

# Institutional Best Practice Booklet



**“Strengthening the Dialogue Between  
Higher Education, Government and  
Industry: Working Together towards a  
Common Vision”**

**MENA Higher Education Leadership  
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Center for Learning Innovations &  
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# CASE STUDY

## A CASE STUDY OF EMPOWERMENT: LINKING ADULT TRAINING TO EMPLOYMENT THROUGH INNOVATIVE LEARNING APPROACHES



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## Abstract

The aim of this case study project paper, which is based on 10 workshops is to prepare a customized personal development plan, an action plan including; short-term, mid-term and long-term goals for 3 women learners from diverse backgrounds, on a 'Status of Women Canada' funded project titled: 'Empowerment'. The case study is focused on aligning learners to their professions either through self-employment or through employment within the government, non-profit or the private sectors. The learners' comprehension-level learning objectives and their application-level learning objectives were facilitated. Data was analyzed using SWOT, Needs, and Functional Job analyses. Principles of Adult Training, Needs Analysis, Presentation / Facilitation and Evaluation formed the competencies' framework for carrying out the assessment. Based on initial needs analysis conducted, learners were assessed. The case study project proceeded as per standards laid down by the Ontario Institute of Studies in Education of University of Toronto's training guidelines. This case study project led to all 3 women gaining meaningful employment in their field of education and training within 6 months of the project's initiation and this stands as a testament to the highly successful innovative techniques that were employed, which enabled all 3 learners employability, contributing to the project's 100% success. This paper is a reflection on the problems identified, the context within which this occurred, the purpose of the project, the project information related to it, the methodology used and findings.

**Key Words:** Personal Development Plan, Action Plan, Goal Setting, Empowerment, Adult Training, Need Analysis, Facilitation and Education

## A Background of the Institution(s) Involved

This was a 'Leaders in Residence' project titled 'Empowerment' funded by 'Status of Women Canada' and supported by 'Skills for Change' (SfC) a not-for-profit organization based in

Toronto, Canada. The project followed University of Toronto's Ontario Institute of Studies in Education standards of evidence-based evaluation related to the collection, analysis and reporting of data.

This 10-workshop based project was a unique opportunity to integrate and apply skills and knowledge gained including prior experiences, knowledge and key competencies related to adult training and development principles. The reason for selecting all 5 modules of Adult Training, Needs Assessment, Instructional Design, Facilitation and Presentation for this project, was to make use of this unique opportunity to apply their individual competencies to seamlessly integrate and blend them to train adults in a different environment, focused on achieving different learning goals for them.

## The Context for the Case Study / Best Practice – trends it addresses, the problem and the reason for undertaking the initiative

### Description of the Context

The aim of the project was to support 3 women immigrants (35 to 55 years) most in need of help, unemployed or underemployed and / or at risk of violence; and get them out from a situation of dependence to a situation of self-employment or a job. This project worked on customized goals for each woman based on individualized needs assessment, leading to all 3 women on a path to their empowerment by enabling them gain meaningful self-employment / sustainable employment. Ten workshops were conducted as a part of this project from October 2013 to April 2014, which form the basis for this article.

### The target group

- 2-3 new women immigrants out of whom 1-2 facing an abusive environment were identified to be a part of the learning group for this project; a total of 3 learners.

- This target group was identified based on their commitment to work regularly on the project for the specified duration of the project period or until their goal on the project could be achieved/ whichever was earlier.

short-term, mid-term and long-term goals for each of the women, to help focus on their current strengths

- To help align these women to jobs within their key areas of expertise

## Statement of the Problem / Task

The problem addressed in the case study was the lack of employment in the field of expertise matching specific skill sets of all 3-immigrant women learners.

### The task

- To evaluate current skill sets of the 3 immigrant women
- To conduct needs analysis and ascertain current training gaps of these women
- To prepare a customized personal development plan, an action-plan document,

## Best Practices / Trends it Addresses

The Canadian Society for Training and Development (CSTD) in its framework 'Competencies for Training and Development Professionals' lays down Competencies for training and developing professionals for assessing performance needs (pp.17-28), designing training (pp.31-44), facilitating training (47-58), supporting transfer of learning (pp.61-66) and evaluating training (pp.69-80).

### Conceptual framework

This paper uses the conceptual framework laid out here below:

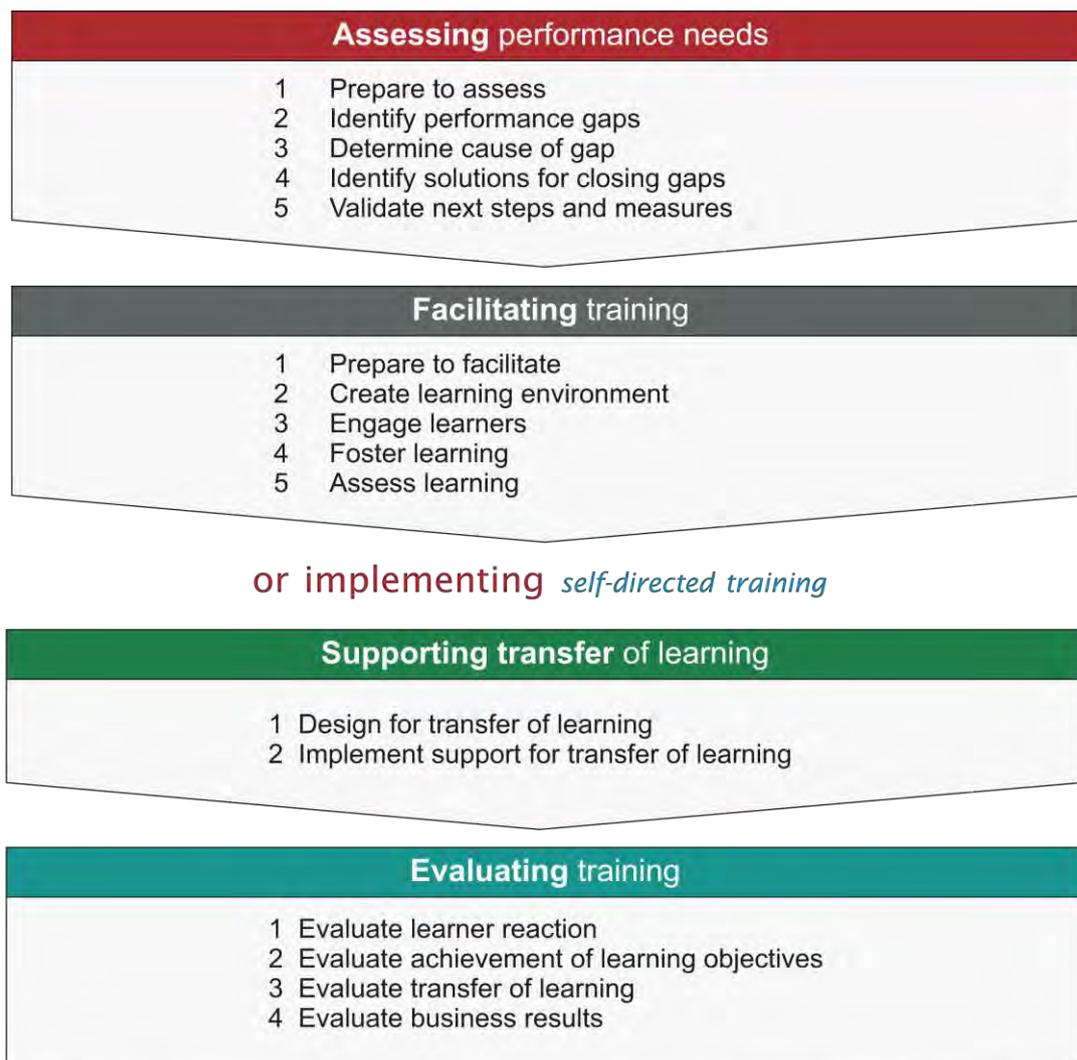


Figure: CSTD Framework

The American Society for Training and Development (ASTD) also created a competency model as a guide. The model includes “*competencies of designing learning, improving human performance, delivering training, measuring and evaluating, facilitating change, managing the learning function, coaching, managing knowledge, career planning and talent management, and roles, and is a frame of reference for career growth and professional development*” (ASTD, pp.1).

Regarding need analysis, it has been stated, “Task Analysis is a Training Need Analysis (TNA) technique that derives optimal tasks attached to visible tasks” (Rosett, A. pp. 8, para.4). Barbazette, J. (2006, pp.1) in her book *Training Needs Assessment, Methods, Tools and Techniques*, demonstrates “the essentials of needs analysis from the emerging trainer’s perspective.” She throws light on “when and how to do a training needs analysis, using informal and formal analysis techniques; goal, task and population analysis and, how to develop and present a training plan.” “The challenge is to find the problem to understand it sufficiently so that it can be solved” (Rosett, 1987, pp. 8, para.4). Gupta, K. (2006, pp.1) shows how to “manage and report a needs assessment project and access professional ethical guidelines”.

On the importance of setting objectives, many affirm, “working from goals and strategies, training strategies are planned and developed” (Rosett, 1987, pp. 10, para.2). Russo, C. (2008, pp.36, para.1) states, “objectives are based on clearly defined needs, derived from careful analysis of the problem, opportunity, or requirement that led to the project or program”. As stated by Kirkpatrick, D. and Kirkpatrick, J., (2006, pp. 9, para.1-2), “*once the needs have been determined, it is necessary to set objectives. Objectives should be set for three different aspects of the program in the following order: What results are we trying to accomplish? What behaviors are needed to accomplish these desired results? What knowledge, skills, and attitudes are necessary to achieve the desired behaviors?*” Russo (2008, pp. 5, para.4) highlighted that “objectives are powerful in that

they provide direction, focus and guidance and create interest, commitment, expectations and satisfaction.” Russo (2008, pp. 17, para.3) further states that, “the highest level of objectives comes from analysis of need” and, that “Learning objectives are based on learning needs” (Russo, 2008, pp.32, para.4).

With relevance to design, Bloom’s revised framework explores curriculums from three unique perspectives “cognitive psychologists (learning emphasis), curriculum specialists and teacher educators (C&I emphasis), and measurement and assessment experts (assessment emphasis).” “Design of training should be based on desired performance outcomes.” (CSTD Competencies Framework, pp. 31, para.6) “If the problem is one that can be solved through training then instructional designers will establish clear training intentions.” (Rosett, pp. 8-10) Colvin, C (2010, pp.6, para.2) shows “how to maximize learning through visuals and words, apply examples and practice to strengthen instructional methods.” “Implementation is trying out training solutions developed” (Rosett, pp.10, para.3).

About presentation, Durate, N. (2008, pp.4) states ‘presentations to often reflect the agenda of the presenter’ “True presentations focus on the presenter and the visionary ideas and concepts they want to communicate (Durate, pp.4, para.3). He (pp.14, para1) also adds “before beginning a presentation, it is important to ask yourself questions about your audience – Who they are? What are their needs? and How can you address them?” “Multimedia environments, including online presentations, lessons, simulation games, slide shows play a crucial role in education” (Mayer, R, 2005, pp.1). “Graphics got better ratings than lessons lacking visuals, even though only the relevant graphics led to better learning” (Colvin, 2010, pp.12, para.2).

Malcolm, Knowles in his book ‘*The Modern Practice of Adult Education*’, while “focusing on the notion of informal education, points to the ‘friendly and informal climate’ in many adult learning situations, the flexibility of the process, the use of experience, and the enthusiasm and

commitment of participants including the teachers” (Malcolm, 1981, pp.1). Further “facilitating training can range in scope from a classroom with a few people, to a webinar with hundreds” (CSTD, pp.47, para.1). Barbazette, J (June, 2010) on learning and performance thinks “there needs to be a stronger focus on the proactive performance consulting approach to the training function.” Bloom, B. (1956, pp.98) recommends, “Stakeholder strategies to support performance.” CSTD (pp. 17, para.1) says “assessing performance needs can range from a designer taking a few hours to clarify what learners should be able to do after training, to an experienced training and development professional taking weeks to conduct a needs assessment of a complex performance issue that involves many work processes, functions and roles.” “The learning style myth leads to some very unproductive training approaches contrary to the modern evidence of what works. Engagement is essential; but it is psychological engagement rather than physical engagement that counts” (Colvin, 2010, pp.15, para.1). Tuckman, B., Bruce, J., and Mary J. (1977, p.419-427) proposed in ‘Stages of Small Group Development Revisited: Group and Organizational Studies’, “a model of developmental stages for various group settings over time, labeled (1) testing and dependence, (2) intragroup conflict, (3) development of group cohesion, and (4) functional role relatedness. The stages of task activity were labeled (1) orientation to task, (2) emotional response to task demands, (3) open exchange of relevant interpretations, and (4) emergence of solutions. The model now stands: forming, storming, norming, performing, and adjourning.”

On transfer of learning, Mary (2005, pp.1) shows how to “find and engage stakeholders in transfer of learning efforts.” “Training primarily addresses skills and knowledge component of performance.” (CSTD, pp. 17, para.3) “Supporting transfer of learning involves designing and promoting activities and materials that help learners apply what they learned during training back in the workplace (CSTD, pp.61, para.1) CSTD. “If the trainees do not apply what they learned, the program has been

a failure even if learning has taken place” (Kirkpatrick, 2005, pp.6, para.3).

Finally, Broad, M (2005, pp.138) speaks regarding the role of evaluators in supporting learning and performance. “Evaluation is, in fact, an ongoing process that starts with assessing performance needs, and continues through designing training, facilitating training and supporting transfer of learning” (CSTD, pp.69, para.2). “Training effectiveness depends on the intended learning outcome and the learners” (CSTD, pp.17, para.1). Kirkpatrick et.al, (2006, pp. 4, para.1) state, “if programs are going to be effective, they must meet the needs of participants.” Kirkpatrick (2005, pp. 5, para.1) further states that the “reactions of participants should be measured on all programs for two reasons: to let the participants know that trainers value their reactions, and to measure their reactions and obtain suggestions for improvement.” Kirkpatrick (2005, pp.6, para.1) believes “learning evaluations should be targeted to the specific objectives of the program and should be used to evaluate all programs.” “Evaluation should be done only on those programs considered most important” (Kirkpatrick, 2005, pp.7, para.3). Rosett (1987, pp. 10, para.4) believes “evaluators seek data to judge the worth of the training effort.” He further goes to say, “extant data analysis is the effort training professionals make to ground front end analysis in performance and accomplishment” (Rosett, pp.27, para.3 and pp.48, para.2). Russo (2008, pp.9, para.6) also states that “these high level objectives pave the way for evaluation by providing the facts and details needed for the evaluator to collect and analyse results.”

## The Goals and Outcomes intended to be achieved by the Institution(s)

Learning objectives were first established by assessing the intended and desired performance outcomes and are based on learners’ needs analysis. Based on which, application-level and comprehension-level learning objectives were established.

## Application-level Learning Objectives

- Expressing thoughts and communicating orally and fluently in English
- Creating a personal development and a goal-focused action plan
- Producing a professional portfolio to demonstrate organization skills
- Creating a plan based on prioritization of importance and urgency of tasks
- Evaluating approaches to goal setting and reflecting on how to make improvements

## Comprehension-level Learning Objectives

- Interpret the relationship between personal effectiveness and self-confidence
- Translate the relationship between being clear goal focused and being successful at achieving those goals
- Develop and execute the knowledge that one has successfully and confidently

Achievement of these learning objectives were evaluated during training, using tools such as role-plays, case study, tests, etc. Based on gaps assessed, the following goals were selected for training of all 3 learners:

## The Final Goal

- To complete the Empowerment case study project and achieve the goals of finding meaningful employment for the learners
- To achieve the learning outcomes for myself
- To achieve the learning objectives set out for the learners at both application and competency levels

## The Actual Implementation Strategy

### Principles of Adult Training

The specific modules and their underlying competencies from where the case-study project drew upon were as follows:

#### **Adults learn through reflecting on their own and others' experiences**

A reflective learner diary was introduced in the first workshop, which all learners were taught to maintain from the beginning and could read from it during the workshops whenever they wanted to share something important from it, of their reflections from the workshops and their experiences and learning, with others.

#### **Adults learn when content meets their perceived need**

The content developed was based on the needs analysis done for all 3 learners and the learning objectives derived from it. The activities were aligned to achieve key learning objective for all 3 learners at skill / application and knowledge / competency levels, meeting goals of adult learners of content meeting perceived needs.

#### **Adults are internally motivated to develop increased effectiveness**

This was focused to enable and facilitate all 3 learners to bring out their SMART goals and objectives and understand that they were internally motivated to increase their performance and effectiveness through activities 1 to 17.

#### **Adults filter their learning through their personal value systems**

Ground rules were set right at the beginning during the first workshop through a consensual approach, establishing the principle of valuing each learner's personal value system and recognizing this explicitly throughout the learning process.

## Adults learn optimally in informal environments

The learning environment of the workshop was kept informal and friendly, yet disciplined enough for the learners to become effective based on the agenda that they followed for their learning.

## Need Analysis

Competencies that were used are as specified below:

### Identifying performance gaps

Knowing what results to achieve and how to evaluate those results based on key goals set for each learner at the very beginning was critical. Knowing at the start, the tasks / activities in which the learners required to be engaged in order to achieve their desired performance outcomes was equally important. Learners' performance outcomes and their current gaps based on SWOT and KSAO analysis emerged as follows:

- a. Learner 1 – Needed external help with some emotional aspects of life; required to build on more industry awareness; and needed confidence presenting to groups.
- b. Learner 2 – Needed guidance to overcome weaknesses; to learn to become more clear and goal focused; to build personal effectiveness; needed financial understanding; required to build specific professional language skills; needed training to express thoughts clearly; required support to leverage project work experiences; needed to improve on oral communication skills and speaking and presenting to groups; needed more practice to use information and communication technology.
- c. Learner 3 – Lacked Canadian job experience; needed to better leverage current knowledge; required to build more industry awareness; needed better financial understanding; needed to learn to prioritize; needed to complete a task once initiated; needed to

become better process oriented; needed to improve numeracy skills; needed to improve organizational skills; needed to build rapport with people and time management skills.

### Determining causes for performance gaps

Assessing prerequisite knowledge, skills, abilities and other attributes (KSAOs) of these learners based on their earlier jobs from their previous organizations (as all learners were currently unemployed), their performance gaps were assessed as follows:

- a. Learner 1 – Being in an abusive marriage for 20 years, this learner lacked sufficient Canadian employment experience in the professional field of expertise and sufficient exposure to professional presentation opportunities and lack of required presentation skills.
- b. Learner 2 – Coming from a cultural background such as Hungary, this learner was multi-talented and multi-focused yet lacked clear goal focus and confidence due to the cultural background. The learner also lacked financial understanding due to lack of an opportunity to work in this area specifically. Further, due to English not being the first language in Hungary, the learner had weak communication skills also being less exposed to communication technology.
- c. Learner 3 – Not having a job in Canada was one of the reasons for the lack of utilization of professional knowledge for this learner and lack of appropriate transferable skills and industry awareness in the country of residence. The learner also lacked financial understanding due to a lack of opportunity to work with that skill specifically apart from a lack of prioritization and a lack of commitment to task-fulfillment due to a lack of organizational skills. Furthermore, this learner also lacked numeracy skills due to insufficient exposure to working with numbers; insufficient people management, relationship building and interpersonal skills.

## Identifying solutions for closing gaps

Non-training solutions for these learners were not considered as they did not apply. Solutions for closing some of the performance gaps and supporting transfer of learning for all learners to a satisfactory extent considered were:

- a. First, to create an awareness of the existence of these gaps among all learners;
- b. Second, to get a buy-in from all learners for closing some of these gaps and to gain their commitment to do so;
- c. Third, create a plan by designing learning objectives both at the skill and competency levels and, design / choose suitable activities to achieve those objectives for the learners.
- d. Finally, implement the plan by facilitating those activities for the learners by designing / creating a learning environment enabling transfer of learning to take place thus achieving the goals for the learner/s.

## Design

### Conducting a design analysis

To decide what tasks and activities these learners should be doing based on their intended performance outcomes, based just on who these learners were, their educational background, their job experiences etc.

### Establishing learning objectives and evaluation

To establish the learning objectives by assessing the intended and desired performance outcomes based on their need analysis. Based on these, application-level learning objectives and the comprehension-level learning objectives are established to evaluate the achievement of the learning objectives during training.

### Creating detailed design

What is the best way to deliver training? (Classroom, virtual, e-learning etc.) What learning activities are required to achieve the learning

objective? These were some of the questions that went into the design process. Classroom was decided as the best way to deliver training rather than virtual or eLearning, etc.

The timing for each activity was 20 to 30 minutes. Learning activities designed to facilitate and achieve the learning objectives included activities are given below.

- Activity 1 – Learning Expectations
- Activity 2 – Reflective Diary
- Activity 3 – SWOT (Strengths, Weaknesses, Opportunities, and Threats) Analysis
- Activity 4 – Skills Audit-1
- Activity 5 – Need Assessment-1
- Activity 6 – Need Assessment-2
- Activity 7 – Skills Spotting
- Activity 8 – Skills Audit-2
- Activity 9 – Discovering your Career DNA
- Activity 10 – Priorities for Personal Development
- Activity 11 – Personal Development Plan
- Activity 12 – Aims and Objectives
- Activity 13 – SMART Goals (Specific, Measurable, Accurate, Relevant, and Time Bound)
- Activity 14 – Achievement Dates
- Activity 15 – Setting Timelines and Measures
- Activity 16 – Success Criteria and Implementation Plan
- Activity 17 – Action Plan
- Activity – Demonstrating how to develop a professional portfolio
- Resource Identified: Goals Setting article
- Resource Identified: Personal Development Planning article
- Resource Identified: Personal and Professional Development article

## **Developing materials**

Care was taken in developing materials that the learners needed during training to support their learning and the material that was required by the facilitator to support the delivery of the training and evaluation of the learning objectives. Care was taken for preparing and printing them out and keeping them ready for the learners well before hand. The material used was based on well-projected content that suited the learning outcomes and validated the learner and the facilitator materials.

## **Supporting implementation**

Care was taken of all other requirements, such as printing, distribution, and maintenance of materials. All printing was done before every workshop and was stored in every learner file. The agenda for the week would be sent to all learners 2-3 days in advance. The training design and materials would be maintained in a separate file in a separate location and in a safe cabinet in the facilitator's office.

## **Presentation / Facilitation**

Logistics were arranged and contingency plans prepared well in advance as required related to materials, room etc. Learners were advised and all prerequisites and pre-work requirements were taken care of. Competencies that were used are as specified below:

### **Preparing to facilitate**

This involved finalizing the place of the workshop, arranging for the internet access, printing of materials in advance, making room arrangements, space, tables, chairs, whiteboard, podium, projector, computer, slide deck, markers, flip chart, etc., including server for accessing the internet and a printer for printing out materials for the workshop. Informing all learners through email of each week's agenda's and the pre-work they required to complete before coming to the workshop,

such as reading an assignment and making key points for discussions etc.

