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Goal Setting Theory on Mobile Fitness Application Engagement: The Mediating Role of Goal Mechanisms

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ABSTRACT

This empirical paper fills the research gap by modelling goal mechanisms on the extension of Goal Setting Theory (GST) as a mediator role between the goal core (GC) and engagement in mobile fitness applications. Data were gathered from a survey whereby 355 mobile fitness application users completed the questionnaire of the study. The study utilized structural equation modelling (SEM), specifically the partial least squares approach (PLS-SEM). The analysis was conducted in two stages: evaluating the measurement model and assessing the structural model. The results indicate that goal mechanisms have a significant impact on user engagement, providing strong support for the hypothesis that individuals who use goal-setting features in mobile fitness apps tend to exhibit greater levels of engagement. Consistently, goal mechanisms significantly mediate the relationship between goal core and individual engagement. The contribution of the paper is threefold: first, it increases the literature database regarding the antecedents of goal mechanisms on Goal Setting Theory (GST); second, it changes the way we perceive the relationship between goal core and engagement by introducing goal mechanisms as a mediator and lastly, it provides guidance on engagement strategy decisions to fitness trainers and centres and serves as the basis for future research.

Keywords: *engagement, goal core, goal mechanisms, Goal Setting Theory (GST)*

INTRODUCTION

Goal mechanisms are an essential aspect in the extension of Goal Setting Theory (GST) for performance and engagement studies. The importance of the construct has been asserted following pivotal works that linked goal mechanisms to engagement (Locke & Latham, 2002; Locke & Latham, 2006). Subsequently, the concept attracted numerous scholars' interest in developed countries (Medlin et al., 2009; Ramshe et al., 2019), developing countries (Fortes et al., 2018; Smith et al., 2013), organisations (Sholihin et al., 2010; Swarnalatha & Prasanna, 2012) and health care (Khuhro et al., 2019). In addition, online health platforms and mobile apps are being used to monitor weight and health concerns (Yang et al., 2019).

Even though these digital platforms have made it simpler for people to make exercise plans and alter their health-related behaviour, a lack of interest and motivation among mobile fitness application users may

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lower their fitness activity engagement (Tortorella et al., 2020). Based on a systematic review by Jeong et al. (2023), Goal-Setting Theory was mostly studied by various scholars as a method to improve the engagement and performance. The study of goal mechanisms in Goal Setting Theory has generated the interest of scholars and has been widely researched in the marketing and information technology disciplines over the years. However, limited studies have been conducted to investigate goal mechanisms as the mediator (Burns et al., 2019; Fortes et al., 2018). The aforementioned two studies have only investigated goal mechanisms as direct relationships, but not as a mediator. Goal mechanisms refer to the ability to justify the effect of specific goals from goal core and act as the action plan through the implementation of strategy and planning that leads to a greater effort in engaging in activity (Locke & Latham, 2006).

Goal mechanisms have a significant potential as a mediator predictor of engagement behaviour in mobile fitness application (Lim & Noh, 2017). Individuals with a high level of goal mechanisms tend to engage with their activity. Furthermore, studies have shown that there is an association between individual goal core with a high level of engagement (Smith et al, 2013; Tanes & Cho, 2013). Consistently, many studies have indicated that goal mechanisms have a positive effect on individual engagement behavior (Arraya et al., 2015; Howlett et al., 2019). However, little is known about goal mechanisms as a mediator between goal core and engagement. Moreover, it remains unclear on how practitioners applied and used Goal Setting Theory in mobile fitness application engagement (Gilham & Weiler, 2013; Maitland & Gervis, 2010).

Accordingly, this study aims to achieve two primary objectives: (a) to offer further empirical support for the connection between goal mechanisms and user engagement, and (b) to investigate the mediating role of goal mechanisms in the link between goal core and engagement. The anticipated findings are intended to enrich the existing literature on goal mechanism mediation and serve as practical guidance for fitness centres and trainers

LITERATURE REVIEW

Goal Setting Theory

Locke et al., (1981) remarked that Goal Setting Theory began flourishing in fitness activity and it has become the domain and improvement platform for engagement activities (Kyllo & Landers, 1995). Initially, many scholars were doubtful that Goal Setting Theory can boost engagement activity. Hall and Bryne (1988) found that Goal Setting Theory failed in application due to a lack of rigorous research methodologies in interventions, such as using different instructors for different conditions, failure to manipulate control group, the lack of other attributes (Locke and Latham, 1991) and contextual and motivational differences (Cardenas et al., 2024).

