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Advancing Malaysia's Recreational Studies: Application of Structural Equation Modelling (SEM) in Validation of Adventure-Based Mental Toughness Model (AbMTM)

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ABSTRACT

Over decades, there are numerous training programs with the intervention of adventure-based programs have been implemented. The nature of adventure-based programs is also often associated with the development of psychological aspects including mental toughness. However, the fact is the term of mental toughness is more focused in the perspective of sports. Since it was first introduced in the 80's, various models and measuring instruments have been developed and are clearly more focused on the sports perspective. The issues arises when the sport-based mental toughness model is applied in adventure-based programs. Work on this matter, Adventure-based Mental Toughness Model (AbMTM) was developed with the application of Structural Equation Modeling (SEM). SEM was well known in development studies because of the effectiveness of its statistical analysis to determine the value or validity of the measured focus. It turned out to be very influential and applied in various fields of study. A total of 507 respondents were involved among individuals who had been involved in adventure-based programs in 2019 to 2020. As results, SEM analysis through Confirmatory Factor Analysis (CFA) and Goodness of Fit (GoF) strongly suggests the 7 dimensions of AbMTM was indicates the value of an excellent fit model. The results of this study, provide a new horizon and advancing the current field of recreational study.

Keywords: mental toughness, adventure-based program

INTRODUCTION

Adventure-based programs are widely implemented around the world (Mackenzie, Son, Eitel & tourism, 2018)and are often associated with the development of psychological aspects including mental toughness (Bowen & Neill, 2013; Davidson, 2016; Lekies, Yost & Rode, 2015). However, at the best of knowledge there are still limitations related to adventure-based mental toughness model development (Shafie & Che Mat, 2014). There are many sport-based models that have been developed. However, the perspective and way of development is based on sports performance and coaching. The core for the development of these models must also be worked on based on a competitive nature, such as pressure from the opponent or fans (Bell, Hardy & Beattie, 2013; Bull, Shambrook, James & Brooks, 2005). This clearly contradicts the basics of adventure-based program implementation (Clough, Houge Mackenzie, Mallabon & Brymer, 2016; Ewert, 1989). Many models clearly emphasize mental toughness is when an individual can calm down and maintain their best level of performance despite

facing difficult situations or circumstances (Crust & Azadi, 2010). The definition of this difficult situation is often debated among researchers, as it has a large space of perspective (Delahaij & Van Dam, 2017). In fact, previous models of mental toughness also feature it as multi-dimensional constructs (Crust, 2008).

There are several constructs that are often associated with mental toughness in previous models such as self-confidence, motivation, coping skill, focus, challenge, control, and commitment (Coulter, Mallett & Gucciardi, 2010). Crust, (2008) takes an approach by associating it with a challenge. Most previous studies state that this construct will operate when a person is faced with a difficult situation (Bell et al., 2013; Fourie & Potgieter, 2001), but there are recent studies that show that mental toughness not only exists when faced with difficulties, but also includes the individual's ability to stay focused and motivated even in situations. which is going well (Bowen & Neill, 2013).

Most of the models developed included mental toughness measurement instruments and more to sport-based perspectives. Clearly there are irrelevant measurement items when applied in an adventure-based program. In details, many items from the established model are considerably irrelevant, such as, the influence of fans distraction (PPI), (Loehr, 1982), pressure from the opponent (PPI-A), (Golby, Sheard & Van Wersch, 2007), competition's pressure (CMTI), (Gucciardi & Gordon, 2009), (SMTQ), (Sheard, Golby & Van Wersch, 2009) and considerably too general (MTQ48), (Clough, Earle & Sewell, 2002; Fourie et al., 2001). Factors or nature of adventure-based programs are excluded such as in terms of environmental challenges (open weather condition, wilderness, discomforts zone) and risks. Accuracy-related issues may arise, hence mental toughness was measured using sports context instruments in an adventure-based setting.

Since the beginning of the popular term mental toughness, it has indeed always been associated with sports performance (Clough et al., 2002; Loehr, 1982). Constructs developed to represent mental toughness directly are based on sporting perspectives (Butt, Weinberg & Culp, 2010). This contrasts with some claims that state that mental toughness is universal and does not simply refer to competitive pressure, athletes, or coaches (Clough et al., 2002; Coulter et al., 2010). This also shows that issues related to accuracy can arise because it is different from the nature of adventure-based programs that are less competitive element (Virden, 2006).

Moreover, the constructs highlighted in previous models are also mostly constructed based on a sports perspective. There are some constructs that are difficult to adapt in adventure-based program settings such as visualization and imagery control (Golby et al., 2007; Loehr, 1982), future potential (Middleton, Shadbolt & De Roure, 2004); sports intelligence and competition's behaviour (Gucciardi & Gordon, 2009) are based on competition influences. This gaps possibly contribute to misconception in designing appropriate program.

