Effect of financing on project delivery delay of construction projects in Nigeria

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Abstract
Delay in construction project delivery has been an issue of great concern to many construction projects in Nigeria and on the global scale. Construction project delivery delays have been mostly linked to ineffective access to project financing as a lifeline of construction project delivery. Therefore, this study determined the effect of construction project financing on delivery of construction projects in Nigeria. Primary data was collected using adapted structured questionnaire administered to construction project stakeholders. The data collected was analyzed using regression and correlation analyses with the aid of SPSS. Findings of the study revealed that project financing factors (source of finance, new financing arrangement) have significant positive impact on project delivery delay. Therefore, to realize successful projects without delays, adequate financing is required through many available and affordable construction project financing options. The work recommended that adequate policies that could improve access to cost effective project financing be developed and implemented in the public and private sectors for an effective construction project delivery.

Keywords: Construction projects, Effective financing, Effective project delivery, Project delivery delays

1. Introduction

The construction sector is responsible for the number of capital construction projects being undertaken to stimulate further development in other sectors of the economy, as well as guarantee sustained national income and potential economic growth of countries (Gorshkov & Epifanov, 2016). According to Makun & Ganiyu (2019) project execution delays are prevailing in construction projects in Nigeria which have impacted negatively on project delivery making the construction industry in Nigeria to lose its capacity in meeting national construction demands. Further, project delivery delay factors have led to suspension or outright abandonment of many construction projects in Nigeria estimated to amount to 56,000 construction projects needing about 12 Trillion Naira to complete across six geological zones of the country Makun & Ganiyu (2019). Rashid (2020) opined that construction projects are often faced with unpredictable delays whose mitigation forms the biggest challenge in construction project delivery. Project delivery delay is a project deviation from a targeted schedule and is characterized as a common problem which is a universally admitted issue in construction project delivery (Mahamid *et al.,* 2012). According to Adamu (2023) construction projects are investments made by the project owners which are expected to yield timely returns in the form of profit in monetary terms or satisfactory usage. Construction project delays affect the timely delivery of projects which lead to waste of resources, enhanced cost of projects in the form of cost overruns, increased interest to be paid to creditors for credit financing by financial institutions and frustration among the client and other

project stakeholders Adamu (2023). Nguye & Chileshe (2015) reported that 50% of construction project delays are attributed to financial difficulties experienced by construction project owners which lead to the inability of construction project owners to pay consultants, contractors and suppliers for the work executed and certified for payment, which cause construction delivery delays and profit loss. Financing is critical to the success of every construction project as construction projects are capital intensive and require a sustainable flow of financial resources for project targets and objectives to be met (Okereke *et al.,* 2018). Construction project financing has to do with forecasting, budgeting, acquisition of finance needed for construction projects and management of the acquired finances in an efficient and effective manner to achieve a cost effective and timely delivery of construction projects Adamu (2023). Owing in part to strengthened prudential regulations in the banking sector, it is increasingly acknowledged that alternative sources of finance are needed to support infrastructure development finance (OECD, 2015). Construction projects are capital intensive and require sustainable sources of cash flow for effective delivery. However, accesses to finance through favourable financing options are limited with many conditions attached that mostly scared away construction companies and other project stakeholders leading to project delivery delays, abandonment of construction project, demobilization of contractors or developers, consultants and client from the construction project site Adamu (2023).

It is obvious that studies on how project financing affect project delivery abound in international construction markets (Semenova *et al.,* 2017; Adia, 2019; Makumba *et al.,* 2022) but the outcomes are to some extent conflicting where variable inclusion and geographic gaps exits. While researchers in Nigeria have made efforts to study project financing and delivery delays

in the construction industry (Okereke *et al.,* 2018; Makun & Ganiyyu, 2019; Awodele *et al.,* 2022), variable inclusion, domain and methodological gaps exist within this research work. Hence, this study aims at evaluating the effect of financing on project delivery delay of construction projects considering Kaduna metropolis in North-western Nigeria as its domain.

