INVESTIGATING BARRIERS TO BIM IMPLEMENTATION IN DEVELOPING COUNTRIES WITH AN APPROACH TO ALBERT BANDURA THEORY OF SELF-EFFICACY

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Abstract
The process of building information modeling is one of the most effective advances in the construction industry in the last decade, which is developing rapidly around the world. On the other hand, the construction industry of many developing countries is a vital industry and a driver of development, but it is inefficient and underdeveloped. Although building information modeling can have a great impact on the efficiency of this industry, but there are many obstacles in its way and the flow of its application in the construction industry of these countries has slowed down. Identifying these barriers in different fields and considering the local conditions of the construction industry in developing countries has been one of the main objectives of this research. Some of these barriers are rooted in the technical shortcomings of the Beam system, but many also stem from the nature and characteristics of the construction industry and its relationships and functions. In order to successfully implement this advanced and efficient system and enjoy its advantages, these obstacles must be identified and examined according to their origin, and appropriate solutions must be designed to make this process run more quickly. In this research, first BIM technology and the benefits of its implementation are introduced and then the obstacles and problems during the implementation of BIM in some developing countries in this field are investigated and finally, according to the theory of self-efficacy, solutions to eliminate these barriers are presented.

Keywords: *BIM, Executive Barriers, Albert Bandura Theory, construction industry, risk management*

Classification JEL: G32, L74, M1, O16

1. INTRODUCTION

BIM has been increasingly in demand internationally in the construction industry in recent years. The use of this technology reconciles several problems in project teams such as delays, rework, lack of communication and other issues related to inefficiencies that affect project success. While actively used by most developed countries, however, BIM is not as advanced in most developing countries. Therefore, this article examines the absorption of BIM in some Asian developing countries and examines its implementation in these regions. Common challenges were addressed with recommendations to address the low level of BIM acceptance issues that distinguish developing countries from developed ones. This article provides insights into how BIM is evolving in those countries, considering the incentives and barriers to technology adoption, and how it may change in the near future.

Common challenges were addressed with recommendations to address the low level of BIM acceptance issues that distinguish developing countries from developed ones. This article provides insights into how BIM is evolving in those countries, considering the incentives and barriers to technology adoption, and how it may change in the near future. Introduction as comprehensively explained by Eastman et al. (2011), Building Information Modeling (BIM) is a modeling technology with a set of processes for analyzing building models that are characterized by digital objects that contain coordination data that describes their behavior (Eastman et al, 2011).

Levels of BIM use are widely reported worldwide, especially in developed countries. Despite many challenges, the inevitable recognition of BIM across the Architecture, Engineering and Construction Industry (AEC) worldwide has been recognized for its promising benefits. Includes continuous BIM benefits from industry experts, cost and time savings, quality and performance improvements, collision detection, improved accuracy, increased collaboration and communication, better documentation and documentation process, improved planning and design, and visualization It is better (K. Newton, 2012), (L. Zhang, 2014).

While many construction projects in developed countries are gradually implementing BIM, the cultivation of this technology in developing countries is lagging behind. For example, although BIM has increased slowly in the Middle East, a recent survey reported that acceptance levels are still unsatisfactory with a low percentage of BIM users (M. Gerges, 2016). The main barriers identified are: Compare BIM to CAD, change resistance and BIM as additional cost. In Nigeria, on the other hand, one of the barriers to BIM adoption in the country is lack of government support, lack of awareness and cost (N. Usman, 2016), (M. Abubakar, 2014).

While the enablers that encourage BI M implementation include training, awareness, government support, and software. In addition, J. Kang (2012), adapting lessons learned from the United States, suggested five challenges that must be solved for contractors in developing countries to successfully implement BIM (J. Kang , 2012). The reviewed articles confirmed that researchers in some developing countries have begun to explore BIM topics in the last few years. While those publications described the neonatal stage of BIM in the relevant regions, the findings also showed limited studies from most developing countries (Bui et al., 2016). However, previous studies on BIM emissions in Asian developing countries have been almost non-existent or lacking in some areas. This highlights the need for more BIM exploration for less developed countries rather than highlighting the potential benefits of BIM in most developed countries.

This study is important because the construction industry in developing countries plays an important role in contributing to GDP, where BIM can potentially increase productivity at the level of developed countries. Improve the future. Therefore, this article, with the aim of providing an overview of BIM development in some developing countries in Asia, basically identifies the main drivers and obstacles for countries to adopt BIM.

