THE EFFECT OF LABOR INPUT, CONSTRUCTION COST, AND BUILDING PERMITS ON PRODUCTION CONSTRUCTION WITH STRUCTURAL EQUATION MODELING, EVIDENCE FROM EUROPE

Abdillah Arif Nasution [A], Iskandar Muda[B], Yasara Ulfah[C], Erlina Erlina[D], Alexandru-Mircea Nedelea[E]

Purpose : This study examines the impact of labor input, construction costs, and building permits on production construction.

Theoritical Framework : Nowadays, construction projects are growing. Construction projects require serious management because the larger the project, the more complex the dependence on one job to another in order to achieve the desired results.

Design/Methodology/Approach : The secondary data explore from European data obtained from Eurostat from 2016 to 2019. Analyzing and proving hypotheses using Smart PLS software.

Findings : The labor input has impact on production construction. The Construction Cost and Building Permits are not impcat to the Production Construction. Efforts to increase business creation should be a development priority in Europe. This is not only related to efforts to achieve the demographic bonus, but also efforts to achieve increased welfare for the Europe community.

Research implication : Regional revenue is money that goes into the regional treasury. In implementation of decentralization, regional revenues consist of revenue and financing. Regional income is a recognized right of local government as in the period concerned, while regional financing is all revenues that need to be paid back and/or expenses that will be received back, either in the relevant fiscal year as well as in other fiscal years next.

Practical implication : There is potential for the development and energy sources, increasing mastery of technology and quality of human resources, development of strategic industries, increasing sector between European and non-European countries.

Social implication : The construction sector is one sector that can create jobs and encourage the transfer of technology that is useful for social aspects.

Originality/Value : Enhancement productivity and quality of human resources to be important factor in the effort to reach the potential bonus demographics in Europe. In an effort to achieve demographic bonus opportunities, then in European countries it is

[A] Lecturer at the Accounting Department of Universitas Sumatera Utara, Medan, Indonesia.
E-mail : badinst@usu.ac.id Orcid: https://orcid.org/0000-0001-5538-7992
[B] Lecturer at the Accounting Department of Universitas Sumatera Utara, Medan, Indonesia.
Email : iskandar1@usu.ac.id Orcid: https://orcid.org/0000-0001-6478-9934
[C] Accounting Student at the Universitas Sumatera Utara, Medan, Indonesia.
E-mail : yasaraulfah@students.usu.ac.id Orcid: https://orcid.org/0000-0002-4921-4216
[D] Accounting Professor at the Accounting Department of Universitas Sumatera Utara, Medan, Indonesia.
E-mail: erlina@usu.ac.id Orcid : https://orcid.org/0000-0002-0114-0377
[E] Researcher at Coordinator Club of Asian Studies, University of Suceava, Romania.
Email : alnedelea@yahoo.com Orcid https://orcid.org/0000-0002-2781-1482

expected focus on improving job creation and business for the population young age due to the number of young people which is relatively less. If this population group has the ability increase revenue and productivity, then the country's economy can be improved which in turn can promote growth economy in achieving the demographic bonus in future.

O EFEITO DA MÃO DE OBRA, CUSTO DE CONSTRUÇÃO E LICENÇAS DE CONSTRUÇÃO NA CONSTRUÇÃO DE PRODUÇÃO COM MODELAGEM DE EQUAÇÕES ESTRUTURAIS, EVIDÊNCIAS DA EUROPA

RESUMO
Objetivo : Este estudo examina o impacto da mão-de-obra, dos custos de construção e das licenças de construção na construção de produção.
Estrutura teórica : Atualmente, os projetos de construção estão crescendo. Os projetos de construção exigem uma gestão séria porque quanto maior o projeto, mais complexa é a dependência de um trabalho para outro, a fim de alcançar os resultados desejados.
Projeto/Metodologia/Aproximação: Os dados secundários explorados a partir de dados europeus obtidos do Eurostat de 2016 a 2019. Análise e comprovação de hipóteses utilizando o software Smart PLS.
Constatações : A mão-de-obra empregada tem impacto na construção da produção. O custo de construção e as licenças de construção não são impcat para a construção de produção. Os esforços para aumentar a criação de negócios devem ser uma prioridade de desenvolvimento na Europa. Isto não está relacionado apenas aos esforços para alcançar o bônus demográfico, mas também aos esforços para alcançar maior bem-estar para a comunidade européia.
Implicação da pesquisa : A receita regional é dinheiro que vai para o tesouro regional. Na implementação da descentralização, as receitas regionais consistem em receitas e financiamento. A receita regional é um direito reconhecido do governo local como no período em questão, enquanto o financiamento regional é todas as receitas que precisam ser pagas e/ou despesas que serão recebidas de volta, tanto no ano fiscal relevante quanto em outros anos fiscais seguintes.
Implicação prática : Há potencial para o desenvolvimento e fontes de energia, crescente domínio da tecnologia e qualidade dos recursos humanos, desenvolvimento de indústrias estratégicas, aumento do setor entre países europeus e não europeus.
Implicação social : O setor de construção é um setor que pode criar empregos e incentivar a transferência de tecnologia que é útil para os aspectos sociais.
Originalidade/Valor: O aumento da produtividade e da qualidade dos recursos humanos é um fator importante no esforço para atingir o potencial bônus demográfico na Europa. Em um esforço para alcançar as oportunidades de bônus demográficos, então nos países europeus espera-se que o foco seja na melhoria da criação de empregos e negócios para a população jovem devido ao número de jovens que é relativamente menor. Se este grupo populacional tiver a capacidade de aumentar a receita e a produtividade, então a economia do país pode ser melhorada, o que, por sua vez, pode promover o crescimento econômico para alcançar o bônus demográfico no futuro.

