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PREDICTING CUSTOMER ENGAGEMENT OF PRIVATE HOSPITAL: A CASE STUDY IN MALAYSIA

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Abstract: *This study investigates customer engagement (CE) in private hospitals in Malaysia, focusing on medical and health insurance in the context of the post-COVID-19 environment. Employing the Health Belief Model (HBM) as a theoretical foundation, the research aims to predict CE based on various perceptions. Utilizing variance-based structural equation modeling with Smart PLS 4.0, data was collected from 150 respondents who are private hospital customers. The findings reveal that perceived susceptibility (PS), does not significantly influence CE. However, significant relationships were identified between perceived severity (PI), perceived benefits (PA), and perceived barriers (PB) on CE. These results highlight the importance of emphasizing the severity of health issues and the benefits of medical insurance while addressing barriers to engagement. The implications for hospital management include developing targeted communication strategies that enhance patient understanding and minimize perceived obstacles, ultimately fostering greater CE and loyalty in a competitive healthcare landscape.*

Keywords: *Customer Engagement, Perceived Susceptibility, Predictive Severity, Perceived Benefits, Perceived Barriers*

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Introduction

Customer engagement (CE) is undeniably important, even more so in the Medical and health insurance (MHI). In today's global environment and especially in light of the COVID-19 attack in 2020, it is important to comprehend customers in order to formulate future decisions and plans. In addition, as part of the financial services industry, insurance companies must be able to engage clients at all possible touch points in order to match their plans with customer demands (Agyei et al., 2020). According to Dash & Chakraborty (2021), COVID-19 not only causes an imbalance in the insurance sector but also considerably degrades it, influencing CE's decision to purchase or defer more security. The Economist Intelligence Unit defines CE as "a deeper, more meaningful relationship between the business and its customers." And it means that engaged customers outperform those who are just loyal to a company because engaged customers are more likely to purchase items or services in the future (Voyles, B., 2007). The higher the level of CE, the more CE is demonstrated in interactions with a company's employees or its own employees. The more engaged a customer is, the more they contribute to the company's value creation. Higher levels of CE are indicated when customers gain more information about a company, build relationships based on cumulative commitment and recurrent purchases, and devote more time or effort to spreading the word about the company's products or services.

In the past decade, according to Islam & Rahman (2016), CE has become an important construct in marketing research. Over the past decade, engagement has been conceptualized as actively participating in the life of a community to improve the circumstances of others. CE is seen as a strategic requirement for sustaining a competitive advantage (Abbas et al., 2018: Brodie et al., 2013) and is described as the process of building, maintaining, and enhancing customer connections (Islam et al., 2019). CE, on the other hand, offers firms and individuals a variety of benefits, including revenue growth, market share expansion, return on investment (ROI), and profitability (Chen, 2013). Due to the importance of CE in MHI as a source of revenue for the government, the pressures on Malaysia's health system as it works to achieve high-income country status, and growing concerns about equity, efficiency, and fiscal constraints, the Malaysian government set a goal of reaching a 75% penetration rate (PTR) for life insurance and family takaful, including MHI, by the end of 2020 (Bank Negara Malaysia (BNM), 2016) (Bank Negara Malaysia (BNM), 2016). However, this objective didn't get achieved because only 54% of the population was insured in 2019 (Guan & Yusuf, 2020), and it got worse when there was a decline in the number of CE with approximately 13 million policyholders in the nation during COVID-19; 7.7% of all policyholders elected to defer their premium payments, involving more than one billion ringgits (Zhe, 2020).

Why is studying CE towards Medical and health insurance (MHI) important? When COVID-19 spread rapidly throughout the world, including Malaysia, it impacted negatively on the country's economy and health system, affecting the country's 32 million people (Tan et al., 2021). In 2019, total insurance penetration in Asia's emerging markets increased significantly, continuing a steady upward trend. However, in comparison to Thailand and the Philippines, Malaysia's total insurance penetration barely increased (+0.9 percent), while Vietnam slowed but remained in double-digit territory (+12 percent), and Indonesia maintained its excellent trajectory from the previous year, with gains (+8.4 percent) (Swiss Re, 2020). The slightly increasing figures reveal that most Malaysians rely largely on government-subsidized services, especially in health care, which is provided at a low cost or for free, and this has a considerable negative impact on the country's economic growth, particularly in terms of generating more

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income through co-payments. Furthermore, the dependency of the population on government subsidies can further erode the nation's development necessity (Selamat et al., 2020).

