Original article

ABSORPTIVE CAPACITY AND PROJECT-DRIVEN FIRM PERFORMANCE

Adeyemi Oluwaseun Adepoju[1], David Oloyede Fabunmi[2]

[1,2]*Department of Project Management Technology, Federal University of Technology, Ondo State, Nigeria*

Received: 17 March 2023
Revised: 15 August 2023
Accepted: 8 February 2024

Abstract: Absorptive capacity is an important determinant of a routine-based firm performance. However, there is need to validate its impact on project-driven firm performance such as in construction companies. In this article, we conceptualize absorptive capacity and firm performance as third-order hierarchical constructs. Our model is tested based on the impact of absorptive capacity on firm performance by using survey data from a sample of 158 project managers in construction companies belonging to the Federation of Construction Industries (FOCI). Using the partial least square structural equation model (PLS-SEM) approach for the hierarchical order constructs (HOC), the findings from the research corroborate most of the earlier studies as well as contrasting relationship between the realised absorptive capacity and financial performance (β = -0.029, t = 0.565). The study offers useful insight into the experiential relationship for our conceptualization and its influence on project-driven firm performance.

Keywords: Absorptive capacity, Firm performance, Hierarchical constructs, Partial Least Squares, Structural Equation Modeling.

1. INTRODUCTION

The construction sector is one of the most significant project-driven industries that contributes to economic growth (Okoye et al., 2018) and is a crucial part of investment programmes in emerging nations (Dlamini, 2012). Construction, operation, and equipment of architectural structures make up one-tenth of the worldwide economy, and this activity accounts for 40 per cent of the material flow entering the global economy. These activities include everything from connecting buildings to maintaining them (Akadiri et al., 2012). Du Plessis (2001) averred that the construction industry is the largest industrial employer, employs more than 111 million people, accounts for more than half of capital expenditure, and contributes roughly 10 per cent of the global Gross National Product (GNP) (Navon, 2005). It is believed that the building industry dominates the nation's economic activity in developing nations like Nigeria. It has a notable effect on individual income, employee support, and the nation's Gross Domestic Product (GDP).

The Nigerian construction industry has played a significant role over the years. It is estimated to be worth $3.15 billion (Isa et al., 2013), and it contributes 3.2 per cent of the country's GDP. However, the majority of the contractors are medium-sized, local businesses that work on mostly residential projects (Dantata, 2008). The Nigerian construction sector has overtaken all other economic spheres. However, the expansion of its GDP and employment are currently slowing (Dantata, 2008; Okoye et al., 2018). Construction is transitioning from a traditional design bid and create process to a performance and capability-based business, becoming a transaction-oriented industry

Corresponding author. Email: aoadepoju@futa.edu.ng
ISSN 2560-4961 (online)

https://doi.org/10.56889/mjoh5799

(Rodney et al., 2010). Among other things, the drive is threatened by shifting consumer preferences and goals, market dynamics, the quickening pace of technological advancement, the democratisation of information, globalisation, and political pressure (Palmer & Perkins, 2012). Due to their subpar output in terms of both physical and service delivery, the majority of Nigerian construction firms have been accused of having a weak commitment to project success (Abdullah et al., 2011; Thwala et al., 2012).

However, very few construction firms have the internal resources and infrastructure to obtain and use university-generated research results (Gann, 2001). Companies in the least developed nations also stand out for having very low levels of absorptive capacity. Due to the aforementioned factors, construction companies must acquire the skills and talents necessary for their survival in the face of increased competition (Faniran, 1999). These kinds of abilities could be developed by absorbing new knowledge, skills, and technologies (Wang et al., 2021) through the identification of priceless outside information, interpreting it, and gaining it through innovation (Ismail et al., 2011). According to conventional thinking, the construction sector's relatively insufficient absorptive ability hinders its overall performance in terms of innovation (Blayse & Manley, 2004; Reichstein et al., 2005; Sicotte et al., 2014).

In general, the ability to assimilate outside knowledge for a firm's competitive advantage is referred to as absorptive capacity. Businesses must be able to benefit from spillovers, but more importantly, they must use knowledge from outside their environment to increase production. According to Allas (2014), a firm's ability to recognise the value of, assimilate, and financially exploit fresh, external knowledge is known as its absorptive capacity, and it is a powerful predictor of an organization's capacity to innovate. This specific capability is a characteristic of the link between a firm's unique structures, procedures, and rules (Allas, 2014). Assimilation capacity has been found to significantly influence organisational performance (García-Morales et al., 2014), financial performance (Lichtenthaler, 2016), and overall company performance (Tzokas et al., 2015). Any company's ability to absorb information is crucial in evaluating its capacity for innovation (Foss et al., 2010).

The effectiveness of a corporation, including its financial performance and increased productivity levels, is significantly influenced by its high level of absorptive capacity (Bjorvatn & Wald, 2018). Mullins (2005) defined overall performance as pertaining to elements like enhancing service delivery, increasing sales and profitability, or perhaps achieving the best results in key organisational operations. One of the main goals from the perspective of dynamic capacities is the observed fluctuation in the performances of firms. A company's ability to learn from and profit from new knowledge and breakthrough technologies is eventually reinforced by the dynamic nature of absorptive capacity, which is rooted in routines of organisations or individuals. As a result, it can be difficult for construction organisations to find ways to develop these talents over time in a methodical manner in order to maintain competitiveness. The ability to learn quickly, digest new information, transform it, and then apply it to the organization's processes, routines, and procedures is a dynamic skill that both the company and its workforce must possess as the construction sector expands in a competitive climate (Daghfous, 2004; Reason & Bradbury, 2001). This specific plan will improve the organization's overall competitiveness and innovation in the construction markets, where it is now crucial to demonstrate innovative organisational competence (Rodney et al., 2010).

Despite numerous studies (Cohen & Levinthal, 1990; Jansen et al., 2006; Jansen et al., 2005; Zahra & George, 2002) attesting to the significance of absorptive capacity on the performance of the firm in other sectors, there is still little research about the impact of absorptive capacity on the performance of construction firms. Or do the project management academics ignore it? As a result, the study aims to investigate and present the many components of absorptive ability and how they affect the operations of construction enterprises in Lagos State, Nigeria. Additionally, because Lagos State is likely the most economically significant state in the nation and is where the majority of

construction firms have their headquarters, the study was inspired to focus on the state's construction firms. It is a significant financial hub and Africa's fifth-largest economy (Ekundayo, 2013). The state's healthy population expansion has drawn attention to its strong economic standing, which continues to draw construction company establishment. Lagos was chosen as the study location to provide details on the amount of absorptive capacity of the State's construction enterprises and how these local businesses might gain access to outside knowledge sources to increase their capacity.

The sections in this study are further divide into literature review and conceptual framework, thereafter, the presentation of the methodology, followed by the presentation of results and finally the discussion and conclusion.

2. LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

Zahra and George (2002) divided Cohen and Levinthal's initial conceptualization of absorptive capacity (ACAP) into two subcategories to show potential absorptive capacity (PACAP) and also achieved absorptive capacity (RACAP). The two dimensions were combined in this novel endeavour to investigate how the absorptive capacity affects business performance. Acquisition and assimilation are two latent dimensions included in PACAP. Identifying and acquiring fresh, pertinent knowledge from the outside is the goal of this dimension (Leal-Rodríguez et al., 2014; Zahra & George, 2002). RACAP accepts two more dimensions, exploitation and transformation. The ability of the business to produce innovative results is improved by these latter aspects, which integrate the new knowledge with the old expertise (Fosfuri & Tribó, 2008; Leal-Rodríguez et al., 2014; Zahra & George, 2002). The literature suggests that ACAP dimensions lead to increased performance in businesses. In particular, Zahra and George (2002) argued that when ACAP dimensions are well-managed, performance improves. In fact, Jansen et al. (2005) discussed how PACAP enhances data and the company's ability to respond to the ecosystem pretty fast, but RACAP is much more likely to boost performance. To improve procedures, practises, and results, the transformation dimensions set in action the integration of both active knowledge and new information. By combining knowledge, the exploitation dimension enables the purification of current practises, which frequently results in new, critical information (Zahra & George, 2002). Many academics are aware that businesses in the construction sector need to improve their capacity to respond quickly to them due to the intense rivalry and unpredictable environment. However, it depends on the level of ACAP present in the companies (Unsal & Taylor, 2011).

There are no fewer than seven aspects to the idea of company performance as it is defined by satisfying the stakeholders: market value, profitability, social, environmental, and employee performance. Typically, these constructs are one- or multidimensional. Numerous dimensions that together make up a comprehensive notion and the complex of performance are the focus of empirical studies and theoretical viewpoints. The Venkatraman and Ramanujam (1986) conceptual model suggests a multidimensional representation, within which performance would have two second order dimensions: the financial one, represented by profitability, growth, and market value; and additionally, the operational domain, which includes non-financial or possibly strategic competitive aspects, such as customer satisfaction, employee satisfaction, innovation, social performance, environmental performance, and reputation.

