



Development and Validation of Framework for Promoting Staff and Skill Development Strategies through University – Industry Collaboration in Nigeria

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ABSTRACT

This study is a descriptive survey research design was used. The population of the study consists of 28604 academic staff of universities, and manufacturing industry staff. Multistage sampling method was used to select sample for the study. Taro Yamane formula was used to calculate the sample size of university staff. The sampled university staff was 375 and sampled industry staff was 394, total was 769. However, only 673 of the administered developed framework were retrieved. Therefore, the sample used was 673. The opinion of respondents was sought on the suitability of items to include in the framework. Mean and standard was used to answer the research questions, any item with a mean rating of 3.50 and above are considered suitable and are included in the final draft of the framework. The hypotheses was tested using ANOVA at 0.05 level of significance, the result showed that there was no significant difference between the mean responses of respondents, the two hypotheses were accepted. The final draft of the framework has two sections with each having action statements to be implemented to enhance collaboration. The researchers therefore, recommend that; both universities and manufacturing industries should implement the action statements under the Staff development programmes through collaboration between universities and manufacturing industries in section A of the developed framework. Ways that skills can be developed through the Collaboration between Universities and Manufacturing Industries, systematically following these by the two bodies in collaboration will enhance skill acquisition.

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INTRODUCTION

The pressures on community-based organizations have increased and the issues faced by our society become more complex, the idea of multiple organisation collaborations becomes necessary with greater results. Through collaborations one can contribute a part and also reap the benefits of other people efforts. Collaboration between university and manufacturing industry can accelerate learning and distribute skills and knowledge. Universities worldwide play a leading role in advancing the frontiers of science and technology. In recent years, a key concern for policy-makers has been how to ensure that the wealth of knowledge generated within universities can be transferred to industry so

that society in general, and local businesses in particular, can benefit from university scientific and technological expertise (Nezu, 2007). The benefits of university-industry collaboration are also evident in developing countries. For example, a study in Chile and Colombia shows that collaboration with universities substantially increased the propensity of firms to introduce new products and to patent (Marotta, Blom, & Thorn 2007). The benefits for industry in University-Industry Partnership are as follows: a. Improvement in the companies' competitiveness b. solving the companies' communication problems c. understanding comprehensive business strategic planning d. understanding more about the audit and e. Be able to make a good planning for ICT-related programs.

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In most developed or industrialized nations, partnership between university and industry is one of the most effective strategies for technology development and a useful tool for assuring the effective and efficient application of science and technology to the resolution of development problems. Partnerships take many forms including the joint execution of research projects, the award of research contracts, the development of curricula and the provision of continuing engineering education for practicing engineers and scientists (Bogoro 2015). Bogoro (2015) went further to say, there is a huge gap between what is being taught in our universities and what industry actually needs in terms of professional skills and talents. Universities in Nigeria, at both the undergraduate and post graduate levels, tend to focus on theory. The reasons for these are easy to understand. After all, higher education is itself an industry, and as such it tends to find the best ways to perpetuate itself. To do that it has made the elevation and advancement of theories one of its primary "products." No need to short change the importance of theories or market analyses at all. Collaboration may be more or less intense and may focus on training or research activities. Collaboration may be formal or informal, from formal equity partnerships, contracts, research projects, patent licensing, and so on, to human capital mobility, publications, and interactions in conferences and expert groups, among others (Hagedoorn, Link, & Vonortas 2000). Similarly, Koschatzky & Stahlecker (2010) outlined that, Long-term collaborations are associated with joint projects and public-private partnerships (including private-funded university institutes or chairs, joint university-industry research centers, and research consortia), often allowing firms to contract for a core set of services and to periodically re-contract for specific deliverables in a flexible manner. Longer term collaborations are more strategic and open-ended, providing a multifaceted platform where firms can develop a stronger innovative capacity in the long run, building upon the capabilities, methods, and tools of universities. Bamiro (2015) reported that, one of the important pre-requisites for the economic well-being and prosperity of any nation is the sustainable development of industry. Highly technologically developed countries in the