Given the above, the present study seeks to answer the question of what are the administrative barriers to the use of BIM in developing countries? And how important are each of the identified

obstacles? And according to the theory of self-efficacy, what are the solutions to remove the barriers to using BIM?

2. LITERATURE REVIEW
Theoretical foundations

- **Executive barriers**

In the process of building information modeling, all project members must have the necessary cooperation in design and construction with each other to reduce design errors and increase the efficiency of the construction industry (Miettinen, 2014). Cultural, legal and contractual barriers and problems, economic and security and management problems are the most important challenges and problems in implementing this technology. Understanding the challenges in implementing BIM is the first step in finding solutions for them (Vass et al, 2017). Undoubtedly, with the advent of any new technology and process, there will be many problems and difficulties in its implementation, some of which Over time, advances in various technologies will be resolved, but there may still be new issues until the technology is fully implemented.

- **BIM**

The advent of building information modeling is in fact the emergence of a new technology and approach in the construction industry that changes the design and construction process in a favorable way. Technologies based on building information modeling are used in building energy analysis, the study of the impact of sunlight and many analyzes based on the creation of sustainable buildings in terms of energy. So building information modeling is more than just a tool for drawing, it covers the entire project life cycle from the beginning of planning to design to the end of construction and even operation.

- **Benefits of BIM**

Several studies have identified some benefits of BIM and the drivers for its imple-mentation (Rogers,2015. Khosrowshahi,2012. Badi,2017. Miettinen,2014). Ghaffarianhoseini, Tookey (Ghaffarianhoseini,2017). viewed the range of BIM benefits as "technical superi-ority, interoperability capabilities, early building information capture, use throughout the building lifecycle, integrated procurement, improved cost control mechanisms, reduced conflict and project team benefits" (p.2). Eastman, Eastman (Eastman,2011). identified: early design assessments ensuring that the project requirements are met; evaluation of building per-formance and maintainability by operations simulation; reliability of cost estimates, and reduction in variations as possible BIM benefits. BIM improves productivity and facilitates the management of project information throughout the building lifecycle (Khosrowshahi,2012).

The collaborative benefits of BIM have also been investigated (Azhar,2011. Cidik,2014). Furthermore, BIM contributes to increased productivity and efficiency (Miettinen,2014), and contributes extensively to improved project value and enhanced construction practice (Elmualim,2014). A survey of nine of the world's top construction markets found that the top project-related benefits that contractors are receiving from BIM are reduced rework, reduced con-struction cost, reduced project duration, and improved safety, all of which impact strongly a company's return on investment (McGraw-Hill,2014). Rodgers, Hosseini (Rodgers,2015) identified drivers for BIM implementation including: enhancing collaboration on projects; earlier clash detection; in-creasing the ability to respond to requests for information; improving cost estimation and control abilities; increasing clients' satisfaction; enhancing product quality; increasing the quality of construction details; improving the ability to meet sustainability needs and fa-cilitating

cost savings during design. In Table 1, we look at the overall benefits of BIM in three areas: employers, designers, and contractors.

Table 1 ***Benefits of using BIM***

Effects and results of using BIM for employers	Effects and results of using BIM for designers	Effects and results of using BIM for contractors
More basic and permanent design evaluation	Better design with more comprehensive analysis	Analysis and construction planning
Manage facility complexity, scheduling and assets	Better compliance with predefined design and urban planning standards	Estimate time and cost
Reliability and cost management	Initial evaluation and ensuring energy efficiency to reassure employers	Predict early on the mistakes and shortcomings ahead and try to solve them
Sustainable Development	Predicting problems and obstacles in the early stages	Stronger relationships with project owners and avoiding common conflicts
Low investment risk due to the reduction of unpredictable events	Resolve conflicts with the work of other groups involved in the project	Optimal cost and timing
Comprehensive and complete information of the building in one file	re-construction project simulation to meet the needs of the client	Achieve the best quality

- **Barriers to BIM**

Implementation Despite the purported benefits and drivers for BIM, its implementation to date has been limited, due to a number of challenges and barriers (Gu,2010.Khosrowshahi,2012. Gerges,2017). Gu and London (Gu,2010) found that BIM awareness, knowledge, and interests vary across construction industry disciplines, but perceptions of the main factors affecting its implementation are consistent amongst engineers, architects, project managers, and other key stakeholders. Alreshidi, Mourshed (Alreshidi,2017) categorized BIM adoption barriers into five themes: socio-organizational barriers (e.g., risk avoidance and resistance to change); financial (e.g., cost of BIM training, software and hardware); technical (e.g., inter-operabil-ity issues); contractual (e.g., lack of BIM related aspects in current contracts), and legal (e.g., BIM model ownership, intellectual property, and copyright issues).

