

THE IMPACTS OF ECONOMIC CRISIS ON FIRM-LEVEL INNOVATION IMPLEMENTATION: IMPLICATIONS FOR SUSTAINABLE DEVELOPMENT IN THE CONSTRUCTION INDUSTRY

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ABSTRACT

Innovation is viewed by many as a driving force for sustainable economic and social change. Indeed, it has often been argued that continuous innovation is essential for sustainable developments in the construction industry. However, it has been established that economic crises negatively impact firms' capacity to implement innovations. The size of the effect and the impact on firm-level innovation differ widely across countries and industries. In the case of Nigeria, it has been argued that the rather frequent economic turbulence it experiences significantly affects firm-level innovation implementation in the local construction industry. This study identifies the key effects of economic crises on construction contractors and how these impact firm-level innovation implementations (it focuses on the factors at play in this regard). The paper provides an overview and synthesis of the literature on innovation, economic crisis, innovation persistence and sustainable development. This is supported by case studies and semi-structured interviews within construction contractors based in Abuja, Nigeria. The study finds several key effects of economic crises on construction contractors in Abuja Nigeria. These are shrinking demands for products and services, increased operating costs, increased delays in payments for jobs completed, increased difficulties in accessing credits and loans, declining revenue and profit levels, a rise in employee dissatisfaction and a surge in crime rate.

Keywords: Innovation, Innovation implementation, Innovation persistence, Sustainable development, Economic crisis, Construction contractors

1. INTRODUCTION

With the consistent robust growth in Nigeria's population, it is envisaged that the demand for the constructed product in the form of social infrastructure and amenities will continue to expand (Daramola & Ibem, 2010, Aibinu & Jagboro, 2002). The corollary of this, however, is that the demand for resources in this area will also continue to increase. Thus, the need for continuous improvements and renewal of sustainable construction practices so as to preserve the natural environment (Spence & Mulligan, 1995). However, it has been established that continuous innovation is fundamental to the development and renewal of sustainable practices in the construction industry (Seyfang & Smith, 2007; Meyer-Krahmer, 1998). But for firms operating in developing countries such as Nigeria, implementing innovations is largely dependent on the state of the economy (Archibugi & Filippetti, 2011). Indeed, several studies

have found a positive correlation between innovation and the economy cycle (Archibugi et al., 2013b; Anthony & Feinzaig, 2008, Filippetti & Archibugi, 2010). The work of Archibugi et al. (2013a) concludes that firms are often more inclined to halt innovation decisions during periods of economic crisis. Therefore, for firms operating in countries with perennial problem of economic instability such as Nigeria, the importance of understanding the specific impacts of economic crises on firms' capacity to persist with innovations with a view to designing strategies for safe and continuous implementation of firm-level innovations during economic crisis cannot be over-emphasized.

2. LITERATURE REVIEW

2.1. Sustainability in Construction

As argued by Seebode et al. (2012), discussions on 'sustainability' often provoke a sense of urgency and concern from scholars and industry practitioners. In reality, sustainable developments can only be met by developing and implementing radically new concepts for the future industrial society (Meyer-Krahmer, 1998). The capability to continually innovate is a key mechanism for organizational growth and sustainable development (Lawson & Samson, 2001). It is argued that industry practitioners are only able to engage in development "...which meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987) by being persistently innovative. In fact, the work of Ruttan (2000) finds that the rate and direction of technical change is induced by changes in relative resource endowments. This implies that sustainable developments can only be accomplished through persistent innovation.

2.2. Innovation

The overwhelming importance of innovation to wider economic and social order has continually provoked the interest of scholars from a broad range of academic endeavours and this is reflected in the multiple, albeit, largely harmonious interpretation of the innovation phenomenon by several studies. Indeed, innovation is a "concept central to economic growth and can be a source of sustained competitive advantage to firms" (Damanpour & Wischnevsky, 2006). The work of Murphy et al. (2011) stresses the importance of product innovations for economic growth. They contend that product innovation has fundamental implications for appreciating the nature of capitalism as well as the nature of competitive forces. Utterback (1974) affirms this point with his observation that product innovations are not just about increased productivity but are creative reactions to competitive and technological challenges. Furthermore, a widely-adopted definition of innovation is offered by the Organisation for Economic Co-operation and Development (OECD) (2005). It submits that:

"An innovation is the implantation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations" (p. 46).

