

# Cambodian Construction Industry's Issues in the ASEAN Economic Community

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**Abstract:** *Issues in the construction industry of Cambodia in ASEAN Economic Community (AEC) is the main priority to be identified before identifying causing factors in order to find out recommendations, to improve this sector, and to survive in this community. Two major issues were identified from the literature review and the investigation, namely i) Long-term vision and its policy, and ii) practice culture. The total sample collected from concerned government officers and engineers in Cambodia were 463. Factor analysis was then conducted to find out the issues, and as the results, there are five issues in two main groups: (i) the Organization's vision and its skill, which consist of a vision of the organization, knowledge and skill, and less investment in the construction sector; (ii) Knowledge and motivation towards the AEC, which consist of knowledge about the AEC, and level to promote organization for the AEC.*

**Keywords:** *Construction Industry Development, Strategy planning, Economic Development, Cambodia*

## I. GENERAL BACKGROUND

Issues for the construction industry of Cambodia is the main concern to be dealt with as construction industry accounts for almost 7% of the total GDP of Cambodia for each year [1, 2]. This means it plays a very important role in Cambodia's economic development.

ASEAN Economic Community (AEC) is an economic community which was planned for the integration by 10 member countries of South East Asia by 31<sup>st</sup> of December 2015 [3, 4]. ASEAN leaders had produced of ASEAN Economic Community Blueprint since 2008 [5]. In the AEC, Cambodia could take an opportunity to attract a lot of construction investments, both from ASEAN countries and from outside ASEAN. However, Cambodian construction industry still has many issues, and it needs to be improved for a better development. The construction industry of Cambodia is lagging behind most of the other countries in the region both technically, and economically. The GDP per capita of Cambodia is very low at \$1,008 in 2013, less than the neighboring countries like Lao which is \$1,646; Vietnam \$1,911; and Thailand's \$5,779 [6]. Even though the economic growth was faster this recent year with a 7.2% in 2013 [7], it still largely depends on foreign aid from China, Japan, India, Korea, Thailand, EU, USA, ADB, and The World Bank [8]. Many project donors were concentrating on producing a human resource and construction of infrastructure which is the key driving force of Cambodia for better development. Cambodia became a destination of

foreign direct investment (FDI) after the country's first general elections which were held in 1993.

The construction industry is a labor intensive sector with a low qualified labor force [9]. Increasing investment in the construction industry in Cambodia has to be implemented with a competitive strategy in the AEC. The current public administration activity in Cambodia is not efficiently, effective and not economically sound [10]. It takes approximately 710 days to get all the construction permits required to complete a project in Cambodia, as opposed to 200 days in Vietnam and about 150 days in Thailand. It takes 31 days to clear each procedure in Cambodia while in Vietnam and Thailand it is about 15 days, and 7 days in Lao People's Democratic Republic [2].

This research is to find out issues of the construction industry of Cambodia in the AEC. The main two groups of issues for the construction industry of Cambodia in the AEC have been identified from literature reviews and investigation, they are: (i) Long-term vision and its policy, and (ii) Practice culture. Therefore, to find out the significant issues of the construction industry of Cambodia is the point and the main objectives of this research. Without knowing these significant issues, it is difficult to find out the right causing factors and then provide recommendations in order to improve the construction industry of Cambodia to survive in the AEC.

## II. LITERATURE REVIEW

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#### A. ASEAN Economic Community (AEC)

Cambodia could take an opportunity to attract a lot of construction investors to invest in it as a member of AEC, both from ASEAN countries and outside ASEAN. However, Cambodian construction industry still has a lot of issues, and it needs to be improved for a better development. The world economic challenge could make many countries and regions to form an economic community in order to gain more benefit. The ASEAN Economic Community is integrated on 31st December 2015[3, 4, 11]. The ASEAN leaders produced a publication of ASEAN Economic Community Blueprint since 2008[5]. According to this blueprint, there are four key characteristics of the AEC: 1) A single market and production base 2) a highly competitive economic region 3) a region of equitable economic development 4) a region fully integrated into the global economy. In the AEC blueprint, there are five core elements of an ASEAN single market and production base[12]: 1) free flow of goods, 2) free flow of services, 3) free flow of investment, 4) free flow of capital, and 5) free flow of skilled labor [12]. Cambodia needs to deal with issues to prepare itself in the AEC as one of the developing countries in the ASEAN [2] and Cambodia has a very low GDP as compared to most of ASEAN members.