world invest so much in technological innovation through partnership of industry with academia. It is important to note that, a country can only be highly technically developed and innovative through effective technology transfer between its local university, small and medium scale enterprises. Therefore, Rajibussalim, Sahama, & Pillay, (2016) assert that, University-industry partnerships in the field of science and technology are complex and may develop through a large number of mechanisms. These may range from more informal mechanisms, which include publication of research results, employee mobility or informal exchanges between scientists to more formal contractual mechanisms in which longer term relationships are established. That is a situation in which universities (or their staff) and industries enter into formal relations in the field of scientific and technological research and development. The relationship may imply the transfer of technology developed within universities, consultancies and transfer of know-how, collaborative research projects, sponsored research or other similar arrangements. A scientific productivity is usually measured by the output of scientific products. These scientific products include publications in form of scientific literature, scientific texts, prototypes and patents

According to, Stanojević, Vlajić, Miloš, and Ognjanović (2011) a framework could be defined as an application generator for one particular domain, or more to the point, it represents a skeleton of an application, that includes the complete code for the basic functions of a system, which can be conformed to the needs of one specific application. A framework is a basic conceptual structure used to solve or address complex issues, usually a set of tools, materials or components. It is used as a name for different kinds of toolsets, component bases. Framework is a mechanism for regular communication between two bodies; it helps to answer several key questions. Belfield, (2012) suggested that, the essence of framework in collaboration among other things could be to identify the higher order of skill needed by the students for success in school and in the work place after graduation so as to inculcate same in the students. Universities send their students to industry partners to learn and gain some important skills and work

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experiences. Successful industry-university collaboration needs to support the missions and motivations of each partner. Collaboration is based on the experience that multi-dimensional problems can only be successfully tackled when organisations, with profiles and competencies that complement and reinforce each other, co-operate actively by developing synergies, and by sharing visions and objectives, opportunities, risks, commitments and tasks, competences and resources. Building “bridges”, “interfaces” or “one stop shops” that bring together different and coordinated services and support structures can resolve difficulties that, in isolation, individual organisations would be unable to deal with. Such collaboration will make graduates of such institutions ready to take up jobs in industries their universities have collaboration with. Such industrial training could be done through creating opportunities for student attachments and co-placements.

There are these benefits to both universities and industries as entities, why are there many challenges associated with bridging cultural and communication divides between academia and the industry that has remained a constant impediment in fostering such collaborations? Considering the importance of collaboration between university and industry in the growth and development of Nigeria, there is the need to develop and validate a framework for promoting these collaborations. This is necessary because both the university and industry stand to benefits from the collaboration. Many social, economic, developmental problems can be resolved through the collaboration.

Purpose of the Study

The purpose of this study is to develop a framework that will be used by universities and industries to promote collaboration. Specifically, the study developed a framework on

1. Staff development strategies through collaboration between universities and manufacturing industries in north eastern states of Nigeria
2. Skills development strategies through collaboration between universities and manufacturing

industries in north eastern states of Nigeria

Research Questions

The following research questions were formulated to guide this study.

1. What are the Staff development programmes that should be included in the framework to enhance collaboration between universities and manufacturing industries in north eastern states of Nigeria?
2. What are the skills development strategies to promote collaboration between university and manufacturing industry in north eastern states of Nigeria?

Hypotheses

The following hypotheses were tested at 0.05 level of significance

- H₀₁ There is no significant difference between the mean responses of university administrators, lecturers, industry management and industry technical staff with regards to Staff development strategies for promoting collaboration between university and manufacturing industry in north eastern Nigeria
- H₀₂ There is no significant difference between the mean responses of university administrators, lecturers, industry management and industry technical staff with regards to skills development programmes strategies for promoting collaboration between university and manufacturing industry in north eastern Nigeria

METHODOLOGY

The research design that was used for carrying out this study was a descriptive survey. The area of the study is north-eastern, Nigeria. It encompasses the six states; Adamawa, Bauchi, Borno, Gombe, Taraba, and Yobe. There are six federal universities and five state owned universities. The population for the study consisted of all the academic staff and administrators of the six federal universities and five state universities in the north-eastern Nigeria which is 3364 and all

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senior management and technical staff of manufacturing industries in the study area which is 25240. The total population therefore was 28604.