The OECD's definition emphasizes two fundamental factors: Firstly, that innovation is the implementation of something (a key distinction between innovation and invention), and secondly, that what is being implemented is new in its current form. Indeed, identifying what is new is essential for distinguishing innovation from mere change (Slappendel, 1996). However, novelty alone does not constitute innovation; it instead represents invention. To transmute from a mere invention to an innovation, Egbu (2001) points out that the new idea (service, process or product) must be successfully exploited in the marketplace. To this end, Egbu (2001) posits that an innovation is the "successful exploitation of an idea, where the idea is new to the unit of adoption". A number of authors echo this view (Thornberry, 2001; Pinchot, 1985), thus confirming that without the presence of some form of entrepreneurial activity to

exploit opportunities as they arise within organisations, innovation remains little more than an aspirational destination, rather than a tangible one.

2.3. *Economic Crisis*

Several environmental variables impinge on firms' capacity to innovate constantly. One of the environmental variables that hamper innovation is economic crisis. Findings from previous studies confirm that economic crises negatively impact organizations' ability to innovate (Archibugi et al., 2013a; Paunov, 2011). Indeed, Grant (2003) argues that the increased volatility in an organization's external environment (as frequently witnessed during economic crisis) often makes systematic strategic planning – a key step towards innovation – more challenging.

Most global economic crises recorded so far fit in with what Taleb (2007) describes as “Black Swans” – highly improbable events. He argues that to qualify as a “Black Swan”, the event first has to be an outlier, “...as it lies outside the realm of regular expectations”. Secondly, it must carry an extreme impact. Thirdly, despite its status as an ‘outlier’, “...human nature makes us concoct explanations for its occurrence after the fact, making it explainable and predictable”. The present study views economic crisis as a period of economic recession characterized by negative GDP growth lasting at least two consecutive quarters. This excludes periods of slow but not necessarily negative economic growth which can be referred to as economic stagnation. These periods are characterized by the overall shift in many macroeconomic indicators, including falls in real output (determined by GDP), hyper-inflation, a high unemployment rate, negative alterations in demands for goods and services, and an unstable currency (Grewal & Tansuhaj, 2001).

3. EFFECTS OF ECONOMIC CRISIS ON INNOVATION - FACTORS AT PLAY

Although, the Schumpeterian economists are quick to point out that economic crisis can be a source of opportunities for entrepreneurial firms (Anthony & Feinzaig, 2008), there is, however, little or no doubt that economic crisis is often of huge concern to organizations (Grewal & Tansuhaj, 2001). These fears stem from the often-deleterious impacts economic crises have on organizations. A review of literature reveals the following as effects of economic crisis on organizations: Shrinking demand levels for products and services (OECD, 2012; Bricongne et al., 2010; Barlevy, 2007), increased operating costs (Gilchrist et al., 2017; Wang et al., 2014; Higgins, 1977), increased difficulties in accessing credit (OECD, 2012; Lerner & Tufano, 2011; Aghion et al., 2008), and declining revenue and profit levels (Donald et al., 2014; Kalemlı-Ozcan et al., 2013; Pavlínek, 2015). These identified effects of economic crisis on construction-based firms are briefly discussed below.

3.1. *Shrinking Aggregate Demand for Products*

The OECD (2012) points out that economic downturns can reduce the demand for innovative products because they are often more expensive, as well as for durable products. The reason for this is that the acquisition of these products can often be deferred. The constructed product is a classic example of an expensive and durable product the purchase of which can be deferred during economic crisis. The OECD (2012) further notes that this could in effect mean “...fewer internal resources available to cover operational expenses”; hence, funding regimes for product research and development endeavours are often interrupted.

3.2. *Increased Difficulties in Accessing Credit*

Financial institutions are often at the centre of systemic economic turbulence as liquidity

usually dries up during downturns (Tong & Wei, 2010; Cornett et al., 2011; Malherbe, 2014; Diamond & Rajan, 2005). Indeed, “the volume of venture financing varies with the business cycle” (Schoar, 2005 cited in OECD, 2012). The point here is that failure in credit markets may get worse as lower cash flows mean firms have less collateral (Bernanke & Gertler, 1995). Consequently, “...investors have fewer resources to allocate across investment projects” (OECD, 2012). This often implies that firms often have to deal with a significantly constrained resource base, often causing instability in funding and funded regimes.