#### A. Construction Investment in Cambodia

Until 2013, there were 1,641 construction projects with the approximate total investment budget of \$2,773.13 million. It was increased by 31.45% as compared to 2012. There are 1,327 construction companies that had been registered and legally operated until the end of 2013, which 1,043 are small, 163 are medium, and 121 are large construction companies. Construction companies comprise of 964 local contractors and 310 foreign contractors, 42 local design/consultants and 11 foreign design/consultants [13]. Separately, in 2013, there are 149 newly local construction companies, and 59 foreign construction companies registered. In addition, there are two local construction consultants, and two foreign construction consultant companies legally registered [13, 14]. The Cambodian construction sector faces a number of challenges both in the short and long term, which could be addressed to ensure maximum efficiency and safety and to make the sector an enabler for other productive sectors of the Cambodian economy [2].

Calculating from the year of 2000 to 2013 [13], Korea is the biggest investor in construction projects in Cambodia with a total budget of \$1,858.09 million for 41 projects. The second rank is China with total budget of \$747.27 million for 72 projects. The third place is British with total budget of \$131.44 million for 7 projects. The fourth is Japan with a total budget of \$113.44 million for 15 projects. The fifth is Thailand with a total budget of \$86.67 million for 16 projects. The sixth is Russia with \$46.75 million for 1 project. The seventh is Lao with \$36.36 million for 1 project. The eighth is Malaysia with a total

budget of \$35.72 million for 10 projects [13]. The rest is Taiwan, Vietnam, India, USA, Australia, Singapore, Belgium, France, and the last one is Canada. The total of foreign investments in the construction project was \$3,131.51 million for a total of 182 projects. The foreign construction investors is depicted in table I [13].

TABLE I  
FOREIGN CONSTRUCTION INVESTORS (2000-2013)

Ranking	Country	Budget (Million USD)	Nos. of Project
1	Korea	1,858.09	41
2	China	747.27	72
3	British	131.44	7
4	Japan	113.44	15
5	Thailand	86.67	16
6	Russia	46.75	1
7	Lao	36.36	1
8	Malaysia	35.72	10
9	Others	75.77	19
<b>Total</b>		<b>3,131.51</b>	<b>182</b>

The majority of construction materials are imported, and the Cambodian construction companies depend to a large degree on regional and world prices for materials [13]. The following table II and figure 1 depict the number of projects and investment budget in the construction sector in Cambodia from 2000 to 2013 which is licensed by the Ministry of Land Management, Urban Planning and Construction (MLMUPC) [13].

TABLE II  
CONSTRUCTION PROJECT AND INVESTMENT BUDGET IN CAMBODIA

Year	Nos. of Project	Approx. budget (million USD)	Remarks
2000	22	70.27	
2001	46	179.83	Increased by 155.9% as compared to 2000
2002	55	203.94	Increased by 13.4% as compared to 2001
2003	67	407.32	Increased by 99.7% as compared to 2002
2004	80	523.14	Increased by 28.4% as compared to 2003
2005	85	608.7	Increased by 16.4% as compared to 2004
2006	127	726.15	Increased by 19.3% as compared to 2005
2007	167	3,000.8	Increased by 313.2% as compared to 2006
2008	181	2,966.7	Decreased by 1.14% as compared to 2007
2009	116	1,709.3	Decreased by 42.4% as compared to 2008
2010	126	557.21	Decreased by 67.4% as compared to 2009
2011	208	976.17	Increased by 75.2% as compared to 2010

2012	248	1,826.1	Increased by 87.1% as compared to 2011
2013	158	2,320.8	Increased by 27.1% as compared to 2012

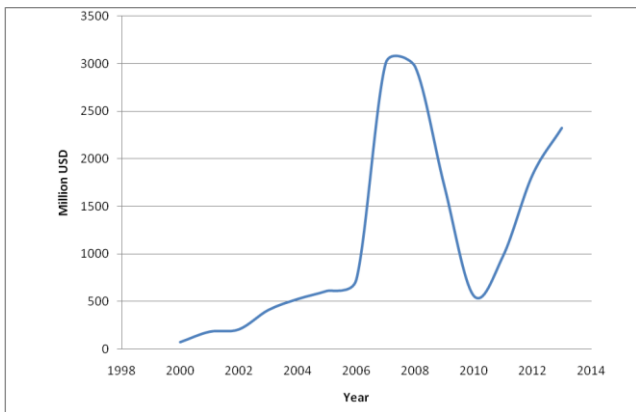


FIGURE 1 CONSTRUCTION INVESTMENT BUDGET LICENSED BY MLMUPC

According to figure 1 above, it's shown that the construction development in Cambodia is easily influenced. As of 2008, when the economic crises in many countries in the world, the development of construction industry of Cambodia dropped down dramatically as it was 3,000.8 million USD in 2007 to 557.21 million USD in 2010. In addition, its development is largely dependent on foreign aid.