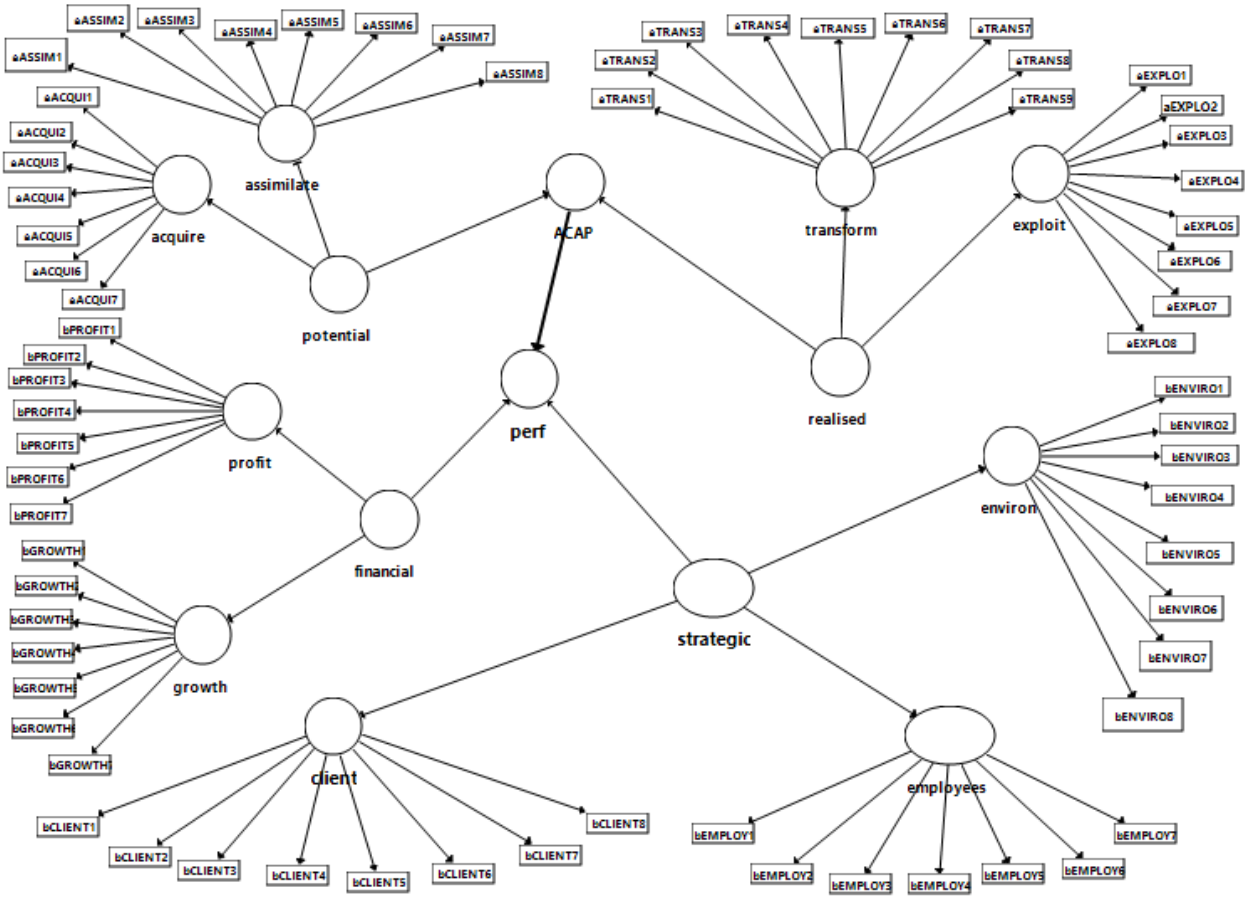

Figure 1: Conceptual framework

Figure 1 proposes a conceptual framework for testing the effect of absorptive capacity on performance in construction firms. This has been developed based on integration several literature search and knowledge of the information gathered from many models established by Venkatraman and Ramanujam (1986), Cohen and Levinthal (1990), Zahra and George (2002) Cho and Pucik (2005), Glick et al. (2005) and Sazali et al. (2009) customized to the context of the construction industry.

3. METHODOLOGY

Due to the construct-based nature of the variables examined, this study adopted a quantitative research approach. The location of this study was Lagos State, Nigeria. Nigeria's southwest geopolitical zone includes the state of Lagos. Lagos was chosen since it is undoubtedly the State with the greatest economic impact in the nation and because the majority of construction companies have their headquarters there. It is a significant economic hub and has Africa's fifth-largest economy (Ekundayo, 2013). Twenty local government areas in Lagos State were involved in this particular study. Eighty-four (84) certified firms in the study area made up the study's population of registered construction companies, which were chosen from the Federation of Construction Industry (FOCI). The study's sample population was chosen using a multistage sampling procedure. For this study, three business representatives from each firm were chosen at random. Managers, directors, coordinators, architects, engineers, quantity surveyors, land surveyors, consultants, and other pertinent experts in construction businesses should all be included in the professional selection for successful coverage. A sample size of roughly seventy (70) businesses was obtained using the Yamane (1973) formula. Invariably, 210 respondents were randomly examined. The survey questionnaire's absorptive capacity and firm performance variables (Table 1) were measured using a 10-point scale since it provides enough points for discrimination, help avoiding the danger of common method

variance and better performance in the determination of the construct validity Awang et al., 2016. Also, Sangthong (2020) attested to the quality of data collected with 10-point scale to control for type I error.

Table 1: Study variables and their measurement

Variable	Second order construct	Lower-order construct	Manifest number
Absorptive capacity	potential; realized	acquisition; assimilation; transformation; exploitation	32
Firm performance	financial; strategic	profitability; growth; client satisfaction; employee satisfaction; environmental	37

Partial Least Square Structural Equation Modeling was used in this investigation (PLS-SEM). Due to the robustness of its estimations and capacity for achieving a sufficient level of statistical power, PLS-SEM was chosen for this study (Reinartz et al., 2009). When a particular association is important, PLS-SEM might indicate that it is significant (Hair et al., 2017). It also gives researchers a chance to investigate the connections between variables and pinpoint the current paths between them (Hair et al., 2017). Ringle et al. (2020) believe it to be a useful tool for both creating statistical models and making predictions. PLS-SEM was employed to estimate the measurement and structural model for this experiment. The measurement model described how the reliability and validity of the constructs were evaluated, whilst the structural model was used to characterize the link and the effect among the constructs in multivariate analysis. So, the methodology therein was based on the principles and procedures found in the literature (Barclay et al., 1995; Chin, 1998; Henseler et al., 2015; Hair et al., 2017; Khalili-Damghani & Tavana, 2014; Sekaran & Bougie, 2009).

4. RESULTS

4.1 Descriptive analysis

Out of the total distributed, the study was able to gather 153 completed questionnaires, which represents a response rate of 72.86%. According to Mugenda and Mugenda (1999), a response rate of 50% is sufficient for analysis and reporting, a rate of 60% is good, and a rate of 70% or more is outstanding. The response rate is in line with these standards. Gender, age, education, professional certification, designation, and years of experience are only a few of the demographic characteristics of the respondents that are distributed in Table 2. According to the gender distribution, there were 79% more male respondents than there were female respondents. This shows that there are more men than women working as construction professionals. The majority of the respondents were between the ages of 30 and 39, according to the survey. 49.0% of the respondents belonged to this group. The responders who were between the ages of 40 and 49 (29.4%) came in second place, closely behind this age group. Table 2 also shows that 14.4% of respondents were between the ages of 15 and 29, while only 7.2% of respondents gave an age of 50 or older. None of the respondents, according to the frequency distribution of their educational backgrounds, have less than a bachelor's degree. The majority of respondents (79.7%) have a first-degree certificate, while the remaining percentages have a master's degree certificate. None of the respondents had a certificate proving they have a doctorate. In addition, professional qualification is held by 26.2% of the respondents. This shows that the respondents are intelligent and have the capacity to both receive and impart training. All of the respondents are educated, as seen by the frequency distribution of their responses' designations. Project managers came in second with 10.5% of the respondents, followed by construction engineers with 45.8% of the total. The rest of the respondents were made up of various other professionals. This shows that the responders are knowledgeable about the relevant companies.

