

Cues to Action and Self-Efficacy in the Health Belief Model: Perceived Risk as Mediating Roles Towards Enhancing Customer Engagement

Rohayah Adiman, *Noraznira Abd Razak, Nur Mellisa Muhammad Faisal Wee
Faculty of Business & Management, Universiti Teknologi MARA, Cawangan Melaka, Melaka, Malaysia
ningady415@gmail.com, *noraznira@uitm.edu.my, nurmelissa@uitm.edu.my
Corresponding Author: Noraznira Abd Razak

Abstract: Understanding and predicting customer engagement (CE) is crucial, especially in the context of medical and health insurance (MHI). In the current global landscape, particularly in light of the COVID-19 pandemic in 2020, gaining insights into customer behavior is essential for shaping future decisions and strategies. This study aims to investigate CE in private hospitals in Malaysia by utilizing the Health Belief Model (HBM). The HBM offers a comprehensive view of how customer beliefs and behaviors affect CE, making it well-suited for this research context. The study employs variance-based structural equation modeling through Smart PLS 4.0, using a sample of 150 private hospital customers in Malaysia. The findings reveal a significant relationship between Cues to Action (CA) and Self-Efficacy (SE) on CE, while perceived risk (PR) does not mediate the relationship between CA and SE about CE.

Keywords: *Customer Engagement, Health Belief Model, Cues to action, Self-Efficacy, Perceived Risk*

1. Introduction

According to Lim and Tan (2019), the insurance penetration rate (PTR) is described as the number of the relevant population that has purchased insurance at least once, including repurchases of insurance products, which contributes to the country's gross domestic product (GDP). In other words, PTR includes Customer engagement (CE). CE has become a concern for Malaysia, particularly since COVID-19 hit the country in 2019, where it provides 2.9% of Malaysia's GDP and provides employment for over 52,000 people. According to the 2019 National Health and Morbidity Survey (NHMS), only 22 percent of the population is covered by personal health insurance, even though 36 percent do not require it and 43 percent cannot afford it (Institute for Public Health, 2019). Furthermore, a lower PTR was reported, with only 54 percent of the population insured in 2019, which is considered low compared to developed countries such as Singapore, which has a PTR of more than 80 percent (Guan & Yusuf, 2020). The lower PTR indicates that government income is affected, and risk management awareness and practices among Malaysians are also low. As a result, Malaysians may be unprepared to guard against certain types of risks (Guan & Yusuf, 2020). As a corollary, Zhe (2020) asserted that the CE issue necessitates an in-depth examination of the underlying causes by all insurance industry stakeholders to understand and predict the beliefs and behaviors that contribute to this problem, particularly in MHI. However, there is still a scarcity of research in this area, particularly in the field of CE in the insurance industry.

Despite the issue, the lower "engagement" of insurance among Malaysians, including MHI, particularly during pandemic attacks, occurred when most insurance policies fell under the communicable disease clauses of COVID-19, which insurers preferred as absolute exclusions and were drafted like exclusions for radioactive materials. The exclusions indicate that the insurance provider would not cover the loss unless the policyholder paid an extra premium. As a result, there was a decrease in the number of CEs with approximately 13 million policyholders in the country during COVID-19; 7.7 percent of all policyholders elected to defer their premium payments, involving more than one billion ringgit (Zhe, 2020). Given the significance of this issue, it was necessary to perform this study to examine the customers' behaviors towards CE.

In the role of a mediating, according to Srivastava et al., (2021), in a study, it was found that a customer's PR exerts a strong influence in the early stages of the consumer buying process and is also important in the later stages of building customer relationships, which demonstrates that PR is suitable to become a mediating or a central component between CE and customer behavior. The mediating influence of PR, which is also a common link between CE and customer behavior, has not, however, been examined. This is even though there is a common link between CE and customer behavior. PR is one of the aspects of marketing and workplace literature that receives the least amount of attention (Wang & Wnag, 2013). Therefore, it would be interesting

and worthwhile to examine whether PR can have a mediating effect on CE by using the Health Belief Model (HBM) theory on the MHI.

Why is studying CE using cues to action and self-efficacy constructs are important? Numerous additional variables have been proposed as possible HBM additions. In 1988, self-efficacy was officially added to the HBM, having been constructed in 1977. Cues to action are also included in this theory because they are believed to affect individuals' behavior and actions (Dzulkipli et al., 2019). However, these variables are rarely included in HBM studies (Zimmerman & Vernberg, 1994), owing to a lack of research and the uncertainty associated with these additional variables. As a result, existing HBM studies are typically focused on the four original variables (Carpenter, 2010). Additionally, Conner and Norman (2006) report that early research discovered that these health beliefs were associated with health behaviors and thus could be used to distinguish between those who engaged in and those who did not engage in such behaviors. As a result, to achieve a more accurate prediction of the induced willingness of CE behavior toward purchasing MHI in this study TWO (2) constructs that cues to action and self-efficacy were considered while considering this issue.