According to Lim & Tan (2019), insurance penetration rate (PTR) is described as the number of the relevant population that has purchased insurance at least once, including repurchase of insurance products, which contributes to the country's gross domestic product (GDP). In other words, PTR includes CE. Due to the lower PTR was reported, with only 54 percent of the population insured in 2019 (Guan & Yusuf, 2020) which is only 22 percent of the population is covered by personal health insurance, despite the fact that 36 percent do not require it and 43 percent cannot afford it (Institute for Public Health, 2019) there are a past studies had been highlighted the significant influence of trust on engagement (Johnson & Grayson, 2005; Putnam, 1993) and most recently by Kosiba et al. (2018). Van Tonder & Petzer, (2018) assert that trust is crucial in relational exchanges among stakeholders. Due to this a lot of research conducted regarding trust however it was little empirical research conducted regarding Perceived risk (PR). According to Agyei et al. (2020), PR is significant, and a decrease in PR would increase consumers' trust, thereby enhancing their commitment to service providers (Van Tonder & Petzer, 2018); as a result, committed consumers would become engaged with service organizations and demonstrate greater customer loyalty (Brodie et al., 2013; So et al., 2014). This suggests that PR can have a positive impact on CE, but little empirical research has been conducted on the topic to date (Liang et al., 2018) especially as a mediator. Specifically, it is difficult to find empirical evidence in support of how different dimensions of PR drive CE in the MHI context given that previous research has primarily focused on service quality assessment (Bala et al., 2011), cost efficiency (Ansah-Adu et al., 2012), performance (Akotey et al., 2013), growth (Alhassan & Fiador, 2014), and customer satisfaction (Abaidoo & Nwosu, 2016). Therefore, this study was conducted in order to examine the effect of PR as a mediating effect on via HBM.

Due to the limited studies that analyze customer behavior from a belief viewpoint (Sullman et al., 2018) assert that behavioral beliefs are the individual's inner convictions, conceptions, values, and precepts, as well as the repercussions of their actions. Indicating a problem, Uma & Ilango (2021) affirm that the HBM is a suitable model used to examine CE after enjoying particular products especially insurance. Murray, 2004 also suggests that the HBM is a suitable framework for studying CE. This theory model is appropriate because it can be used to examine customer behavior and was initially applied to draw links between health behavior and undergoing CE (Ashoori et al., 2020). It emphasizes personal perceptions (such as perceived severity and susceptibility), modifying factors (such as self-efficacy and outcome expectations), and actions (such as cues to action) that justify a behavior. Aside from that, the impact of customer behavioral which is engagement intent on service products can result in a more successful marketing strategy, new product lines, and effective enhancements for exciting products, as well as assist in the development of an attractive policy (Alsahliy et al., 2020).

Literature Review

MHI and issue on CE

MHI is a contract between an insured and an insurance company wherein the insurer agrees to provide protection and cover the cost of private medical treatment, such as hospitalization and healthcare services, if the insured becomes ill or has an accident (Hoon, 2015). MHI does have a long and illustrious history that dates back to the nineteenth century. Originally, health insurance was known as disability insurance. For this policy, patients were expected to cover

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all medical expenses out of their own pocket. Traditional disability insurance evolved into modern health insurance programmed over the twentieth century, and most comprehensive private health insurance programmed now cover the cost of routine, preventive, and emergency health care procedures, as well as most prescription pharmaceuticals (Balqis-Ali et al., 2021).

The United States was the first country to implement MHI. The first insurance company in the United States was established in 1850. It provided coverage for injuries sustained in the event of an accident (Griffin, 2020). Following the United States was the introduction of social insurance, which began in Germany in 1883. Workers are required to be insured by sickness funds maintained by labour unions and various trades under these policies. These funds covered both medical care and loss of wages. After Germany, many other nations followed suit: Austria (1888), Hungary (1891), Norway (1909), Serbia (1910), Britain (1911), Russia (1912), and the Netherlands (1913) (Starr, 2017) (Starr, 2017). Following that, various types of health insurance schemes, such as critical illness, hospitalizations, surgical income benefits, and accident coverage, were introduced to safeguard society, and these policies have become important sources of financial protection against the consequences of health risks (Selamat et al., 2020).