2. Literature Review and Hypotheses Development
Project Financing and Project Delivery Delay

Construction projects are high value, time bound, special construction mission for creating a construction facility or service with predetermined performance objectives defined in terms of quality specification, completion time, budgeted cost and other specified constraints (Chitkara, 2013). The American Institute of Architects (AIA, 2007) while trying to define project delivery did it in an integrated way and defined project delivery in terms of integrated project delivery as an approach that integrates people, systems, business structures and practices into a process that collaboratively harnesses the talents and insights of all participants to optimize project results, increase value to the owner, reduce waste and maximize efficiency through all phases of conception, design, fabrication and construction. Yang and Wei (2010) defined project delivery delay as the time exceeding the specified work execution time or contract completion date agreed by the project parties.

Okereke *et al.* (2018) studied the impact of financing on construction project delivery in Port Harcourt of Rivers State in south-western Nigeria where the authors identified: credit from suppliers, equity, bank loan, bank overdraft, personal savings, retained profit, family and friends, green bonds, private capital, international assistance programme, government funds and tax refunds, direct equity investment funds, life insurance companies, real estate

investment trust funds and crowdfunding as sources of project finance through and extensive literature review. The study used Mean Item Score (MIS) and Kruskal-Wallis test to rank the identified project finance sources according to their significance in terms of usability and ability to solve project finance difficulties in the construction industry on the basis of the data collected and analyzed. Simple percentages, chi-square values, p-values and multi-linear regression analysis were used to analyze the relationship between the dependent (impact of financing) and independent variables (sources of finance) of the research. The study reported 86.78% of respondents acknowledging the importance of project financing in the delivery of construction projects where it was noted to have a high (45.45%) to very high (41.32%) impact. The study observed that the top five most used project finance sources in the study area according to the level of usage are in the order of: credit from suppliers, bank loans, bank overdraft, personal savings and retained profit. The least used project finance sources ranked in the order of usage were reported to be: real estate investment trust funds, green bonds, life insurance companies, crowdfunding, government funds and tax refunds. The study concluded that all of the assessed finance sources are options for project financing in Nigeria. However, Chen & Bartle (2017) reported other construction project finance options called new project financing arrangements not reported by Okereke *et al.* (2018) which are: Public Private Partnership (PPP), privatization, infrastructure investment funds, and private and non-philanthropic partners.

Makumba *et al.* (2022) conducted a study to assess success of construction project finance for SMEs in Gauteng province of South Africa where data was collected from 28 construction professionals using structured questionnaire and statistical analysis done using content analysis in Excel window. Findings of the study revealed that construction firms rely on various sources of finance to execute projects among which are: self-funding, client upfront payment, family and friends, government assistance and bank loans with bank financing as the least used. Further, the study reported self-funding and family and friends as the most used project finance sources.

Semenova *et al.* (2017) investigated PPP project investment financing efficiency in Russia. The study collected data and conducted SWOT Analysis as well as regression analysis to determine dependence of Russia's economic growth rate to volume of PPP investment within the federation using development factors: institutional environment development, regulatory and legal support, and investment attractiveness as PPP proxies. The authors concluded that low level of development of PPP projects exist in Russia which requires the development of institutional and economic conditions to aid cooperation between businesses and government in infrastructural development. Awodele *et al.* (2022) studied factors that affect financing-built assets in Nigeria through crowdfunding with the use of structured questionnaire distributed to 40 respondents within the construction industry in Imo state. The collected data was analyzed for reliability using chronbach's alpha test, simple percentages and ranking method were used in the statistical analysis to arrive at some inferences. The study reported: credibility and expectation for reward, funding period and amount, stakeholder communication, lack of crowdfunding projects, fraud, business failure risk, lack of finances, and poor management decisions as mitigating factors on crowdfunding based project finance in the state.

Makun & Ganiyu (2019) investigated the causes and effect(s) of delays in building construction projects at Abuja Nigeria by employing questionnaire, interview methods of data collection and inferential

statistics analysis using simple percentages and ranking of the factors identified to be responsible for project delivery delay under four sub-heads: client related causes, contractor related causes, consultant related causes and external causes. The study reported time and cost overruns resulting from access to finance as having major impact on project delivery. The study observed the need to ascertain funding sources and reliability of accessing them in construction projects before conception and implementation decisions are made.

