

## **VIETNAM REPORT**

# **THE CONTRIBUTION OF LABOUR, CAPITAL, TECHNOLOGICAL PROGRESS IN THE CONSTRUCTION SECTOR GROWTH OF VIETNAM**

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## **1. Executive Summary**

The political economic Doi Moi has initiated since 1986 to put Vietnam from one of the poorest countries in the world with per capita income below \$ 100, to low middle income country in just 25 years with per capita income of up to 1,960 dollars by the end of 2013. The poor ratio fell sharply from 58% in 1993 to 9.67% in 2012, and the social security index are also significantly improved.

Vietnam is a member country of the United Nations, the World Trade Organization, International Monetary Fund, the World Bank Group, the Asian Development Bank, Economic Cooperation forum Asia - Pacific region, ASEAN. Vietnam to join the multilateral free trade agreement with ASEAN, Korea, Japan, China. Vietnam and Japan signed an agreement for bilateral economic cooperation.

Nevertheless, in recent years, there is evidence that growth has been slowing down particularly with the global crisis and Vietnam's closer integration into the world economy with its entry into the WTO. In its analysis of this slow down, the McKinsey Global Institute (MGI) report "Sustaining Vietnam's Growth: The Productivity Challenge" points to the need to increase productivity within the manufacturing and service sectors and for deep structural reforms and commitment from both the government and the private sector to sustain the country's transformation process into the 21<sup>st</sup> century.

In the context of the domestic economy is still in a difficult period, the construction industry has now focused on the implementation restructure, initiative in overcoming difficulties, and the gradual stabilization of production and business development, job creation and improving income for workers.

## **2. Macroeconomic review & outlook**

### **2.1 Overview of the National Economy**

1986-2000 period called transitional economy of Vietnam, from planned economy to a centrally operated according to market mechanism. In which, the period of 1991-1997 was considered successful development stage of Vietnam. The growth rate achieved over 9% in 1995 (9.54%) and 1996 (9.34%). But economic growth slowed after 1997 (in 1998 increased 5.76% and

increased only 4.77% in 1999). Then the growth rate continued to rise rapidly from 2000 to 2007 (the highest growth rate in 2007 8,48%). 2008 was an unhappy year with GDP growth rate was only 6.23%, (the lowest level since 1999) the growth rate dropped to 5.32% of GDP in 2009, 6.78% in 2010 and 5.89% in 2011 and 5.25% in 2012.

This is the 6<sup>th</sup> largest economy in Southeast Asia in the 10 countries of Southeast Asia; 56<sup>th</sup> largest in the world in terms of total size of nominal domestic product in 2013, and 128<sup>th</sup> in terms of gross domestic product per capita in nominal. GDP in 2013 was 171.392 billion USD.

In 2013<sup>1</sup>:

- GDP growth rate: 5.42 % (*GDP per capital reached USD 1,960*)
- Export value US\$132.2 billion, 15.4% increased;
- Import value US\$131.3billion, 15.4% increased ;
- Consumer Price Index (CPI) 6.6%;

Economic restructuring in 3 sectors: public investment, state owned enterprises and banking system.

The structure of economy has slowly shifted towards industrialization and modernization. The proportion of agriculture, forestry and fishery in GDP has declined from 19.3 percent in 2005 to 18.89 percent in 2010 and 18.38 percent in 2013, share of industry and construction in GDP has risen from 38.13 percent in 2005 to 38.23 percent in 2010 and increased 38.31 percent in 2013, and services have increased from 42.57 percent of 2005 to 42.88 percent in 2010 and 43.31 percent in 2013<sup>2</sup>.

<b>ECONOMIC INDICATOR</b>					
	2009	2010	2011	2012	2013
<b>GDP &amp; Components</b>					
GDP at Real Price (Please indicate the Base Year)	1658,4	2157,8	2292,5	2412,8	2543,6
GDP at Current Market Price	1809,1	2157,8	2779,9	3245,4	3584,3
GDP Growth (%)	5,32	6,78	5,89	5,03	5,42
GDP Growth (%) for agriculture, forestry & fishery sector	1,82	2,78	4,00	4,01	2,67
GDP Growth (%) for Manufacturing Sector	7,6	8,38	8,3	8,4	8,6
GDP Growth (%) for Services Sector	6,29	8,69	7,42	6,99	6,56
GDP Growth (%) for Mining Sector	7,62	-3,69	0,14	0,5	0,7
GDP Growth (%) for Construction Sector	11,36	10,06	-0,97	2,4	2,6
<b>Demographic Indicators</b>					
Population Number	86.025.000	86.932.500	87.840.000	88.772.900	89.710.000

<sup>1</sup> Ministry of Planning and Investment 2014

<sup>2</sup> General Statistics Office (from 2009 to 2013), Statistical Yearbook of Vietnam, Statistical Publishing House.

Population Growth Rate (%)	1,06	1,05	1,04	1,06	1,05
Labor Force(number)	49.322.000	50.392.900	51.398.400	52.580.000	53.650.000
Labor Force Growth rate (%)	2,5	2,68	1,97	2,3	2,45
Unemployment Rate	2,9	2,88	2,27	1,99	2,2
Inflation Rate	6,5	11,7	18,1	6,8	6,0
<b>Financial Indicator</b>					
Interbank interest rate	11,2	14,5	13,5	10,6	8,23
Short term loan interest rate (please indicate the duration)	8	13	12	9	9,5
Long term loan interest rate (please indicate the duration)	12	17,5	18	14	11
Average Change against USD\$	18,5	18,9	20,8	20,83	21,04

Sources: Vietnamese statistical yearbooks, state bank of Vietnam

## 2.2 Economic Outlook

### Medium-Term Economic Outlook for Viet Nam

Official statements indicate that the government will act to support economic growth in the next 2 years, though its priority is to maintain macroeconomic stability. Forecasts assume policy stimulation will be moderate and that the government will make further gradual progress on structural reform to the financial sector and state-owned enterprises.

According to ADB, GDP growth is forecast to rise slightly to 5.6% in 2014, picking up further to 5.8% in 2015 with economic recovery in the United States and the Euro Area and as progress is made in addressing domestic banking sector weaknesses.

According to the World Bank, Vietnam's economy will grow 5.5% in 2014, the World Bank predicts growth at 5.6% and 5.8% in 2015 and 2016 respectively. With this prediction, Vietnam will have the highest growth rate of 9 in 14 countries in East Asia - Pacific. In short, economic growth remains modest due to weak domestic demand.

### Medium- to Long-Term Economic Prospects

Context of the world economy in 2020 is quite favorably assessed worldwide in most of the region and the larger economy. Economic growth may be improving year by year, is expected to reach 4.1% average for the period 2016-2020, compared with 3.7% respectively from 2014 to 2015 forecast period.

Foreign investment flows expected to be improved as investors regain confidence in the medium term. Although the world economy still risks, outlook is better in the medium-term, the world economy has gradually get rid of the negative impact of the global financial crisis of 2008 and is likely to become the steady rise in the future. This factor will be a positive impact on the economy of Vietnam, especially in the field of trade and investment.

Viet Nam’s medium- to long-term economic prospects are bright if Vietnam further enhances the effective implementation of policies to accelerate the process of restructuring, innovation model of economic growth and make good use of the opportunities of regional and international integration from now to 2020.

**Table 2: Prediction of CPI and GDP growth in 2020**

<b>Year</b>	<b>CPI growth (%)</b>	<b>GDP growth (%)</b>
2011	18.58	6.24
2012	9.21	5.25
2013	6.04	5.42
2014	6.24	5.60
2015	6.36	5.82
<b>2011 - 2015</b>	<b>9.29</b>	<b>5.67</b>
2016	6.67	6.20
2017	6.83	6.35
2018	7.12	6.75
2019	7.10	7.02
2020	7.07	6.80
<b>2016 -2020</b>	<b>6.96</b>	<b>6.62</b>

*Source: National Center for Socio - Economic Information and Forecast, Operations Center*

### **3. Overview of Construction Industry**

Vietnam construction industry is one of the key economic sectors, attracting investment. However, the construction industry are still facing some difficulties and challenges. The share of construction sector in GDP of Vietnam is approximated to 5 percent to over 6 percent of GDP.

The number of construction enterprises is 48790 in 2012. The workforce construction sector were 3,258,300 persons respectively in 2013. The sectoral GDP growth rate from 2009 to 2013 was 4.67 percent (at 1994 price). In 2013 sectoral GDP of construction sector growth rate was 5.87 percent higher than GDP growth rate (only 5.42 percent) (at 2010 price). The domestic economy is still in a difficult period; real estate market remains sluggish; production and business of enterprises is in a difficult situation; handle inventory and bad debt, maintain the life, employment for workers continues to be a major challenge for construction enterprises<sup>3</sup> ...