*B. Long term vision and its policy*

A long-term vision and its policy are the keys for the construction industry to perform efficiently and grow in a sustainable manner. A strong and sustainable construction industry is essential [15, 16]. Government policies and strategies are significant when considering the amount of support to be given to private industries and the degree of intervention that is necessary [17]. A long-term vision for positioning the Cambodian construction industry is lacking at the outset according to many of the industry practitioners consulted. It is envisaged that such an industry specific vision shall be developed as the basis of government policy for the industry's forward planning and long-term development. Extensive consultation with professional bodies, industry practitioners, academia, and other relevant non-government organizations is essential in the process of developing the vision so as to rightly position the industry and enable a roadmap to be established[15]. It is, therefore, logical that government should consider forming a centralized planning body to strategically plan and coordinate at a macro level the overall output of the construction sector in future. The aim shall be to maintain an output level which enables the industry to develop its technical capacity, preserve the skill sets of practitioners, and most importantly retain trained workers [15]. At the implementation level, the government must serve as a regulator to sustain the construction output for a steady growth of a healthy industry.

To keep the government and companies better informed, the industry shall, therefore, capture, analyze, and release information related to the supply and demand of various facilities and resources required. This would not only help policy makers and investors in identifying suitable project opportunities, but it could also ensure suitable training is provided to those areas of expertise needs of the foreseeable future.

Sustainability is a global trend, where the construction industry has shifted to includes energy saving, waste management, sustainable construction methods, etc. Relevant government departments are advised to take proactive and flexible approaches in facilitating the proposed “revitalization uses”, which may be contradicting existing land lease conditions of town planning ordinances, or prevailing building regulations [18]. It is also essential to implement redevelopment, rehabilitation, preservation, and revitalization to cover historic buildings [19]. Sustainability should, therefore, be considered in the formulation of a long-term plan for the construction industry. The issues related to Long-term vision and its policy are: knowledge about the AEC [20], level to promote organization for the AEC [20], knowledge and skill [21], and a true vision of the organization. These issues were selected as they are interrelated with Long-term vision and its policy.

*C. Practice culture*

Practice culture is the intense competition in construction services, various industry stakeholders should continuously strive to sharpen their competitive edge, so as to stay ahead of their competitors locally and internationally [15]. As a major client and regulator of the construction industry, the government plays a pivotal role in influencing the extent of mechanization, design and technological innovation, and promoting the best practices in terms of time, cost, quality, as well as environmental performances [15]. Unfair in tendering [22, 23] is a local practice which seems not to be strong and well familiar among all stakeholders, and it needs to be improved as it is a negative impact to the investment in the construction sector [24-26] which is practically needed for an action from both government and private sectors to improve. While the unsustainable job is also an issue, it is not only for the key construction stakeholders and workforces themselves but for the overall sectors in Cambodia. Thus, this could lead to an unbalanced cost of living and income.

*D. Issues of Construction Industry of Cambodia in the AEC*

It is difficult to find out all the issues at the same time as management practices always have to face limited resources such as money, manpower, time, and management efforts. Therefore, identifying a list of factors considered as issues is valuable for helping us how to identify the causing factors and provide a recommendation that could facilitate stakeholders and policy makers to be more focused in order to develop for their competitiveness

[27]. Factors related to Long-term vision and its policy, and Practice culture were identified as listed in table III, and IV.

TABLE III  
ISSUES RELATED TO LONG TERM VISION AND ITS POLICY

<b>Long term vision and its policy</b>
Knowledge about the AEC [20]
Level to promote organization for the AEC [20]
Knowledge and skill [21, 28-30]
Vision of organization [30-33]

TABLE IV  
ISSUES RELATED TO PRACTICE CULTURE

<b>Practice culture</b>
Unfairness in tendering [22, 23, 34, 35]
Less investment in construction [24-26, 36]
Unsustainable job [2, 37-39]
Cost of living unbalances of income [2, 40]

### III. RESEARCH METHODOLOGY AND SURVEY

#### A. Methodology

Data were analyzed by using SPSS version 20 for a window to view the facts. Factor analysis was used to identify the underlying structure of factors (issues) in terms of its relational structure[41, 42]. It reduced the number of factors to a smaller number of factors as the groups of issues for the construction industry of Cambodia in the AEC. It can help in the further analysis by reducing the number of factors and simplifying a model group of issues.