3.3. *Increased Operating Costs*

Aibinu and Jagboro (2002) point out that most construction materials and equipment utilized in Nigeria are still being imported. Mansfield et al. (1994) agree that not only a significant proportion of construction materials but also human resource and equipment are imported into Nigeria. They add that this has enormous cost implications for construction firms, especially when clients are not willing to accept increased costs passed to them in the form of increased price. A key effect of the 2015-2017 economic crisis in Nigeria was the substantial decline in the value of the naira against the dollar and other major foreign currencies. For instance, the official naira/dollar exchange rate as at April 2017 stood at \$1/N366 as against \$1/N190 less than two years previously (OANDA, 2017). The exchange rate on the more accessible parallel market was \$1/N400 at this point. Since most imports are valued in foreign currencies (especially dollars), this meant increased costs for local construction-based firms. As with most economic crises Nigeria has witnessed in the past, the rate of inflation increased significantly. Nigeria’s National Bureau of Statistics puts the CPI for February 2017 at 17.78% year on year. Again, this leads to increases in the operating costs of construction-based firms in Nigeria.

3.4. *Declining Revenue and Profit Levels*

Several factors as triggered by economic crises converge to cause a decline in firms’ revenue and profit levels. The key contributory factors for this as identified from literature are the declining demand for products (OECD, 2012), the increase in operating costs (Gilchrist et al., 2017) and the non-payment or delays in the payments for projects as specified in contract terms (Ode & Battaineh 2002; Mansfield et al., 1994). Firms’ reaction to this is often one of prioritizing survival over growth (Anthony & Feinzaig, 2008). The works of Donald et al. (2014), Kalemlı-Ozcan et al. (2013), Pavlínek (2012), and Opler and Titman (1994) conclude that firm-level revenues and overall financial performance decline during economic crisis.

3.5. *Summary of Literature Review*

It was established through a review of related literature that a positive correlation exists between sustainable developments and continuous innovations in the construction industry. This work further noted that economic crisis hampers continuous innovation and thus sustainable developments in construction industry. To better understand the specific factors at play in this regard, this study further investigated the effects of economic crisis on construction-based firms and how these specific effects impact innovations within the organizations. The validity of the identified factors as discussed in this section was later tested empirically. This will be fully discussed in the next section.

4. RESEARCH STRATEGY AND CASE SELECTION

A case study strategy was adopted to investigate the effects of economic crisis on firm-level innovation implementations. The specific factor(s) responsible for constraining innovation implementation during economic crisis was selected as the unit of analysis within

the boundaries of construction contractors that were innovative prior to the onset of the 2015-2017 economic crisis in Nigeria. Accordingly, five case studies were selected for this study. Yin (2003) advises that in multiple case study design, case selection should be done to purposefully predict similar results or contrasting results for predictable reasons. Silverman (2001 cited in Kulatunga et al., 2011) identifies a slight variant of theoretical sampling which he terms “purposive sampling”, where the “...purpose behind the case selection is not theoretically defined”. This “purposive approach” in case selection allows the researcher to select cases that demonstrate characteristics in which they are interested. The author recognizes the value of theoretical selection of cases rather than the statistical or random selection and contends that for this investigation that focuses on the effects of economic crisis on firm level innovation implementations, it was necessary to select cases from a wider context where economic crisis is present and at the same time, where innovation was present before the onset of the economic crisis (Kulatunga et al., 2011). Furthermore, consideration was given to construction contracting firms that were top players in the local construction industry. The rationale for this was the established relationship between innovativeness and market leadership (Hu, 2014).

4.1. Case Study Descriptions

This section discusses the five (5) construction contracting firms that provided the boundaries within which the study was conducted. These construction firms all have significant presence in Abuja, Nigeria and together account for over 50% of public-sector related construction projects currently being implemented in Abuja. More importantly for this study, the 5 construction contractors were innovative prior to the 2015-2017 economic crisis in Nigeria. These 5 construction contractors are coded as CS1, CS2, CS3, CS4, and CS5 and are briefly discussed below.

4.1.1. Case study 1 (CS1)

Founded in Egypt in 1955, CS1 is one of the leading construction companies in the Middle East and Africa with over 77,000 employees globally. Around 5000 of these employees are in Nigeria, including around 100 expatriates who are mostly from Egypt. Their areas of expertise include public buildings, bridges, roads, airports, tunnels, water and sewage systems, power stations, and ship building. Over 95% of its clientele in Nigeria is public sector related. Its global head office is situated in Cairo, Egypt.

