

Adedeji, Abdulkabir N.; Sidique, Shaufique F.; Rahman, Azmawani Abd; Law, Siong H.

Article

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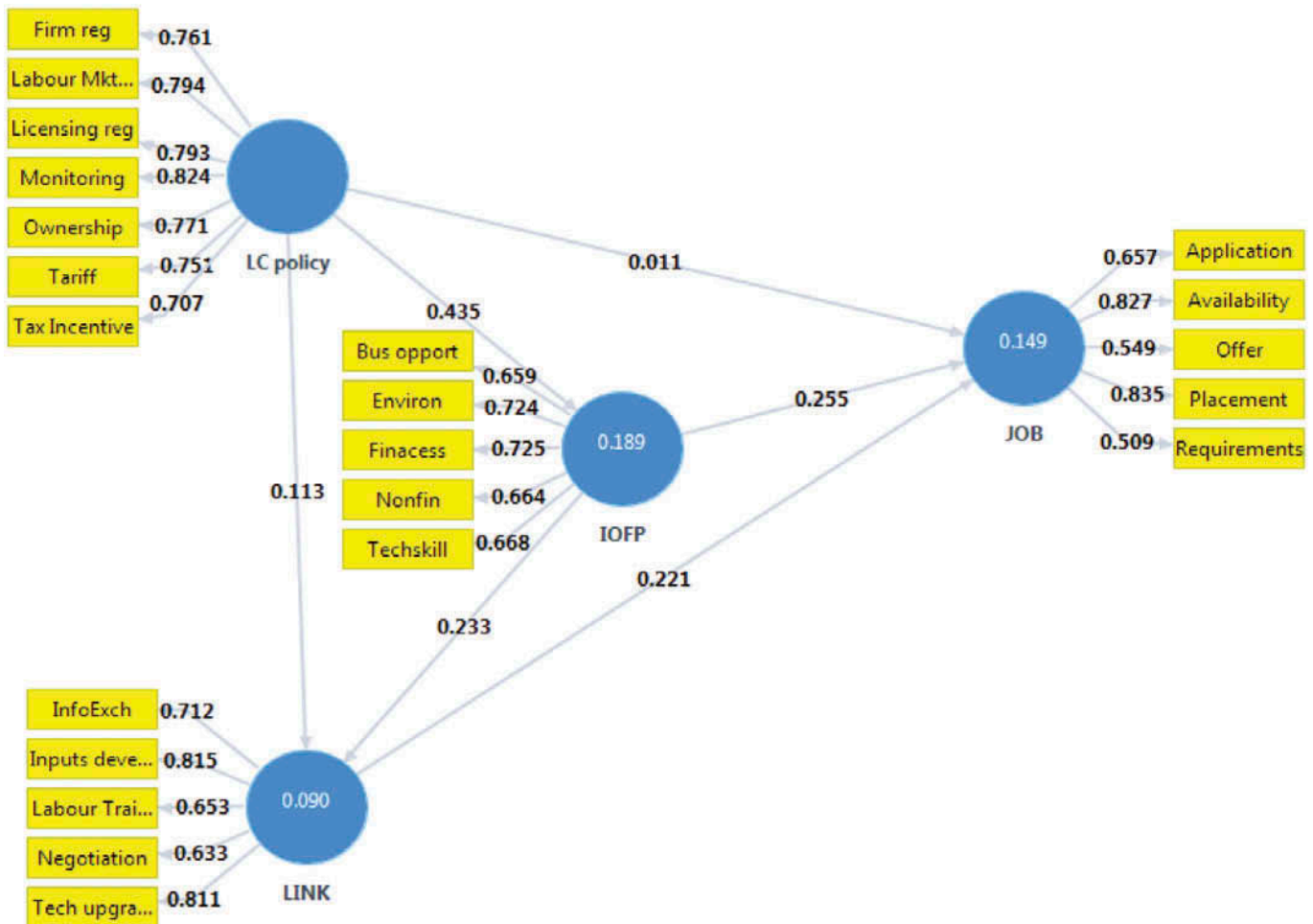
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*Corresponding author: Shaufique F. Sidique, Institute of Agricultural and Food Policy Studies, Universiti Putra Malaysia, Malaysia
E-mail: shaufique@upm.edu.my

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Mediating effects of indigenous oil firms' participation and backward linkages on the relationship between local content policy and job creation: Insight from Nigeria

Abdulkabir N. Adedeji¹, Shaufique F. Sidique^{2*}, Azmawani Abd Rahman³ and Siong H. Law³

Abstract: The increase in indigenous oil firms' participation (IOFP) and backward linkages through which additional jobs could be created was the main target of the local content policy (LC policy) implemented in the Nigerian oil sector over the past decade. Thus, the purpose of this paper is to assess whether IOFP and backward linkages mediate the relationship between the LC policy and job creation in the country's oil sector on which there was little empirical research. Data obtained from Nigerian indigenous oil service firms through self-administered questionnaires were analysed by using a bootstrapping technique. Our results revealed that there was an indirect effect of the LC policy on the creation of new jobs. This finding sheds light on the positive impact of the LC policy. Our results imply that if Nigeria's LC policy is effective and efficient, increased job opportunities will follow. This may speed up the country's vision of 2020 on value-addition in achieving economic development through the oil sector.

Subjects: Energy Policy; Energy policy and economics; Development Policy



Abdulkabir N. Adedeji

ABOUT THE AUTHOR

ADEDEJI Abdulkabir Niran is a senior academic staff in the Department of Economics, University of Maiduguri, Borno State, Nigeria. Niran completed his Doctorate programme in Economics at the Universiti Putra Malaysia, Malaysia, in 2016, where he acquired skill in advanced research and methodology and trained academically in advanced Microeconomics, Macroeconomics, and Econometrics, and in development economics and resources policy. His research areas of interest include economic growth and development, international trade, and resources policy.

PUBLIC INTEREST STATEMENT

Oil and gas are natural wealth on which the host economies mostly depend for development. Observably, the resources often create little value to host economies, in terms of local inputs procurement and job creation. Low participation of local firms in operational activities in oil sectors is identified as a major bottleneck in maximally reaping the wealth. The proposition of opportunity theory, that if the sector is regulated in favour of local firms, the resources would benefit majority of the citizens, prompts many oil-endowed countries, including Nigeria, to adopt opportunity-given strategy called local content policy. How effective this policy has achieved its targets in Nigeria since it was introduced is not understood. This perspective study clears the blunt. It was found that local content policy can turn oil resources to create large values in Nigerian economy if well harnessed. However, government should caution about enforcement of the policy.

Keywords: LC policy; indigenous oil firms' participation; backward linkages; oil sector; job creation

1. Introduction

A number of established oil and gas producing countries have adopted or are considering the adoption of policies that can capitalize on the extraction of their non-renewable resources to enhance the development of their local economies. The most used policy is the so-called local content policy (LC policy) primarily applied as a strategy in the oil sector for generating more resource benefits to the common citizens in addition to the direct contribution of the oil resource.

The LC policy goals remained the same in Nigeria when the policy was introduced in its oil and gas sector in 2001. As imitated from some oil-dependent economies, such as Norway and Venezuela, the primary target of the policy is to increase participation of indigenous oil firms in business activities in the oil sector. Conceivably, an increase in indigenous oil firms' participation in the sector's business activities is a way of creating more job opportunities for the local workforce within the industry. From this, the benefits of the nation's resources are likely to reach the less affluent. Nigeria's LC policy was defined as follows:

"quantum of composite value added to or created in the Nigerian economy by a systematic development of capacity and capability through the deliberate utilization of Nigerian human, material resources and services in the Nigerian oil and gas industry" (NOGICD, 2010)¹.