Goal Setting Theory (GST) is defined as "what an individual is aiming to do; it is the object or aim of an action", such as "to attain a specific standard of skill, usually within a set time limit" (Locke et al., 1981). It is also one of the most frequently used health behavioural change interventions such as fitness activity and promoting engagement behavior (Howlett et al., 2019; Nig et al., 2008). Based on Locke and Latham's (2006) research notes on Goal Setting Theory application, they recommended that goal-setting theory be extended to include individual behavior, such as engagement from different contexts instead of different organisations. Arshad et al. (2019) expanded Goal Setting Theory to individual settings and concluded that there is a positive relationship between goal core and goal mechanisms, which increases their task performance, which is worthy of in-depth studies.

De Walt and Hink (2009) found that there is a direct correlation between goal core setting and task performance, in that those who have established their goal core would be motivated to create additional strategy or add more mechanisms to the task performance based on feedback. Parker (2021)

found that autonomy as goal mechanisms improved self-efficacy, which improved task performance towards reaching the goals. Thus, the concepts of Goal Setting Theory help to motivate individuals and teams to perform better and engage more in different contexts (Sorrentino, 2006: Law et al., 2020). On these premises, the paper introduced goal mechanisms as a mediating construct because it supports the justification of indirect effects on target behavior through the intervening variable role in Goal Setting Theory (Duda & Ntoumanis, 2003; Hatger & Chatzisarantis, 2009) as well as the justification of direct effects on behavior (Bip et al., 2017; Salamin et al., 2010). Therefore, this paper has set out to refine the relationship between goal core (independent variable) and engagement (outcome) by introducing goal mechanisms (indirect variable) as a mediator.

Goal Mechanisms and Mediator

The study of goal mechanisms has focused mostly on organisations, but not individuals. (Bipp et al., 2017; Tanes & Cho, 2013). Goal mechanisms explain the effect of specific goals from goal core and focus on the action through the implementation of strategy and planning that leads to a greater effort in achieving the actual behaviour in organisations (Locke & Latham, 2006). On the contrary, it is vital to understand how goal mechanisms affect the outcome from an individual perspective, although there are justifications at the organisational level (Tondello et al., 2018; Rodrigues et al., 2023). Hence, literature has underestimated the impact of goal mechanisms from individual perspectives. Swarnaltha and Prasanna (2012) studied goal mechanisms of individuals through employee perspectives and found that goal mechanisms helped employees engage with their organisational tasks. However, these studies have largely overlooked the individual's perspective and have not demonstrated whether the framework can be applied by fitness centres and trainers to enhance employee engagement through goal mechanisms. Studies of goal mechanisms are still very few and most of the existing research studied goal mechanisms as an independent variable but not as a mediator. The meta-review research by Locke and Latham (2004) has recommended that goal mechanisms should be studied as a mediator since the majority of scholars studied it as an independent variable. They also concluded that goal mechanisms serve as attention toward goal-relevant activities that affects individual behaviour.

Goal Core and Engagement

Individual evaluation on goal core towards engagement occurs when individuals have a specific goal core while performing the target behaviour. By having a specific goal core, it can decrease task ambiguity, and by clarifying what needs to be done, it encourages a greater effort towards accomplishing the specific objective (Locke & Latham, 1996). They emphasized that a clearer understanding requires deeper insight into the diverse relationships between goal core and engagement in existing studies. Medlin and Green (2009) found that goal core is positively related to employee engagement in organisational performance. Tanes and Cho (2013) examined the learning outcomes of goal core towards engagement in video games. They found that goal core engaged the player while playing a video game, which yielded greater outcomes and repeated plays. However, Bipp et al. (2017) found that there were only small differences in goal core influence between employees with goal core in job engagement and those who did not set the goal core and did not find any changes in job satisfaction and engagement. In addition, studies have seldom used goal mechanisms as a mediator in the relationship between goal core and engagement (Bueno et al., 2008; Lim & Noh, 2017). Thus, the discussion suggests that goal mechanisms not only affect engagement directly but also serve as a mediator in the relationship between goal core and engagement.