Since then, MHI has grown rapidly over the years, and overall insurance penetration in developed and advanced markets such as the United States, Switzerland, Denmark, Germany, Canada, and Taiwan has stayed relatively stable over the last decade, as measured by insurance premiums as a percentage of GDP. In recent years, as medical insurance has grown and rates have improved, non-life insurance engagement has also increased. In advanced markets, the average per capita insurance spending (density) was USD 4664 in 2019, and insurance penetration (premiums/GDP) was 9.6% (Swiss Re, 2020). Despite the fact that the penetration rate has remained stable, most of the country is dealing with the problem of CE and an increasing percentage of uninsured people each year. In the United States, for example, the number of uninsured non-elderly Americans has decreased from 48 million in 2010 to 28 million in 2016, before rising to 30 million in the first half of 2020 (Finegold et al., 2021). The rising number of uninsured shows that CE has decreased and they are more likely to rely on out-of-pocket expenses or government tax payments, which are not the best options available now or in the future.

With rapidly growing medical costs, having and engaging health insurance as a backup is necessary, especially to finance expensive medical care, decrease the financial burden on the health system, and reduce catastrophic health spending for patients (Azhar et al., 2018). The consequences of not engaging, according to the (National Immigration Law Center(2014), influence not only individuals in critical elements of their lives, such as employment, education, and financial stability, but also the health care system and the wider population. According to McWilliams et.al (2009), health insurance status not only affects health, but health insurance status also affects the entire life status. Health deterioration, for example, may result in increased demand for private insurance or eligibility for public insurance, or may result in job loss, income reductions, or insurer selection behaviors.

Recognizing the greatest impact of CE, numerous empirical studies have been conducted both internationally and locally to ascertain the factors that contribute to this problem. According to (Azizam et al. (2020) and Jayaraman et al. (2017), determining the factors that influence engaging and retention for private insurance is important for resolving the CE problem. Except for price, cost can also be a determining factor in CE for MHI, where demand generally reduces as insurance costs and even premiums increase. Nonetheless, according to Vijay & Krishnaveni

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(2018) and Mwangi et al. 2019), customer satisfaction and loyalty, as well as other demographic factors such as age, gender, income, and education level, all have a positive relationship with demand for MH and contribute to the CE problem. Demographic characteristics have a significant impact on demand for MHI and CE (Emamgholipour, 2016). Additionally, Deloitte (2011) indicates that the CE problem can manifest itself among non-buyer respondents who avoid health insurance primarily due to a misperception of its importance.

As a conclusion, several studies have been conducted to study the factors influencing CE, demonstrating how medical insurance is critical not only for protection but also for organizational and individual performance, including sales growth, market share, return on investment (ROI), and profitability (Chen, 2013). Why is it necessary to indicate "CE"? Because, as Davis (2001) points out, problem of CE has a slew of economic consequences. Individuals pay a price in terms of reduced quality of life and reduced productivity; businesses pay a price in terms of employees missing work or retiring early due to health reasons; the health care system pays a price in terms of bad debt and inefficient care for the uninsured; and society as a whole pays a price in terms of economic benefits associated with a healthy, productive population. Additionally, the significance of the fact that approximately 44 million households, or more than 150 million individuals, worldwide face catastrophic expenditure each year and that approximately 25 million households, or more than 100 million individuals, are pushed into poverty as a result of the need to pay for services must be overcome (Xu et al., 2005). Thus, it demonstrates how critical CE of MHI have become. HBM and Hypotheses development

Perceived Susceptibility (PS)

One of the HBM variables known as perceived susceptibility is particularly important for predicting behavior. Perceived susceptibility predicted preventive health behavior more accurately than sick-role behavior (Karen Glanz, Barbara K. Rimer, 2008). People's perceptions of their personal susceptibility to illness or disease vary widely (LaMorte, 2018). According to Karimy, Azarpira, and Araban (2017), the following elements influence health-related behaviors: knowledge, attitudes, and beliefs regarding alternative activities; perceived vulnerability and psychological obstacles to action; self-efficacy; and interpersonal factors.