Won, Lee (Won,2013) undertook a review of literature on barriers to BIM adoption, and categorized them as three innovation constraining issues: company-specific innovation, in-ter-organizational innovation, and a hybrid of company-specific and inter-organizational innovation issues. The authors found that non-technical issues such as willingness to share information and effective collaboration among project participants were more sig-nificant as challenges to BIM implementation than technical issues such as BIM training programmes and technical support for inter-operability issues. Issues such as different attitudes and beliefs and cultural resistance of project participants are often cited (Gu,2010. Alreshidi,2017), although some 'harder' factors are frequently mentioned, such as cost of investment and learning curve in BIM technologies, and poor software inter-operability (Sun ,2017. Azhar,2011.Eastman,2011. Rogers,2015).

Thus, insights gained from the literature on the most widely reported potential barriers to BIM implementation include:

- High initial cost of software and hardware

- High cost of training staff in new software and technology
- High cost of process and technology implementation
- Behavior (i.e., resistance, struggle) of professionals to change from drafting to modeling (i.e., change from current practices)
- Weak support from organization environment and culture in implementation of BIM
- Non-availability of support from top management in organizations for implementations of BIM
- Non-availability of skilled professionals
- Lack of BIM object libraries and standard modeling protocols
- Industry resistance to process change
- Lack of standardized process and guidelines for implementation of BIM in the construction industry
- Compatibility issue between software platforms
- Absence of inter-operable environment in the construction industry
- Limited use of BIM in construction industry
- Non-availability of market support/trends for BIM implementation
- Lack of comparative analysis between traditional and BIM-based project delivery methods
- Lack of comparative analysis between the existing methods and BIM technology in terms of cost utilized by organizations
- Non-availability of opportunities to apply the technology
- The industry is not clear enough on what BIM is yet
- Information models only work in the software they were made on

- **Self-efficacy**

Self-efficacy is the mediator between knowledge and behavior and is related to professional competence. A strong sense of self-efficacy leads to effort and perseverance to succeed.

The goals that each person sets for themselves can be affected by how the individual evaluates his or her ability. According to social cognitive theory, humans are not only affected by the environment, but can also affect the environment based on their cognitive processes.

Bandura (2001) considers self-efficacy beliefs as one of the most important mechanisms of personal agency. Self-efficacy is defined as an individual's belief in his or her ability to control his or her performance and environmental events (Bandura, 1994) and the ability to perform well in challenging situations (Schonfeld, Brailovskaia, Bieda, Zhang & Margraf, 2016). Self-efficacy beliefs as the most important self-reference beliefs (knowledge) are mediated between knowledge and behavior and are the basis of human agency and self-control.

People with high self-efficacy are able to cope with life stresses and increase their social interactions with high self-confidence and positive emotions (Yang, 2016).

According to a number of scientists, self-efficacy is the belief of people that they can mobilize motivation, intellectual resources, and behavioral efforts to control events that affect their lives (Schein & Schein, 2018). Researchers emphasize the effect of self-efficacy on the ability to create communication and professional networks, as well as to change the situation by means of interpersonal communication (Lepri et al., 2016; Maree, 2017). Some studies indicate that self-efficacy and the ability to shape one's own future are closely related to or reflected through some specific skills and activities, such as the ability to take notes and plan (Salame & Thompson, 2020).

A group of American psychologists have identified two basic types of self-efficacy, namely professional self-efficacy and verbal self-efficacy (Lippke, 2020). Let us consider them in more detail:

1) *professional self-efficacy* is related to the belief and confidence of the person that they can apply their knowledge, abilities, skills, and experience previously gained in a particular type of activity to

deal with similar situation in the future and achieve success (Lippke, 2020; Olivier et al., 2019; Peiffer et al., 2020);

2) *verbal self-efficacy* involves the belief of the person that they possess communication skills and the confidence that they can be successful communicators constructively solving communication problems (Lippke, 2020).

Therefore, it can be concluded that the self-efficacy components are important not only for personal but also for professional development that can be based on career ideas, interests, and orientations of students.

3. RESEARCH BACKGROUND

There is still little research on the subject in the developing countries. For instance, a review in a previous study (Bui,2016) showed that out of the 135 developing countries identified by the World Bank, the number of BIM studies reported in China, Malaysia, and India were 13, 9, and 3, respectively, indicating a major research gap on the subject in the remaining 132 countries. While issues around BIM adoption in developed countries may be homogenous on account of the relatively similar implementation standards, R&D expenditure, skills, and operating environments, corresponding issues in the developing countries are heterogenous (Mbachu,2017), thereby requiring case-by-case exploration of the issues using adequate num-ber of case studies.