Purposive sampling technique was used to select three federal universities and three state universities in the study area. The universities selected were those located in areas having highest cluster of manufacturing industries, thus; Modibbo Adama University of Technology Yola, University of Maiduguri and Abubakar Tafawa Balewa University Bauchi were the federal universities selected, while the state universities selected are; Gombe State University, Gombe, Taraba State University, Jalingo and Yobe State University, Damaturu.

Multi-stage sampling technique was later used in arriving at sample for the study. Multistage sampling divides large populations into stages to make the sampling process more practical. A combination of stratified sampling or cluster sampling, and simple random sampling is usually used (Gay, Mills & Airasian, 2011). After the universities were selected, a simple random sampling technique was used to select two faculties or schools, thus, faculties of engineering and sciences were selected. Further simple random sampling technique was used to select the academics and administrators from the universities. There are 112 university administrators and 245 lecturers. There are 357 respondents from the universities. Using Taro Yamane formula for calculating the sample size;
$$n = \frac{N}{1+N(e)^2}$$

Where n= sample size
N= finite population
e=level of significance

(Uzoagulu, 2011).

Similarly, the manufacturing industries were classified into three; small and medium scale manufacturing, large scale manufacturing and multi-national manufacturing. The sample from industry management staff is 123 while the sample of industry technical staff is 271. The total sample from manufacturing industries is 394 respondents while sample from the universities is 357. The sum total of sample size is therefore 751 respondents, using Taro Yamane formula to calculate the sample for academic staff separately and calculating that of manufacturing industries separately as well.

The developed framework was distributed to all the sampled respondents and was retrieved after they have responded to the items of the developed framework. The percentage of the retrieval is 89.44%. The sample used in the study was 103 university administrators, 215 university lecturers, 106 industries management staff and 249 industries technical staff. Therefore, the sample is 673.

The final draft of the developed framework was tested for reliability; the internal consistency was determined using Cronbach's Alpha reliability coefficient, Cronbach's Alpha (α) of 0.87 was obtained.

Data that was gathered from the developed framework in the try-out was analysed, mean and standard deviation was used to answer the research question. The real limits of number assigned values of response a category was used to take decision for answering the research questions. The decision point was put at 3.50. This therefore implies that a mean rating of less than 3.50 is "Not needed" while a mean rating of 3.50 and above is "Needed". Those items rated as needed were included in the framework while those rated as not needed were deleted.

The hypothesis was tested at 0.05 levels of statistical significance using Analysis of Variance (ANOVA) using micro- soft excel. Since the samples or groups are more than two. The decision was based on the F - ratio, when the F- computed is less than the F - critical the difference is not significant, therefore the null hypothesis is accepted and where otherwise the hypothesis was rejected.

Procedure for Developing the Framework

The framework for bridging the cultural divide between universities and manufacturing industries was developed by the researcher. The following stages were used as the procedure for the development of the framework. These are;

1. Identification of Items
2. Writing out Items
3. Developing rating scale for items
4. Validation of the Framework
5. Experts rating of the framework for reliability
6. Preliminary selection of items
7. Try-out of the framework

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8. Final selection of items
 The 29 identified items are the materials, steps and activities needed to promote collaboration between universities and manufacturing industries. In selecting items for framework for promoting Staff and Skill Development Strategies through collaboration between universities and manufacturing industries, items with a mean of 3.50 and above were considered suitable items and fit for inclusion in the framework. (Ali, 2020)

Table 1a: Content Validity Index of the Framework

S/No	Items (Staff Development)	CVI	Remark
1	Collaboration office at university and industry	0.87	Relevant
2	State the number of staff at collaboration office at the start of the collaboration.	1	Relevant
3	Agreement on the proportion of staff at the collaboration office	1	Relevant
4	The person having the responsibility for driving the collaboration agenda forward is agreed.	1	Relevant
5	Written statement of the collaboration leader's objectives	0.96	Relevant
6	Written statement of the collaboration leader's responsibilities.	0.91	Relevant
7	Accountability arrangements are in place	1	Relevant
8	Strategic plan that sets out a clear structure of the collaboration.	1	Relevant
9	Industries are to accept the direct hires of students	1	Relevant
10	Industries to accept temporary exchange of researchers.	1	Relevant
11	The nature of the partnership is well established	1	Relevant
12	University should appoint a Deputy Vice Chancellor (DVC) (or equivalent) in charge of industry linkages	1	Relevant
13	There is a dedicated unit/office responsible for promoting linkages between university and industry	0.87	Relevant
14	There is a strategy that forms the basis of the partnership's work	1	Relevant
15	Allow flexibility to change by the staff members of the collaboration office	1	Relevant
16	Allow flexibility to growth by the staff members of the collaboration office	1	Relevant