Palavras-chave: Entrada de Mão-de-Obra, Custo de Construção, Licenças de Construção, Construção de Produção.

EL EFECTO DE LA MANO DE OBRA, EL COSTE DE LA CONSTRUCCIÓN Y LOS PERMISOS DE EDIFICACIÓN EN LA PRODUCCIÓN DE LA CONSTRUCCIÓN CON MODELOS DE ECUACIONES ESTRUCTURALES, EVIDENCIA DE EUROPA

RESUMEN
Objetivo : Este estudio examina el impacto de los insumos de mano de obra, los costes de construcción y los permisos de construcción en la producción de la construcción.
Marco teórico : Hoy en día, los proyectos de construcción son cada vez más numerosos. Los proyectos de construcción requieren una gestión seria porque cuanto más grande es el proyecto, más compleja es la dependencia de un trabajo a otro para lograr los resultados deseados.
Diseño/Metodología/Enfoque : Los datos secundarios se exploran a partir de datos europeos obtenidos de Eurostat de 2016 a 2019. Se analizan y prueban las hipótesis utilizando el software Smart PLS.

Intern. Journal of Profess. Bus. Review. | Miami, v. 7 | n. 3 | p. 01-16 | e0592 | 2022.

2

Conclusiones : La mano de obra tiene impacto en la producción de la construcción. El coste de la construcción y los permisos de construcción no son impcat a la construcción de producción. Los esfuerzos para aumentar la creación de empresas deberían ser una prioridad de desarrollo en Europa. Esto no sólo está relacionado con los esfuerzos para lograr el bono demográfico, sino también con los esfuerzos para lograr un mayor bienestar para la comunidad europea.

Implicación de la investigación : Los ingresos regionales son el dinero que entra en las arcas regionales. En la aplicación de la descentralización, las rentas regionales consisten en ingresos y financiación. Los ingresos regionales son un derecho reconocido a la administración local en el período en cuestión, mientras que la financiación regional son todos los ingresos que deben devolverse y/o los gastos que se recibirán de vuelta, tanto en el ejercicio fiscal correspondiente como en otros ejercicios fiscales siguientes.

Implicación práctica : Existe un potencial para el desarrollo y las fuentes de energía, el aumento del dominio de la tecnología y la calidad de los recursos humanos, el desarrollo de industrias estratégicas, el aumento del sector entre los países europeos y no europeos.

Implicación social : El sector de la construcción es un sector que puede crear puestos de trabajo y fomentar la transferencia de tecnología útil para los aspectos sociales.

Originalidad/Valor : La mejora de la productividad y de la calidad de los recursos humanos será un factor importante en el esfuerzo por alcanzar el bono demográfico potencial en Europa. En un esfuerzo por alcanzar las oportunidades de bonificación demográfica, a continuación, en los países europeos se espera que se centran en la mejora de la creación de empleo y de negocios para la población de edad joven debido al número de jóvenes que es relativamente menor. Si este grupo de población tiene la capacidad de aumentar los ingresos y la productividad, entonces la economía del país se puede mejorar que a su vez puede promover el crecimiento de la economía en el logro de la bonificación demográfica en el futuro.

Palabras clave: Mano de obra, Coste de la Construcción, Permisos de Construcción, Producción de la Construcción.

INTRODUCTION

The construction industry plays a role in economic development because it provides the production of goods and services from related industries. The national socio-economic development goals in the provision of housing, infrastructure and employment are created and contributed by the construction sector. According to Alaloul *et al*., (2021), the construction industry is a complex economic sector, which involves various stakeholders and has broad linkages with other fields of activity such as the manufacture and use of materials, energy, finance, labor. and equipment. In addition, according to Nguyen and Nguyen (2021) state that the role of the construction industry can mobilize the use of human and material resources in the development of the housing and infrastructure sector that can create jobs and increase economic efficiency. The construction industry produces output from the construction industry that is inseparable from national output, which is part of the Gross Domestic Product (GDP) in both developed and developing countries. (Alaloul et al., 2021, Banerjee et al., 2021, Demydenko & Demydenko, 2021, Ikabe et al., 2021; Musarat et al., 2021).