Moreover, increasing calls for more research on BIM adoption issues in the developing countries are driven by several other imperatives, such as the globalization of construction (Gu,2010), increasing emphasis on the utilization of BIM and digital technologies for the implementation of major building and infrastructure projects in the developing economies by the World Bank, United Nations, and other global bodies (Mbachu,2017), and the growing participation of multinational construction firms in landmark projects that require the utilization of BIM for optimized cost efficiency and goal effectiveness of the dollar investments in the projects within the developing economies (Bui,2016).

It should be noted that, though they have not been fully utilized by stakeholders, the benefits of BIM have been clearly defined and reported by a number of academics (Ghaffarianhoseini,2017); by professional groups, as well as by software vendors. Furthermore, the barriers, or challenges, to BIM implementation have been identified in numerous studies (Gu,2010.Khosrowshahi,2012. Rogers,2015). However, most of the reported drivers of, and barriers to BIM implementation are country-, industry-, and project-specific. This is due the fact that each project is unique and operated in different legislative, regulatory, and socio-cultural environments (Mbachu,2017. Durdyev,2018). In the following, some studies done in this regard are mentioned:

- Wilis et al. (2017): Research result: examined the challenges of implementing BIM in architectural firms in Indonesia as the shortage of BIM experts, low demand from clients, high investment cost, and reluctance of transforming into BIM environment. Besides, the recognised benefits where time efficiency, better communication and coordination, and improved project documentation.
- Hanifah (2016): Research result:It was found that the respondents were highly aware about BIM execution in the construction industry; however, the usage of the technology in the country was low. Although BIM was mostly used and restricted to 3D modelling and visualisation, the BIM users noted the benefits accustomed by the techno logy in terms of the efficiency related to time, performance, cost and workforce. There is yet no standard and regulation for BIM implementation in Indonesia, where only large projects have started using BIM mostly in design and engineering phase.
- Bo et al. (2015): Research result:concluded that BIM standards, policies and commercial models are crucial to encourage more BIM development in China.
- Eadie et al 2014: Research result:Analysis of barriers to implementation of the Beam implementation in Kingdam State with the cost of purchasing software and hardware, non-

acceptance by the project manager, staff training costs, non-acceptance by staff, lack of technical expertise, legal problems, lack of vision, lack of flexibility culture And identifies changes in methods, etc., and finally, by ranking, raises the lack of a culture of flexibility and change in methods.

- Zhang et al. (2014): Research result:They found that most respondents had little knowledge of BIM, in which designers have more experience than clients and contractors. The most common business benefits are: less change orders to design, improved project team collaboration, and better contract documents and drawings.
- Sawhney(2014):Research result: The results disclosed that despite having quite a number of BIM users in the country, most of the respondents claimed that they were aware but indecisive in using the technology in the future. Sawhney and Singhal (2013)through interviews and surveys identified some drivers and barriers of adopting BIM in India.

4. RESEARCH METHODOLOGY

The information in this article has been retrieved mainly through a review of the literature of journal articles and conference papers. As well as compliance with relevant reports and instructions. This study focused only on the evolution of BIM for developing Asian countries. References used to the last five years to provide current information to the study. However, due to the very little material available from articles and selected articles for some areas, some alternative methods were used to obtain more data for this study. Additional contact information was obtained through social media platforms such as Facebook and LinkedIn. Finally, through those methods, a brief BIM development of some Asian developing countries was identified.

Therefore, the present study is descriptive in nature and applied research in terms of purpose. Applied research is a type of research that is done in line with the practice and needs of societies and humanity. In descriptive research, the aim is to describe the conditions or phenomena under study. Conducting this type of research can only be to better understand the current situation or to assist in the decision-making process.

