AN INVESTIGATION INTO THE IMPACTS THE TECHNICIANS' SKILLS GAP HAS ON THE DEVELOPMENT OF THE NIGERIAN CONSTRUCTION INDUSTRY

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Abstract

This study investigates the effect of the technicians' skills gaps and its impact on the building construction industry development in Nigeria. The technicians' skills gaps are considered critical in terms of the industry performances particularly in the workforce efficiency. This has led to poor performances of the industry in its competences and productivity, which affected the nation's economy. The paper critically assessed the technicians' skills gaps and training on the output of the industry performances. Hence, identify the factors that negate growth in technicians' skills within the industry. The research method for this study is a mixed method comprises of both quantitative and qualitative enquiries. However, at this stage, the paper is quantitative in nature through questionnaire survey with a total of 182 Participants, These Participants are Project Managers, Technicians and Trainers within the Nigerian construction industry in Abuja Metropolis. Collected data was analysed using content means and frequency analysis, descriptive analysis. The findings of this study indicate that there are great demands for skilled workforce within the industry. More so, behavioural issues may exist between the employers and employees, which negate proper construction practices. This suggests that, Technicians' skills training and development is necessary for the industry to achieve effective output for its future growth.

Keywords: Construction Industry, Technicians' Skills development, Training and education

1. INTRODUCTION

In a developing country that is currently undergoing economic reform, the Nigerian construction industry is one of the major contributors to the country's Gross Domestic Product (GDP) for its future development (Okoye, 2016; Abdullahi and Bala, 2018; Mu'awiya et al., 2018). In addition, there are evidences that construction industry originally contributed between 10% and 20% to the Nigeria GDP in the 1970s, before it declined to 4% in its current state (Jagboro, 1989; Mogbo, 2000; Ihua-Maduenyi, 2018). The decrease in the contribution to the nation's GDP is due to several factors which, includes inadequate training and skills development, motivation and labour relation practices, poor planning, problems of finance, corruption, recruitment and selection practices (Andrey, 2015; Oseghale et al., 2015; Tunji-Olayeni et al., 2017; Ameh and Daniel, 2017). More so, the rate at which buildings are collapsing in Nigeria today are increasing daily and this failure in buildings occur during construction work and use, which needs immediate attention (Okolie et al., 2016; Egunjobi et al., 2016). As cited by Okolie et al., (2016), the collapsed buildings are due to so many problems which include; Unethical behaviour and poor guidance in terms of commitment, knowledge, negligence, dishonesty, and unfair practices are prevalent in the Nigerian building industry (Iyagba, 2009; Shah and Alotaibi, 2018).

However, training and skills development in its current form is inadequate which has led to skill shortages, skills gaps within the industry. This has affected the performances of the industry which led to low and consistently poor productivity over the years. In addition, the quality of workers' skills is another pressing issue in the Nigerian construction industry and is already having serious implications for both the industry and the Nation's economy (Oseghale et al., 2015; Ahmeh and Daniel, 2017). Yet, there are inadequate studies that addresses the impact of training and skills development on the output of the construction industry in Nigeria. The importance of training and skills upgrading of workers in the construction industry should be a continuous improvement process. Unskilled workers affect the quality of products and impact on time as well as costs of projects that are undertaken in the country, thus endangering the success of projects' execution, which in turns affect the nation's economic growth (Bilau, et al.2015; Zannah et al., 2017).

The failure of construction industry to address Skills gaps in terms of quantity and quality has seriously influenced the reduction in the Nigerian economic growth (Ekundayo, et al., 2013; Rahim, et al., 2016). Training and skills development are keys prerequisite for performances of any workforce, particularly in the construction industry (Banihashemi et al., 2017; Kassem et al., 2017). Hence, training of the workforce is important towards skills development, and it's a necessity for construction companies to understand the need for training and skills acquisition (Mpofu and Hlatywayo, 2015; Rashid et al., 2018). Therefore, the key objectives of this paper are: i) conduct critical reviews of literature on worker's skill acquisition and training within the context of the Nigerian Construction Industry, and ii) critically assess the current workers skills acquisition and training in Nigerian Construction Industry.