### 3.1 Construction investment

Investment in construction sector of duration of 2009 – 2013 displayed in table 3 as follows

**Table 3: Construction investment**

*Billion dong*

Year	2009	2010	2011	2012	2013 (est.)
Total investment at constant 2010 prices	29296	37362	36502	37629	37820
Index (previous year = 100)%	104.14	127.53	97.70	103.09	100.51
Total investment at current prices	26227	37362	43914	47273	47790
State investment at constant 2010 prices	14857	16257	15166	18838	23681
Index (previous year = 100)%	114.85	109.42	93.29	124.21	125.71
State investment at current prices	13301	16257	18273	23659	29998
Non-state investment at constant 2010 prices	14439	21105	21336	18791	14139
Index (previous year = 100)%	114.85	146.17	101.10	88.07	75.24
Non-state investment at current prices	12926	21105	25641	23614	17792

*Source: Statistical yearbook of Vietnam - General Statistical Office*

<sup>3</sup> Ministry of Construction of Vietnam, Annual report 2013

Total investment in construction sector from 2009 to 2013 almost increased every year (at constant 2010 prices). Although total investment in 2011 decreased 2.3 percent. Duration of 5 years, only 2010 get highest figure of investment growth rate of 27.53 percent, other years increased level of investment is very modest.

The state investment increased every year except 2011. In 2012 and 2013 investment increased sharply 24.21 percent and 25.71 percent respectively because Vietnam has still invested infrastructure.

In 2009 and 2010 non-state investment increased 14.85 percent and 46.17 percent respectively. But they were down -11.93 percent and - 24.76 percent in 2012 and 2013.

Foreign Direct Investment (FDI) in Vietnam has had progress. According to Ministry of Plan and Investment of Vietnam, Vietnam had total 16,910 FDI projects from 1988-8/2014 with total registered capital of 243.038 billion USD. In which implemented capital per year was 10.5-11.0 billion USD. In 2013, the registered capital accounted 22.35 billion USD and the implemented capital: 11.5 billion USD. First 8 months of 2014, there were 992 new projects and 349 expanded projects with \$ 10.23 billion USD.

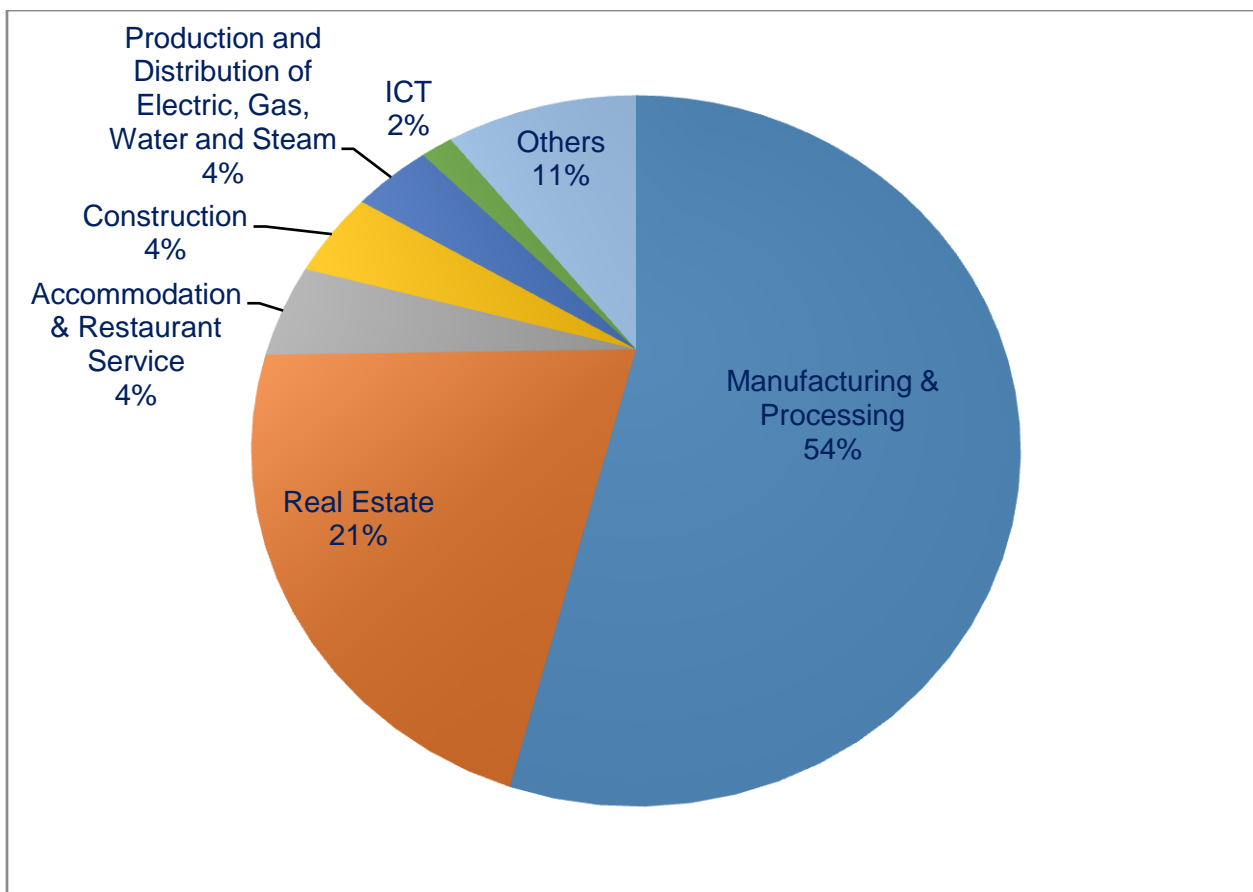
The table 3 let us to know more about the proportion of FDI in the construction and real estate:

**Table 3: FDI in Vietnam from 1988-8/2014**

<b>No SI</b>	<b>Sector</b>	<b>Project</b>	<b>RegisteredCapital (bil USD)</b>
1	Manufacturing	9207	131,645.68
2	Real estate	430	50,075.35
3	Accommodation and Restaurant service	353	11,024.64
4	Construction	1119	10,843.48
5	Electricity, gas, steam and air-conditioner supply	96	9,748.60
6	Telecommunication and information	1024	4,072.34
7	Wholesale, Retail trade and repair	1245	3,741.92
8	Transportation and storage	417	3,659.18

9	Agriculture, Forestry and fishing	146	3,631.78
10	Mining and quarrying	512	3,430.25
11	Others	2361	11,164
<b>Total</b>		<b>16,910</b>	<b>243.038</b>

Source: Ministry of Plan an Investment 2014



The table 3 and chart 3 show that share of FDI in real estate sector is raking second with 21 percent and FDI in construction sector is 4 percent. Since Vietnam doimoi, investment in real estate has brought big profit that is why foreign investor invest large amount money in this field.

Table 4 shows top 10 countries and territory invested in Vietnam from 1988 to 8/2014. They are Japan, Korea, Singapore, Taiwan, BritishVirginIslands, Hongkong, USA, Malaysia, China and

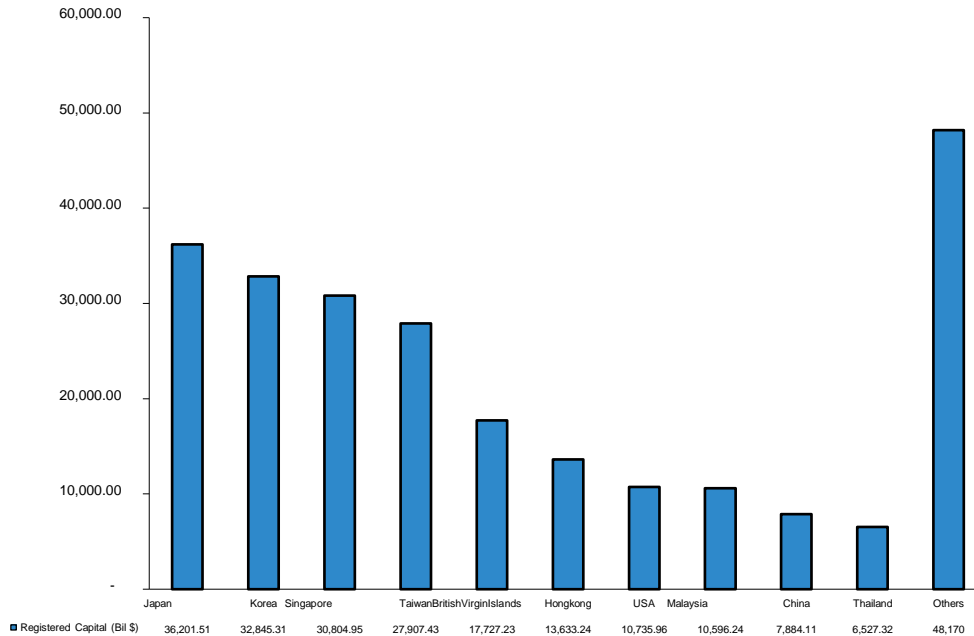


Thailand. Japan is ranking first and Korea ranking is second to invest in Vietnam and following Singapore, Taiwan etc.

**Table 4: top 10 FDI counterparts in Vietnam from 1988-8/2014**

No	Countries	Project	Registered Capital (bil \$)
1	Japan	2,381	36,201.51
2	Korea	3,930	32,845.31
3	Singapore	1,300	30,804.95
4	Taiwan	2,325	27,907.43
5	British Virgin Islands	541	17,727.23
6	Hong Kong	838	13,633.24
7	USA	703	10,735.96
8	Malaysia	470	10,596.24
9	China	1,056	7,884.11
10	Thailand	361	6,527.32
	Others	3,005	48,17
	<b>Total (101 countries)</b>	<b>16,910</b>	<b>243,038</b>

*Source: Ministry of Plan and Investment 2014*



### 3.2 Construction companies

**Table 5: Construction companies in Vietnam as of annual 31 December**

Year	2008	2009	2010	2011	2012
Construction of building	12869	15404	20810	21531	24687
Civil engineering	10909	13876	14608	13503	14050
Specialized construction activities	4468	5898	7483	9149	10053
Total	28246	35178	42901	44183	48790

*Source: Statistical yearbook of Vietnam - General Statistical Office*

Since 31 December 2008 to 31 December 2012, number of acting enterprises of construction increased year by year. Number of enterprises in all sectors of the construction industry has increased that is showed in table 5.