2. Literature Review

Customer Engagement (CE)

CE has evolved in recent years as an increasing number of companies seek novel methods to acquire and retain customers. CE is unquestionably essential to the insurance industry, particularly in overcoming Malaysia's low PTR (Guan & Yusuf, 2020). Before now, a high-quality product or service was sufficient to persuade a customer to purchase. However, new data and analytical tools indicate that engagement now plays a significant role not only in the customer's purchasing decision but also in the firm's performance (Chen, 2013). According to Agyei et al. (2020), CE in the insurance industry entails more than merely ensuring that consumers receive requested services on time. It involves establishing meaningful touch points throughout a transaction that aid businesses and brands in promoting and expanding their businesses through customer loyalty. This is consistent with Jayalath and Galdolage's (2021) description of healthcare CE as distinct from other services, where participants are typically patients or have a connection to a specific illness. Customers in the healthcare industry are frequently helpless because they desire life or good health but have little or no influence or knowledge regarding viable solutions. Customers prefer service providers who clearly explain the issues and solicit their input throughout the entire decision-making procedure. Due to persistently high demand and fundamental obstacles such as a lack of human and physical resources, it is difficult for government-run hospitals to promote such engagement behaviors. To address this market gap, private health care promotes its services as friendly, welcoming, and caring while maintaining a high level of confidentiality. They incorporate quality, technology, and originality into their products to attract and engage customers (Suchman et.al, 2011).

Hypotheses Development

Cues to Action (CA)

Numerous formulations of HBM include the concept of action-triggering cues. Cues to action is a construct that is associated with the HBM. It refers to a person's readiness to engage in a particular action (Francis et al., 2018; Hisam et al., 2018; Tamayo et al., 2018). Cues to action, as defined by Bishop et al. (2015), are the precipitating and mediating factors that motivate an individual to initiate or maintain an action. They can be internal or external. Additionally, cues to action are instances in which an individual is prompted to engage in preventative behavior by an external factor (Rosenstock, 1966). Cues to action, according to Rosenstock's original formulation, could include external cues such as a mass media campaign, or internal cues such as a negative change in bodily state (Carpenter, 2010). However, Rosenstock, on the other hand, said that the model's "cue to action" is the most underdeveloped and rarely studied part (Janz & Becker, 1984; Rosenstock, 1974; Zimmerman & Vernberg, 1994).

Even though there is a paucity of research discussing cues to action, it is impossible to overstate the importance of this construct in predicting behaviors aimed at reducing health problems. According to Rosenstock (1966), the variable defines readiness to act and argues that healthcare action will not occur unless an initiating event occurs, which may include external cues such as mass media campaigns, social influence, or internal cues such as perception of symptoms, are what constitute cues to action. Thus, it is obvious that strong cues to action will

motivate individuals to act (Dzulkipli et al., 2019).

Finally, cues to action and health motivation have been largely ignored in empirical studies of the HBM. Janz and Becker (1984) and Harrison et al. (1992) did not include these components due to a scarcity of relevant studies. One reason researchers have been unable to operationalize these components is a scarcity of precise construct definitions (Abraham & Sheeran, 2014). Because cues to action can refer to a wide variety of experiences, they have been operationalized differently by different researchers. According to Sulat et al. (2018), additional variables such as cues to action, general health motivation, and self-efficacy were not explicitly included in the original HBM formulation and are only very rarely included in HBM studies (Janz and Becker, 1984; Zimmerman and Vernberg, 1994; Winfield and Whaley, 2002; Abraham and Sheeran, 2015) due to the lack of study and the uncertainty of these additional variables. Considering this, the following hypothesis was developed to justify the relationship between cues to action and CE towards MHI:

H1: Cues to action are positively related to CE towards MHI.

Self-Efficacy (SE)

Self-efficacy has been added to the list of HBM variables (Rosenstock, Strecher, & Becker, 1988). However, quantitative summarization is impossible because these factors are rarely included in HBM studies (Zimmerman & Vernberg, 1994). Given the scarcity of data and theoretical uncertainty surrounding the inclusion of these additional variables in the model, most reviewers concentrate on the original four variables of susceptibility, severity, benefits, and barriers (Carpenter, 2010). Recognize that additional variables, such as cues to action, general health motivation, and self-efficacy, were not explicitly included in the original HBM formulation and are used in HBM studies only infrequently (Janz and Becker, 1984; Zimmerman and Vernberg, 1994; Winfield and Whaley, 2002; Abraham and Sheeran, 2015, Sulat et al., 2018). Most researchers in the insurance field, for example (Murray, 2004b; Uma & Ilango, 2021), also exclude self-efficacy from their research. However, Luquis & Kensinger (2019) indicated that the dimensions of cues to action and self-efficacy can be used to explain more accurately whether an individual takes action to avoid, screen for, or improve health behaviors. In a similar situation to Maddux et al. (1995), researchers discovered that self-efficacy beliefs have a dual effect on health. To begin, self-efficacy influences the adoption of healthy behaviors, their cessation, and the maintenance of these behavioral changes in the face of adversity and difficulty. Second, self-efficacy affects the body's physiological responses to stress, most notably the immune system.

Realizing the importance of self-efficacy, Rosenstock et al. (1988) suggested self-efficacy be included in the HBM after acknowledging that Janz and Becker (1984) underestimated its importance. Subsequent research has examined the predictive usefulness of an expanded HBM, which includes self-efficacy and has typically found that self-efficacy is an important additional predictor (e.g., Wallace 2002; Hay et al. 2003; Norman and Brain 2005). However, self-efficacy does not necessarily improve the predictive usefulness of the model. When floor or ceiling effects are detected, such as when individuals are uniformly confident in their ability to act, self-efficacy may be ineffective at providing extra differentiation (e.g. Weitkunat et al. 2003). Unlike King (1982), according to Conner and Norman (2006), Rosenstock et al. (1988) did not develop a new theoretical formulation defining the connections between beliefs and self-efficacy. They proposed that self-efficacy be added to the other HBM characteristics without changing the model's theoretical structure. This may have been a mistake since subsequent research revealed that major HBM components had an indirect effect on behavior via their effects on perceived control and intention, which may be considered more proximal drivers of action (Schwarzer 1992; Abraham et al. 1999a). Nevertheless, Rosenstock et al. (1988) examined the overlap between the HBM's perceived barriers component and self-efficacy. They regard the perceived hurdle dimension as a catch-all word that encompasses all potential barriers to action, both internal and external. As a result, they propose the addition of self-efficacy as a distinct construct within the HBM, emphasizing two critical implications: first, it would help define the extent of the obstacles dimension; and second, it would increase the predictive value of the HBM (Conner & Norman, 2006).