Prior to the commencement of the 2015 – 2017 economic crisis in Nigeria, CS1 was implementing innovative solutions that were often focused on saving money and time and enhancing the overall project performance. For instance, CS1 introduced a cloud collaboration system allowing for the remote sharing of data on a construction site in real time. This innovation digitised the design process on construction projects and allowed for better collaboration between architects and engineers.

4.1.2. Case Study 2 (CS2)

Established nearly 40 years ago, CS2 is rated among the top construction firms in Nigeria, with a staff strength of around 3000 employees, including over 80 expatriates most occupying top technical and management positions. Among the projects executed by CS2 are several housing estates, bridges, flyovers, highways, and airport runways. Nearly 100% of its clientele is public sector related. Its vision is to be amongst the top construction organizations working in the Middle East and Africa within the next five years.

Before the 2015-2017 economic crisis in Nigeria, CS2 pioneered the use of predictive software in the construction process. This innovation aided the integration of a vast number of distinct structural parts to achieve building designs, while at the same time complying with

extant regulatory requirements. The key merit of this innovation was the improvement in structural integrity of projects executed and quality standardization.

4.1.3. Case Study 3 (CS3)

CS3 is a multinational engineering and services group that includes over 30 semi-autonomous companies operating within the public and private sector. It has about 20,000 employees globally and over 6000 employees in Nigeria. CS3 retains ownership of equipment and machineries worth over N30 billion (2016 estimates). Its mission is to continuously embrace new ideas and learn continuously. Over 90% of its current client base (2017) is public sector related.

Prior to the onset of the 2015 - 2017 economic crisis in Nigeria, CS3 introduced the computer-generated design. This innovation enabled CS3 to produce project designs with minimal human input and thus, helped to achieve quality standardization.

4.1.4. Case Study 4 (CS4)

CS4 is a transnational construction and development group with subsidiaries in several countries. Its first foray into Nigeria was in 1956. Some of the notable construction projects CS4 has executed in Nigeria include the Obafemi Awolowo University, Ile Ife (this remains Nigeria's most beautiful university), hotels, offices, embassies, commercial and residential properties, industrial schools, hospital buildings, various regional water projects, major highways, urban and rural roads, as well as bridges and runways for major airports in Nigeria. CS4 currently employs over 4000 individuals, with expatriates forming a large portion of top management. About 90% of its client base is public sector related.

Before the 2015 - 2017 economic crisis in Nigeria, CS4 pioneered the adoption of laser scanning technology in Nigeria's construction industry. This enabled CS4 to produce a 3D map of project sites and structures. A key benefit of this innovation was that it eliminated incidents of design errors often associated with traditional surveying methods.

4.1.5 Case Study 5 (CS5)

CS5 was established in 1988. It has over time become one of the largest infrastructure and construction companies in Nigeria. It currently has over 3000 employees in Nigeria, including over 100 expatriates, mostly Israelis. CS5 is experienced in all areas of civil engineering construction such as roads, bridges, office buildings and residential buildings. Over 95% of its clientele is public sector related.

Prior to the onset of the 2015 - 2017 economic crisis in Nigeria, CS5 adopted innovative just-in-time practices in terms of raw materials ordering, forecasting and storage. This ensured that the right type and amount of raw materials were supplied at the right time. This enabled CS5 to maintain a balanced level of inventory at all times without ever having too much or too little product in stock.

4.2. Data Collection and Analysis

This study utilized semi-structured interviews as the principal instrument of data collection because of its usefulness in enabling exhaustive empirical investigations. Open-ended interviews were preferred to maximize the "...possible extent to which interviewees were free to express their views" (Kulatunga et al., 2011). The interviews focused on the themes identified from literature with emphasis on "...what and how events unfolded" from the construction contractors' perspective. Nevertheless, care was taken to ensure that the emergence of new themes or ideas was not restricted. Two key management level professionals were interviewed in each of the five construction contractors. To ensure accuracy, interview transcripts were tape-recorded and manually transcribed.