Content Validity Index (CVI) = 0.97

Table 1b: Content Validity Index of the Framework

S/NO	Items (Skills Development)	CVI	Remark
1	Periodically organize workshops on industry related issues	1	Relevant
2	Regularly conduct short courses for industry personnel	1	Relevant
3	The need to provide consultancy services to industries by universities	1	Relevant
4	Universities are to establish a science parks (science incubation centres)	1	Relevant
5	Fund specifically dedicated to supporting entrepreneurial activities by staff by universities	1	Relevant
6	Industry professionals should be involved in training academic staff in entrepreneurship skills	1	Relevant
7	University community should have access to industry laboratories	1	Relevant
8	Industries should offer internships/ student attachments in the relevant areas	1	Relevant
9	Build a core instructional programme that involves all lecturers and industry supervisors with high standards	1	Relevant
10	Introduction of one year SIWES for undergraduates for general industrial experience in specific area of specialization	1	Relevant
11	Introduction of one year SIWES for post graduates for general industrial experience in specific area of specialization	0.87	Relevant

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12	Introduction of one year industrial experience for universities lecturers in their specialised area, as a requirement for promotions	0.79	Relevant
13	Industry to sponsor research proposed by the academics	1	Relevant

Content Validity Index (CVI) = 0.97

RESULTS AND DISCUSSION

The results obtained from the analysed data are presented; the presentations are done in line with the research questions

and hypotheses that were postulated. The results are presented in Tables accordingly and systematic in the order of the research questions and hypotheses

Table 2: Mean and Standard Deviation of Respondents on the Staff Development Programmes that should be Included in the Framework to Enhance Collaboration between Universities and Manufacturing Industries in North Eastern States of Nigeria

s/no	Items	\bar{X}_a	\bar{X}_l	\bar{X}_m	\bar{X}_t	\bar{X}_g	δ	Remark
1	Collaboration office at university and industry	3.78	4.00	3.97	3.85	3.93	0.14	Needed
2	State the number of staff at collaboration office at the start of the collaboration	1.73	2.54	3.00	2.67	2.47	0.12	Not Needed
3	Agreement on the proportion of staff at the collaboration office	3.76	3.93	3.79	3.79	3.80	0.13	Needed
4	The person having the responsibility for driving the collaboration agenda forward is agreed	4.20	3.94	3.83	3.95	3.97	0.13	Needed
5	Written statement of the collaboration leader's objectives	3.84	3.91	3.95	3.97	3.92	0.13	Needed
6	Written statement of the collaboration leader's responsibilities	3.87	3.94	3.59	3.87	3.83	0.14	Needed
7	Accountability arrangements are in place	3.91	3.87	3.91	3.92	3.90	0.13	Needed
8	Strategic plan that sets out a clear structure of the collaboration	3.73	3.82	3.71	3.82	3.78	0.14	Needed
9	Industries are to accept the direct hires of students/graduates	3.52	3.71	3.69	3.77	3.62	0.12	Needed
10	Industries to accept temporary exchange of researchers	4.03	3.90	3.83	3.91	3.92	0.12	Needed
11	The nature of the partnership is well established	3.83	3.92	3.79	3.94	3.91	0.15	Needed
12	University should appoint a Deputy Vice Chancellor (DVC) (or equivalent) in charge of industry linkages	3.79	3.81	3.92	3.75	3.84	0.12	Needed
13	There is a dedicated unit/office responsible for promoting linkages between university and industry	3.79	3.80	4.31	3.87	3.93	0.13	Needed
14	There is a strategy that forms the basis of the partnership's work	3.12	3.20	3.11	3.00	3.10	0.13	Not Needed
15	Allow flexibility to change by the staff members of the collaboration office	3.77	3.81	3.68	3.91	3.82	0.13	Needed
16	Allow flexibility to growth by the staff members of the collaboration office	3.82	3.80	3.89	3.83	3.81	0.14	Needed
	Grand	3.75	3.71	3.82	3.85	3.79	0.13	Needed