Present construction companies of Ministry of Construction still occupies large market share. We must mention corporations and companies under Ministry of Construction as follows:

1. Song Da corporation

2. HUD corporation
3. VICEM corporation
4. Lilama corporation
5. Ha Noi construction corporation
6. Construction No 1 corporation
7. Viglacera corporation
8. Licogi corporation
9. Idico corporation
10. DIC corporation
11. Bạch Đằng corporation
12. Viwaseen corporation
13. FICO corporation
14. Sông Hồng corporation
15. COMA corporation
16. VNCC corporation
17. CDC company
18. CONINCO company

### 3.3 Employees and construction labour

Vietnam manpower construction industry today is the fifth large number of labor structure. Share of labor was 5.4 percent in 2009, 6.3 percent in 2010, 6.4 percent in 2011 and 2012 and 6.2 percent in 2013. Labour of construction industry increased every year except 2013. Growth rate of employed population in construction industry in 2010 got highest figure 19.8 percent. Table 6 shows clearly data as follows.

**Table 6: Manpower in construction industry 2009 - 2013**

<b>Year</b>	<i>Thousand persons</i>				
	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>
Employed population at 15 years of age and above as of annual 1 <sup>st</sup> July in construction industry	2594.1	3108.0	3221.1	3271.5	3258.3
Structure of employed population at 15 years of age and above as of annual 1 <sup>st</sup> July in construction industry	5.4%	6.3%	6.4%	6.4%	6.2%
Growth rate of employed population in construction industry	5.1%	19.8%	3.6%	1.6%	0.0%

*Source: Statistical yearbook of Vietnam - General Statistical Office*

However, the quality is not high, such as the low-skilled and there are lack of the industrial working style, and the general engineers, engineers are not really good; experts, consultants, advisors, leaders, managers are still limited.

### 3.4 Construction cost

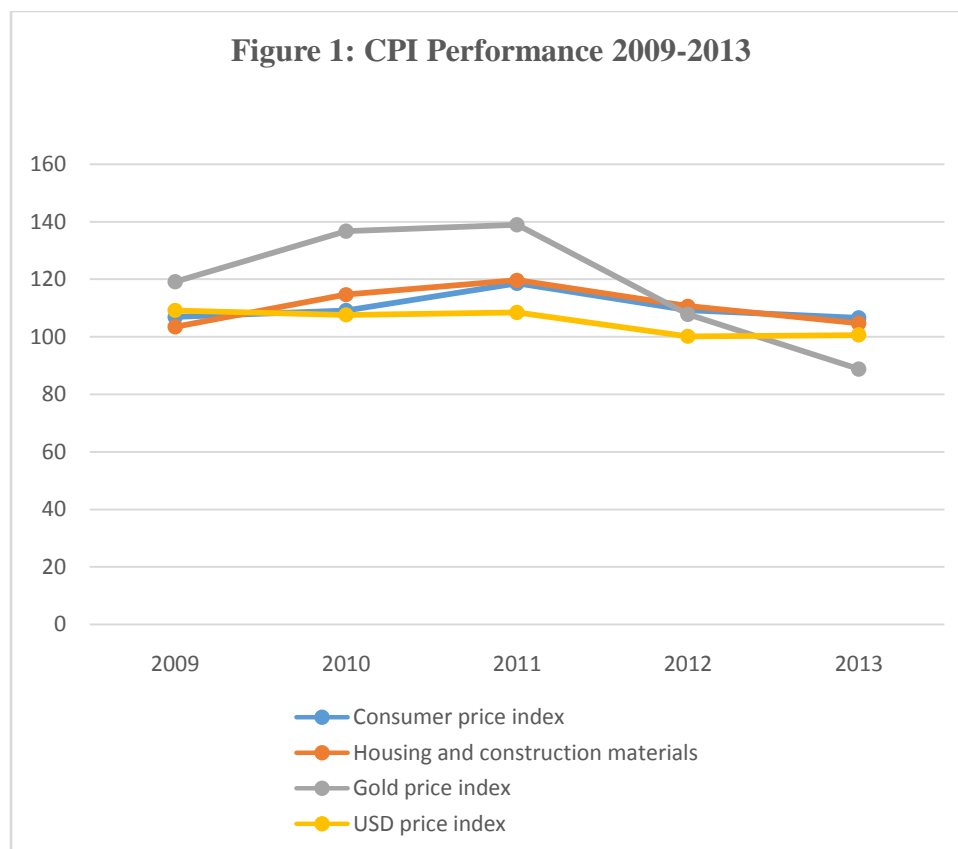
General goods price as well as the housing and construction materials of prices were very fluctuant from 2009 to 2013 in comparison with General CPI. Housing and construction materials CPI increased highly in 2010 and 2011 14.68 percent and 19.66 percent respectively. General CPI increased 9.19 percent, of which CPI housing, construction materials increased 14.68 percent in 2010. Figure 1 display trend of fluctuation of CPI in general and housing, construction materials, gold price index, USD price index. Gold price index is more fluctuant than other.

**Table 7: CPI Performance, 2009-2013**

(% increase compared to previous year)

Year	2009	2010	2011	2012	2013
<b>General consumer price index</b>	<b>106.88</b>	<b>109.19</b>	<b>118.58</b>	<b>109.21</b>	<b>106.60</b>
Housing and construction materials	103.46	114.68	119.66	110.64	104.72
<b>Gold price index</b>	<b>119.16</b>	<b>136.72</b>	<b>139.00</b>	<b>107.83</b>	<b>88.74</b>
<b>USD price index</b>	<b>109.17</b>	<b>107.63</b>	<b>108.47</b>	<b>100.18</b>	<b>100.66</b>

*Source: Statistical yearbook of Vietnam - General Statistical Office*



### 3.6 Import and Export of Construction Sector

In the construction sector, wood and wood products is one of 10 groups of valued largest exports in recent years. In addition, the pottery and glassware are also bring greater export value of Vietnam. Overall value of exports of these commodities are annual growth. Table 9 displays figures from 2009 to 2013.

**Table 9: Some main goods for exportation and importation**

*Unit: USD million*

Year	2009	2010	2011	2012	2013
<b>Exportation</b>					
Pottery and glassware	267.2	317.1	359.2	440.5	457.3
Wood and wooden products	2597.6	3444.5	3960.5	4665.5	5590.8
<b>Importation</b>					

Machinery, apparatus and parts for construction	818.2	868.8	639.1	433.0	N/A
Machinery, apparatus and parts for cement construction	171.4	211.7	161.2	108.4	N/A
Iron, steel	5357.4	6164.6	6442.3	6019.9	6656.6
<i>Of which: blank</i>	1057.3	1115.6	627.1	325.2	194.1
Aluminum	657.0	930.5	1055.3	1105.7	N/A
Glass	75.4	81.6	99.1	200.0	N/A
Clinkers	132.5	86.5	45.1	23.8	N/A

*Source: Statistical yearbook of Vietnam - General Statistical Office*

A group of imported goods such as Machinery, apparatus and parts for construction, Machinery, apparatus and parts for cement construction, Clinkers tends to decrease. Some of the other imported goods increase such as Iron, steel, Aluminum.

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## ABSTRACT

In the past years, the construction sector of Vietnam had great achievements. Besides, the contribution of labour and capital to GDP growth of the construction sector, it was found that technological progress in a total factor productivity framework contributed the GDP growth rate duration of 2006 – 2012.

This paper have been used production function method originally developed by **Solow (1957)** and later modified by **Noriyoshi Oguchi (2001)**

$$Gr(Q) = Gr(A) + SkGr(K) + SlGr(L)$$

*Gr(Q): Growth rate of GDP*

*Gr(A): Growth rate of technological progress*

*Gr(K): Growth rate of capital*

*Gr(L): Growth rate of labour*

*Where Sk and Sl represent share of capital and labour respectively*

This model is useful for decomposing the overall growth of the construction sector and isolating the contribution of each one of the three components namely labour, capital and technological progress.

The whole period (2006 to 2012) after 20 years of doimoi, the contribution of technological progress, capital and labour to sectoral GDP growth in the construction sector of Vietnam was analysed. From that point, author reviewed the role of technological progress in growth of sectoral GDP in the construction sector of Vietnam. On the basis of research findings, author brings forward some reasons to cause negative and positive contribution of technological progress to GDP growth in construction sector. On the basis of research, suggestions and recommendations were put forward for construction enterprises, government and stakeholders.

## 1. INTRODUCTION

Construction sector is an important part of every economy as creator of infrastructure, provider of job opportunities and the driver of growth. It is more so for a developing country like Vietnam. The share of construction sector in GDP of Vietnam is approximated to 5 percent to over 6 percent of GDP. The workforce in the enterprises of construction and total construction sector were 3,258,300 persons in 2013. The sectoral GDP growth rate has been significant, average sectoral GDP growth rate from 2006 to 2012 was 14.09 percent (GDP at current price).