The literature was firstly conducted in order to find out factors (issues) by making an investigation. The factors were then grouped and ranked from most to least important. The work breakdown structure (WBS) was done after that and the factors were validated by content validation. The coordination schema (parameters, complex variables, simple variables) was done. The instrument was designed by taking a simple variable from the coordination schema, and then put for a pilot test to verify reliability and validity. The questionnaires were then sent to all construction stakeholders for answering with a purposive sampling. Data analysis was done in two parts, which the first part was a descriptive analysis of the demographic samples, and the second part was the factor analysis [41, 42]. The results were interpreted accordingly, and finally, a conclusion was made. The methodology of research is depicted in figure 2.

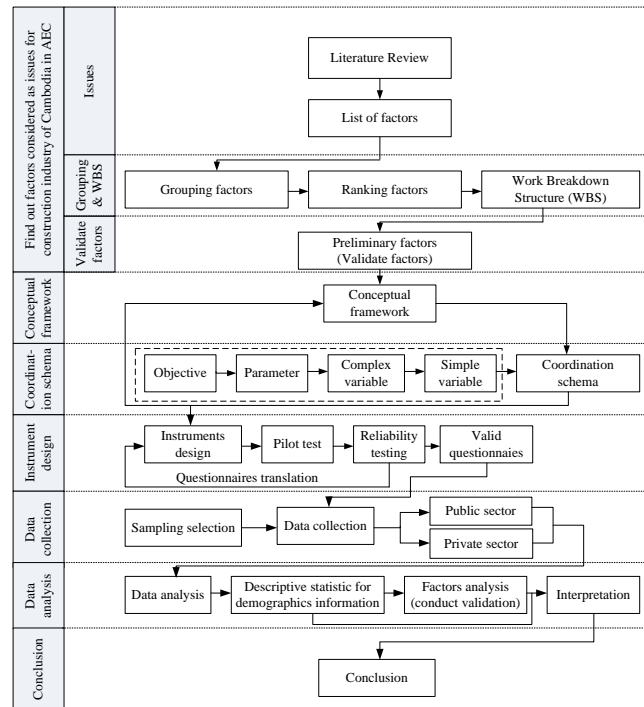


FIGURE 2 RESEARCH METHODOLOGY

#### B. Survey

The research study emphasizes the influences of the AEC on the construction industry of Cambodia. The finding was particularly considered on the issues of the construction industry of Cambodia in the AEC. The selection of the qualified sample selected from respondents both, in public and private sectors, whose work was dealing with the construction sector. The total of 463 sets of questionnaires was used for the factor analysis. The total duration of the data collection was three months from the middle of December 2012 to the middle of March 2013.

The close-ended questions were designed to measure the issues for the construction industry of Cambodia in the AEC. The questionnaires were comprised of two parts:

**Part I:** This part includes questions related to the demographic data of the respondents.

**Part II:** This part includes issues of the Cambodian construction industries in the AEC.

To enhance the quality of the instrument, all items on questionnaires were carefully worded by using the following guidelines [130, 131]:

1. Keep the language usage to the level that respondent is familiar with.
2. Avoid ambiguous wording.
3. Avoid bias or leading questions.
4. Avoid double-barrel question (limit to a simple idea or a single reference)
5. Protect the respondent's ego.

Five scales ranging from 0% to 100% were used to measure each issue. In addition, to avoid skipping some answers which the responder has had no idea at all, one more scale was added: “No idea”.

- 81-100%: defined as the factors that are extremely strong.
- 61-80%: defined as the factors that are quite a bit strong.
- 41-60%: defined as the factors that are moderately strong.
- 21-40%: defined as the factors that are a little bit weak.
- 0-20%: defined as the factors that are very weak.

1) *The Public Sector:* The number of 237 samples were collected from the most five concerned ministries that have work related to the construction sector. The selection of departments and offices, to conduct a survey, were appointed by each ministry to the most concerned departments under their supervision and works related to the construction sector. Each ministry had one or more concerned departments responsible within the construction industry and ASEAN. At the Ministry of Land Management, Urban Planning and Construction (MLMUPC), there were three departments under the general department of construction that are responsible for construction work within the country and acting as the representative of government for the construction sector. These departments include: the Department of Construction, the Department of Construction Technical Research, and the Department of Design. At the Ministry of Public Works and Transport (MPWT), there were the Public Work and Research Center, the Department of Heavy Equipment, and the Department of Personnel. At the Ministry of Planning (MOP), there were the National Institute of Statistics (NIS) and the General Directorate of Planning (GDP). At the Ministry of Economy and Finance (MEF), there were the Department of Economic and Public Finance Policy, and the Department of Administration and Finance. At the Ministry of Commerce (MOC), there were the Export Promotion Department, the Intellectual Property Department, and the Department of Multilateral Trade (include ASEAN and the Economic Integration Office, the Sub-Regional Cooperation Office, the Technical Inspection Office, the Research and Trade Analysis Office, and the Rule of Origin and Certificate Issuance Office).