2.0 LITERATURE REVIEW

The achievement of every organisation's aims and objectives depends on the performance of its workforce, which is true for the construction industry. As such, well-trained workforce is one of the key prerequisites for a sound organisation. This implies that organisations should ensure that training and skills development of their workforce are paramount. This important activity within the industry should be carried out regularly to add value to human resources.

2.1 CONCEPT OF TRAINING

According to Armstrong (2017); Armstrong et al. (2015) training is defined as the formal and organized or systematic modification of behaviour through learning that occurs due to education, instruction and development as well as planned experience. Similarly, Salas et al. (2012), Obisi (2011) and Ericsson et al. (2018) stress that training is a planned and a continuous process that is designed to meet up with the training needs of today and the future, enhancing organisation performance and productivity through knowledge improvement and skills development.

Following the above studies, training has to do with imparting knowledge, skills and change in behaviours for a great job with the best available information and to the best quality required. In this light, the best possible arrangement of methods, techniques, tools and practices should be assembled in an organised form to achieve such a goal.

The construction industry is labour intensive, particularly in developing countries around the world. This is where construction organisations depends on the effort of their workforce for better outcomes due to the manual activities. For this study, an effective training should create an enabling environment which trainees are able to:

• Learn the importance of knowledge, skills and attitude.

- Practise applying the learned knowledge, skill and attitude.
- Act on feedback, both negative and positive, to enhance future performance.

2.2 TRAINING METHODS.

Bilau et al. (2015) explored the shortages of a skilled workforce in the Nigerian construction industry and identified numerous approaches to training. These include classroom training, trade group training, apprenticeship training, on the-Job-training, Craft Apprenticeship courses, conferences/discussion methods and an Apprenticeship Programme. These classifications of training methods are consistent with Craig (1996), who identified four basic techniques of training such as management development training, on the job training, classroom training and vestibule training. On the other hand, Naukrihub (2007) divides methods of training into two broad categories of behavioural and cognitive methods while Obisi (2011), and Raheja (2015) categorise training into two; as training on the job and off the job and the key issues are shown in Table 1.

2.3 THE NIGERIAN CONSTRUCTION INDUSTRY

The Nigerian construction industry has experience failure, since the discovery of crude oil in the seventies (Chen et al., 2016; Ogunde et al., 2017). Prior to oil and gas discovery, the construction projects executed have been on a large scale and these projects include buildings, roads, bridges, sewage plants, and dams (Awe et al., 2010). However, training status within Nigerian context is ineffective with low-quality coupling with challenges against the realisation of quality training (Ogbunaya and Udoudo, 2015; Okolocha and Baba, 2016). In addition, most of the technologies adopted by the construction industry in Nigeria are both local and imported.

This suggest the needs for training and skills development plus steady supply of manpower to the indigenous population to make use of the available resources and adapt the technology available (Ayonmike et al., 2015; Serumu, 2015; Chen et al., 2016). These skilled shortages has been experienced in most of the urban areas where a large percentage of unemployed workers are accompanied by technicians' skilled gaps in the building trades such as bricklayers, carpenters and plasterers (Oseghale et al., 2015; Afolabi et al., 2016; Zannah et al., 2017). Technicians are trained skilled workforce that can either work under the supervision of a professional or independently in a complex system.

2.4 THE NIGERIAN CONSTRUCTION INDUSTRY SKILLS SHORTAGE

Construction industry is mostly dependent on availabilities of its workforces due to its manual activities predominantly in developing countries. This implies that adequate supply of skilled workforce is of major concern to performances within the industry. However, the industry for many years undergo the shortages of skilled workforce and required materials (Bilau et al., 2015; Mukhtar et al., 2016). Furthermore, Healy et al. (2015) and Oseghale et al. (2015) state that skilled shortages and skills gaps are often portrayed as major hindrances to the development of the industry and the nation's economy. Likewise, failure of any project due to insufficient skills is due to inadequate training/education (Mukhtar et al., 2016; Agetue and Nnamdi, 2017).

Ihua-Maduenyi (2018) lamented that standard of competent skilled construction workforce is decreasing yearly, by 15 percent of technicians within the construction sector. According to the author, the poor performances of the Nigerian construction industry is due to inadequately skilled workforce and the need to improve the industry performance is paramount.