The purpose of this paper is to examine the contribution of capital, labour and technological progress in sectoral GDP growth of the construction sector in Vietnam. The efficiency of the

construction sector, like any industry or activity, can be measured by total factor productivity which, in turn, depends on a number of factors including use of technological innovations, capacity utilization, scale of operation, external economies, managerial skills etc. However, in the context of construction sector, technological progress remains the most important determinant of the change in total factor productivity. Methodologically, changes in total factor productivity are estimated as a residual after the contribution of the conventionally defined inputs of labour and capital to the growth of output has been accounted for. In this paper, we use the well known Solow model that identifies technological progress with improvements in total factor productivity (TFP) as the key determinant of growth in the long run.

## 2. RESEARCH METHODOLOGY

### 2.1 The production function method

The production function method originally developed by Robert M. Solow (1957)<sup>1</sup> and later modified by Noriyoshi Oguchi (2001)<sup>2</sup> will be used as follows.

The relation between output and input can be expressed as:

$$\begin{aligned} \text{Total production} &= \text{Efficiency} \times \text{Volume of combined inputs} \\ &= \text{Total factor productivity} \times \text{Volume of combined input} \end{aligned} \quad (i)$$

In other words:

$$Q_t = A_t F(K_t, L_t) \quad (ii)$$

Where Q stands for output (Value Added), K, L represent for capital and labour respectively, A for the level of efficiency and t for time. *The gross value added by normal residents of a country in a year's time is called "gross domestic product"*<sup>3</sup>.

Equation (ii) is called the production function. F is a single valued function and possesses certain properties such as positive first derivative to be economically meaningful. Since F is single valued, we can interpret it to be an index of two factors of production, labour and capital, combined together. By dividing both sides of equation (ii) by F, we have  $Q/F = A$ . Thus, A is a ratio of output and an index of the volume of combined inputs and becomes a measure of total factor productivity or technological progress. A widely used production function is the Cobb-Douglas variant that is written as:

$$Q_t = A_t \cdot K_t^\alpha \cdot L_t^{1-\alpha} \quad (iii)$$

This is nothing but a specific functional form for equation (ii) and it is homogeneous of degree one exhibiting constant return to scale for the economy.

By taking the growth rate of each term of relationship (i), we have

$$\text{Growth rate of output} = \text{Growth rate of TFP} + \text{Growth rate of combined inputs}$$

*istics, 1957;*

39(3): 312 -320.

<sup>2</sup> *Measuring Total Factor Productivity – Survey report – Asian Productivity Organization, Tokyo, 2001, pp. 2-4.*

<sup>3</sup> *I.C. Dhingra and V.K Garg (2001), National income accounting, Sultan Chand & Sons, New Delhi, p.15*



We take the change of all terms in equation (ii) and totally differentiate it with respect to time

$$\frac{dQ}{dt} = \frac{dA}{dt} F(K_t, L_t) + A_t \frac{\partial F}{\partial K} \frac{dK}{dt} + A_t \frac{\partial F}{\partial L} \frac{dL}{dt} \quad (\text{iv})$$

Dividing both sides by  $Q_t$ , we have:

$$\frac{dQ}{dt} \frac{1}{Q} = \frac{dA}{dt} \frac{1}{A} + \frac{\partial Q}{\partial K} \frac{dK}{dt} \frac{K}{Q} \frac{1}{K} + \frac{\partial Q}{\partial L} \frac{dL}{dt} \frac{L}{Q} \frac{1}{L}$$

$$Gr(Q) = Gr(A) + MPK \left( \frac{K}{Q} \right) Gr(K) + MPL \left( \frac{L}{Q} \right) Gr(L) \quad (\text{v})$$

where  $Gr(X)$  indicates the growth rate of variable  $X$  and  $MPK$  and  $MPL$  stand for the marginal productivity of capital and labour, respectively. The left hand side of equation (v) is instantaneous growth rate of the output.

In a perfectly competitive market, the real rate of return is equal to the marginal productivity of capital ( $MPK$ ) and the real wages rate is equal to marginal productivity of labour ( $MPL$ ).

Hence, in this case,  $MPK (K/Q)$  in equation (v) is the share of capital in income and  $MPL (L/Q)$  the share of wages. Equation (v) can be rewritten as:

$$Gr(Q) = Gr(A) + Sk Gr(K) + Sl Gr(L) \quad (\text{vi})$$

Where  $Sk$  and  $Sl$  represent share of capital and labour respectively

Rearranging the equation (vi), we have

$$Gr(A) = TFPG = Gr(Q) - Sk Gr(K) - Sl Gr(L) \quad (\text{vii})$$

This is the equation to estimate TFPG. It is the residual of GDP growth rate after taking out the part that is due to increase in physical inputs.

Differentiation is applicable only to continuous values, where as annual data are discrete in nature. Hence, application of annual data to estimate equation (vii) will lead to error of approximation, which can be eliminated by modifying the equation as:

$$Gr(A) = TFPG = Gr(GDP_t) - (1/2)(S_{kt} + S_{kt-1})Gr(Kt) - (1/2)(S_{lt} + S_{lt-1})Gr(Lt) \quad (\text{viii})$$

Where  $Gr(GDP_t)$  is the growth rate of GDP during years between t-1 and t, that is

$$Gr(GDP_t) = \ln(GDP_t) - \ln(GDP_{t-1})$$

Similarly,  $Gr(Kt)$  and  $Gr(Lt)$  are growth rate of capital and labour during years between t-1 and t, respectively. Thus, computation of equation (viii) rewrite below:

$$Gr(A) = TFPG = (\ln(GDP_t) - \ln(GDP_{t-1})) - \frac{1}{2} (S_{kt} + S_{kt-1})(\ln K_t - \ln K_{t-1})$$

(ix)

$$- \frac{1}{2} (S_{lt} + S_{lt-1})(\ln L_t - \ln L_{t-1})$$

$$\text{Gr}(\text{GDP}_t) = \text{TFPG} + \frac{1}{2} (S_{kt} + S_{kt-1})(\ln K_t - \ln K_{t-1}) + \frac{1}{2} (S_{lt} + S_{lt-1})(\ln L_t - \ln L_{t-1}) \quad (\text{x})$$

Thus, we make use of equation (ix) for the purpose of computing technological progress (TFPG) and equation (x) for analysing contribution of capital, labour and total factor productivity growth to GDP growth rate in construction sector.

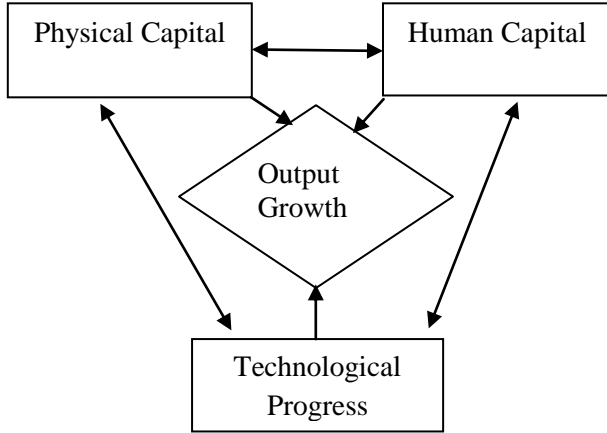


Figure 1. The three - pronged approach to output growth<sup>4</sup>

## 2.2 Data collecting and processing

All the data are taken from secondary sources – mostly official of Vietnam statistical book i.e. Gross domestic product at current prices, total labour, monthly average income per employees (state enterprises represented).

Labour and capital share of output: the share of labour is defined as the ratio of the employee compensation to GDP.

Assuming constant returns to scale and two factors of production, the share of capital is measured as a residual of the labour share as follows<sup>5</sup>

$$S_k = 1 - S_l \quad (2.1)$$

Where,

$S_k$  share of capital

$S_l$  share of labour

## 3. ESTIMATION AND ANALYSIS OF RELATED DATA

### 3.1 Growth of sectoral GDP, labour and capital stock in CSV

<sup>4</sup> The figure shown here is a modification of the figure given in Mahadevan (2002) wherein output growth was not explicitly mentioned.

<sup>5</sup> Measuring Total Productivity – Survey Report – Asian Productivity Organization, Tokyo, 2001, p.36.

The table 3.1 shows that the sectoral GDP growth rate was positive throughout the period 2006 to 2012 except 2011 it was negative and averaged around 8.42 percent for the whole period (at current price). The sectoral growth rate attained its maximum in year of 2010 when it accounted for 23.28% percent.

The growth rates of labour of all years of period study were positive. The labour growth averaged 7.04 percent for the study period. Such construction sector has annually created jobs. However, situation in Vietnam showed that the construction workforce are large number but the poor quality. In other words, Vietnam's labor resources are abundant, young, educated but unskilled and lack of workmanship. Number of trained workers are proportionately low, the quality did not meet the job requirement of knowledge and skill. Universities and vocational training are not aligned with the needs of business and recruitment. Whereas, the cheap manpower are no longer considered a competitive advantage of Vietnam. Thus, the growth rate of labour rose due to use unskilled workers and inadequate managers.