Table 2: Demographic characteristics of respondents

Construct	Items	Freq.	Percent
Gender	Male	137	89.5
	Female	16	10.5
	Total	153	100.0
Age	15 - 29 years	22	14.4
	30 - 39 years	75	49.0
	40 - 49 years	45	29.4
	50 - 59 years	11	7.2
	Total	153	100.0
Education	First degree	122	79.7
	Second degree	31	20.3
	Total	153	100.0
Certification	Yes	40	26.1
	No	113	73.9
	Total	153	100.0
Designation	Project Director	9	5.9
	Project Manager	16	10.5
	Project Consultant	8	5.2
	Project Coordinator	8	5.2
	Project Engineer	70	45.8
	Quantity Surveyor	7	4.6
	Architect	4	2.6
	Safety Engineer	12	7.8
	Land Surveyor	9	5.9
	Others	10	6.5
	Total	153	100.0
Experience	Less than 5 years	13	8.5
	5 - 10 years	45	29.4
	11 - 15 years	55	35.9
	16 - 20 years	30	19.6
	21 - 25 years	7	4.6
	More than 25 years	3	2.0
	Total	153	100.0

Additionally, the distribution of experience reveals that 19.6% of respondents have between 16 and 20 years of work experience, 29.4% have between 5 and 10 years, and 35.9% have between 11 and 15 years. Only 2% of respondents had more than 25 years of job experience, compared to 4.6% who have between 21 and 25 years. The distribution of experience indicates that the majority of respondents (62.1%) had more than 10 years of professional experience. This shows that the majority of the respondents had experience working in the construction industry to a high degree.

4.2 Level of absorptive capacity

The mean values of the four constructions of absorptive ability are shown by the relative important index (RII) result from this study, which is displayed in Table 3. Using the subsequent threshold Very Low = 1 to 2.80, Low = 2.81 to 4.60, Moderate = 4.61 to 6.40, High = 6.41 to 8.20, and Very High = 8.21 to

10. The outcome shows that the two constructs of prospective absorptive ability (acquisition and assimilation) have mean values that are within the threshold of "High." The average acquisition score of 7.24 suggests that construction companies have a fairly strong capacity for identifying and acquiring externally created expertise. The mean score of 7.20 for assimilation suggest that the construction firm's processes and routines for evaluating, digesting, understanding and interpreting received information out of external sources is also substantial. Table 3 further showed that the mean values of the two realised absorptive capacity constructs (transformation and exploitation) fall under the "Moderate" criterion. The construction firm's ability to adapt, integrate, and transform external knowledge with current firm expertise to develop new knowledge and results is moderate, as indicated by the mean transformation value of 5.69. The construction company's ability to boost, expand, and also use its existing innovativeness and competences to develop new processes and products through the incorporation of acquired knowledge and transformation of its operations in order to increase the firm's productivity is moderate, according to routines, as indicated by the mean value of 5.22 for exploitation.

Table 3: Extent of absorptive capacity constructs

Constructs	Mean	SD	Rank
Acquisition	7.24	1.52	1
Assimilation	7.20	1.61	2
Transformation	5.69	1.57	3
Exploitation	5.22	1.75	4
Potential	7.22	1.56	1
Realised	5.46	1.66	2
Average	**6.34**	**1.61**	

According to Table 3, which summarises the study's findings, the average mean for PACAP (assimilation and acquisition) is bigger than the average mean for RACAP (transformation and exploitation), which is 5.46, and both average means fall within the range of high and moderate, respectively. According to a study done by Leal-Rodríguez et al. (2014), the PACAP records attempts made to locate and acquire new knowledge from the outside world. This design enhances the company's capacity to review pertinent external data (Fosfuri & Tribó, 2008). The RACAP, in contrast, combines existing and recently gained information into operations to produce new insights and results (Leal-Rodríguez et al., 2014). In several other terms, RACAP represents the capacity to exert control over acquired information and transform it into innovation-related outcomes (Fosfuri & Tribó, 2008; Zahra & George, 2002). These two subsets (PACAP and RACAP), in line with Zahra and George (2002), have supplementary roles. The level of absorptive capacity of construction enterprises is therefore indicated by their average mean of 6.34, which is also the average mean of the four constructs of absorptive capacity in Table 3. Our scale's average mean value of 6.34 shows that construction enterprises have a moderate level of absorptive ability.

4.3 Measurement model

PLS-SEM was applied in this study. The first step was to fit each model by removing the signs that raised certain fitness questions. The factor loadings have been taken into account in these procedures. Due to poor or cross loadings and resulting reliability difficulties, we deleted two (2) items from acquisition (aAcqui5 and aAcqui6) and one (1) from exploitation (aExplo1). There were originally 67 pieces from the nine structures employed in this study, but there are now only 64. In Figure 2, the final fit models are displayed. For this study, the internal consistency reliability, convergent validity, and discriminant validity of the measurement models were assessed. Using the methods recommended by Hair et al. (2017) and Cronbach's alpha, the constructs' internal consistency was assessed. With a threshold of 0.7 for both Cronbach's alpha and composite reliability, larger numbers signify higher levels of dependability (Herath & Rao, 2009). However, it is possible to obtain a reliable estimate for values between 0.60 and 0.70, but additional validity coefficients must be sufficient (Hair et al., 2017). Table 4 displays Cronbach's alpha and composite reliability with values over their 0.7 cutoff points. This finding suggests that all of the latent constructs used in this particular study have good internal consistency. The average retrieved variance

was used to evaluate the constructs' convergent validity (AVE). A sufficient convergent validity is one with an AVE value above 0.5 (Bagozzi & Yi, 1988; Hair et al., 2017). There is no problem with the variables being studied because all of the latent constructs in this particular study had AVEs above the suggested level.

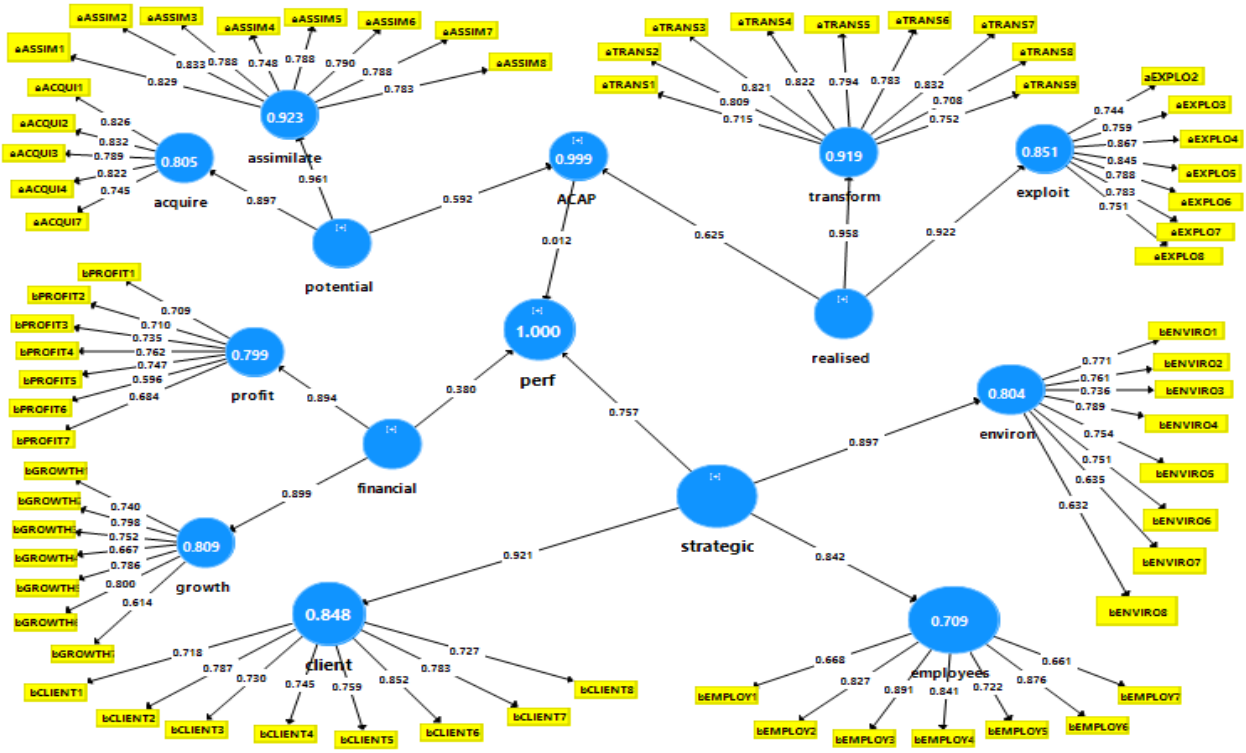

Figure 2: Measurement model for absorptive capacity and firm performance through PLS algorithm

Table 4: Reliability and validity of constructs

Construct	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Acquire	0.862	0.863	0.901	0.646
Assimilate	0.916	0.916	0.932	0.630
Client	0.897	0.900	0.918	0.583
Employees	0.896	0.905	0.919	0.622
Environ	0.874	0.877	0.901	0.534
Exploit	0.901	0.904	0.922	0.628
Growth	0.860	0.865	0.893	0.547
profit	0.833	0.837	0.875	0.501
Transform	0.921	0.923	0.934	0.613

On the basis of cross-loadings, the Fornell-Larcker criterion, and the evaluation of the correlations' HTMT, the discriminant validity of this study was assessed. The results of the cross-loadings predicted that in the assessment, an indicator's outer loading on its own relevant latent variable should be more significant than its cross-loadings on the other constructs. Table 5 indicates that each indicator's outer loading is larger on its own specific construct as compared to its cross-loadings on other constructs, with Gefen and Straub's recommended minimum difference of 0.10 being shown (2005). Another method was the Fornell-Larcker criterion, which suggested comparing each construct's AVE to the squared

inter-construct correlation of that particular construct and any other constructs within the structural model that were reflectively measured (Hair et al., 2017). Additionally, the shared variance for each model construct shouldn't be greater than its AVE.