This definition is similar to the policy objectives in other oil-dependent economies where the aim is achieving local economic development. The policy aims to enhance increased participation of Nigeria's indigenous oil service firms and utilization of local goods and services, termed as backward linkages, in the exploration, production and distribution activities of the sector. The policy encourages local participation and backward linkage development as well as job creation in the industry as stated in part 1 Section 3, Subsection 2, of the content Act (2010):

"there shall be exclusive consideration to Nigerian indigenous service companies ... for contracts and services..."

Section 13 states as follows:

"...to ensure the use of locally manufactured goods (and services)..."

The policy mandates offering job opportunities to the citizens as indicated in Section 28 of the same part:

"Nigerians shall be given the first consideration for employment and training in any project ... in the Nigerian oil and gas industry".

An analysis of business activities in Nigeria's oil and gas industry confirms that more than US\$2.8 billion in related oil business activities occurs annually (Klueh, Pastor, & Segura, 2009). However, despite the fact that these activities may generate numerous job opportunities for the local unemployed workforce, it appears that the present rate of unemployment in the country raises serious concerns. Recent available evidence shows that the rate of unemployment in the active population for 2011 was approximately 24% compared to 13% in 2001 (Nigeria National Bureau of Statistics (NBS), 2012). Although the contribution of the oil sector to Gross Domestic Product (GDP) has an impressive record, evidence has shown that the growth rate of GDP does not correspond with the level of local economic development, specifically when considering the rate of unemployment in the country.

Employment creation in this study refers to job opportunities generated by an establishment for the local workforce. Although the oil sector is seen to be less labour-intensive due to high capital

and technology requirements (World Bank Report, 2009), a wide range of goods and services is needed for operational activities in the sector to provide numerous direct and indirect job opportunities that may absorb a substantial number of workers (United Nations Economic Commission for Africa (UNECA), 2015; Ovadia, 2014; Steven, 2011). This is not impossible to achieve, especially when a viable LC policy is implemented.

The introduction of Nigeria's content policies in the oil sector is evident from series of economic policies such as the Petroleum Act 1968 and the Nigerian Enterprises Promotion Decree, 1972. These policies aim to encourage and support the participation of Nigerian companies in entrepreneurial activities in the oil sector. Although these policies allowed the Nigerian government to own a significant percentage of equity in the sector, it is documented that the policies failed to achieve their targets on local value creation as they were not properly implemented (Ariweriokuma, 2009). This was likely among the reasons prompting the Goodluck Jonathan's administration to pass the recent LC policy into law in 2010. However, apart from a few studies (Adedeji, Sidique, Abd Rahman, & Law, 2015, 2016; Adewuyi & Oyejide, 2012; Ariweriokuma, 2009; Nwosu, Nwachukwu, Ogaji, & Probert, 2006), the impact of the LC policy on local value creation have not been thoroughly examined in the literature.

Adedeji et al. (2015) demonstrate the links between local content policy and involvement of local firms using entrepreneurial opportunity theory and argue that entrepreneurship involves recognition and appropriation of market opportunities. Adedeji et al. (2016) empirically examine the impact of local content policy on value creation and found that the policy has less impact. This paper extends our previous work by testing mediational model in which local firms' participation and backward linkages are considered as mechanisms transmitting the effect of LC policy to job creation.

The results of this study may provide insights to help policymakers in resource-reliant countries to make informed decisions regarding the transformation of their resource sectors in line with economic development goals. Currently, minimum local employment requirements are imposed on the oil sector. If there is clear evidence that local firms' participation and backward linkages mediate the relationship between the LC policy and job creation within the industry, then governmental authorities should further strengthen the policy to increase minimum local employment targets to increase the amount of jobs. To achieve the above objective, survey data were obtained through questionnaires administered to selected indigenous service oil firms operating in Nigeria's oil sector. The data were analysed using the bootstrap in covariance-based method.

This paper consists of the following sections: Section 2 provides a review of relevant literature. Section 3 contains a discussion of the motivational theories of entrepreneurship. Section 4 presents the methodology and data analysis. Section 5 discusses the empirical results, and Section 6 gives a summary of the paper.

2. Existing views on local content initiatives

Various studies have examined the impacts of local content regulatory policies on regulating business activities in the oil sector. According to Esteves, Coyne, and Moreno (2013), there is no specific definition for LC policies; instead, different countries adopted different definitions based on the targets they aimed to achieve. However, it was noted that the structure and forms of the LC policy are similar across many oil resource-rich countries, although they may vary in scope, level and type. For instance, the Norwegian petroleum policy is defined as a tool that mandates the use of petroleum resources for the benefit of the Norwegian society to ensure welfare, employment and an improved environment as well as to strengthen the Norwegian trade and industrial development (Hunter, 2014). The policy resulted in more than 206,000 local jobs in the Norwegian oil sector and created local values in excess of 9,000 billion NOK (US\$1073.98 billion) (Norwegian Petroleum Directorate, 2011). The LC policy has similar objectives in Nigeria. The former Nigerian minister of petroleum resources, Diezani Alison-Madueke, was quoted saying that Nigeria's content policy has created over 30,000 jobs, especially in engineering, fabrication,

exploration and production, marine transportation and logistics sectors, and that the participation of Nigerian companies in the oil and gas

Contracts has increased to 87% of the total industry contracts in 2012 (Daily Independent, 2013). Similarly, the impact of Angola's content policy, termed as *Centro de Apoio Empresarial (CAE)*, is documented to have improved the local service firms' participation in the oil industry and has created more employment opportunities for Angolans in the sector. CAE has generated local values worth more than US\$214 million and created more than 2,700 jobs for the Angolan people (Levett, Chandler, Patterson, & Savoy, 2012).

Recently, the experience of some oil-rich countries has shown that the so-called "resource curse" could be avoided if effective regulatory policies are enacted. The petroleum sector could contribute to economic development when viable regulatory policies are implemented in enhancing participation of local service companies, developing backward linkages in the sector supply chain and generating more employment (Ovadia, 2013). This indicates that the LC policy could positively influence job creation, and such influence depends on the level at which local firms are involved in the activities and the level of local materials procurement. Esteves and Barclay (2011) argued that social and economic impact assessment in Australian mining, and oil and gas sectors enhanced the utilization of local inputs of goods and services through which economic benefits of the resources were steered towards the local community. They agreed that the sector is not labour intensive due to huge capital and high technical skill requirements in core operational activities. However, they emphasized that there are several activities, such as engineering, well construction, and drilling that potentially generate employment opportunities and create links to other sectors in the economy. A study by Ovadia (2014, 2012) corroborates these findings in Angola and Nigeria. He pointed out that LC initiatives have the potential of transforming oil sectors to benefit and improve the living standards the majority. However, he claims that the oil benefits are mostly stacked in favour of the few, especially the "rentier elites", whose interests run counter to that of sustainable development. Nonetheless, he argued that if LC initiatives are well designed to favour local entrepreneurs, the outcomes could benefit the majority and promote national economic development.