2) *Private Sector:* The remaining of 226 samples were collected from 33 construction companies, which came mainly from construction key personnel ranging from the project manager to the site engineer. The types of construction companies were: a developer, a design and consultant, a contractor, a sub-contractor, and a supplier.

### C. Operational definition

Table V below depicts the Operation definition of each Variable.

TABLE V  
OPERATION DEFINITION

Variable	Operational definition
Knowledge about the AEC	Degree of knowledge that all construction stakeholders know and understand about the AEC and its policies
Level to promote organization for the AEC	Degree of intention for the development of individual construction company or organization towards the AEC
Knowledge and skill	Degree of technical knowledge and skill in the construction sector
Vision of organization	Degree of thinking and planning for development of the construction company or organization
Unfairness in tendering	Degree of unfair competition in order to be awarded for the project
Less investment in Construction	Degree of investment rate in the construction sector
Unsustainable job	Degree of unemployment rate or unsustainable employment in the construction sector
Cost of living unbalances of income	Degree of unbalance between the income and expenditure, less income but more expenditure for the construction workers, engineers as well as all stakeholders

## IV. ANALYSIS AND DISCUSSION

### A. Demographics of a Sample

The questionnaires were sent to all respondents, both public and private construction sectors.

The questionnaires were sent to request officers in the government sector from concerned departments of each ministry for the responding. 480 sets of questionnaire were sent out to the public sector, and then 237(49.4%) sets of useful questionnaires were returned.

On the other hand, questionnaires were also sent to the private construction sectors requesting owner, project managers, engineers, architects, and specialists, who work for the private construction firm, to personally respond to the questionnaire. 1,295 questionnaires were sent out to construction private companies by direct delivery and also sending by email and other communication media. There were 226 (17.45%) useful questionnaires returned from the private sector.

Questionnaires returned from both the public and private sectors were combined for the factor analysis. The total questionnaires of 463 were analyzed. The demographics of respondents of the public and private sectors were separately analyzed.

1) *Public Sector:* 59 (24.9%) samples of the total in public sector were returned by the MLMUPC, followed by MOP with 57 (24.1%) samples, while MOC responded with 21.9 (21.9%) samples, which is slightly higher than MPWT with 43 (18.1%) samples, and the final, as the minimum number, was returned by MEF with 26 (11.0%) samples. The responders’ ages were divided into four groups. The highest group of responders was between the ages of 21 and 30-years-old with 110 (46.4%) samples, followed by the group between the ages of 31 to 40-years-old with 83 (35.0%) samples, and then dropped to 44 (18.6%) samples between the ages of 41-year-old or more.

There was no any respondent in the age 20-year-old or younger from this public sector. So far, for education level, the highest number of samples was bachelor's degree holders with 168 (70.9%). Master's degree holder was ranked as second in a large amount of sample number that was 50 (21.1%) samples. The minimum number of samples were high school and higher diploma holder's with 12 (5.1%) and 7 (3.0%) respectively. There was no any responder holding a Ph.D level. Those responders were of the majority made up of male responders with 190 (80.2%) as compared to female responders of just only 47 (19.8%). The samples as depicted are in table VI below.

TABLE VI  
PUBLIC RESPONDENT DEMOGRAPHICS (N=237)

Public sector		
Description	Frequency (Respondent Nos.)	Percent (%)
<b>Organization</b>		
MLMUPC	59	24.9
MPWT	43	18.1
MOP	57	24.1
MEF	26	11.0
MOC	52	21.9
<b>Age (years)</b>		
20 or lesser	0	0.0
21 to 30	110	46.4
31 to 40	83	35.0
41 or more	44	18.6
<b>Education level</b>		
PhD	0	0.0
Master	50	21.1
Bachelor	168	70.9
Higher diploma	7	3.0
High school	12	5.1
<b>Gender</b>		
Male	190	80.2
Female	47	19.8

2) *Private Sector*: 226 questionnaires were returned from the private sector. Among those, the highest numbers of questionnaires were received from contractors 108 (47.8%), followed by the developers with 61 (27.0%) sets of questionnaires, then the numbers were dropped to 30 (13.3%) from design/ consultant. 9 (4%), and 6 (2.7%) were responded by sub-contractor and supplier respectively. The rest of 12 (5.3%) sets of questionnaire were returned from others, which were free-lance engineer/architect.