While Okereke *et al.,* 2018 studied the impact of sources of finance (credit from suppliers, equity, bank loan, bank overdraft, personal savings, retained profit, family and friends, green bonds, private capital, international assistance programme, government funds and tax refunds, direct equity investment funds, life insurance companies, real estate investment trust funds and crowdfunding) on construction project delivery in portharcourt of Rivers State in south-western Nigeria, Chen & Bartle (2017) identified other construction project financing options called new project financing arrangements (Public private partnership, privatization, infrastructure investment funds, and private and non-philanthropic partners) not used in the study conducted by Okereke *et al.* (2018). Study on the combined effect of these construction project financing options (sources of finance and new project financing arrangements) on project delivery delay in Nigeria is scarce in literature. Thus, the need for the study has been justified and the following hypotheses were formulated for the study.

Ho_1: *Sources of finance have no significant impact on construction projects delivery delay.*

Ho_2: *New project financing arrangements have no significant impact on construction projects delivery delay.*

Expectancy Theory

Expectancy Theory was proposed by Vroom (1964); a motivation theory which predicts that actions are driven by two factors: expectancy (expectation; the possibility that effort will contribute in achieving expected goals) and the perceived value (valence; outcome relating to the reward of actions). The expectancy theory was called "expectancy-valence framework" (Vroom, 1964; Snead & Harrel, 1994). At its early stages, the theory was used to explain individual intentions and behaviours in employee motivation and organizational behaviour fields (Fudge & Schlacte, 1999; Chen & Fang, 2008). The theory was further refined and applied to obtain insights on the decision-making process required to achieve organizational objectives and strategy (Wood *et al.,* 2005) and supplier development (Chen *et al.,* 2016) among several applications. The theory was used by Edjimibi Nga (2019) to assess work motivation on employees of Cameroon banks. Therefore, this study employed expectancy theory to investigate the impact of financing on project delivery of construction projects in Nigeria.

3. Methodology

This study adopts a survey research design in which primary data was collected and used. The study used cross sectional data which were obtained in 2023. The sources of finance and new financing arrangements instruments were unidimensional while the project delivery delay instrument was multidimensional which were all adapted from previous studies and reports. Sources of finance has fourteen items adapted from Okereke *et al.* (2018), new financing arrangement has five items adapted from Chen & Bartle (2017), while project delivery delay has seven dimensions with first, second, third, fourth, fifth, sixth and seventh dimensions having four, four, two, nine, six, nine and four items respectively adapted from Kirubel (2023). The study considered construction project stakeholders (Client, Consultants,

Contractors, Sub-contractors, Developers and Suppliers) in Kaduna Metropolis as its population. Krejcie and Morgan sample size determination table was used in obtaining the study sample size at infinitesimal level which yielded 384 samples. The 384 sample size determined from Krejcie and Morgan table was adjusted by adding 10% to cover for non-responding population from the sample size which gave a total sample size of 423 for the study. The total sample size obtained (423) was divided into 150, 75, 75, 53, 40 and 30 samples on whose basis the adapted questionnaire was distributed to Contractors, Client, Consultants, Developers, Sub-contractors and Suppliers respectively. Statistical Package for Social Sciences (SPSS Version 23) was used to statistically analyze the data obtained and establish how the independent variables proxies relate with the dependent variable using correlation and regression analyses.

The regression model for the study is formulated as follows adapted from Fried *et al.,* 1993.

$$DEL_i = \beta_0 + \beta_1 SF_i + \beta_2 NFA_i + \varepsilon_i \ldots\ldots 1$$

Where DEL_i, SF_i and NFA_i are project delivery delay, sources of finance and new

financing arrangement for ith item making the proxies respectively. While β_0, ε_i, β_1, β_2 are intercept or sample constant, error term and coefficients for the respective financing options.

4. Results and Discussion
Response Rate

A total number of 423 questionnaires were administered to the categories of respondents in line with the sample size earlier determined, out of which 407 were filled and returned with the information given by the respondents numerically quantified and presented.

Table 1 indicates that the respective response rate per category of respondents were 36.36 %, 17.94 %, 17.20 %, 12.53 %, 9.34% and 6.63% for contractor, consultant, client/client representative, developer, supplier and sub-contractor which shows that the data collected for the study captures relevant stakeholders in the construction industry. Further, the response rate per samples ranges from 90.00 % to 98.67 % for the project stakeholders indicating that the study got reasonable response rate per samples.