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The data in Table 2 showed that after the try-out 14 items are rated as needed. The grand mean is 3.66, the standard deviation is 0.13 and the reliability index of the section is 0.91, that is, staff development will be improved if the items were implemented by universities and industries. The mean of most items was above 3.50 while the standard deviation was low, indicating the variability is

less. Items 17 and 29 are having a mean rating of 2.47 and 3.10 respectively; they were expunged from the framework. The mean, standard deviation and reliability index indicated that these are the staff development programmes needed to enhance collaboration between universities and manufacturing industries.

Table 3: Mean and Standard Deviation of Respondents on the Skills Development Strategies to Promote Collaboration between University and Manufacturing Industry in North Eastern States of Nigeria

s/no	Items	\bar{x}_a	\bar{x}_i	\bar{x}_m	\bar{x}_t	\bar{x}_g	δ	Remark
1	Periodically organize workshops on industry related issues	3.9	3.8	3.7	3.8	3.8	0.1	Needed
2	Regularly conduct short courses for industry personnel	4.10	4.00	4.21	3.99	4.06	0.1	Needed
3	The need to provide consultancy services to industries by universities	3.97	3.86	3.89	3.82	3.90	0.13	Needed
4	Universities are to establish a science parks (science incubation centres)	3.78	3.92	3.88	3.90	3.85	0.13	Needed
5	Fund specifically dedicated to supporting entrepreneurial activities by staff of universities	3.79	3.81	3.76	3.80	3.78	0.13	Needed
6	Industry professionals should be involved in training academic staff in entrepreneurship skills	3.93	3.89	3.79	3.96	3.92	0.13	Needed
7	University community should have access to industry laboratories	3.82	3.81	3.73	3.84	3.80	0.15	Needed
8	Industries should offer internships/student attachments in the relevant areas	3.73	3.80	3.94	3.88	3.89	0.14	Needed
9	Build a core instructional programme that involves all lecturers and industry supervisors with high standards	3.77	3.71	3.86	3.76	3.79	0.12	Needed
10	Introduction of one year SIWES for undergraduates for general industrial experience in specific area of specialization	3.73	3.81	3.74	3.71	3.76	0.11	Needed
11	Introduction of one year SIWES for post graduates for general industrial experience in specific area of specialization	2.16	2.70	2.97	2.22	2.51	0.12	Not Needed
12	Introduction of one-year industrial experience for universities lecturers in their specialised area, as a requirement for promotions	3.76	3.88	3.83	3.92	3.89	0.13	Needed
13	Industry to sponsor research proposed by the academics	3.91	3.80	3.82	3.79	3.86	0.12	Needed
	Grand	3.78	3.81	3.87	3.72	3.82	0.13	Needed

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The data in Table 3 presented the opinion of the respondents on skills development needed for the collaboration between university and manufacturing industry. The mean and standard deviation indicated those items that respondents agreed on as needed. The grand mean was 3.60, reliability index of the section is 0.79 and standard deviation was 0.13 indicated that if the items are fully implemented the skills of both staff of universities and industries will be developed. However, item 11 have a mean of 2.51 it is therefore, not fit for inclusion into the framework. The mean, standard deviation and reliability index indicated the ways skills development needed for collaboration between

universities and manufacturing industries are enhanced.