In various parts of the world, the construction industry makes an important contribution to job creation. In Europe work in the construction industry provides the proportion of 5% of the average wage. The period 2007-2011, when the Great Recession occurred the construction industry lost about 2 million workers. In the UK, construction industry revenues fell by 1.1

Intern. Journal of Profess. Bus. Review. | Miami, v. 7 | n. 3 | p. 01-16 | e0592 | 2022.

3

percent during the fourth quarter of 2008. In Spain, 500,000 construction jobs were lost. The result was massive job losses between 2009-2015 (Cekindo, 2019). The construction industry was able to recover and grow back overall in 2014. The growth rate for the EU-28 countries has reached a total of 1.1% in 2014, while the construction industry has grown by 2 (Andreou et al., 2020).

The mobility of workers is largely due to the average construction company having only 3.9 employees. All construction workers in the small and medium business sector absorb around 200 workers. On average, SMEs only have 3.4 employees. Only a fraction of 0.06% of all companies are considered large companies. The average employs 752.3 people (Astrov et al., 2021). These small companies become the job base and income base of the construction industry which tends to focus on a specific task and construction itself, while large companies tend to be more involved in civil engineering and various services. In 2012 there were 3.2 million registered construction companies in Europe with more than 3 million companies employing more than 12 million people in the European construction industry (Smit et al., 2020). This industrial sector is highly fragmented due to specialization and volatility. Larger companies usually have a more productive workforce than small companies. Housing development is the most influential sector in Europe. Civil engineering will be the sub-sector with the highest growth. The construction industry remains one of the most important pillars of Europe's most important sector providing 20 million jobs with a 10% share of the EU's domestic product.

LITERATURE REVIEW
Labor Input

According to Subramony *et al.,* (2021) that in order to carry out a project, one of the resources is a determining factor for its success is labor. Workers are individuals who are looking for work or have got a job and are able to carry out a job so as to produce goods and money. Without a workforce, construction projects cannot be completed. Labor as a human resource has the following meaning:

a. Humans who work in an organization are also called personnel, workers or employees.

b. Human potential as an organizational driving force in realizing its existence

c. Potential that serves as non-financial capital in the organization, to create the existence of the organization.

Ballard and Jones (2021) state that Judging from the form of work relationship used, project workers, especially construction workers, can be divided into:

a. Permanent workers, namely permanent employees of the main contractor company concerned with an individual work bond for a relatively long period of time.

b. Temporary labor The existing labor association is between the manpower supplying company and the main contractor for a short period of time.

Labor input is the average expenditure of labor to be able to live or the total volume of output expressed in hours worked. Labor input is one unit of output obtained by dividing the number of hours worked by the number of units produced. Labor input which consists of the total or overall input of economic activity that represents the realization of aggregate expenditure from labor (Gawthorpe, 2020). To determine the number of hours of work required for a certain type of output when more than one branch of the economy is involved includes workers who are directly involved in the manufacture of products, as well as labor that can absorb raw materials, fuels, equipment, and other goods expended in production, there are several things that need to be reviewed, namely labor productivity: quality and quantity of work, efficiency of work plans, working hours, environmental conditions and so on (Nikoloski, 2017). Clardy (2021) state that the following are the job functions of the workforce based on their expertise.

a. A foreman is a person who has expertise in a certain field according to a certain type of work. The foreman directly supervises the worker or builder.

b. A head craftsman is a person who has expertise in the carpentry field for a certain type of work and gives instructions to the masons associated with that type of work.

c. A builder is a person who directly works in the field in a certain field as directed by the head craftsman. Builders usually have few skills.

d. Workers (laborers) are people who help masons or head artisans for all types of work without having to have expertise in certain jobs.

Labor input is standard, so its existence in a production is absolutely necessary (Diaconu, 2014). This labor will later be rewarded by a salary or wages. Salaries or wages for workers are formed based on the interaction between the demand and supply of various markets. This is also related to the formation of the price of labor itself as a factor of production. The theories explaining the background to the formation of wages and the formation of wage prices, namely:

a. The natural wage theory. David Ricardo explained that, a fair wage is based on the living costs of the worker's family and adjusted to the company's capabilities.

Intern. Journal of Profess. Bus. Review. | Miami, v. 7 | n. 3 | p. 01-16 | e0592 | 2022.

5

b.   Iron wage theory. This theory was put forward by Ferdinand Lasalle who stated that an entrepreneur would press the lowest possible wage in order to get maximum profit.

c.   Wage fund theory. This theory explains that the high wages are based on the amount of funds or capital provided by the company to pay wages.

d.   Ethical wage theory. This theory was developed by utopians who longed for an ideal society. The purpose of this theory is that wages are not only nominal, but wages must also ensure a decent life for workers and their families.