In addition, United Nations Economic Commission for Africa (UNECA) (2015) reported that industrial policies such as tax incentives, skills and training development programmes, technology transfer initiatives and infrastructure investment promotions adopted in formal sectors of some African countries, including the oil and gas sector, boost productivity and expand opportunities in the supply value chain. This encourages entrepreneurs to actively participate in this sector. The report indicated that several service activities, such as fabrication, construction and engineering, often required in many formal sectors, are labour intensive. Ovadia (2013) noted that the oil sector covers a number of activities that require basic skills that open the door to numerous employment opportunities. This recent assertion challenges the traditional perception that most activities in the sector are very specialized and cannot generate significant employment for non-skilled and semi-skilled workers.

The extraction sector could also play a key role in economic development. A study conducted by Adewuyi and Oyejide (2012) regarding activities in Nigeria's oil sector found that there is a linear link between LC policies and backward linkage development. They claimed that development of backward linkages in Nigeria's oil sector results from the effectiveness of LC policies adopted by the government through the increase of local entrepreneurial activities. UNECA report (2015) indicated that transformation of formal sectors could be achieved when transformative policies are fully adopted and effective. It concluded that economic transformation in achieving added value, especially in the case of oil-reliant economies, largely depends on the structure and effectiveness of the policy applied.

3. Research methodology

3.1. Survey design and data collection

The data for this study were obtained through a survey. A sample questionnaire was adapted from a study conducted by Adewuyi and Oyejide (2012) which was redesigned and administered to indigenous oil service providers in five out of nine oil states in the Niger Delta region. The five states were as follows: Akwa Ibom, Bayelsa, Cross River, Delta and Rivers. They were selected because a large number of firms and oil business-related activities were concentrated in these states (Antai, Anam, Ekpenyong, & John, 2012). A sample frame of 347 companies across the five states was obtained from the Department of Petroleum Resources (DPR). These firms engage in goods and service supply to the three streams of the sector, which includes fabrication and construction services, drilling and well completion, consultancy design and engineering services, control system and ITC services, exploration and production services and supply of goods such as baryte, bentonite and chemicals. The firms are classified as indigenous firms because they are formed and registered in Nigeria in accordance with the provision of companies and the allied matters Act with no less than 51% equity shares and have the majority of local staff in the technical management workforce (NOGICD, 2010).

The survey contained questions asking the respondents what their perception was on the impact of the LC policy to encourage them to engage in entrepreneurial service activities in the oil industry and how this has affected procurement of local input materials for their production. The survey also contained a set of questions of the frequency of job opportunities for local labour in their respective companies. Senior staff in each company (managing director or business development officer or human resource office) was requested to complete the questionnaires because they were more likely to be involved with the organization's activities, policy issues and employment decision. The exercise was conducted between August and December 2014.

We used the stratified random sampling method to select representatives from the population. The population was first stratified into five according to the location of the firms vis-a-vis: 45 (Akwa Ibom), 77 (Bayelsa), 65 (Cross River), 52 (Delta) and 108 (Rivers). Microsoft Excel was then used to randomly select the sample from each state, representing about 75% of the population. The Excel tool allowed the respondents to be selected with minimal sampling bias. Accordingly, the possible proportional elements of 34, 56, 48, 37 and 85 were selected from Akwa Ibom, Bayelsa, Delta, Cross River and River states respectively, which yielded a sample size of 260. With assistance of three trained research assistants, structured questionnaires were concurrently distributed to each of the selected companies in each state. Rivers state is a central state laid among the others and Port Harcourt, its capital, was used as a base for distribution of the questionnaires within and to other states for the period of data collection. We often requested top management or a representative to provide relevant information in completing the questionnaire. In a follow up, multiple emails were sent and several telephone calls were made to remind the respondents and to book an appointment for collection. At the end of the exercise, a total of 43 companies across the states declined to participate in the exercise under the pretext that this exercise was not in line with the company policy or because they could not find time to complete the questionnaire. A total of 217 responses were received, out of which 209 were properly completed.

The questionnaire requested that the respondents assess the influence of the LC policy towards the enhancement of their participation in business activities in the industry on seven indicators based on a five-point Likert-scale. They were also asked about the extent to which they participate in the industry and how their participation enhanced employment in the industry, measured by five items. The Likert-scale ranged from 1 = never to 5 = always. A pilot test was conducted on five firms in Port Harcourt (Rivers State) to test the questionnaire before administering the general survey. The comments received from the pilot study resulted in fine-tuning and rearranging some questions in the survey instrument.

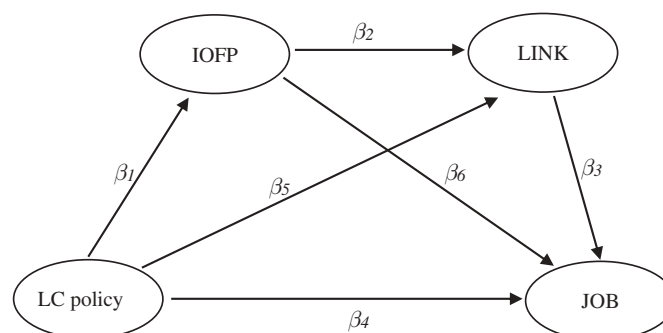
Nevertheless, sample size has often been a concern when considering an adequate statistical power for Structural Equation Model (SEM) and SEM related analyses. A traditional way of determining sample sizes in many previous studies was often given by the ratio of items to latent variables. However, in a recent study of Westland (2010), it was pointed out that the ratio minimum sample size for SEM related analyses may not only depend on the ratio for achieving adequate statistical power, but also depends largely on three other indicators that a researcher wants to detect: level of significance, α ; standard statistical power; and minimum effect size,². Following this criterion, we specified a small effect size of 0.15, a middle point of the magnitude of the effect size, and a statistical power of 0.8 and 0.05 level of significance in setting the lower bound for the sample needed for the study to detect adequate size with 22 indicators and 4 latent variables. Westland (2012) provides an online link³ to use statistical algorithm software later used to compute this figure. The result suggested a minimum sample size of 168 to be adequate for our analysis. Thus, the random sample size of 209 used for the analysis in this study was deemed adequate.

3.2. Multiple mediation model, hypotheses and method

Based on the existing literature, we developed a structural model (Figure 1) to test indirect effects of the LC policy on job creation through indigenous oil firms' participation (IOFP) and backward linkages (LINK). The direction of structural relationships among the latent constructs is shown in Figure 1 from which indirect effects of exogenous construct on endogenous construct through the mediators is tested. The arrows from the LC policy depict the construct as exogenous latent construct and arrows pointing at JOB depict the construct as endogenous latent construct, while arrows pointing at and going from IOFP and LINK depict constructs as mediators. Thus, based on this model, we generate three hypotheses: JOB is positively significantly related with IOFP and LINK (H1); IOFP and LINK positively and significantly mediate the relationship between the LC policy and JOB (H2); and IOFP and LINK individually significantly mediates the relationship between the LC policy and JOB (H3). We employ the bootstrapping method in Partial Least Squares-Structural Equation Modelling (PLS-SEM) to test these hypotheses.

The bootstrapping method is a statistical technique frequently used in analysing the multiple mediation model. The method was initially proposed by Efron and Tibshirani (1993) and has been recently recognized for its ability to resample data thousands of times from which confidence intervals (CI) are generated to test the total and specific indirect effects (see Preacher & Hayes, 2008; Sarah, Carol, & Prem, 2013). Different from traditional mediation approaches, such as causal-step and product of coefficient, which can only test indirect effects of a mediator one at a time, the bootstrapping technique is developed for testing indirect effects of more than one mediating variable. Another proven advantage of this method is that it is very robust when applied to skewed distribution samples compared to other methods (Hair et al., 2008; Taylor, 2008). In addition, the requirement that total effects must be significant as a criterion for testing mediation effect using traditional methods is not necessary in bootstrapping.