Table 5: Cross-loadings of constructs and items

Item	Acquire	Assimilate	Exploit	Transform	Client	Employees	Environment	Growth	Profit
aACQUI1	0.826	0.615	0.138	0.327	0.311	0.281	0.312	0.539	0.473
aACQUI2	0.832	0.610	0.174	0.355	0.334	0.276	0.333	0.500	0.503
aACQUI3	0.789	0.578	0.059	0.226	0.290	0.202	0.245	0.533	0.422
aACQUI4	0.822	0.576	-0.035	0.191	0.251	0.234	0.268	0.538	0.386
aACQUI7	0.745	0.654	0.020	0.200	0.224	0.263	0.247	0.601	0.435
aASSIM1	0.630	0.829	0.180	0.338	0.463	0.340	0.355	0.603	0.553
aASSIM2	0.591	0.833	0.230	0.435	0.444	0.321	0.400	0.515	0.575
aASSIM3	0.554	0.788	0.115	0.264	0.309	0.312	0.367	0.539	0.508
aASSIM4	0.575	0.748	0.176	0.317	0.400	0.232	0.301	0.499	0.559
aASSIM5	0.635	0.788	0.106	0.231	0.360	0.253	0.373	0.674	0.615
aASSIM6	0.667	0.790	0.075	0.293	0.383	0.273	0.341	0.587	0.599
aASSIM7	0.569	0.788	0.178	0.359	0.415	0.330	0.411	0.583	0.576
aASSIM8	0.580	0.783	0.218	0.372	0.507	0.313	0.438	0.551	0.573
aEXPLO2	0.285	0.349	0.744	0.690	0.431	0.596	0.368	0.178	0.294
aEXPLO3	0.216	0.219	0.759	0.678	0.478	0.615	0.419	0.135	0.216
aEXPLO4	0.044	0.099	0.867	0.650	0.573	0.595	0.536	-0.124	0.144
aEXPLO5	0.117	0.227	0.845	0.695	0.519	0.565	0.426	0.009	0.209
aEXPLO6	0.017	0.114	0.788	0.525	0.487	0.525	0.454	-0.043	0.126
aEXPLO7	-0.124	0.023	0.783	0.549	0.483	0.450	0.369	-0.233	0.091
aEXPLO8	-0.125	0.036	0.751	0.500	0.471	0.433	0.413	-0.254	0.110
aTRANS1	0.185	0.239	0.528	0.715	0.394	0.487	0.366	0.084	0.217
aTRANS2	0.372	0.414	0.585	0.809	0.523	0.595	0.495	0.199	0.333
aTRANS3	0.361	0.495	0.626	0.821	0.508	0.587	0.495	0.250	0.421
aTRANS4	0.223	0.332	0.637	0.822	0.487	0.518	0.374	0.182	0.266
aTRANS5	0.263	0.313	0.612	0.794	0.463	0.470	0.376	0.190	0.287
aTRANS6	0.366	0.430	0.608	0.783	0.548	0.553	0.460	0.217	0.421
aTRANS7	0.293	0.280	0.698	0.832	0.572	0.592	0.484	0.078	0.319
aTRANS8	-0.048	0.083	0.619	0.708	0.362	0.415	0.310	-0.079	0.108
aTRANS9	0.240	0.280	0.579	0.752	0.510	0.487	0.427	0.097	0.290
bCLIENT1	0.261	0.348	0.459	0.516	0.718	0.529	0.488	0.182	0.393
bCLIENT2	0.143	0.263	0.524	0.460	0.787	0.529	0.510	0.119	0.346
bCLIENT3	0.209	0.361	0.398	0.423	0.730	0.514	0.500	0.261	0.424
bCLIENT4	0.279	0.375	0.415	0.382	0.745	0.417	0.606	0.260	0.421
bCLIENT5	0.396	0.539	0.415	0.460	0.759	0.492	0.618	0.415	0.485
bCLIENT6	0.265	0.417	0.663	0.634	0.852	0.601	0.640	0.181	0.364
bCLIENT7	0.316	0.422	0.521	0.487	0.783	0.456	0.697	0.251	0.356
bCLIENT8	0.276	0.429	0.376	0.423	0.727	0.457	0.638	0.263	0.333

bEMPLOY1	0.494	0.534	0.390	0.514	0.398	0.668	0.394	0.446	0.423
bEMPLOY2	0.366	0.405	0.561	0.600	0.576	0.827	0.531	0.298	0.337
bEMPLOY3	0.178	0.202	0.681	0.649	0.546	0.891	0.506	0.106	0.275
bEMPLOY4	0.298	0.307	0.562	0.525	0.605	0.841	0.525	0.149	0.231
bEMPLOY5	0.150	0.221	0.474	0.411	0.458	0.722	0.362	0.091	0.214
bEMPLOY6	0.123	0.204	0.687	0.631	0.529	0.876	0.510	0.051	0.253
bEMPLOY7	0.157	0.238	0.387	0.331	0.471	0.661	0.537	0.205	0.269
bENVIRO1	0.295	0.402	0.387	0.448	0.571	0.511	0.771	0.301	0.365
bENVIRO2	0.159	0.319	0.512	0.468	0.596	0.443	0.761	0.128	0.238
bENVIRO3	0.197	0.255	0.298	0.260	0.476	0.411	0.736	0.193	0.327
bENVIRO4	0.194	0.366	0.520	0.483	0.630	0.472	0.789	0.256	0.356
bENVIRO5	0.293	0.351	0.478	0.420	0.591	0.495	0.754	0.233	0.297
bENVIRO6	0.408	0.475	0.342	0.393	0.564	0.389	0.751	0.241	0.366
bENVIRO7	0.259	0.333	0.302	0.363	0.468	0.424	0.635	0.246	0.304
bENVIRO8	0.253	0.239	0.274	0.291	0.592	0.432	0.632	0.161	0.330
bGROWTH1	0.568	0.529	0.129	0.334	0.377	0.348	0.348	0.740	0.522
bGROWTH2	0.517	0.469	-0.042	0.125	0.124	0.160	0.101	0.798	0.380
bGROWTH3	0.540	0.548	-0.121	0.021	0.196	0.082	0.141	0.752	0.473
bGROWTH4	0.421	0.495	-0.150	-0.034	0.126	0.017	0.135	0.667	0.381
bGROWTH5	0.528	0.591	-0.030	0.158	0.323	0.212	0.344	0.786	0.511
bGROWTH6	0.531	0.598	-0.096	0.130	0.213	0.163	0.195	0.800	0.455
bGROWTH7	0.366	0.469	0.054	0.151	0.250	0.204	0.281	0.614	0.409
bPROFIT1	0.338	0.500	0.156	0.258	0.319	0.311	0.249	0.390	0.709
bPROFIT2	0.379	0.535	0.198	0.349	0.401	0.344	0.313	0.432	0.710
bPROFIT3	0.403	0.550	0.173	0.263	0.413	0.329	0.373	0.363	0.735
bPROFIT4	0.468	0.641	0.155	0.278	0.400	0.196	0.347	0.460	0.762
bPROFIT5	0.388	0.507	0.177	0.226	0.374	0.227	0.366	0.516	0.747
bPROFIT6	0.292	0.337	0.104	0.214	0.246	0.190	0.184	0.385	0.596
bPROFIT7	0.463	0.464	0.122	0.303	0.354	0.182	0.334	0.456	0.684

Table 6's results for the Fornell-Larcker criterion reveal that each latent variable's square root of AVE is larger than its correlation with other latent variables. One must largely rely on this criterion because the HTMT-based assessment using a confidence interval depends on inferential statistics, especially in light of the limits of cross-loadings and the Fornell-Larcker criterion (Hair et al., 2017). In place of the inadequate AVE technique, Henseler et al. (2015) suggested the HTMT. For HTMT, it is expected that a threshold value of 0.90 has been suggested. A number greater than 0.90 indicates that the discriminant validity is low. Additionally, the value 1 shouldn't be included in the HTMT's confidence interval. Table 7 demonstrates that the study's PLS model satisfies the HTMT requirement.