Table 1: Response Rate

Category of Respondents	Samples	Responses	Response/Category (%)	Response/Samples (%)
Contractor	150	148	36.36	98.67
Consultant	75	73	17.94	97.33
Client/Client representative	75	70	17.20	93.33
Developer	53	51	12.53	96.23
Supplier	40	38	9.34	95.00
Sub-contractor	30	27	6.63	90.00
Total	**423**	**407**	**100**	**96.22**

Source: Survey (2023)

Respondents Level of Experience

Figure 1 presents the construction project related experience level of the study respondents which indicates that 11.5 %,

23.10 %, 37.20 % and 28.20 % of respondents have construction project related experiences of less than 5 years, between 6 to 10 years, between 11 to 15 years and more than 15 years respectively. This indicate that 88.5 % of the respondents

have construction project related experience of more than 6 years signifying that the study population are well

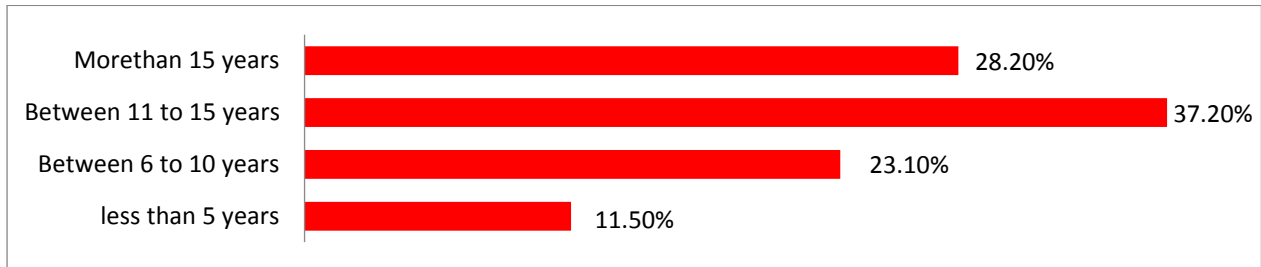experienced to adequately respond to the research structured questionnaire.

Figure 1: Construction project related experience of respondents

Multicollinearity Test

The degree of relationship between the independent variable (IV) and dependent variable (DV) is presented in Table 2 using pair wise correlation matrix, which is used to evaluate the level of correlation between variables and the significance of relationship among variables. Figures provided in correlation matrix are usually in the range of 0 to 1 (0 - 100%) with zero indicating absence of relationship and 1 means great relationship. The correlation matrix indicates the level of multicollinearity; an indicator of the relationship between the model variables when analyzing a model with many IVs. Multicollinearity is said to exist when correlation values in the correlation matrix exceed 0.8. From Table 2 it could be observed that values of correlation coefficient obtained and reported are less than 0.8 with 0.561 as the highest except when the relationship is between same variables where a value of 1 was obtained. Further, the p-values obtained as presented

in Table 2, are all less than the maximum allowable p-value of 0.05 when the different variables are considered; meaning that the all the IV variables in the model are positive and significant in estimating the relationship between the IV's and the DV. Therefore, it could be concluded that multicollinearity does not exist between the model variables at 5% significance level; high correlation between variables does not exist, as such all the variables in the IV and DV are valuable in estimating the relationship between project delivery delay and project financing, as such none of them should be eliminated in the model.

The positive correlation coefficient values in the correlation matrix indicate a positive relationship between project delivery delay and project finance factors, meaning that a 1% increase in positive direction to ameliorate the negative effect of each of the project finance factors adopted in the study would lead to a more satisfactory project delivery.

Table 3: Correlations

		Delay	Sources of Finance	New Financing Arrangements
Pearson Correlation	Delay	1.000	0.436	0.442
	Sources of Finance	0.436	1.000	0.561
	New Financing Arrangements	0.442	0.561	1.000
Significance (1-tailed)	Delay	.	0.000	0.000

	Sources of Finance	0.000	.	0.000
	New Financing Arrangements	0.000	0.000	.
	Delay	407	407	407
Sample Size (N)	Sources of Finance	407	407	407
	New Financing Arrangements	407	407	407

Source: SPSS (2023)

Research Hypotheses Test
Table 3: Regression Results

Variables		B-value	T-value	p-value
Source of Finance		0.275	5.270	0.001
New Financing Arrangements		0.288	5.526	0.001
R Square	0.247			
Adjusted R Square	0.243			
F Statistics	66.341			
Durbin - Watson	2.156			

Source: SPSS output extract

The adjusted regression coefficient obtained from the regression analysis is presented in Table 3 having a value of 0.243. This indicates that the two independent variables (sources of finance and new financing arrangements) account for 24.3% of project delivery delay. The F-statistics obtained was found to be significant at 5% confidence level (F(2,404) = 66.341, p<0.05) which indicates the model fitness in predicting the relationship between the dependent and independent variables.