Goal Mechanisms and Engagement

Engagement conceptualization has captured the attention of practitioners as well as academicians in recent years. In marketing literature, engagement is defined as the approach to create, build and enhance individual relationships (Brodie et al., 2013) and is seen as an essential strategy to build a sustainable competitive advantage (Van Doorn et al., 2010; Maseri et al., 2022). Engagement is

performed when an individual has clarity on goal core and goal mechanisms as a channel to translate goal core into a strategy or an action (Locke & Latham, 2002). Bueno et al. (2008) found that goal mechanism played an essential role in influencing engagement among patients and pharmacists in health care. Consistently, Arraya et al. (2015) conducted a study on the effects of goal core factors on goal mechanism and engagement on a mobile fitness application and found that individual goal mechanism positively influenced their engagement on mobile fitness app. They explained that an individual who has excellent skills and knowledge would motivate himself/herself to engage because the actual behaviour acts as both motivation and ability. This discussion seems to imply that there is a relationship between goal mechanisms and engagement.

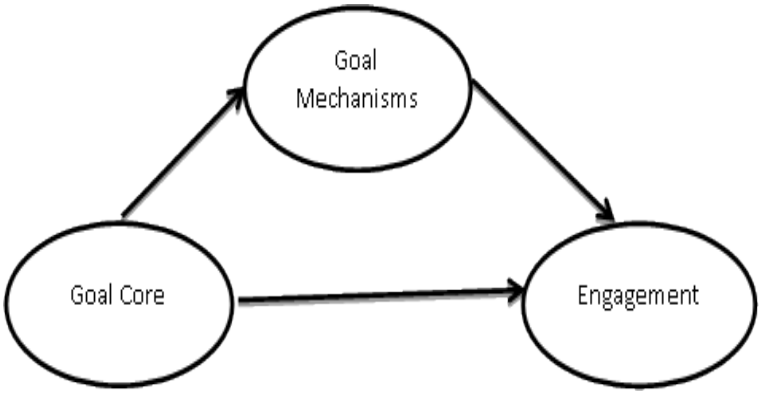

Figure 1: The Conceptual Model of Study

While numerous antecedents and factors have been recognized as key determinants of individual engagement, this paper focuses on explaining the role of goal mechanisms and Goal Setting Theory in driving user engagement within mobile fitness applications. Thus, the hypotheses are proposed as follows:

H1: Goal core is positively related to engagement

H2: Goal core is positively related to goal mechanisms

H3. Goal Mechanisms mediate between the goal core and engagement

METHODOLOGY

The descriptive cross-sectional study adopted a hypothesis deductive approach. It employed a survey method through self-administered questionnaire. Data were obtained from Malaysian Generation Y users of mobile fitness applications, aged 21 to 35, at fitness centres located in the Klang Valley. Before the data collection began, a pre-test and pilot study were conducted to validate the self-developed instruments (Pivač et al., 2020). Respondents were selected using purposive sampling techniques seeking to gain deep insights from individuals who are especially knowledgeable about or have experienced the phenomenon. According to Etikan et al. (2016), the purpose of the study and knowledge of respondents are crucial in the selection of purposive sampling method.

The questionnaires were distributed in each of the middle and high-income neighbourhoods in each of the fitness centres in the cities. Klang Valley was selected for data collection because of its strategic location and population diversity, making it the cultural, technological and economic hub of Malaysia, where most of the modern retail and fitness centre establishments are located. The respondents were intercepted at fitness class that used mobile fitness application at the fitness centre. Survey time was between 9 am and 7 pm daily, including weekends. This timing made it possible to reach the different

segments of the Malaysian populace. Besides, efforts were made to achieve a sample that can be considered a fair representation of the target population. To reduce mistakes made by target respondents, they were briefed on the contents and instructions of the questionnaire, before answering it.

The data collection was completed within 3 months (i.e., approximately one month in each city). To determine the sample size of respondents for the study, it is deemed appropriate to use the rule of thumb, which suggests a respondent-item ratio of five to one (5:1) (Tabachnick & Fidel, 2014). They proposed that five respondents answer one item on the questionnaire. The sampling method yielded a sufficient sample size, exceeding the minimum number of respondents suggested by Hair et al. (2016).