## **Creating a learning environment**

Welcoming learners as they entered the physical learning environment, coming 15-20 minutes before time to ensure that the room was prepared for the learners and all required materials and technology were made available; making arrangements for refreshments such as coffee and snacks to be served during the workshops etc. Welcoming learners with a bright smile and a big hug, asking them how their earlier week had gone had to be taken care of. Greeting each learner using their first names and when responding to questions or comments as this made them feel respected and also made them feel that they were given personal attention. This also kept them alert throughout the session.

## **Engaging learners**

Using a variety of instructional techniques to provide content, which included interaction and sharing of real life experiences and storytelling form of example sharing, group discussions, case study discussion, expectation discussions, activity feedback giving and receiving, sharing from each other's reflective diary's and reading them out aloud, giving ad hoc presentations and role-plays etc.

Maintaining an appropriate balance between providing content and allowing learners to participate – this was very important and a challenging thing to do. It was important for learners to talk and to share their learning. It was important to allow learners to communicate what they wanted to and to receive their feedback as the facilitator and to balance this with the agenda set for the session.

Using of appropriate language, anecdotes, and examples to facilitate learning, and making use of paced training to meet the needs of the group. Interspersing the workshops and activities with questions also encouraged the learners to do the same in order to clarify understanding and

remove ambiguity if any and to keep both learners and the facilitator on the same page.

Drawing upon learner experience, knowledge and skill to enhance learning as all learners were between the age group of 35 to 55 years, coming into this project with varied experiences, knowledge, and skill and with tacit knowledge and transferable skills. This coupled with the new skills and learnings they gained, enhanced what they learned during the workshops and during the project. Each workshop encouraged active participation from all learners and proceeded through interactive discussion and feedback being given and received.

## Fostering learning

All information and concepts presented and explained to learners clearly and feedback was taken subsequently on whether they had understood, thus clarifying learners' comprehension of key concepts presented.

## Assessing learning

Each learning objective was evaluated through various learners' activities and practice as required. Each workshop was for duration of 2 hours except 5th to 7th workshops that were of 3 hours' duration. Each activity ranged between 20-30 minutes in duration.

**Table: 10 Workshops Conducted**

Se	Workshop	Modules Facilitated (No.)	Date	Type	Activities
1	1 <sup>st</sup> Workshop	(1) Adult Training, (2) Instructional Design & (3) Facilitation	26 <sup>th</sup> Oct, 2013	Group Activities	<ul style="list-style-type: none"> <li>▪ Welcome all participants to the project</li> <li>▪ Establish some ground rules to the project as a group</li> <li>▪ Listen to each one's story in the group</li> <li>▪ Facilitate Activity 1 – Learning Expectations</li> <li>▪ Facilitate Activity 2 – Reflective Diary</li> <li>▪ Facilitate each of these women to maintain a mandatory daily Reflective Diary</li> <li>▪ Facilitate Activity 3 – SWOT (Strengths, Weaknesses, Opportunities and Threats) Analysis</li> <li>▪ KSAO Analysis – Job Analysis Interview; Task Analysis, KSAO Identification</li> </ul>
2	2 <sup>nd</sup> Workshop	(1) Adult Training, (2) Instructional Design, (3) Presentation, (4) Facilitation & (5) Need Analysis	10 <sup>th</sup> Nov, 2013		<ul style="list-style-type: none"> <li>▪ Key learning points from the previous session to be shared by each participant</li> <li>▪ Review assessments from previous workshop</li> <li>▪ Facilitate Activity 4 – Skills Audit-1 (Inventory)</li> <li>▪ Review of Need Assessment Competencies</li> <li>▪ Facilitate Activity 5 – Need Assessment-1</li> <li>▪ Facilitate Activity 6- Need Assessment-2</li> <li>▪ Document the learning outcomes needed by each based on the NA completed</li> <li>▪ Tabulate the results of KSAO Identification and Analyse the scores</li> <li>▪ Discuss the findings with each woman individually</li> </ul>
3	3 <sup>rd</sup> Workshop		30 <sup>th</sup> Nov, 2014		<ul style="list-style-type: none"> <li>▪ Key learning points from the previous session to be shared by each participant</li> <li>▪ Review self-assessments from previous workshop</li> <li>▪ Discussion and Learner Interaction</li> <li>▪ Facilitate Activity 7- Skills Spotting</li> <li>▪ Facilitate Activity 8 – Skills Audit-2</li> <li>▪ Facilitate Activity 9-Discovering your Career DNA</li> <li>▪ Discuss KSAO's (Knowledge, Skills, Abilities and Other Attributes) identified for each participant</li> </ul>

Table continued...

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Se	Workshop	Modules Facilitated (No.)	Date	Type	Activities
4	4 <sup>th</sup> Workshop		18 <sup>th</sup> Jan, 2014	Individual Activities	<ul style="list-style-type: none"> <li>▪ Key learning points from the previous session to be shared</li> <li>▪ Review and feedback of KSAO's from previous workshop</li> <li>▪ Facilitate Activity 10- Priorities for Personal Development</li> <li>▪ Facilitate Activity 11 – Personal Development Plan (PDP)</li> <li>▪ Build consensus around support that is required based on the analysis done</li> </ul>
5	5 <sup>th</sup> & 6 <sup>th</sup> Workshops	(1) Instructional Design, (2) Facilitation & (3) Needs Analysis	15 <sup>th</sup> Feb, 2014		<ul style="list-style-type: none"> <li>▪ Key learning points from the previous session to be shared</li> <li>▪ Break down of key areas of support needed for each woman (based on the meeting held on 29<sup>th</sup> Jan with SfC Program Manager) – 2:35 to 3:05 pm (10 minutes maximum time for each participant)</li> <li>▪ Facilitate Activity 12 – PDP – Aims and Objectives</li> <li>▪ Facilitate Activity 13 – PDP – SMART Goals</li> <li>▪ Review SMART Goals</li> <li>▪ Facilitate Activity 14 – PDP – Setting Achievement Dates</li> <li>▪ Begin working on a professional portfolio</li> <li>▪ <i>Homework Assignment-</i> Read <i>Goal Setting Activity</i> Article and come back with Key learning for self from it.</li> </ul>
6	7 <sup>th</sup> Workshop	(1) Adult Training, (2) Instructional Design, (3) Presentation, (4) Facilitation & (5) Need Analysis	1 <sup>st</sup> Mar, 2014		<ul style="list-style-type: none"> <li>▪ Facilitate Activity 15 – PDP – Setting Timescales and Measures</li> <li>▪ Facilitate Activity 16 – PDP – Setting Success Criteria and Implementation Plan</li> <li>▪ Facilitate Activity 17 – PDP – Prepare an Action Plan and Milestones</li> <li>▪ Quantify goals to be achieved as far as possible, with timelines in the AP that in drawn; facilitate each one to prepare a Personal Development Plan (PDP) based on their need and SWOT analysis completed &amp; discuss Individual Action Plans</li> <li>▪ <i>Homework Assignment-</i> Read 2 articles on <i>Personal and Professional Development</i></li> </ul>
7	8 <sup>th</sup> Workshop	(1) Adult Training, (2) Needs Analysis, (3) Facilitation & (4) Presentation	29 <sup>th</sup> Mar, 2014		<ul style="list-style-type: none"> <li>▪ Key learning points from the previous session to be shared</li> <li>▪ Facilitate each one to prepare a list of their short-term, mid-term and long-term goals</li> <li>▪ Discussion of short-term goals identified by each participant</li> <li>▪ Break down key need areas of support needed for each woman</li> <li>▪ Design a mentoring plan once the Need and SWOT analysis is completed</li> </ul>
8	9 <sup>th</sup> Workshop		12 <sup>th</sup> Apr, 2014		<ul style="list-style-type: none"> <li>▪ Key learning points from the previous session to be shared</li> <li>▪ Prioritise key pre-requisites</li> <li>▪ Design a coaching plan once the Need and SWOT analysis is completed</li> <li>▪ Plan on Job search strategies</li> <li>▪ Discussion and Learner Interaction</li> <li>▪ Feedback</li> </ul>

Table continued...

Table continued...

Se	Workshop	Modules Facilitated (No.)	Date	Type	Activities
9	10 <sup>th</sup> Workshop		26 <sup>th</sup> Apr, 2014		<ul style="list-style-type: none"> <li>▪ Arrive at a consensus on their ST, MT and LT needs</li> <li>▪ Facilitate the learner to individually present her plan for mutual achievement of her short-term goals</li> <li>▪ Facilitate the learner to individually present her plan for mutual achievement of her mid-term goal to be initiated at the end of the project</li> <li>▪ Go back to Activity 1 – <i>Learning Expectations</i> – and complete Part B</li> <li>▪ Discussion and Feedback</li> </ul>

How did learners get meaningful coaching and feedback? By getting feedback immediately and the coaching being specific, need based, and one-on-one. Gaps were ascertained because activities and problems were identified based on needs felt by the learners because their short-term and mid-term goals were identified which were meaningful for the learners.

Each learner received meaningful feedback based on personal and one-on-one interaction and soon after, a review of their answers was completed by their facilitator who was also able to support transfer of learning through feedback given to all the 3 learners. A positive change in behavior in all the 3 learners was recognized after the first 3 workshops. A great improvement in self-confidence in Learner 1 was noticed and a greater amount of goal-focus in Learner 2 was noticed and Learner 3 was able to express written thoughts more succinctly.

The following learning objectives were validated through the above activities:

- Expressing and communicating thoughts clearly in English;
- Creating a personal development and a goal focused action plan;
- Producing a professional portfolio to demonstrate organization skills;

- Creating a plan for prioritization based on importance and urgency of tasks;
- Evaluating approaches to goal setting and reflecting on how to make improvements (resource);
- Interpreting the relationship between personal effectiveness and self-confidence;
- Being clear goal focused and successful at achieving goals;
- Developing and executing successfully and confidently the knowledge they have.

## Evaluation

This involved explaining with evidence, how the whole program / presentation / facilitation was validated before the event and identifying changes made as a result of validation. Questions that were asked before the event were as follows:

- Why will the learners be interested in doing this workshop?
- What should be the goals for this workshop?
- Who are the potential learners?
- How should the learning objectives be achieved?
- Where these workshops should be held?
- Evaluation – How will learners be assessed as having achieved their required goals?

These questions helped validate the following, after the event:

### **Evaluating learner reaction**

This involved the assessment of the aggregate learner reaction based on feedback that was received from learners during various activities that they did, both verbal and written.

### **Evaluating learning objectives**

This was done by writing learning objectives, developing materials, evaluating those objectives, assessing individual achievement of those learning objectives, assessing aggregate achievement of those objectives, and recommending changes based on evaluation of those objectives.

**Key Outputs:** The learning objectives were well created at both skill and knowledge level given the time constraints of the project. Facilitation skills would need to be improved by becoming a better listener.

### **Evaluating transfer of learning**

Evaluating transfer of learning helped in identifying desired performance outcomes, evaluating learning objectives, assessing transfer of learning and recommending changes based on those.

**Key Outputs:** The sources of data were the various activities that were designed and planned from activities 1 to 17 and more conducted through workshops 1 to 10. The achievement of the learning objectives during training was evaluated making use of tools, such as role plays, case study, tests etc. Assessment of performance results was done through evaluation of training. Learning was assessed through learning objectives set out at the beginning – both application and comprehension levels, achieved through various activities designed and conducted during the workshops.

### **Evaluating results**

This was done by identifying measures, assessing results and recommending changes based on those.

**Key Outputs:** Planning on the evaluation of results was done by using the following methods both quantitative and qualitative such as: observation, interviews, questionnaires, group discussions, skill observations, teach backs, action planning, performance reviews, quarterly reviews, peer evaluations, and self-assessments. Assessment results were obtained through the evaluation of the training completed as a result of the achievement of the learning objectives.

For the learning objective: 'expressing and communicating thoughts fluently in English', results were evaluated through oral and written group and individual activities during workshops 1 to 10.

For learning objective: 'learning to become clear goal focused', results were evaluated by creating a personal development plan at the end of a series of activities from 10 to 17 during workshops 1 to 5.

For learning objective: 'developing organization skills', results were evaluated by demonstrating how to develop a professional portfolio in workshops 5 and 6.

For learning objective: 'prioritization of tasks' results were evaluated through activities 3, 4, 7, 8, 10 and 11 conducted from workshops 1 to 4.

For learning objectives: 'approaches to goal setting', 'personal effectiveness and self-confidence' and 'being clear goal focused', results were evaluated through key points discussed on resources that were identified that learners took home as assignments.

For learning objective: 'execute knowledge successfully', results were evaluated through activities 1 to 17 conducted from workshops 1 to 7.

## The Results and Outcomes of Implementing the Strategy

### Effectiveness of Initial Goal Assessment

Asking learners to complete a needs assessments activity as the initial step, helped in preparing for them a set of customized goals with timelines. The need analysis and SWOT analysis helped learners prepare an action plan. All 3 learners achieved short-term goals during the project while mid-term goals were initiated before the end of the project. Each learner also individually created long-term goals to be achieved after the project based on practice gained during the project. Ability to give timely support to each learner and connecting them to resources and right networks based on their action plans, supported development of all 3 learners.

### Effectiveness of Need Analysis

#### Successes

The analysis led to a rich source of information on each of the learner's areas of strengths and weaknesses, opportunities and threats and to a rich source of knowledge, skills, abilities and attributes that helped in evaluating their goals and what their learning objectives should be.

### Effectiveness of the Design Process

#### Successes

Arriving at the learning objectives – both at the application level and

comprehension levels to meet the skill and knowledge gaps of the learners ascertained from the needs, SWOT and KSAO analysis; and then being able to integrate those seamlessly through the 17 activities designed to achieve those learning objectives, was a key success of the design process.

## Effectiveness of Presentation / Facilitation

### Successes

An awareness of the ability to present / facilitate during the project and learning what facilitation actually meant and involved; the true meaning and impact of facilitation on learners and learning and, the extent to which it was carried out successfully during the project process; this in itself was tremendous success.

### Effectiveness of the Evaluation Process

#### Successes

There were many successes, such as evaluation of learner reaction and feedback – both verbal and written and evaluation of learning objectives. The formulation of learning objectives was in itself a major point of success and the activities to achieve those, which helped immensely in the evaluation piece.

## Reflections on Lessons Learnt

In the overall analysis, the project training provided an immense opportunity for learning at different levels that could have never thought to be possible. Although there were several challenges and frustrations that were faced, and several gaps in knowledge and skills that had to be filled up by going through books and learning material that had to be referred to at different stages of this process; yet what was key is the project helped apply the several tools and practical principles of adult learning in an environment very different from a classroom. The project and its' workshop activities' objectives have provided opportunity to link deeper skills and knowledge of adult training gained with personal career goals and aspirations in a very special and unique way meeting individual needs within the same context.

At the end of which, it can be very confidently claimed that success on this journey has been accomplished with more experience being gained than before with the project enabling one become a better facilitator, a better presenter, a better adult trainer, a better instructional designer and a better needs assessor. Humbled also by the knowledge that this journey has only begun, as there is still so much more to accomplish and so much more to learn.

### **Personal reflection**

As a professional adult educator and professor in an educational and academic environment, getting to understand principles of adult training from the perspective of adult education is key. The project tested my personal knowledge and ability to apply those principles learnt outside the context of a classroom, giving me confidence, which was very much needed. This required a lot of hard work, dedication and commitment and made me put in long hours. I was able to learn and grow as an educator and a facilitator through this project and more than this, I was able to create, plan and implement a project plan; designing and executing it successfully and beyond the traditional confines of a classroom using adult learning principles.

It also required me to be responsible for learners' outcomes and goals, to align them to their personal employment goals, which was not an easy responsibility. Finally, it was a coming together of a lot of good intentions and a lot of hard work that made all these goals achievable at various levels. It is beyond belief that I was able to make this a roaring success for all stakeholders involved, myself included.

### **Feedback and Self-reflection**

The project helped align 3 capable women to their professional fields of employment and expertise. Learner 3 got was the 1st one get success and found her job in her area of expertise and mastery: Communication as a 'Communications Coordinator' in TRIEC (<http://triec.ca>) within 3 months of the start of the project, after the 3rd workshop. The 2nd learner was the next to see success and got a permanent job with the Ontario Government

within the Treasury Board Secretariat (<https://www.canada.ca/en/treasury-board-secretariat.html>) after the 8th workshop. The 1st learner worked as a consultant and started her own company (Simplicity IT Solutions) upon the completion of 10 workshops.

The goals of the project and the action plan for the learners were achieved as a result of the meticulous planning that went into this project even before it started. This was possible due to the planning done at the pre-implementation stage and due to timelines that were maintained and adhered to. Although some of the workshops had to be altered in between due to constraints beyond my control, yet it was all possible because of the internal flexibility that was built into the plan. The methodology of the workshops allowed for that flexibility and at the end it was a team effort, without which, this project could not have become such a success.

## **Effectiveness of the Need Analysis**

### **Challenges**

Some of the key challenges faced were while doing the need analysis were especially encountered while determining causes of performance gaps at the job level and organizational level, since the scenario and application were not relevant at the organization or job level. So, this was a challenge. Key outputs here had to be based on past sources and relied on learners' earlier jobs held as each learner / women in their current state were all unemployed.

### **Lessons learnt**

This project would be approached differently a second time and more emphasis would be laid on needs analysis right from the beginning until the end instead of having it as only as one part of the project.

## **Effectiveness of the Design Process**

### **Challenges**

The challenge involved in the design did not begin and end merely with choosing / designing

the activities, or planning / arriving at the learning objectives, but began with designing the project itself, laying out the plan, the before, during and after the implementation plan. The first challenge lay in planning out and designing the details meticulously and implementing them according to the plan. The second challenge lay in aligning the needs of the learners based on the gap / needs assessment done to the learning objectives – both at the application and competency levels and aligning activities to meet those learning objectives appropriately.

### **Lessons learnt**

To put in place a design process that would be more systematic and not work on the design competency as a part of other competencies but work on it as a stand-alone competency only, to be able to derive the maximum learning and benefit from it.

## **Effectiveness of the Presentation / Facilitation**

### **Challenges**

It required a conscious effort and was a challenge many times not to ‘talk to’ and ‘lecture to’ but ‘to listen’ and to ‘facilitate’. Not to ‘impose’ what ‘I thought’ the learners must do, but how best ‘I could help them’ channelize what ‘I think they wanted to do’. Facilitation was walking that thin line between the urge to give the learners all the collective ‘wisdom’ from personal years of experience and holding it all back, and giving them just so much as they needed to know at any given time. Presentation was fairly simple as compared to facilitation. Maintaining an appropriate balance between providing content and allowing learners to participate was indeed the biggest challenge of all. The time constraint of the workshop also added to the challenge.

### **Lessons learnt**

Facilitation is an art that can be cultivated and must be cultivated to bring out the potential of the learners. One makes presentations as a teacher most of the time in life but facilitation is more rare. It is a new skill that needs further

honing and one that needs continued practice for perfection.

## **Effectiveness of the Evaluation Process**

### **Challenges**

The challenge lay in evaluation being not merely a quantitative one but also being a qualitative and a subjective assessment. Added to this was the customized nature of the need analysis and the activities. Each learner had to be evaluated based on her current level of achievement of the learning objectives that could not be evaluated at all times on a quantitative criteria or measure effectively.

### **Lessons learnt**

It is not possible to achieve 100% satisfaction and pinpoint gains when there is a qualitative measure of evaluation, as these tend to be largely subjective.

## **Recommendations to Learning Institutions wishing to Implement a Similar Practice**

The following individual components were considered and these questions may serve as a guide throughout such a process for others, who wish to follow.

### **The context**

This must describe the training opportunity. It must outline the context in which the problem / opportunity is occurring. It must identify factors that will help in the learners’ involvement and factors that may hinder their involvement and must identify the facilitator’s personal learning objectives.

### **Need analysis**

This must involve conducting a topic analysis. It must identify methods of analysis selected and describe the rationale for selection. The facilitator must also ensure that the analysis is comprehensive and that subtasks follows standard verb and noun formats and are clearly presented to the learners.

## Design

This must provide an overview of the session design and must identify the learner profile clearly. It must identify the pre-requisite skills and knowledge, select priority tasks for training and include both application and comprehension level learning objectives. There must be a rationale for the design approach that provides linkages to adult learning principles.

## Presentation / facilitation

Delivery channels must be selected for learners for which clear rationales must be provided. Outlines for a lesson plan must be created showing specific activities and timing for each session showing how learning activities would pan out matching learning objectives. These must include appropriate variety of learning activities that provide optimum opportunities for practice for learners. Learner materials that are appropriate for learners, instructor materials that are appropriate for the design and for facilitators, including job aids may be provide with a high-level overview describing how the session will play out.

## Evaluation

The overall evaluation process must cover the methods – both quantitative and qualitative, sources of data, analysis strategies that the facilitator would be using to evaluate learners. This must indicate how the facilitator will gather data to support reflective practice, feedback strategies, assessment etc.

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# CASE STUDY

## BRIDGING THE GAP BETWEEN INDUSTRY AND ACADEMIA: A CASE STUDY OF ESTABLISHING AMRC-OMAN (SOHAR UNIVERSITY)

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## Abstract

In this paper, the development of “Advanced Manufacturing Research Centre – Oman” (AMRC-Oman) is explored to show its impact on knowledge transfer, capacity building, and economy diversification. The project is a collaboration among Government-Industry-Academia and is based on the public-private sectors partnership. The delivery model of the AMRC-Oman project has taken in consideration the need to deliver the project, at its full operational level, in the shortest possible time. Hence, the project has considered the available resources to Sohar University to meet such goal. The paper also discusses the project’s solid links with the university’s strategic aims and how the university’s future research with impact directions will benefit from the developed infrastructure and facilities provided by this project. In addition, the article also highlights how the project will open new opportunities for the university to offer more graduate, postgraduate, and training programs in the relevant fields of specialty. The paper concludes on the importance of the collaboration of academia, government, and industry to achieve higher beneficial economic and educational impacts.

**Keywords:** Advanced Manufacturing, Industry-Academia Collaboration, Public-Private Sectors Partnership, Manufacturing Capacity Development

## Introduction

For more than a century, Industry and Academia have been collaborating at different levels. Universities are increasingly recognised as important drivers for innovation and sustainable development (Gregersen, 2017). The current market challenge to enable growth of businesses dictates the need for strategic industry-academia partnership. There is no doubt that world-class research universities are successful in the realization of such partnerships. On the other hand, many universities in the world are facing big challenges to establish proper industry-academia collaboration that go beyond the

traditional funding of discrete research projects (Edmondson, 2012). Industry is focused on gaining knowledge that leads to competitive advantage, whereas many universities primarily aim to educate and produce research publications (Dasgupta, 1994). The identification of industry needs and alignment of university research towards such needs are the key elements to ensure the success of industry-academia collaboration. There is always a required budget and transitional time to build the capacity and capabilities at universities to address the industry need. Hence, governmental and other sources of funding are necessary to cover the required budget and reduce the required transitional time, thus enabling the universities demonstrate their readiness to deliver industry-oriented research and consultancies.