In more specific terms from the regression results presented in Table 3, sources of finance regression coefficient were found to be positive and significant with (β = 0.275, t-value = 5.270, P < 0.05) and New financing arrangement regression coefficient was found to be positive and significant with (β = 0.288, t-value = 5.526, P < 0.05). Therefore, the null hypotheses signifying no relationship are rejected with the study concluding that significant positive relationship exist between the construction project finance predictor variables (source of finance and new financing arrangement) and the dependent variable (project delivery delay). This outcome agrees to some extent to (Chen & Bartle, 2017; Makumba *et al.,* 2022; Okereke *et al.,* 2018). Results also conform to expectancy theory which states that: actions are driven by two factors: expectancy (expectation; the possibility that effort will contribute in achieving expected goals) and the perceived value (valence; outcome relating to the reward of actions). Thus, project executors: contractor, developer, consultants, clients are to deliver the project with affordable finances that could yield valence of satisfaction or reasonable net profit. Further, the research hypotheses test revealed that sources of finance and new financing arrangements have significant positive impact on project delivery delay, as such, to reduce the effect of project delivery delay and realize

successful projects without delay; adequate financing is required through many affordable sources.

5. Conclusion and Recommendations
Conclusion
This study evaluates the effect of financing on project delivery delay of construction projects in Nigeria. The findings of the study revealed that construction projects are hardly delivered effectively without some guaranteed sources of finance where project stakeholders with adequate financing and assurance of deployment meet project objectives within reasonable time frames. In a bid to obtain cost effective financing for construction project delivery, project stakeholders evaluate and attempt to access available finances that could effectively meet their objectives. More so, the study concludes that sources of finance and new financing arrangements have significant positive impact on project delivery delay. Therefore, to reduce the effect of project delivery delay and realize successful projects without delay, adequate financing is required through many affordable sources.

Recommendations
Based on the findings of this study it was recommended that project stakeholders and relevant government agencies need to actualize projects by tapping into many available project financing options that could meet project objectives, while relieving government of the much responsibility of financing public infrastructural development projects through the use of some project delivery options such as Public Private Partnership and infrastructure concessions. Privatization is a means of getting finances for new construction projects in the public sector and also a means of relieving government of the enormous financial burden of running and maintaining existing infrastructure, as such, policies that would ensure effective implementation and realization of privatization efforts to relieve

government on financing new infrastructure in prioritized areas are essential. Policies relating to appropriate taxation to generate funds for public sector projects need to be looked unto, with policies relating to establishment of infrastructure investment funds for credit financing of construction projects by the private sector timely. It is obvious that debt financing is inevitable in construction projects due to their huge financial requirements; therefore, policies relating to proper monitoring and evaluation of the projects financed through debt, and maximization of financial resources to ensure efficiency in utilization of finances in project development and implementation are essential. The relatively untapped means of project financing meant for private sector and the general public such as crowdfunding needs to be well developed and harnessed for effective project delivery in Nigeria. The work recommends further research on the effect of Chinese foreign direct investment and Islamic Development Bank sukuk construction project financing models on project delivery delay in Nigeria.

References

AIA (2007). *Integrated Project Delivery: A Guide.* Version 1, American Institute of Architects, AIA California Council, 2.

Awodele, I. A., Mewomo, C. M., Olatunde, N. A, Eze, E. C., and Ukaji, C. (2022). Financing Built Assets in Nigeria through Crowthfunding. *In: Proceedings of CBPM,* pp: 69-69, Available at Research Gate.

Adamu, I. M. (2023). *Determinants of Project Delivery: An Analysis of Construction Projects.* (Unpublished Postgraduate Diploma in Management Project), Department of Business Administration, Kaduna State University, Kaduna, Nigeria.