As Ihua-Maduenyi (2018) mentioned, the shortage of skilled workforce is mostly due to the weak stock of skilled construction workforce in the country. The paper further suggested a key

strategy to the challenges and repositioning of the sector through enhancement of domestic construction skills. This is can be carried out through educational institutions, with emphasis on providing students with practical training to complement their theoretical knowledge.

2.5 THE NIGERIAN CONSTRUCTION INDUSTRY SKILLS GAPS

Limited trained/skilled workforce is of major concern within the industry and has affected the industry performances. This has led to technicians' skills gaps and skills shortages within the industry, which required immediate attention. In addition, studies indicate that there are shortfalls within the industry in terms of quantity and quality of technicians being trained to satisfy the challenges (Afolabi et al., 2016; Bilau et al., 2015; Oseghale et al., 2015). Skills of the workforces is of great importance to the industry development, which is defined by Peterson et al. (2001:464) as "Skills represent a person's level of proficiency or competency to perform a task". The Government's Skills Task Force STF (2003) defined "skills gaps" - this is where members of the existing workforce lack necessary skills to do the job and "Skills shortages;" as absence of people with the required skills in the workforce. However, further training of the existing workforce to improve industry performance can fill skills gap and the problem of skill shortages can be address through enrolment of more competent people in the industry.

Article in Vanguard by Okogba (2019) lamented the skill gap in the Nigerian construction industry and poor project delivery has become a trend within the country and is of great concern. These skills gaps include: Masonry, carpentry, plumbing, electrical installation, painting and decoration among others.

2.6 CURRENT BEHAVIOURAL PATTERNS OF CONSTRUCTION WORKERS WITHIN THE SYSTEM

Construction is risky and one of the most dangerous industries that needs to be properly managed (Ganah and John, 2015; Ganah and John, 2017). It can manifest itself through hazards of work patterns and behaviour problems at work, which may be linked to the low level of health and safety culture when compared with other related industries.

Recent studies reveal that the Nigerian construction industry has the highest human rights abuses and other social problems such as lack of training on health and safety, risk assessment, ethics in construction related works, among others, compared to other countries (Olutuase, 2014; Abubakar, 2015; Agbede et al., 2016). Ogundipe et al., (2018) highlighted that lack of awareness on health and safety issues among Nigerian construction workers as major concerns. Similarly, organizations' reluctance to health and safety management are the biggest cause of fatal injury in workplace. Consequently, the overall health and safety standard and corporate image of Nigeria's construction industry have been affected.

According to Zhou et al. (2015), the trend of accidents within the construction industry has reduced progressively, due to continuous effort of researchers/practitioners. Though, Ghasemi et al., (2015) argue that construction industry compared to other industries has a high rate of fatal injuries and there should be need for adequate attention. However, this study suggested that should be more application on innovative approach on construction safety because at the present, the industry is still regarded as one of the hazardous.

2.7 KEY FINDINGS OF THE LITERATURE REVIEW

Based on the extensive reviewed of literature on the Nigerian construction industry, the key challenges identified for poor performances of the industry are: (See

Table 1). There are inadequate skilled upgrade of workforce within the industry which required adequate attention (Ogunsanmi, 2016), inadequate investment on skilled artisan training, and

workers'/ contractors' reluctance to invest on their training (Bilau et al., 2015; Oseghale et al, 2015).

Table 1:Outline of the Key issues on training in an organisation

- Training benefits are not clear to the top management
- Supervisors are not rewarded for carrying out effective training by top management
- Trainers provide limited counselling and consulting services to the rest of the organization
- There are great demands for skilled workforce in the Nigerian construction industry
- Construction related work is recorded as the most hazardous in terms of safety
- Most of the youths in Nigeria are not showing interest in construction related work
- There is insufficient funding on training of vocational and technical education
- In the literature, it appears there are behavioural issues (i.e. attitude) from employers and employees that are negating proper construction practices.

Okoye and Arimonu (2016) enumerated inadequate funding of technical and vocational education; inadequate facilities; brain drain; staff training and retention; curriculum of technical education; policy issues as some of the problems of the construction sectors. It has also indicated that effective communication among the stakeholders within the industry is vital to improve performance (Ejohwomu et al., 2017; Nipa et al., 2018). However, there is ineffective communication among technicians and other stakeholders. This suggest that there can be no effective training and skills development in any successful organisation without effective communication.