Adventure-based programs are very widely implemented in Malaysia (Md Taff, Shafie, Zakaria, Mohd Yasim & Abdul Rahman, 2012) involve various organizations and community groups. Referring to data from the Malaysia Sport Index (IYRES, 2018) it is said that more than 50 percent of Malaysia population is involved in active recreation and sports. This clearly proves that millions of Malaysians are involved in outdoor recreational activities including adventure-based training programs that stated the objectives is for mental toughness development. However, there is gap hence yet still lack of specific model regards adventure-based mental toughness.

METHOD

This study become a new area of investigation and certainly advance the knowledge base within outdoor adventure studies in Malaysia. There are several phases of the development of AbMTI. The study is based on the modified Design and Development Research (Saedah, Muhammad Ridhuan & Rozaini, 2020). There are 3 main stages of modified DDR.

First, is Need Analysis and involves a total of 112 Malaysian active adventure-based program practitioners who are purposively selected from various backgrounds such as academicians, consultants, instructors, and trainers. This process is important for obtaining issues and identifying key problems in the focus of this study.

Next, is Stage 2 namely Design and Development. At this, 14 purposely selected expert panels were involved. To obtain expert consensus, a 3-round of modified Delphi technique was employed. Round 1 is focused on consensus of constructs. Round 2 focused on consensus of constructs and sub constructs. Round 3 focus on the consensus of items to represent constructs. Several adjustments were made based on the expert recommendation and comments.

In Stage 3 is Evaluation. The validation of AbMTM was performed using Structural Equation Modeling (SEM) and involve a total of 507 respondents (pilot study *n*=11; actual study *n*=357), and age range 19-25 years old among 5 university and campus. In details, AMOS analysis is applied to obtain values for each item and constructs. The validation of AbMTM was performed using Structural Equation Modeling (SEM). In details, AMOS analysis is applied to obtain values for each item and constructs built. The main analysis for this validated model is Goodness of Fit (GoF) (See Figure 1).