Table 1. The Participants' Assigned Codes, Roles of the Interview Participants and Interview Duration

Organisation	Assigned ID	Profession	Role	Interview duration
CS1	CECS1	Civil Engineer	Chief Engineer	47 mins
CS1	COOCS1	Project Manager	Chief Operating Officer	49 mins
CS2	HPDCS2	Architect	Head, Project Design	60 mins
CS2	GPMCS2	Estate Manager	General Project Manager	55 mins
CS3	GMOCS3	Quantity Surveyor	General Manager, Operations	62 mins
CS3	PMCS3	Project Manager	Project manager	45 mins
CS4	MDCS4	Chief Architect	Managing Director	50 mins
CS4	PMCS4	Structural Engineer	Project manager	45 mins
CS5	SMRDCS5	Architect	Senior Manager, R&D	48 mins
CS5	HOCS5	Surveyor	Head, Operations	52 mins

The qualitative data obtained was analyzed using thematic coding and cognitive mapping of the transcribed data. Thematic coding of transcribed data enabled the researcher to identify themes from dataset and label them under distinct names (Bernard, 2000). Cognitive mapping was utilized to organize and analyze concepts and to establish causal relationships between themes (Kulantunga et al., 2011). To obtain a structured and complete list of thematic codes, a combination of both deductive (generation of themes with the support of literature and assigning relevant concepts from a set of data) and inductive coding methods (generation of themes from the data itself) was adopted (Kulantunga et al., 2011).

The analysis of the qualitative data obtained was supported by NVivo 23 – computer-aided software. To perform the analysis, the interview transcripts were uploaded to the NVivo 23 software and carefully scrutinized with the aim of identifying ideas related with specific factors that constrain innovation implementation during economic crisis. As can be seen in Figure 1 below, identified concepts were subsequently assigned a unique code to reflect the specific factor at play. Subsequently such identified concepts were assigned with a code to reflect the effects of economic crisis from the construction contractors' perspective and how these effects impact innovation implementation (refer to Figure 1 for the NVivo structure). Having labelled the main codes related to the research questions using NVivo software, they were imported to Decision Explorer software to generate cognitive maps for each identified effect of economic crisis on construction contractors and for each identified impact on firms' levels of innovation implementation.

The screenshot displays the NVivo Pro software interface. At the top, the title bar reads 'qualitative.nvp - NVivo Pro'. Below it is a ribbon with tabs: FILE, HOME, CREATE, DATA, ANALYZE, QUERY, EXPLORE, LAYOUT, and VIEW. The ribbon contains various icons for file operations (Go, Refresh, Open, Properties, Edit, Paste, Copy, Merge), formatting (B, I, U, A, text alignment), paragraph styling, styles, editing (Select, PDF Selection, Text, Region, Find, Replace, Delete), and proofing (Spelling). Below the ribbon is a search bar with 'Look for' and 'Search In' dropdowns, and a search box containing 'main themes'. Below the search bar is a table of nodes for thematic synthesis.

Name	Sources	References	Created On	Created By	Modified On	Modified By
Effects of economic crisis		9	12 20/02/2017 17:12	AAU	24/03/2017 23:30	AAU
Declining revenue and profit levels		5	5 15/03/2017 10:47	AAU	08/09/2017 16:22	AAU
Increased delays in payments for jobs		9	11 23/02/2017 15:08	AAU	24/03/2017 23:23	AAU
Increased difficulties in accessing credit		7	10 20/02/2017 17:21	AAU	22/03/2017 21:34	AAU
Increased operating cost		10	21 20/02/2017 17:49	AAU	24/03/2017 23:24	AAU
Rise in employee dissatisfaction		5	5 01/03/2017 10:29	AAU	22/03/2017 21:53	AAU
Shrinking aggregate demand for products		10	14 20/02/2017 17:20	AAU	08/09/2017 16:21	AAU
Surge in crime rate		4	5 05/03/2017 17:56	AAU	08/09/2017 16:22	AAU

Figure 1. Codes in NVivo for the Thematic Synthesis

5. RESULTS AND DISCUSSION

To sufficiently address the research problem, this study articulates a key research question as follows: What are the effects of economic crises and how do these impact firm level innovations? This research question is explored from a construction contractor's perspective.