Hypotheses

H₀₁ There is no significant difference between the mean responses of university administrators, lecturers, industry management and industry technical staff with regards to Staff development strategies for promoting collaboration between university and manufacturing industry in north eastern Nigeria. The data that were used in testing this hypothesis were analysed using ANOVA and presented in Table 4

Table 4: ANOVA of Respondents on Staff Development Strategies for Promoting Collaboration between Universities and Manufacturing Industries in North Eastern Nigeria

Source of variation	Ss	Df	Ms	F	F – Critical	Remark
Between Groups	0.64	3.00	0.21	1.86	2.76	Not significant
Within Groups	1.44	60.00	0.02			
Total	2.08	63.00				

Result in Table 4 above indicated that the F- critical was 2.76 and was greater than F – calculated of 1.86. The hypothesis is therefore accepted. The interpretation is therefore that there is no significant difference between the mean responses of university administrators, lecturers, industry management staff and industry technical staff on Staff development strategies for promoting collaboration between universities and manufacturing industries in north eastern Nigeria.

H₀₂ There is no significant difference between the mean responses of university administrators, lecturers, industry management and industry technical staff with regards to skills development programmes strategies for promoting collaboration between universities and manufacturing industries in north eastern Nigeria. The data that were used in testing this hypothesis were analysed using ANOVA and presented in Table 5.

Table 5: ANOVA of Respondents on Skills Development Programmes Strategies for Promoting Collaboration between Universities and Manufacturing Industries in North Eastern Nigeria

Source of variation	Ss	Df	Ms	F	F – Critical	Remark
Between Groups	0.33	3.00	0.11	2.33	2.80	Not significant
Within Groups	0.39	48.00	0.01			
Total	0.73	51.00				

Result in Table 5 indicates that the F-critical is 2.80 which is greater than F-computed 2.33. The hypothesis is therefore accepted. The interpretation is therefore that there is no significant difference between the mean responses of university administrators,

lecturers, industry management staff and industry technical staff on skills development programmes strategies for promoting collaboration between university and manufacturing industry in north eastern Nigeria. These are ways that skills development programmes needed for

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collaboration between universities and manufacturing industries can be enhanced.

The findings of the study in relation to research question one which stated "What are the Staff development programmes through collaboration between universities and manufacturing industries in north eastern Nigeria" and a corresponding hypothesis two stated as "There is no significant difference between the mean responses of university administrators, lecturers, industry management and industry technical staff with regards to Staff development programmes through the collaboration between university and manufacturing industry in north eastern Nigeria" the result revealed that the respondents all rated the items as needed. These are shown in Tables 2 and 4 respectively. The grand mean, the grand standard deviation and F- value all indicated that the items are suitable for inclusion into the framework for collaboration between universities and manufacturing industries.

These findings are in agreement with Mongkhonvanit, (2008) who conducted a study titled, "The relationship between university and industry in the knowledge economy: A case study of Thailand's automotive cluster" Findings from this research show universities, as important players in the knowledge based cluster, have three major schemes to serve the cluster, in collaboration with government, organization/institute and industry. Those are; to produce graduates highly relevant to the need of related sectors, to conduct basic and applied research and to collaborate with organization/institute and industry to create new technology/innovations. Furthermore, the study suggested that; providing consultancy and collaborating with industry and government through an entrepreneurial spirit, supporting business incubation services and spin-offs, enhancing continuity of cooperative and entrepreneurship education and recruiting and developing industrially-experienced and research-active staff. Similarly, Kuntu (2017), in a study educational involvement in innovative university-industry collaboration agreed with findings of this study and found out that; education and the creation of knowledge is a primary goal of universities, and involvement in academic educational activities is a source of great potential in terms of improving the competences of firms seeking

new skills and competences or wishing to develop their own internal capabilities. Therefore, both universities staff and all carders of industry staff will be fully developed in all aspects of skills through collaboration.

The findings in relation to research question two and the null hypothesis two indicated that respondents rated the items in the developed framework for collaboration as needed and are suitable for inclusion in framework. The mean, standard deviation and P- value all indicate a favourable value. What are the skills development needed for collaboration between university and manufacturing industry in north eastern Nigeria? And there is no significant difference between the mean responses of university administrators, lecturers, industry management and industry technical staff with regards to ways that skills can be developed through the collaboration between university and manufacturing industry in north eastern Nigeria.