2.8 OUTLINE OF CONCEPTUAL MODEL OF TRAINING DEVELOPMENT IN NIGERIA

The proposed model gives a top-level understanding of how training and skills that should be implemented for the construction industry. The model is in three stages and is based on the INPUT-PROCESS – OUTPUT (IPO) model. The P (i.e. Process) is what the researcher wants to enhance, or effect change for the Nigerian construction industry. The new processes will include new behavioural patterns that will be embedded within the old processes, in an integrated format. Such injection will involve for example, remodelling universities curriculum development and remodelling at the college and vocational level curricula.

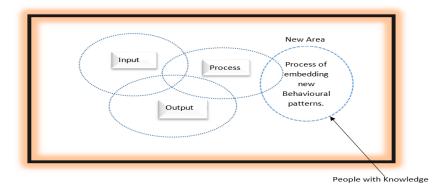


Figure 1: Outline for conceptual model for training and skills development.

From both primary and secondary data, it is clearly seen that there is a serious challenge within the construction industry in Nigeria regarding training. This has led to the shortfall in growth rate contribution to national growth and survival of the industry. This research investigates source of the problems to find a solution for developing a training and skills development

model for workers of the Nigerian construction industry that will improve workers' skills quality. The model shown in figure 1 is an outline for the conceptual model, which serve as a guide for the researcher to develop a detail model as the research progress.

3.0 METHODOLOGY

In this study, quantitative method of enquiry through questionnaire survey has been chosen as the most appropriate due to the nature of the research. An extensive literature review has been conducted which has resulted in the above outline of a Conceptual Model (Figure 1). The quantitative method of enquiries is in accordance to the research objectives, data collection and data analysis (McCusker and Gunaydin 2015; Brannen, 2017; Nardi, 2018). The use of this method enables the researcher to fill in the missing gaps, such that a holistic understanding can be generated through the research. The second aspect of this paper is to gather an understanding from primary sources (i.e, technicians', managers, educationist/trainers) in the Nigerian construction industry, whether what the researches, papers and articles in the literature corroborate well with the field work.

Quantitative method involves questionnaire survey:

A data collection from participants to seek their views on current workers skills within Nigerian construction industry through questionnaires survey. Constructed questionnaires on workers skills base on the research findings to fill in the gaps. This justify the participants views on the findings of the research achieved through closed ended questions from the questionnaire survey. Participants are the Project Managers, Technicians and Trainers/Educationist within the selected Nigerian construction industries.

3.1 QUESTIONNAIRE SURVEY

Questionnaire survey was used as a quantitative method, to gather participant's opinions to accessed workers skills based on the findings of the study (Brace, 2018; Nardi, 2018). The questionnaire covers the important criteria of technicians' skill development identified from the literatures to fill in the missing gaps. The questionnaire was designed to investigate the current technicians' skills within the Nigerian construction industry based on the findings. In the questionnaire, the factors that negate the development of workers (technicians) skills and the growth of the industry performances were examined. This approach facilitates the gathering of opinions and allowed comparison as well as statistical aggregation of strategic data collection from the different group of respondents.

3.2 PILOT TESTING OF THE QUESTIONNAIRE SURVEY, PROCEDURE AND RESULT

The aim of the pilot study was to test the reliability, authenticity, feasibility of an approach that is planned to ultimately be used in a larger scale study and validation of the questionnaires with experts within the selected construction industry (Adeleke et al., 2016; Mani et al., 2017).

Pilot testing is a technique which is valuable and viable for testing feasibility, acceptability and risk management in a study (Donovan, et al. 2019). This technique is a desirable effort before the major study commence. The Pilot study serves as a means of testing the procedure to employed in achieving the research objectives. The first draft of the questionnaire survey based on literature review findings for the pilot study was distributed to the academic team for review. After amendments were made and submitted to the academic team for final review. The selection of 12 participants within the Nigerian construction industry were through stratified random sampling and recruited for the Pilot studies. The questionnaires were submitted to the

ethical committee for consideration and approval was granted. After being approved by the university's ethic committee, the questionnaires were sent out to the participants through emails and post box.

