The strategy in making firms that are entering new foreign markets expand their businesses in terms of services, products, technology, human and other resources has been widely studied. However, a review of the literature suggests that a comprehensive model with existing theories to clearly guide the firms in adopting effective market entry decisions for construction firms is still lacking. Most previous studies have dealt with entry location (EL), entry timing (ET) and entry mode (EM) decisions in an isolated way by considering one dimension or a combination of dimensions in particular. Although the method has been through various studies, relating to international market entry decisions, there is currently no model that attempts to integrate the common factors linked to ELETEM decisions for construction firms. The main aim of this study is to develop an integrated model by determining the mutually inclusive and significant factors (MISFs) that influence the ELETEM decisions. Questionnaires were administered to Malaysian construction firms with 62 managers participating in the survey. The findings on the proposed ELETEM decision model were then validated through interviews with 13 managers holding top managerial positions in the firms. It was found that majority of the firms have penetrated both ASEAN and non-ASEAN countries as late movers, using both equity (EQ) and non-equity (NEQ) modes in their international operations. Logistic regression predictive models for EL, ET and EM decisions were also established. The EL decision model predicts that firms need to acquire more knowledge related to the country factors in order to select suitable locations in both ASEAN and non-ASEAN regions. The ET decision model predicts that firms need to acquire more knowledge related to firm, country, market and factors to be late movers. Finally, the EM decision model predicts that firms need to acquire more knowledge related to firm factors to adopt both EQ and NEQ modes. In addition, Rasch Model analysis was adopted to integrate all three entry decision constructs to determine the MISFs for the ELETEM decision model. The findings suggested that the MISFs amongst others were host and home government support, international risks, market potential, firm’s tangible and intangible resources, such as financial capacity, strategic orientation, experience, reputation, business network and competency, and project requirements relating to time and contracts. The overall findings led to the emergence of a few critical issues relating to strategic, risk and resource management, and the sustainability of construction firms. Firms must increase efficiency in allocating their tangible and intangible resources, such as financial, experience, business network, and adopt suitable entry strategies in their global operations within any geographical proximity of the targeted potential markets. This study breaks out the silo-based thinking by integrating all three domains of EL, ET and EM decisions. It provides a holistic approach to understanding how international construction firms make decisions that cut across all three domains as well as across country, market, firm and project factors and within the context of the well-established OLI+S paradigm. It is envisaged that the integrated ELETEM decision model provides more complete and coherent theoretical and empirical solutions for international market entry strategy to guide construction firms in avoiding poor decision-making, which can lead to failure in their new international ventures. The ELETEM decision model also offers valuable information to provide a comprehensive solution for construction firms already in international markets to make better entry decisions in their future ventures.

A large number of studies, both theoretical and experimental have been devoted to understanding the physical mechanisms underlying the bar formation. Numerous data on bar formation have been accumulated yet the methods to predict bar geometry, especially bar height are still insufficient. This research aims to investigate the parameters that promote bar formation in terms of bar height. Investigation was carried out on an erodible sand bed channel using a large-scale physical river model. Study have included various hydraulic and sediment characteristics with steady flow rates and sediment supply. There are four matrices of flow rate and bed slope which were kept constant. A relationship between dimensionless bar heights with the respective independent parameters has been established. Bar profile development was generated using Surfer, of which 3D elevation plots are given. Analysis has included the discussion on a significant difference of planform view for each experimental condition, trends in volume change along the channel, widening ratio and centreline bed elevation profile along the longitudinal distance. Both experimental and historical data were used to develop the empirical model. Model development involved selection of parameters through review of established models, dimensional analysis to check on the homogeneity of the model and statistical analysis. Derived empirical model has been validated using a different set of data from previous studies. Analysis confirmed that the empirical model derived using linear regression technique depicts the highest accuracy of 90% with $\frac{H_b}{d_c}$ and $\frac{w}{d_c}$ as the most significant parameters that promote bar height formation. An empirical formula to predict bar height formation in sand bed channel for flow rates in the range of 4.97 m$^3$/hr to 10.91 m$^3$/hr is proposed. The empirical formulae considers constant supply of sediment in the upstream of channel, thus the growth of bar $\frac{H_b}{d_c}$ is higher in the range of 67 to 107.