In the Sultanate of Oman, the higher education system is relatively young, as the first public university in Oman, namely Sultan Qaboos University, was founded in 1986. Sohar University was established in the year 2001 as the first private university in the Sultanate of Oman. Its main aims are to develop skilled and enterprising graduates and to deliver “Research with Impact” that supports the strategic priorities of Oman. Currently, Sohar University has approximately 7000 students studying for the Degree and Master levels in six different departments, namely Engineering, Business, Computing and Information Technology, Language Studies, Education and Art, and Law. The impact of Sohar University relevant to the population of the country is very high since the population of Oman is just under 2.5 million Omanis. Despite Sohar University being a young university, it has developed its own facilities and infrastructure and has been successful in winning and delivering many research and consultancy grants. Hence, capacity is established in the university-identified research thematic areas.

Oman’s five year development plan 2016-2020 has identified the need to reduce the economy’s dependence on oil and gas. The plan has set a goal for diversifying the economy into other promising sectors including the manufacturing sector.

There are several main upstream industries in Oman, such as manufacture of steel, Aluminium, and plastic. These present valuable raw material resources for utilizing in downstream manufacturing industries. Table 1 shows a list of the production capacities potential and upstream raw material producing industries. On the other hand, despite there being many downstream manufacturing small and medium size firms in Oman, most of the produced raw materials from the upstream industries are being exported. Hence, there is a need to utilize such materials in producing higher value products to help in the diversifying of economy from dependency on oil and gas.

Most of the Omani downstream manufacturing industries are focused on the fabrication of structures and other components/assemblies that do not require high manufacturing precision and where these industries are highly dependable on expatriate skilled/unskilled labor, whereas Oman has set a long-term goal to create more suitable jobs for Omanis.

Precision manufacturing requires high skilled technical workers and engineers. Most of the processes in precision manufacturing are developed to be automated or/and involve computer programming to set and to control the process parameters. Hence, jobs in such a field are less tedious and require far less efforts of unskilled labor. Nevertheless, workers in such jobs are well paid. Hence, if the Omanis are up skilled, precision manufacturing jobs will be suitable for them.

Establishment of precision manufacturing industries requires investments, promising markets, supportive infrastructure, supportive regulations, and incentives, easy access to raw materials and production requirements, and availability of ready and suitable human resources. Table 2 shows the main manufacturing threads and how these can be overcome or minimized. For any successful project in manufacturing, all these threads should be addressed and overcome.

**Table 1 Main upstream industry in Oman to support downstream manufacturing**

	<b>Upstream Industry</b>	<b>Main Producing Company</b>	<b>Annual Production Capacity</b>
1	Steel making	Jindal Shadeed Steel Sohar Steel Muscat Steel	2 Million Tons
2	Aluminiumsmelting	SoharAluminium	400 Thousand Tons
3	Plastics/Polymers production	Liwa Plastics OMPET OCTAL	Approx. 2.25 Million Tons

**Table 2 Main manufacturing threads and how their effects can be eliminated or minimized(Manufacturing Readiness Level (MRL) Deskbook, 2015)**

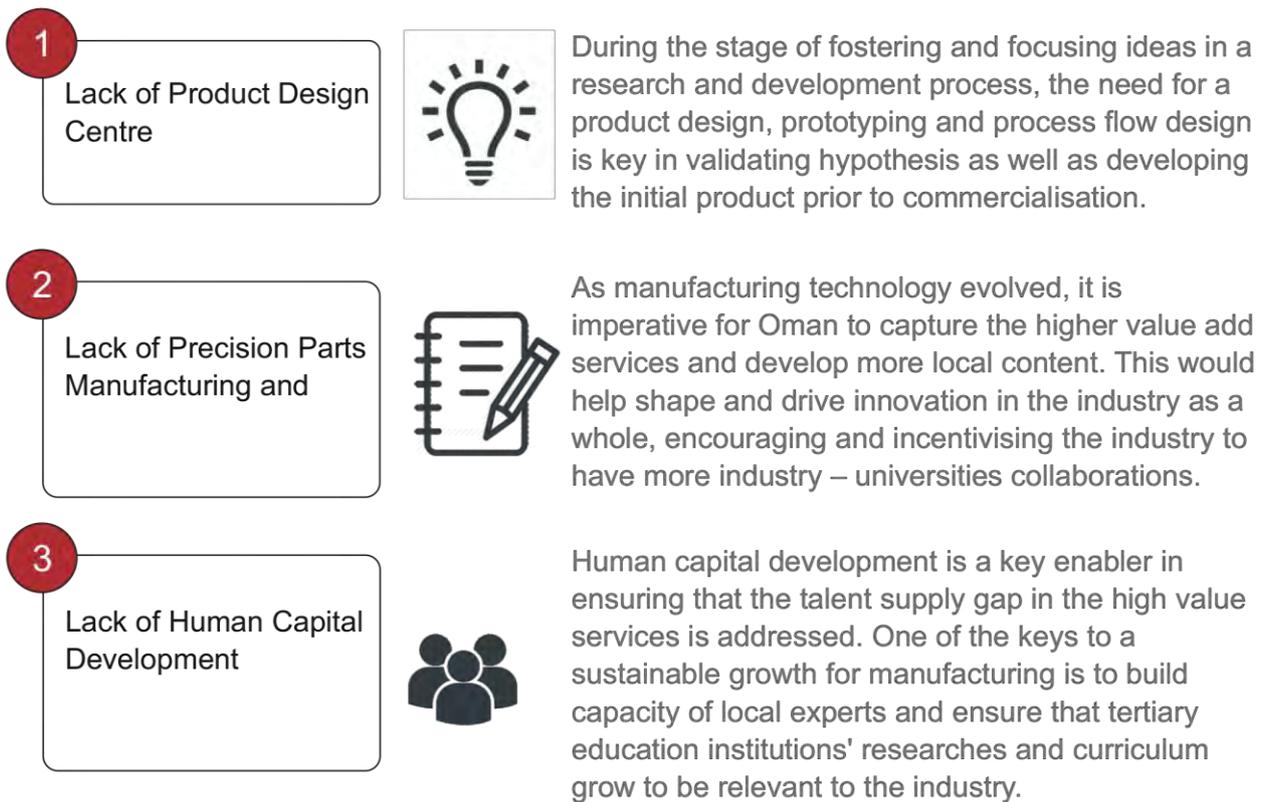
	<b>Thread area</b>	<b>Required actions</b>
1	Technology and industrial base capabilities	Requires an analysis of the capability of the national technology and industrial base to support the design, development, production, operation, uninterrupted maintenance support of the system and eventual disposal (environmental impacts).
2	Design	Requires an understanding of the maturity and stability of the evolving system design and any related impact on manufacturing readiness.
3	Cost and funding	Requires an analysis of the adequacy of funding to achieve target manufacturing maturity levels. Examines the risk associated with reaching manufacturing cost targets.
4	Materials	Requires an analysis of the risks associated with materials (including basic/raw materials, components, semi-finished parts, and subassemblies).
5	Process capability and control	Requires an analysis of the risks that the manufacturing processes are able to reflect the design intent (repeatability and affordability) of key characteristics.

*Table 2 continued...*

Table 2 continued...

	Thread area	Required actions
6	Quality management	Requires an analysis of the risks and management efforts to control quality, and foster continuous improvement.
7	Manufacturing personnel (work force)	Requires an assessment of the required skills, availability, and required number of personnel to support the manufacturing effort.
8	Facilities	Requires an analysis of the capabilities and capacity of key manufacturing facilities (prime, subcontractor, supplier, vendor, and maintenance/repair).
9	Manufacturing management	Requires an analysis of the orchestration of all elements needed to translate the design into an integrated and fielded system (meeting Program goals for affordability and availability).

**Figure 1 Lag of infrastructure limits the manufacturing innovation efforts in Oman.**



There is a clear correlation between innovation and success in growing revenues (Misthal, 2013). Figure 1 shows summary of the main lags of infrastructure that limits the innovation efforts in the area of precision manufacturing in Oman. Therefore addressing such lags will considerably help in diversifying the economy.

Thus, to encourage investments in the area of precision manufacturing, there is a need to develop a well-established echo system within the country. This can be achieved by implementing projects that act as enablers to

overcome all threads and obstacles hindering the establishment of proper precision manufacturing industries to enable them compete locally and globally.

### AMRC-Oman

Having come to know the available resources, the industrial need, and the University research capacity and strength, Sohar University has responded to the country's need by deciding to establish the "Advanced Manufacturing Research Centre - Oman" AMRC-Oman.

This project bridges the industry-academia gap and supports economic diversification through (see Figure 2):

- Provision of technology capability in advanced manufacturing through world-class facilities in design, machining, prototyping and proving pre-mass production.
- Capacity building and delivery of a technical skills training programmes for human resource development
- Oman private sector development

AMRC-Oman is an enabler project to facilitate the development of precision manufacturing sector, through downstream production from existing major industries which include aluminium, steel, composites and oil derived products (i.e. polymers).

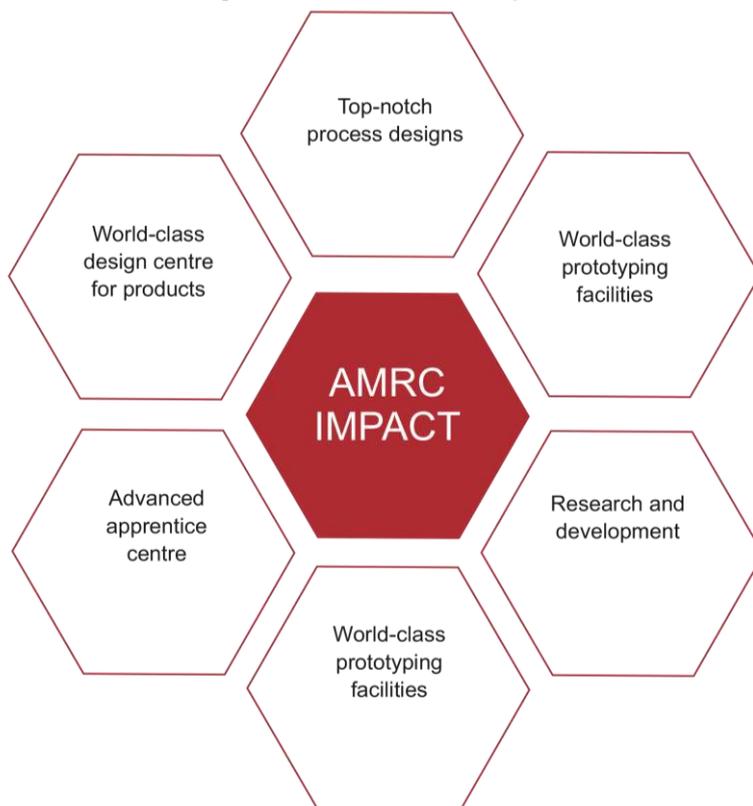
The centre would attract foreign direct investment and support Oman’s development of small and medium businesses by de-risking investment, providing access to design and for prototyping pre-production. This would lead to the development of a cluster of world-class advanced manufacturers with access to 400 million consumers in GCC and MENA. The

proposal draws upon the experience of the Advanced Manufacturing Research Centre at the University of Sheffield. Nevertheless, the proposal also has benefited from the experience of other centers around the world.

High-value manufacturing areas that AMRC-Oman is expected to support have been identified as follows:

- Dies and Moulds for Plastics and Packaging Industries: In Oman, there are 100+ plastics/polymers products and packaging industries. However, those companies depend on importing all of the required production moulds, dies, and other tools. Currently, there are no facilities in Oman to design and produce such essentially required production tools. This area of manufacturing support is selected to be one of the main application areas that AMRC-Oman will address. Hence, technology assessment and proving as well as the design and manufacture of moulds, dies, and other production tools will be handled by the AMRC-Oman. More about this specific point will be discussed in a coming section of this article.

Figure 2 AMRC-Oman Impacts



- **Oman Rail Network Project:** Oman Rail project is one of the largest projects in Oman. When the Railway system becomes operational, AMRC-Oman will provide specialized high-value products and services to serve the rail network and its related industries.
- **Military Industries:** AMRC-Oman will contribute to military industries through research and technical support.
- **Oil, Gas, and Energy:** AMRC-Oman will support developments through high-value products and ensure the industry maintains its market position. One of the emerging applications that AMRC-Oman has started to address is the “Grow Domes-Oman” project. This project is developed specifically to help the agriculture sector in Oman expand by using protected/covered state of the art agriculture technology that is integrated with renewable energy-based systems to over-come the harsh weather and shortage of freshwater and hence help in food security in Oman.

Once the AMRC-Oman becomes fully operational, there is a range of other industries that can benefit from its facility and capacity.

The main technology focus at the first phase of AMRC-Oman will be on:

- Machining
- Assembly
- Material development
- Design and prototyping
- Logistics

It is anticipated that the AMRC-Oman will generate higher value products to bring the upstream products, such as Steel, Aluminium, and Plastics into better utilization in downstream industries. This will create more jobs, contribute to the Oman’s GDP, and possibly bring more investments. Possible future plans to integrate the project with a wider technology/industrial park are also suggested to provide an insight on higher potential of the project.

To enable the benchmarking of the proposed AMRC-Oman with other world-class centers, the “Manufacturing Technology Centre” (MTC) in Coventry, UK is selected to be a comparison base with AMRC-Oman. Figure 3 provides a summary on the benchmark outcome.

**Figure 3 Benchmark Summary of the AMRC-Oman with MTC at Coventry**



#### **MTC project summary**

- Established in 2010 with the objective of bridging the gap between academia and industry. MTC develops and provides innovative manufacturing processes and technologies.
- It represents one of the largest public sector investments in UK manufacturing. A grant of £40m was awarded to its first stage development.
- The project is developed over four years of planning and a 16-month build of 12000m<sup>2</sup>.
- The centre focuses on component manufacturing, assembly, testing (i.e. Metrology & NDT), apprentice and training (100 annually), and manufacturing operations efficiency.
- The MTC provides a high quality, low risk environment for the development and demonstration of new technologies on an industrial scale.
- The centre has started in 2011 with high skilled 44 staff. In 2015, its staff has reached 500. MTC has planned to raise the number of staff to 1,000 within five years.
- MTC partners are 50 that include most of the leading UK industries.
- MTC revenue after 2 years of full operation was £3.5m from research work and the plan was to achieve £15m in their 3rd year of operation.

*Figure 3 continued...*

### Key success factors

- Governmental investment and support.
- Industrial partnership plan.
- Focus on state of the art manufacturing technologies.
- Include apprentice training program.
- High skilled staff.
- Linked with Universities.

### Similarity with AMRC-Oman project

- All the above key success factors are addressed by the proposed AMRC-Oman project.
- The AMRC-Oman will start with far less governmental investment.

AMRC-Oman will benefit from the AMRC-Sheffield's experience and lead on the development of its own research areas that will complement existing research activities being undertaken in other AMRC Centers. Hence, AMRC-Oman will serve as an important hub to attract major international manufacturers to make their first footprint in Oman. Some of the expected results from establishing AMRC-Oman are as follow:

- Maintaining a world-class community for research, design, manufacture
- Having a manufacturing capability for showcasing best practices, tools and techniques associated
- Being a global centre for the benchmarking of tools and techniques
- Developing knowledge-based simulation tools and techniques
- Incubating and spinning out technology to raise the performance of both local and national manufacturing companies
- Developing vocational engineering student programmes

The project is totally in line with the Sohar University strategic plan where the "Research with Impact" is set as one of the University goals to achieve. Sohar University has identified the following research areas to focus on:

- Advanced and Emerging Technologies.
- Industry and Enterprise
- Environment
- Connecting Communities

Hence, there is a solid link between the AMRC-Oman project and the strategic goals of Sohar University. The project will open new dimension for more advanced collaboration between Sohar University and industries in Oman where the developed facilities of the AMRC-Oman will provide valuable support to the industries. On the other hand, Figure 4 provides a summary on the benefits gained from the establishment of AMRC-Oman within Sohar University campus.

### Realization Plan

Projects should document the Manufacturing Readiness Level both at the start of the project and the targeted levels at the end of the project (De Baas, 2013). This project has benefited from the AMRC-Sheffield experience in planning its realization. The Sheffield experience suggests that the followings provide best options to the successful establishment of an innovative cluster of manufacturing companies:

- An applied research centre operating at "Manufacturing Readiness Levels" (MRL) levels 4 to 7, (see Figure 5 (Manufacturing Readiness Level (MRL) Deskbook, 2015)), in what has become known as the "valley of death" (National Research Council, 2004). This will take research to the point where it becomes useful to industry.
- A business incubator with office and workshop facilities and a training facility tied to a university, together with sufficient land to build new factories.

Based on the above, a plan is developed to establish the AMRC-Oman in two phases. In

Phase#1, the AMRC will be incorporated in Sohar University, which has existing facilities that can be leveraged on. This phase of the project is planned to be based on the public-private sectors partnership. Governmental funding is essential to support the capacity building and provide the seed to the development. Figure 6 provides summary of the expected output from this phase.

**Figure 4 Why AMRC-Oman is to be located at Sohar University campus**

-  Close to Sohar Industrial area and port
-  Ready premises to establish the centre (i.e. no construction and land are needed)
-  Support from skilled academic staff, engineers, and technicians as well as other supporting staff
-  AMRC-Sheffield has agreed with Sohar University to provide support in the development of AMRC-Oman
-  Existing 20 testing labs and workshops complement this project
-  Enhance student experience in real manufacturing activities through industrial related projects

Once Phase#1 of the project is delivered and the AMRC-Oman becomes fully operational, Phase#2 of the project will establish “Advanced Manufacturing Park” in a nearby location within the Sohar industrial area which is close to main raw materials producers (e.g. Steel, Aluminium, Plastics). Private sector investors will be the main source of funding to establish this phase of the project. Figure 7 shows a summary on the expected outcome from this phase of the project.

The project plan was presented to the Omani government and discussed in detail. Accordingly, the government has decided to fund this project with a total fund of 13 Million US\$ whereas Sohar University provides in-kind support to the project (including the use of

workshops and other required offices and spaces) with an estimated value of 26 Million US\$. Hence, the project implementation has already started and Phase#1 is expected to be fully operational within 18 months.

**Figure 5. The Manufacturing Readiness Levels (MRL) (Manufacturing Readiness Level (MRL) Deskbook, 2015)**

Phases	MRL	Definition
Operations and Support	10	Full Rate Production demonstrated and lean production practices in place
	9	Low Rate Production demonstrated. Capability in place to begin Full Rate Production
Engineering and Manufacturing Development	8	Pilot line capability demonstrated. Ready to begin low rate production
	7	Capability to produce systems, subsystems, or components in a production representative environment
Technology Development	6	Capability to produce a prototype system or subsystem in a production relevant environment
	5	Capability to produce prototype components in a production relevant environment
Material Solutions Analysis	4	Capability to produce the technology in a laboratory environment
	3	Manufacturing proof of concept developed
	2	Manufacturing concepts identified
	1	Basic manufacturing implications identified

## Examples from AMRC-Oman Adopted Applications

### Design and Manufacturing of Dies and Moulds

Dies and moulds are essential manufacturing tools for most product industries. They are considered as high value industrial products. Currently there is no specialized facility in Oman to design and manufacture dies and moulds, hence all dies and moulds are imported with an estimated value of 25 Million US\$ annually. AMRC-Oman has adopted the design and Manufacturing of dies and Moulds as one of its main application areas. This is expected to open

many opportunities to establish SMEs and downstream industries. It will also open doors to recondition used or damaged dies and moulds. AMRC-Oman will upskill Omanis in the advanced manufacturing field of specialty to enable them design and manufacture of dies and moulds. Nevertheless, AMRC-Oman will establish a pilot scale manufacturing facility to produce twenty dies and moulds annually. Once successfully delivered, the facility can be expanded to full scale production of 200 dies and moulds per year. The facility will have opportunities to further expand (based on demand) in the same field as well as the manufacturing of precision products and machinery spare parts.

**Figure 6 Summary of the expected output from Phase#1 of the project**

<b>Facility 1: Prototyping and machine tools workshop</b>
<p><b>Required:</b></p> <ul style="list-style-type: none"> <li>• Minor alterations to the available workshop space</li> <li>• Equipment order and installation</li> <li>• Up to 11 staff will be recruited for this facility in the first phase</li> </ul> <p><b>Outcome:</b></p> <ul style="list-style-type: none"> <li>• Operational prototyping and precision manufacturing facilities</li> <li>• Handling industry innovation for commercialization and R&amp;D projects</li> </ul>
<b>Facility 2: Design Centre</b>
<p><b>Required:</b></p> <ul style="list-style-type: none"> <li>• CAD/CAE/CAM systems facilities, 3D geometrical scanning facilities, and drafting and prototyping facilities.</li> <li>• Up to 5 staff will be recruited in the first phase.</li> </ul> <p><b>Outcome:</b></p> <ul style="list-style-type: none"> <li>• Properly produce detailed product design and “Design for Manufacturing” approvals to support existing and new SMEs.</li> </ul>
<b>Benefit of having the facilities in this phase of the project</b>
<ul style="list-style-type: none"> <li>• Provide product design and product prototyping facilities (the first centre of its kind in Oman) to support industrial innovation.</li> <li>• Provide a hub for precision manufacturing which open doors for producing higher value products.</li> <li>• Setup proper apprentice facility for precision manufacturing.</li> </ul>

**Figure 7 Summary of the expected output from Phase#2 of the project.**

<b>Facility 1: Permanent location of design and prototyping centre</b>
<b>Facility 2: Apprentice training centre</b>
<b>Facility 3: Precision manufacturing workshop</b>
<p><b>Required:</b></p> <ul style="list-style-type: none"> <li>• Suitable land to be allocated to this phase of the project</li> <li>• Design and construction of the premises</li> <li>• Full set of work permits</li> <li>• Relocate the Phase#1 facilities to the new premises</li> <li>• More staff will be recruited.</li> <li>• Order of additional equipment</li> <li>• Develop and commission the part reconditioning technology.</li> <li>• Developed training program will be delivered periodically to up-skill the staff.</li> <li>• Sohar University continues to support this facility for certain agreed duration.</li> </ul> <p><b>Outcome:</b></p> <ul style="list-style-type: none"> <li>• Skilled product designers, technologists, trainers, technicians</li> <li>• Fully operational professional product design, product prototyping, precision machining facilities, proper apprentice centre</li> </ul>
<b>Benefits of having this facility</b>
<ul style="list-style-type: none"> <li>• Act as national centre of excellence in precision manufacturing.</li> <li>• Support industrial innovation, prototyping, pre-production stage towards implantation and commercialization.</li> <li>• Deliver proper precision manufacturing apprentice program.</li> <li>• Act as a hub to attract major international manufacturing companies to make their first footprint in Oman</li> </ul>

The expected outcomes from AMRC-Oman in this application area are:

- Support the operational sustainability to more than 150 companies.
- Boost the establishment of new production lines and introduce new products to the market at existing companies and also for new SMEs.
- Encourage new investments in the downstream especially in the plastic sector and establishment of new SMEs
- Capacity building in the human resources to produce experienced die and mould designers, technologists, and technicians.