Construction Cost

The essential to certify the project on an economic basis and plan financing means. Estimation is generally intended to estimate the value of the financing of a project, not the actual cost incurred or spent. Cost estimation is carried out at an early stage, namely project conception (Holm and Schaufelberger, 2021 and Ali et al., 2022). Thus, the estimation can be done well and the estimation results are more accurate. This estimate is used to prepare a budget and form the basis for evaluating the project (Anysz *et al*., 2021). Evaluation is done by comparing the level of actual expenditure with the level of budgeted expenditure. Mahdavian *et al*., (2021) state that there are three main approaches to cost estimation namely:

a.   The Top down cost estimates

Top management will estimate the overall cost of the investment given to managers under it to estimate the cost of work packages that are part of the overall project.

b.   Bottom Up Cost Estimates

The first step is to divide the project into small jobs. The people involved in the work were asked for their opinion on the costs involved and the time for the work. This approach is rarely used because it is risky due to the tendency of top managers to inflate cost estimates to their subordinates.

c.   The combination

This approach is a combination approach between Top Down and Bottom Up where the top level manager invites his subordinates to submit a proposal for the estimated cost of work by noting the estimated limit, then the subordinate will submit a request from the top level manager to a lower level to be considered for his proposal.

In addition, there are four types of project cost estimates that we should know:

1.   A rough estimate for the owner, which is the estimate the owner will need to decide whether to implement the project or not, assisted by a feasibility study.

2.   Preliminary estimates by the planning consultant are carried out after the design or design has been completed by the planning consultant.

3.   Detailed estimation by the contractor, namely an estimate made in more detail and thoroughly because it has taken into account all possibilities, starting from the terrain, implementation methods, stock of certain materials, and others.

4.   The actual cost after the project is completed, or what is called the fixed price as stated in the last contract, except in the implementation of additional and less work. In the construction sector, this value is fixed revenue, whereas actual expenditure is everything that is spent to complete the project.

In construction companies there are also many costs incurred. These costs can be divided into several types, namely: (Elmousalami, 2020)

a.   Direct cost

1.   Material cost.

2.   Labor cost.

3.   Wage costs, disaggregated by daily wages, piece rates per unit volume, or as a whole for certain areas. Apart from wage rates.

b.   Indirect costs

1.   Field fees, including a number of tips for workers, fees for building temporary project facilities, building permit fees, taxes, meeting fees, equipment costs, FOH fees, costs for site documentation, and others.

2.   Office costs, costs not directly related to construction activities. For example, office rent, business license fee, qualification fee, stamp duty fee, and so on.

Building Permits

A building construction permit is a type of authorization that must be granted by the government or other supervisory agency before the legally possible construction of a new or existing building can occur. The Building Permits will legalize a planned building in accordance with a predetermined Spatial Plan. In addition, the existence of the Building Permits shows that the building construction plan can also be accounted for for the common interest.

Production Construction

Construction is basically the design and assembly of objects that are set in place, so that they have the characteristics of a site product, a unique product, and a temporary team. Consequently, to a certain extent the production construction is always about site production at

Intern. Journal of Profess. Bus. Review. | Miami, v. 7 | n. 3 | p. 01-16 | e0592 | 2022.

7

a particular location. Project technology requirements generally vary and require the mobilization of a temporary team with specific technological capabilities. Generally, there are two ways used to reduce the negative effects of instability in the production situation in construction. The first is to minimize the peculiarities of construction developed in a construction field, for example in manufacturing to simplify site construction and improve prefabrication and standardization. Second, the development of construction techniques so that they can cope with construction dynamics (Maraveas, 2020). According to Jeong and Jeong (2021), scope management is determined through a job breakdown structure. The objectives of scope management are: (1) sufficient or sufficient number of jobs; (2) work that does not need to be done; (3) the work performed provides a stated business objective. Thus, it is clear that project management is based solely on the concept of transformation and the principle of hierarchical breakdown. There are three different conceptualizations of production that have been used and developed Hardcopf et al., (2021) which provided the basis for JIT and lean production which was further developed in the 1940s. As for a number of important findings about behavior and flow control in brief:

a) Waste: proposed a model flow consisting of four stages: processing, inspection, waiting, and transfer. Ong and Pheng (2021) suggests that this approach makes transformation more efficient.

b) Reduced cycle time: cycle time refers to the time it takes for a particular piece of material to traverse the flow.

c) Rouwenhorst (2021): the formula for the relationship between cycle time and work in progress on each production line can be derived =

Cycle time = Work in progress/throughput

d) Impact of Variability: Katiraee et al, (2021) suggest that three alternatives; (1) flow buffering leading to long cycle times and high WIP rates; (2) receives a lower level of resource utilization, which equates to the acquisition of extra capacity; (3) accept the lost throughput..

e) Pull and Push: The push system schedules job releases, while the pull system authorizes job shedding based on the system status (Schulze and Dallasega, 2021). Gayer et al., (2021) present a push-pull system that pushes through certain manufacturing stages.