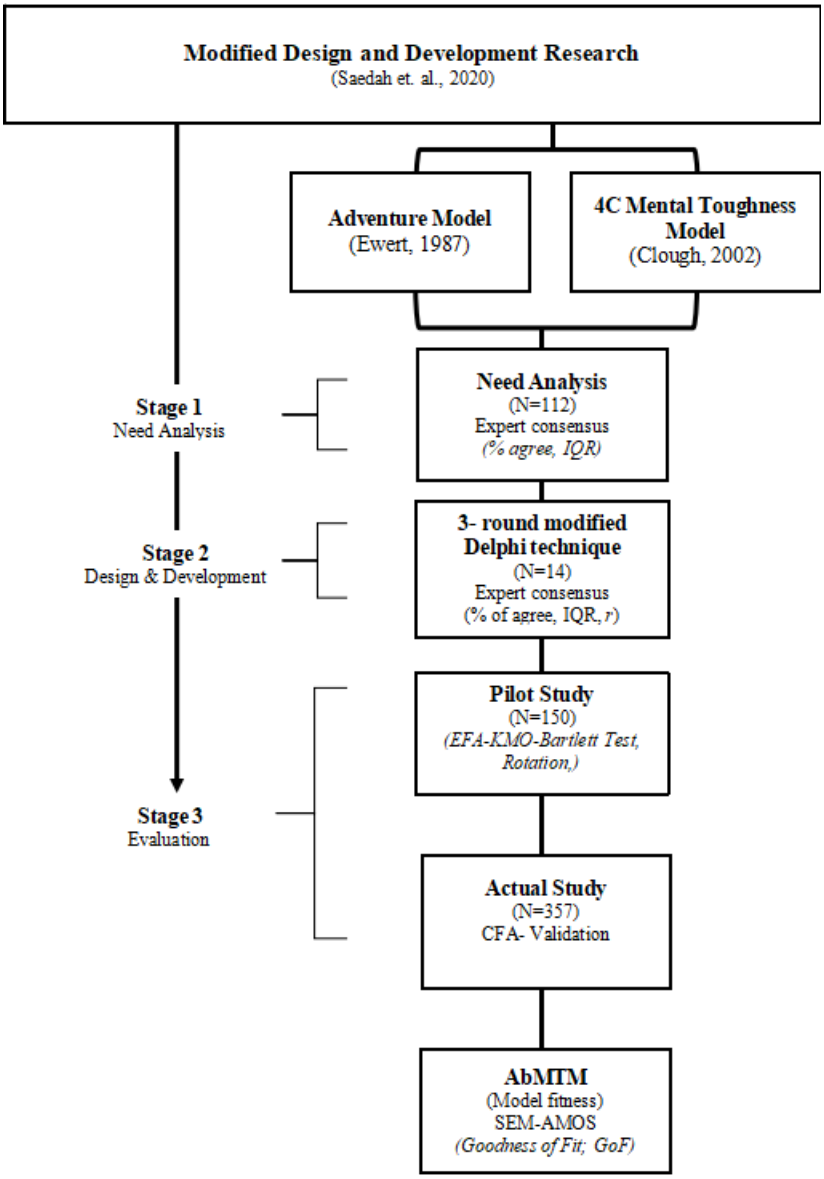

Figure 1. Methodology

RESULTS

The through SEM, the modification indices (MI) examination was conducted. A CFA measurement model (AbMTM) was respecified few times. The reduction of the items based on MI recommendation was made until the measurement model reach the best fit to the sample data. After undergoing a series of analysis, the final model of AbMTM was established. A total of 62-items was iteratively removed based on the analysis suggestion. All 7 constructs to tap adventure-based mental toughness also recorded significant construct reliability (CR=.60) and internal consistency (α=>.70). This validation process was believed to foster accurate value of reliability of the items in each construct (Hair, Celsi, Money, Samouel & Page, 2015) (See Table 1).

In details, all constructs achieved construct reliability (CR) with Self Confidence (.86) Motivation (.85), Coping Skill (.86), Focus (.86), Challenge (.86), Control (0.85), and Commitment (0.84). Marzita (2012) stated construct validity is integral important for model testing and to provide confirmed based of goodness-fit-indices. The Cronbach alpha analysis stated all constructs achieved high internal consistency. A measurement set of items per constructs stated Challenge is the highest (α=.90), followed by Self Confidence, Coping Skill, and Focus (α=.86), Motivation and Control (α=.85), and Commitment (α=.84). The analysis strongly suggested significant relationship a set of items as a group. It is also considered valid to be measured as a scale reliability.

Structural Equation Modelling		
Constructs	**CR** (>.60)	**CA (α)** (>.70)
Self Confidence (6-items)	.86	.86
Motivation (5-items)	.85	.85
Coping Skill (6-items)	.86	.86
Focus (5-items)	.86	.86
Challenge (6-items)	.86	.90
Control (5-items)	.85	.85
Commitment (5-items)	.84	.83

Table 1.

In another analysis, the Goodness of Fit (GoF) analysis of final AbMTM also recorded very significant data (Gaskin, James, & Lim, 2019). Referred to Figure 4.14.3a, the final examination on AbMTM provides greater fit to the data (X2 = 1.904, p = .000). The GFI is .839 AGFI = .792, NFI = .815, TLI = .924, CFI = .931 and RMSEA = .05. (See Figure 2)

