony and lessens the complexity of the model (Hair et al., 2014).

Traditionally, PLS-SEM is used to construct measures for each variable prior to determining the causal links between the variables. However, for this study, the Rasch measurement is used to construct measures while PLS-SEM is used to examine the

causal links. The person measure which is of equal interval generated by WINSTEPS was imputed into Smart-PLS software to replace LOC scores.

Convergent Validity and Discriminant Validity of PLS-SEM Measurement Model.

Although the Rasch analysis was already conducted to undertake the process of analyzing the measurement model, it is only appropriate for the researchers to follow the steps for analyzing data using the PLS-SEM approach. Therefore, the model was analyzed for its convergent and discriminant validity.

Results in Table 4, for the convergent analysis shows that all indices (indicator loadings, AVE and CR) exceeded the recommended thresholds as recommended by Hair et al. (2017). As for discriminant validity, the researchers follow the suggestion by Henseler et al., (2015) to apply the Heterotrait-Monotrait (HTMT) ratio of correlation which is a more robust method. Results of HTMT in Table 5 shows that all the values are well below than the threshold value of HTMT.85 (Kline, 2011), indicating that discriminant validity has been ascertained. This is further confirmed by the results of HTMT inference that discriminant validity has been established as the confidence interval does not show a value of 1 on any of the constructs Henseler et al., (2015).

Table 4. Convergent Validity Indicators.

Higher Order Constructs	Indicators	Loadings	AVE	CR	Cronbach
Service Experience Stimulus (SES)	SCon	0.910			
	SInt	0.878	0.814	0.946	0.924
	eSE	0.906			
	sPRO	0.913			
Emotional Experience (EMx)	Ang	0.912			
	Dis	0.949	0.869	0.964	0.950
	Rg	0.940			
	Sd	0.926			
Overall Unfavourable Experience (UFx)	UFx *(single item)*	1.00	1.00	1.00	1.00
Dissatisfied Response Behaviour (DRB)	SMC	0.857			
	PAtt	0.934	0.818	0.947	0.926
	VIN	0.889			
	WoM	0.934			
Co-creation Effort (CCE)	CtB	0.885	0.791	0.883	0.735
	PtB	0.893			

Note: Composite reliability (CR) = (square of the summation of the factor loadings) / [(square of the summation of the factor loadings) + (square of the summation of the error variances)].

Average Variance Extracted (AVE) = summation of squared factor loadings) / summation of squared factor loadings) (summation of error variances).

Table 5. Discriminant Validity Indicator - HTMT Ratio & HTMT$_{inference}$.

Constructs	1	2	3	4	5
1. CCE					
2. DRB	0.537 CI$_{85}$ (0.416, 0.628)				
3. EMx	0.471 CI$_{85}$ (0.362,0.581)	0.740 CI$_{85}$ (0.687,0.788)			
4. SES	0.522 CI$_{85}$ (0.411,0.609)	0.696 CI$_{85}$ (0.638,0.764)	0.796 CI$_{85}$ (0.747,0.844)		
5. UFx	0.374 CI$_{85}$ (0.254,0.469)	0.469 CI$_{85}$ (0.374,0.556)	0.496 CI$_{85}$ (0.396,0.574)	0.515 CI$_{85}$ (0.420,0.597)	

Structural Path Analysis.

To assess the structural model, we follow the procedures as suggested by Hair et al., (2014). In the 1st step, the structural model was assessed for collinearity to assess if there is any highly correlated constructs. Result showed that all the Variance Inflation Factor (VIF) values ranges between 1.137 to 2.257, which are well below than the suggested threshold of 3.3 (Diamantopoulos & Siguaw, 2006), signifying the absence of substantial amount if multicollinearity.

Next, the significance and relevance of the path coefficients was examined. First, the study looked at the predictors of UFx, which are SES and EMx. It was found that the service experience stimuli $(\beta = 0.308,\ t = 3.392,\ p<0.01)$ and emotional experience $(\beta = 0.255,\ t = 2.845,\ p<0.01)$ were positively related to UFx explaining 27.7% ($R^2 = 0.277$) of the variance in UFx. Thus, H1 and H2 are supported.