The statistical population of the study consists of project managers, experts, experts, consultants and project contractors in developed countries. These people can provide relevant and valuable information to the present study due to their different specialties in road construction projects and in attracting a wide range of experts. In order to maintain the validity of the model, it has been tried to select the majority of the statistical population from people whose background is in the field of building information modeling. Therefore, in the present study, in order to collect information on the theoretical foundations and literature of the subject research, from library sources, articles, the existing books in this field and the world wide web have been used and in the field part of the research, interviews with 47 experts in the field of building information modeling have been used to collect information. As shown in Figure 1, the general process of conducting research is in 5 different steps:

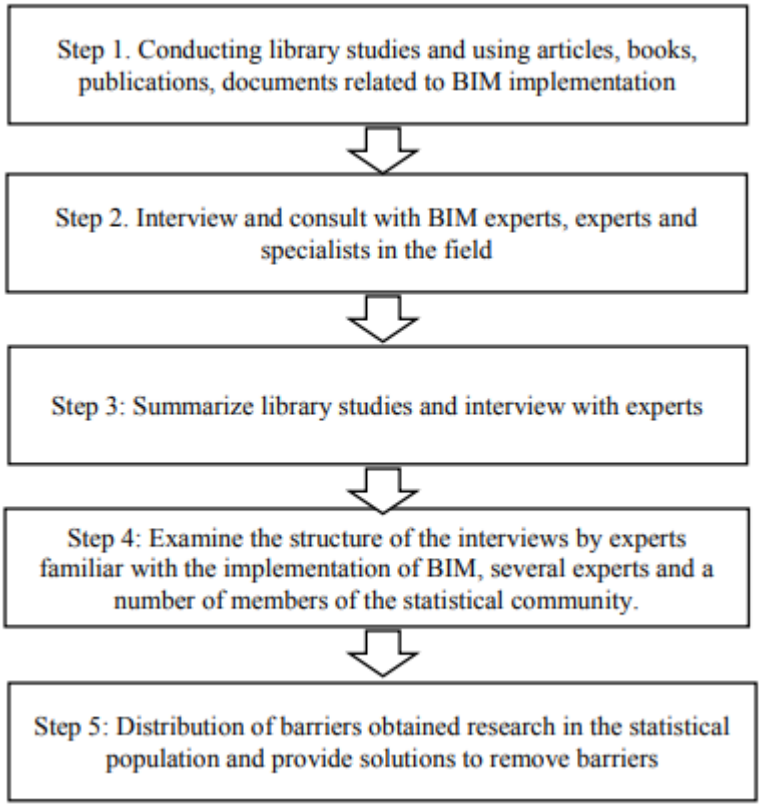

Figure 1 ***Research process***

5. DISCUSSION

In Table 2, we examine these barriers in some developing countries.

Table 2
Barriers to BIM implementation in some developing countries

Row	Country	The result of the review
1	China	In the survey byCao et al. (2015), it was considered that BIM application in China has gradually expanded from the design phase to the construction phase (D. Cao,2015). However, the usage of BIM is st ill largely limited to visualisat ion to detect clashes in building systems. The majority of surveyed BIM-based projects are still practising the traditional way of project delivery. Despite not having any mandate from the government (Bo,2015), there were some documents released by Ministry of Housing and Urban-Rural Development of the People's Republic of China (MOHURD) and also policies by so me provinces to promote BIM . BIM standards that are classified by funct ions have been divided into three types of strategy, foundation and application standards; within four levels of national, professional, provincial and association standards.
2	India	According to Chougule and Konnur (2015), the construction industry in India has a minority BIM users with limited BIM knowledge (N. S. Chougule,2015). Although it was acknowledged that the technology could potentially overcome many problems in the industry sector, the employment is st ill at infancy stage (V. Kushwaha and M.