3.3 DATA COLLECTION

In this study, the population is from Abuja in central Nigeria, due to its expansion as the new capital city of the country. The population was estimated to be 4,000,000 by the National population commission (NPC) (CTGN Africa Published on July 20, 2016). A random sample technique was used to represent the population of construction workforce opinions (Teddlie and Yu, 2007; Creswell, 2009). This was accomplished using the construction industries drives from the Civil Construction Directory Gallery (CCDG) database within Abuja metropolis.

Sample size is the genuine number of sampling made on the aggregate population; this is the extent of the population that was served with the research instrument (questionnaires). This study considers 5% of size accuracy, 95% certainty level, 50% level of inconsistency and a purposive sampling technique was embraced (Chuan and Penyelidikan, 2006). From there on, the sample size was chosen in view of this formula:

Sampled size (n) =
$$(\frac{N}{1+N(e^2)})$$
 (Yamane, 1967) Equation 1
Sample Size (n) = $(\frac{4,000,000}{1+4,000,000})$ = 399 Equation 2.
 $(1+4,000,000)$ (0.052)

Where n is the sample size, N is the population, and the e is the level of precision. Considering the above factors for deciding sample size and using the formula gave 399 participants when applied, the figure indicate that the least questionnaire to be distributed for the whole research.

At this stage or for this paper, 250 participants were selected through stratified random sampling, these are; Project Managers/Site Managers, Technicians and Trainers/Educationists. Designed questionnaires were administered to the participants to identify the training analysis, actual skills and knowledge needed for the Nigerian construction industries. Against the backdrop, 250 questionnaires were distributed and 182 were retrieved and used for the analysis. An E-mail address was made available to the participants and self-envelop; Post Box is also available in Nigeria.

3.4 DATA ANALYSIS

A descriptive statistical technique was used to assess the data collected from the developed questionnaires (Cox, 2018; Nardi, 2018). The approach tends to describe the phenomenon and the attitude of those affected by it (Glaser and Strauss, 2017). Parametric tests have been used to analyse the reliability and validity, this provides empirical reliance on the data collected. The tests were used to analyse the data include the mean, a chi-squared test was used to explore relationships between variables and correlation analysis was conducted to measure the relationship among variables to accomplish research objectives.

3.4.1 RESPONDENTS PROFILE

A total number of 182 questionnaires from different construction industries participated in this research and from the research demography shows that all the participants are of different age range (See **Error! Reference source not found.**). At this stage of the study, 63 questionnaires from Technicians, 49 and 70 from Project Managers and Trainers respectively were returned constituting a total of 73% and were all valid and were further analysed. Table 2 indicates the Participants occupation, Level of education, Working Experience and Company size. Across the three groups, 60.3% are supervisory technicians, with higher qualifications, (11–15) years

of working experience within the industries of various sizes (Micro enterprise, Small, medium and large enterprise). In addition, Table 2 indicates that 61.4% of the participants belongs to others (trainers/educationists) with higher qualifications and a working experience in the industry for 21 years and above. These findings are in line with Bilau et al. (2015) and Ogunsanmi, (2016) studies, who argued that the young people are not interested in developing construction related skills. However, in developed countries like the United Kingdom (UK), reports indicate that demand from young people for apprenticeships is outstripping the number of training places available (Awe, 2006; Bilau, 2015)

4. RESULTS AND DISCUSSIONS

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Current Job	%	Education Level	%	Experience	%	Company Size	%
Electrical technician	3.2	Primary School	14.3	0-5 years	55.6	Micro Enterprise	3.2
Mechanical technician	15.9	Secondary school	19.0	6 – 10 years	28.6	Small Enterprise	28.6
Supervisory technician	60.3	Higher Institution	30.2	11 – 15 years	9.5	Medium Enterprise	50.8
Technician	19.0	Vocational	22.2	16 – 20 years	4.8	Large Enterprise	17.5
Operational technician	1.6	Others	14.3	21 and above	1.6		
Project Manager	8.2			0-5 years	53.1	Micro Enterprise	6.1
Site Manager	51.0	Higher Institution		6 – 10 years	22.4	Small Enterprise	30.6
Supervisory Manager	22.4			11 - 15 years	10.2	Large Enterprise	10.2
Operational Manager	18.4			16 and above	14.3	Large Enterprise	10.2
Electrical technician	7.1	Secondary School		0-5 years	55.6	Micro Enterprise	3.2
		•	11.4%			1	
Mechanical technician	7.1			6 – 10 years	28.6	Small Enterprise	28.6
Supervisory technician	17.1			11 - 15 years	9.5	Medium Enterprise	50.8
Operational technician	19.0			16 and above years	6.4	Large Enterprise	17.5