Then, we look at predictors of DRB which is UFx. It was also found that UFx $(\beta =0.372,\ t = 7.116,\ p<0.01)$ was also positively related to dissatisfied response behaviour, explaining 33.7% ($R^2 = 0.337$) of the variance in DRB. Thus H3 were also supported. Both the R^2 values were above the cut-off value of 0.26 indicating a substantial model (Cohen, 1988).

Finally, the f^2 effect size was assessed to determine the relative impact of a predictor construct on an endogenous construct (Cohen, 1988). In doing so, we used the guideline as suggested by Cohen (1988) of 0.02, 0.15, and 0.35 which represent small, medium, and large effects, respectively. From our investigation, and as exhibited in Table 6, it can be observed that all the relationship shows substantive impact with 2 small effects, and 1 medium effect.

Table 6. Results of Direct Relationship.

Hypothesis & Path	Std Beta	SE	t-value	p-value	VIF	R^2	f^2	Decision
H1 SES → UFx	0.308	0.091	3.392**	p < 0.001	2.257		0.058	Supported
H2 EMx → UFx	0.255	0.090	2.845**	0.002	2.257	0.277	0.040	Supported
H3 UFx → DRB	0.372	0.052	7.116**	p < 0.001	1.137	0.337	0.183	Supported

*Note: ** p<0.01 (2.33)*

After testing the direct effects, we examined the moderation hypothesis using a two stage approach as recommended by Henseler and Fassott (2010). As depicted in Table 7, our prediction on the moderating effect of co-creation effort on the relationship between unfavourable experience and dissatisfied response behaviour was significant (β =0.126, t = 2.447, $p<0.01$). We also observe that the interaction term's f^2 effect size has a value of 0.035, which according to Aguinis, Beaty, Boik, & Pierce, (2005) the value indicates a medium effect. Further, the inclusion of the interacting effect of co-creation effort increases the R^2 value for dissatisfied service experience to 0.330.

Table 7. Moderating Effects of Co-creation Effort.

Hypothesis & Path	Std Beta	SE	t-value	p-value	f^2 interaction	LL	UL	Decision
H4: UFx*CCE → DRB	0.126	0.052	2.447**	0.007	0.035	0.033	0.203	YES

To further elaborate the moderating effect phenomenon of co-creation effort on unfavourable experience and dissatisfied response behaviour, the pattern of the relationship between UFx and DRB was plotted at both high and low co-creation effort (CCE). As can be seen in Figure 2, the slope for high co-creation effort is steeper compared to low co-creation effort, suggesting the relationship between UFx and DRB is stronger when there is more co–creation effort (CCE) being practiced by the subscribers'. Hence H4 is also supported.
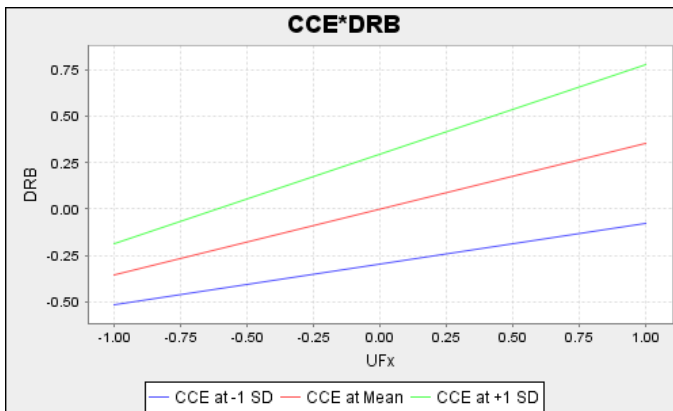
Fig. 2. Moderating Effect of Co-creation Effort on the Relationship between UFx and DRB

5   Discussions, Implication and Conclusion

The application of Rasch method of analysis has provided evidence that the scale used in the study appears to be conceptually sound, and is psychometrically valid and reliable in measuring the intended constructs. Items were found to be fitting and meeting the stringent quality criteria of Rasch Measurement Model. Other than that, most importantly, Rasch helps to validate the simplified version of value co-creation scale. This effort is in line with the suggestion made by the original developer of the scale, Yi and Gong, (2013), that a shorter scale would be beneficial if it is to be applied as part of a bigger research design. Indeed, the application of Rasch has provided the study with interval level measures (Bond, 2003) which serves as a good foundation for predictive models because of its intention, which is to produce parameter estimates as independent as possible of the idiosyncrasies (Linacre, 2010) in the present data set.