Likewise, Tarkang and Zotor (2015) revealed self-efficacy as "the strength of an individual's belief in his or her ability to respond to tough situations and to deal with any accompanying challenges or setbacks," while Rosenstock (1988) defined it as "confidence in one's ability to act." Thus, it is apparent that a high level of self-efficacy will motivate an individual to act. This construct is associated with the intent to purchase MHI. The population with a high level of self-efficacy is likely to have a strong desire to purchase MHI, whereas the

population with a low level of self-efficacy will opt to remain uninsured. For instance, a population that has gotten accurate information about MHI and has prior experience with the high cost of medical services may have a highly affected intention to purchase MHI (Dzulkipli et al., 2019). As the inclusion of self-efficacy in the HBM indicates, if an individual lacks confidence in pursuing an action or lacks confidence in their ability to prevent disease or harm, they are unlikely to seek behavior changes (Bishop et al., 2015). Historically, self-efficacy has been classified as a dimension of barriers vs. benefits within the HBM. However, Rosenstock et al. (1988) proposed using self-efficacy as an explicit construct without describing its specific links to other constructs. In light of this, the following hypothesis has been developed to examine the relationship between self-efficacy and CE concerning MHI:

H2: Self-efficacy is positively related to CE towards MHI.

Perceived Risk (PR)

Bauer (1960) first introduced the concept of perceived risk (PR) into academic discussions, and various definitions have emerged that describe PR as "the uncertainty consumers experience when making purchasing decisions" (Dowling 1986; Mitchell 1999; Schiffman et al. 2011). More recently, this concept has been explored in the risk research literature (Rao et al. 2017; Buratti and Allwood 2019). Economists have studied risk aversion and higher-order risk preferences, such as prudence and temperance, across different contexts (Deck and Schlesinger 2010; Ebert and Wiesen 2011; Noussair, Trautmann, and van de Kuilen 2014; Mayrhofer 2017), PR has not been extensively addressed within the insurance field. Notably, Cabantous et al. (2011) examined a priori expectations related to PR. Currently, several researchers, including Desrochers & François Outreville (2020), are investigating PR in the insurance sector. Their findings suggest that individuals tend to prefer familiar, known-risk situations when purchasing insurance, revealing a tendency toward ambiguity-seeking rather than ambiguity aversion. Additionally, there is no evident relationship between individuals' backgrounds and their PR concerning economic conditions or insurance orientation (Hoyt, 2004). This aligns with the findings of Jayaraman et al. (2017), which indicated that PR does not mediate the influence on policy continuation or customer engagement (CE).

The detrimental effect of PR on CE appears to be a widespread issue. Ariff et al. (2014) confirmed that PR negatively impacts CE, supporting Liang et al. (2018), who noted a lack of consensus regarding the relationship between PR, trust, and CE. Although these factors are interconnected, the nature of their relationship remains unclear; it is uncertain whether PR serves as a prerequisite for or an outcome of trust and CE. Multiple studies have provided empirical evidence of a negative correlation between PR, trust, and CE (Pappas, 2016; Zhang, Tang, Lu, & Dong, 2014). Given the inconsistencies in findings related to PR and CE, this study aims to address these gaps by exploring how cues to action and self-efficacy influence CE, with PR serving as a mediating variable in the context of medical and health insurance (MHI).

H3: PR mediates the relationship between CA and CE.

H4: PR mediates the relationship between SE and CE.

3. Methodology

Research Design

For this study, surveys were chosen as the data collection strategy. Additionally, a questionnaire survey of customers (private hospital patients) was conducted to examine the relationship between the CA, SE and CE while taking into account the mediating effect of PR toward MHI. As the issue description emphasized CE, data would be gathered from customers of private hospitals listed by the Malaysian Ministry of Health (MOH), which would serve as the unit of analysis for this research.

Data collection and Analysis procedure

Customers from any of the 219 Malaysian private hospitals that are listed on the Ministry of Health (MOH) website as of 2022 make up the sampling frame for this study. The respondents of this research were 150 in total. This study aims to gather information via self-administered questionnaire surveys on the selection criteria for CE, and their belief in MHI protection. The researcher uses four predictors as the input parameters for this study. SmartPLS was chosen as a nonparametric multivariate analytic tool for structural equation modeling (SEM) that is variance-based. The data were analyzed with SmartPLS 4.0. The analysis modeled the measurements and design of the study using the two-stage methodology recommended by experts (Ngah et al., 2021).

4. Results

Measurement Model

For this study, to test the model developed a 2-step approach was used using the suggestions of Anderson and Gerbing (1988). First, in the measurement model to test the validity and reliability of the instruments the guidelines of Hair et al. (2019) and Ramayah et al. (2018) were used then the structural model was run to test the hypothesis developed.

For the measurement model the loadings, average variance extracted (AVE), and the composite reliability (CR) were assessed. The values of loadings should be ≥ 0.5 , the AVE should be ≥ 0.5 and the CR should be ≥ 0.7 . As shown in Table 1, the AVEs are all higher than 0.5 and the CRs are all higher than 0.7. The loadings were also acceptable with only two loadings less than 0.708 (Hair et al., 2019). Overall, all the measurements of this study were valid and reliable.