Table 6: Fornell-Lacker criterion

	Acquire	Assimilate	Client	Employees	Environment	Exploit	Growth	Profit	Transform
Acquire	0.804								
Assimilate	0.757	0.794							
Client	0.352	0.517	0.764						
Employees	0.314	0.375	0.655	0.789					
Environment	0.351	0.471	0.771	0.614	0.731				
Exploit	0.090	0.201	0.622	0.688	0.539	0.792			
Growth	0.676	0.717	0.316	0.234	0.302	-0.048	0.740		
Profit	0.554	0.718	0.509	0.358	0.441	0.220	0.609	0.708	
Transform	0.325	0.411	0.623	0.670	0.54	0.781	0.176	0.382	0.783

The distribution of the HTMT statistic for this investigation is also shown in Table 7. For HTMT, a threshold value of 0.90 has been suggested (Henseler et al., 2015). Values of 0.9 and above, as noted previously, show a lack of discriminant validity. Additionally, the value of 1 should not be included in the HTMT's confidence interval. Insufficient discriminant validity is indicated by a confidence interval with the value 1. Additionally, Table 8 shows that neither of the confidence intervals included the value 0, which supported the achievement of discriminant validity (Hair et al., 2017).

Table 7: HTMT

	Acquire	Assimilate	Client	Employees	Environment	Exploit	Growth	Profit	Transform
Acquire									
Assimilate	0.850								
Client	0.399	0.570							
Employee	0.365	0.424	0.728						
Environ	0.405	0.525	0.868	0.692					
Exploit	0.205	0.234	0.687	0.753	0.601				
Growth	0.780	0.807	0.359	0.305	0.346	0.248			
Profit	0.650	0.818	0.589	0.425	0.515	0.260	0.715		
Transform	0.376	0.446	0.680	0.733	0.596	0.849	0.244	0.433	

4.4 Assessing the second-order and third-order measurement models

According to Becker et al. (2012), higher-order constructs, hierarchical component models, and hierarchical latent variable models are all related to explicit representations of multidimensional constructs that happen at a higher level of abstraction and are related to other constructs at a lower level of abstraction, completely mediating the influence from or to their underlying dimensions. Currently, both the absorptive capacity and firm performance have been represented as third-order hierarchical component models for this study. It is a reflective-reflective-formative model, meaning the objects can be separated from one another but are correlated at distinct layers. The

first-order construct and the second-order are both reflectively created. The sub-dimension of prospective and realised absorptive capacity, where their dimensions of acquisition and absorption as well as in transformation and exploitation are associated, is a typical illustration in this situation (ditto for financial and strategic in firm performance). While the lower-order constructs are reflectively measured and do not have a common cause with the third-order constructs, they do create a generic idea that fully mediates the influence on subsequent endogenous variables (Becker et al., 2012). It is also crucial to remember that the study used a repeated indicator technique, which involves establishing a construct that signals every element of the underlying lower-order constructs to create a higher order construct (Becker et al., 2012). For example, as a third-order construct, absorptive capacity has two dimensions, including potential and realised, which are underlying second-order constructs. These constructs themselves have four dimensions, including acquisition, assimilation, transformation, and exploitation, which are underlying first-order constructs and each have their own unique manifest variables. As a result, all (32) apparent variables of the underlying dimensions, which are taken to be first-order constructs, can be used to specify absorptive capacity as a third-order latent construct. Similar to how RACAP is specified using all (17) underlying dimensions from transformation and exploitation, PACAP latent construct is specified using all (15) manifest underlying dimensions from acquisition and assimilation. The items or manifest variables have always been employed three times: once for the first-order constructs, where they serve as primary loadings; twice for the second-order constructs, where they serve as secondary loadings; and finally, once for the third-order construct. As a result, the measurement model has been defined in this manner, and firm performance has also been stated in this manner as a third-order latent construct. Therefore, the repeated indicator approach's key benefit is that it can estimate all the latent constructs simultaneously rather than individually estimating the higher and lower order constructs, which avoids the confounding issue (Becker et al., 2012). According to Wold's report, which Tehseen et al. (2017) cited, the standard method for the repeated indicator on a hierarchical construct is to use Mode A, which is appropriate for both reflective-reflective type models and formative type models, particularly when the first-order latent variables are reflective. We utilise Mode A for the higher order repeating indicators because both absorptive capacity and firm performance dimensions were considered reflecting first-order components in this study. The study next ran the measurement models for the second- and third-order latent components.

As with prospective and realised absorptive capacity on the one hand, and financial and strategic business performance on the other, the second-order constructs have also been measured reflectively. The reflective formation's secondary loadings, composite reliability, and AVEs have all been used in the study to evaluate it. Table 8 illustrates this. The examination of the hierarchical third order composites (Mode A) using the repeated indicator approach yielded data showing that all secondary loadings are greater than the suggested value of 0.7, ranging between 0.842 and 0.958. The computed values for composite reliabilities (CR) and AVEs have surpassed the corresponding thresholds of 0.7 and 0.5. The methods outlined by Hair et al. (2017), which involve analysing the collinearity problems and the significance and relevance of formative indicators, have also been used to examine the third order latent variables. Since collinearity problems are problematic, it is expected that indicators shouldn't have strong correlations between them. Because of this, the study assessed the value of the Variance Inflation Factor to determine whether there was any collinearity between the formative elements of the constructs (ACAP and Firm performance) (VIF). In order to determine whether there is a collinearity problem, the study looked at the inner VIF values. As a result, the study assessed the constructs potential and realised, financial and strategic for collinearity, and absorptive ability and firm performance as predictors, respectively. A value of less than 5 VIF is acceptable based on the cutoff of Hair et al. (2017). Because all of the predictors' latent variables' VIF values in Table 8 were less than 5, the study has no collinearity problems. 5000 resamples were used in the bootstrapping process to test the significance of weights (Hair et al., 2017). For a T-value of 1.96 or above, it is advised that the weight be greater than 0.1 and significant at a 95 percent level. Remember

that Table 8 demonstrates that the weights are significantly different from the suggested threshold for larger T-values as well, offering empirical evidence for keeping all the indicators.

Table 8: HOC measurement model

	First-order variable	Scale	Loading/ Weight	CR/VIF	AVE/T-value
PACAP	Acquisition	Second-order Variable Reflective	0.897	0.927	0.864
	Assimilation		0.961		
RACAP	Transformation		0.958	0.938	0.884
	Exploitation		0.922		
Financial	Growth		0.899	0.891	0.804
	Profit		0.894		
Strategic	Client		0.921	0.917	0.787
	Employee		0.842		
	Environment		0.897		
ACAP	Potential	Third order variable Formative	0.592	1.118	14.318
	Realised		0.625	1.118	18.273
Performance	Financial		0.380	1.593	9.636
	Strategic		0.757	2.381	23.102

4.5 Assessing the structural model

According to the method used by Hair et al. (2017), the structural model was evaluated in this study (2017). Through the use of variance explained R-square values for the dependent latent constructs, the structural model predictability is calculated. R-square can change depending on the subject of the study. According to Chin, who was referenced by Ali et al. (2018), R-square values of 0.67, 0.33, and 0.19 should be regarded as substantial, moderate, and weak, respectively. The variation explained for company performance can be characterised as large based on the R-square values of performance (0.672), finance (0.372), and strategy (0.580), whereas financial and strategic are only fairly acceptable (Figures 3a and 3b show the PLS-Algorithm and Bootstrapping respectively). The hypothesis was supported by the study's examination of the path coefficients' magnitude and significance. According to Hair et al. (2017), the bootstrapping method is used to determine the path coefficients' significance levels. The path coefficients, t-statistics, significance level, p-values, and bootstrapping confidence intervals at 95% are all shown in Table 9. All direct effects of ACAP on firm performance, as well as the business's disaggregated financial and strategic performances, are significant, according to the path coefficient results and their respective levels of significance.