5.1. *What are the effects of economic crisis and how does this impact firms' levels of innovations?*

To further investigate the key effects of economic crisis, this study obtained empirical data from 10 key management level employees of 5 market-leading construction organizations based in Abuja. All 10 semi-structure interview participants offered their views on the key effects of economic crisis are for their respective firms. The results of the analyzed qualitative data as presented in Table 2 below reveal that all the 10 (100%) semi-structured interview participants unanimously cite 'shrinking aggregate demand for the constructed product' and 'increased operating costs' as key effects of economic crisis on their respective firms. Also, as can be seen in Table 2 below, 9 (90%) of the 10 semi-structured interview participants indicate that 'increased delays in payments for completed jobs' is a key effect of economic crisis on their organisations, while 7 (70%) participants identify 'increased difficulties in accessing credits' as a key effect. In addition, 5 (50%) participants report that 'declining revenue and profit levels' is a key effect of economic crisis. Similarly, 5 (50%) of the 10 individuals that participated in the semi-structured interview cite a 'rise in employees' job dissatisfaction' as a key effect, while four 4 (40%) participants report that a 'surge in crime rate' is a key effect of economic crisis on their respective organisations.

Table 2. Results of the Semi-Structured Interview regarding the Key Effects of Economic Crisis on Construction Contractors

Key effects of economic crisis on construction contractors	No of organisations = 5 Total No. of participants = 10		Ranking based on number of responses
	No of responses	Percentage (%) Response	
Shrinking aggregate demand for products and services	10	100%	1
Increased operating costs	10	100%	1
Increased delays in payments for jobs completed	9	90%	2
Increased difficulties in accessing credits	7	70%	3
Declining revenue and profit levels	5	50%	4
Rise in employees' job dissatisfaction	5	50%	4
Surge in crime rate	4	40%	5

The above highlighted effects of economic crisis as identified in literature and from empirical data are discussed descriptively in the next sub-sections.

5.1.1. Shrinking Aggregate Demand for the Constructed Product

As discussed in section 2.4.1 above, this factor was identified from literature as a key effect of economic crisis with substantial implications for firms' ability to continue with innovation implementation. As presented in Table 2 above, all 10 (100%) interview participants accept that the number of construction jobs being put out had been significantly reduced. For instance, CECS1 reports that:

“There are fewer jobs now than ever before. The reason being that because of tighter budgetary situations, our clients (mostly public-sector organizations) are approving fewer projects for execution”.

Similarly, HPDS2 observes that:

“Most of the jobs we do like most other top local construction contractors are public sector related. However, because of the squeeze in public finances, there is currently a significant reduction in the number of jobs being put out for bidding”.

Furthermore, the result of the analysed data gathered from sighted documents (job orders and schedules) in all the 5 construction contractors that were empirically investigated clearly indicate that job orders significantly reduced during the current economic crisis. In the case of CS3, job order documents sighted reveal that when compared to the pre-crisis demand level, the reduction in public sector related demands was over 80%. Therefore, findings from analysed empirical data on this theme lend credence to the conclusion reached in the works of OECD (2012), Bricongne et al. (2010) and Tambunan (2000) that economic crisis often causes a reduction in the demand for durable products whose purchase can be deferred. The key reasons for this as adduced by economists are (i) drop in consumer confidence (Zurawicki and Braidot, 2005) and; (ii) liquidity dry-ups (Malherbe, 2014, Cornett et al., 2011).

5.1.2. Increased Difficulties in Accessing Credit

This factor was identified from literature and discussed in section 2.4.2 above and further empirically investigated. Results of the analyzed interviews data as presented in Table 2 above indicate that 7 (70%) of the 10 interview participants report that their respective organisations experienced increased difficulty in accessing bank loans or other forms of credit. In fact, a good number of them narrate their respective firms' inability to maintain a stable funding regime because of difficulties in accessing credit. For instance, COOCS1 remarks that:

“It has been extremely challenging to access credits from commercial banks. In fact, most of our credit lines with commercial banks were withdrawn and we have had to devise other creative ways to access the much-needed fund to continue innovation implementations”.

COOCS1 adds that:

“There are fewer jobs now than ever before. The reason being that because of tighter budgetary situations, our clients (mostly public-sector organizations) are approving fewer projects for execution”.

The above viewpoint is further echoed by GPMCS2. He notes that:

“It has become almost impossible to get financial help from the local banks. Their interest rates and charges have gone through the roof. As pointed out earlier, we found it almost impossible to access funds from the banks or from other institutions”.

Therefore, the results that emerged from the analyzed literature and interview data relevant to this theme suggest that increased difficulty in accessing credit and loans from banks and other financial institutions is a key effect of economic crisis for construction contractors based in Abuja Nigeria.