Then in step 2, to assess the discriminant validity HTMT criteria were used as suggested by Henseler et al. (2015) and updated by Franke and Sarstedt (2019). The HTMT values should be ≤ 0.85 for the stricter criterion and the mode lenient criterion should be ≤ 0.90 . As shown in Table 2, the values of HTMT were all lower than the stricter criterion of ≤ 0.85 as such it concludes that the respondents understood that the 4 constructs are distinct. Taken together both these validity tests have shown that the measurement items are both valid and reliable

Table 1: Measurement Model

First Order Constructs	Items	Loadings	AVE	CR
Cues to Action	CA1	0.794	0.605	0.792
	CA2	0.825		
	CA3	0.752		
	CA4	0.738		
Self-efficacy	SE1	0.810	0.600	0.877
	SE2	0.794		
	SE3	0.816		
	SE4	0.738		
	SE5	0.808		
	SE6	0.672		
Perceived risk	PR1	0.643	0.691	0.952
	PR2	0.859		
	PR3	0.903		
	PR4	0.871		
	PR5	0.855		
Customer engagement	CE1	0.825	0.714	0.904
	CE2	0.885		
	CE3	0.858		
	CE4	0.804		
	CE5	0.850		

Table 2: Discriminant Validity (HTMT)

	1	2	3	4
1. Cues to action				
2. Customer engagement	0.666			
3. Perceived Risk	0.169	0.255		
4. Self-efficacy	0.589	0.584	0.135	

Structural Model

In this study the path coefficients, the standard errors, t-values and p-values for the structural model using a 5,000-sample re-sample bootstrapping procedure (Ramayah et al. 2018). Also based on the criticism of Hahn and Ang (2017) p-values are not good criteria for testing the significance of the hypothesis and suggested to use of a combination of criteria such as p-values, confidence intervals and effect sizes. Tables 3 and 4 show the summary of the criteria used to test the hypotheses developed.

First, the effect of the 3 predictors on CE, the R² was 0.471 (Q² = 0.394) which shows that all the 2 predictors explained 41.9% of the variance in CE. Cues to action ($\beta = 0.402, t > 4.811$) and Self-efficacy ($\beta = 0.352, t > 4.534$) were all positively related to CE, thus H1 and H2 were supported. In contrast for indirect effect, rating ($\beta=0.0031, t\text{-value}=1.306, P>0.01$) for CA and ($\beta=-0.011, t\text{-value}=0.495, P>0.01$) for SE have shown there are no relationship exists where its shows that hypotheses H3 and H4 are not supported.

To test the mediation hypotheses, this study followed the suggestions of Preacher and Hayes (2004; 2008) by bootstrapping the indirect effect. If the confidence interval straddles a 0 then it shows that there is no significant mediation. As shown in Table 5, Cues to action → PR → CE ($\beta = 0.031, p > 0.05$) and Self-efficacy → PR → CE ($\beta = 0.352, p > 0.05$) were all not significant. The confidence intervals bias corrected 95% also shows the intervals were straddling to 0 thus confirming the study findings. Thus, H3 and H4 were also not supported.

Table 3: Hypothesis Testing Direct Effects

Hypothesis	Relationship	Std Beta	Std Error	t-values	p-values	BCI LL	BCI UL	f ²	VIF
H1	Cues to Action → CE	0.402	0.084	4.811	0.000	0.264	0.586	0.009	1.244
H2	Self-efficacy → CE	0.352	0.078	4.534	0.000	0.197	0.512	0.023	1.224

Note: We use a 95% confidence interval with a bootstrapping of 5,000

Table 4: Hypothesis Testing Indirect Effects

Hypothesis	Relationship	Std Beta	Std Error	t-values	p-values	BCI LL	BCI UL
H3	Cues to Action → PR → CE	0.031	0.024	1.306	0.192	-0.023	0.074
H4	Self-efficacy → PR → CE	-0.011	0.023	0.495	0.621	-0.056	0.035

Note: We use a 95% confidence interval with a bootstrapping of 5,000

Further to that as suggested by Shmueli et al. (2019) proposed PLSpredict, a holdout sample-based procedure that generates case-level predictions on an item or a construct level using the PLS-Predict with a 10-fold procedure to check for predictive relevance. Shmueli et al. (2019) suggested that if all the item differences (PLS-LM) were lower then there is strong predictive power, if all are higher then predictive relevance is not confirmed while if the majority is lower then there is moderate predictive power and if minority then there is low predictive power. Based on Table 5, all the errors of the PLS model were lower than the LM model thus it concludes that this study model has a strong predictive power.

Table 5: PLS-Predict

Items	PLS-SEM_RMSE	LM_RMSE	PLS-LM	Q ² _predict
CE1	0.752	0.780	0.629	0.232
CE2	0.671	0.685	0.543	0.325
CE3	0.650	0.666	0.517	0.318
CE4	0.844	0.839	0.623	0.257
CE5	0.814	0.843	0.639	0.276
PR1	1.145	1.190	0.975	-0.032
PR2	1.138	1.141	0.953	-0.017
PR3	1.252	1.292	1.066	0.007
PR4	1.242	1.209	0.998	-0.025
PR5	1.273	1.290	1.079	-0.003

5. Conclusion and Discussion

The proposed hypothesis (H1) is supported, indicating that there is a significant relationship between CA and CE. One unique contribution of this study was that, although CA is rarely included in HBM studies (Janz and Becker, 1984; Zimmerman and Vernberg, 1994; Winfield and Whaley, 2002; Abraham and Sheeran, 2015), it was discovered that CA is a predictor that influences insurance policy engagement when this construct included in the study. When both advantages and barriers are ranked highly, for example, CA can help people resolve internal conflicts concerning both factors. CA can stimulate health-related activities when appropriate attitudes are maintained. To put it another way, information on insurance and CA found in promotional materials may contribute to an impulse to engage with insurance products (Uma & Ilango, 2021). This assertion is consistent with the research conducted by Dzulkipli et al. (2019), which indicates that people who lack access to trustworthy healthcare information and feel they have a low chance of contracting the same disease could need more external cues to get examined. It follows that compelling cues to action will undoubtedly spur people to act.