According to Murray (2004) in order for a healthy individual to engage in preventative health behaviors such as repurchasing health insurance, the individual must believe he or she is susceptible to the sickness, or in this case, vulnerable to the need for health insurance (susceptibility). Susceptibility is a term that refers to individual perceptions about the likelihood of contracting a disease or developing a health problem (Janz and Becker, 1984; Champion and Skinner, 2008). When an individual believes he or she is at risk for specific health problems, he or she is more motivated to adopt healthy behaviors (Carpenter, 2010). In this study, researcher will try to find out whether there is a positive perceived susceptibility effect on CE towards MHI. Previous research has found that when insurance is voluntary, when a policy matures despite revisions or additional coverage being offered on the policy, some people choose not to engage or become uninsured (Murray, 2004). This clearly shows that perception of health risks determines the coping mechanism one would choose to adopt. Although one is aware of the fact that negative life events such as death or the occurrence of chronic illness could have a devastating effect on the family, causing emotional stress and heavy financial loss, their significance is by and large uncertain.

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Even though there are a lot of empirical studies and findings regarding perceived susceptibility and its relationship with belief and behavior, the HBM construct primarily gives another dimension. According to Rosenstock, 1966; Champion and Skinner, 2008; Tarkang and Zotor, 2015), an individual is more likely to engage in certain behaviors if she or he perceives vulnerability to a health problem, perceives the impact of the health problem will be severe, perceives the target behavior will benefit the individual by reducing the appearance of health problems, and perceives the barriers to adopting the target behavior are quite low. In other words, perceived susceptibility has a significant impact on an individual's attitude toward health insurance engagement. Brahmana et al. (2018) indicated that when individuals are exposed to danger, their susceptibility to acquiring insurance increases. This means that the more people perceive the value of health insurance, the greater their intention to purchase insurance. Similarly, (Luquis & Kensinger (2019) supports the notion that when individuals perceive themselves to be vulnerable to bad health outcomes and have access to health care coverage, they will seek out preventative care treatments to protect themselves. As a result of differences of opinion among researchers regarding the effect of perceived susceptibility to CE behavior and belief, the following study hypotheses were developed:

H1: PS is positively related to CE towards MHI.

Perceived Severity (PI)

Perceived severity is an HBM construct that is frequently found to be highly correlated with perceived susceptibility. Perceived severity refers to an individual's perceptions about the seriousness of the disease and the potential health consequences of infection (Rahmati-Najarkolaei et al., 2015). Additionally, perceived severity is defined as an individual's perception of the seriousness of an illness or its consequences if left untreated, which may include both medical and clinical consequences (such as death, disability, and pain) and possible social consequences (effects of the conditions on work, family life, and social relations) (Janz and Becker, 1984). According to Chin & Mansori (2019), the more severe a person's view of an unfavorable health outcome, the more motivated her or he is to act in ways to avoid that outcome.

According to empirical evidence, CE are significantly affected by the perceived severity towards MHI. This is consistent with Kefeli & Jones (2012) finding that the severity of an individual's health has a significant impact on insurance engagement intent and hospitalization decision-making. The findings indicate that factors such as income, education, employment status, job sector, ethnic origin, state of residence, and smoking all influence the decision to engage and obtain MHI. According to Uma & Ilango (2021), perceived severity occurs when an individual understands the consequences of not engaging in a desired behavior. In other words, when perceived severity is high, product engagement is also high, and individuals will respond to a stimulus, such as a health risk, when its exposure is well predicted.

Overall, perceived severity was the least predictive factor, but it was strongly associated with sick-role behavior (Karen Glanz and Barbara K. Rimer, 2008).Recognize the significance and limitations of the severity construct (HBM) in predicting CE behaviors and beliefs about MHI, and because perceived severity refers to the effect or consequences of a disease on an individual, which can include disability, long-term medication and mental illness, financial difficulties, and even death (Cal & Bahar, 2018; Chin & Mansori, 2018; Didarloo, Nabilou, & Khalkhali, 2017). Customers who perceive their health problems as significant are more likely to seek insurance coverage in order to avoid or lessen the severity of their condition, according to the literature.

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A person who believes a health consequence will have a negligible effect on his or her life will be unmotivated to take preventative action (Carpenter, 2010)(Carpenter, 2010). As a result, the following hypothesis is developed to determine whether there is relationship between perceived severity and CE with the MHI:

H2: PI is positively related to CE towards MHI.

Perceived Benefits (PA)

Perceived benefits are a construct in the HBM that refers to an individual's perceptions of the benefit and efficacy of engaging in a health behavior, in this example, engaging in health insurance (Murray, 2004). In other words, perceived benefits refer to an individual's valuation acquired by engaging in desirable behavior (Akhondali, Deana, & Radan, 2015; Soriano et al., 2018). Additionally, if the individual believes that he or she would benefit from the outcome expectation, they will most likely engage in the recommended behavior (Darvishpour, Vajari, & Noroozi, 2018; Figueiredo et al., 2017).