Bertelsen and Lauri (2002) in their journals explain that there are four different sets of principles that are the basis for designing, controlling and improving production systems.

METHODOLOGY

The data used is secondary data obtained from the European Statistical Recovery Dashboard. Secondary data used are labor input, construction costs, building permits, and construction production in 2016-2019 in Eurostat.

RESULTS AND DISCUSSION

Result

Data Descriptive

The explanation of data are show in Table 1.

Table 1. Descriptive Statistics

Years	Countries	Labor Input (X_1)	Construction Cost (X_2)	Building Permits (X_3)	Productions Construction (Y)
2016	Ireland	114.2	100.7	122.3	112.6
	France	98.9	100.7	114.6	99.8
	Croatia	98.8	98.9	133.1	103.6
	Italy	99.7	100.3	103.9	99.9
	Netherland	99.7	101.6	97.7	107.8
	Austria	100.3	100.6	115.6	102.2
	Poland	99.1	99.8	112.2	85.9
	Sloveria	99.2	98.8	109.2	82.3
	Slovakia	101.2	101.1	114.6	89.1
	Findland	105.1	100.5	126.2	105.4
2017	Ireland	105.1	100.8	154.4	103.6
	France	98.9	102.6	122.1	102.6
	Croatia	98.2	100.9	120.8	100.6
	Italy	104.8	102.9	123.6	105.1
	Netherland	102.7	103.9	125.9	116.9
	Austria	101.3	100.6	133.8	98.1
	Poland	102.6	103.5	116.8	96.9
	Sloveria	103.7	103.9	104.7	92.3
	Slovakia	110.2	100.8	150.7	110.9
2018	Ireland	107.6	100.3	168.9	110.8
	France	97.6	102.2	127.4	101.6
	Croatia	101.1	110.2	122.5	112.5
	Italy	107.1	104.8	137.3	109.3
	Netherland	106.3	106.5	129.3	122.4
	Austria	107.7	107.1	108.2	116.3
	Poland	105.7	103.7	138.2	117.3

Intern. Journal of Profess. Bus. Review. | Miami, v. 7 | n. 3 | p. 01-16 | e0592 | 2022.

9

	Sloveria	107.2	107.8	116.6	99.7
	Slovakia	100.9	105	113.9	102.2
2019	Ireland	104.1	107.8	109.7	102.9
	France	98.6	102.8	127.5	103.6
	Croatia	116.3	133.3	108.8	111.6
	Italy	109.7	107.9	134.8	110.1
	Netherland	110.2	109.5	104.7	128.2
	Austria	113.1	108.3	121.8	122.6
	Poland	117.6	109.6	122.2	119.8
	Sloveria	114.1	112.6	115.5	96.4
	Slovakia	112.7	104.1	120.8	113.3

Source: Eurostat (2021).

Based on Table 1, it can be seen that the average value of transactions in the industrial sector, namely $X_1 = 1,046,886$, $X_2 = 1,036,600$, $X_3 = 1,230,743$, and $Y = 1,057,829$ with a maximum value of $X_1 = 1,176$, $X_2 = 1,126$, $X_3 = 1,689$, and $Y = 1,282$ and minimum $X_1 = 9.76$, $X_2 = 9.88$, and $X_3 = 9.77$ and $Y = 8.23$.

Table 2 presents Skewness and kurtosis which can show the condition of the distribution or distribution of data. The ideal condition is when the data is normally distributed, i.e. when skewness is 0 and kurtosis is 3. The farther from the ideal condition means the data is spread out more and more not ideally or unevenly.

Table 2. The Skewness and Kurtosis Statistics

	No.	Missing	Mean	Median	Min	Max	Std. Deviation	Excess Kurtosis	Skewness
X_1	1	0	1046.886	1041.000	976.00	1176.00	53.662	-0.538	0.626
X_2	2	0	1036.600	1028.000	988.00	1126.00	36.125	-0.476	0.754
X_3	3	0	1230.743	1221.000	977.00	1689.00	146.132	1.816	1.059
Y	4	0	1057.829	1036.000	823.00	1282.00	102.680	-0.021	-0.05

Source: Results of processing with SmartPLS (2021).