### Grow Domes-Oman for Food Security

Covered/protected agriculture is perhaps one of the best options for Oman to expand its

agriculture sector. However, to make such agriculture technology successful, there is a need to overcome the problems of harsh weather and shortage of fresh water.

The severe shortage of fresh water and hot weather conditions in Oman are considerably hindering the real need of expanding the agriculture sector. If feasible, solutions can be found to overcome these conditions and Oman can progress towards achieving food security.

Sohar University in collaboration with the University of Sheffield has been awarded 0.5 million US\$ funded by the British government to conduct a research project in the area of food security. The grant is part of the UK-GCC institutional links program, which is run by the British Council. The project concerns the development and demonstration of an innovative method for the expansion of agriculture that

significantly reduces fresh water consumption. The collaboration will build the in-country research capacity and in the medium term demonstrate the technological and business potential for a sustainable, resource-efficient 'soil-less agriculture sector' optimized for the environmental and market conditions in Oman.

The project idea has been developed specifically to help the agriculture sector in Oman expand by overcoming of the harsh weather and shortage of fresh water. The project concept is based on applying the state of the art agriculture technology to "Grow-Domes" as an application of protected crop growing, while these grow-domes are equipped with renewable energy-based water desalination, evaporative cooling, and irrigation systems. Once the project is successfully completed, it will open doors to design modular tailored-to-order size grow-domes that are equipped with the developed technologies. These can be produced and used in Oman as well as providing excellent opportunities for their export to GCC and MENA.

## Conclusions and the Way Forward

In this article, we have discussed the realization of the AMRC-Oman to help in achieving knowledge transfer, capacity building, and economy diversification. The project is shown to be a successful case of collaboration among Government-Industry-Academia using public-private sectors partnership model. The governmental funding support has provided the seed to pave the way towards the establishment of the project. There are strong links between this project and the strategic goals of Sohar University as the project is in line with the University's identified thematic research areas. In addition, the successful delivery of this project will unlock new opportunities to Sohar University to offer more graduate, postgraduate, and training programs in the relevant fields of specialty, benefiting from the developed infrastructure and facilities provided by this project. On the other hand, the plan to establish Phase#1 of the AMRC-Oman at Sohar University meets the requirement to deliver such project to

its full operational level, in the shortest possible time by leveraging its available testing labs, workshops and other infrastructure facilities. The adopted applications to be delivered by this project, such as the Grow Domes-Oman and Dies and Moulds address the real need of the country and help to diversify the economy.

The Phase#1 of the project has now put on a well-defined track towards its successful delivery; however, the project teams are determining the best available opportunities to help in the delivery of Phase#2 of the project.

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# CASE STUDY

## FLOWERING IN THE DESERT: GROWING EMPLOYABILITY AT MENA HEI



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## Abstract

The key purpose of higher education institutions has been keenly focused on preparing graduates who are not able to secure jobs, but they have the right ingredients that empower them to move smoothly across different careers during their working life.

Since its establishment in 2008, Bahrain Polytechnic has pursued its mission of producing work-ready graduates to cater for the labor market needs as part of the national education reform initiatives. This paper charts the efforts to develop and embed employability at Bahrain Polytechnic, from the initial launch of the Bahrain Polytechnic Employability Skills Framework in 2010 to the review, re-conceptualization, and enhancement of the framework in 2016.

The initial framework, approved in 2010, was informed by Australian practice and comprised eight core employability skills: teamwork, problem solving, communication, initiative and enterprise, planning and organizing, self-management, learning, and technology. As Bahrain Polytechnic's mission clearly emphasizes the readiness of graduates to meet labor market needs and their attainment of 21st century skills, local industry was consulted on identification and description of these skills with the aim of ensuring their relevance to Bahraini employers.

During an institutional review in 2015, it became clear that the framework was neither as holistic nor as embedded as initially anticipated. In consultation with academic and administrative staff across the institution, two key aspects were identified as missing.

Firstly, there was a lack of a clear definition of Employability institutionally, which meant that the term was open for interpretation among staff members. As definitions have progressed considerably during the past twenty years, moving from demand-led skill sets towards a comprehensive perspective of 'graduate attributes', the inherent challenge was to establish a comprehensive understanding of

employability and its definition among the Polytechnic stakeholders. The second aspect identified was the lack of understating of what a framework meant in terms of conceptualization and applied practice. By agreeing to a conceptual framework, a coherent link between the theories underpinning the practice could be established. This framework led to the development of a meaningful model which united the concepts, created a visual map, and illustrated their complementary function in an accessible artifact.

This paper documents the progress to date in reifying Employability by working to the Higher Education Academy (HEA UK)'s guidelines for defining and developing an institutional approach to Employability. It describes the process undertaken, from the initial training with the HEA UK in June 2015, through the planning, consultation, analysis, reporting, and mapping to the final model of a contextualized framework – The Bahrain Polytechnic Learner Employability Framework (2016). It shares the progress made in working to embed Employability, presents the conceptual model, and reports on the implementation of training and development activities to support the dissemination of the work.

Our paper addresses key stream 2 of Improving Graduates' Employability through Innovative Curricula, meeting the sub-theme of improving faculty and teaching staff skills to support employability.

**Keywords:** Employability; Teaching and Learning; Higher Education

## Introduction

As the mission and vision of higher education institutions has become increasingly more labor-market focused, it is incumbent upon teaching and learning leaders to ensure a holistic approach to the construction and embedding of appropriate frameworks to support the development and acquisition of work skills, competencies and attributes in graduates in preparation for their entry into the global workplace.

*Embedding employability into the core of higher education will continue to be a key priority of Government, universities and colleges, and employers.'*  
(HEFCE, 2011)

In the 21st century, the core purpose of higher education institutions globally has been keenly directed towards preparing graduates who are not just able to secure jobs, but also have the right skills to enable them empower themselves to navigate their working life with ease, moving seamlessly from post to post, building their career during their working life.

Accordingly, Bahrain Polytechnic was established in 2008 by Royal Decree with the specific purpose of preparing work-ready graduates to respond to labor-market needs as part of the national education reform initiatives which in turn are intended to support the 2030 vision for the Kingdom of Bahrain. In short, Bahrain Polytechnic aspires to being known for the quality of its graduates (Bahrain Polytechnic, 2013) as competent, confident, and creative individuals who possess the relevant skills to gain employment and who are able to achieve their full potential and contribute to economic success and enterprise development. Logically, the development of a sustainable framework to ensure the attainment of this mission was crucial at the time of establishment.

## Initial Focus on Employability

The original Bahrain Polytechnic Employability Skills Framework, approved and launched in 2010, was conceptualized drawing on the model established in Australia (2006) and consisted of eight core employability skills: *teamwork, problem solving, communication, initiative and enterprise, planning and organizing, self-management, learning, and technology*. As Bahrain Polytechnic's mission has always emphasized the readiness of the graduates to meet the labor market needs through attainment of skills needed for 21st century, the initial scoping phase of the work (2009) was conducted in consultation with local industry to ensure that skills identified were relevant to

Bahraini employers and determined by the needs of the time, with the aim of ensuring their relevance to Bahraini employers and potential graduate employees. The framework was developed during 2008 and 2009 and approved by the institution in 2010.

In 2015, further to attending training in staging and benchmarking the development of Employability (Higher Education Academy UK) hosted by the Bahrain Higher Education Council, a cycle of institutional review was undertaken to interrogate Employability at Bahrain Polytechnic both in terms of institutional and individual awareness, systemic embedding at curriculum level and the institutional understanding of the reach, adoption and implementation of the framework in place.

## Defining Employability

As outlined by Cole and Tibby (2013), employability definitions have evolved from the preference for demand-led skill sets towards a comprehensive perception of 'graduate attributes' that include 'softer' transferable skills and person-centered qualities, developed in conjunction with discipline-specific knowledge, skills and competencies. Many models (Bowden et al, 2000; Knight & York, 2004; Dacre, Pool & Sewell, 2007; Bridgstock, 2009) advocate for the embedding of employability through learning opportunities in higher education institutions, a model which Bahrain Polytechnic developed as part of its initial benchmarking activity shortly after set-up.

In referencing Employability at Bahrain Polytechnic, the focus has been since inception on tangible scaffolding elements and practices that are believed to augment employability in learners, bench marked against international practices. The main teaching and learning approach at the institution is the Problem-Based Learning (PBL), adopted to enable learners to develop and build generic skills while, at the same time facilitating subject-specific (or discipline-based) knowledge and skills (Moore and Poikela, 2011; Kek and Huijser, 2011).

Moreover, since Bahrain Polytechnic is an applied higher education institution, it has endeavored to adopt an authentic hands-on approach to provide the touch and feel for its learners before releasing them to the world. As per the Australian National Strategy on Work Integrated Learning (WIL) in University Education, the integrated industry-focused approach to pedagogy has also been identified as a way to support the transition of learners between preparing for and functioning in a specialized work place that necessitates more than subject-specific knowledge. By exposing the learners to real workplaces, there are multiple opportunities for building practical experience that enhances curriculum-gained knowledge, allowing the student to contextualize knowledge and improve employability. The canon of literature shows a correlation between career advising and economic benefits, both for the individual and the economy as a whole (Bysshe et al., 2002; Killeen & White, M. 2000). Likewise, Dacre Pool & Sewell (2007) emphasize career development learning in their model of employability which reflects the importance of preparing the individual for the job. The significance of reflective practice in self-regulating the attainment of the required knowledge, skills and attributes for the job is also highlighted in the literature as key to the successful acquisition of a relevant and flexible skill set for employment. As Hinchcliffe and Jolly (2011) attest, understanding graduate identity is crucial in better understanding employability from the employer's standpoint, a key consideration in any employability-related endeavor then, should be the inclusion of employer's concerns and feedback.

## Aim and Objectives

The aim of the institutional consultation research project was to conduct a study to investigate the understanding, perceptions, and practice of employability of Bahrain Polytechnic staff.

The objectives of the study were:

- To identify and describe the experience of e-portfolios by stakeholders

- To document the accounts of experience of practice of the participants
- To investigate the relevant literature on employability
- To consider the implications of the experience and practices around employability for further practice at Bahrain Polytechnic

## Methodology

The authors of the work embarked upon a qualitative study to garner perceptions of practice and understanding of Employability of all staff at the Polytechnic. Participants in the study were sampled purposively – the single criterion for inclusion was employment at Bahrain Polytechnic in either and allied (administrative) or academic (teaching or support staff) roles at the time of the study. In this way, the intention was to extend the reach of the investigation as broadly as possible across the institution and so capture as many views as possible.

## Focus Groups

A schedule of consultation sessions was devised and the subsequent Education Discussion Forum (EDF) Series was rolled out in August 2015 with the initial phase completed in December 2015. A second phase was run between January 2016 and June 2016 to ensure flexibility and openness of access to all participants. The aim of the EDF series for consultation was to garner perceptions of employability to determine awareness of theory, practice, and application at Bahrain Polytechnic. Participation in the EDF sessions entailed responding to a series of open-ended questions posed to capture views and perceptions of institutional Employability practice, activity and understanding. Participants were encouraged to respond to the questions in the way that they felt most conformable – some preferred to agree to a series of responses in groups, while others worked in pairs. A small number of the total participants preferred to respond to the questions on an individual basis.

## Data Generation

Participants were invited to register through the institutional intranet for a single ninety-minute focus group session at a time of their choice. The interview groups were led by the researchers with the support of two administrative staff to facilitate discussion and assist with note-taking. All responses during the sessions were transcribed by the researchers. Participants were briefed prior to the sessions regarding the nature of the focus group. In total, 188 staff participated in 16 ninety-minute focus groups during a nine-month period. The average number of participants numbered 15, with a maximum participation of 35 and a minimum of two.

## Collation and Analysis of Data

The analysis drew on open coding of the qualitative data to identify the emerging predominant themes. To ensure anonymity, participants were given a coded gender-neutral moniker in reporting and transcription. The data was manually open-coded to ascertain emerging themes. A second stage of coding was conducted to distil the data into more specific points of recommendation.

## Results

Almost all participants who registered attended the sessions (188 attendees of 201 registered).

82 of the participants were male and 106 female. Participants represented all five allied (administrative) departments and all three faculties. The majority of the participants self-defined as academic (58 per cent). All hierarchical levels of staffing accounted for participation - Executive Managers, Senior Managers, Deans, and Directors, Teaching staff, support staff and allied staff from all departments.

## Emerging Themes

The results indicated mixed levels of practice and awareness of employability at Bahrain polytechnic.

- a) Employability is perceived as an important driver of teaching and learning by staff
- b) There is an understanding of the core concepts of employability amongst the majority of staff, with knowledge of the links between work-ready graduates and approaches to teaching and learning
- c) There is no framework to support staff in developing awareness of concepts and practice
- d) There is no institutional repository for employability to support compliance and enhancement
- e) There has been very limited training in employability at Bahrain Polytechnic
- f) There is little or no marketing of employability (internal / external)

It became clear that the original framework was neither as holistic nor as embedded as initially anticipated. In consultation with academic and administrative staff members across the institution, two key quality-related aspects were identified as missing from the framework.

Firstly, there was a lack of a clear definition of Employability institutionally which meant that the term was open for interpretation among staff members. As definitions of employability have progressed considerably during the past twenty years, a more holistic and attribute-led conceptualization, the results of the study speak to the inherent challenge for all HEIs to establish a comprehensive understanding of employability and its definition among stakeholders.

The second aspect identified was the lack of understating among staff members of what a

framework means in terms of conceptualization and applied practice. In agreeing to a conceptual framework, it is possible to establish a coherent link between the theories underpinning the practice.

The cycle of work initiated at Bahrain Polytechnic in June 2015 to support the initial activity completed in the set-up phase of the institution has effectively enabled the development of a more holistic framework of practice for employability. In conducting and extensive review and remodeling of the framework, the Polytechnic continues to reflect on ways in which it can effectively meet its mission of producing work-ready graduates by delivering an accessible and flexible framework to assure teaching and learning for employability.

In essence, the data indicated that there was awareness, commitment and conceptualization of employability and employability practice was embedded at faculty level to various degrees. By clustering the data into themes in the second stage of analysis, there was evidence to suggest that some of the staff were regional experts in Employability research, while others had extensive knowledge of both theory and practice. Equally, it was apparent from many of the responses that some staff, while versed in the notions of employability, were keen to know more, and wished to help our institution become fully employability-focused.

To address these two quality-related aspects, an extensive redevelopment of the model informed by the practice, views, and knowledge of our HEI community was undertaken

## Redevelopment of the Learner Employability Model

In order to re-conceptualize the model, the initial findings were assumed as informing the design. By mapping practice against the HEA UK's framework for developing employability, it was possible to initiate stage two.

## Bahrain Polytechnic Employability Framework

### Framework

A framework may be defined as an entity which is more than the sum of integral tools, elements or parts which are practical in nature and support the implementation of a work stream. A conceptual framework connects assumptions and principles which may articulate a phenomenon and more specifically how the occurrence of that phenomenon may be realized. In this way, and as per the recommendations which emerged during the consultation process, a framework which groups all the institutional activities and practices supporting Employability and which illustrates the relationships between the component parts has been developed for Bahrain Polytechnic.

Educational beliefs may be defined on the basis of a conceptual framework. The most frequently used approach in providing descriptive interpretations of education dynamics is the so-called productive system, in which learning opportunities are provided and assured by a robust system in place.

Bahrain Polytechnic engaged a conceptual approach to create an Employability framework which reflects the systems and services provided in-house to aid the development of learner's employability. As per McQuaid & Lindsay (2005) the framework embodies a range of activities which support and guide the learner towards the goal of achieving and acquiring the competencies and qualities required for employment and beyond. Moreover, based on an extensive review of literature, the framework has been developed to comprise two main underpinning aspects of the institution – Learning Opportunities and Assurance of Learning; or those systemic events and practices, which when combined represent mandatory and non-mandatory agents that mediate the learner experience and represent the processes that learners experience during their time spent at the Polytechnic.

Drawing on Bourdieu's (1986) notion of multiple capitals, Bahrain Polytechnic recognizes the learners' individual self and potential variance and disparity in basic transferrable skills, personal (established) competencies, qualifications, and individual circumstances of incoming learners. Therefore, alongside the systems that support learners at institutional level, Bahrain Polytechnic acknowledges the external 'unmodifiable' environment, which has a great influence in developing learner's employability outside the institution. The external environment includes local, regional, and international communities. In acknowledging the composition of those communities and their impact on the learners - industry, family, government, friends, and associations are recognized as external factors that encompass the external environment and shape learners' employability significantly. In this way, the emphasis has been on reassessing and presenting the entire model of practice at Bahrain Polytechnic.

In order to develop an institutional definition for employability the relevant literature was reviewed in the search for a description which was suited to the context of Bahrain Polytechnic. In reviewing the multiple definitions available, it was apparent that the meaning of employability has evolved over time. Robbin (1963) emphasized the objective of providing instruction in skills suitable for playing a part in the general division of labor. Dearing (1997) linked employability to the attainment of skills via education which supports the development of students for potential employment. A large swathe of the literature focuses on skills only for addressing employability, which implies a narrow perspective of the concept (McQuaid & Lindsay, 2005). Equally, the notion which started with the principle of the ability to secure a job has morphed gradually to include the development of individuals within their place, and latterly has begun to articulate the concept of moving from one career to another (Cole & Tibby, 2013).

In debating and deciding on an institutional definition of Employability for Bahrain Polytechnic, two definitions were initially proposed to the Academic Board. There was significant support of Lowden et al (2011) definition of Employability Skills as:

'the acquisition of skills and attributes that allow the individual to secure and maintain employment, to develop within a particular job and have the ability to move on to new sustainable employment if required' as well as 'the possession of particular knowledge, skills and attitudes with an ability to deploy them and market them to employers.'

Ultimately, the definition adopted by the Polytechnic was that of Yorke and Knight (2002). Their description of Employability Skills as:

'a set of achievements – skills, understandings and personal attributes – which make graduates more likely to gain employment and be successful in their chosen occupations, which benefits themselves, the workforce, the community and the economy' was felt to be congruent with the institutional understanding of Employability.

The process-led design stage consisted of identifying areas of practice and activity at the Polytechnic, which had been identified in the focus groups, mapped against four core areas – Teaching and Learning, Quality, Evaluation and Feedback and Pastoral Care. The subdivisions within the model address input and output in terms of mandatory and non-mandatory activity – curricular and co-curricular activity. In designing the model, importance was given to identifying all stakeholders, environments, tensions mediating forces that bring to bear upon the institutional Employability activity. The model was further developed in additional consultation with senior management resulting in a single-page infogram (see Fig.2).

**Figure1: – Bahrain Polytechnic Learner Employability Model, 2016**



**Figure 2: Stages and Phases of Consultation and Review at Bahrain Polytechnic**

Stage as per HEA UK Framework for Approach to Employability	Stage	Dates	Activity
<b>One: Defining</b>	Review	June - August 2015	Literature review Document analysis
	Benchmarking	August 2015	
	Consultation	August 2015-March 2016	Focus Group Interviews with all staff, allied and academic
<b>Two: Auditing and Mapping</b>	Data analysis and Reporting	April 2016	Formal reporting to senior management
	Framework design	April 2016	Informed by feedback from senior management and staff comments
	Piloting and further consultation	May-June 2016	Small group consultation on design and content
	Approval of Learner Employability Model	September 2016	By Academic Board
<b>Three: Prioritizing Actions</b>	Institution-wide training and development for Employability	August 2016 to July 2017	Developed and delivered by Academic Development Directorate
<b>Four: Measuring Impact</b>	Quality led audit	September 2017	In collaboration with Quality Directorate

## Next Steps

It is important to note that while the initial evaluation and re-conceptualization stages of the work are now complete, additional steps include the roll out of training for all staff across the institution to raise awareness of the framework and to support pedagogic development for implementation. The final stage of the work will consist of assessing the impact of the framework and its success; it is anticipated that the full cycle of the work will be completed by end 2018 – see Fig. 1.

As outcomes of the consultation study, the following recommendations for embedding institutional practice to support Employability were identified:

## Recommendations

- Embed Employability in the professional sphere (practice and knowledge)
- Create a sustainable comprehensive framework for Employability at Bahrain Polytechnic
- Raise awareness of Employability at with all stakeholders (internally and externally)

## Ongoing Work

The recommendations have now been actioned upon by the Academic Development Directorate as outlined in Fig 2. In completing the first two stages of review and redevelopment, the up-skilling of staff and identification of gaps in training has been initiated in response to the third recommendation of **prioritizing actions** – to raise awareness of employability with all stakeholders. While it is recognized that this is an enviable task in terms of reaching all groups as per the framework, strides have been made in continuing the discourse around employability, supporting staff to access information and support in embedding employability at curriculum level. This has been broached in a number of ways to ensure a top down and bottom-up approach in the process of reification of employability activity, detailed in Fig. 3.

## Still more to do

The work commenced at the start of the academic year 2016-7 (August, 2016) and thus far has been conducted on schedule and with positive evaluation and feedback from academic staff. The next stage of the work will

**Figure 3: Activities to support embedding employability at Bahrain Polytechnic**

- Extension of the consultation to include all staff feedback on the approved Employability Framework (fig.2) led by the Teaching and Learning Unit from August 2016.
- Development of an employability training series for all staff, designed to inform staff in current practice, institutional progress and plans for embedding employability, rolled out at the annual Teaching and Learning Development Weeks and Symposium (August and February) and offered to all staff as ongoing open-access professional development activity. Led by the Teaching and Learning Unit from August 2016.
- Dissemination of the work regionally to enable cross HEI dialogue re regional practice lead by the Teaching and Learning Unit and the Careers and Employment Centre from August 2016.
- Curriculum reviews to revise all Program Intended Learning Outcomes to include and address Bahrain Employability Skills explicitly with subsequent review and approval for internal regulatory bodies from August 2016; led by the Curriculum Development Unit.
- Mapping of all Program Approval Documents to ensure inclusion of explicit employability skills from August 2016; led by the Curriculum Development Unit.

include extension to the broader community of stakeholders – allied staff, students, families, and industry, and will build on existing capacity.