The results additionally demonstrated that hypotheses (H2) were accepted, and SE was found to be significant with CE. SE is a construct that was introduced to HBM, like CA. Unfortunately, unlike King (1982), Rosenstock et al. (1988) did not propose a new theoretical framework for the relationship between beliefs and SE, which led many researchers to overlook this construct. The characteristics of Cues to action and self-efficacy according to Luquis & Kensinger (2019), can be utilized to more precisely describe whether a person takes action to prevent, screen for, or improve health behaviors. This is consistent with the findings of Hay et al. (2003) and Sulat et al. (2018), who indicate that the variables (CA and SE) need to be combined with HBM constructs to ensure the reliability and effectiveness of HBM as a behavioral predictor. SE is essential in CE because it provides motivation to overcome barriers which is if people are aware of the advantages of a service, they may still be discouraged from using it because of barriers. On the other hand, those who have a high sense of their abilities are more driven to keep going after their engagement goals and get through challenges. Their self-assurance in their ability to overcome obstacles encourages them to come up with original ideas and get past obstacles, which keeps them engaged.

The study's findings show that all hypotheses for mediating were found to be not significant or supported because the bias-corrected 95% confidence intervals for H3 and H4 crossed zero, indicating that there was no mediation, which means PR did not mediate the relationship between SE and CE. This demonstrates that PR is not a mediating factor in the relationship between HBM components and CE. This finding is consistent with Van Der Pligt, J. (1998), who asserts that PR plays a significant role in influencing health-related beliefs, attitudes, and behaviors within the framework of the HBM. However, most researchers believe PR is significant when it involves precautionary behavior rather than preventive behavior. Depending on the behavior or health outcome under consideration, these HBM components can play a stronger role in predicting health-related behaviors or outcomes, and PR can become a weak predictor. This is consistent with the findings of the research, as the preceding chapter of this study previously revealed how CE was employed as a preventive behavior to shield individuals from increasing, unexpected costs and long periods of waiting for treatment.

These preventative behaviors, which result in this behavior outcome, contribute to the rejection of hypotheses H3 and H4 with PR did not mediate the relationship between HBM constructs and CE.

In conclusion, BNM has highlighted concerns regarding the low levels of CE and the high rate of uninsured individuals in Malaysia's medical health insurance (MHI) sector. The government, along with insurance companies and providers, seeks to understand the factors influencing CE in health insurance. This research aims to outline CE in MHI and offer recommendations to stakeholders about improving the healthcare system in Malaysia. While prior studies have recognized the importance of customer satisfaction, risk attitudes, and purchase intentions in MHI, there has been no exploration of the Health Belief Model (HBM) about CE. Therefore, this study will illustrate HBM's significance in predicting CE and identify which HBM dimensions most influence it. This is crucial for insurance companies and private hospitals, as they should concentrate on these key dimensions and tailor marketing strategies for both insured and uninsured populations.

Overall, this research is important as it addresses the gap in studies concerning Malaysia's context. It contributes to the health insurance field by examining CE and Cues to action and self-efficacy constructs in a limited Malaysian setting, with implications for the broader global context. This research will confirm its significance. Additionally, the findings will be vital for insurance companies in developing effective policies, regulations, and marketing strategies to enhance their offerings and tackle the issue of low CE among Malaysians.

Acknowledgment: The authors extend their sincere appreciation to Universiti Teknologi MARA, Cawangan Melaka, for the invaluable support provided in the completion of this article.

References

- Abraham, R. (1999). The impact of emotional dissonance on organizational commitment and intention to turnover. *The Journal of Psychology*, 133(4), 441-455.
- Abraham, C., & Sheeran, P. (2014). The health belief model. *Cambridge Handbook of Psychology, Health and Medicine, Second Edition*, May, 97-102. <https://doi.org/10.1017/CBO9780511543579.022>.
- Abraham, C., & Sheeran, P. (2015). The health belief model. *Predicting health behavior: Research and practice with social cognition models*, 2, 30-55.
- Agyei, J., Sun, S., Abrokwah, E., Penney, E. K., & Ofori-Boafo, R. (2020). Influence of Trust on Customer Engagement: Empirical Evidence From the Insurance Industry in Ghana. *SAGE Open*, 10(1). <https://doi.org/10.1177/2158244019899104>.
- Ariff, M. S. M., Sylvester, M., Zakuan, N., Ismail, K., & Ali, K. M. (2014, June). Consumer perceived risk, attitude and online shopping behavior; empirical evidence from Malaysia. In *IOP Conference Series: Materials Science and Engineering* (Vol. 58, No. 1, p. 012007). IOP Publishing.
- Azizam, N. A., Dzulkpli, M. R., Shamimi, N. I., Maon, S. N., John, D., Belawing, J., Jawa, J., & Yahaya, N. (2020). Applicability of Theory of Planned Behavior and Protection Motivation Theory in Predicting Intention to Purchase Health Insurance. *Advances in Business Research International Journal*, 6(1), 41. <https://doi.org/10.24191/abrij.v6i1.9939>
- Becker, A., & Becker, J. (2021). Dataset shift assessment measures in monitoring predictive models. *Procedia Computer Science*, 192, 3391-3402.
- Bank Negara Malaysia (BNM). (2016). Insurance and Takaful Sector. *BNM Financial Stability and Payment Systems Report 2016*, 1(July 2011), 1-2. <http://www.takaful.bh/default.asp?action=article&id=77&menuid=sub4>
- Bishop, A. C., Baker, G. R., Boyle, T. A., & MacKinnon, N. J. (2015). Using the Health Belief Model to explain patient involvement in patient safety. *Health Expectations*, 18(6), 3019-3033.
- Bauer, R. A. (1960). Consumer behavior as risk-taking. In *Proceedings of the 43rd National Conference of the American Marketing Association*, June 15, 16, 17, Chicago, Illinois, 1960. American Marketing Association.
- Buratti, S., & Allwood, C. M. (2019). The effect of knowledge and ignorance assessments on perceived risk. *Journal of Risk Research*, 22(6), 735-748.
- Cabantous, L., Hilton, D., Kunreuther, H., & Michel-Kerjan, E. (2011). Is imprecise knowledge better than conflicting expertise? Evidence from insurers' decisions in the United States. *Journal of Risk and*