The results in Table 2 above show that the condition of each variable is normally distributed, namely when skewness is 0 and kurtosis is 3. The results of the t-statistic value in the path coefficient table are presented in Figure 1 below:

Figure 1. Overall model with coefficients
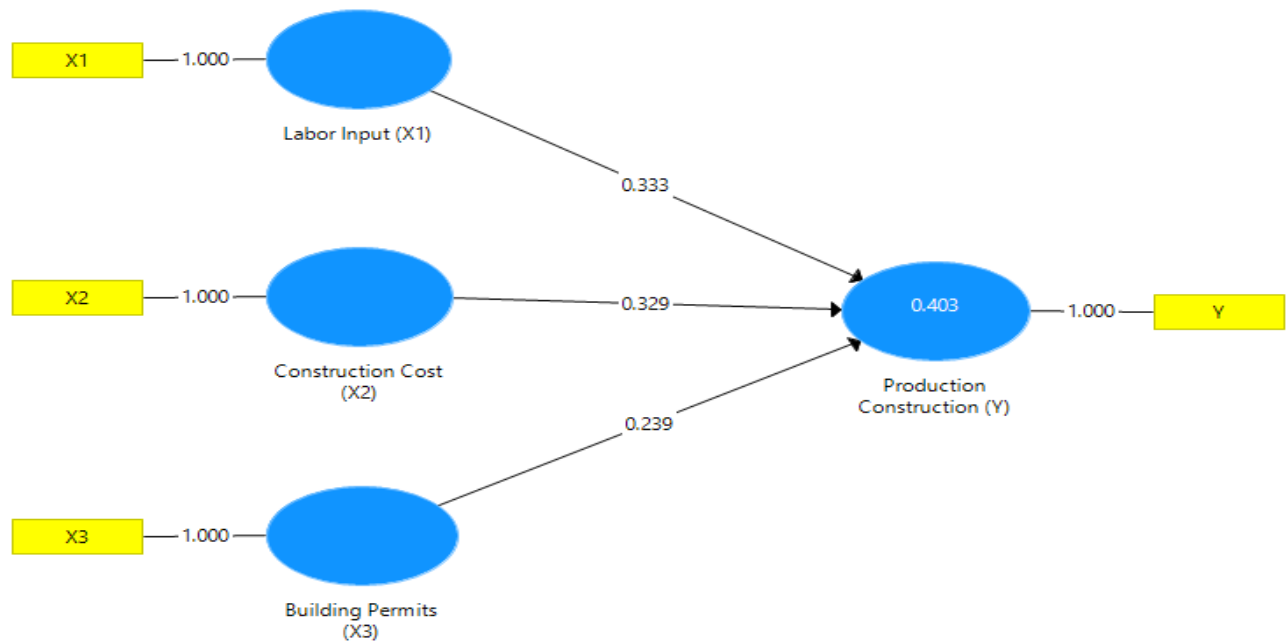
Source: SmartPLS (2021).

Based on the model in Figure 1, it can be seen that the labor input variable (X_1) has an effect on the Production Construction variable (Y), the Construction cost variable (X_2) affects the Production Construction (Y) variable, and the Building Permits variable affects the Production Construction (Y) variable. The results of hypothesis testing can be seen in the following table: The statistical results of this study can be seen in Table 2 below:

Table 2. Path Coefficient

	Standard Deviation	T Statistics	P Values
Building Permits (X_3) -> Production Construction (Y)	0.131	1,816	0.070
Construction Cost (X_2) -> Production Construction (Y)	0.173	1,908	0.057
Labor Input (X_1) -> Production Construction (Y)	0.127	2,627	0.009

Source: SmartPLS Output (2021).

Based on the Table 2 results of hypothesis testing that has been done, it can be seen that labor input (X_1) is an independent variable that has a positive and significant effect on production construction. This can be seen from the value of t statistic> t table, namely 2.627> 2.037, and this is evidenced by the original sample value of 0.009 with a significance of 0.009 <0.05, which means that the labor input variable (X_1) is significant for production construction. The Construction Cost (X_2) and Building Permits (X_3) variables are independent variables that do not have a positive and significant effect on Production Construction (Y). This can be seen

from the t statistical value of X_2 is 1.908 with a significance of 1.908 <2.037 while X_3 has a statistical t value of 1.816 with a significance of 1.816 <2,

The predictive relevance

The results of the predictive value are shown in Table 3 as follows:

Table 3. Predictive relevance

	Building Permits (X₃)	Construction Cost (X₂)	Labor Input (X₁)	Production Construction (Y)
Building Permits (X₃)				0.079
Construction Cost (X₂)				0.103
Labor Input (X₁)				0.106
Production Construction (Y)				

Source: PLS Output (2021).

Based on table 3, it can be seen that labor input (X_4) has an effect of 10.6% on the production construction variable (Y). Construction cost (X_2) has an effect of 10.3% on production construction (Y). And building permits (X_3) has an effect of 7.9% on production construction (Y).