The Ministry of Construction manages four universities, nine colleges and seven vocational schools. Currently, it is too difficult for the colleges and vocational schools to enroll new students, because construction job is not attract people and education and training of colleges, schools do not meet demand of practice.

So the problem is a human obstacle for productivity and efficiency of production in construction sector.

In the meanwhile the growth rate of capital stock rose stronger. In 2007 the growth rate of capital got highest of 42.59 percent. Its average growth was 25.29 percent during the study period. However construction enterprises in recent years are often scattered investment, do not focus investment of your own key sector. After the economic crisis of Asian finance of 1997 -1998, Vietnam economic development, construction companies expect to invest in the construction of real estate projects to get big profit. New urban areas development is rampant. Besides, business is according to crowd psychology. Similar phenomena investment in cement industry and other industries in construction sector, consequently capital flows into the real estate sector is too large and has increased year by year.

**Table 3. 1. Growth of sectoral GDP, labour and capital stock in CSV**

*At curent prices*

YEAR	GDP (Dongs. Billion.)	Growth Rate of GDP[1]	Total Labour (Thousand persons)	Growth Rate of Worker[2]	Gross Capital (Dongs. Billion.)	Growth Rate of Capital[3]

2005	53276		1998.9		60923	
2006	64503	19.12%	2136.5	6.66%	77752	24.39%
2007	79712	21.17%	2267.8	5.96%	119034	42.59%
2008	95696	18.28%	2468.4	8.48%	163958	32.02%
2009	110255	14.16%	2594.1	4.97%	239304	37.81%
2010	139162	23.28%	3108	18.07%	296290	21.36%
2011	138305	-0.62%	3211.1	3.26%	322075	8.34%
2012	142800	3.20%	3271.5	1.86%	373836	14.90%
<b>Average</b>		<b>14.09%</b>		<b>7.04%</b>		<b>25.29%</b>

Sources: Estimated on basis of Vietnamese statistical yearbooks

$$Gr(GDP_t) = \ln(GDP_t) - \ln(GDP_{t-1})$$

$$\text{Growth rate of capital} = \ln K_t - \ln K_{t-1}$$

$$\text{Growth rate of labour} = \ln L_t - \ln L_{t-1}$$

### 3.2 Share of Labour and Capital Income

Table 3.2 shows the pattern of income distribution between labour and capital during the period 2006 to 2012. The share of labour income average in GDP of Vietnamese construction sector was 0.5974 (59.74 percent). In 2008 figure of labour income share registered highest 0.7205 (72.05 percent). The lowest share of labour income was 0.4320 (43.20 percent) in 2010.

**Table 3.2 Growth of sectoral GDP, labour and capital stock in CSV**

*At current prices*

YEAR	GDP (VND.Billion)	Total Compensation to Employees[1] (VND.Billion)	Wages share	Capital share	(Sl <sub>t</sub> + Sl <sub>t-1</sub> )/2	(Sk <sub>t</sub> +Sk <sub>t-1</sub> )/2
2005	53276	33534	0.6294	0.3706		
2006	64503	42790	0.6634	0.3366	0.6464	0.3536
2007	79712	57255	0.7183	0.2817	0.6908	0.3092
2008	95696	69165	0.7228	0.2772	0.7205	0.2795
2009	110255	44445	0.4031	0.5969	0.5629	0.4371
2010	139162	64141	0.4609	0.5391	0.4320	0.5680
2011	138305	79018	0.5713	0.4287	0.5161	0.4839
2012	142800	93397	0.6540	0.3460	0.6127	0.3873
<b>Average</b>			<b>0.6029</b>	<b>0.3971</b>	<b>0.5974</b>	<b>0.4026</b>

Sources: Estimated on basis of Vietnamese statistical yearbooks

The share of capital income in GDP had different figure each year. The average of capital share of the study period was 0.4026 (40.26 percent) per year. It was lowest to 0.2795 (27.95 percent) in 2008. The share of capital income accounted for (48.39 percent) in 2011.

Thus, share of labour every year is bigger than capital share except 2010. Here we need to consider the efficiency of investment, production and business in construction sector.

### 3.3 Estimation and Analysis of Technological Growth

Based on the given above method of calculation, we have the results as in Table 3.1 and Table 3.2 from which calculating the results table 3.3. During the period under study (2006 to 2012) the average growth of sectoral GDP was 14.09 percent per year. The contribution to growth from increased capital input was about 9.89 percent per year in average. Labour input contributed positive figure which accounted for 3.99 percent. Technological progress (or total factor productivity) contributed small figure of 0.20 percent annual average. Therefore, the major factor contributing to this growth is increase in capital and labour input.

**Table 3.3 Contribution of Capital, Labour and Technological growth to GDP growth rate**  
*At current price*

YEAR	GDP growth rate	Contribution of capital	Contribution of labour	TFP growth
2006	19.12%	8.62%	4.30%	6.19%
2007	21.17%	13.17%	4.12%	3.88%
2008	18.28%	8.95%	6.11%	3.22%
2009	14.16%	16.53%	2.80%	-5.16%
2010	23.28%	12.13%	7.81%	3.34%
2011	-0.62%	4.04%	1.68%	-6.34%
2012	3.20%	5.77%	1.14%	-3.72%
<b>Average</b>	<b>14.09%</b>	<b>9.89%</b>	<b>3.99%</b>	<b>0.20%</b>

Through all the years of research in the period 2006 - 2012, contributions of labor and capital brought a positive contribution. However, the contribution of technological progress 7 years, there were 4 years positive contribution and negative contributions for 3 years.

Dr. Duong Minh Tam - Deputy Head of the Management Board of Ho Chi Minh Hi-Tech Park: in terms of advanced technology applications, Vietnam is also backward technology systems at a much lower level compared with other countries in the neighborhood. Generally, enterprises has modern equipment level only 10%, other has medium equipment of 38%, backward and very backward equipment of 52%. Especially in small production area and equipment in a very backward and outdated accounts for 70%. Meanwhile, Vietnamese enterprises to invest in

technological innovation is low about 0.2 to 0.3% of revenue. This figure is 5% in India, South Korea is 10%<sup>6</sup>.

In the Global Competitiveness Report of the WEF in 2012 -2013, this index was our country ranked 75/144 with 4.11 point. In 2012-2013, the World Economic Forum has launched the technology readiness ranking. In this ranking chart, hierarchy of our country was far worse than Thailand. The technology readiness of Thailand ranked 84 with 3.56 point, while Vietnam at position 98 with 3.33 point, (2) innovation index Thailand ranked 68 with 3.19 point, Vietnam ranked 81 with 3.07 point<sup>7</sup>.

Due to infrastructure (power, transport ...), operational qualification, and management capacity is weak ... so the exploitation process technology equipment is limited; production efficiency is not high. Most new plants achieve sustained operating at normal production, the plant does not reach optimal levels. Ability to acquire and receive low technology transfer; most engineers and operators take a lot of time to master the job<sup>8</sup>.

According to the report of the General Statistics Office of social-economic Vietnam in 2001 - 2010. "big invested demand brought hot investment to lead in excess of absorptive capacity of the economy ", many foreign investors after the investment license or construction bid was not strictly out of their commitment about the level of technology application and transfer of technology "<sup>9</sup>

Thus, the economic construction growth in Vietnam is largely dependent on increased investment and increased the number of employees. This proves that the construction technology industry remains backward. So, the quality of economic growth of Vietnam construction sector is low and not achieve sustainable.

#### **4. RESEARCH FINDINGS AND REASONS**

General period study 2006 – 2012 contribution of technological progress to GDP growth in construction sector was inconsiderable. The growth GDP of the construction sector mainly based on the contribution of capital and labor factors 2006 - 2012.

- Not self-reliance in science and technology: no factory machinery modern technology, fully imported from abroad
- There are lack of excellent leaders in Science and Technology personnel, the General engineers in charge, especially lack of adjacent of Science and Technology young with high qualification.
- Investment in science and technology is very low, especially investment from the corporate sector "The proportion of new high-tech: 19.2%; average technology: 26.8%; low technology up to 54.0%"<sup>10</sup>. The equipment of the research institutes, universities are generally very short, asynchronous and backward compared with the advanced production facilities in the

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<sup>6</sup> DN Việt cần đầu tư, đổi mới công nghệ <http://laodong.com.vn/kinh-doanh/dn-viet-can-dau-tu-doi-moi-cong-nghe-220938.blid>

<sup>7</sup> The global competitiveness report 2012 - 2013

<sup>8</sup> Xuân Tuân (2012), Một số đánh giá tổng quan về Công nghệ sản xuất Xi măng tại Việt Nam, <http://www.hoivlx.vn.org.vn/index.php?module=khcntDetail&newsId=671>

<sup>9</sup> General Statistics Office (2012), Statistical Yearbook of Vietnam 2011, Statistical Publishing House p p.59, 60, 61

<sup>10</sup> General Statistics Office (2012), Statistical Yearbook of Vietnam 2011, Statistical Publishing House p.50

same industry. Therefore, trained human resource does not meet the technical requirements and technology. That is not to mention the untrained human who accounted for no small proportion of the workforce in construction sector.