		Adhikari,2016). BIM is relatively popular amongst the architects as compared to other consultants in India (A. Sawhney,2013). Where there were no government initiatives identified, some private sector organisations made BIM mandatory for a few selected projects.
3	Indonesia	Chandra et al. (2017) featured the main challenges as incompatibility of different kinds of software used by the practitioners (H. P. Chandra,2017). Whilst, the main BIM benefit characterised is the possible reduction of construction cost. For the practitioners to get in touch with the latest development of BIM in Indonesia, there is also a BIM website available managed by the Institut BIM Indonesia (A. Indraprahasta,2015).
4	Malaysia	The development of BIM in Malaysia was recently driven by the Construction Industry Transformation Programme (CITP) 2016-2020 agenda to transform the Malaysian construction industry towards a more productive, sustainable and competitive region (CIDB,2015). Nonetheless, the BIM innovation was initiated in the country since 2007 by the Malaysian Public Work Department but only limited to their internal projects. It was known the progress of BIM was then dominated by the private sectors from 2009 onwards.
5	Mongolia	The BuildingSmart Mongolia group was found by Mongolian architects and engineers, who have primary purpose to develop a mid-term program to introduce BIM in Mongolia. The program is divided into three main stages, namely "Developing the program", "Preparation" and "The implementation of the program".
6	Myanmar	Although the country is not really adopting BIM technology, apparently most of Myanmar BIM practitioners are working in the Singapore BIM field. Through personal LinkedIn in-mailed communication, it was clarified that there is no mandate by the government to use BIM in the construction industry in Myanmar. Nevertheless, they as so-called BIM specialist that strived to commence several BIM seminars, trainings, websites and Facebook groups since 2012. It can be claimed that all of those BIM resources were mostly derived from private efforts.
7	Pakistan	The majority of Pakist ani respondents claimed that they have medium knowledge about BIM. Whereas some of the barriers include the belief that current practice is serving excellently, process changes in convent ional practices, and limitat ion of adoption in the local market.
8	Sri Lanka	BIM is not yet adopted in Sri Lanka. According toJayasena & Weddikkara (2012), many of the strategies and roadmaps adopted in developed economies may not be readily adoptable in the Sri Lankan context (K. Gunasekara,2013).
9	Thailand	Ruthankoon (2015)reviewed BIM barriers based on experience as a stakeholder and consultant of the techno logy implementation in Thailand (S. Tangparitkul,2015). The barriers were categorised into; learning by people, time and effort in process and return of innovation as invest ment. It was recommended that incentives as motivat ion, training and additional workforce should be imparted to improve the low transition stage of BIM in the country.
10	Vietnam	From 2021 onwards, in sequence with the piloting period assessment, Circular Letter and Detailed Guidelines will be published by the Ministry

		of Construction, for BIM to be widely employed for the construction, operation and management activities. Apart from the program is funded by the National Budget, under the Law of National Budgeting, the cost for the BIM application in pilot projects stated in BIM roadmap, are included in the Law of Construction total investment (R. Masood,2014).

According to the table above and according to the cases mentioned in the research method section, in order to collect information on the theoretical foundations and literature of the research, library resources, articles, books in this field and the World Wide Web were used and In the field research section, interviews with 47 experts in the field of building information modeling were used to collect information. Finally, these barriers should be redistributed among the experts of this industry and the most important barriers include the following:

1. Behavior (i.e., resistance, struggle) of professionals to change from drafting to modeling (i.e., change from current practices)
2. Non-availability of support from top management in organizations for implementations of BIM
3. Industry resistance to process change
4. High initial cost of software and hardware
5. High cost of training staff in new software and technology
6. High cost of process and technology implementation
7. Non-availability of skilled professionals
8. Absence of inter-operable environment in the construction industry
9. Lack of standardized process and guidelines for implementation of BIM in the construction industry
10. Lack of BIM object libraries and standard modeling protocols
11. Compatibility issue between software platforms
12. The industry is not clear enough on what BIM is yet
13. Limited use of BIM in construction industry
14. Non-availability of opportunities to apply the technology
15. Lack of comparative analysis between traditional and BIM-based project delivery methods
16. Lack of comparative analysis between the existing methods and BIM technology in terms of cost utilized by organizations
17. Non-availability of market support/trends for BIM implementation
18. Information models only work in the software they were made on

According to the research findings, the following are solutions to eliminate the most important factor (factor 1) according to the theory of Albert Bandura.

According to Bandura, the teaching and learning of new behaviors in humans occurs more through modeling the behaviors of others than through direct and classical learning. Unlike behaviorists, he believes that learning does not necessarily lead to behavior change. People can learn new information; Without a change in their overt behaviors.

In Bandura's theory of social learning, it is said that the learner learns by observing the behavior of others. When the learner, that is, the observer, observes the behavior of another person for which that person receives a reward or reinforcement for that behavior, that behavior is learned by the observer. This type of reward or reinforcement is called surrogate reinforcement.

Since 1977, when Bandura published the study of "self-efficacy" towards a uniform theory of behavior change, this issue has become one of the topics of the day in psychology and many studies have been done on it. Why has self-efficacy become such an important issue among psychologists and educators? As Bandura and other researchers have shown, self-efficacy can affect almost everything from mental states to behaviors and motivations.

The role of self-efficacy

Almost everyone can identify what goals they want to achieve, what they want to change, and what they want to achieve. However, most people agree that implementing these programs is not an easy task. Bandura discovered that each person's self-efficacy plays a major role in how they approach and approach goals, tasks, and challenges.

People with a strong sense of self-efficacy:

- Challenging issues are seen as problems that need to be overcome.
- Show a deeper interest in the activities in which they participate.
- They feel more committed to their interests and activities.
- and quickly overcome the feeling of despair and hopelessness.