The determination coefficient

The result of Adjusted R as a follows in Table 4:

Table 4. The determination coefficient

	R Square	R Square Adjusted
Production Construction (Y)	0.403	0.346

Source: SmartPLS output (2021).

Based on the test results of the coefficient of determination in the Table 4 above, the R Square value is 0.403 and the Adjusted R Square value is 0.346. This indicates that the variation of the independent variables, namely labor input (X_1), construction cost (X_2), and building permits (X_3) which is able to explain the dependent variable in the form of construction production (Y) is 34.6%.

DISCUSSION

This process certainly involves related parties, either directly or indirectly. Construction projects are divided into two, namely buildings, such as: houses, offices, factories, etc. as well as civilian buildings, such as: roads, bridges, dams, and other infrastructure (Górecki, 2020). Conversely, if you want to reduce costs, you have to compromise on quality and schedule. From a technical point of view, the measure of a project's success is linked to the extent to which the three objectives can be met.

Apart from the factors mentioned above, there are several other factors that support construction projects including: labor input, construction costs, and building permits. Workforce plays a big role in the success of construction projects. The construction workforce has certain classifications and qualifications, including: architectural, civil, mechanical, environmental planning and implementation management. Meanwhile, the qualifications of the construction workforce are: operator, technician or analyst, and expert.

Apart from labor, another thing that is needed is construction costs. In essence, construction cost is estimating or estimating an analysis value based on experience. Estimating, especially in describing the volume (quantity) of each activity post, is a job that requires accuracy in order to obtain the right results. The most important part of estimating preparation is the field survey by the estimator accompanied by the operations manager so that they can provide input related to implementation.

Besides that, building permits are also an important factor. Without a building construction permit, construction will be hampered. Good construction regulations are essential for public safety. According to recent research, the construction industry files on average account for 6.5% of the OECD economic GDP.

CONCLUSION

Of the three variables tested, there is only one variable that has impact namely the labor input variable (X_1) on construction production. The remaining variables do not have a positive and significant effect on construction production. The implication of this research is that the demand for labor is the demand for inputs. This demand is different from consumer demand for goods and services (commodities). Consumers buy a commodity because the commodity will provide use or satisfaction for him, but for the entrepreneur, hiring a worker with a purpose to help produce goods or services (commodity) to be sold to consumers and obtain profit. In other words, the increase employers' demand for labor very dependent on the increase in

demand consumers of the goods to be produced. Therefore, the demand for labor referred to as related demand (derived demand).

REFERENCES

Alaloul, W. S., Musarat, M. A., Rabbani, M. B. A., Iqbal, Q., Maqsoom, A., & Farooq, W. (2021). Construction Sector Contribution to Economic Stability: Malaysian GDP Distribution. Sustainability, *13*(9), pp.5012.

Alaloul, W. S., Musarat, M. A., Rabbani, M. B. A., Iqbal, Q., Maqsoom, A., & Farooq, W. (2021). Construction Sector Contribution to Economic Stability: Malaysian GDP Distribution. Sustainability, *13*(9), pp.5012-5029).

Ali, M.; Opulencia, M.J.C.;Chandra, T.; Chandra, S.; Dias, R.; Chetthamrongchai, P.; Jalil, A.T. (2022). An Environmentally Friendly Solution for Waste Facial Masks Recycled in Construction Materials. Sustainability. 14, 8739. https://doi.org/10.3390/su14148739

Andreou, A., Barrett, J., Taylor, P. G., Brockway, P. E., & Wadud, Z. (2020). Decomposing the drivers of residential space cooling energy consumption in EU-28 countries using a panel data approach. *Energy and Built Environment*, *1*(4), pp.432-442.

Anysz, H., Nicał, A., Stević, Ž., Grzegorzewski, M., & Sikora, K. (2021). Pareto Optimal Decisions in Multi-Criteria Decision Making Explained with Construction Cost Cases. *Symmetry*, *13*(1), pp.46-61.

Astrov, V., Grieveson, R., Hanzl-Weiss, D., Leitner, S., Mara, I., & Vidovic, H. (2021). *How do Economies in EU-CEE Cope with Labour Shortages?* (No. 452). The Vienna Institute for International Economic Studies, wiiw.

Ballard, R., & Jones, G. A. (2021). Trickle-out urbanism: are Johannesburg's gated estates good for their poor neighbours?. In *Urban Forum* (Vol. 32, No. 2, pp. 165-182). Springer Netherlands.

Banerjee, O., Cicowiez, M., Vargas, R., Obst, C., Cala, J. R., Alvarez-Espinosa, A. C., ... & Meneses, D. S. (2021). Gross domestic product alone provides misleading policy guidance for post-conflict land use trajectories in Colombia. Ecological Economics, 182, pp.106929.

Bertelsen, S., Lauri, K. (2002). Managing The Three Aspects Of Production In Construction. *Research Gate,* pp.2-9.