Training Methods: Technicians/Project Managers

The most effective method of training is the Polytechnic/Colleges of Technology and this view is in line with study of Yusuff and Soyemi (2012), who argue that the polytechnic is the most appropriate training method for effective skilled development of construction workforce. Yet other studies rejected this assertion, saying that they are being discriminated by many professional bodies (Ogbunaya and Udoudo, 2015; Olibie et al., 2013). For instance, a Higher National Diploma (HND) graduates cannot gain admission for a postgraduate degree without an additional qualification and equal opportunities are not given during employment.

However, Olibie et al., (2013) argue that the standard of all tertiary institutions should be raised to the same level, staff development and training intensified. In line with the above, adequate educational resources (human and material resources) should be provided and once existing be maintained. This study is in support of the participants views that the polytechnic/Colleges of Technology education is the most appropriate training method. This is due to the manual activities been carried out within the industry, mostly in the developing countries like Nigeria. The construction activities are mostly manual, and the polytechnic/Collages of technology mostly do constructions activities while the universities are more of theoretical work.

Table 2: Appropriate methods of training for apprenticeship in the Nigerian construction industry (Group of Project Managers).

	Response scores in percentage %						Mean	Std	Cronbach's
	No of respondent	VS	S	N	DS	VD	Value	Dev.	Alpha
Polytechnic/ Colleges of Technology	49	77.6	18.4	4.1	0.0	0.0	4.73	.53	
University Education	49	73.5	24.5	2.0	0.0	0.0	4.71	.50	0.80
Science and technology colleges	49	53.1	42.9	4.1	0.0	0.0	4.49	.58	

Factors hindering the growth of TVET in enhancing the skilled upgrade in Construction Industry.

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	Response scores in percentage %						Mean	Std D	Cronbach's
	No of respondent	SA	A	N	DA	SD	Value		Alpha
Poor funding of TVET in Nigeria	63	68.3	27.0	1.6	3.2	0.0	4.60	.685	
Insufficient facilities for training	63	25.4	68.3	6.3	0.0	0.0	4.19	.535	
Ineffectiveness of training models	63	14.3	76.2	9.5	0.0	0.0	4.05	.490	
Government lack of commitment to TVET	63	25.4	57.1	12.7	4.8	0.0	4.03	.761	.87
Shortages of qualified TVET teachers	63	25.4	54.0	12.7	4.8	3.2	3.94	.931	

The above table indicate the various factors hindering the growth of TVET in enhancing the skilled upgrade in construction industry with regards to Quality standard and Quantity of skilled labour trained. These findings are in line with the findings of Okoye and Arimonu (2016), Ifeyinwa and Serumu (2016) and Ayonmike (2014) among others whose views are in line with the factors impeding the growth of Nigerian construction industry. However, there is a clear indication of challenges of TVET funding, training facilities, ineffective training methods, shortages of qualified TVET trainers with a mean value of 4.60, 4.19, 4.05, and 4.03 respectively. More so, the findings also indicated that the effect of the Quantity of skilled labour trained is a serious challenge within the organisation to the quality standard of skilled labour.

5.0 CONCLUSION AND FUTURE RESEARCH

From the study carried out, the findings from the analysis of the questionnaire survey indicates that the Polytechnics/Colleges of Technology are the most appropriate training method for construction related works. This is surprising that the polytechnic method of training is been given less attention to that of the university training. This study suggests that lack of interest shown by youths in acquiring construction related skills, poor funding of TVET, insufficient training facilities lack of government commitment are major concerns for poor performances. In addition, the study also suggests that training and skill upgrade is a necessity for the construction industry development. Despite different innovations in producing the needed skills apprentices for the industry, the expected effectiveness in the training of apprentices in the industry is still limited. The demand for skilled workforce has not been properly addressed within the Nigerian building construction industry. Hence, there is need to investigate further the behavioural issues of both the employees and the employers within the industry.

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