People with poor self-efficacy:

- Avoid challenging tasks.
- They believe that the conditions and tasks of the problem are beyond their ability and capability.
- Focus on personal failures and negative outcomes.
- They quickly lose confidence in their personal abilities and capabilities.

Successful experiences

"The most effective way to develop a strong sense of efficiency is through successful experiences." Successfully doing a task strengthens our sense of self-efficacy. On the other hand, failure to face a task or challenge can lead to a weakening of a sense of self-efficacy.

Social modeling

Seeing others succeed in doing something is another important source of self-efficacy. According to Bandura: "Observing that people like us achieve success through continuous effort reinforces the observer's belief that he or she also has abilities that he or she can handle similar activities successfully".

Social persuasion

Bandura states that people can also be convinced that they have the skills and abilities necessary to succeed by encouraging others. Remember when a positive, motivating statement from someone helped you achieve your goal. Verbal encouragement from others helps the person to put aside doubts about their abilities and focus on trying to get the job done.

Psychological reactions

Our emotional and psychological reactions to different situations also play an important role in self-efficacy. Mood, emotional states, physical reactions and stress levels can all affect how a person feels about their personal abilities in a particular situation.

To describe the interaction of behavior, environment and personal factors, Bandura introduced the principle of two-way determinism. The environment can determine a person's behavior and the person changes the environment. Personal factors can both influence and influence behavior.

The steps of observational learning include the following steps:

1 -The stage of paying attention or observing the behavior of the pattern: To imitate a pattern, we must first pay attention to the pattern. Patterns often attract our attention because they have attractiveness, fame, competence, admiration, power, etc. Factors that are related to the learner himself include his talent and readiness, interests and enthusiasm.

2 .The stage of memorization or pregnancy: Because we often imitate patterns after a period of time, we remember them symbolically (for example, we watch a motorcyclist take a new path. We associate the new path with words. Later, when we want to move in this path, verbal codes help us to go through it correctly. Learning takes place according to the principle of proximity.

Self-management

People will have a great ability to regulate their own behavior if people have high personal efficiency, confidence in their successors, and strong collective performance. Manipulate and bring about the consequences of their actions. These consequences are fed back into the pattern of reciprocal determinism and enable individuals to behave on their own.

External factors in self-government:

1 .They provide people with a benchmark to evaluate their behavior.

2 .External factors contribute to self-regulation by providing a means of reinforcement.

Internal factors in self-government:

External factors in self-government interact with internal or personal factors. Bandura (1986-1996) identified three internal conditions in self-government:

1 -Self-examination 2- Judging processes 3- Self-reaction.

Self-Esteem: People should be able to monitor their own performance, although their attention does not need to be complete or even accurate. People pay attention to some aspects of their behavior selectively and ignore other aspects altogether.

Judgment process: Helps people regulate their behavior through the process of cognitive mediation. People not only have the ability to think deeply but they can also set goals based on the goals they set for themselves.

Self-reaction: People react positively or negatively to their behaviors, depending on how well their behavior meets their personal criteria. That is, people create incentives for their actions by reinforcing or punishing themselves.

Four important characteristics of human factor in Bandura:

1. Intentionality: To perform actions with planning (intentionality) for a specific purpose.
2. Forethought: Predicting the consequences and choosing the behavior that has the desired result.
3. Self-reactivity: Monitoring one's progress in making choices
4. Deep Thinking: Assessing and evaluating performance, motivation, goals, and self-efficacy - The most important mechanism for people to think deeply is personal performance or self-efficacy.

It is the link between thought and action. People do things that bring them satisfaction and a sense of pride. Metacognitive ability to think about the direction, consequence and meaning of plans and actions, deep thinking or self-reflectiveness.

6. CONCLUSIONS

The process of building information modeling, or BIM for short, is an emerging phenomenon that is revolutionizing the construction industry and dramatically increasing its efficiency. Implementing this system in the construction industry requires structural changes because this process is in fact a new method and approach, and in addition to its own tools, it also changes the workflow in this industry.