Most of responders were site engineers with 132 (58.4%), then senior engineers with a number of 33 (14.6%), which is slightly higher than the number of project engineers with 29 (12.8%), and project managers with 21 (9.3%). The numbers of project owners were 4 (1.8%); it is equal to the number of architects. The remaining of 3 (1.3%) were from others.

The responders from private construction companies were divided into four groups. The highest groups of responders were the ages between 21 and 30-years-old with 164 (72.6%) numbers, followed by the

group of responders with ages of 31 to 40-years-old with 39 (17.3%) samples, and then dropped to 17 (7.5%) samples for the ages of 41-years-old or more. There were 6 (2.7%) responders in the age of 20-years-old or less. For the education level, the highest number of samples was the bachelor's degree holder with 183 (81.0%). The Master's degree holder was ranked as second highest with a sample number of 35 (15.5%), followed by a higher diploma and Ph.D holders with 4 (1.8%) and 3 (1.3%), respectively. The last and a minimum number of samples was high school certificate holder with 1 (0.4%). Among those, the males, were the majority responders with 207 (91.6%) as compared to female responders of just only 19 (8.4%) samples as depicted in table VII.

TABLE VII  
PRIVATE CONSTRUCTION RESPONDENT DEMOGRAPHICS (N=226)

Private sector		
Description	Frequency (Respondent Nos.)	Percent (%)
<b>Type of firm</b>		
Developer	61	27.0
Design/Consultant	30	13.3
Contractor	108	47.8
Sub-contractor	9	4.0
Supplier	6	2.7
Other	12	5.3
<b>Position</b>		
Project owner	4	1.8
Project manager	21	9.3
Project engineer	29	12.8
Senior engineer	33	14.6
Architect	4	1.8
Site engineer	132	58.4
Other	3	1.3
<b>Age (years)</b>		
20 or lesser	6	2.7
21 to 30	164	72.6
31 to 40	39	17.3
41 or more	17	7.5
<b>Education level</b>		
PhD	3	1.3
Master	35	15.5
Bachelor	183	81.0
Higher diploma	4	1.8
High school	1	0.4
<b>Gender</b>		
Male	207	91.6
Female	19	8.4

## B. Factor Analysis

The main purpose of factor analysis is to reduce a large number of factors to a more limited number of factors [42, 43]. This factor analysis has been used for theory and instrument development and assessing the construct validity of an established instrument when used on a specific population. Factor analysis may also be used to identify external variables that appear to relate to the various dimensions of the constructs of interest [44]. Cronbach's alphas for the group of items that were loaded

on a given factor were calculated. These alphas were used to evaluate the factor's internal consistency and help to determine where the items best fit when they load onto multiple factors. Cronbach's alpha is a measure of internal consistency that is how closely related a set of items are as a group. It is considered to be a measure of scale reliability [44, 45].

1) *Evaluation of the Correlation Matrix:* There is a suggestion that the researcher examines the correlation matrix closely for item consistency and identifies items that are either too highly correlated ( $\geq 0.80$ ) or not correlated sufficiently ( $\leq 0.30$ ) with one another [43]. In this study, the correlation between each pair of variables was performed. Two items which have a correlation less than 0.30 were removed at this stage.

2) *Extraction:* To identify issues, the extraction of issues that pass through exploratory factor analysis is applied. During the analysis, it is important to determine if there are sufficient numbers of significant correlations among the items to justify the undertaking of a factor analysis. Bartlett's test of sphericity and the Kaiser-Meyer-Olkin test were used in this analysis. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy tests whether

or not the partial correlations among variables is 0.700, which is equal or greater than 0.70 is acceptable. Bartlett's test of sphericity, tests whether the correlation matrix is an identity matrix which would indicate that the significant level of 0.000, which is less than 0.05 is acceptable [43]. The result of Bartlett's test of sphericity and the Kaiser-Meyer-Olkin test is depicted in table VIII.

TABLE VIII  
KMO AND BARTLETT'S TEST

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.700
Bartlett's Test of Sphericity	Approx. Chi-Square	300.936
	df	10
	Sig.	.000

The approach in determining the numbers of initial factors is to select only those factors for which the eigenvalues are greater than 1.00 [43]. An eigenvalue indicates how much of the total variance of all variables is covered by the factors. It means that these factors would account for more than their share of the total variance in the items. The eigenvalues of factors are listed in table IX.