According to Harrison et al. (1992), perceived benefits refer to the anticipation that the promoted health behaviors will reduce the risk and/or severity of health problems. Individuals who have a high perceived vulnerability and severity do not always accept recommendations for measures, regardless of whether they believe the advised acts will help reduce health concerns. A person must be confident that the recommended target behavior will result in significant and beneficial benefits in terms of preventing health problems (Carpenter, 2010). This is consistent with Uma & Ilango (2021), who highlight that perceived benefits are when an individual recognizes that the benefits of contracting a particular behavior outweigh the costs or restrictions.

Furthermore, Abraham and Sheeran (2014) indicated that perceived benefit and barriers were the biggest predictors of all outcomes in reviews and meta-analyses, regardless of moderator variables. Munro et al. (2007) revealed that perceived benefits influence perceptions of a behavior's effectiveness, increasing the likelihood of engaging in suggested health behaviors. Although a perceived threat may stimulate one to take action to minimize it, the choice of which action to take is subject to the perceived benefit of taking it. Benefits are also measured against perceived barriers, such as the possibility that an action may be costly, harmful, unpleasant, or inconvenient (Bishop et al., 2015). Benefits and barriers are likely to predict behavior more accurately when the objective is to prevent a negative health result rather than determine whether participants will adhere to a treatment programmed for an existing ailment. It arises in the insurance scenario when, despite the undeniable benefits of insurance in terms of mitigating the impact of loss, especially financial impact, CE a challenge, since some people opt to stay uninsured. This finding contradicts Janz and Becker's (1984) finding that this moderator has no influence on barriers and that treatment studies would demonstrate a greater effect. Measures of outcome behavior reveal that perceived benefits and perceived barriers have a larger effect size on preventive health behavior than on treatment behavior (Janz and Becker, 1984; Carpenter, 2010). Thus, to test the relationship between perceived benefits and CE towards MHI, the hypothesis is conducted as below:

H3: PA is positively related to CE towards MHI.

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Perceived Barriers (PB)

From the four main variables of HBM, perceived barriers were found to be the most important predictor of health behavior in all reviews and meta-analyses, even when other factors were taken into account (Sulat et al., 2018). According to Karen Glanz and Barbara K. Rimer (2008), perceived barriers were the most powerful single predictor across all studies and behaviors. Chin and Mansori (2019) say that perceived barriers are a person's problems or impediments to doing what they want to do. As a result, the person will think that a certain behavior is bad and will not do it (Dadipoor et al., 2017; Ganga et al., 2018; Tafti et al., 2018; Viviana et al., 2018).

Along with the perceived barriers factored into HBM, the barriers faced by customers who are not engaged or repurchase MHI, may include perceived psychological hurdles and other costs associated with engaging in a health behavior (Murray, 2004b). Geographical location can also act as a barrier (Uma & Ilango, 2021). Localities with a scarcity of or no healthcare facilities act as a deterrent to purchasing health insurance. Asgary et al. (2004) discovered a negative correlation between the lack of healthcare facilities in a community and the willingness to repurchase insurance. The further away the facility, the lower the willingness to pay, as they believe that insurance benefits cannot be fulfilled without infrastructure. This is consistent with the findings of Munro et al. (2007), who revealed that perceptions of the effectiveness of behavior influence perceptions of benefits and barriers, thus increasing the likelihood of engaging in recommended health behaviors (Munro et al., 2007).

Reflecting this, there are numerous CE barriers that could contribute to the CE towards MHI. Due to varying levels of knowledge, cultural background, social stigma, and other uncontrollable barriers, some issues are more critical and require urgent attention in order to resolve the engagement problem (Dzulkipli et al., 2019). According to previous research, perceived barriers may become the primary impediment to individuals adopting any advised action or acquiring MHI. With that being said, if people perceive the barriers as low, it will increase the likelihood of not engaging in insurance and vice versa. Given that, to justify the relationship between perceived barriers and CE towards MHI, the hypothesis is hypothesized as below:

H4: PB are positively related to CE towards MHI.

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 perceived severity (PS), perceived susceptibility (PI), perceived benefits (PA), and perceived barriers (PB) on customer engagement (CE) toward medical health insurance (MHI). As the issue description emphasized customer engagement, data were gathered from customers of private hospitals listed by the Malaysian Ministry of Health (MOH), which served 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. The aim of this study is to gather information via self-administered questionnaire surveys on the selection criteria for CE, and their belief in MHI

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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).