5.1.3. Increased Operating Costs

This factor as identified from literature (see section 2.4.3) was further empirically interrogated. The result of the semi-structured interview as presented in Table 2 indicate that all 10 (100%) interview participants agreed that increased operating cost is a key fallout of the current economic crisis. For instance, COOCS1 remarks that:

“There is a significant increase in the prices of raw materials. High rate of inflation is the reason for the hike in the prices of locally sourced raw materials while the crash in the value of the naira is the reason for the spike in the prices of imported materials. These increases have led to increases in our costs”.

Likewise, MDCS4 remarks that:

“Our operating costs have gone up quite significantly. There are so many reasons for this. Firstly, we source for most of our machineries, equipment, materials abroad. A good number of our employees are expatriates who are paid in dollars. The current dollar rate is terribly high. In fact, we cannot source for forex via the official rate so the only option is the parallel market which is so high. These all translate into additional cost for us”.

Therefore, finding that emerged from the empirical investigation of this theme corresponds with a key literature position on this (Gilchrist et al., 2017; Wang et al., 2014). The works of Gilchrist et al. (2017), Wang et al. (2014) and Higgins (1977) find that inflationary pressures that often characterize economic crisis impact negatively on the operating costs of firms. In fact, the work of Higgins (1977) poses an instructive question; “How much growth can a firm afford?”

5.1.4. Declining Revenue and Profit Levels

Results obtained from the analysis of semi-structured interview data as presented in Table 2 above show that 5 (50%) of the 10 interview participants report that declining revenue and profit levels is an adverse effect of the current economic crisis. For instance, GMOCS3 narrates that:

“The high operating cost coupled with the significant decrease in the number of jobs being put out mean our revenue levels have gone down as well as our profit levels”.

Similarly, SMRDCS5 recounts that:

“Our revenues have actually gone down quite substantially”.

PMCS4 corroborates the above views with his remark that:

“Our revenues have dried up. We are just managing to survive. We are now making huge losses”.

The finding on this theme is consistent with the key literature position as discussed in section 2.4.4 above. The works of Donald et al. (2014), Kalemli-Ozcan et al. (2013), Pavlínek (2012) and Opler and Titman (1994) conclude that firm-level revenues and overall financial performance decline during economic crisis.

5.1.5. Increased Delays in Payments

This theme emerged from the analyzed interview data. Indeed, as presented in Table 2, 9 (90%) of the 10 semi-structured interview participants identify “increased delays in payments for jobs” as a key consequence of the current economic crisis and that this has a significant consequence for their respective firms’ capacity to persist with innovations during economic crisis. They note that the extended delays in receiving payments for jobs carried out or even payment mobilization to commence approved projects have far-reaching implications for the turnaround time and overall cost of projects. PMCS4 remarks that:

“We are currently struggling to get some of our clients to make payments for jobs we had completed. Some of these jobs have been completed since 2015 and we are still asking for our

money. With the high inflation rate and crash in the value of the naira, these monies we are owed have depreciated in value”.

SMRDCS5 corroborates the above views. He reports that:

“Payments for completed jobs are not being made in time. Fund mobilizations for new projects are equally not being advanced”.

Results from analyzed data obtained from sighted documents and direct observations (calls made to chase up payments) appear consistent with the findings that emerged from the analyzed interview data that increased delays in payments for jobs completed is a key deleterious effect of economic crisis for construction-based firms operating in Nigeria. The reason for this is not far-fetched. Economic crisis often means lower public resources (OECD, 2012). The impacts of economic crises on Nigeria’s construction industry have often been particularly telling, although this is not surprising considering that the government (federal and states) is by far the largest client of the local construction industry, accounting for over 60% of local construction orders (Ayangade et al., 2009). With a widespread paucity of funds, various levels of governments in Nigeria often have deferred payments for construction projects approved and sometimes completed and focus instead on what they consider as key priorities of governance.

5.1.6. Rise in Employees’ Job Dissatisfaction

This factor emerged from the interview dataset. As presented in Table 2, 5 (50%) of the 10 semi-structured interview participants identified rising employees’ dissatisfaction as a key negative effect of the current economic crisis. They argued that keeping employees motivated has become substantially more challenging during the period of economic crisis. PMCS4 points out that:

“We know that some of our employees aren’t as motivated as they were prior to this economic crisis for a number of reasons. As a result, their creativity levels have been impacted”

while HOCS5 remarks that:

“Attracting and motivating knowledge employees is doubly more difficult during economic crisis”.