TABLE IX  
VARIANCE EXPLAINED (N=463)

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.209	44.183	44.183	2.209	44.183	44.183	1.669	33.375	33.375
2	1.018	20.357	64.540	1.018	20.357	64.540	1.558	31.165	64.540
3	.707	14.134	78.674						
4	.577	11.533	90.207						
5	.490	9.793	100.000						

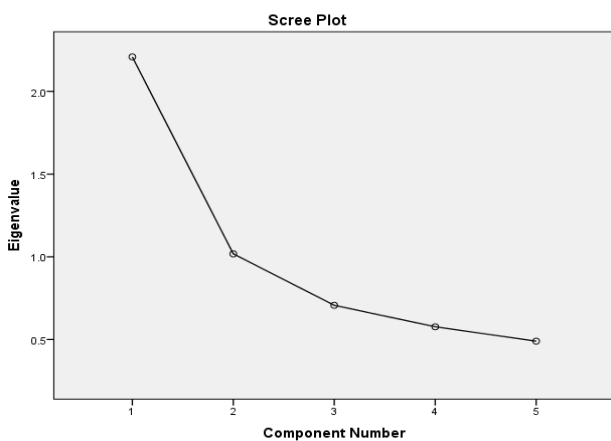


FIGURE 3 SCREE PLOT

3) *Mean and Ranking:* The overall mean score and ranking of issues of the construction industry of Cambodia in the AEC are shown in table X. The highest mean score of groups is: "the Organization's vision and its skill". In addition, the three items with the highest mean scores are "the vision of organization" (3.225), "knowledge and skill"

(3.138), and "less investment in the construction sector" (3.133). The vision of the organization is considered fundamentally for the issue of construction industry of Cambodia in the AEC. The driving force to accomplish this for the construction industry of Cambodia and in the AEC. When there is a clear vision of the organization, it would lead to the improvement of knowledge and skill in the construction work, which could improve investment in the construction sector which is the main goal for the construction industry in the AEC. The activities should be dealt with responsibility for a clear vision of organization for the improvement of the construction industry, which could lead to a better view of the construction sector.

The two items with the lowest mean scores include "knowledge about the AEC" (2.913) and "the level to promote the organization for the AEC" (2.898), respectively. The construction stakeholders still have very limited knowledge on the AEC, which leads them to not be really motivated to improve their organization for the AEC. Therefore, the Organization's vision and its skill, and knowledge about the AEC are the main issues of the construction industry of Cambodia in the AEC.

C. *Interpreting and Naming the Factors*

Cronbach's alpha was computed again to examine the reliability of the instrument. A higher cutoff of 0.70 was used given that the instrument was newly developed. The results are shown that the constructs had the reliability coefficient higher than the 0.70, which is acceptable. All items of factors relating to item-to-total correlation more than 0.40, except one was dropped.

Factor analysis with Varimax was performed to identify issues and checked uni-dimensionality among the items. Items with a factor loading of value less than 0.50 were deleted [46].

TABLE X  
VARIMAX ROTATED COMPONENT MATRIX OF ISSUES FOR CONSTRUCTION INDUSTRY OF CAMBODIA IN THE AEC

Factors	Mean	Rank	N
<b>Organization's vision and its skill</b> (3 items)	<b>3.165*</b>	1**	
(OVS1) Vision of organization	3.225	1	391
(OVS2) Knowledge and skill	3.138	2	391
(OVS5) Less invest in construction sector	3.133	3	391
<b>Knowledge and motivation towards the AEC</b> (2 items)	<b>2.906*</b>	2**	
(KMA1) Knowledge about the AEC	2.913	4	393
(KMA2) Level to promote organization for the AEC	2.898	5	393

\*Average mean within group

\*\*Group rank

#### D. Issues of Construction industry of Cambodia in the AEC

Table IX above presents the rotation of two dimensions of issues of the construction industry of Cambodia in the AEC: (1) Organization's vision and its skill, and (2) Knowledge and motivation towards the AEC. The first factor, Organization's vision and its skill emphasized the "vision of the organization, and knowledge and skill" items as it is considered as crucial to a clear vision for the development of the construction industry. The second factor is: knowledge and motivation towards the AEC, and is characterized by a higher weighting on the "knowledge aspect about the AEC", and "the level to promote organization for the AEC" items. Since, the AEC is the main concern, so knowledge about the AEC and the level to promote the organization for the AEC are issues. The above-listed factors will be elaborated on in a detailed variance explained in order to comprehend the concept.