These findings agreed with, Mongkhonvanit, (2008), universities do not produce highly qualified and industrially relevant graduates, also it agreed with the findings of Obanor, and Kwasi-Effah(2013), Universities should offer continual short courses programs relevant to the industry. Also, industrial personnel should attend courses in the universities to refresh their knowledge. There is need to use a common language, i.e. the language used by academics should be understood by managers in the industry. Technology transfer should be taught as a compulsory course in science and engineering faculties. Cyril (2016) found out that there are skills mismatch by the graduates of universities of technology and those required by manufacturing industries and no significant difference between the mean responses of Universities of Technology lecturers and supervisors of manufacturing industries on the skills mismatch.

The final draft of the framework has two sections with each section having action statements. The sections are; .

- a. Section B: Staff development programmes through collaboration between universities and manufacturing industries.

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- b. Section C: Skills development needed for collaboration between universities and manufacturing industries. implemented by the universities and manufacturing industries in the north-eastern, Nigeria the expected result will be increase in collaboration between them.

The detailed statements under each section as shown in Appendix I Each action statement if

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Title	Items	Remarks
A: Staff Development Programmes Needed for Collaboration between Universities and Manufacturing Industries	a) Collaboration office at university and industry b) Agreement on the proportion of staff at the collaboration office c) The person having the responsibility for driving the collaboration agenda forward is agreed d) Written statement of the collaboration leader's objectives e) Written statement of the collaboration leader's responsibilities f) Accountability arrangements are in place g) Strategic plan that sets out a clear structure of the collaboration h) Industries are to accept the direct hires of students/graduates i) Industries to accept temporary exchange of researchers j) The nature of the partnership is well established k) University should appoint a Deputy Vice Chancellor (DVC) (or equivalent) in charge of industry linkages l) There is a dedicated unit/office responsible for promoting linkages between university and industry m) Allow flexibility to change by the staff members of the collaboration office n) Allow flexibility to growth by the staff members of the collaboration office	Staff of university and manufacturing industry will develop through collaboration
B: Skills Development Needed for the Collaboration between University and Manufacturing Industry	a) Periodically organize workshops on industry related issues b) Regularly conduct short courses for industry personnel c) The need to provide consultancy services to industries by universities d) Universities are to establish a science parks (science incubation centres) e) Fund specifically dedicated to supporting entrepreneurial activities by staff by universities f) Industry professionals should be involved in	Ways that skills can be developed among university and industry staff

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- training academic staff in entrepreneurship skills
- g) University community should have access to industry laboratories
 - h) Industries should offer internships/student attachments in the relevant areas
 - i) Build a core instructional programme that involves all lecturers and industry supervisors with high standards
 - j) Introduction of one year SIWES for undergraduates for general industrial experience in specific area of specialization
 - k) Introduction of one-year industrial experience for universities lecturers in their specialised area, as a requirement for promotions
 - l) Industry to sponsor research proposed by the academics

SUMMARY AND CONCLUSION

The study developed a framework for bridging the cultural divide between universities and manufacturing industries in north-eastern Nigeria. University and industry linkage is a major collaborative effort on the part of the two distinct entities (academia and industry) they share their resources in an effective and efficient way for attaining mutually compatible goals of technological innovation, enhancing global competitiveness and performing as engine for economic growth. Framework is a mechanism for regular communication between two bodies. Framework helps to answer several questions: how to build, sustain, and evaluate the activities in a thoughtful way. Why are effective partnerships important? What are key steps to managing effective partnerships in order to achieve mutually agreed-upon outcomes? The study was based on the theory of symbiosis. "the living together of unlike organisms" The theory state that "A close, prolonged association between two or more organisms of different species that normally benefits both members". The university and the manufacturing industry are two distinct organisations that can come together and mutually benefit each other when the cultural divide between are overcome.

Survey research design was used in this study. The opinion of universities lecturers, administrators, industry management staff and industry technical staff were sought for the suitability of the action statements to be included in the framework. The developed

framework was validated by experts; face and content validation.

RECOMMENDATION

Both universities and manufacturing industries should implement the action statements under the Staff development programmes through collaboration between universities and manufacturing industries in section A of the developed framework.

Ways that skills can be developed through the Collaboration between Universities and Manufacturing Industries, systematically following these by the two bodies in collaboration will enhance skill acquisition.

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