Figure 1. Hypothesized multiple mediation model.



PLS-SEM method was used to run the bootstrapping analysis. PLS-SEM is a one-step method with less restrictive requirements compared to SEM on model fits and other measures that affect the statistical power of other covariance based methods (Hair, Sarstedt, Ringle, & Mena, 2012; Radošević & Yoruk, 2013; Reinartz, Haenlein, & Henseler, 2009). More so, evidence has shown that PLS-SEM has the advantage of producing robust estimates with fewer identification issues and tends to achieve statistical power when used with both small and large samples (Hair, Hult, Ringle, & Sarstedt, 2014; Hair, Ringle, & Sarstedt, 2011; Wong, 2013). This method is also suitable for analysing our data given the skewedness of its distribution.

Evidence for mediation (i.e. total indirect effect), Figure 1, requires that the following three regression equations should simultaneously estimate and signify:

$$IOFP = \alpha_1 + \beta_1 LC.policy + \varepsilon_1 \quad (1)$$

$$LINK = \alpha_1 + \beta_1 IOFP + \beta_5 LC.policy + \varepsilon_2 \quad (2)$$

$$JOB = \alpha_3 + \beta_6 IOFP + \beta_3 LINK + \beta_4 LC.policy + \varepsilon_3 \quad (3)$$

where β s are parameters (regression weights), α_1 , α_2 and α_3 are intercept coefficients and the residuals are denoted by ε_i . The direct effect of the LC policy on JOB, adjusting for both IOFP and LINK, is β_4 in equation 3. The statistical significance of β_1 and β_5 in equations 1 and 2 would provide the evidence that IOFP and LINK are potential mediators, and the significance of $\beta_1\beta_6$ and $\beta_3\beta_5$ would provide the evidence of specific indirect effects of individual mediator; whereas, total mediation effects of LC policy on JOB through the mediators would be established when $\beta_1\beta_2\beta_3 + \beta_1\beta_6 + \beta_3\beta_5$ meet the mediation criterion. Based on the bootstrapping rule of thumb, if the CIs do not include zero, we can establish that the total and/or specific indirect effect is different from zero (Sarah et al., 2013; Taylor et al., 2008).

3.3. Latent variables description

LC policy: The concept of LC policy is commonly described as a state intervention in a commodity-led sector, particularly the petroleum sector, to promote local value additions. According to Ovadia (2014), it is a strategy often used to increase utilization of national human and material resources and domicile operational activities in the industry that are previously handled and located abroad. The existing studies on sectoral government entrepreneurial policies measured the concept in terms of factors that influence participation of the targeted enterprising groups. For instance, Ihua, Olabowale, Eloji, and Ajayi (2011) measure government policy in terms of monitoring and supervision and awareness. Kazzazi and Nouri (2012) measure the concept covering the following aspects: company registration, monitoring, capital market development, and wealth capturing and distribution. Deriving from the Nigerian content policy guideline, the present study draws from Adewuyi and Oyejide (2012) and identifies seven indicators to measure the LC policy. These include licensing regulation, ownership regulation, firm registration, labour market regulation, tax incentives, import tariff and monitoring. They were designed to promote the participation of indigenous oil firms in business activities in the petroleum industry, to inspire them to spot and seize business opportunities in the sector, and to equally motivate them to take reasonable risks and seek profits (Ihua et al., 2011; Radošević and Yotuk, 2013). Practically, entrepreneurs would be encouraged to actively partake in business activities, especially in a corporate domain like the oil sector, if registration procedures are not cumbersome, and conditions are favourable and supportive. Most studies focusing on the role of government in developing its local entrepreneurs identified some policy options that the government often implements to achieve this goal. In developing oil-rich countries, this was shown as a common practice to develop an industrial base and build the capacity and capability of local firms. More so, these indicators are seen as protective measures compared to local oil firms' participation in business activities in foreign countries (Tordo, Tracy, & Arfaa, 2011). This is because, in many instances, local oil firms are less competitive and/or have low capacity to compete with foreign counterparts in the industry. Thus, policy

instruments are mostly used to increase the participation of the local oil firms with the aim of ensuring more value-addition into the domestic economy.

In the survey, respondents were asked about the extent the LC policy influenced their participation in business activities in the industry and the level of their satisfaction on the effects of the policy. Summated scores from these two responses were generated to reduce measurement error and prevent redundancy of the items (Hair, Black, Babin, & Anderson, 2010). The factor loadings of the measurement indicators are presented in Appendix E (see Appendices in supplementary file). We consider variables with loadings greater than 0.6 to be “highly loaded” and significant to the interpretation of a factor. The values are above the threshold of 0.6, indicating the internal reliability and consistency of the indicators. Based on the mean score of the distribution of responses obtained in Table 1, we noticed that the indigenous oil firms perceived that licensing registration procedures are somewhat effective in influencing their participation in the business activities in the sector ($M = 3.22$). They also perceived both ownership regulation ($M = 3.31$) and firm registration ($M = 3.27$) to somewhat impactful towards providing opportunities in the business sector. More so, a large number of the local oil service providers observed that labour market regulation ($M = 2.88$), tax incentives ($M = 3.91$), import tariff ($M = 2.99$) and monitoring ($M = 3.04$) are somewhat impactful in regulating business activities in the sector.

Indigenous oil firms’ participation: This is related to the level of involvement of local companies in the supply business activities in the oil industry. Active participation of the local companies in the sector’s supply chain is seen as means where oil benefits can be captured, retained and add value to the local economy. Ovadia (2014) regarded this as spin-off effects that include job creation and linkages of the oil sector to non-oil sectors in the economy. Table 2 reports the participation of firms in service activities in the industry. Most of the firms (32.1%) participate in at least two activities focused in the study, while 15.8% engaged in others. Moreover, 19.6% of the firms are involved in exploration and production goods and services supply and 8.1% are involved in design and engineering services. The remaining 7.7% are engaged in fabrication and construction, 5.2% are involved in drilling and well completion, while 4.8% are in consultancy services. Only 2.9% of the firms are in ITC services and 3.8% did not indicate their activities.

The indicators used to measure firm’s participation are derived from economic conditions that motivate the firms to engage in enterprising activities. These conditions are widely spread in the entrepreneurship literature. Following Gnyawali and Fogel (1994) who proposed factors influencing entrepreneurship development, five relevant indicators were extracted to measure indigenous oil firms’ participation. These include business opportunity, environment conduciveness, technical skill, financial accessibility and non-financial incentive. Arguably, entrepreneurial opportunity tends to be higher in a free market where entrepreneurs can freely enter into the market. Similarly, it was argued that a favourable government policy may reduce entry barriers and create more business opportunities, allowing increased participation of entrepreneurs (Gnyawali & Fogel, 1994). In addition, financial accessibility, as well as technical skill, especially in the oil and gas sector, was identified as an important factor for the successful participation of local entrepreneurs (Ihua et al., 2011). According to the OPEC report (2013), a shortage of these factors can affect entrepreneurs’ productivity, deliverability and competitiveness. Furthermore, non-financial support in terms of counselling, assistance programmes and technology transfer schemes in the oil sector have been useful for the development of entrepreneurship. In addition, the conduciveness of the environment where entrepreneurs operate is equally an important factor and often encourages entrepreneurs to take risks (Gnyawali & Fogel, 1994).