- Uncertainty*, 42, 211-232.
- Carpenter, C. J. (2010). A meta-analysis of the effectiveness of health belief model variables in predicting behavior. *Health Communication*, 25(8), 661–669. <https://doi.org/10.1080/10410236.2010.521906>
- Chen, J.-S. (2013). Customer engagement and service innovation for insurance companies. *International Decision Sciences Institute (IDS)*. <http://gebrcc.nccu.edu.tw/proceedings/APDSI/2013/proc/P130129003.pdf>
- Chin, J. H., & Mansori, S. (2019). Theory of Planned Behaviour and Health Belief Model: females' intention on breast cancer screening. *Cogent Psychology*, 6(1). <https://doi.org/10.1080/23311908.2019.1647927>
- Conner, M., & Norman, P. (2006). Predicting Health Behaviour: research and practice with Social cognition model. *Predicting Health Behaviour*, 172–182.
- Dash, G., & Chakraborty, D. (2021). Digital transformation of marketing strategies during a pandemic: Evidence from an emerging economy during COVID-19. *Sustainability (Switzerland)*, 13(12), 1–19. <https://doi.org/10.3390/su13126735>
- Davis, K. (2001). The Costs and Consequences of Being Uninsured. *The Commonwealth Fund*, 14(1), 50–53.
- Deck, C., & Schlesinger, H. (2010). Exploring higher order risk effects. *The Review of Economic Studies*, 77(4), 1403-1420.
- Desrochers, J., & François Outreville, J. (2020). Perceived risk and insurance decision-making for small losses. *Journal of Risk Research*, 23(4), 447-460.
- Dowling, G. R. (1986). Managing your corporate images. *Industrial marketing management*, 15(2), 109-115.
- Dzulkipli, M. R., Maon, S. N., & Kamarudin, N. H. (2019). Predicting Intention to Purchase Medical and Health Insurance using The Health Belief Model. *International Tourism and Hospitality Journal*, 2(3), 1–7.
- Ebert, S., & Wiesen, D. (2011). Testing for prudence and skewness seeking. *Management Science*, 57(7), 1334-1349.
- Francis, T., & Hoefel, F. (2018). True Gen': Generation Z and its implications for companies. *McKinsey & Company*, 12(2).
- Finegold, K., Conmy, A., Chu, R., Bosworth, A., & Sommers, B. (2021). Trends in the U.S. Uninsured 2010-2020. *ASPE Office of Health Policy, February 2010–2020*.
- Galdolage, B. S. (2021). Customers value co-creation intention, practices and experience in self-service technologies. *Journal of Scientific Research and Reports*, 27(4), 12-26.
- Guan, L. P., & Yusuf, D. H. M. (2020). Factors Influencing Customer Purchase Intention Towards Insurance Products. *International Journal of Business and Management*, 4(5), 70–79. <https://doi.org/10.26666/rmp.ijbm.2020.5.9>
- Harrison, J. A., Mullen, P. D., & Green, L. W. (1992). A meta-analysis of studies of the health belief model with adults. *Health Education Research*, 7(1), 107–116. <https://doi.org/10.1093/her/7.1.107>
- Hay, G. J., Blaschke, T., Marceau, D. J., & Bouchard, A. (2003). A comparison of three image-object methods for the multiscale analysis of landscape structure. *ISPRS Journal of Photogrammetry and Remote Sensing*, 57(5-6), 327-345.
- Hoyt, J. E., & Winn, B. A. (2004). Understanding retention and college student bodies: Differences between drop-outs, stop-outs, opt-outs, and transfer-outs. *NASPA journal*, 41(3), 395-417.
- Hisam, A., Mashhadi, S. F., Faheem, M., Sohail, M., Ikhlaq, B., & Iqbal, I. (2018). Does playing video games affect cognitive abilities in Pakistani children? *Pakistan journal of medical sciences*, 34(6), 1507.
- Institute for Public Health. (2019). *National Health and Morbidity Survey 2019* (Vol. 20). https://doi.org/10.1007/978-1-4939-6556-4_7
- Islam, J. U., Hollebeek, L. D., Rahman, Z., Khan, I., & Rasool, A. (2019). Customer engagement in the service context: An empirical investigation of the construct, its antecedents and consequences. *Journal of Retailing and Consumer Services*, 50(April), 277–285. <https://doi.org/10.1016/j.jretconser.2019.05.018>
- Islam, J. U., & Rahman, Z. (2016). The transpiring journey of customer engagement research in marketing: A systematic review of the past decade. *Management Decision*, 54(8), 2008–2034.
- Janz, N. & Becker, M.H. (1984). The health belief model: a decade later. *Health Education Quarterly*, 11, 1–47.
- Jayaraman, K., Alesa, N., & Azeema, N. (2017). Factors influencing the purchase intention of health insurance policy-an empirical study in Malaysia. *International Journal of Economic Research*, 14(16), 1–13.
- Karen, G., Barbara, K. Rimer, K. V. (2008). Health Behavior and Health Education. In *Jossey Bass*. <http://riskybusiness.web.unc.edu/files/2015/01/Health-Behavior-and-Health-Education.pdf#page=503>
- Kefeli, Z., & Jones, G. (2012). Moral hazard and the impact of private health insurance on the utilization of health