- The lack of organic links between of Science and Technology research and education - training and production - business, lack of cooperation between research institutions, universities and enterprises.
- Management of Science and Technology activities are focused primarily on inputs, not pay due attention to the management of product quality output and application research findings into practice.
- The lack of effective policies to create incentives for officers of Science and Technology and meritocracy, reasonable salary, there are no encouragement for scientific and technological officers to be fully committed to the career of science and technology.
- Investment to improve potential of Science and Technology in the long run is not focused properly, the lack of focus on key areas, priorities, resulting infrastructure of Science and Technology is backward, and investment efficiency is low. Almost businesses in the construction sector were spreading investment, leading to inefficiency and waste resources (most of the state enterprises).
- Corruption in the import of machinery and industrial production line of the backwardness of State enterprises is the cause of the negative impact of technological progress on the construction sector GDP.

## **5. SUGGESTIONS AND RECOMMENDATIONS**

From study of results, findings and reasons analyses for results, some suggestions and recommendations for improving contribution of technological progress to development construction sector as follows:

- Ministry of Construction should do project on survey, investigation and evaluation of real situation of technologies in construction industry. On the basis of reviews, making appropriate policy decisions to develop best-practice technology for present and future such as construction materials, construction mechanics, infrastructure, the standards and regulations of construction techniques;
- Improving the system of universities, colleges and vocational schools and institutes system of Ministry of Construction that is investment in new equipment for the laboratories, the workshops, strong partnerships between universities, institutes, colleges, vocational schools with construction enterprises, researching sciences and technologies in parallel with production test, proceeding technological completion and applying production process for construction enterprises;
- Education, training and fostering for scientific and technological personnel has to be associated with the policy of staff use, the appropriate incentives of incomes, respectability, creating good environment for them to work and dedication;
- Government must strictly control technological lines of the state corporation imported from abroad to anti-corruption, strictly control foreign capital share by machines, equipment, technological lines in joint venture corporation, evaluate technological qualification of

enterprises with 100% foreign capital to prevent landfill of technology from advanced countries;

- The strategy for long-term, the mechanical engineering must be the master of design and manufacture of high-tech machinery for the construction industry, import substitution; the construction industry has to be master of the technology to build ultra-high buildings, specially industrial project, underground works, marine works, participation in the nuclear power plant projects with a value of 30 ÷ 40% of the construction and installation; the building materials has to develop the materials to be friendly with environment, save energy, recycled materials and materials used nanotechnology, etc.
- Funds: we should be diversification of investment capital for science and technology, paying special attention funds from the businesses, combination based on 3 partners: State, entrepreneur, scientist;
- To enlist international cooperation in development of construction technologies.

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# **VIETNAM REPORT**

*Prepared by Dr. Pham Van Bo*

*Vice president*

*Academy of Managers for Construction and Cities*

*Ministry of Construction*

# OVERVIEW

- The political economic Doi Moi has initiated since 1986;
- Member: UN, WTO, IMF, WB Group, ADB, Economic Cooperation forum Asia - Pacific region, ASEAN;
- To join the multilateral free trade agreement with ASEAN, Korea, Japan, China;
- Vietnam and Japan signed an agreement for bilateral economic cooperation.

# OVERVIEW

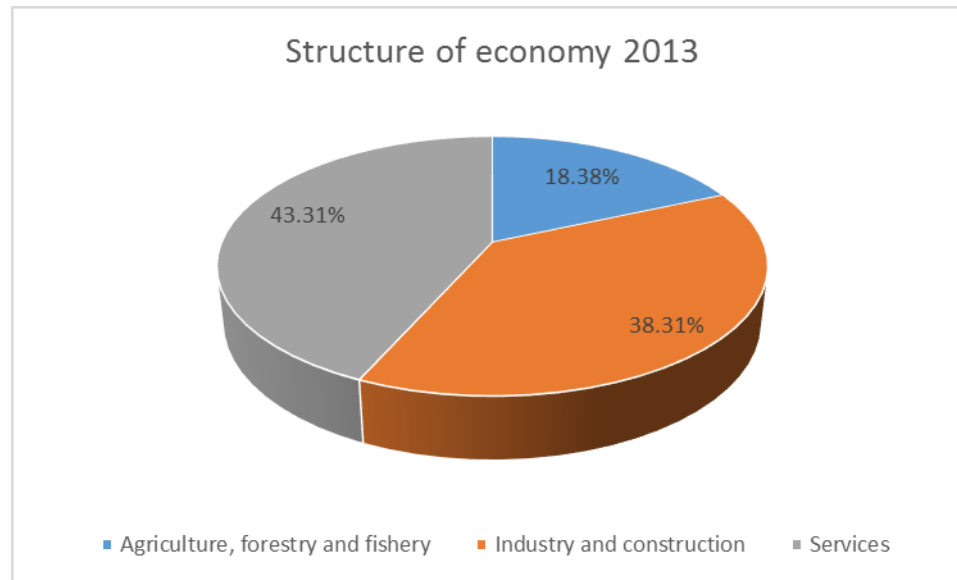
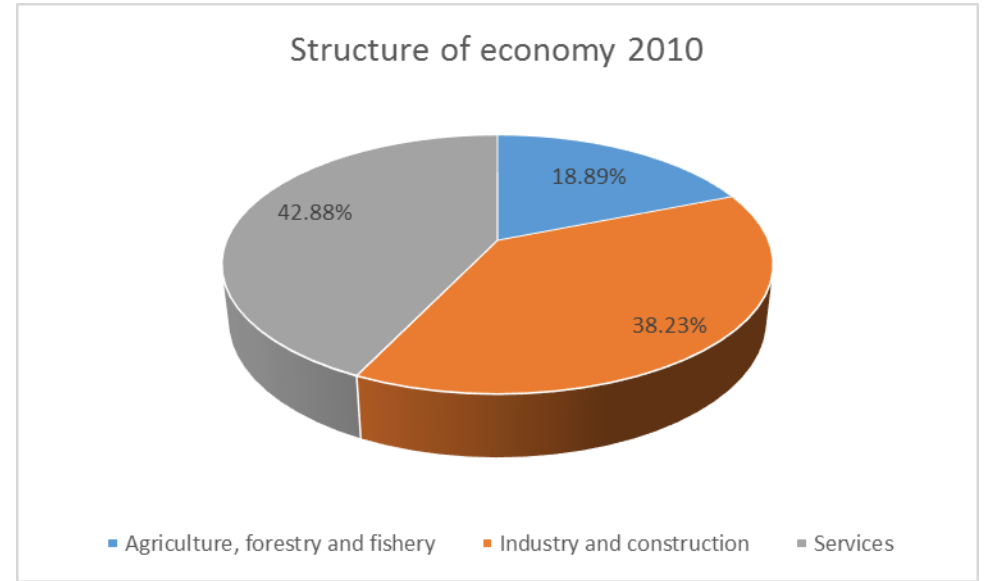
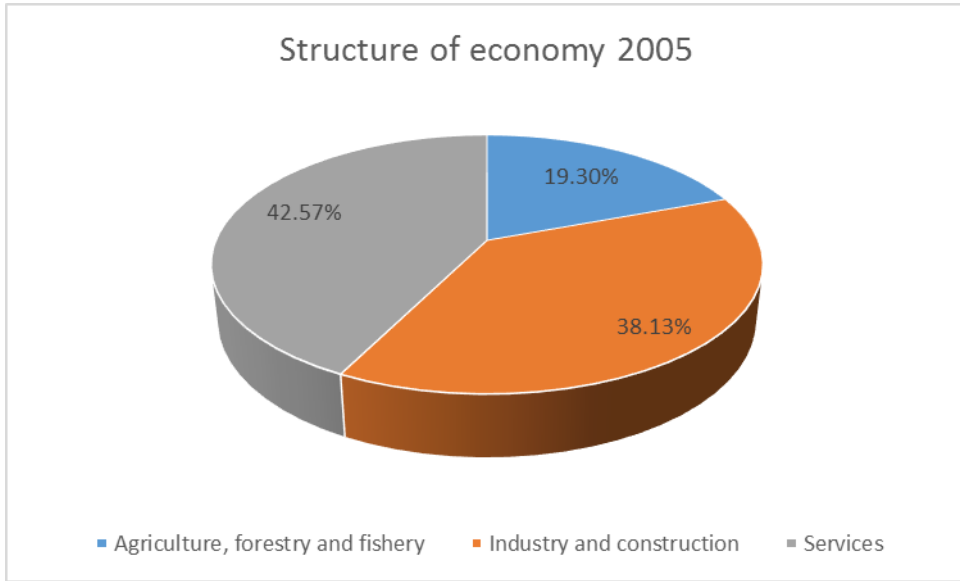
- Land area: 329,560 km<sup>2</sup>
- Population of Vietnam in 2013: 89,708,900 people
- GDP growth rate in average (2009 - 2013): 5.69%
- GDP in 2013: 175,829 billion USD
- GDP per capita in 2013: USD 1,960
- Total labour force (thousand person) in 2013: 53,650
- Average labour growth rate: 2.38%. (2009 - 2013)
- Unemployment: 2.45% (2009 - 2013)
- Export value US\$132.2 billion, 15.4% increased ;  
Import value US\$131.3 billion, 15.4% increased
- Inflation rate: 9.82% (2009 - 2013)

- 6<sup>th</sup> largest economy in Southeast Asia;
- 56<sup>th</sup> largest in the world in terms of total size of nominal domestic product in 2013;
- 128<sup>th</sup> in terms of gross domestic product per capita in nominal.