Each of the indicators was rated on a five-point Likert scale with different statements on which the indicators were scored. For instance, respondents were asked about their perceptions on business opportunities available to them in the oil industry, whereas the statement concerning the area where they operate asked about their perceptions on conduciveness of the environment

Table 1. Percentage distribution of responses on LC policy

	Not at all impactful	Slightly impactful	Somewhat impactful	Very impactful	Extremely impactful	Total	Mean	SD
Licensing reg	2 (1.0)	24 (11.4)	86 (41.1)	81 (38.7)	16 (7.6)	209 (100)	3.22	0.77
Ownership reg	2 (1.0)	19 (9.1)	87 (41.6)	76 (36.4)	25 (12.0)	209 (100)	3.31	0.81
Firm reg	3 (1.4)	31 (14.9)	73 (34.9)	72 (34.4)	30 (14.4)	209 (100)	3.27	0.93
Labour mkt reg	4 (1.9)	59 (28.3)	78 (37.3)	53 (25.4)	15 (7.1)	209 (100)	2.88	0.91
Tax incentives	4 (1.9)	30 (14.4)	104 (49.7)	66 (31.5)	5 (2.4)	209 (100)	3.91	0.75
Import Tariff	4 (1.9)	29 (13.8)	114 (54.6)	53 (25.3)	9 (4.3)	209 (100)	2.99	0.80
Monitoring	8 (3.8)	38 (18.2)	79 (37.8)	67 (32.1)	17 (8.1)	209 (100)	3.04	0.94

Source: Field survey (2014).

Table 2. Firms' participation in supply activities

Supply activities	Frequency	%	Cumulative %
Fabrication and Construction	16	7.7	7.7
Drilling and Well Completion	11	5.2	12.9
Control System and ITC	6	2.9	15.8
Design and Engineering Services	17	8.1	23.9
Consultancy	10	4.8	28.7
Exploration and Production Goods and Services Supply	41	19.6	48.3
Multiple services	67	32.1	80.4
Others	33	15.8	96.2
Not indicated	8	3.8	100

Note: ITC = Information Technology Communication.

for their business activities. The indicators show a high internal reliability because their factor loadings were above 0.6 (Appendix E). The descriptive statistics of the responses of the firms on their participation in the sector are presented in Table 3.

Most of the responses from indigenous oil firms were not different on business opportunities available to them in the oil sector ($M = 3.14$) and also demonstrated that they have the technical skills ($M = 3.22$) needed to render prompt services in the sector. However, they perceived that financial accessibility ($M = 2.79$), non-financial incentives ($M = 2.91$) and environment conduciveness ($M = 2.99$) are relatively less provided as the mean ratings of these factors are below, but close to, the midpoint.

Backward linkages: This refers to procurement and utilization of locally produced input materials, among others, in a particular sector of the economy. In the case of the petroleum sector, it relates to the sourcing of intermediate materials, often passing through processing before being supplied for production in the oil industry (Teka, 2012; Tordo, Warner, Manzano, & Anouti, 2013). For instance, steel is mostly processed by fabrication and construction firms before the outputs are supplied as inputs for oil production processes. This definition has extended beyond sourcing and patronizing of only locally produced materials, but includes the development of these materials, often recognized as an important linkage (Tordo et al., 2013). This is because the collaboration between firms and their suppliers reduces the capital cost that may have been incurred by the former and over-extension of the firm (United Nations Conference on Trade and Development, UNCTAD, 2001). Thus, backward linkage indicators measured the cooperation between local oil service firms and their local affiliate suppliers. There is a wide range of drivers to capture this variable. This study derived five indicators from the previous studies (Adewuyi & Oyejide, 2012; United Nations Conference on Trade and Development, UNCTAD, 2001) in measuring the construct. The observed indicators take the form of local input development, information exchange, technical upgrading, negotiation of payment and delivery, and labour training.

The indicators are highly loaded on the construct that they measured as the values of the loadings of these indicators are above 0.6, ranging between 0.815 and 0.633 (Appendix E). Moreover, the mean scores, outlined in Table 4, show that the indigenous oil firms were strongly perceived that their participation and cooperation in business activities in the sector stimulate development of locally produced raw materials ($M = 3.34$). In addition, the firms believed that information exchange ($M = 3.63$), technical upgrading ($M = 3.17$), negotiation of payment and delivery ($M = 3.86$), and labour joint training ($M = 3.08$) are strengthened by their activities in the industry.

Table 3. Responses on firms' participation in the oil sector

	Mostly inaccessible	Inaccessible	Neutral	Accessible	Mostly accessible	Total	Mean	SD
Business opportunity	2 (1.0)	37 (17.7)	106 (50.7)	59 (28.2)	5 (2.4)	209 (100)	3.14	0.76
Financial accessibility	15 (7.2)	56 (26.8)	96 (45.9)	37 (17.7)	5 (2.4)	209 (100)	2.79	0.87
Non-financial incentives	9 (4.3)	44 (21)	115 (55)	37 (19.1)	4 (0.5)	209 (100)	2.91	0.73
	Very uncondusive	Uncondusive	Neutral	Conductive	Very conductive	Total	Mean	SD
Environment conduciveness	10 (4.8)	43 (20.6)	98 (46.9)	53 (25.3)	5 (2.4)	209 (100)	2.99	0.83
	Very low	Low	Neutral	High	Very high	Total	Mean	SD
Technical skill	3 (1.5)	26 (12.4)	102 (48.8)	70 (33.5)	8 (3.8)	209 (100)	3.22	0.74

Note: Per cent is in parentheses; SD = standard deviation.

Table 4. Responses on backward linkage

	No cooperation at all	No cooperation	Undecided	Strong cooperation	Very strong cooperation	Sample	Mean	SD
Local inputs development	10 (4.8)	32 (15.3)	63 (30.1)	85 (40.7)	19 (9.1)	209 (100)	3.34	1.00
Information exchange	2 (1.0)	17 (8.1)	66 (31.6)	95 (45.5)	29 (13.9)	209 (100)	3.63	0.86
Technical upgrading	9 (4.3)	48 (23.0)	66 (31.6)	70 (33.5)	16 (7.7)	209 (100)	3.17	1.01
Nego. of payment and delivery	3 (1.4)	6 (2.9)	46 (22.0)	116 (55.5)	38 (18.2)	209 (100)	3.86	0.79
Labour training	18 (8.6)	47 (22.5)	63 (30.1)	63 (30.1)	18 (8.6)	209 (100)	3.08	1.10

Note: Per cent is in parentheses; SD: standard deviation.

Job creation: is often measured by the amount to which employment opportunities are available and offered to a labour force (Husmanns, Mehran, & Verma, 1992). The observed variables are reversed items used to measure the perception of job seekers regarding availability of jobs in a survey instrument designed by Husmanns et al. (1992). A five-point Likert-scale response format was also employed for five observed variables, including job availability, job placement, job application, job requirement and job offers. These items inquired about the frequency of job positions, creation of awareness about the available positions, and the frequency of employability of the local applicants into available positions. The mean scores, as shown in Table 5, revealed that indigenous oil firms believed that they demand local employment through creating job availability ($M = 3.35$) and create awareness through job placement ($M = 3.27$). They also perceived that they often received job applications ($M = 4.08$) from the local applicants, as well as offer jobs ($M = 3.73$) to local applicants that meet the job requirements ($M = 3.33$).