Subsequent analysis on subscribers' negative service experiences revealed a positive significant influence on their expressions of dissatisfaction. This outcome aligns with the findings of Nor Irvoni and Rosmimah (2016b), which also identified a positive and significant effect of service dissatisfaction on customer response behavior. This underscores the imperative for service providers to deeply understand how consumers assess their overall experience. By achieving this comprehension, service providers can foster a stronger relationship with their customers, ultimately enhancing loyalty behaviors (Gentile et al., 2007). This approach not only mitigates adverse reactions but also contributes to building a sustainable customer-service provider rapport, essential for long-term business success.

The present study also makes an important contribution to the marketing literature by providing new insights on the role of co-creation behaviour in moderating the relationship between unfavourable experience and dissatisfied response behaviour among mobile subscribers. In contrast to the study conducted by Prebensen et al. (2015), this study has empirically examine the moderating effect of co-creation effort by applying the simplified version of value co-creation scale, which was originally developed by Yi and Gong (2013), and thus extends the current knowledge of the subject in the context of relationship marketing. Indeed, literatures have shown that in the past researchers have been investigating co-creation in the context of good customer behaviour, such as loyalty. However, this study has provided evidence that co-creation can also result in disruptive behaviour. Thus, it is hoped that with these new findings, more studies will be conducted to further explore the phenomena.

The study's managerial implications highlight the critical role of customers' co-creation effort in fostering positive relationships with service providers. While past research has consistently emphasized the positive impact of co-creation on relationship quality, this study underscores the need for practitioners to recognize its potential pitfalls. The findings emphasize that if co-creation is not well-understood, it can become a double-edged sword, potentially leading to unfavourable outcome. Therefore when crafting strategy that requires customers' to co-create, service providers must first ensure that the service stimuli fulfil the most stringent standards. Customers that actively participate in co-creation expect heightened service standards, and failure to meet these expectations may result in more pronounced negative responses from subscribers.

The current study also presents a novel methodological way for social scientists to analyze research data. The report utilizes a hybrid approach to analyze data that combines two different procedures to assess constructs and investigate the links revealed in the investigation. The Rasch Measurement Model analysis is first used to calculate interval-level measurements for the indicators, which are then imputed into the smartPLS3 software for further test the relationships. To the best of the researchers' knowledge, this study is among the first to amalgamate these methodologies. The adoption of this technique results in the generation of more reliable and substantive findings. Specifically, the interval-level data produced through Rasch analysis lays a solid and robust groundwork for a more comprehensive analysis (Nor Irvoni & Rosmimah, 2016c) when the relationships are explored using the Partial Least Squares Structural Equation Modeling (PLS-SEM) approach. Moreover, the interval scale developed via Rasch analysis is posited as an optimal alternative for the latent variable scores, which Hair et al. (2014) believe might be overestimated. Consequently, it is the researcher's aspiration that this hybrid methodological approach will be increasingly employed in future studies, thereby enriching the robustness and depth of scholarly inquiries across disciplines.

While the current study provides useful insights, it does have limits, which pave the way for future research opportunities. To begin, there is a convincing rationale for applying the scales used in this study (SES, EMx, CCE, and DRB) across different countries and cultures. The increasing tendencies of globalization highlight the need to evaluate the impact of cultural variations on the topics covered in this study. This expansion would help us better understand how culture effects consumer behaviour and service perception. Second, our analysis was limited to the mobile service sector. It would be good to expand this research into other businesses, testing the proposed model's applicability and generalizability across various service sectors. Such an effort will not only validate the model's relevance, but also widen its applicability by providing insights into sector-specific customer behaviour and service evaluation. Finally, the use of a longitudinal study paradigm offers an intriguing opportunity for future research. Long-term research can provide strategic management with richer, more complex knowledge. A longitudinal method, which includes a time-series analysis of the conceptual framework, would provide a solid foundation for determining causal links and trends across time. This, in turn, could help to design more informed and successful management strategies based on a better understanding of dynamic consumer-service interactions.

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