- care in Malaysia. *Jurnal Ekonomi Malaysia*, 46(2), 159–175.
- King, J., Banerjee, S. K., Marvin, J., & Özdemir, Ö. (1982). A comparison of different magnetic methods for determining the relative grain size of magnetite in natural materials: some results from lake sediments. *Earth and Planetary Science Letters*, 59(2), 404-419.
- Liang, X., Li, J., & Xu, Z. (2018). The impact of perceived risk on customers' intention to use - An empirical analysis of DiDi car-sharing services. *Proceedings of the International Conference on Electronic Business (ICEB), 2018-Decem*, 644–653.
- Lim, C. C., & Tan, S. S. (2019). Demographic profiling of life insurance ownership in the northern regions of Malaysia. *International Journal of Business and Society*, 20(3), 1022–1035.
- Lobb, A. E., Mazzocchi, M., & Traill, W. B. (2007). Modeling risk perception and trust in food safety information within the theory of planned behavior. *Food Quality and Preference*, 18(2), 384–395.
- Luquis, R. R., & Kensinger, W. S. (2019). Applying the Health Belief Model to assess prevention services among young adults. *International Journal of Health Promotion and Education*, 57(1), 37–47.
- Maddux, J. E. (1995). Self-efficacy theory. In *Self-efficacy, adaptation, and adjustment* (pp. 3-33). Springer, Boston, MA.
- Mayerhofer, C. C., Ueland, T., Broch, K., Vincent, R. P., Cross, G. F., Dahl, C. P., ... & Trøseid, M. (2017). Increased secondary/primary bile acid ratio in chronic heart failure. *Journal of Cardiac Failure*, 23(9), 666-671.
- Michael McWilliams, J. (2009). Health Consequences of Uninsurance among Adults in the United States: Recent Evidence and Implications. *Milbank Quarterly*, 87(2), 443–494.
- Mitchell, V. W. (1999). Consumer perceived risk: conceptualizations and models. *European Journal of Marketing*, 33(1/2), 163-195.
- Murray, J. E. (2004). *Differentiating Beliefs of Insured And Uninsured, Insurance-Eligible State Employees: A New Application of The Health Belief Model* (Issue May) [Louisiana State University and Agricultural and Mechanical College]. <http://eprints.uanl.mx/5481/1/1020149995.PDF>
- Mwangi, E., & Oluoch, M. (2019). Factors Influencing Uptake Of Social Health Insurance In Kenya : A Case of Nyeri County Factors Influencing Uptake of Social Health Insurance In Kenya : A Case of Nyeri County. Author : Boniface Gathu Macharia Co-Authors : Eunice Muthoni Mwangi Musa
- Ngah, A. H., Anuar, M. M., Rozar, N. N., Ariza-Montes, A., Araya-Castillo, L., Kim, J. J., & Han, H. (2021). Online sellers' reuse behavior for third-party logistics services: An innovative model development and E-Commerce. *Sustainability (Switzerland)*, 13(14). <https://doi.org/10.3390/su13147679>.
- Norman, P., & Brain, K. (2005). An application of an extended health belief model to the prediction of breast self-examination among women with a family history of breast cancer. *British journal of health psychology*, 10(1), 1-16.
- Noussair, C. N., Trautmann, S. T., & Van de Kuilen, G. (2014). Higher order risk attitudes, demographics, and financial decisions. *Review of Economic Studies*, 81(1), 325-355.
- Rahmati-Najarkolaei, F., Tavafan, S. S., Fesharaki, M. G., & Jafari, M. R. (2015). Factors predicting nutrition and physical activity behaviors due to cardiovascular disease in Tehran university students: Application of health belief model. *Iranian Red Crescent Medical Journal*, 17(3), 1–6. <https://doi.org/10.5812/ircmj.18879>.
- Rao, C., Xiao, X., Goh, M., Zheng, J., & Wen, J. (2017). Compound mechanism design of supplier selection based on multi-attribute auction and risk management of supply chain. *Computers & Industrial Engineering*, 105, 63-75.
- Rosenstock, I. M., Haefner, D. P., Kegeles, S. S., & Kirscht, J. P. (1966). Public knowledge, opinion and action concerning three public health issues: radioactive fallout, insect and plant sprays and fatty foods. *Journal of Health and Human Behavior*, 91-98.
- Rosenstock, I. M. (1974). Historical Origins of the Health Belief Model. *Health Education & Behavior*, 2(4), 328–335. <https://doi.org/10.1177/109019817400200403>
- Rosenstock, I. M., Strecher, V. J., & Becker, M. H. (1988). Social Learning Theory and the Health Belief Model. *Health Education & Behavior*, 15(2), 175–183. <https://doi.org/10.1177/109019818801500203>.
- Schiffman, M., Wentzensen, N., Wacholder, S., Kinney, W., Gage, J. C., & Castle, P. E. (2011). Human papillomavirus testing in the prevention of cervical cancer. *Journal of the National Cancer Institute*, 103(5), 368-383.
- Schwarzer, E., Turrini, F., Ulliers, D., Giribaldi, G., Ginsburg, H., & Arese, P. (1992). Impairment of macrophage functions after ingestion of Plasmodium falciparum-infected erythrocytes or isolated malarial pigment. *The Journal of Experimental Medicine*, 176(4), 1033-1041.