By considering the assessment of their factor loadings, the items measured the construct they were intended to measure. The loadings of the factors are above 0.6 (Radosevic & Yoruk, 2013), although two factors (job requirements and job offers) had factor loading values of 0.509 and 0.549, respectively, slightly below the acceptable figure of 0.6 (Appendix E). However, these items are considered to be retained in the model as the JOB construct is newly developed (Awang, 2012). In addition, the values are above the consideration point necessary for practical significance (Hair et al., 2010: 118). There is no cross-loading value that was higher than the loading values of the indicators measured in each construct; thus, there was no need to consider moving an item from one factor to another.

Table 5. Responses on job creation within oil Sector

	Never	Rarely	Sometimes	Often	Always	Total	Mean	SD
Job availability	0 (0)	19 (9.1)	110 (52.6)	68 (32.5)	12 (5.7)	209 (100)	3.35	0.73
Job placement	3 (1.4)	29 (13.9)	100 (47.8)	62 (29.7)	15 (7.2)	209 (100)	3.27	0.84
Job application	2 (1.0)	9 (4.3)	31 (14.8)	95 (45.5)	72 (34.4)	209 (100)	4.08	0.87
Job requirement	2 (1.0)	29 (13.9)	98 (46.9)	59 (28.2)	21 (10.0)	209 (100)	3.33	0.87
Job offer	2 (1.0)	6 (2.9)	75 (35.9)	89 (42.6)	37 (17.7)	209 (100)	3.73	0.82

Note: Per cent is in parentheses; SD = standard deviation.

Source: Field Survey, 2014.

3.4. Model assessment

The descriptive statistics and correlation matrix between the latent variables LC policy, indigenous oil firms' participation, backward linkages and job creation are presented in Table 5. The correlation matrix among the latent constructs is relatively minimal and does not exceed 0.90, a sufficient requirement in structural equation analysis (Radošević & Yoruk, 2013). We do not suspect a collinearity problem, as reflected by variance inflation factors (VIF) of which the values are well below the acceptable range of 10 (Radošević & Yoruk, 2013). Moreover, correlation matrices between the manifest indicators that measured each latent construct are well below the acceptable figure of 0.9 (Hair et al., 2010). Discriminant validity tests confirmed that the four latent constructs are distinctly different. Traditionally, Fornell-Lacker and crossing loading criteria are primarily used for this test; however, a recent simulation has found these two tests to have less power to reliably detect discriminant issues (Henseler, Ringle, & Sarstedt, 2015).

An alternative approach, heterotrait-monotrait ratio of correlations (HTMT) suggested by Henseler et al. (2015), was employed to test discriminant validity. HTMT is computed by taking the geometric average of the correlations of indicators measuring different constructs (heterotrait ratio) and dividing by the correlations of indicators within the same construct (monotrait ratio). The computed HTMT value is compared with predefined thresholds that have been suggested as cut-off points. The most conservative threshold value of 0.8, suggested by Kline (2011), is considerably preferred. Following this criterion, Table 6 shows the HTMT values of the correlations between the latent constructs. The highest of these values was given a 0.52, and lies between IOFP and LC policy, which is less than 0.8. As the discriminant validity was established, it provides evidence for the distinctness of the constructs in the model.

In addition, the composite reliability (CR) and Cronbach's alpha were equally computed for each latent construct to test the reliability of the item indicators as well as the average variance extracted (AVE) to validate the items' internal consistency. A general acceptable lower limit for CR and Cronbach's α is 0.7, while the lower limit for AVE is 0.5 (Chin, 1998; Hair et al., 2010, 2014). The CR values for all four latent constructs, as well as their Cronbach's α values, are well above the threshold point of 0.7, indicating that the measurement items that measured respective latent constructs are adequately reliable and consistent. Similarly, the AVE values are above the cut-off point, except for the values for IOFP and JOB, which are slightly below (0.47, 0.48), but very close to 0.5. These factors, on approximation, at least partially explain the variance of their indicators and their AVE values are considered to be within the range of acceptable limit. Thus, this indicates that all measurement variables are internally consistent (Hair et al., 2014).

4. Empirical results

As shown in Table 7, all direct effects were first assessed in the multiple mediation model. The standardized coefficients (i.e. θ_1 , θ_2 , θ_3 , θ_5 , and θ_6) that made up both specific and total mediated

Table 6. Correlation matrix and construct validity

	IOFP	JOB	LC policy	LINK	VIF
IOFP					1.39
JOB	0.357 (0.322)				1.64
LC policy	0.519 (0.435)	0.206 (0.169)			2.11
LINK	0.343 (0.282)	0.376 (0.295)	0.256 (0.215)		1.63
CR	0.82	0.81	0.91	0.85	
Cronbach's α	0.73	0.73	0.89	0.78	
AVE	0.47	0.48	0.60	0.53	

Note: Latent variable correlations are in parentheses. VIF = variance inflation factors.
 CR = composite reliability. AVE = average variance extracted.

Table 7. Standardized direct coefficients

	Direct effect	Total indirect effect				
Path coefficients (β)	Coeff.	SE	z	Coeff.	SE	Z
LC policy IOFP (θ_1)	0.435	0.053	8.146***			
IOFP LINK (θ_2)	0.233	0.092	2.543***			
LINK JOB (θ_3)	0.221	0.074	2.984***			
LC policy JOB (θ_4)	0.011	0.090	0.119	0.158	0.043	3.703***
LC policy LINK (θ_5)	0.113	0.091	1.238			
IOFP JOB (θ_6)	0.255	0.084	2.050***			

Note: ** and *** indicate significance at the 5% and 1% levels, respectively. SE = standard error. Coeff. = coefficient. θ = estimated standardized parameters.

effects were significantly different from zero, except θ_5 , which was positive but not significant. This indicates that the LC policy does not have a statistically significant direct effect on LINK. This may be due to the condition that the LC policy is usually designed with less direct effects on backward linkages, specifically the second-tier suppliers, because the policy more often targets an increase in participation of indigenous oil firms, the first-tier suppliers, in the oil sector through which backward linkages are expected to be developed (Steven, 2011).

However, the LC policy was found to be positively associated with IOFP ($\theta_1 = 0.44$; z -value = 3.15; $p = 0.00$), indicating that the more effective LC policy is in giving opportunities to local firms, the more the local firms would actively participate in business activities in the oil industry. The coefficient of IOFP on LINK is positive and statistically significant ($\theta_2 = 0.23$; z -value = 2.54; $p = 0.00$). This implies that backward linkages may increase the procurement of locally produced input of goods and services. Moreover, IOFP is found to be positively associated with JOB and its direct coefficient is statistically significant at the 1% level ($\theta_6 = 0.26$; z -value = 2.05; $p = 0.00$), indicating that the increase in participation of indigenous oil firms may potentially create more jobs for the local workforce in the oil sector. Equally, the path coefficient from LINK to JOB was found to be positive and statistically significant ($\theta_3 = 0.22$; z -value = 2.98; $p = 0.00$), indicating that a sustainable development in LINK could create additional local jobs. These results support hypothesis 1.