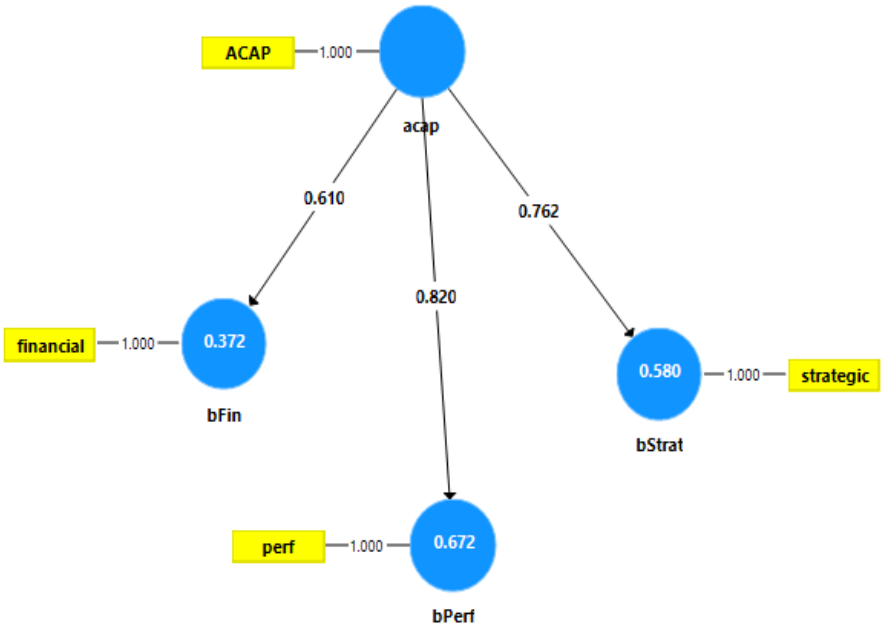

Figure 3a: PLS-Algorithm structural model for absorptive capacity and performances

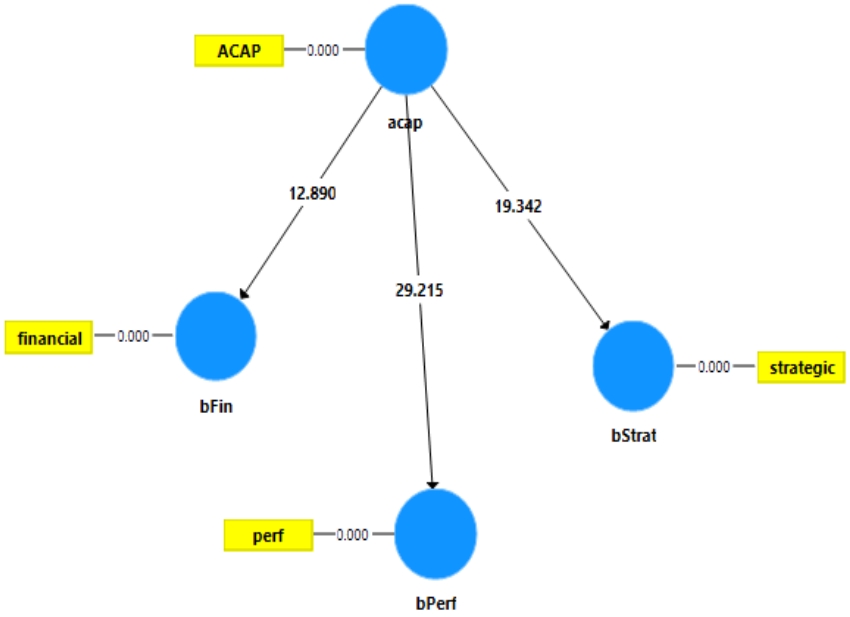

Figure 3b: Bootstrapping structural model for absorptive capacity and performances

Table 9: Structural model results

Structural path	Path coefficient	T-Value	95% BCa Confidence interval	f^2 value/R^2 value
acap -> Performance	0.820	29.215	[0.770, 0.863]	2.050 / 0.672
acap -> Financial	0.610	12.890	[0.529, 0.687]	0.593 / 0.372
acap -> strategic	0.762	19.342	[0.691, 0.820]	1.381 / 0.580
Realized -> Performance	0.481	11.075	[0.407, 0.549]	0.647 / 0.680
Potential -> Performance	0.531	13.121	[0.464, 0.598]	0.791 / 0.680
Realized -> Financial	-0.029	0.565	[-0.116, 0.054]	0.000 / 0.648

Potential Financial	->	0.814	18.494	[0.738, 0.882]	1.685 / 0.648
Realized Strategic	->	0.635	16.164	[0.567, 0.696]	0.923 / 0.608
Potential Strategic	->	0.290	5.868	[0.207, 0.369]	0.194 / 0.608

In order to uncover more about the aspect of the ACAP construct that has the greatest impact on the endogenous variables, the ACAP construct dimensions were further broken down into potential and realised and examined for their effects on the aggregated firm performance as well as its disaggregated dimensions, financial and strategic firm performances. This is due to the fact that a route coefficient gives the impression that an impact is large, but it is useless for evaluating the size of effects across models due to the influence of numerous other explanatory factors. As a result, Chin (1998) recommends determining the effect size (f^2), a metric to gauge the relative influence of an explanatory variable on a dependent variable (Hair et al., 2017). Effect sizes of 0.02, 0.15, and 0.35 are thought to correspond to minor, medium, and high effects, respectively. The summary of the effect size findings for each relationship in the structural model (as shown in Figures 4a&b) is given in Table 9. Between 0.000 and 1.685 are the effect sizes for the routes of actual and projected absorptive capacity. In particular, the relationship between realised absorptive capacity and firm performance has no effect (0.000), while the relationship between potential absorptive capacity and strategic firm performance showed a medium-sized effect, and all other paths showed significant large effects because their values exceeded the threshold of 0.35 (Table 9).

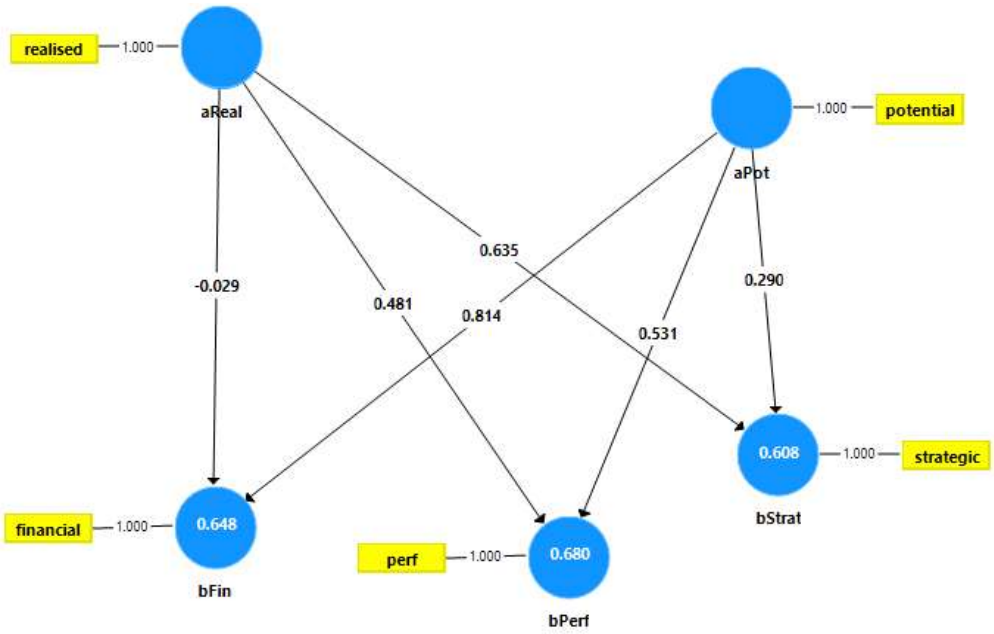

Figure 4a: PLS-Algorithm structural model for realized and potential absorptive capacity and performances

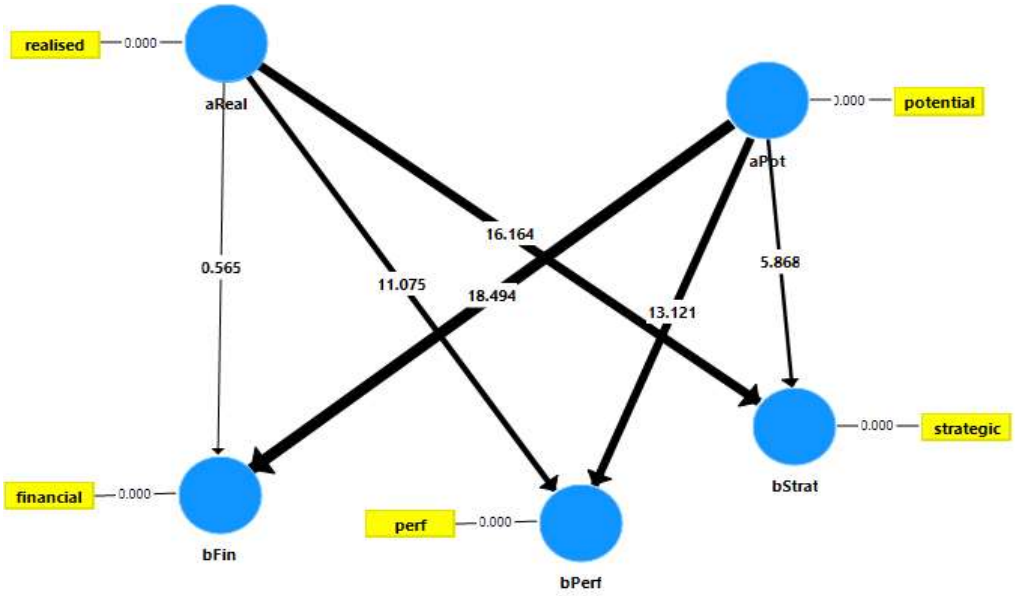

Figure 4b: Bootstrapping structural model for realized and potential absorptive capacity and performances

5. DISCUSSION

Despite the positive correlations between absorptive capacity, potential and realised absorptive capacities, and company performance (as well as its metrics like financial and strategic performance), few studies have empirically examined these correlations in a single study so far. Being the first study to look at these connections between absorptive ability and company performance (in both aggregated and disaggregated forms) in construction firms, emerging economies in general, and Nigeria in particular, this study adds to the body of literature. while utilising partial least square structural equation modelling and hierarchical order structures.