In the past decade, construction industry professionals and academics have centered much discussion on the potential offered by building information modeling (BIM) (Lee,2015. Sun,2017), to facilitating the achievement of construction project cost, time, and quality objectives, and improvement in the management of the project implementation process (Azhar,2011). Numer-ous articles, books, and construction industry surveys have reported the general benefits, barriers, and limitations to BIM adoption throughout the entire lifecycle of various con-struction projects worldwide (Ghaffarianhoseini, 2017).

although most of the developing countries in Asia highlighted the low level of BIM implementation in their respective regions, the benefits of using the technology have also

been acknowledged. However, more importantly, for the BIM capabilities to be fully utilised to improve the low level of its usage, t he challenges or barriers of implementing it require significant attention. for some of the developing countries in Asia, the efforts from private sectors in escalating the BIM usage in the construction industry is no less important. Consequently, more training should be organised, as well as emphasising exposure at all education levels to produce more expertise in BIM. Additionally, cost often becomes the most prominent challenge in deploying BIM especially by the small-scale companies. Unwillingness to purchase software and to upgrade exist ing hardware is typically based on the belief that the return is not profitable for their investment. Indeed, more clients nowadays demand the BIM usage, conceiving the potential of the technology to bring more benefits in their infused projects. Thus, there should be significant opportunities for the construction players to be more competitive and to thereby survive in an increasingly challenging industry. The major limitat ion of this study is the lack of reliable information on BIM development in some of the studied countries; thus, more research needs to be conducted in the future.

Bandura cognitive-social theory emphasizes people's expectations of events and their beliefs about themselves. For example, people have expectations of the behavior of others and expect rewards and punishments for their behavior in different situations. They also develop beliefs about their ability to solve problems and challenges in specific situations. Obviously, these beliefs involve cognitive processes such as classifying situations (such as work, leisure, formal, relaxed). And scary), predict the future and react to it. When we can not distinguish between situations, we behave in the same way in all of them. Distinguishing between situations is essential to life because of the needs it satisfies. Obviously, a person's behavior varies depending on his perception of the situation. According to cognitive theory, the main essence of personality lies in different perceptions of situations and in the pattern of behavior, based on which perception is formed.

Summary of Bandura theory

He emphasizes that almost all behaviors can be learned without directly experiencing reinforcement. Bandura's approach is also called observational learning. We learn by vicarious reinforcement, by observing the behavior of others and the consequences of that behavior. This emphasis on observational learning is a prominent feature of Bandura theory.

Another feature of Bandura's observational learning approach is its approach to cognitive processes. We do not automatically imitate the behavior we see, but make calculated and conscious decisions to behave in the same way. To learn through pattern, we must be able to anticipate and understand the consequences of the behaviors we observe.

Modeling: The basis of observational learning

Bandura does not deny the importance of direct reinforcement as a way of influencing behavior, but he challenges the idea that behavior can only be learned or changed through direct reinforcement. He believes that conditioning the actor to learn skills such as swimming or driving is an inappropriate and potentially dangerous way. According to Bandura, most human behaviors are learned through pattern. We learn by observing others.

Exercise head position features

Three factors that influence role modeling:

1. Characteristics of patterns: We are more influenced by a person who looks like us than a person who is very different from us. We learn more from the behavior of someone of the same sex as us. The type of behavior that the pattern performs affects the amount of imitation. Hostile and aggressive behaviors are strongly imitated, especially by children.
2. Observer traits: People with low self-esteem are much more likely to imitate role model behavior than people with high self-esteem.
3. Consequences of Rewards Related to Behaviors: A high-ranking pattern may lead us to imitate a particular behavior, but if the rewards are not meaningful to us, we will not continue that behavior and are less likely to be influenced by that pattern in the future.

Observational learning processes

Attention processes: Develop our cognitive processes and perceptual skills so that we can pay full attention to the pattern and understand it carefully enough to imitate the revealed behavior.

Memorization processes: To do this, we use our cognitive processes to encode or form mental images and verbal descriptions of pattern behavior.

Production processes: Transmitting mental images or verbal symbolic representations of pattern behavior to their overt behavior by physically generating responses and receiving feedback from the accuracy of continuous practice.

Incentive and Motivational Processes: Recognizing that pattern behavior leads to reward and, therefore, expecting that our successful learning and practice of the same behavior will lead to similar consequences.

Behavior change

Bandura's goal was to change learned behaviors that society deemed undesirable or abnormal. It focuses on the external aspects of inappropriate or destructive behaviors, believing that they, like all other behaviors, are learned.

Ethical issues in behavior change

Bandurabelieves the allegations are misleading. Behavior change does not occur without the client's awareness.

Reflections on Bandura's theory

Social learning theory focuses on overt behavior. Critics believe that this emphasis ignores prominent aspects of human personality such as motivation and excitement. The social learning approach has several advantages. First, in this approach, it is objective and receptive to laboratory research methods that fit it with the current emphasis on experimental psychology. Second, observational learning and behavior change are in tune with the functional and pragmatic atmosphere of American psychology.

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