# Table 1: Structure of economy

Sector	2005	2010	2013
Agriculture, forestry and fishery	19.30 %	18.89%	18.38%
Industry and construction	38.13%	38.23%	38.31%
Services	42.57%	42.88%	43.31%

# Figure 1: Structure of economy



# Economic outlook

- **Medium-Term Economic Outlook for Viet Nam**
  - The government will act to support economic growth;
  - Structural reform to the financial sector and state-owned enterprises;
  - According to ADB, GDP growth is forecast to rise slightly to 5.6% in 2014, picking up further to 5.8% in 2015;
  - According to WB, Vietnam's economy will grow 5.5% in 2014, the World Bank predicts growth at 5.6% and 5.8% in 2015 and 2016 respectively.



## **Medium- to Long-Term Economic Prospects**

Vietnam further enhances the effective implementation of policies to accelerate the process of restructuring, innovation model of economic growth and make good use of the opportunities of regional and international integration from now to 2020.

# Medium- to Long-Term Economic Prospects

**Table 2: Prediction of CPI and GDP growth in 2020**

Year	CPI growth (%)	GDP growth (%)
2011	18.58	6.24
2012	9.21	5.25
2013	6.04	5.42
2014	6.24	5.60
2015	6.36	5.82
<b>2011 - 2015</b>	<b>9.29</b>	<b>5.67</b>
2016	6.67	6.20
2017	6.83	6.35
2018	7.12	6.75
2019	7.10	7.02
2020	7.07	6.80
<b>2016 -2020</b>	<b>6.96</b>	<b>6.62</b>

Source: National Center for Socio - Economic Information and Forecast, Operations Center

# **CONSTRUCTION INDUSTRY OVERVIEW**

**Table 3: Construction investment**

VND Billion

Year	2009	2010	2011	2012	2013 (est.)
Total investment at constant 2010 prices	29296	37362	36502	37629	37820
Index (previous year = 100)%	104.14	127.53	97.70	103.09	100.51
Total investment at current prices	26227	37362	43914	47273	47790
State investment at constant 2010 prices	14857	16257	15166	18838	23681
Index (previous year = 100)%	114.85	109.42	93.29	124.21	125.71
State investment at current prices	13301	16257	18273	23659	29998
Non-state investment at constant 2010 prices	14439	21105	21336	18791	14139
Index (previous year = 100)%	114.85	146.17	101.10	88.07	75.24
Non-state investment at current prices	12926	21105	25641	23614	17792

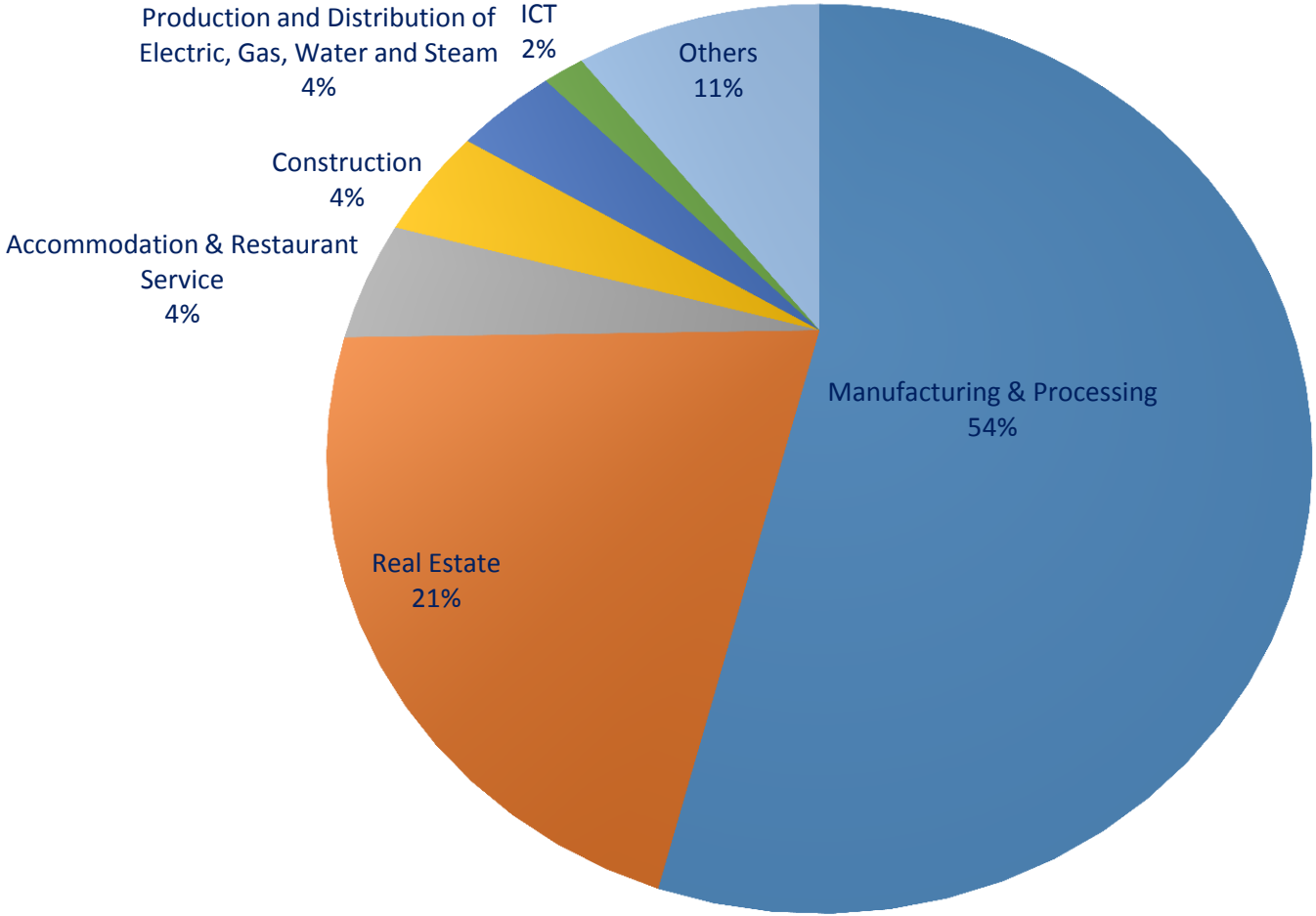
*Source: Statistical yearbook of Vietnam - General Statistical Office*

**Table 4: FDI in Vietnam from 1988-8/2014**

<b>No SI</b>	<b>Sector</b>	<b>Project</b>	<b>Registered Capital (bil USD)</b>
1	Manufacturing	9207	131,645.68
2	Real estate	430	50,075.35
3	Accommodation and Restaurant service	353	11,024.64
4	Construction	1119	10,843.48
5	Electricity, gas, steam and air-conditioner supply	96	9,748.60
6	Telecommunication and information	1024	4,072.34
7	Wholesale, Retail trade and repair	1245	3,741.92
8	Transportation and storage	417	3,659.18
9	Agriculture, Forestry and fishing	146	3,631.78
10	Mining and quarrying	512	3,430.25
11	Others	2361	11,164
<b>Total</b>		<b>16,910</b>	<b>243.038</b>

Source: Ministry of Plan an Investment 2014

**Figure 2: FDI in Vietnam from 1988-8/2014**



**Table 5: Top 10 FDI counterparts in Vietnam from 1988-8/2014**

<b>No</b>	<b>Countries</b>	<b>Project</b>	<b>Registered Capital (US\$ bil.)</b>
1	Japan	2,381	36,201.51
2	Korea	3,930	32,845.31
3	Singapore	1,300	30,804.95
4	Taiwan	2,325	27,907.43
5	British Virgin Islands	541	17,727.23
6	Hong Kong	838	13,633.24
7	USA	703	10,735.96
8	Malaysia	470	10,596.24
9	China	1,056	7,884.11
10	Thailand	361	6,527.32
	Others	3,005	48,17
	<b>Total (101 countries)</b>	<b>16,910</b>	<b>243,038</b>

Source: Ministry of Plan and Investment 2014

**Table 6: Construction companies in Vietnam as of annual 31 December**

Year	2008	2009	2010	2011	2012
Construction of building	12869	15404	20810	21531	24687
Civil engineering	10909	13876	14608	13503	14050
Specialized construction activities	4468	5898	7483	9149	10053
Total	28246	35178	42901	44183	48790

*Source: Statistical yearbook of Vietnam - General Statistical Office*



**Table 7: Manpower in construction industry 2009 - 2013***Thousand persons*

<b>Year</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>
Employed population at 15 years of age and above as of annual 1 <sup>st</sup> July in construction industry	2594.1	3108.0	3221.1	3271.5	3258.3
Structure of employed population at 15 years of age and above as of annual 1 <sup>st</sup> July in construction industry	5.4%	6.3%	6.4%	6.4%	6.2%
Growth rate of employed population in construction industry	5.1%	19.8%	3.6%	1.6%	0.0%

*Source: Statistical yearbook of Vietnam - General Statistical Office*

**Table 8: CPI Performance, 2009-2013**  
 (% increase compared to previous year)

Year	2009	2010	2011	2012	2013
General consumer price index	106.88	109.19	118.58	109.21	106.60
Housing and construction materials	103.46	114.68	119.66	110.64	104.72
Gold price index	119.16	136.72	139.00	107.83	88.74
USD price index	109.17	107.63	108.47	100.18	100.66