Results and Discussion

Measurement Model

For this study, a two-step approach was employed to test the developed model, following the recommendations of Anderson and Gerbing (1988). Initially, the validity and reliability of the instruments were assessed using guidelines from Hair et al. (2019) and Ramayah et al. (2018). Subsequently, the structural model was analysed to test the proposed hypotheses.

In the measurement model, the loadings, average variance extracted (AVE), and composite reliability (CR) were evaluated. The acceptable criteria are that loadings should be ≥0.5, AVE should be ≥0.5, and CR should be ≥0.7. As presented in Table 1, all AVE values exceeded 0.5, and all CR values surpassed 0.7. The loadings were generally acceptable, with only two falling below the 0.708 threshold (Hair et al., 2019). Overall, all measurements in this study demonstrated validity and reliability.

Then in step 2, the discriminant validity was assessed using the HTMT criterion suggested by Henseler et al. (2015) and updated by Franke and Sarstedt (2019). The HTMT values should be ≤ 0.85 the stricter criterion and the mode lenient criterion is it 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 can be conclude that the respondents understood the 5 constructs are distinct. Taken together both these validity test has shown that the measurement items are both valid and reliable.

Table 1: Measurement Model

First Order Constructs	Items	Loadings	AVE	CR
Perceived Susceptibility	PS1	0.877	0.819	0.937
	PS2	0.894		
	PS3	0.920		
	PS4	0.928		
Perceived Severity	PI1	0.844	0.700	0.865
	PI2	0.842		
	PI3	0.899		
	PI4	0.756		
Perceived Benefits	PA1	0.643	0.628	0.719
	PA2	0.859		
	PA3	0.903		
Perceived Barriers	PB1	0.732	0.560	0.849
	PB2	0.818		
	PB3	0.689		
	PB4	0.757		
	PB5	0.744		

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	PB6	0.775		
Customer Engagement	CE1	0.829	0.670	0.917
	CE2	0.875		
	CE3	0.851		
	CE4	0.789		
	CE5	0.852		
	CE6	0.705		

Table 2: Discriminant Validity (HTMT)

	1	2	3	4	5
1. Customer engagement					
2. Perceived benefits	0.664				
3. Perceived barriers	0.482	0.377			
4. Perceived severity	0.337	0.408	0.101		
5. Perceived susceptibility	0.214	0.211	0.110	0.636	

Structural Model

According to Hair et al. (2019) path coefficients, the standard errors, t-values and p-values were reported 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) that p-values are not good criterion for testing the significance of hypothesis and suggested to use a combination of criterions such as p-values, confidence intervals and effect sizes. Table 3 shows the summary of the criterions used to test the hypotheses developed.

First, the effect of the 4 predictors on CE, the R^2 was 0.419 (Q^2 = 0.365) which shows that all the 4 predictors explained 41.9% of the variance in CE. Perceived severity (β = 0.147, t> 1.811), Perceived benefits (β = 0.388, t> 5.227) and Perceived barriers (β = -0.338, t> 4.876), were all positively related to CE, thus H2, H3 and H4 were supported. In contrast for direct effect, rating (β=0.089, t-value=1.278, P>0.01) for PS have shown there are no relationship exists where its shows that hypotheses H1 are 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	Perceived Susceptibility→ CE	0.089	0.070	1.278	0.101	-0.030	0.201	0.009	1.48
H2	Perceived Severity→ CE	0.147	0.081	1.811	0.035	0.024	0.294	0.023	1.62
H3	Perceived Benefits→ CE	0.388	0.074	5.227	0.000	0.255	0.497	0.208	1.24
H4	Perceived Barriers→ CE	-0.338	0.069	4.876	0.000	-0.462	-0.236	0.174	1.13

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

According to the study's data, PS was not significant to CE towards Medical and health insurance (MHI). This demonstrates that PS is not a good predictor of health behaviour, which is CE and it is supported by the study's findings, which reveal that the effect size for PS on CE (f^2= 0.009) shows that PS do not affect CE prediction. This result is consistent with most previous studies measuring PS as the weakest predictors of all outcomes in HBM (Carpenter,

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2010), except Zimmerman and Vernberg (1994), who reported a very strong effect size of the PS dimension. Studies on HBM have repeatedly proven that individuals will not engage in any preventive health behaviours against a health problem that they believe will not affect them (Champion and Skinner, 2008). Nevertheless, an individual is more motivated to perform healthier behaviours when she or he believes they are at risk for certain health problems (Carpenter, 2010). This is aligned with Murry (2004), who states that a person would need to believe he or she is susceptible to the illness, or in this case, susceptible to engaging in health insurance and that the occurrence of the illness or need for insurance would have at least some negative impacts on his or her life (severity).