## Conclusions

A conclusion from this study may be a simple one; that there is value in returning to the roots of the challenge, problem or in this case, the entity of employability through consultation. In initiating an open dialogue around practice and understanding, as educators, we may speak to the concept of negotiated syllabus. Feedback from the participants has indicated that engaging with such a ground-up approach to review has enabled them and us as a community to consider employability in a fuller context. The work carried out has enabled Bahrain Polytechnic to engage in organized conversation and to re-create a discourse around employability. In working to reify a model of practice through levels of consultation and ongoing dialogue across all departments and faculties, engagement with staff views and values has led to the development of a meaningful model which unites the parts or concepts which existed amongst staff and students in the HEI. In working to bring all of the ideas and views together, it may be argued that the visual map of the component parts created as an output of this endeavor, illustrates their complementary function in a single accessible artifact. This artifact, in turn, has provided a map for developmental activity regarding training and dissemination of practice – to support the practitioners and to share their (success) stories.

The cycle of work initiated at Bahrain Polytechnic in June 2015 to review Employability at completed in the set-up phase of the institution has enabled the development of a more holistic framework of practice for employability. In conducting an extensive review and remodeling of the framework, the Polytechnic seeks to meet its mission of producing work-ready graduates by delivering an accessible and flexible framework to assure teaching and learning for employability. While

the initial evaluation and re-conceptualization stages of the work are now complete, and the next steps of roll-out of training for all staff across the institution to raise awareness of the framework and to support pedagogic development for implementation have begun, there is still much to do. The final stage of the work will consist of assessing the impact of the framework and its success.

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# CASE STUDY

## **'WHERE THERE'S WIL, THERE'S A WAY': WORK-INTEGRATED LEARNING AND THE TRIANGULAR RELATIONSHIP AMONG HIGHER EDUCATION, GOVERNMENT AND INDUSTRY – A SOUTH AFRICAN PERSPECTIVE**



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Organizer



## Abstract

This paper begins with an overarching view of higher education/government/industry partnerships, from the perspective of Africa in general and South Africa in particular. I also examine some of the current inhibitors to the triangular relationship, in order to imagine improved integration of respective interests and ambitions. In the second section, I focus on examples of cooperation between my own university, the University of South Africa (Unisa), and organizations external to the university, as a way of developing an approach that may have applicability in developing countries. These arise from the acknowledgement that academic life, as we know it, must move beyond its normal boundaries, its 'ivory tower' of seclusion and private thought, to territories that may at first seem alien to the intellectual enterprise, but which can produce significant academic innovation and renewal. In the first example, the Signature Courses, the impact has been on curriculum change, accompanied by technological innovation, which influences graduateness and employability. In the case of WIL (Work-Integrated Learning), the university has responded to a social crisis in which graduates struggle to find employment, thus adding to the already huge politics of inequality in South Africa, especially among the youth. A third example, the Management of Democratic Elections in Africa program (MDEA) extends the frame of reference of the university ever wider, into not only local politics and governance, but also across the continent of Africa. The paper explores these endeavors, and gestures towards others, weighing their relative successes and shortcomings to make tentative proposals about solutions that may have wider applicability in other national contexts. I propose that universities become the anchor partner in the triangular relationship.

## Introduction

I would like to start with a question: Why should we be concerned about dialogue between government, industry and higher education, especially in developing countries such as the

Arab States and South Africa? This question leads to another more significant one: Are mutually beneficial, ethical, equal tripartite partnerships possible at all?

Let us begin with the here and now, our immediate context, by singling out two of the objectives of the MENA Higher Education Leadership Forum:

- To share best practices and 'know-how', and learn from each others' experiences;
- To form a 'think-tank' for the future of Higher Education within the region.

Sharing, learning from each other, and using the knowledge gained from this dialogue to strategize about the future of Higher Education is undoubtedly at the core of the academic enterprise and it is our avowed purpose in meeting here at this time. Yet, how often do we encounter a willingness to share; how eager are we to learn from each other; and how often do we actively use what we have learnt to consider the future of the academy? As you can see, I am already answering in part my opening question. I trust that the rest of this paper will succeed in offering a broader and more comprehensive answer to that same question.

At the outset, we should be clear about our context, for without that we will lose a good deal of perspective. The Arab Knowledge Index (2016) is highly context-specific while remaining open to input from quality research within the scientific domain, and it is clear that it is interested in 'knowledge from a development perspective'. The Index locates itself firmly in the Arab region, focusing on challenges pertinent to its own context and aiming at delivering knowledge that will benefit the 'critical role of Arab youth in the establishment of the knowledge society in the Arab region'.

It intends, in other words, to begin at home. And I want to suggest that that is where all good enterprises should begin, but that they shouldn't end there. There is a larger, more inclusive purpose, surely. In its final statement, the Knowledge Index shares its intention to become a global leader in the knowledge enterprise.

Let's pause there for a moment. This is a noble goal, but look where it started. In sound local origins – at home.

## Tripartite Alliances: The Good and the Bad

My paper will follow a similar trajectory by sharing some of South Africa's local challenges. South Africa's *National Plan for Higher Education*, crafted in 2001, stresses the crucial role of scientific research in the following way:

Research, in all its forms and functions, is perhaps the most powerful vehicle we have to deepen our democracy. Research engenders the values of inquiry, critical thinking, creativity and open-mindedness, which are fundamental to building a strong democratic ethos in society. It creates communities of scholars, who build collegiality and network across geographic and disciplinary boundaries. It makes possible the growth of an innovation culture in which new ideas, approaches and applications increase the adaptive and responsive capacity of our society, thereby enhancing both our industrial competitiveness and our ability to solve our most pressing social challenges. It contributes to the global accumulation of knowledge, and places South Africa amongst those nations who have active programs of knowledge generation (National Plan for Higher Education, 2001).

That last sentence about contributing to global knowledge is important for my purposes since it describes precisely what we are witnessing here today (cf. Cooper, 2001). South Africa, like the Arab States, has an active program of knowledge generation, and we are here to engage in dialogue in order to strengthen the international ties between us and to share our experiences so that we can contribute to the global accumulation of knowledge.

One of the recommendations flowing from an important conference in South Africa organized by Higher Education South Africa (HESA) in 2010, on a similar theme to this conference, was for greater collaboration not only between government, industry and higher education, but

also with state finance institutions, such as the Development Bank of Southern Africa and the Industrial Development Cooperation. Its mandate was to increase research funding, which, in South Africa, is sporadic at best and insufficient in general (cf. HESA conference report, 2010). Sadly, seven years down the line, our National Research Foundation has had to curtail substantially its financial support for South Africa's top researchers, making the search for innovative ways to increase dialogue and collaboration even more crucial.

But let's back-pedal a little. We are, I believe, all agreed on the need for a tripartite dialogue between government, industry and higher education. But what may not be so clear is the relative responsibilities in this partnership, and who should take the lead in steering the alliance and guiding the dialogue. Does government rightly have the lead position as the progenitor of policies pertaining to national interests? Does industry necessarily have a powerful position as leader of innovation with the necessary capital to support research? Are universities and institutions of technological research, with their knowledge capital, the logical leaders of dialogue? Does a tripartite alliance need a leader or are the three partners on equal terms?

If we look more closely at the nature, if you like, the DNA, of each of the members of this so-called triangular relationship, sometimes called the triple helix, we will see that each has a very different agenda, based on the purpose of its existence. And these differences are exacerbated by the serious inequality, in emerging economies, between rich and poor, a condition that requires sound social and political policy. So, government plays its part here in creating that policy.

But we have to be cautious about the extent to which we allow business/industry to take the lead in the alliance. The market economy needs to be corralled wisely by both universities and government. For instance, there is talk of mega firms such as Google, Amazon and Facebook entering the education domain. What is there to stop them creating their own universities,

untethered by the restraint that cautious thinking in the formation of educational policies offers, with an eye to unequal social conditions? Who will restrain Google from taking the lead in the alliance? Research, too, needs direction. It should not always be commissioned research in the service of business. We face huge environmental challenges that need the combined resources of industry, government and universities to deal with climate change and competition for scarce resources, such as water and the control of excessive heat.

A recent example of this is the MEDOW project initiated by Cardiff University in Wales, which is leading a consortium of five universities and six companies in the development of an energy 'super-grid' for sharing renewable power across Europe. This is a project too large for one university situated in one location to take on, but this kind of inter-university, inter-business collaboration could be a catalyst for future and similar projects that can help address our urgent climate change crisis. In South Africa, there is a similar example of such an enterprise, called The Genius of Space pilot project, initiated by the University of Cape Town and working with Sun Exchange to run a crowd investment program, which allows individuals around the world to invest in small-scale solar energy that is consumed by small businesses.

This, I think, expands on the MEDOW project by involving the community as well as industry and academia in a pilot project geared towards finding a solution to global warming. This is an example of collaborative research at the service of society, indeed at the service of the planet.

Related to this last point, we must be mindful of the relationship between public and private universities. As Tony Bates argues in a recent blog about the International Council for Open and Distance Education (ICDE) conference, held in Toronto this October, what restrains companies such as Amazon, from entering full steam into the education market are the robust business models for mass higher education. But it is only a matter of time before mega companies come up with a more effective business model. In talking about the different

models and the threat to smaller institutions, he says:

There is no doubt in my mind that the elite institutions, such as Oxford and Harvard, will survive by offering a completely different, campus-based experience for those rich enough to afford it, and/or through partnerships, but the impact of the digital commercialization of higher education will probably drive into the ground many less prestigious private and public universities and especially two-year colleges (Bates, 2017).

We need here to distinguish between digital commercialization and digitization. We should not regard digitization as a threat. It has become part of our lives and part of the lives of our students. I am Principal of an open distance mega university of 350 000 students that has pioneered the design of highly successful and cost-effective online courses, so I am no stranger to digitization.

But I expect digitization to be part of a controlled policy-driven environment, which makes room for proper planning and design as mechanisms of both forward thinking and restraint. If a huge business enterprise takes on the whole-scale digitization of higher education, that is also geared to massification, without having engaged with government and the academy, we are in danger of succumbing to unbridled capitalism, shorn of the need to take into account the needs of the poorest in our society. As we all know, when the poor are neglected we have increased political violence and corruption, which presents a social problem on a scale that is often ungovernable. These are already evident conditions in Africa and the Middle East.

It has been the pattern thus far that universities seek partnerships with either government or with industry, but not with both. This has led to a skewed relationship wherein the academy focuses on what business likes to call 'innovation' at the service of capitalism if they partner with industry, or the academy focuses on guiding or informing policy if they partner with government. While each partner is pursuing discrete goals, what suffers is society.

Industry by nature is concerned with increasing profits despite its nod towards poverty eradication, employment, anti-corruption and so on. Government is concerned with party politics while supposedly focused on improving the lives of its citizens. Higher education can and should be the mediator between these competing drives, by pursuing research that benefits society, addressing social problems and fostering innovation by tackling intractable (wicked) problems such as inequality and climate change. There are good examples of this across the African continent, especially in Kenya, which has forged an influential and productive international partnership with Italy which has forged university-industry collaboration for development (Nyerere and Frisco, 2013).

So, it is vital, in my opinion, that higher education becomes the leading partner in the tripartite alliance (the so-called 'third mission' of the university). This means that we look to the period 2020-2030 as a time of ethical partnerships between higher education, government and industry, in the interests of sound development and achieving the Sustainable Development Goals set by the United Nations. Universities need to address the widespread antipathy of industry to invest in public institutions by taking on a 'convening' and 'connecting' role in order to bring the interests of government and industry into a more mutually beneficial and pragmatic relationship.

This would lead to the idea of the 'fully engaged university' (cf. Mark Dodgson, 2017). Historically, as Dodgson points out, a number of higher education institutions engaged comprehensively with industry as part of a mutually beneficial partnership in which universities were acknowledged as 'wellsprings' of knowledge and progenitors of research that was geared towards specific problems in agriculture, manufacturing and urban engineering, generating ideas that were then transferred and used commercially (Dodgson, p.1).

Business had to import R&D specialists to interpret and apply the research supplied by universities. The mutual benefits reside in

funding for university researchers and long-term solutions for businesses, which put them ahead of their competitors. After 1990, however, business shifted towards more agile, short-term solutions to business problems, making redundant traditional models of long-term research, while, at the same time, industry began to hire researchers more adapted to innovative transfer than their academic counterparts.

Academics, in their turn, began to pursue government-funded research that Dodgson describes as 'self-referential', research that is untethered from economic or social concerns and set free from local development. Such research is less concerned with application, in other words, more insular. However, as Dodgson (2017, p.2) suggests, we should perhaps reach a critical point when academic research is needed to help address the intractable problems industries face, while universities, increasingly short of funds, actively encourage collaboration with business as a third stream of income. In this way they have the opportunity to become 'fully engaged' by working in tandem with government, business and the community 'to identify and co-resolve complex economic, social and environmental problems.

Far from pointing to the future 'commercialization' of the university, Dodgson believes that this will lead to academics engaging in research that is both challenging and valued and reciprocal. The particular contribution of academic research in this new context of mutually beneficial co-operation is higher education's insistence on research that is holistic and embedded in social and political contexts. This has a virtuous outcome: industry is satisfied with the results of the research and crucial social issues are addressed. In order to achieve this, universities must be proactive in opening up new spaces for multi- and transdisciplinary research, such as centers and institutes, as well as public spaces in which dialogue is fostered.

Universities are crucial contributors to explaining and solving complex social and economic

problems. They should never become instrumental tools for economic development nor should they be led by the demands of the market (Dodgson, 2017, p.5). But if we are realistic, we must acknowledge that there are real and present constraints in university-industry relations. These are, as Ulrichsen (2017), outlines: time pressures, lack of resources, and university bureaucracy and management processes, among others.

All this points to the need for innovative thinking on the part of the three partners, higher education, industry and government, in re-examining their roles and rethinking their willingness to adapt to a new age, one in which the partners in the triple alliance are not competitors for resources and co-creators of social reform, but as part of a continuum. One of the key findings of the 2017 British Council Report (called *Catapults to Commercialization*) is that universities should realize their limitations in addressing global problems, which cannot be solved at a local level.

In the same vein, universities need to adopt a critical approach to the rising trend of Global Citizenship Education, which is in many ways the result of the partnership with industry and government to advance employability. Its pedagogy has potential to create a more equitable, just and sustainable world, but its ideological foundations often tend to reproduce hegemonic neoliberal ideas (Cho and Mosselson, 2017, p.15). I have made similar cautionary remarks in writing about the ethics of preparing graduates for global citizenship (Makhanya, 2016).

## Part 2: South Africa and the University of South Africa (Unisa)

Turning now to the second part of this paper, the University of South Africa (Unisa) has, I believe, been at the forefront of engaged and committed social and economic policy, research and teaching in South Africa, and I hope to show that it is an example of Dodgson's 'fully engaged' university. We are the first university in South Africa to be a signatory to the ten

principles of the United Nations Global Compact (UNGC) and we have taken steps to ensure that the university lives these principles both in its everyday life and in its research and teaching (see the Unisa/UNGC 2016 Final Report).

Not only has the Unisa campus become a fully-fledged green and self-sustaining environment, but at least one important project has been launched as a consequence of the UNGC principles, where the university has partnered with the National Business Initiative to develop a carbon footprint inventory and management plan. There are several other such projects managed by multidisciplinary institutes, such as our Institute for Social and Health Sciences in partnership with the South African Medical Research Council.

As a prelude to the second part of this paper, I should like to provide a brief description of the University of South Africa, before turning to my two examples of dialogue between universities and external agencies.

## Unisa: A Brief Background

Unisa is one of the oldest universities in South Africa and among the oldest Open and Distance Learning institutions globally. Some time ago, Sir John Daniel named it as a 'mega' university and indeed it is the largest university in Africa. Shortly after South Africa was formed as a newly democratic nation in 1994, Unisa undertook massive reforms leading to its current status as a proudly transformed African institution. In 2004, the new Unisa was established after a merger of three distinct institutions, the previous University of South Africa, Technikon Southern Africa and Vista University Distance Education Campus, thus becoming South Africa's largest comprehensive university with a dedicated distance-education focus.

After 2006, Unisa adopted its Strategic Plan with a strong social mandate to offer cost-effective, high-quality education opportunities to students across South Africa and on the rest of the African continent. Its vision and mission

encompasses a shared responsibility to meet national objectives; a pledge to effect social transformation in helping create a society committed to social justice, fairness and sustainability; and, predominantly, a commitment to produce graduates who will contribute to the nation's needs by being critically aware and socially responsive citizens. Unisa has eight Colleges, so-called because they are larger than most faculties. Indeed, some of them are larger than other universities in South Africa.

## Unisa's Signature Courses as Example of a Successful Partnership

The meaning of the term 'signature' when used in conjunction with academic modules suggests an intention to stamp the signature or brand of the university on its graduating students. The origins of the term are derived from the idea of a signature as a mark of proof or intent, but such courses are variously described as basic or foundational courses on topics which can be deemed as universal in scope and essential to the context and ethos of the nation in which they are situated.

In a Unisa context, Signature Courses are defined as introductory-level courses that uniquely express Unisa's vision to be the African University, shaping futures, in the service of humanity. This implies that signature courses should be relevant to South Africa as a nation on the continent of Africa, its many communities and its people. But they should also underscore the characteristics of Unisa's identity and the university's aims for its students, which are expressed in the university's *Transformation Charter and Graduateness Statement*, which proposes that Unisa students have a unique identity that distinguishes them from students at other institutions of higher learning in South Africa and the world. The distinguishing mark of our students is their self-efficacy and their awareness that they are students of and in Africa. We encourage the characteristics of critical acuity, community engagement, social responsibility, and African-ness.

Unisa also commits to align its pedagogy (how we teach) to a strongly transformational agenda by promoting African ideas and philosophies, highlighting learner-centeredness as a key didactic direction, practicing a critical scholarship focused on Africa-centered perspectives, and preparing students to be fully fledged participators in a mainly market-based economy. It is, however, interesting that, at this turbulent time in the history of higher education in South Africa, in which students are calling for free tuition (the #FeesMustFall movements), radical changes in curricula and an end to colonial epistemologies (the removal of colonial statues, symbols and emblems), Unisa has been preoccupied with ideas about what it means to be an 'African' university, for more than a decade. It has worked closely with South Africa's democratic government to effect social and political transformation, not only through ensuring that its curriculum is 'decolonized', but also through the work of its various centers and institutes (Badat, 2017).

The Signature Courses, a project launched in 2008 with a summit, which I organized, are an intrinsic part of this institutional transformation and curricular reform. The summit was called *Towards a New Institutional Academic Identity: Revision, Rehabilitation and Rebirth*, words deliberately chosen to reflect the thinking around reform that spurred this initiative. We were intent on change, change that would lead to a new kind of university, a new kind of teaching and a new breed of students. As a follow-up to this summit, I also arranged a conference entitled *Becoming a Knowledge Centre in the Service of Humanity*, which signaled our ambition to begin reform with re-curriculation -- with our teaching, in other words.

Thereafter, Unisa forged a partnership with the *Council for the International Exchange of Students*, a program of the *Institute of International Education* (CIES/IIE), an institute which administers the Fulbright Program, and whose director had attended both the summit and the conference. With a group of scholars from different backgrounds and varied skills selected by CIES/IIE, from across the world, we embarked on the work of designing six courses.

The idea was that we would take the 'life worlds' – in Habermas's vocabulary, of our students as the basis of the design of the courses, and which would also be fully operational as online courses, the first courses designed from scratch as fully digitized modules.

We met several times with the international team, which consisted of specialized curricular designers, as well as specialists in online teaching, together with Unisa's own academics, course designers, and other staff from administrative departments. The venues were shared: if the team visited South Africa, we made sure that we travelled to the USA for the next meeting. The six fields of study we decided on were Environment and Ecology, Economics and Ethics, Computer Literacy, Language and Culture, Teacher Education and Law, and the titles chosen for each module reflect their ethos very neatly:

- Environmental Awareness and Environmental Sciences (an alliance between Unisa and Johns Hopkins University)
- Greed and Sustainability (an alliance between Unisa and Howard College, Washington)
- Being a Teacher (an alliance between Unisa and EmpowerED LLC, USA)
- Understanding Language usage: An African cultural perspective (an alliance between Unisa and Herkimer County Community College)
- End User Computing: solutions for a changing world (an alliance between Unisa and the Salk Institute for Biological Studies, University of Pennsylvania)
- Social Dimensions of Justice (an alliance between Unisa and the International Centre for Transitional Justice, New York)

The teams functioned through virtual and contact discussions involving visits to the two respective host/partner countries (South Africa and the USA) twice each year, backed up by email and site visits to the various platforms of the contributing universities. These included both contact universities, such as Johns

Hopkins, who generously shared their knowledge about IT equipment for online teaching and the State University of New York (SUNY) for advice on the best administrative processes for online learning. This turned out to be an extraordinarily productive partnership with each team learning through cross-border comparisons about student behavior and staff competencies, differences in broadband delivery and social norms and the policy environment.

The collaboration has had huge benefits for both partners, enabling mutual shared wisdom and knowledge gained from our disparate environments. It was never a case of the USA dominating South Africa. Indeed, the US team said repeatedly how much they had learnt from the South African team. I hope this brief description of the Signature Courses at Unisa has highlighted the efficacy of one particular international partnership, while underscoring the alignment of Unisa's fundamental values with those of our democratic government.

## Work Integrated Learning (WIL)

And now to WIL, or work integrated learning, variously known as experiential learning, or workplace learning. Before I describe WIL at Unisa, let me share something about our students. We have around 350, 000 students at present, a hugely diverse constituency from both rural and urban areas in South Africa, with many registered from beyond our borders. This large and diverse range of students significantly affects our ability to provide top-class learning opportunities, since we cannot rely on the fact that all our students are equitably equipped in terms of electricity supply, resources and access to the Internet.

Indeed, this variation in context is a major challenge and has a bearing on the ability of our graduates to secure work in the marketplace. Because Unisa is a comprehensive university offering both academic and vocational courses, we regard WIL as part of our learner support, which endeavors and encourages industry to cooperate with the university to ensure that the students who complete a WIL course are of an

acceptable standard to be employed after graduation.

Among the wide range of courses that incorporate WIL into their study packages are tourism, real estate, education, human resource management, engineering and peacekeeping. In addition, our students are required to collaborate with each other in learner support groups when working on assignments (learning tasks), in such fields as the MBL (Masters in Business Leadership), which is Unisa's niche MBA. Experiential learning is also an intrinsic component of teacher-training programs, in which practical work is reflected through reports and workbooks; engineering programs in which logbooks have to be completed that have been evaluated by an industry mentor; and practical projects in industrial-related subjects, which are part of the final assessment, for example, in Information Technology.