- Selamat, E. M., Rasidah, S., Ghani, A., & Fitra, N. (2020). Systematic Review of Factors Influencing the Demand for Medical and Health Insurance in Malaysia. *International Journal of Public Health Research*, 10(2), 1242–1250.
- Snoj, B., Korda, A. P., & Mumel, D. (2004). The relationships among perceived quality, perceived risk and perceived product value. *Journal of product & brand management*, 13(3), 156-167.
- Starr, P. (2017). The social transformation of American medicine: The rise of a sovereign profession and the making of a vast industry. In *Hachette UK* (p. 441).
- Srivastava, R., Banerji, D., Nema, P., & Choudhary, S. (2021). The Role of Perceived Risk in Engaging Customers and Employees for Value Creation in Services. *Vision*, 1–8. <https://doi.org/10.1177/09722629211022516>
- Sulat, J. S., Prabandari, Y. S., Sanusi, R., Hapsari, E. D., & Santoso, B. (2018). The validity of health belief model variables in predicting behavioral change: A scoping review. *Health Education*, 118(6), 499–512. <https://doi.org/10.1108/HE-05-2018-0027>
- Sullman, M. J. M., Przepiorka, A. M., Prat, F., & Blachnio, A. P. (2018). The role of beliefs in the use of hands-free and handheld mobile phones while driving. *Journal of Transport and Health*, 9, 187–194.
- Swiss Re. (2020). World Insurance: Regional Review 2019, and Outlook. *Sigma Extra 4/2020*, 4.
- Tan, C. S., Lokman, S., Rao, Y., Kok, S. H., & Ming, L. C. (2021). Public and private sectors collective response to combat COVID-19 in Malaysia. *Journal of Pharmaceutical Policy and Practice*, 14(1). <https://doi.org/10.1186/s40545-021-00322-x>
- Tamayo, L. I., Vidaurre, T., Vásquez, J. N., Casavilca, S., Aramburu Palomino, J. I., Calderon, M., ... Fejerman, L. (2018). Breast cancer subtype and survival among Indigenous American women in Peru. *PloS One*, 13(9), 1–12. doi:10.1371/journal. Pone.0201287.
- Tarkang, E. E., & Zotor, F. B. (2015). Application of the health belief model (HBM) in HIV prevention: a literature review. *Central African Journal of Public Health*, 1(1), 1-8.
- Teh Chooi Hoon, C. (2015). *Medical and Health Insurance* (CORE strategiccreativity, Ed.; FIRST). The Malaysian Insurance Institute (MII).
- Uma, V. R., & Ilango, V. (2021). Over Dependence of the Health Insurance Industry on the Healthcare System. 26(1), 197–219.
- Van Tonder, E., & Petzer, D. J. (2018). The interrelationships between relationship marketing constructs and customer engagement dimensions. *Service Industries Journal*, 38(13–14), 948–973. <https://doi.org/10.1080/02642069.2018.1425398>
- Vijay, A., & Krishnaveni, V. (2018). A study on policyholders' satisfaction with health insurance with special reference to Ernakulam District, Kerala. *International Journal of Engineering and Technology(UAE)*, 7(3), 160–163. <https://doi.org/10.14419/ijet.v7i3.6.14961>
- Wallace, C. (2002). Opening and closing borders: migration and mobility in East-Central Europe. *journal of ethnic and Migration studies*, 28(4), 603-625.
- Wang, H. W., Chen, T. S., Liu, B. X., & Wnag, Y. G. (2013). Seismic prediction of sand body in upper Paleozoic and new exploration breakthrough in the southwest Ordos Basin. *Progress in Geophysics*, 28(4), 2132-2140.
- Weitkunat, R., Pottgiesser, C., Meyer, N., Crispin, A., Fischer, R., Schotten, K., ... & Überla, K. (2003). Perceived risk of bovine spongiform encephalopathy and dietary behavior. *Journal of Health Psychology*, 8(3), 373-381.
- Winfield, E. B., & Whaley, A. L. (2002). A comprehensive test of the health belief model in the prediction of condom use among African American college students. *Journal of Black Psychology*, 28(4), 330-346.
- Xu, K., Xu, K., Evans, D., Evans, D., Carrin, G., Carrin, G., Aguilar-Rivera, A. M., & Aguilar-Rivera, A. M. (2005). Designing health financing systems to reduce catastrophic health expenditure. *Bulletin of the World Health Organization*, 85(09), 8.
- Yarbrough, S. S., & Braden, C. J. (2001). Utility of health belief model as a guide for explaining or predicting breast cancer screening behaviors. *Journal of Advanced Nursing*, 33(5), 677–688. <https://doi.org/10.1046/j.1365-2648.2001.01699.x>
- Zhe, K. S. K. (2020). Insurance: Medical insurance premiums rising at an unsustainable rate, says LIAM. *Theedgemarkets.Com*, 1–13. <https://www.theedgemarkets.com/article/insurance-medical-insurance-premiums-rising-unsustainable-rate-says-liam>
- Zimmerman, R. S., & Vernberg, D. (1994). Models of preventive health behavior: Comparison, critique, and meta-analysis. *Advances in medical sociology*, 4, 45-67.