The results of this study offer more evidence in favour of the positive and noteworthy benefits of absorptive capacity on company performance, including its indicators, financial performance, and strategic performance. The same is true of the positive correlations between prospective, realised absorptive capabilities, and company performance, its indicators, with the exception of realised absorptive capacity's non-significant impact on financial performance. Numerous earlier studies that reported on the beneficial influence of absorptive ability on business performance, such as Wales et al. (2013) and Ferreras-Méndez et al. (2015), provide support for the conclusions of this study. Additionally, Tzokas et al. (2015) research confirmed that absorptive ability has a favourable impact on a company's performance—but only when there are strong customer relationships and technological capabilities present. The results of Tzokas et al. (2015) and Lichtenthaler (2016) further support the existence of a significant positive correlation between prospective absorptive ability and, respectively, firm performance and financial performance. The association between realised absorptive capacity and financial performance was not significant, in contrast to other studies. Jiménez-Barrionuevo et al. (2019) found that absorptive capacity has a large and advantageous impact on both financial and strategic performance, which is in opposition to this result. Results from Jansen et al. (2005) also show that the mechanism behind performance leverage is realised absorptive capacity. They demonstrate that actual absorptive capacity has a far greater impact on performance than theoretical absorptive capacity. However, Wang and Ahmed's (2007) research, which asserts the beneficial effect of dynamic capability but in this case on the long-term performance (performance evaluated by market and financial indicators), offers a brief explanation. Therefore, it would be accurate to state that every business entity's financial performance is a long-term consequence. Comparing this to the experience of the participating firms in this study, it becomes

clear that only a pitiful 6.6 percent of the sample population had experience of more than 20 years. Hence supporting the claim made in an earlier study by Wang and Ahmed (2007).

The results of this study demonstrated that businesses focused more on actual absorptive capacity than potential absorptive ability (acquisition and assimilation) (transformation and exploitation). In order to develop absorptive capacity, networking and alliance formation are important but insufficient measures. More importantly, the majority of developing economies have low levels of technological development; as a result, agrarian and subsistence knowledge predominate. Construction companies' performance would continue to be as it was in this study unless they invested the same amount of energy in turning prospective absorptive capacity into realised capacity, particularly in Nigeria. In particular, no amount of encouragement or slight improvement would affect their financial performance.

The findings of this study have significant ramifications for many different stakeholders, including project managers, owners of construction companies, sponsors of the project, business, the government, and financial institutions like the apex bank, among others. The report makes the suggestion that project managers and others in the construction sector avoid using overly robust designs since they have a negative impact on the businesses' ability to make a profit. The government should use its policies to create an environment that is favourable to business growth. Construction companies are project- and time-driven, so when they struggle to secure contracts, it may have a multiplier effect on their financial performance and, by extension, the economy. According to Idrisov et al. (2015), the fluctuation in oil prices may likely be a factor in the economy's slow growth, which is connected to the construction industry and results in a noticeable increase in the cost of materials and other inputs. Finally, the likelihood of a project delay and eventual abandonment may increase due to high loan interest rates, bank fees, and delays in the project sponsor disbursing funds. Because every project is different in terms of learning, these invariably have an impact on the firm's ability to absorb information. This has an impact on both the financial performance and the performance of the company as a whole.

6. CONCLUSIONS

In conclusion, this article had examined the level of absorptive capacity among the professionals in the construction industry. It was revealed that acquisition was ranked best followed by the assimilation in the construction industry. However, exploitation was ranked least among the disaggregated second-order constructs of absorptive capacity. It is an indication that most firms are timid in carrying new methods of doing things as presented by the construction professionals. Also, it would be recalled that absorptive capacity as an aggregate showed positive significant relationships with the measure of performance in the construction industry. The results were not too different for the first order constructs of absorptive capacity showing positive and significant relationship with the performance constructs except for realised on financial performance. The implication of this results for project managers, owners of construction companies, sponsors of the project, business, the government, and financial institutions is that realised absorptive capacity being similar to the capability requires fund to attain certain level for a period of time before the manifestation could become reality in the future. However, firms need to be patient as this would yield positive results in the long-run if sustained.

REFERENCES

Abdullah, A., Bilau, A. A., Enegbuma. W. I., Ajagbe, A. M., & Ali, K. N. (2011). Evaluation of Job Satisfaction and Performance of Employees in Small and Medium Sized Construction Firms in Nigeria. *Proceedings of the 2nd International Conference on Construction and Project Management*, Singapore, *15*, 225-229.

Ali, I., Ali, M., Badghish, S., & Baazeem, T. A. S. (2018). Examining the role of childhood experiences in developing altruistic and knowledge sharing behaviors among children in their later life: A Partial Least Squares (PLS) path modeling approach. *Sustainability*, *10*(2), 292.

Akadiri, P. O., Chinyio, E. A., & Olomolaiye, P. O. (2012). Design of a sustainable building: A conceptual framework for implementing sustainability in the building sector. *Buildings*, *2*(2), 126-152.

Allas, T. (2014). Insights from International Benchmarking of the UK Science and Innovation System. London: Department for Business Innovation & Skills (BIS) Analysis Paper, 3, 1-55.

Awang, Z., Afthanorhan, A., & Mamat, M. (2016). The Likert scale analysis using parametric based Structural Equation Modeling (SEM). Nicolae Titulescu University of Bucharest, Faculty of Economic Sciences. *Computational Methods in Social Sciences (CMSS)*. *4(1)*, 13-21.

Bagozzi, R. P., & Yi, Y. (1988). On the evaluation of structural equation models. *Journal of the academy of marketing science*, *16(1)*, 74-94.

Barclay, D., Higgins, C., & Thompson, R. (1995). The Partial Least Squares (PLS) Approach to Causal Modelling: Personal Computer Adoption and Use as an Illustration. *Technology Studies. Special Issue on Research Methodology*, *2(2)*, 285-309.

Becker, J. M., Klein, K., & Wetzels, M. (2012). Hierarchical latent variable models in PLS-SEM: Guidelines for using reflective-formative type models. *Long Range Plan*. *45*, 359–394.

Bjorvatn, T., & Wald, A. (2018). Project Complexity and Team-Level Absorptive Capacity as Drivers of Project Management Performance. *International Journal of Project Management. 36*, 876-888. https://doi.org/10.1016/j.ijproman.2013.12.002

Blayse, A. M., & Manley, K. (2004). Key influences on construction innovation. *Construction Innovation. 4(3)*, 143-154.

Chin, W. (1998). Issues and opinion on structural equation modeling. MIS Q. 1998, 22, 7–16.

Cho, H. J., & Pucik, V. (2005). Relationship between innovativeness, quality, growth, profitability, and market value. *Strategic management journal*, *26*(6), 555-575.

Cohen, W. M., & Levinthal, D. A. (1990). Absorptive capacity: a new perspective on learning and innovation. *Administrative Science Quarterly*, *35(397)*, 128-152.

Daghfous, A. (2004). Absorptive capacity and the implementation of knowledge-intensive best practices. *SAM Advanced Management Journal*. 69(2), 21–27.

Dantata, S. A. (2008). General Overview of Nigerian Construction Industry. Unpublished Master of Engineering Thesis, Massachusetts Institute of Technology. Department of Civil and Environmental Engineering, 1-83. http://hdl.handle.net/1721.1/44272

Dlamini, S. (2012). Relationship of Construction Sector to Economic Growth. Paper present at Joint CIB International Symposium of W055, W065, W089, W118, TG76, TG78, TG81 and TG84, Montreal, QC, Canada, June 26–29.

Du Plessis, C. (2001). Agenda 21 for Sustainable Construction in Developing Countries. CSIR Report for the CIB and UNEP-IETC. Pretoria: CSIR Building and Construction Technology.

Ekundayo, J. M. (2013). Out of Africa: Fashola-Reinventing Servant Leadership to Engender Nigeria's Transformation: Foreword by Femi Falana, San. Author House.

Faniran, O. O. (1999). The role of construction project planning in improving project delivery in developing countries. Proceedings of the 2nd International Conference on Construction Industry Development, and 1st Conference of CIB TG 29 on Construction in Developing Countries, 27-29 October, School of Building and Real Estate, National University of Singapore.