Moreover, entry to take examinations is allowed only for those students who have demonstrated that they have worked under the supervision of an industry mentor and have been assessed in such in fields such as Safety Management. Portfolios are another way of judging progress and, similarly, an industry mentor assesses these before being evaluated by the university. This two-way process is eminently sensible as it ensures that industry is an intrinsic part of the academic experience of the student and facilitates a greater understanding of both spheres, hopefully leading to higher levels of employment. It also acknowledges that a student's university experience is not always only a theoretical one, but that practical components are endemic to work experience. Thus, we emphasize in certain courses the necessity to complete a practical component for final assessment.

Unisa uses WIL in the following disciplines: Science, Engineering and Technology; Economic and Management Sciences, Tourism, humanities, Social Sciences, Education, and Law and Justice (see Sonnekus, Louw and Wilson). In addition, all diplomas and B.Tech degrees offered by Unisa have a compulsory period of WIL consisting of a minimum of one

year of approved training. Monitoring takes place by means of a logbook, a mentor system and visits to industry by a Unisa academic. As part of our partnership with government and industry, we adhere to the new requirements laid down by the Higher Education Qualifications Framework (HEQF) as well as the standards set by the Engineering Council of South Africa (ECSA), which is the accrediting body for all engineering courses in South Africa.

In order to oversee WIL, Unisa has instituted an Experiential Learning Research Office (ELRO), which supports both students and academic staff in their experiences of WIL. Students requiring experiential learning for the completion of their course are required to hand in a Curriculum Vitae, or résumé, to the office and to register with the government Department of Higher Education and Training (DHET) for work-integrated learning opportunities. In this way, Unisa demonstrates a clear partnership with the appropriate government department in its care for students, as well as adhering to the norms and standards set by industry for its students.

## Management of Democratic Elections in Africa (MDEA Program)

The third example I would like to share is a program that has significant political and socio-economic implications for the African Continent. It is jointly managed by Unisa and its funder, USAID, and began in 2011. It is uniquely designed to deepen and promote electoral democracy and develop knowledge and expertise in election management and administration through the provision of education and training programs that are run by the university. To date, 451 electoral officers have been trained. Botswana, Lesotho and South Africa have each engaged in 'in-country' training. We have also produced a significant number of Commissioners in this partnership. I am proud that this has been a transnational success story of Unisa's partnerships, one that has had a resounding effect not just in our own country, but whose tentacles have spread to countries across the African continent, producing trained officials in the complexities of

democratic election processes. We have been able to use our Ethiopian campus to reach East African delegates and participate in African Union projects, based on a memorandum of agreement.

Within Unisa, the MDEA program is managed by the *Institute for African Renaissance Studies*, which offers a three-week study period, after which each candidate engages in a week's experiential learning with the *Independent Electoral Commission* of South Africa, with whom we work closely. The overwhelming and perhaps unexpected success of the MDEA program has prompted Unisa to think more widely about its possible impact on democratic processes at home, as well as more universally. We have expanded the program by making use of the program's alumni to become catalysts for positive change, democratic influence and inspiration beyond their specific locales. In effect, they participate in continuous learning pertaining to expertise in election management and so democratic practices and institutions are strengthened in South Africa. The success of the program has led to the development of an accredited distance-education postgraduate diploma course. It has also resulted in significant policy development in many countries and produced pioneering research in the *International Journal of African Renaissance Studies* published by Unisa Press.

## Conclusion

As I hope I have demonstrated, there is a way to liaise, bond and cooperate with both government and industry, and across borders, which is beneficial for the university and its students. In all the examples I have cited, no single body has had the upper hand. The tripartite alliance has remained stable and is united by its mutually prescribed goal to be of service to the students of South Africa in ensuring that they emerge as globally ready, critically aware and socially responsive adults, and, moreover, that they do not find themselves part of the increasing numbers of the unemployed. My main argument is that universities need to assert themselves in the

tripartite arrangement and assume pre-eminence. This is in contrast to some conventional African models, which propose that government sets the policy framework and offers 'seed money', thus relegating universities to the role of preparing students with entrepreneurial mindsets (Mbataru, 2015).

The importance of strengthening dialogue among the three arises from the serious inequality in emerging economies – rich and poor, which focuses on social and political policy, but also the excesses of the market economy. Another reason for its importance is that we face huge environmental challenges that need the combined resources of industry, government and universities to deal with climate change and competition for scarce resources, such as water. The nature of work, life expectancy and technological futures are additional factors, which call for collaborative partnerships. And most of all, the crisis of unemployment in many developing societies presents a huge social problem and the potential for increased political violence and corruption – all conditions that are evident in Africa and the Middle East.

The democratizing role of universities is worth emphasizing, pointing to the growing preoccupation with social justice, which widens participation through financial support and progressive approaches to access. As universities offer better student support for success, which includes 'apprenticeships' with industry to grow WIL and give students workplace experience during their studies, at the same time we are increasing diversity and inclusivity to enhance graduate mobility in globalised contexts.

Higher education can take the lead in the triangular relationship as the 'knowledge partner', which can provide 'evidence-based leadership', advanced intellectual capacity, entrepreneurial education, youth leadership, design-thinking for innovation -- especially in technological fields, and thought leadership in ethical, political and cultural domains. Universities are also influential in transformational frameworks, which influence

government and industry, as well as act as a conduit for community engagement. This role is assuming priority in South Africa as its democracy feels the winds of protest because of the stark class inequalities that translate into racial division, on account of unresolved historical apartheid politics.

Universities offer insights on different kinds of leadership – visionary, adaptive, distributive and shaping. They therefore need to take on various roles in the alliance with government and industry by helping developing societies to cope with dramatic change and hardship. They are connected internationally to provide solutions to local challenges, convene think-tanks, industry-government dialogue, and offer their considerable resources and capabilities to improve technology, human interaction, and help to create more porous boundaries between government, industry and community. In all of these ways, universities can be the anchor organizations in a new compact between universities, government and industry.

Above all, and ever aware of the context from which we began, our students identify as African citizens, proud of their country and their continent, which ultimately shapes government and industry.

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# CASE STUDY

## PUBLIC-PRIVATE PARTNERSHIPS BEST PRACTICES AND SUCCESS FACTORS: A CASE STUDY FROM LEBANON



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## Abstract

Pressures from a quickening marketplace and the fast evolving knowledge-based economy are transforming the traditional role of universities. Universities are becoming primary targets for governments because they are considered as the largest knowledge-based institutions. It is expected that universities will aid economic growth and rejuvenation if they disseminate their knowledge and expertise through industry linked partnerships. This paper is a real life case study that illustrates a successful example of public-private partnership (PPP) between the Lebanese International University, the largest private university in Lebanon, and the Lebanese Standards Institution (LIBNOR), a governmental public body. The collaboration started about two years ago by signing a memorandum of understanding (MoU), and since then, many initiatives and projects have been completed with an astonishing measurable success. Successful implementation of public-private partnerships requires the adoption of some key best practices and the incorporation of the learning obtained from previous PPP experiences. Throughout this short journey so far, LIU and LIBNOR have successfully completed some key projects, which were implemented in Lebanon. The paper will briefly present these projects to share the best practices and key learnings obtained from each project. This is intended to highlight the necessary steps to be taken, especially in developing countries' settings, to implement successful public-private partnerships between universities and the public sector. In addition, highlights of some of the key benefits that were obtained by actively participating in the standardization initiatives carried out by LIBNOR will also be presented.

**Keywords:** Public-Private Partnerships (PPP); universities; case studies; Lebanon; alliances.

## Introduction

The concept of Public-Private Partnership (PPP) has become a principle paradigm in

organizational strategies as of the beginning of the 21st century (Wettenhall, *The Public-Private Interface: Surveying the History*, 2005). Although many case studies of such partnerships have existed since then, the theoretical basis of the cooperation remains poorly developed, and little understood (Osborne, 2000). But in all respects, PPP seems to claim a middle-ground between the two extremes of nationalization at the one end and privatization at the other (Wettenhall, *The Public-Private Interface: Surveying the History*, 2005).

There are countless success stories of productive PPP's. Such cases range from simple service providing, to community empowerment, to state infrastructure and capacity building (Tsamboulas, Verma, & Moraiti, 2013) (Stewart, Kolluru, & Smith, 2009). As a matter of fact, many public policy outcomes were achieved thanks to exciting opportunities offered by PPPs (Wettenhall, *Mixes and partnerships through time*, 2010) (Hodge & Greve, 2007). The outcomes, although numerous, may include (Osborne, 2000):

- Social exclusion resistance
- A way to both the creation of sustenance of civil society and to the reform of the political grounds of governance
- The chance to come up with cost-effective ways of providing public services
- The opportunity to create or reform public policies
- Better responsiveness and flexibility in public policy making

It is the last two points that were behind the drive for a private institution, the Lebanese International University (LIU), to partner with a public body the Lebanese Standards Institution (LIBNOR) – to work on several projects, which will be outlined in this manuscript. LIU is Lebanon's largest university while LIBNOR is a government body which operates under the umbrella of the Lebanese Ministry of Industry (Mol) (Husseini, et al., 2014).

## Success Stories of PPP between LIU and LIBNOR

### Students Training/Internship

Over the past two years, LIBNOR has accommodated around 20 of LIU's undergraduate and graduate students for training and special assignments. The students got involved in initiatives related to standardization. By doing so, they became better aware of the significance of standards and their positive influence on quality in general. They also obtained an appreciation of the importance of the added value that this brings to the society as a whole. As a result, LIBNOR receives the benefits of temporary assistance and the students' knowledge and can even use internships as a screening device for future potential employees. As suggested by Knemeyer and Murphy, internships are often seen as a "win-win" proposition (Knemeyer & Murphy, 2002).

### Active Participation of LIU Experts in Committees

An academic staff member from the Department of Industrial Engineering at LIU was selected as a national expert for Lebanon on water footprint (ISO 14046) within the ISO MENA STAR project in collaboration with LIBNOR. The project is being implemented by the International Organization of Standardization (ISO) and funded by the Swedish International Development Cooperation Agency SIDA. The project aims at "Strengthening the institutional infrastructure standardization and regulations to support business and industry". She participated in several workshops in the MENA region and gave presentations during the National Awareness Seminar and Workshop on ISO 14046, which was organized by LIBNOR.

Another staff member from the department of Computer and Communications Engineering, helped establish NL JTC1. This committee has studied and adopted a number of international standards as national standards in the information security and smart card domains. The professor participated in international

Technical Committee (TC) meetings and working group meetings. He became the editor of ISO/IEC 14496-31. A seminar focused on encouraging universities to participate in standards development was organized. In addition, LIU is also helping to establish committees looking into Internet of Things (IoT) and information technology for education. Several research projects have been proposed in conjunction with LIBNOR with the aim of answering ISO calls for proposals in information processing standardization activities.

The last project involved the participation in the PC288 (ISO 21001) related to management of educational organizations. To better understand the needs of Lebanese educational institutions, an assessment survey was designed and conducted. The survey was diffused to the universities participating in the mirror committees of the international Project committee (ISO PC 288) established by the international organization for standardization, which is taking charge of studying new international standards for the quality in educational organization. The survey was distributed to 45 Lebanese universities, of which 10 ended up participating in the study. This consists of 22% response rate, which is considered low. The qualitative assessment was done on two levels: The first level is based on significant consultancy experience in ISO 9001 implementation (through the meetings of technical committees, where they studied the elaboration of a new standard that specify requirement for the implementation of quality in educational organization). The second level is the prioritization of the obtained challenges through the General Directorate of the Higher Education in Lebanon, as a governmental and presumably an objective party (validation of the first level). The findings helped in providing feedback, taking into consideration the concerns raised by the participating universities.

### Access to and Initiating Standards

A number of students have engaged in research and projects related to standardization in the form of capstone senior projects at the

undergraduate level and master thesis projects at the graduate level. Projects cover a number of application and research topics which are centered around quality management, process improvement and optimization and standardization. In one of the projects, the students developed a set of standards for a dairy products facility, a popular industry in Lebanon. Standards for such facilities in terms of layout did not exist. Serious work has been done to launch initiatives to fill this gap where there is a lack of standardization in specific areas or sectors. Facilities layout, healthcare facilities, and food related standardizations are some examples. Currently, there are several projects which are focused on waste management; a problem that has affected Lebanon severely in recent years.

## Exchange of Expertise

LIBNOR and LIU have jointly held several workshops, seminars and training sessions on a number of topics such as: project management, value chain management, ISO 14046: Water footprint, ISO21001: Education standards, ISO 50001: Energy management, road standards, and social responsibility.

As the need for quality and standards awareness and knowledge became obvious, LIU introduced two quality management courses at the undergraduate and graduate levels. The courses have been designed and taught in consultation and collaboration with experts from LIBNOR with a primary objective of having the courses meet the market needs and add value to the students' learning experience and knowledge portfolio.

## Joint Seminars and Publications

In October of last year, LIU organized the first national awareness seminar on educational systems standards. The idea was to bring together key stakeholders to reflect on their experiences and initiatives with regards to quality management and standardization. Representatives from the industry, government, consumer groups, non-governmental organizations (NGO), labor unions, services

sector, research, academic and others actively participated in the event, and they considered it a great success. The event was hosted at LIU premises and was attended by over 300 participants. Numerous other smaller events have also been organized and successfully completed including: Information sessions, workshops, exhibitions, and fairs.

As both parties evolved their collaboration, some studies were done jointly to understand some key aspects related to quality and standards in Lebanon. Questionnaires, surveys, and interviews were conducted and important data collected. The outcomes of such exercises were a series of articles that were published in conference proceedings and specialized journals.

## Private-Public Partnerships Key Benefits

### Key Benefits for LIU

Over the past few years, LIU has been participating in various initiatives related to governance, regulation, and standardization on aspects that are of importance and relevance to the University. These include – but are not limited to: Higher education, accreditation, governance, management, and environmental and social responsibility. As a result, both parties have significantly increased their engagement and throughout the process have benefited from the exercise on multiple levels. Some of these benefits:

- Early access to specifications and legislation.
- Greater understanding of the standards and their underlying designs, tradeoffs and the compromises made during their development, and the operating conditions and environments they are intended to serve.
- Building relationships and contacts that can become technical resources
- Reducing operating risks through lower costs (due to knowledge and experience shared among participants).

- Improving the ability of foresighting to identify future trends (Due to research developed during the design of the standard)
- Influencing the resulting standard in the early stages and while it is still in the making.
- Developing the skills of personnel by giving them the opportunity to work with leaders in the field and to witness standards development processes that maximize cooperation and consensus building
- Enhancing your organization image by being proactive and pioneering standardizations
- Enhancing the credibility and image of the technical expertise of your staff
- Participating in promotion of the standard. E.g. Mentions in press releases, including providing executive quotes and announcements of product dependencies, often comes with membership.
- Benefiting from financial discounts for various events or materials sponsored by the standards organization (conferences, workshops, journals) etc. by being a member.
- Participating in exclusive (i.e. member-only) technical events, e.g. workshops, development meetings, conferences, etc
- Improved sales efficiency due to decreased trading costs, simplification of contractual agreements, and lowering of trade barriers
- Standards provide assurances that products are safe (or more safe) to use.
- Risk reduction: The standards development process, through prototyping, and agreements by its proponents, insure standards are implementable and incorporate best practices.
- Economies of scale: Employing standards in software components increases the reusability of modules. Reuse increases sales and therefore the production of these components, making them cheaper to build. This further increases their usability and the competitiveness of products that use them.
- Ease of data integration.
- Investment protection: When it comes time to retire a standards-based product, it is likely that replacements will be available (from a variety of vendors) supporting the standards.
- Product life extension: Products that use standards are less likely to require replacement in order to integrate with other, newer products.
- Protection against obsolescence: Standards organizations are generally highly motivated to provide an orderly way to migrate to new versions of standards.
- Reduced development time and costs. Finding trained and experienced personnel for standardized technologies is easier than for proprietary technologies.

## Key Benefits for Private Organizations

Standards can have a significant impact on the products that incorporate them and on the marketplace. For example, standards can provide assurances of performance, reliability, safety and interoperability that eliminate inhibitions to sales. Often, increased sales volume reduces production costs of commonly used components that support standards. Standards also provide guidance to designers, reducing research and development costs and eliminating costly errors.

In particular, companies producing products that incorporate standards typically gain the following benefits:

- Increased market access and acceptance.

## Conclusion and Future Work

The Private-Public Partnership model is one that has more positives than negatives. It allows for the beneficial interaction between the two parties for the final benefit of the consumer. The case of the partnership the LIU – a private institution – built, maintained, and developed over time with LIBNOR – a public body – is an example of a success story that may be duplicated between LIU and other public

sectors, as well as between LIBNOR and some other private institutions.

While the current cooperation is somehow limited to standardization, future plans are being drawn to target other aspects of services.

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# CASE STUDY

## EXPLORING THE INTEGRATION OF YOUTH IN THE WORKPLACE TO IMPROVE HIGHER EDUCATION CURRICULA FOR EMPLOYABILITY – A CASE STUDY ON THE ARAB ACADEMY FOR SCIENCE AND TECHNOLOGY



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## Abstract

This research was a case study experiment – in the College of Engineering and Technology (CET) in The Arab Academy for Science, Technology and Maritime Transport (AAST), during job fairs including employers in campus for alumni, noticed the need for embedded career programs within curriculum. The education process is operated by high-level academics offering local and international programs with partnership with more than 130 ranked international universities. The objectives of this case study is to outline the institutional approach to enhancing the employability of our students in their final year before graduation and to explain how this has been achieved across the CET and to outline the finding from initial implementation across the practical training subject.

**Keywords:** Educational planning, career guidance, work experience, employability skills,

## Introduction

The problem of employability is one of the recurrent problems of the world society, especially in the Egyptian context. Graduate youth are more sensitive than others towards changes in the economic situation; youth finishing their education benefit from every economic improvement but are also severely affected by any degradation in the employment situation. The past decade is no exception. After a clear improvement in the integration of young people due to the period of global economic recovery and employment growth in the late 1990s, their situation on the labor market has gradually deteriorated since 2001.

It is imperative to note that youth and woman constitute the largest and the weakest segment in Least Developed Countries (LDCs) populations. As a continent, Africa harbors the majority of Least Developed Countries with 34 countries out of the 48 listed as LCDs in 2015. The Istanbul Program of Action (IPoA) 2011-2020 for LDCs has identified youth as a fundamental asset towards graduation. The

potential of young generations, if maximized, could have tremendous bearing on society if they are able to engage fully both economically and socially. However, many young people have little or no skills are therefore, largely excluded from productive economy. Developing skills is one of the strongest tools to prepare youth for the immediate needs of countries' economy. However, conventional education as a single intervention is likely to be insufficient in integrating youth to overcome a context of high levels of unemployed or underemployed youth because of serious difficulties of in integrating youth into the labor market.

This phenomenon is known and is not particularly related to Egypt, even if this country structurally suffers from a greater difficulty than others in this field do. Despite the seismic shifts in the global economic sphere over the last decade, a burgeoning economy, and seen, significant progresses in its human development indicators in Egypt. However, these optimistic development, an increasing youth unemployment remain critical obstacles towards Egypt's growth. For Egypt to transition into a prosperous country with high quality growth, sound economic and industrial policies should be geared towards providing employment opportunities for all.

As emphasized in the Kathmandu Declaration (2014), graduation should not be seen as an end in itself, but should rather be regarded as a means to achieve structural change, poverty eradication, and economic diversification in the country and thereby contribute to the Sustainable Development Goals with a priority focus on economic efficiency, ecological compliance, and social inclusion. The education system, especially in higher education, needs to be restructured to ensure it produces graduates who are capable of matching the needs of economy growth, building leadership and entrepreneurships, and creating self-employment.

The conventional university degree is now more and more necessary but not always enough. Beyond the characteristics of the period we are experiencing, the growth of unemployment

among young people from higher education runs counter to a widely shared conviction: Obtaining a degree in higher education generally appears to be one of the surest means of protecting oneself against the difficulties of integration into employment. It is true that youth unemployment affects above all those who have left school with a low level of qualification or even without any qualification. Regardless of the economic situation, inequalities in access to employment between young people according to their level of exit from the education system are almost constant. Any deterioration in the integration of young people from higher education, seems cyclical, therefore it creates a sense of security associated with having successfully completed a path in higher education questionable. For these young people and their families, the experience of unemployment is frequently the source of disillusionment that the investment in the studies is linked to the hope of a status and protection from the dangers of the beginnings of the professional life.

## Literature Review

The topic of Employees' training and development has been treated and researched by many writers over the past few years. Due to the relevance of the topic to the well functioning of most of organization, it is important to know its principles and the factors that influence it. Researchers defined training as the planned process to modify attitudes, knowledge or skill behavior through learning experience to achieve effective performance in an activity or range of activities (Smith, 1995). Training programs are central to the success of transfer of learning. They should be designed and delivered in such a way that they provide trainees the ability to transfer learning back to the job (Halton et al. 2000; Velada and Caetano, 2007).

Training outcomes are more likely to have a positive effect on employee attitudes where training designs are structured and related to employees work (Hayes et al., 1996). In 2004, Rocky stated that there has been little overlap between the development areas (employee,

management, professional Development) and the adult education principles. As employee training is considered adult education, some of the shortcomings of the typical employee training sessions are caused by not paying attention to the nature of adult learning. Definition of education is activities which aim at developing the knowledge, skills, moral values, and understanding required in all aspects of life, rather than a knowledge and skill relating to only limited field of activity (Smith, 1995). Lindeman in 1926 and Knowles in 1980 offered writings on adult education that provided guidelines for practitioners on the nature of adult learning. They provided a theoretical background on training, general principles and practical components of designing employee training and activities that reflect adult education principles.

In the late 1980s, the American Society for Training and Development (ASTD) defined Human Capital Development as the process of increasing the capacity values of human resources through development or a process of adding value to individuals, teams or an organization as a human system (McLagan & Suhadolnik, 1989). Training workshops can heighten individuals' motivation to develop different capabilities and facilitate the development of skills needed to build these capabilities. Factors that influence the development of skills include job involvement, organizational commitment and job satisfaction (Velada and Caetano, 2007). Whether it is an improvement in job skills or a desire for social contact, adult learners will expect the instructional situation to be relevant to their needs (Brookfield, 1986; Brundage and Mackeracher, 1980; Knowles, 1980).

As most of adult learners have defined objectives and life goals, on professional and personal levels, the training objectives need to be clear, measureable, and specific so that the participants and trainer can determine when they have been reached, and they should have input into the objectives of the session (Rocky J. Dwyer, 2004). Some writers argue that the goal is usually set by the organization to enhance individual productivity and competitiveness (Lang and Witting-berman, 2000). Helping

trainees achieve their goals is complicated by the fact that they come from different background environments, and bring to the training their individual values and beliefs and their personal experiences to bear, share, reflect and learn while simultaneously working together on a challenging yet unfamiliar task (Cogner, 1992). In his research in 1989, Cranton concluded that methods for helping adults learn can be described in four categories: instructor-centered, interactive individualized and experimental. Theorists and practitioners seem to agree on that nearly everybody seeks satisfaction in his or her work (Jepsen and Sheu, 2003).