Adia, I. (2019). Strategies to Secure Sustainable Funding for the Successful Conclusion of Infrastructure Projects. A dissertation submitted to College of Management and Technology for the award of Doctor of Philosophy in Business Administration, Walden University, 4.

Chitkara, K. K. (2013). *Construction Project Management: Planning, Scheduling and Controlling.* Second Edition, McGraw Hill Education Limited, India, 5.

Chen, C., and Bartle, J. R. (2017). Infrastructure Financing: A Guide for Local Government Managers. A Policy Issue White Paper for ICMA (International City/County Management Association) and GOF (Government Finance Officers Association), ICMA/GOF Government and Policy Committee, United States of America, 14.

Chen, L., Ellis, S. C. and Suresh, N. (2016). A Supplier Development Adoption Framework using Expectancy Theory. *International Journal of Operations and Production Management*, 36(5): 592 – 615.

Chen, Y. and Fang, W. (2008). The Moderating Effect of Impression Management on the Organizational Politics – Performance Relation. *Journal of Business Ethics,* 79 (3): 263 – 277.

Edjimibi Nga, A. P. (2019). Work Motivation in the Context of Expectancy Theory: A Research on Bank Employees of Cameroon. A Thesis submitted to Department of Business Administration, University of Gaziantep Graduate School for the Award of Master of Arts Degree, Cameroon, 40 – 55.

Fred, H. O., Lovell, C. A. K., and Eeckaut, P. V. (1993). Evaluating the performance of US credit unions. *Journal of Banking and Finance,* 17(5): 251 – 265.

Fudge, R. S. and Schlacter, J. L. (1999). Motivating Employees to Act Ethically: An Expectancy Theory Approach. *Journal of Business Ethics,* 18(3): 295 – 304.

Gorshkov, R., and Epifanov, V. (2016). The Mechanism of Project Financing in the Construction of Underground Structures. *Procedia Engineering,* 165 (2): 1211-1215.

Kirubel, G. S (2023). Factors that Affect the Timely Delivery of Government Construction Projects in Ethiopia Electric Power Projects - Questionnaire. *Master of Arts Degree Thesis on Project Management,* ST. Mary's University, Ethiopia.

Mahamid, I., Bruland, A. and Dmaidi, N. (2012). Causes of Delay in Road Construction Projects. *Journal of Management Engineering,* 28 (3): 300 – 310.

Makumba, C. P., Amoah, C., and Mbelembe, W. (2022). Construction Project Finance for Success: SME Perspective. *In: ASOCSA2022-0043 Conference.* Available at Research Gate.

Makun, M. J. and Ganiyu, G. B. (2019). Causes and Effects of Delay on Building Projects in Abuja. *In: Proceedings of 1st International Conference on Collaboration for Sustainable Development in the Built Environment.* Held at Faculty of Environmental Sciences, University of Ilorin, on 29th - 30th April 2019, Ilorin, Nigeria, 583 – 594.

Nguye, T. P., and Chileshe, N. (2015). Revisiting the Construction Project Failure Factors in Vietnam. *Built Environment Project and Assessment*, 5(3): 398 – 416.

Okereke, R. A., Pepple, D. I., and Eze, E. C. (2018). Major Finance Sources in Construction Projects Delivery and Impact of Financing in the Construction Industry. *Borno Journal of Sciences and Technology,* 4(2): 112-114.

OECD (2015). *Policy Framework for Investment 2015 Edition*, OECD Publishing, Paris, 13-15.

Rashid, Y. (2020). Analysis of Delay Factors and their Effects on Construction Projects. *Management Sciences Letters*, 10 (2020): 1197 – 1204.

Semenova, N. N., Ermoshina, T. V., Yulenkova, I. B., and Potapov, S. V. (2017). Enhancement of Investment Efficiency Financing based on the Mechanism of Public-Private Partnership in Russia. *Journal of Applied Economic Science,* 12(4): 1015 – 1024.

Snead, K. C. and Harrell, A. M. (1994). An Application of Expectancy Theory to Explain a Manager's Intention to use Decision Support System. *Decision Sciences*, 25(4): 499 – 501.

Vroom, A. (1964). *Work and Motivation.* New York Wiley.

Yang, J-B., and Wei, P-R. (2010). Causes of Delay in the Planning and Design Phases for Construction Projects. *Journal of Architectural Engineering,* 16(2): 80-83.