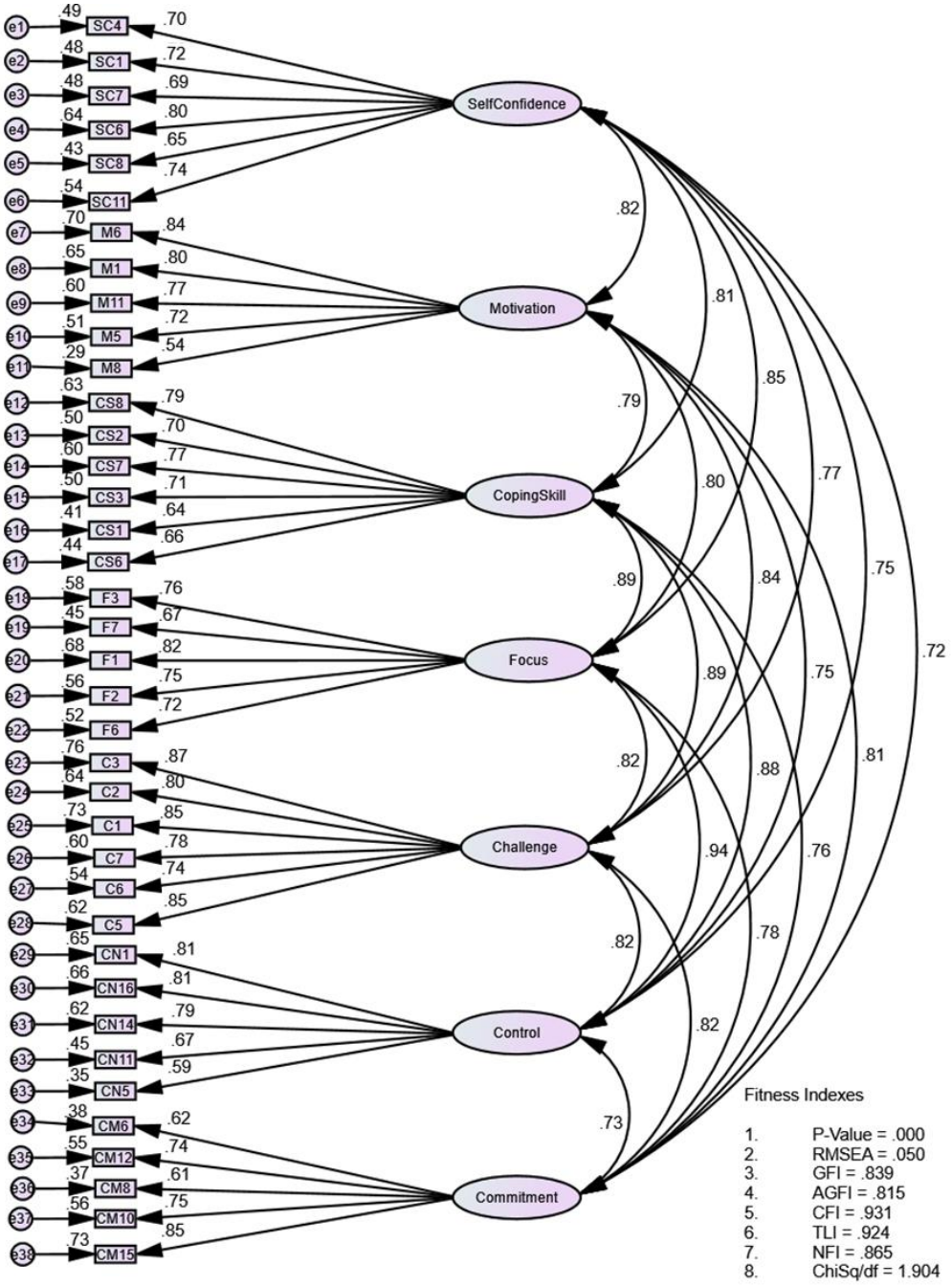

Figure 2. AbMTM

DISCUSSION

A reliability test conducted as to refine the proposed items and constructs with the main purpose to measure of internal consistency a set of items as a group (unidimensional constructs). Cronbach's Alpha coefficient considerably as the most familiar method that to measure the reliability of test (Sekaran & Bougie, 2016). They also stated the general rule of thumb is that a Cronbach's alpha of. 70 and above is good, 80 and above is better, and .90 and above is excellent. Even though several studies claim greater .60 is good (Pallant & Lae, 2002), but in this study the researcher decided the scale is solid when the Cronbach alpha coefficient is above 0.7 (Hashim, 2014). AbMTM recorded high internal consistency values.

Next, according to the Sekaran and Bougie, (2016), CFA assists to examine how well the latent variables are consistent with expected in pre-establish theory, as well as to determine the validity and reliability of the respective constructs and the adequacy of their goodness-of-fit to the data. In CFA, this research applies two (2) stage of modelling. Firstly, the researcher developed the measurement model before furthering to the uni-dimensionality model. This concept was believed to foster accurate value of reliability of the items in each construct, as well as to avoid any interaction between the measurement and structural model (Hair et al., 2015). In addition, this process is important to identify how observed variables depend on the latent variables. Next, the CFA conducted using AMOS. CFA claimed to be rigorous technique, which assisted the facilitation of the examination of factorial properties of the proposed model (Hair et al., 2015). The AbMTM has gone through a series analysis until it reaches best fit to the data.

There are various goodness-of-fit indices to determine the fit of the model. Henseler, Ringle and Sarstedt (2015) and Gaskin et al., (2019) recommended the use at least three fit indices: 1) absolute fit indices; 2) incremental fit indices; and 3) parsimonious fit indices. An absolute fit index includes chi-square, goodness of fit (GFI=>.90), and root mean square error (RMSEA=<.08). Absolute fit indices measure how well the model accounts for observed covariance in the data. The incremental fit indices include comparative fit index (CFI=>.90) and normed fit index (NFI=>.90). Incremental compare how well the proposed model fits the data. Lastly, parsimonious fit indices measured by normed chi-square. The analysis strongly suggests achieved AbMTM fit model to the data.

CONCLUSION

To conclude, the data obtained from the analysis series using SEM and Analysis of a Moment Structures (AMOS) are highly significant. The results of analysis indicated the final model of AbMTM had achieved the significant values.

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