*Source: Statistical yearbook of Vietnam - General Statistical Office*

**Table 9: Some main goods for exportation and importation***Unit: USD million*

Year	2009	2010	2011	2012	2013
Exportation					
Pottery and glassware	267.2	317.1	359.2	440.5	457.3
Wood and wooden products	2597.6	3444.5	3960.5	4665.5	5590.8
Importation					
Machinery, apparatus and parts for construction	818.2	868.8	639.1	433.0	N/A
Machinery, apparatus and parts for cement construction	171.4	211.7	161.2	108.4	N/A
Iron, steel	5357.4	6164.6	6442.3	6019.9	6656.6
<i>Of which: blank</i>	1057.3	1115.6	627.1	325.2	194.1
Aluminum	657.0	930.5	1055.3	1105.7	N/A
Glass	75.4	81.6	99.1	200.0	N/A
Clinkers	132.5	86.5	45.1	23.8	N/A

*Source: Statistical yearbook of Vietnam - General Statistical Office*

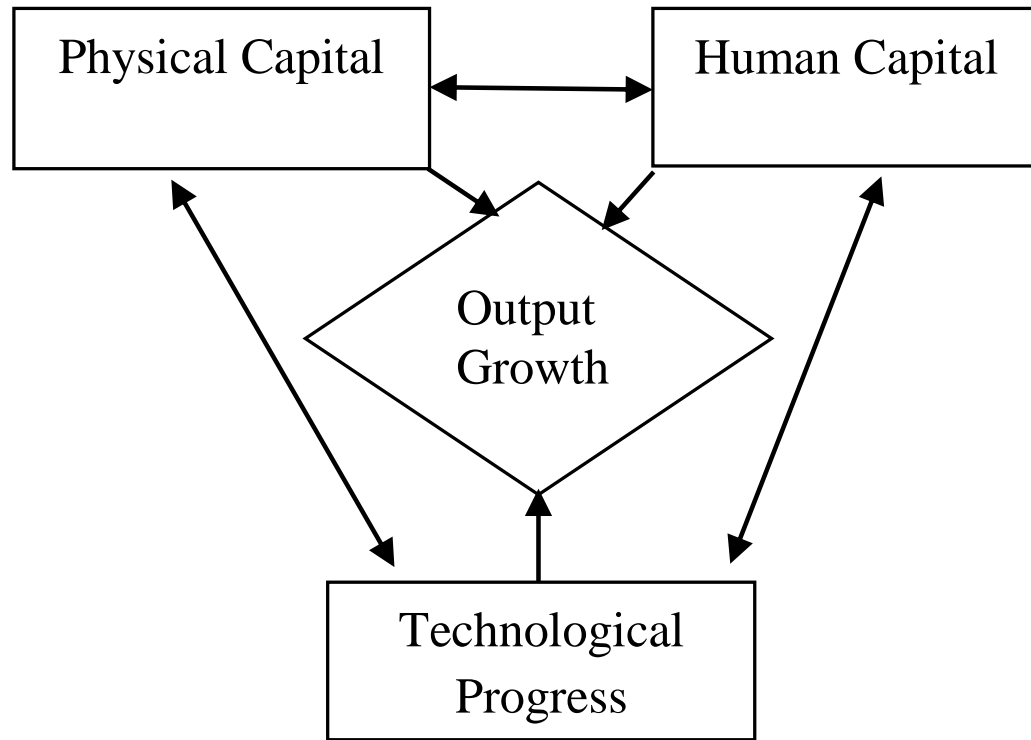
**THE CONTRIBUTION OF LABOUR, CAPITAL,  
TECHNOLOGICAL PROGRESS IN THE CONSTRUCTION  
SECTOR GROWTH OF VIETNAM**

The model is used to examine the contribution of capital, labour and technological progress in sectoral GDP growth as follows

$$\text{Gr}(Q) = \text{Gr}(A) + S_k \text{Gr}(K) + S_l \text{Gr}(L)$$

- $\text{Gr}(Q)$ : Growth rate of GDP
- $\text{Gr}(A)$ : Growth rate of technological progress
- $\text{Gr}(K)$ : Growth rate of capital
- $\text{Gr}(L)$ : Growth rate of labour
- Where  $S_k$  and  $S_l$  represent share of capital and labour respectively

**Figure 3. The three - pronged approach to output growth**



**Table 10. Growth of sectoral GDP, labour and capital in CSV***At current prices*

<b>YEAR</b>	<b>GDP (VND. Billion.)</b>	<b>Growth Rate of GDP</b>	<b>Total Labour (Thousand persons)</b>	<b>Growth Rate of Worker</b>	<b>Gross Capital (VND. Billion.)</b>	<b>Growth Rate of Capital</b>
2005	53276		1998.9		60923	
2006	64503	19.12%	2136.5	6.66%	77752	24.39%
2007	79712	21.17%	2267.8	5.96%	119034	42.59%
2008	95696	18.28%	2468.4	8.48%	163958	32.02%
2009	110255	14.16%	2594.1	4.97%	239304	37.81%
2010	139162	23.28%	3108	18.07%	296290	21.36%
2011	138305	-0.62%	3211.1	3.26%	322075	8.34%
2012	142800	3.20%	3271.5	1.86%	373836	14.90%
<b>Average</b>		<b>14.09%</b>		<b>7.04%</b>		<b>25.29%</b>

**Table 11. Growth of sectoral GDP, labour and capital in CSV***At current prices*

<b>YEAR</b>	<b>GDP (VND.Bil.)</b>	<b>Total Compensation to Employees (VND.Bil.)</b>	<b>Wages share</b>	<b>Capital share</b>	<b>(Slt+ Slt-1)/2</b>	<b>(Skt+Skt-1)/2</b>
2005	53276	33534	0.6294	0.3706		
2006	64503	42790	0.6634	0.3366	0.6464	0.3536
2007	79712	57255	0.7183	0.2817	0.6908	0.3092
2008	95696	69165	0.7228	0.2772	0.7205	0.2795
2009	110255	44445	0.4031	0.5969	0.5629	0.4371
2010	139162	64141	0.4609	0.5391	0.4320	0.5680
2011	138305	79018	0.5713	0.4287	0.5161	0.4839
2012	142800	93397	0.6540	0.3460	0.6127	0.3873
<b>Average</b>			<b>0.6029</b>	<b>0.3971</b>	<b>0.5974</b>	<b>0.4026</b>

*Sources: Estimated on basis of Vietnamese statistical yearbooks*



**Table 12. Contribution of Capital, Labour and Technological growth to GDP growth rate***At current prices*

<b>YEAR</b>	<b>GDP growth rate</b>	<b>Contribution of capital</b>	<b>Contribution of labour</b>	<b>TFP growth</b>
2006	19.12%	8.62%	4.30%	6.19%
2007	21.17%	13.17%	4.12%	3.88%
2008	18.28%	8.95%	6.11%	3.22%
2009	14.16%	16.53%	2.80%	-5.16%
2010	23.28%	12.13%	7.81%	3.34%
2011	-0.62%	4.04%	1.68%	-6.34%
2012	3.20%	5.77%	1.14%	-3.72%
<b>Average</b>	<b>14.09%</b>	<b>9.89%</b>	<b>3.99%</b>	<b>0.20%</b>

# RESEARCH FINDINGS

The period of 2006 – 2012:

- Contribution of technological progress to GDP growth in construction sector was inconsiderable
- Contributions of labor and capital brought a positive contribution

# REASONS

- Not self-reliance in science and technology;
- Lack of excellent leaders in science and technology personnel, general engineers in charge, especially lack of adjacent of science and technology young with high qualification;
- Lack of organic links between of science and technology research and education - training and production - business, lack of cooperation between research institutions, universities and enterprises
- Management of science and technology activities are focused primarily on inputs, not pay due attention to the management of product quality output and application research findings into practice
- Lack of effective policies to create incentives for officers of science and technology and meritocracy, reasonable salary, no encouragement for scientific and technological officers to be fully committed to the career of science and technology.

# REASONS (contd.)

- Investment to improve potential of science and technology in the long run is not focused properly, the lack of focus on key areas, priorities, resulting infrastructure of science and technology is backward, and investment efficiency is low;
- Almost businesses in the construction sector were spreading investment, leading to inefficiency and waste resources (most of the state enterprises);
- Corruption in the import of machinery and industrial production line of the backwardness of state enterprises is the cause of the negative impact of technological progress on the construction sector GDP.

# SUGGESTIONS AND RECOMMENDATIONS

- Survey, investigation and evaluation of real situation of technologies in construction industry;
- Improving the system of universities, colleges and vocational schools and institutes system of Ministry of Construction;
- Education, training and fostering for scientific and technological personnel has to be associated with the policy of staff use, the appropriate incentives of incomes, respectability, creating good environment for them to work and dedication;
- Government must strictly control technological lines of the state corporation imported from abroad to anti-corruption, strictly control foreign capital share by machines, equipment, technological lines in joint venture corporation;
- The strategy for long-term;

# SUGGESTIONS AND RECOMMENDATIONS (contd.)

- Funds: we should be diversification of investment capital for science and technology, paying special attention funds from the businesses, combination based on 3 partners: State, entrepreneur, scientist;
- To enlist international cooperation in development of construction technologies.

**MANY THANKS  
FOR YOUR ATTENTION**