Many researchers agreed that the critical part of training is the evaluation of outcome. It is the necessary component of every training activity. It can include a wide variety of activities, such as informal observation of participants' reactions, structured observations, or performance, use of discussions and anecdotal records or comments to provide feedback to the learner. When developing an evaluation methodology to assess the impact of a training session on employee behavior performance, the general consensus is to involve participants in some way, allowing them to collect evidence of change, to set criteria and involve them in the evaluation process by identifying their own discrepancies with the trainer or to have individual or group evaluations as appropriate (Rocky J. Dwyer, 2004). According to Baldwin and Ford, 1988; Wexley and Latham, 2002; approximately 40 percent of training context is usually transferred immediately following training, 25 percent is retained after six months and only 10 to 15 percent after one year. Smart employers provide trainees with opportunities to learn and retain new job-related competencies (Velada and Caetano, 2007)

According to Garavan et al., in 1999, there are 3 distinct theoretical perspectives on HCD have been identified: Capabilities-driven HCD perspective: which focus on the resources available for an organization to attain its goals; psychological contract perspective: which focuses on employment relationship between employer and employee; Collective

learning/learning organization perspective: which focuses on the organization as a totality generating, improving and transferring knowledge.

According to Wilson and Western in 2000, the performance appraisal interview is widely regarded as one of the main instruments for identifying training and development needs at the individual level. In 2011, Dirani et al. conducted a research in the context of a training services program offered by an HRD department in a large Lebanese financial institution, the purpose was to explore the trainees' perceptions about the effects of a professional training program on their skill development, and how cultural factors specific to Lebanon influence the learning. Professional training means formal learning and support activities and initiatives designed to provide organizations the opportunity to prepare and develop their employees. These opportunities lead to improvements in the knowledge, skills, practices, and disposition of the trainee (Dirani et al., 2011). Training is an important component of retention and increasing the availability of training is critical for retaining older workers, Employee satisfaction is the central role in the link between human capital management practices and organizational performance. (Peccei, 2004).

Employers have been largely careless in providing training for older employees so Armstrong-Stassen and Templer treated in 2005 the Canadian response to an aging workforce, adapting training for older employees. Eighty-three percent of the HR executives indicated that training to upgrade skills is highly important in retaining older managerial and professional employees; approximately 72% of the HR executives indicated that training to learn new skills is highly important in retaining older managerial and professional employees.

Baldwin and Ford (1988) and Holton et al. (2000) provided a framework with the three main determinants of training transfer: Training design or enabling factors, Individual factors or trainee characteristics, work environment or transfer climate. In the knowledge economy,

human capital is any country's greatest asset and nations need to take time to invest by benefiting from new technological opportunities through educational or employment programs in their capital- their people. The shift to knowledge economy and skill- based technological progress are increasing the relative demand for skilled labor at the expenses of the less-skilled (Manacorda and Petrongola 1999). Unarguably an important factor with regard to much of the structural unemployment in developed countries has been the mismatch between skills and newly created jobs (Jones, 1995). Perhaps the key issue is that ICT- based work tends to require lower levels of traditional skills and greater abstract and synthetic reasoning skills (Mansell & Wehn, 1998). In the knowledge era, criteria for employability are getting higher and higher everyday, and more advanced skill requirement is becoming a prerequisite of employment. Most importantly knowledge workers or the creative class have already gained mobility, that is to say tough global competition for high-skilled jobs (Florida 2000; 2002).

Hence, providing education, vocational training, and advanced skill development to young people for their labor force participation have never been that significant before. In addition, equitable access to information, knowledge (or know-how) and education is one of the most vital principles in the emerging global knowledge economy. ICTs are practical tools in narrowing knowledge gaps between countries, regions, and also people by providing new frontiers in the areas of information exchange, intellectual freedom and online education. ICT can make a tremendous contribution to human development, but only for those that have access (Haddon 2001; Walsh et al. 2001). ICT access and usage differs mainly by socio-economic status, and not because of personal preferences, and because many crucial social and economic benefits may accrue from greater access to and usage of communication technologies, such communication disparities constitute a serious 'divide' between segments of a society (Kozma et al. 2004). In Australia, since the late 1990s, the focus has turned to 'employability' skills and how they can be better developed. As with

generic skills, there are some competing definitions of employability and employability skills (Hughes & Stoner, 2001).

As Kearns (2000) has pointed out, the term 'employability skills' can have a broad view that incorporates other types of generic skills within it, but it may also be viewed more narrowly as the skills that enable people to gain, keep and progress within employment. For the purposes of the project, however, it was decided to work with the definition adopted in a recent. Business Council of Australia and Australian Chamber of Commerce & Industry defined in 2002 employability skills as skills required not only to gain employment but also to progress within an enterprise so as to achieve one's potential and contribute successfully to enterprise strategic directions. A study by Smith (2003) of young people in their first jobs focused on the learning processes experienced by young people starting full-time work. It was clear from the Smith's (2003) research that a few of young people's challenges at work related to the technical side of their jobs. Employers appeared to play a major part in either assisting or making more difficult a young person's adaptation to working life.

The Smith (2003) study found examples of employers who had well-tested methods of settling the novice workers into the organization, as well as examples of employers who paid no attention to this role. More generally, there is a wealth of literature on organizational socialization (Kreitner & Kinicki, 1995), which has some application to the entry of young people to their first formal jobs. Strategies for settling employees into organisations include mentoring (Bova, 1987) and induction (Kenney & Reid, 1995). Structure and sequence: all courses are sequenced and structured together to form a coherent program of study (Stark and Lattuca 1997; Stensaker and Harvey 2006) with specific attention to vertical and horizontal integration (Hubball and Burt, 2004). Learning and assessment strategies should be tuned to the educational philosophy, should enable students to obtain the learning outcomes, and should be aligned between courses (Stark and Lattuca 1997; Oliver et al. 2008; Stensaker and Harvey 2006).

The discipline, the research community, the labor market (with alumni) and the society are all closely related to and influencing curriculum choices. It's important to take into account the needs of employers and recruiters, the expectations of society, new findings of the research communities, the accreditation requirements, and those of the disciplinary associations (Diamond 2008; Stark and Lattuca 1997). Institutional resources should include facilities for teaching, organizational infrastructure and technology, quality and quantity of teaching staff, their experience and expertise, staff/student ratio and financial resources (Diamond 2008; Stark and Lattuca 1997; Stensaker and Harvey 2006). Student characteristics that need to be considered are student selection, characteristics of incoming students, diverse background of students (previous knowledge, experience or degrees, ethnic diversity) (Diamond 2008; Stark and Lattuca 1997; Stensaker and Harvey 2006). Resources for students include student guidance, student mobility and facilities for students/learning (Stensaker and Harvey, 2006)

## Research Methodology

This research was a case study experiment in the College of Engineering and Technology (CET) in The Arab Academy for Science, Technology, and Maritime Transport (AAST), during job fairs including employers in campus for alumni. They noticed the need for embedded careers programs within the curriculum. The AAST, established in 1972 is a regional university under the umbrella of the Arab League. The education process is operated by high-level academics offering local and international programs with partnership with more than 130 ranked international universities. The objectives of this case study is to outline the institutional approach to enhancing the employability of our students in their final year before graduation and to explain how this has been achieved across the CET and to outline the finding from initial implementation across the practical training subject.

This case study sets out to describe the approach that College of Engineering and

Technology (CET) has taken up for improving in a short time a zero credit hours subject named "practical training" by implementing a strategy for enhancing student employability through this course. CET outlines the considered approach the institution has taken to developing a list of attributes and how these have been directly implemented within the context of the development of an employability resource zone. To produce a workable agenda for implementation, they needed to spell out what it meant by employability attributes. The responsible comity drew out on the extensive research and well-standardized finding of Knight and York as part of "the Skill Plus Project".

## The Application

"Practical training" outlines for engineering students in 2016 included the following:

- A professional committee participated in the development of the course curricula, named Industrial Advisory Committee, which holds regular meetings twice per month. The committee acted as a link between CET and companies to solicit their opinions on curricula in order to update curricula to cope with the requirements of the business market
- Companies and universities, nationally and internationally were contacted to send their training programs in advance to be reviewed by training supervisors in the different universities in the US, England
- 372 international training was obtained (in USA, Vienna, Shanghai, Germany, Canada, Germany – IKKE, England, Kuwait, Bahrain) serving different departments
- Local training was regularly organized and some factory engineers were invited to participate in teaching during different courses
- An employment forum was created to connect between local companies and students before and after graduation.
- Training opportunities were offered for students. Forms were made for registration of students in training; questionnaires

for students and companies; a form for training supervisors in College; and a form for student evaluation in the final training tests.

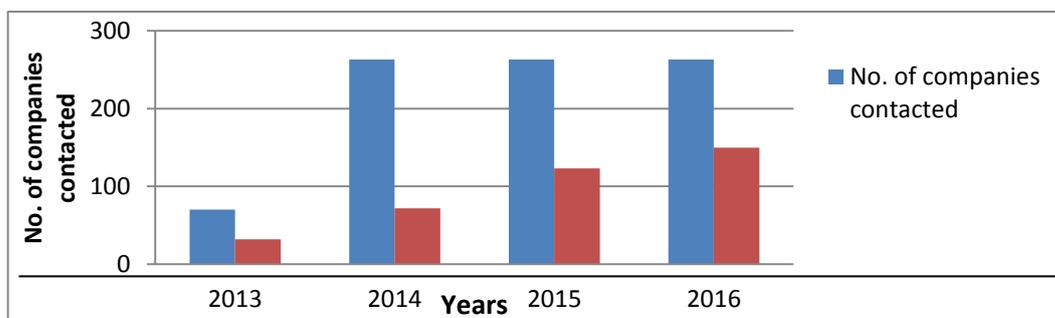
Diverse methods of publicity were used for announcing training opportunities. These methods included a bulletin board to announce training in every department; general bulletin board for the office of the College Undersecretary for Training Affairs and Community Service; College website; Seminars to present the offers of previous years; and TV.

- Students were regularly monitored and distributed across training groups. Each group consisted of 20 students with supervisors from College to monitor training.
- Educational seminars were held for each department presented by university professors or engineers from the companies that hosted training.
- Forms were made for registration of students in training; questionnaires for students and companies; a form for training supervisors in

College; and a form for student evaluation in the final training tests.

- A safety and occupational health course was held during the training. Students are not registered for training until they complete the course.
- A training website was created where forms and training programs were added; students' photos were added regularly in addition to Industry Advisory Council.
- Number of local and international companies responded increased (Figure One)
- The experience enhanced the CET's learning environment and reputation and increased the number of local and international protocols and agreements with companies and with universities in comparison with past years (Figure Two)
- Level of international training opportunities increased due to the positive reputation of the internationalization of curricula and to the enhancing of the practical learning (Figure Three)

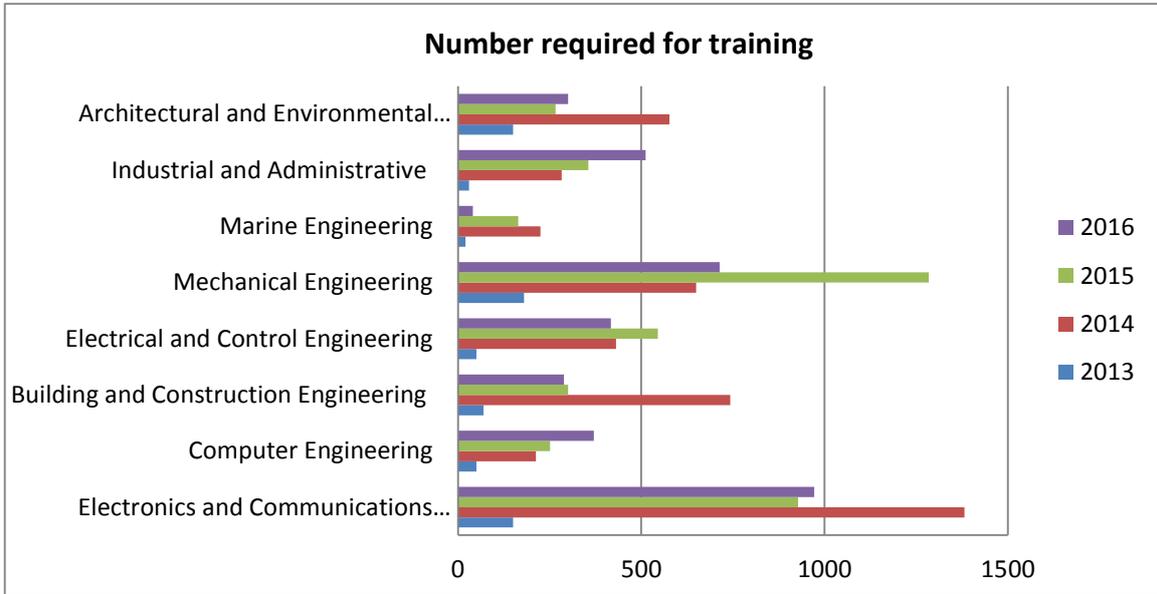
**Figure One: Companies that Participated in the Training**



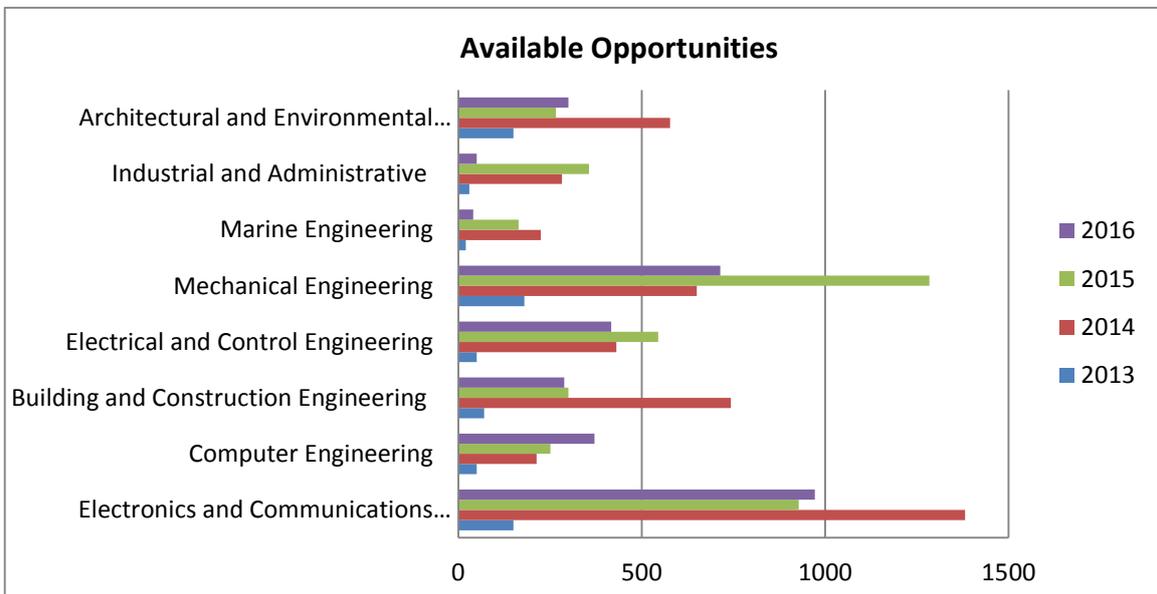
**Table One: Opportunity Training Development in 2013, 2014, 2015, and 2016**

Department	Number required for training				Available Opportunity			
	2013	2014	2015	2016	2013	2014	2015	2016
Electronics and Communications Engineering	170	204	278	190	150	1382	928	972
Computer Engineering	60	70	112	72	50	213	251	371
Building and Construction Engineering	150	167	254	238	70	743	300	289
Electrical and Control Engineering	60	92	156	132	50	431	545	417
Mechanical Engineering	280	351	548	478	180	650	1284	714
Marine Engineering	18	23	52	34	20	225	164	41
Industrial and Administrative Engineering	40	42	45	33	30	283	356	50
Architectural and Environmental Design Engineering	200	312	360	286	150	577	266	300
<b>Total</b>					<b>700</b>	<b>4534</b>	<b>4094</b>	<b>3154</b>

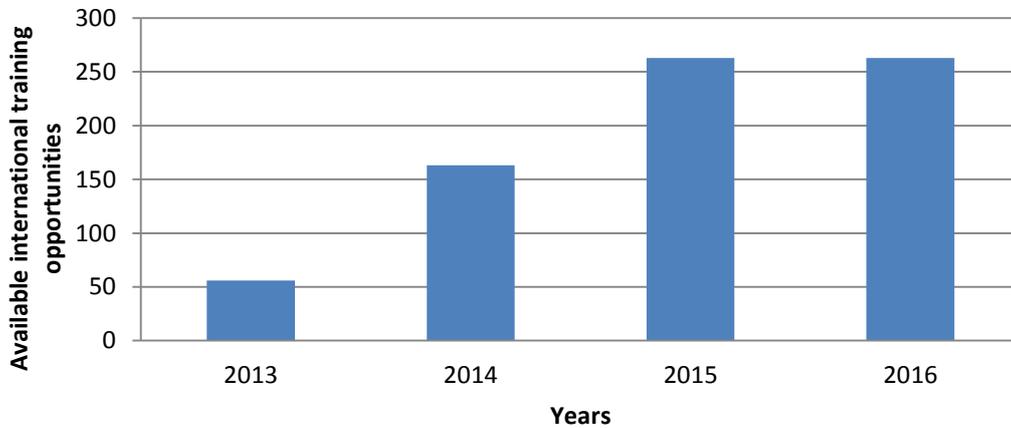
**Figure Two: Number of Required for Training**



**Figure Three: Available Opportunities**



**Figure Four: International Training Opportunities from 2013 to 2016**



## Findings

Confidence in the professional future has improved after the development of the international practical training course. It was very strong in the selective sectors and in the "professionalizing" fields. There must be a sign of this change in behavior by the increase of young people leaving to foreign countries. This type of mobility after studies is positive (confidence in the future, anxious to open up to other social and economic realities), but it sometimes reflects a sense of rigidity in our system.

Whatever it is, one has to distance oneself from a perception of young people as aspiring above all to a statutory position sheltering them from the dangers of the professional life. A majority of French graduates, undoubtedly marked by the rise of unemployment and the break of the ideal employment for life, aspires above all, for one's own children and stable employment, preferably in the civil service.

Whatever the particular sensitivity of opinion on this subject is, the deterioration of the integration of young graduates for three or four years is no less real. The analyses produced by Céreq from the study of the fate of several cohorts of young people during the years following the end of their studies clearly show this. Nearly one in two young persons leaves the education system after a transition to higher education. Among these, 77% had a university degree or a BTS before seeking work. According to the survey of the generation of young people who left the education system in 2001, the unemployment rate of graduates' three years after graduation was about 8 to 9% (compared with 4 to 7% depending on the level of the degree for the generation having left the education system in 1998), the rate of the non-graduates at around 18% (against 9% for the generation left in 1998). Certainly, in the meantime, many have been employed but in precarious conditions. Only 2% did not have any job during these three years, but the first job, only one in two jobs was for an indefinite period. Only graduates of engineering schools or some post-graduate programs obtained a stable first job.

Undoubtedly, those who have followed the less selective and less vocational sectors are the ones who face significant integration difficulties. "Downgrading" at the time of hiring is common: many young graduates of higher education do not have, three years after the end of their studies, a job at the level at which their diplomas theoretically prepared them. For example, only 30% of graduate students have a managerial job and 54% are in intermediate occupations. 68% of those from post-graduate studies in humanities or management (including business schools) are employed as managers. These data, gathered after a phase of improvement in the employment situation of graduates in general and of our graduates from CET in particular, have probably deteriorated over the last five years.

Without going into details on these analyses, it is important to draw some important lessons before proposing recommendations. Recently, companies have found it difficult to find the young graduates they need despite a relatively high level of unemployment. The demographic shock, of which we are just beginning to feel the effects, may, even in the absence of a vigorous recovery in economic growth, produce similar effects.

This optimism, however, must be tempered by the evolution of the school system itself. In twenty years, the number of young people entering higher education has increased considerably. We can only welcome this development, all the more necessary as the structure of jobs has itself evolved. The number of skilled or highly skilled jobs has grown and is expected to continue to grow over the next few years. A society that does not invest in the training of the largest number of people at a high level of training would surely be handicapped in a context of economic openness and global competition. Nevertheless, the access of the majority of young people to higher education necessarily modifies the conditions of integration into employment. As they multiply, the distinctive value of university degrees is no longer the same. Access to managerial positions now involves obtaining a high-level diploma. But getting a degree does not

guarantee that the first job found will be a managerial job. Some young people who have invested in long but unprofessional studies sometimes have more than four difficulties to integrate, while others who have followed shorter paths lead them more directly to a job. Some young people have become aware of this change and are adopting relatively new behaviors: choices for shorter studies but with safer opportunities, willingness to complete their training by a first experience in a company, resumption of studies after a first insertion. But the belief in the virtues of long-term studies has not disappeared, even though the probability of entering a highly qualified job following such paths has been lessened objectively. The attitude of employers sometimes tends to reinforce this attitude, since in France, more than elsewhere, the weight of the diploma acquired in initial training remains an important recruitment criterion, even in the middle or at the end of a career. A recent study by the Center for Employment Studies (2014-2015) recently highlighted the differences, in this respect, between France and other European countries. In France, the criteria displayed at the time of recruitment (especially in advertisements published in the press) refer much more often to training "usually focused on higher education for the most diverse jobs." This does not prevent at the same time from requiring experience in the considered job. In the United Kingdom, employers place more emphasis on know-how and give only relative importance to diplomas.

## Conclusion

In this context, issues related to the choice of studies and orientation in the university system, the relative place of the so-called generalist and vocational pathways, the transition process between university and employment ... are subjects that determine the improvement of the integration of young people from higher education. They require finding answers that go far beyond the effectiveness of placement actions at the end of studies or the familiarization of students with the business world.

This leads to an indispensable finding before the drafting of proposals for action. Faced with the

question of professional integration, it is difficult to consider young people from higher education as a homogeneous bloc. Between those who went through the preparatory classes and prestigious schools and those who dropped out after two or three attempts to obtain a generalist license, it is not only the extent of the phenomenon that differs but its nature. At worst the first will experience a period of job search, the duration of which remains however short. The latter will probably have no alternative but to try to reconvert their beginnings of academic backgrounds into jobs that they consider unsuitable and often insecure. Between these two extremes, the range of situations is very diverse. We do not pretend to deal with all of these situations, which undoubtedly require much diversified answers. If we put aside the ones whose professional destiny is already traced largely at the end of their studies (young people from the grandes écoles, young people who have passed administrative competitions or who have successfully passed a diploma leading them to a profession), for all the others, the question of the transition between studies and employment, the question of professionalization after the acquisition of a solid base during the studies and the question of getting the academic and the corporate worlds close are acute and call for innovative responses. This is what the group has tried to identify, while being aware that some of these responses involve behavioral changes or structural changes that are not built in a day. The Economic and Social Council, at the same time requested by the Government on this subject, has committed to establish long-term prospects. The main focus of the group has been on the relatively short-term actions of young graduates and on the evolution of the supply of university education.