Cekindo. (2019, January 25). Building and Construction. Retrieved from Cekindo Web Site: https://www.cekindo.com/sectors/building

Clardy, A. (2021). What Does HR Manage? Workforce Measurement and Control. Merits, 1(1), pp.16-33.

Demydenko, S., & Demydenko, V. (2021). Assessment Of Impact Factors Affecting Enterprise Performance In The Ukrainian Building Construction Sector. *Financial and credit activity: problems of theory and practice*, *2*(37), pp.142-150.

Intern. Journal of Profess. Bus. Review. | Miami, v. 7 | n. 3 | p. 01-16 | e0592 | 2022.

14

Diaconu, L. (2014). Education and labour market outcomes in Romania. Eastern Journal of European Studies, 5(1), pp.99-112.

Elmousalami, H. H. (2020). Artificial intelligence and parametric construction cost estimate modeling: state-of-the-art review. *Journal of Construction Engineering and Management*, *146*(1), 03119008.

Eurostat (2021). *European Statistics*. Retieved from https://ec.europa.eu/eurostat/data/database.

Gawthorpe, K. (2020). Heterogeneous VAT taxation in the Czech economy. Eastern Journal of European Studies, *11*(2), pp.132-159.

Gayer, B. D., Saurin, T. A., & Wachs, P. (2020). A method for assessing pull production systems: a study of manufacturing, healthcare, and construction. *Production Planning & Control*, pp.1-21.

Górecki, J. (2020). Simulation-Based Positioning of Circular Economy Manager's Skills in Construction Projects. Symmetry, *12*(1), 50.

Hair Jr, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2021). A primer on partial least squares structural equation modeling (PLS-SEM). Sage publications.

Hardcopf, R., Liu, G. J., & Shah, R. (2021). Lean production and operational performance: The influence of organizational culture. International Journal of Production Economics, 235, 108060.

Holm, L., & Schaufelberger, J. E. (2021). *Construction cost estimating*. Routledge.

Ikuabe, M., Aigbavboa, C., Oke, A., Aghimien, D., & Thwala, W. (2021, July). Contextualizing Foreign Investments in the Nigerian Construction Industry. In International Conference on Applied Human Factors and Ergonomics (pp. 277-286). Springer, Cham.

Jeong, J., & Jeong, J. (2021). Novel approach of the integrated work & risk breakdown structure for identifying the hierarchy of fatal incident in construction industry. *Journal of Building Engineering*, *41*, pp.102406.

Katiraee, N., Calzavara, M., Finco, S., Battini, D., & Battaïa, O. (2021). Consideration of workers' differences in production systems modelling and design: State of the art and directions for future research. *International Journal of Production Research*, *59*(11), pp.3237-3268.

Mahdavian, A., Shojaei, A., Salem, M., Yuan, J. S., & Oloufa, A. A. (2021). Data-Driven Predictive Modeling of Highway Construction Cost Items. *Journal of Construction Engineering and Management*, *147*(3), pp.04020180.

Maraveas, C. (2020). Production of sustainable construction materials using agro-wastes. *Materials*, *13*(2), 262.

Musarat, M. A., Alaloul, W. S., & Liew, M. S. (2021). Impact of inflation rate on construction projects budget: A review. *Ain Shams Engineering Journal*, *12*(1), pp.407-414.

Intern. Journal of Profess. Bus. Review. | Miami, v. 7 | n. 3 | p. 01-16 | e0592 | 2022.

15

Nguyen, T. D., & Nguyen, P. N. (2021). Social Resources Mobilization for General Education Development: A Case Study for Secondary Schools in Ho Chi Minh City, Vietnam. *Vietnam Journal of Education*, *5*(2), pp.21-28.

Nikoloski, D. (2017). The impact of Foreign Direct Investments on employment: the case of the Macedonian manufacturing sector. *Eastern Journal of European Studies*, *8*(2), pp.147-165.

Ong, J., & Pheng, L. S. (2021). *Waste Reduction in Precast Construction*. Springer Science and Business Media LLC.

Rouwenhorst, K. G. (2021). 10 Asset Pricing Implications of Equilibrium Business Cycle Models. In Frontiers of business cycle research (pp. 294-330). Princeton University Press.
Schulze, F., & Dallasega, P. (2021). Barriers to lean implementation in engineer-to-order manufacturing with subsequent assembly on-site: state of the art and future directions. *Production Planning & Control*, pp.1-25.

Smit, S., Tacke, T., Lund, S., Manyika, J., & Thiel, L. (2020). *The future of work in Europe*. McKinsey Global Institute.

Subramony, M., Guthrie, J. P., & Dooney, J. (2021). Investing in HR? Human resource function investments and labor productivity in US organizations. *The International Journal of Human Resource Management*, *32*(2), pp.307-330.