In addition, the results reveal that the direct effect of the LC policy on JOB was insignificant, indicating that the policy does not directly impact job creation in the oil sector. However, the total indirect effect of the LC policy on JOB through three paths designated by the two mediators—IOFP and LINK—was found to be statistically significant ($\theta_1\theta_2\theta_3 + \theta_1\theta_6 + \theta_3\theta_5 = 0.159$; z -value = 3.70), and positive. In our view, hence, we can claim that the total indirect effect is different from zero, implying that IOFP and LINK mediate the relationship between LC policy and JOB. The significance of this coefficient is consistent with the interpretation that an effective LC policy that increases indigenous firms' participation in the oil sector may lead to more utilization of locally produced input materials which, in turn, may consequently lead to an increase in job creation.

Furthermore, Table 8 shows the results of the bootstrapping mediation, with three different 95% confidence intervals obtained with 5,000⁴ bootstrap resamples. An examination of total indirect effect of the LC policy on JOB through IOFP and LINK indicates that the point estimate (0.155) is positive and statistically significant at the 1% significance level, with 95% bias corrected and accelerated (BCa) and studentized CI from 0.110 to 0.250 and 0.097 to 0.234, respectively. Zero does not lie between the upper and lower bounds of these CIs, thus indicating that IOFP and LINK can be established as mediators. This implies that the link between LC policy and JOB operates through IOFP and LINK rather than having a direct effect. In other words, IOFP and LINK transmit

Table 8. Bootstrapping estimates and confidence intervals

Indirect effects	Product of coefficients			Percentile 95% CI		Studentized 95% CI		Bca bootstrap 95% CI	
	Point estimate	SE	z	Lower	Upper	Lower	Upper	Lower	Upper
IOFP	0.111	0.127	0.872						
LINK	0.025	0.076	0.327						
IOFP & LINK	0.022	0.120	0.183						
Total	0.158	0.042	3.800***	0.112	0.249	0.097	0.234	0.110	0.250

Note: *** significance at the 1% level.

BCa = bias corrected and accelerated.

SE = standard error. SE for IOFP, INK, and IOFP and LINK were calculated using excel tool package.

the effect of LC policy to JOB. These results support hypothesis 2. Equally, Figure 3 shows the total indirect effect distribution pattern of bootstrap, demonstrates that the effect is different from zero. This supports the argument on the systemic nature of labour-intensive entrepreneurship in every sector.

In the multiple mediation model, one should not only be concerned with total indirect effect, but also with the examination of specific indirect effects. The two specific indirect effects were examined through the two-path mediated effect, that is, the effect passed through only IOFP ($\theta_1\theta_6$) and LINK ($\theta_3\theta_5$). Additionally, we examined the three-path mediated effect, which is the effect passed through all mediators ($\theta_1\theta_2\theta_3$). The point estimates of these effects were obtained by multiplying their corresponding paths in the multiple mediation model (Figure 2). The z-scores were calculated by using an Excel tool package, as SmartPLS software has yet to feature z-scores, as well as confidence

Figure 2. Estimated multiple mediation model.

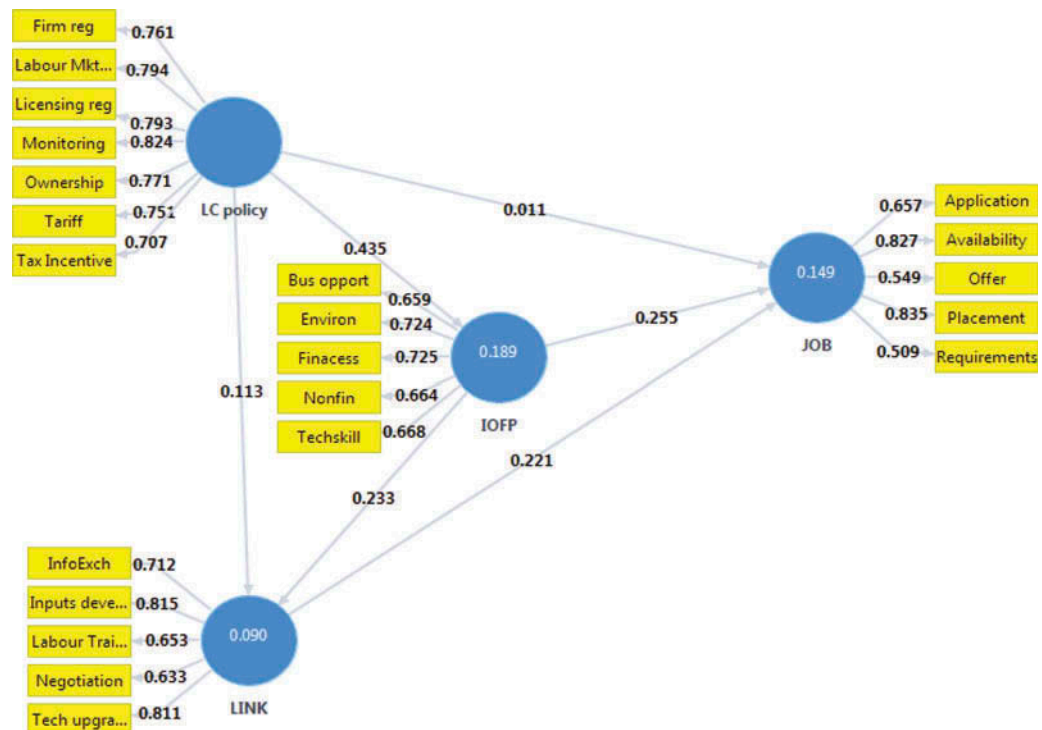
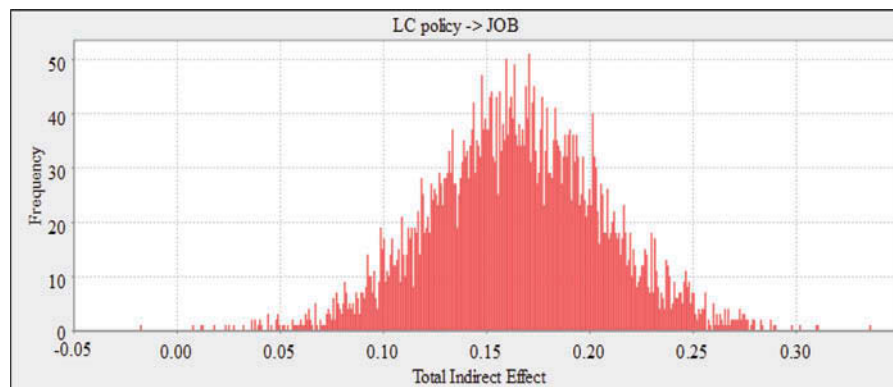


Figure 3. Total indirect effect distributional pattern.



intervals for specific indirect effects. When comparing the three point estimates with 1.96, the critical z-value, and with 0.05 significant level, we found that all three computed z-scores (0.87, 0.33 and 0.18) were less than the critical z-value. Thus, the hypothesis on specific indirect effect via each of the mediators was rejected. This results in rejection of hypothesis 3, which implies that neither IOFP nor LINK is specifically mediating the relationship between LC policy and job creation.

The insignificance of the specific effects in the multiple mediation model may be a result of collinearity, a phenomenon common to the model which often attenuates the degree to which the mediators are correlated. Therefore, the mediated effect of individual mediators was subsequently examined in a single mediator model (Appendix F). This is considered necessary to investigate whether IOFP and LINK are significant as mediators on their own. In addition, the single mediator model will tease apart the mediating effect attributed to each individual factor. It is possible that in the multiple mediation model, each factor was overlapping and probably rendered the mediators' specific effects insignificant (Preacher & Hayes, 2008).