Ferreras-Méndez, J. L., Newell, S., Fernández-Mesa, A., & Alegre, J. (2015). Depth and breadth of external knowledge search and performance: The mediating role of absorptive capacity. *Industrial Marketing Management*, 47, 86-97. DOI: http://dx.doi.org/10.1016/j.indmarman.2015.02.038

Fosfuri, A., & Tribó, J. A. (2008). Exploring

the antecedents of potential absorptive capacity and its impact on innovation performance. *Omega*, 36(2), 173–187.

Foss, N. J., Lyles, M. A., & Volberda, H. W. (2010). Absorbing the concept of Absorptive Capacity: How to realize its potential in the organization field. *Organization Science, 21(4), 931-951.*

Gann, D. (2001). Putting Academic Ideas into Practice: Technological Progress and the Absorptive Capacity of Construction Organizations. *Construction Management and Economics. 19,* 321-330.

García-Morales, V. J., Bolívar-Ramos, M. T., & Martín-Rojas, R. (2014). Technological variables and absorptive capacity's influence on performance through corporate entrepreneurship. *Journal of Business Research*, *67(7),* 1468-1477.

Gefen, D., & Straub, D. A. (2005). Practical Guide to Factorial Validity Using PLS-Graph: Tutorial and Annotated Example. Communications of the Association for Information Systems. *16*, 91–105.

Glick, W. H., Washburn, N. T., & Miller, C. C. (2005). The myth of firm performance. In *Annual Meeting of the Academy of Management*.

Hair, J. F., Sarstedt, M., Ringle, C. M., & Gudergan, S. P. (2017). Advanced Issues in Partial Least Squares Structural Equation Modeling; SAGE Publishing: Thousand Oaks, CA, USA.

Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, *43*, 115–135.

Herath, T., & Rao, H. R. (2009). Protection motivation and deterrence: a framework for security policy compliance in organisations. *European Journal of Information Systems*, *18*(2), 106-125.

Idrisov, G., Kazakova, M., & Polbin, A. (2015). A theoretical interpretation of the oil prices impact on economic growth in contemporary Russia. *Russian Journal of Economics. 1,* 257–272.

Isa, R. B., Jimoh, R. A., & Achuenu, E. (2013). An overview of the contribution of construction sector to sustainable development in Nigeria. *Net Journal of Business Management. 1(1),* 1-6.

Ismail, K., Aslan, A. S., & Ajagbe, A. M. (2011). A conceptualized approach towards building a growth model for venture capitalists finance of TBFs. *International Journal of Innovation, Management and Technology*. 2(2), 315–320.

Jansen, J. J. P., Van den Bosch, P. A. J., & Volberda, H. W. (2005). Managing potential and realized absorptive capacity: How do organizational antecedents matter? *Academy of Management Journal*, *48(6)*, 999–1015.

Jansen, J. J. P., Van Den Bosch, P. A. J., & Volberda, H. W. (2006). Exploratory innovation, exploitative innovation, and performance: Effects of organizational antecedents and environmental moderators. *Management Science*, 52(11), 1661–1674.

Jiménez-Barrionuevo, M., Molina, L. M., & García-Morales, V. J. (2019). Combined influence of absorptive capacity and corporate entrepreneurship on performance. *Sustainability*, *11*(11):1-26.doi:10.3390/su11113034.

Khalili-Damghani, K., & Tavana, M. (2014). A comprehensive framework for sustainable project portfolio selection based on structural equation modeling. *Project Management Journal*, *45*(2), 83-97. DOI: 10.1002/pmj.21404

Leal-Rodríguez, A. L., Roldán, J. L., Ariza-Montes, J. A., & Leal-Millán, A. (2014). From potential absorptive capacity to innovation outcomes in project teams: The conditional mediating role of the realized absorptive capacity in a relational learning context. *International Journal of Project Management*, *32*(6), 894-907.

Lichtenthaler, U. (2016). Toward an innovation-based perspective on company performance", *Management Decision*, 54(1), 66-87. https://doi.org/10.1108/MD-05-2015-0161

Mugenda, O. M., & Mugenda, A. G. (1999). Research Methods: Quantitative and Qualitative Approaches, ACTS Press,

Nairobi, Kenya, 256 pp.

Mullins, L. J. (2005) Management and Organisational Behaviour (7th Ed.) FT Prentice Hall, Pearson Education Ltd. England.

Navon, R. (2005). Automated project performance control of construction projects. *Automation in Construction*, 14, 467- 476.

Okoye, P. U., Mbakwe, C. C., & Igbo, E. N. (2018). Modeling the Construction Sector and Oil Prices toward the Growth of the Nigerian Economy: An Econometric Approach. *Economies*. 6(16), 1-19.

Palmer, N. A., & Perkins, D. D. (2012). Technological Democratization: The Potential Role of ICT in Social and Political Transformation in China and Beyond. *Perspectives on Global Development and Technology. 11*, 456-479. DOI: 10.1163/15691497-12341236

Reason, P., & Bradbury, H. (2001). Handbook of Action Research, Sage, London.

Reichstein, T., Salter, A. J., & Gann, D. M. (2005). Last among equals: A comparison of innovation in construction, services and manufacturing in the UK. *Construction Management and Economics*, 631-644.

Reinartz, W., Haenlein, M., & Henseler, J. (2009). An empirical comparison of the efficacy of covariance-based and variance-based SEM. *International Journal of research in* Marketing, *26*(4), 332-344.

Ringle, C. M., Sarstedt, M., Mitchell, R., & Gudergan, S. P. (2020). Partial least squares structural equation modeling in HRM research. The International Journal of Human Resource Management, 31(12), 1617-1643.

Rodney, M., Kristel, M., Nora, M., & John, D. (2010). The Development of Absorptive Capacity-Based Innovation in a Construction SME. Entrepreneurship and Innovation, 0011(3): 231-244.

Sangthong, M. (2020). The effect of the likert point scale and sample size on the efficiency of parametric and nonparametric tests. *Thailand Statistician, 18*(1), 55-64.

Sazali, A. W., Raduan, C. R., Jegak, U., & Haslinda, A. (2009). Evolution and development of technology transfer models and the influence of knowledge-based view and organizational learning on technology transfer. *Research Journal of Internatıonal Studıes*. (12), 79-91.

Sicotte, H., Drouin, N., & Delerue, H. (2014). Innovation portfolio management as a subset of dynamic capabilities: Measurement and impact on innovative performance. *Project Management Journal*, *45*(6), 58-72. DOI: 10.1002/pmj.21456

Sekaran, U., & Bougie, R. (2009). Research Methods for Business: A Skill-Building Approach (New York: West Sussex).

Tehseen, S., Sajilan, S., Sajilan, S., & Ramayah, T. (2017). Assessing Cultural Orientation as a Reflective-Formative Second Order Construct- A Recent PLS-SEM Approach. *Review of Integrative Business and Economics Research*. 6(2), 38-63.

Thwala, D. W., Ajagbe, A. M., Enegbuma, W. I., Bilau, A. A., & Long, C. L. (2012). Sudanese Small and Medium Sized Construction Firms: An Empirical Survey of Job Turnover. *Journal of Basic, Applied Scientific Research*. 2(8), 7414-7420.

Tzokas, N., Kim, Y. A., Akbar, H., & Al-Dajani, H. (2015). Absorptive capacity and performance: The role of customer relationship and technological capabilities in high-tech SMEs. *Industrial Marketing Management, 47: 134 - 142.* doi:10.1016/j.indmarman.2015.02.033

Unsal, H. I., & Taylor, J. E. (2011). Modeling interfirm dependency: Game theoretic simulation to examine the holdup problem in project networks. *Journal of Construction Engineering and Management*, *137*(4), 284-293.

Venkatraman, N., & Ramanujam, V. (1986). Measurement of business performance in strategy research: A comparison of approaches. *Academy of management review*, *11*(4), 801-814.

Wales, W. J., Parida, V., & Patel, P. (2013). Too much of a good thing? Absorptive capacity, firm performance, and the

moderating role of entrepreneurial orientation. *Strategic Management Journal,* 34(5): 622–633.

Wang, C. L., & Ahmed, P. K. (2007). Dynamic capabilities: A review and research agenda. *International journal of management reviews, 9*(1), 31-51.

Wang, Z., Yang, X., Chan, A. P., & Liu, J. (2021). Are project-based organizations willing to learn compliance lessons from sanctioned organizations close to them? The moderating effect of knowledge base compatibility and strength of the event. *International Journal of Project Management, 39*(6), 672-682.

Yamane, T. (1973). Statistics: An introduction analysis. Harper & Row.

Zahra, S. A., & George, G. (2002). Absorptive Capacity: A review, reconceptualization, and extension. *Academy of Management Review*, 27(2), 185-203.