DATA ANALYSIS

For the data analysis, structural equation modelling (SEM) was employed, specifically using the partial least squares (PLS-SEM) approach. The analysis was carried out in two stages: the measurement model and the structural model. Smart PLS 3 was used for analysis, and the study used bootstrapping of 5,000 samples to test the statistical significance of path coefficients, direct and indirect effects as suggested by Hair et al. (2016). Due to the self-reported nature of the data, there was a potential risk of common method variance (CMV). To assess this, the Harman single-factor test was conducted, revealing that the first factor accounted for only 35.2% of the variance. Therefore, CMV was not considered a concern in this study.

Measurement Analysis

The paper items measurement was self-developed by adapting the method used by Kyriazo and Stalikas (2018). It represents an integrative approach to item development that combines steps from various sources. The measurement scales for goal core and goal mechanisms were adapted from Locke and Latham (2006) and the measurement scale for engagement from Cheung et al. (2011). All the items were self-developed and reconceptualized to suit the research context and all the adapted items were focused on organisational perspectives. The measurement model was tested through the formative measurement model by using convergent validity, collinearity and significance and relevance of formative indicators. The criteria of convergent validity were set at factor loadings ≥ 0.60, collinearity was considered acceptable when VIF values were less than 5 and the outer weight for each formative indicator must be significant. If not, it can still be retained on the basis of content validity (Hair et al, 2014). Smart PLS 3 was used for analysis, and the study used bootstrapping of 5,000 samples to test the statistical significance of path coefficients, direct and indirect effects as suggested by Hair (2016). Because of the self-reported nature of the data, there was a chance of common method variance (CMV). Given that the data were self-reported, there was a potential for common method variance (CMV). To evaluate this, the Harman single-factor test was conducted, showing that the first factor explained only 35.2% of the total variance. This indicates that CMV was not a significant issue in this study.

Structural Analysis

The structural model in this study illustrates the relationships between the independent and endogenous variables, reflecting how effectively the theoretical model predicts the proposed paths. A bootstrapping procedure with 5,000 samples was employed to calculate the path coefficients and their corresponding t-values, allowing for statistical inference by evaluating the significance of each path. The model's explanatory strength is determined by examining the R^2 values of the endogenous constructs. Hair et al. (2016) recommended that R2 can be 0.25 (weak), 0.50 (medium) and 0.75 (substantial). The model depicted in Figure 2 demonstrates that 73.3% of the variance in individual performance is accounted for by the model ($R^2 = 0.733$), which is considered moderate, approaching a

substantial level. Furthermore, all three path coefficients were statistically significant, thus supporting all three hypotheses.

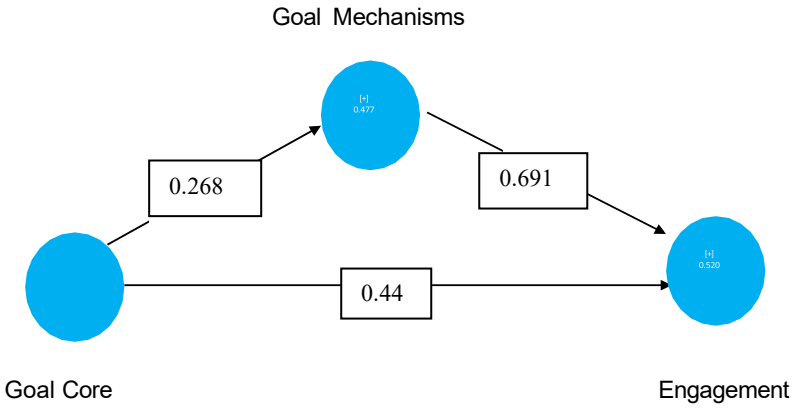

Figure 2 Path Coefficient

Table 1: Hypothesis Result

Direct Relationships	β	S E	t-value	*p*- value	Decision
GC -> ENG	0.446	0.070	6.345***	0.00**	Supported
GC -> GM	0.268	0.074	3.636***	0.00**	Supported
GM -> ENG	0.691	0.030	22.921***	0.00**	Supported