However, the findings of this study were different with previous research whereby there are significant relationship exist between PI and CE. Even though most findings for example Sulat et al. (2018), who discovered that PI is the weakest variable, but PI is a substantial predictor of sick-role behaviours when compared to other variables. In contrast, severity perception may be less relevant to predicting preventative activities but more appropriate for those diagnosed with a disease and/or experiencing disease symptoms (Janz and Becker, 1984). In addition, the respondents' profiles potentially contributed to the outcome. 45% of the respondents, or most respondents, fell within the age group of 40–51 years. Since most of the population is older and has dealt with illnesses before, they are less likely to seek out information in favour of depending on their own experiences. They may decide to remain uninsured if they have never suffered from a serious disease in the past; nevertheless, if they have a history of paying high medical prices, waiting a long time, or not unmet healthcare needs in a public hospital, they will undoubtedly choose to purchase and engage with MHI. Yoon et al. (2009) found that as people age, their ability to preserve mental energy improves. They rely heavily on heuristics. At the same time, they limit themselves to comprehensive analysis while devising ways to eliminate incompatible possibilities as quickly as possible.

Most studies accepted that PA had the most predictive power for health behaviour because of its ability to alter perceptions of the effectiveness of behaviour, increasing the likelihood of performing recommended health behaviours (Munro et al., 2007). Previous research demonstrates that adopting healthy behaviours, like getting insurance, can have a positive impact on preventing the formation of health problems. When customers can acquire the highest level of protection from risks—particularly from illnesses that result in significant medical costs—PA is very helpful to them. If the insurance company can provide a product that meets the customer's needs at an affordable price, this firsthand experience can typically bind the customer to stay engaged with the insurance policy even more. This is demonstrated by the fact that 48% of survey participants in this research had policies in place that were older than nine years, even though 6% of respondents were unemployed. However, because of their PA with MHI, they are willing to engage with MHI.

Hypotheses H4 demonstrated that PB is significant and there is a positive relationship with CE. The finding was aligned with previous studies that stated that of the four main variables of HBM, PB was found to be the most important predictor of health behaviour in all reviews and meta-analyses, even when other factors were considered (Sulat et al., 2018). This means that without any mediator or mediating factor, PB was able to predict health behaviours, and this is supported by Karen Glanz and Barbara K. Rimer (2008), who stated PB was the most powerful single predictor.

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Table 4: PLS-Predict

Items	PLS-SEM_RMSE	LM_RMSE	PLS-LM	Q^2_predict
CE1	0.754	0.826	0.603	0.229
CE2	0.638	0.677	0.508	0.390
CE3	0.686	0.748	0.548	0.241
CE4	0.867	0.949	0.668	0.216
CE5	0.822	0.914	0.633	0.261
CE6	1.146	1.201	0.927	0.098

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 than there is strong predictive power, if all are higher than predictive relevance is not confirmed while if the majority is lower than there is moderate predictive power and if minority then there is low predictive power. Based on Table 4, 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.

Conclusion

As a conclusion, the BNM has identified the lower level of CE and the high number of uninsured in MHI among Malaysians as concerns. The government, insurance companies, and providers are interested in knowing more about factors that induce CE in health insurance. The results of this research shall possibly provide a description of the CE in MHI and will be used to make recommendations to the government, insurance companies, and providers regarding MHI and the healthcare system in Malaysia. Previous research widely acknowledged the role of customer satisfaction, risk attitude, and purchase intention variables in examining MHI, but there was no study on the role of HBM on CE. Hence, this study will give an indication of the importance of HBM in predicting the CE. Furthermore, from a practical point of view, the result of this study shall be able to determine which dimensions of HBM would have a greater impact on CE. It is critical for insurance companies and private hospitals as providers to focus on related critical dimensions, and marketing strategies should target two macro segments: insured and uninsured groups. By identifying that PI, PA, and PS significantly influence CE, the study provides valuable insights into the specific factors that drive patient behavior. Hospitals can leverage this understanding to tailor their services and communications to meet patient needs more effectively.

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