Table XI presents the variance explaining with a total of two groups at about 64.540% of the total variance. The maximum percent of variance explained (33.375%) comes from "the Organization's vision and its skill" The last group with 31.165% of variance explained comes from "knowledge and motivation towards the AEC". So, the cumulative score of 64.540% of these two groups is very good and reliable as the issues of the construction industry of Cambodia in the AEC.

TABLE XI  
VARIANCE EXPLAINED OF THE ISSUES FOR CONSTRUCTION INDUSTRY OF CAMBODIA IN THE AEC

Items	Factor loading	Percent of variance explained	Cumulative percent of variance
<b>Group 1: Organization's vision and its skill</b> (3 items)			
Less invest in construction sector	0.789		
Knowledge and skill	0.732		
Vision of organization	0.685	33.375	33.375
<b>Group 2: Knowledge and motivation towards AEC</b> (2 items)			
Level to promote organization for AEC	0.840		
Knowledge about the AEC	0.835	31.165	64.540

##### 1) Organization's vision and its skill

The first main group of the issue is organization's vision and its skill; consist of less investment in the construction sector item, with the highest loading factor of 0.789. More investment would lead local construction sector to have more insight and could improve their knowledge and their skill for the competitiveness with other companies. A strong Organization's vision and its skill would lead it to have more investment in the construction industry, and the knowledge sharing relationship of foreign investment in construction is quite important. The effective performance of this approach means that it could be successful in solving other pattern classification issues in the construction industry. More financial features resulted from construction investment and may improve knowledge sharing and benefit users, but it would cost a massive amount of time and effort [47]. A public investment project also plays an important role in the national economy [48], which indirectly improves the vision and skill of future construction stakeholders by implementing an effective skill transferring system. Still, there is less investment in the construction industry in Cambodia, where local construction stakeholders couldn't learn more from the real case of the high qualified practice of construction investment and that makes them have less vision and low skill to improve their organization and construction business for the AEC.

##### 2) Knowledge and Motivation towards the AEC

The second main group of issues is knowledge and motivation towards the AEC. This includes the level to promote the organization for an AEC item, with the highest loading factor of 0.840. The intention to promote the individual construction organization/ company for the competitiveness for the AEC level will result in, at least, to get them to be able to survive, in the AEC. When the construction stakeholders are not really willing to improve their organization/ company for the AEC, it will result as a



serious issue for the construction industry of Cambodia in the AEC. As a result, motivation parameters such as training assignment, perceived importance of training, and motivating environments had strong effects on the relationship between the training practices that were applied to the companies and provided an improvement in teamwork activities in the projects [49]. In other words, the companies that applied these motivators, in their strategies, provided motivation for employees to pursue the training and develop practices and therefore, they achieved improvements in their teamwork activities [49], with motivational impact, and enhanced the performance of projects [50]. Thus, less willingness to promote the organization/company of the construction stakeholder for the AEC is the issue for the construction industry of Cambodia in the AEC.

#### E. Practical challenges

The previous research and the updated literature related to the construction industry of Cambodia and the AEC is very limited, so the identified issues for the construction industry of Cambodia in the AEC is still limited in number and there would be some more issues to be identified and covered. Anyhow, the issues have been identified and the outcome can be a part for construction stakeholders to be able to understand the issues of the construction industry of Cambodia in the AEC. In order to improve their competitiveness and it can be a part for policy makers to consider, for improving of construction industry of Cambodia to survive in the AEC.

Therefore, the research outcome is not representing all issues of construction industry of Cambodia as there might be some more issues.

#### V. CONCLUSION

The issues described are based on the practical concept in the construction industry of Cambodia in the AEC. These key issues are important and have an impact in the construction industry of Cambodia. The finding conveys 5 authentic key issues for the construction industry of Cambodia in the AEC, which categorized into two groups and put in the order of importance: (1) Organization's vision and its skill, and (2) Knowledge and motivation towards the AEC. Due to the analyzing of practical data from the construction industry representative both public and private sector, these issues are proved to be reliable for the construction industry of Cambodia in the AEC.

These issues provide decision-making support by an understanding. The concerns of departments of the government ministries and the private construction stakeholders may consider these issues for the development of construction industry of Cambodia to survive in the AEC.

#### VI. CONTRIBUTION AND FURTHER WORK

This research can be in part to help construction stakeholders to understand the issues of the construction industry of Cambodia in the AEC, and it can be a part for policymaker to consider for the development of the construction industry of Cambodia in the AEC. On the other hand, there is a lack of previous research done about the AEC, so this would be a basis for Cambodian researchers as well as any other researcher in South East Asia to do further research on this related topic.

Influence factors and recommendation to improve the construction industry of Cambodia in the AEC would be the next step to be conducted.

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