Note: t-value ≥ 1.96*** p<0.05**

PLS algorithms were applied, and bootstrapping was conducted to assess the significance of the resulting path coefficients as well as the mediation effect of individual market orientation. Table 1 displays the outcomes along with the decision rules for the proposed relationships. The findings support all the hypothesized relationships, with this subsection offering a detailed explanation of the results shown in Table 1. To begin with, it was proposed that GC is associated with ENG variables. The model demonstrated a significant relationship between the two constructs, and this shows that the relationship is statistically significant and supported by data. Second, GC has a relationship with GM. The model demonstrated a significant relationship between the two constructs, and this shows that the relationship is statistically significant and supported by data. Third, GM have a relationship with ENG. The model demonstrated a significant relationship between the two constructs, and this shows that the relationship is statistically significant.

Mediation Analysis

Table 2: Mediation Result

Indirect relationships	β	SE	t-value	Confidence Intervals	
				2.5%	97.5%
GC -> GM-> ENG	0.369	0.028	6.458***	0.244	0.450

Note: ***p<0.01; **p<0.05; *p<0.1

The mediation relationships of goal core, goal mechanisms and engagement in the study were analysed using a biased corrected bootstrapping approach. For the mediation path, the total direct and indirect effects are estimated to provide a clearer picture of the extent of mediation (Hair et al., 2016). It is a common practice for researchers to evaluate each of the paths as mentioned earlier separately.

As shown in Table 2, GM mediate between GC and ENG. The model demonstrated a significant relationship between the constructs; path coefficient= 0.369, standard error= 0.028, t-value=6.458**, CI [0.244,0.450]. The interpretation of mediation is down to the existence of zero between upper and lower confidence interval values (Hayes, 2013).

DISCUSSION

The results seem to support the claim that Goal Mechanisms (GM) have a significant effect on engagement. Furthermore, the results also support the hypothesis that individuals with goal core in mobile fitness application tend to engage better. These findings are corroborated by the findings in the studies by Shoaib and Kohli (2017) and Motel (2016), which concluded that goal core is found to have a strong positive relationship with engagement. It is also supported by past scholars such as Kylo and Landers (1995) who posited that goal core remained a positive predictor of performance and engagement behavior. Thus, the analysis has supported previous findings where a clear and precise goal core enhances engagement behavior. However, some past studies have obtained contradictory results, such as Nahragang et al. (2013) which discovered that goal core is not significantly related to engagement. However, the study found that goal mechanisms (GM) mediate the relationship between GC and ENG. Consistent with Lim and Noh (2017) who have reported comprehensive mediation effects of goal mechanisms on engagement, the findings suggest that individuals with goal core are more likely to engage with their activity through the intervening role of goal mechanisms (GM). Therefore, it provides evidence to support the hypothesis that individuals who have goal core (GC) show the tendency to engage better if they possess goal mechanisms. In addition, the results from the mediation analysis revealed that goal mechanisms (GM) mediated the relationship between GC and engagement.

CONCLUSION

This paper aimed to explore how goal mechanisms contribute to enhancing the link between goal core and user engagement, drawing on Goal Setting Theory within the context of mobile fitness applications. The study's findings appear to support the mediating role of goal mechanisms (GM) in the relationship between goal core (GC) and engagement (ENG). The paper is expected to deepen the understanding on goal mechanisms as a mediator as well as enhancing the literature on Goal Setting Theory. The findings provided by this paper may serve as the foundation for gymnasium owners and personal trainers to consider the importance of Goal Setting Theory through the role of goal mechanisms (GM) in enhancing the engagement of mobile fitness application users.

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AUTHOR'S CONTRIBUTION

Pg Arshad, P.G.M.A conceptualised the study, developed the research design and conducted the survey and performed the data analysis. Monil. M., contributed to the Literature Review development, interpretation of finding and the manuscript drafting. All authors critically reviewed the manuscript and contributed to its refinement and final approval.

CONLICTS OF INTEREST DECLARATION

We certify that the article is the Authors' and Co-Authors' original work. The article has not received prior publication and is not under consideration for publication elsewhere. This research/manuscript has not been submitted for publication, nor has it been published in whole or in part elsewhere. We testify to the fact that all Authors have contributed significantly to the work, validity, and legitimacy of the data and its interpretation for submission to Jurnal Intelek.

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