It is noted that all five firms case studied had cut back on their employee numbers during the economic crisis period. In fact, CS4 reports a cutback of nearly 54% of their pre-crisis staff strength (from 26,000 pre-crisis employee levels to about 12,000 currently). Although, CS2’s employee retrenchment affected just under 20% of its pre-crisis workforce, they did lose over 7000 of their workforce countrywide. This was the key reason adduced by interview participants as to why the level of employee dissatisfaction had risen. There is indeed substantial literature support for this finding. The works of Parvin and Kabir (2011) and Rosenblatt and Ruvio (1996) are instructive in this regard. As expected, employees who are satisfied with their job security perform better than those who are not satisfied with their job security (Rosenblatt and Ruvio, 1996, Rosow and Zager, 1985). Similarly, individuals satisfied with their job security are often more committed to their organizations (Iverson, 1996, Rosenblatt and Ruvio, 1996). Furthermore, the erosion in the value of the naira and the steep rise in inflation rate imply a drop in employees’ real wages. Parvin and Kabir (2011) find a positive correlation between employees’ remuneration and job satisfaction. Tan and Waheed (2011) conclude that there is a relation between salary and job satisfaction. They add that “...employees tend to be highly satisfied with their salary and job when they receive a desired raise”. However, layoffs and lower wages could “...increase individuals’ willingness to take

on greater risks and increase the availability of qualified labour during downturns” (Koellinger, 2008).

5.1.7. Surge in Crime Rate

This theme emerged from the empirical dataset. The analyzed results of the semi-structured interview as presented in Table 2 indicate that 4 (40%) of the 10 interview participants identify rising crime rate as a key effect of economic crisis and that this surge in crime rate bears implications for their respective firms’ capacity to persist with innovations during economic crisis. They note the cost implication of putting in place additional security measures which were not needed pre-crisis. For instance, GPMCS2 argues that:

“Another problem I will like to point out is the steep rise in crime rate. In my opinion, this can be linked to the scorching economic situations with so many young people unemployed. A number of our employees have been kidnapped, and we have had to pay ransoms but then these incidents affected our operations”.

Similarly, SMRDCS5 remarks that:

“There is a noticeable increase in the crime rate locally. This has significant implications for our operations”.

Indeed, the internal documentations of 2 firms out of the 5 firms case-studied (security reports) reveal that these 2 firms were having to deal with a rising rate of property vandalism. In fact, a security report was cited in CS2 which shows that a member of their top management team had been kidnapped and ransom payments were demanded before his eventual release.

There is literature support for this identified effect of economic crisis (rising crime rate). The works of Deflem (2011), Gould et al. (2002), Walberg et al. (1998) and Box and Hale (1982) are instructive in this regard. They argue that adverse economic conditions can be a push factor for some criminal activities. However, there is currently no study on how the rise in crime rates impacts firms’ levels of productivity and innovation implementation during economic crisis. This factor assumes greater relevance in the present study, not only because of the huge cost implications of ensuring the safety of employees, equipment and machinery but also the impact this has on the overall job satisfaction level of the large number of highly skilled expatriates who work for construction contractors in Abuja, Nigeria.

6. CONCLUSIONS

The effects of economic crisis are known to constrain innovation implementation (Archibugi et al., 2013b). This study finds that the seven factors as identified and discussed in section 3.1 converge to erode good organizational slack and cause instability in funding and funded regimes within an organization. The importance of maintaining good organizational slack (Nohria & Gulati, 1997) and stable funding and funded regimes (Ayyagari et al., 2011) to firms’ levels of innovation have been noted. This study further reasons that the reduced appetite for risks by organizations during economic crisis as found in the work of Fernandes and Paunov (2015) could be linked with the erosion of good organizational slack.

Consequently, firms seeking to persist with innovations during economic crisis must first appreciate the limitations of their extant innovation management model and actively seek to design an innovation management approach that addresses the constraining factors that emerge during economic crisis. It is reasoned that this will place the firm in good stead to safely implement innovations during economic crisis. It is further articulated that it is only through implementing continuous innovations that construction industry practitioners can engage in development “...which meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED, 1987).

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