Table 9 reports the point estimates of the individual specific indirect effect of LC policy on JOB. Interestingly, the indirect effects through IOFP ($\beta_1\beta_6 = 0.137$; $z = 3.67$) and same effect through LINK ($\beta_3\beta_5 = .059$; $z = 2.341$) are positive and significant. These denote that individual indirect effect is deemed different from zero. In addition, the Bca 95% confidence intervals ranged from 0.107 to 0.228 for IOFP, and 0.040 to 0.128 for LINK and do not contain zero. As zero was not included between each upper and lower bound, the mediation effect through individual mediators was established. The results indicate that IOFP can be established as a mediator on its own, as well as LINK as each mediator individually transmits the effect of LC policy to job creation, but yields different policy results. The overall model statistics was given as 0.15, implies that the variance of JOB explained by LC policy, IOFP and LINK, altogether, was 15%, and signifies labour-intensivity of the oil sector.

5. Discussion and Conclusions

This study analysed the mediating effect of indigenous oil firms' participation and backward linkages on the relationship between LC policy and job creation by using data obtained from

Table 9. Bootstrap results for individual indirect effects

Indirect effect	Product of coefficients			Percentile 95% CI		Studentized 95% CI		Bca bootstrap 95% CI	
	Point estimate	SE	z-value	Lower	Upper	Lower	Upper	Lower	Upper
IOFP	0.137	0.037	3.673***	0.106	0.232	0.087	0.209	0.107	0.228
LINK	0.059	0.025	2.341***	0.039	0.126	0.025	0.109	0.040	0.128

Note: Bca = bias corrected and accelerated; 5,000 resamples; *** indicates significant at 1% level.

across-section of local oil service companies operating in Nigeria's oil and gas sector. The possible effect, measured on global value chains (GVCs) often expected for the adoption of LC policy instruments in the oil sector, is based on the conception that the policy has potential in influencing firms' participation and developing backward linkages towards local economic development (United Nations Economic Commission for Africa (UNECA), 2015), especially in terms of employment generation for locals. This implies that the participation of firms and backward linkages' promotion in the oil and gas sector could be enhanced if the LC policy is effective. One major contribution of this paper was the application of the bootstrap method given that the technique does not necessarily require total effect to be the driving factor for testing indirect effect in a multiple-mediator model. In addition, based on bootstrap resamples, the technique produces confidence intervals to capture the transmission effect in determining whether the indirect effect is different from zero with a certain percentage of confidence.

With regards to multiple mediation tests, our results revealed that total indirect effect is significantly different from zero and that BCa 95% upper and lower bounds of CI do not include zero. This established the mediated effects of the intervening variables. This result provides evidence that there is benefit associated with the adoption of the LC policy in Nigeria's oil and gas sector. This finding is consistent with findings of research studies conducted by Adewuyi and Oyejide (2012), who found the same outcome from increased participation of local firms in the Nigerian oil value chain and developed backward linkages. In addition, Steven (2011) found that the adoption of the policy in the Nigerian oil sector has a positive significant impact on the manufacturing industry capacity utilization in Nigeria. He stressed that if the policy is well implemented, it has potential of generating employment, increasing value addition and leading to the sustainable development of Nigeria's economy. On specific indirect effects through the mediators, the effect through backward linkages was, however, found to be insignificant. This may be due to overlapping in the content of the mediators. This was shown clearly in the single mediation model that both the indirect effects of the individual mediator were significant when assessed in a separate, single mediation model.

In the present study, the empirical results attest that if the LC policy is well implemented, there are more benefits associated with increased participation of indigenous oil firms and utilization of locally produced input materials in the sector, especially in achieving value-addition in the domestic economy, particularly in terms of the creation of additional jobs for the citizens in the oil sector in Nigeria. Antai et al. (2012) and Ihua et al. (2011) found similar results in their respective studies, providing further evidence of the importance of government intervention policy.

Policy makers should focus more on measures that increase local entrepreneurial activities and develop backward linkages so as to consequently strengthen their intermediating function. Policy currently imposes a minimum local employment requirement. With stronger government intervention, such policies may no longer be required because job availability would be increased. Moreover, the coefficient of determination of the overall model is relatively small, but admissible. However, it signifies that there is need for the government to ensure effective and efficient compliance with the policy. In addition, measures for expansion of entrepreneurial opportunities need to be undertaken because this helps to achieve the focal objective of the policy regarding promotion of value-addition towards domestic economy development.

Backward linkages in practice may link the oil sector to non-oil sectors and create more value addition to the domestic economy. Thus, increasing backward linkages in terms of local sourcing for material resources needed for oil exploration and production must be given adequate attention and should be encouraged. The collaboration among local service providers and their domestic subcontracting suppliers is crucial for such development. This will reduce importation of foreign materials, retain the capital invested in the country, and create more job opportunities. The multiplier effect is expected to benefit the people of Nigeria.

In addition, it is a known fact that due to the nature of the activities entailed in the oil and gas industry, the sector often requires capital, well-developed technical skills and adequate training in order to be competitive in the industry. The authority should ensure adequate accessibility of funds to financially empower the local firms in facilitating their operations. More so, Nigerian tertiary institutions and higher colleges of petroleum studies need to be transformed to curtail brain-drain from the institutions and maintain adequate teaching and training in order to produce quality and competent graduates needed to be absorbed in the industry. This will reduce the shortage of skilled labour often faced by the oil industry (OPEC, 2013: 36). This, inevitably, will create more local jobs. In addition, local oil capacity and capability building should be highly maintained to enable local firms to carry out more of the direct and indirect works effectively in the industry.

Some limitations are identified in this study. The indicators used to measure the LC policy were summated scales which may make the effect of the policy difficult to interpret. Therefore, the results have to be interpreted with caution. There is also a possibility that the respondents might rate the collaboration with their subcontracting suppliers higher than the suppliers themselves, creating a gap in perception. Thus, separate questionnaires may be designed to close this gap in the future.

Nonetheless, it is worth noting that indigenous oil firms' participation can serve as a mechanism in promoting the oil sector's socioeconomic goals with respect to backward linkages' development and employment generation in the oil sector. However, Nigeria's LC policy would be considered ineffective if it does not mandate the oil sector to contribute and add value to the country's economic development.

Supplementary material

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Author details

Abdulkabir N. Adedeji¹
 E-mail: abidatullah@gmail.com
 Shaufique F. Sidique²
 E-mail: shaufique@upm.edu.my
 Azmawani Abd Rahman³
 E-mail: dr.azmawani@gmail.com
 Siong H. Law³
 E-mail: lawsh@upm.edu.my

¹ Department of Economics, Faculty of Social Sciences, University of Maiduguri, Maiduguri, Nigeria.

² Institute of Agricultural and Food Policy Studies, Universiti Putra Malaysia, Seri Kembangan, Malaysia.

³ Faculty of Economics and Management, Universiti Putra Malaysia, Seri Kembangan, Malaysia.

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Notes

1. NOGICD means Nigerian Oil and Gas Industry Content Development.
2. Global Entrepreneurship Monitor.
3. Westland (2010) provides guidelines on the types of effect size provided by Cohen (1992).

4. Available : www.danielsoper.com/statcalc3/calc.aspx?id=89. Calculator was assessed on 11/02/2015. Preacher and Hayes (2008) recommended at least 5,000 resamples for a better estimate of the acceleration constant.

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