## Recommendations

### Promoting a Sustainable Commitment between Youth and Enterprises

In the context that has just been recalled, two pitfalls must be avoided. The first would be to set up an incentive plan to recruit young people

from higher education in order to make this category more attractive to employers. Such a mechanism would only be a response based on the conjuncture to a problem which, as has been said, involves dimensions that also call for more structural responses. Indeed, it is not clear that, in the face of young people who do not have a solid background of knowledge, employers are very sensitive to financial incentives or flexibility in hiring conditions. There is also the risk of playing one category against the other, young people against the younger ones, and some young people against others.

On the contrary, the group favored a reevaluation of the long-term commitment between the employer and the young person who starts his professional career. Nearly thirty years of "young measures" adopted by successive governments have finally anchored in the minds of both employers and young people the conviction that one cannot start his professional life without benefiting from an incentive. As if the essential for both parties was not to accept to share the risk of a sustainable journey in the company. As if the least productivity of a young person during the first months of his professional life had to be compensated by a public aid and not by the commitment of the young person in the development of his competences and the success of the company. As if the uncertainties of the young person in his first steps in the working life and those of the company when it has not yet discovered all of his potentials could find no other solution than the conclusion of a particular contract, preferably for a limited time.

The obstacles to this long-term commitment are not only economic. They are also, and sometimes even primarily, psychological. Not because of any dissatisfaction with work. All studies show, on the contrary, that the overwhelming majority of young people consider investment in working life as an essential condition for their self-fulfillment and personal success. But rather because of the fear of a decision to terminate the contract in the event of disagreement or dissatisfaction on the part of the employer. While the use of fixed-term contracts is mainly motivated by the search for

greater flexibility in the workforce in terms of hiring young people, it is often also due to the fear of having Recourse to individual dismissal. Trade union organizations sometimes reinforce this attitude by tolerating the use of fixed-term contracts, even when it does not really find its economic justification, and by mobilizing strongly when a contract is terminated without a time limit whatever the reasons are.

Re-emphasizing this long-term commitment to recruiting young people requires time-consuming behavior changes. Demographic changes will probably help. Certain aspects can help. For example, a better understanding by companies of the flexibilities offered by a contract of indefinite duration. The introduction of "new hiring" contracts by the government of Dominique Villepin aims at encouraging small companies to commit employees on a long-term basis by simplifying the conditions for a possible breakdown of the contract. For larger companies the issue is not to change the nature of the contracts, but above all to convince them to adopt a new attitude towards young people by encouraging a reciprocal commitment over time, a guarantee of integration And a factor in the development of autonomy in achieving the goals.

From this perspective, the group suggests that the social partners should examine a system for adjusting the contributions to the unemployment insurance regime according to the nature of the contracts. When hiring a young person (looking for a first job or a first stable job), the company would not pay UNEDIC (National Inter-professional Union for Employment in Industry and Commerce) dues in the first year if they were hired on a permanent contract. Over the next two years, the rate would gradually return to its usual level. Under an insurance policy, hiring on permanent contracts corresponds to a reduction in the risk of unemployment. It would therefore not be unusual for the employer, when contributing to reducing this risk, to contribute less to the functioning of the unemployment insurance regime. Such a "bonus" for employers who would prefer the indefinite duration contracts would have not just an incentive value but also a strong symbolic value. It would help to reverse the trend towards the multiplication of special contracts for young people.

# Appendix

## Appendix 1: International Training Institutions in 2013, 2014, 2015, and 2016

Department	University	2013	2014	Institution	2015	Institution	2016
<b>Electronics and Communications Engineering</b>	Queen in Canada		10	SCI – Germany	16	Uclan	10
				Canada	15	Calpolytech	14
				Queen's	30		
				Grimsby UK	1	SCI	2
<b>Computer Engineering</b>	---		---	SCI – Germany	5	Calpoly	1
<b>Building and Construction Engineering</b>	Louisiana in the USA		25	Kuwait	1	Salford	18
				SCI	10	Calpoly	16
						Kuwait	3
<b>Electrical and Control Engineering</b>	Nizwa in the Sultanate of Oman		4	Queen's	2	Uclan	2
				Grimsby (UK)	7	SCI	11
						Calpoly	5
<b>Mechanical Engineering</b>	IKKE in Germany	IKKE 20 Germany	23	IKKE Germany	22	Calpoly	38
				SCI	10	Grimsby	10
				Grimsby (UK)	25	SCI	2
				Kuwait		IKKE	14
						Kuwait	4
<b>Marine Engineering</b>	ASRY Shanghai University	6	6 5	ASRY	5	ASRY	4
<b>Industrial and Administrative Engineering</b>	---		---	Grimsby (UK)	1		
				Kuwait	1		
<b>Architectural and Environmental Design Engineering</b>	Lincoln (UK) Cardiff	Lincoln 30	63 122	Lincoln UK	17	Lincoln UK	9
				Cardiff UK	15	Austria	27
				Cardiff UK Mett	16	Eastlodon	17
				Berlin (Germany)	22	Salford	16
				Kuwait	4		
<b>Total of International Training</b>		56	163		226		205

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# CASE STUDY

## UNIVERSITY-INDUSTRY COLLABORATION: A CASE STUDY FROM THE GERMAN JORDANIAN UNIVERSITY



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Organizer



## Abstract

The German Jordanian University is a unique model in the MENA region. This is due to the excellence in two features. First, the university is based on the German model of applied universities, and second, the university's cooperation with the industry on the German and Jordanian level. The university's interest in cooperation with the industry is due to the need of the industry for graduates with applied knowledge and entrepreneurial skills. Hence, the university has sought to strengthen its cooperation with the industry to achieve three goals focused on applied education, entrepreneurship, and students' skills. To achieve these goals, the university has established several units including mainly, Office for Industrial Links, Program for Innovation and Entrepreneurship, and the Industrial Relations Committee. The results of this cooperation are demonstrated through the partnership agreements with the industry, internships in Germany, workshops with the industry, graduation projects with the industry, and activities on entrepreneurship. The main lessons learned from this experience are the importance of role of university management, and the importance of communication with industry and trust-building.

**Keywords:** University, industry, relations, innovation, entrepreneurship, applied education, employment, technology transfer, Germany, Jordan

## Background

The German Jordanian University (GJU) is a public Jordanian university. It was founded in 2005 through a collaboration agreement between the Ministries of Higher Education and Research in Jordan and Germany. The collaboration aimed at creating an applied sciences university with an objective to prepare highly skilled graduates with relevant knowledge of the industry through a strong focus on applied education and practical training directed to the market and the industry needs. This focus was a new and unique approach following the demand of some industry

representatives who didn't find the right skills of Jordan's university graduates due to its theoretical education system.

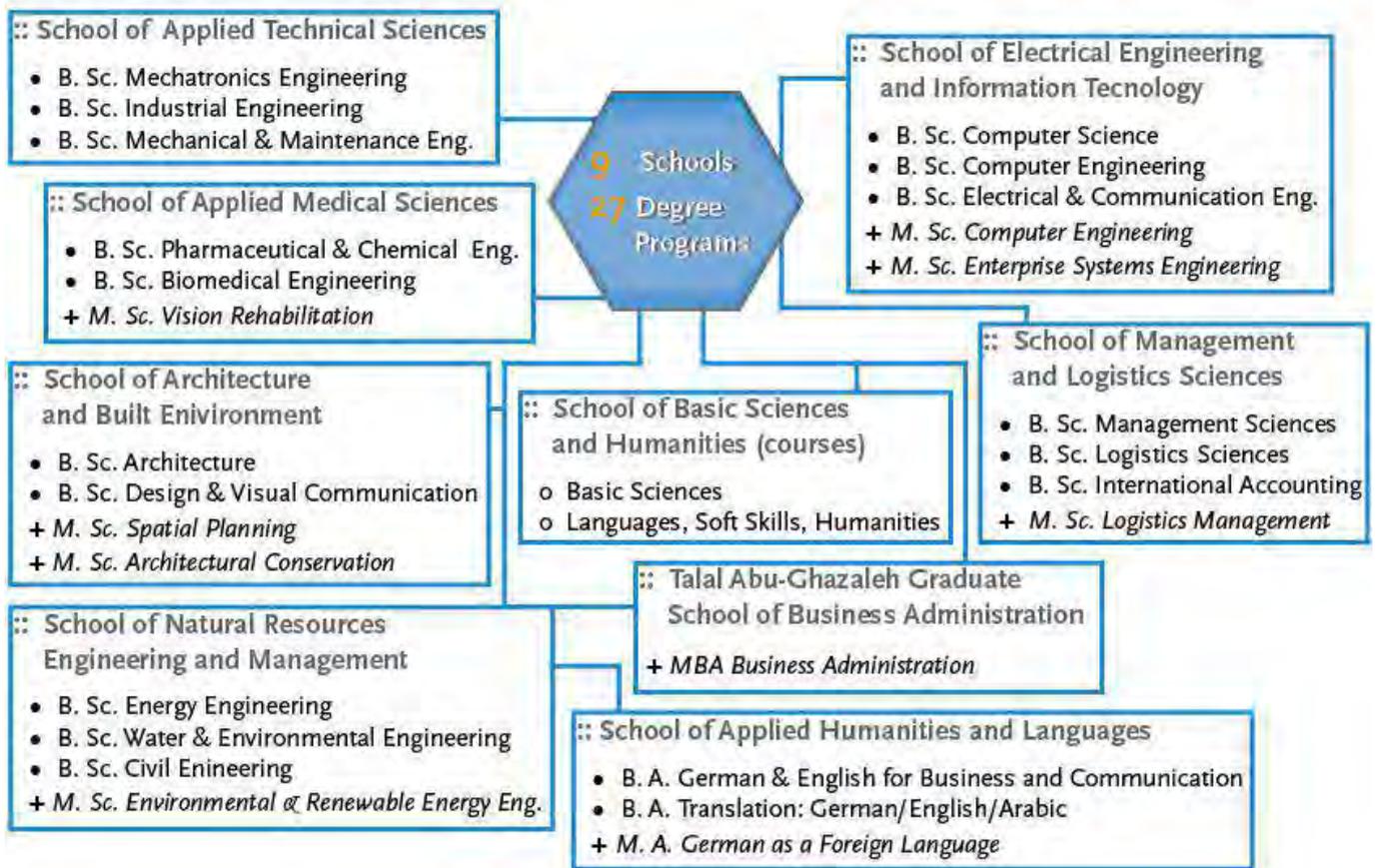
The University has two main unique features, its "German Dimension", where all undergraduate students spend one exchange year in Germany to conduct a study semester in one of the GJU's over 111 partner universities and conduct a practical semester (internship) in a German company in addition to German –Jordanian exchange programs on a faculty level. The second main feature is GJU's "Industrial Dimension" which supports a strong collaboration with industrial partners on different strategic levels in line with GJU's slogan "Education for Entrepreneurship and Employment".

As shown in Figure 1, the University offers 18 Bachelor Programs, mainly in Technical fields, Business and Language studies, and nine Master Programs. It has currently a study body of 3,550 undergraduate students and 450 Masters' students. The overall staff members are 331 academic staff and 300 administrative staff.

## Context

The educational university system in Jordan focuses on providing theoretical knowledge aiming at getting good degrees. However, such degrees alone will not prepare the students for the job market. Hence, there was a big need to establish a higher education institute, which will combine theoretical teaching and research with practical know-how. Looking into the German experience and its system of Universities of Applied Sciences, this successful model was chosen to build an applied sciences university and bring the German dimension to Jordan. The study programs were developed together with German partner universities and the system of industrial professors introduced in order to let students benefit from their practical experience. GJU is the only university in the region that sends all its undergraduate students for one year to Germany to be exposed to a different culture and to gain practical experience during their 5 months' internship.

**Figure 1 Degree Programs offered at GJU**



With the university growing, it was obvious that special units and incentive schemes had to be established at GJU to promote not only the German dimension but also the industrial dimension. The enhanced collaboration with industrial partners on different levels became one of the main strategic objectives putting them on the university's board and deans' council agenda.

## Goals

Strengthening the university–industry collaboration will develop both parties together. Therefore, the university was keen to achieve this by focusing on three main objectives:

## Applied Education

- Develop the corporate image for the industrial dimension of the university
- Create industrial and interdisciplinary research focus groups at each school
- Develop partnerships with the industry through implementing sustainable agreements

- Implement action plans developed with the industry that focuses mainly on engaging industrial partners in teaching, training, research, and advisory
- Develop the practical training of undergraduate students
- Organize regular workshops with the industry, and exhibitions that demonstrate the industrial and applied dimension of the university

## Entrepreneurial and Startup Culture

- Develop the rules and regulations related to the intellectual properties of industrial projects
- Develop partnerships with business incubators
- In-house training on business startups and technology commercialization
- Create a business incubator and a business park at GJU

## Students Skills

- Assist in developing an employability compass that focuses on co-curricular courses and enterprise graduate services
- Develop the practical training of undergraduate students

## Implementation Strategy

Having set the strategic goals of GJU's industrial collaboration approach, the university established different units, as shown in Figure 2, which are responsible for its implementation:

### Office for Industrial Links (OIL)

The Office for Industrial Links (OIL) was established in 2009 to serve both GJU's German as well as industrial dimension. This special unit can be considered as one of the unique features at GJU that facilitate the industrial cooperation within the following scope of tasks:

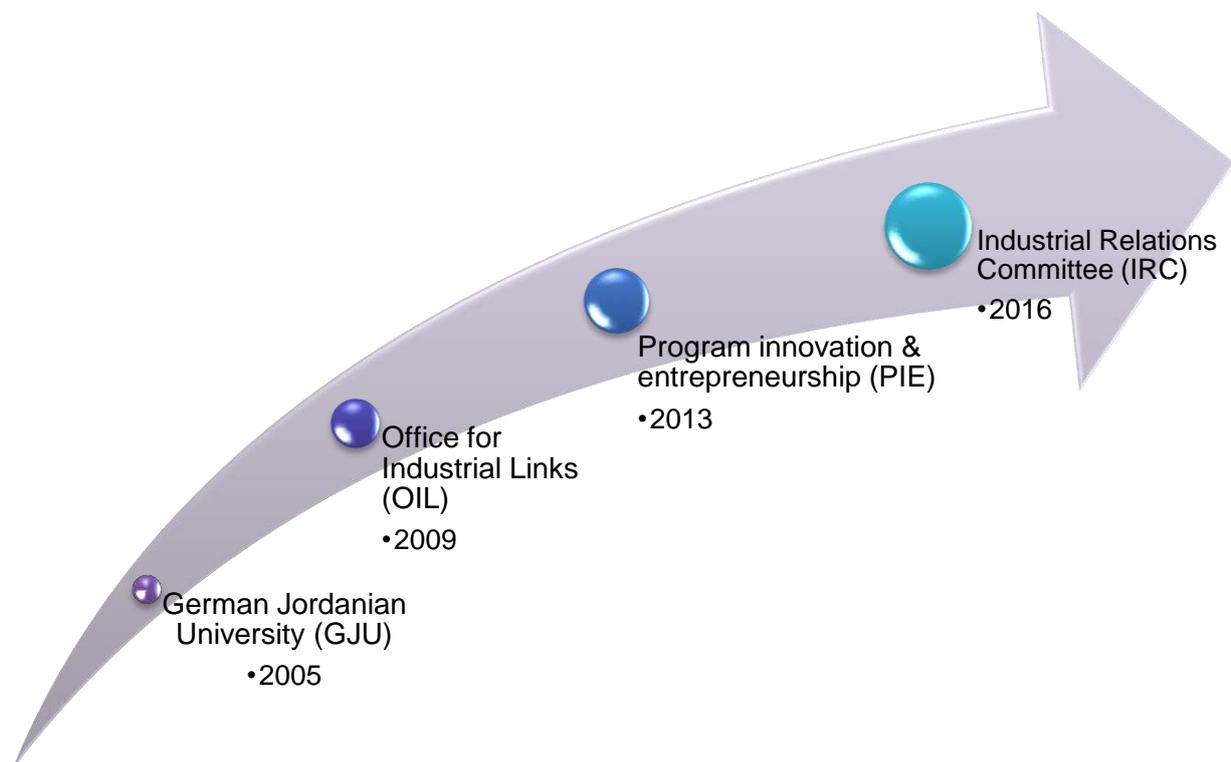
- Build a strong and sustainable network with industrial partners

- Act as a facilitator between faculty and local as well as German industry through involving industry professionals in GJU's study plans, cooperating in the field of applied bachelor projects and organizing business days and company visits
- Attract companies from Germany, Jordan, and the region as potential investors and sponsors (e.g. to invest in training centers, workshops, incubators, labs)
- Introduce Dual Study programs in cooperation with industrial partners
- Provide career services and prepare students and consult them during the application process for their internship in Germany and Jordan
- Organize career fairs and company days for students and graduates

### GJU career fair

To better connect students and graduates with the industry and provide job and internship opportunities, GJU is holding since 2011 an annual career fair organized by the Office for Industrial Links in cooperation with the Career

**Figure 2. Timeline of establishing various units that implement the university-industry collaboration**



Guidance Office of the King Abdullah II Fund (KAFFD-CGO). It is an opportunity for local and international companies to meet face-to-face with hundreds of potential candidates and faculty representatives are given the chance to network and discuss market requirements directly with industry representatives.

GJU Career Fair is growing continuously; in 2016, the fair enabled GJU students and graduates to connect with 80 exhibitors, including the companies' section as well as newly introduced sections for training and scholarship providers in addition to startups and entrepreneurship support organizations. Table 1 shows the number of participants and exhibitors in the GJU Career Fair for the years 2013 to 2016.

The GJU Career Fair is aligned with GJU's vision of Education for Entrepreneurship and Employment and excellent means to reach the goal of networking and cooperation with the industry.

**Table1. GJU Career Fair – Number of participants and exhibitors**

GJU Career Fair	2013	2014	2015	2016
Attended companies	24	40	55	55
Startups and Entrepreneurship support organizations				15
Training / scholarship providers				10
Attended students	~ 200	~ 400	~ 400	~ 500

### GJU alumni

GJU graduates are in high demand in the market because their knowledge can be immediately transferred into their jobs; they have been educated towards market needs, and received international and practical experience in Germany. The OIL is supporting the students in their career after graduation by providing job offers through GJU's recently established own Career Portal and organizing training in cooperation with the King Abdallah II Fund – Career Guidance Office and Jordanian companies.

GJU Alumni are considered as one of the main stakeholders of the University. To preserve a strong involvement of GJU Alumni in the University's activities and keep them connected with their colleagues, a GJU Alumni Club and an annual alumni reunion was established. As part of the Alumni activities and in order to honor successful entrepreneurs, the university introduced in 2014 a new category to GJU's annual Evening of Excellence, the "Alumni Entrepreneurship Award".

Being a young university, GJU Alumni already support students during their German Year, provide job opportunities, and represent "their" companies in GJU Career Fair. They are expected to be the future advocates of GJU with strong connections in Jordan as well as Germany to carry on GJU's message, and give their experience back to their successors on campus.

### Dual studies

Dual Study Programs are essentially a result of two challenges: raising employability of university graduates, and providing the labor market with qualified employees who possess sound skills in practice and theory.

Dual Study Programs integrate academic and vocational training and take place at two locations: a university and a company.

In Dual Study Programs, the academic curriculum and the training at the company are closely connected. Students are continuously integrated into the company's workflow so that they become well acquainted with processes and structures and are immediately fit to start work after graduation. Many of them are directly hired by "their" company, and the others are in much demand by other employers.

In Germany, Dual Study programs exist for many years. It has been proven to be effective in providing companies with "tailor-made" new employees, and enhancing industry–university cooperation.

With the establishment of Dual Study programs, Higher Education in Jordan has entered new

territory. Selected partner companies and important other stakeholders were invited to join reflections about the best way to set up Dual Study programs at GJU. Initially, GJU plans to offer two Dual Study tracks starting in October 2017. Once established, these tracks will provide a model for further Dual Study programs, also at other Jordanian universities.

With such BA programs, GJU's applied approach will be enriched with even more intensive practical phases. Students will study at GJU and work at a company in intervals throughout the entire duration of the program. They will also go to Germany to spend a semester at a partner university and do an internship at a German company.

Dual Studies at GJU will be more than just another internship – students are supposed to take over serious tasks in the companies, bring the knowledge gained at GJU to their workplace and include current challenges and research interests identified in the companies to GJU, through projects and thesis work.

## Program Innovation and Entrepreneurship (PIE)

Innovation and Entrepreneurship are one of the leading factors to create jobs and boost economies. To build an innovation and entrepreneurship culture at GJU, the OIL started in 2013 activities that will lead to the establishment of a Technology Transfer, Innovation and Entrepreneurship support facility through its Program Innovation and Entrepreneurship (PIE). PIE focuses on raising the awareness among students about the alternative career path of establishing own startup companies rather than the employment path. It has the following main objectives:

- Develop a platform for innovators and entrepreneurs both physical and virtual
- Support the utilization of students' graduation projects for:
  - a. Collaboration with the industry
  - b. Establishment of startups

- Build capacity to improve the employability of the graduates through:
  - a. Skills development (presentation, negotiation, etc.)
  - b. Innovation, entrepreneurship, and creativity skills
- Facilitate access to funds and competitions for students and alumni startups
- Create linkages with local and global entrepreneurship and innovation support organizations

One of the tools PIE is utilizing to raise the awareness and build the entrepreneurship culture is its events and activities:

- GJU Hackathons that are 2.5 days of activities to solve different challenges in one theme through the development of proof of concept and sustainability plan or business model
- Innovative Graduation Projects Support Program, which is an initiative to help students identify challenges, and prototype the solutions that have business value
- Entrepreneurship Corner in GJU Career Fair to exhibit startups and entrepreneurship support organizations as alternative career path to employment
- Innovation Space which has two physical spaces at GJU campus, one for prototyping in the equipped Innovation Lab "InnoLAB", and a space for innovation activities and coaching as well as co-working space for entrepreneurial projects "InnoACT"

## Industrial Relations Committee (IRC)

The local industry still needs to be convinced that a strong cooperation with universities will lead to more competitiveness and innovation. Successful engagement with the industry to bridge the gap between academia and business needs to be implemented on a university level in which professors work in close cooperation with industrial partners. Therefore, upon the initiative

of GJU's president, GJU developed under the organizational leadership of the Office for Industrial Links in the beginning of 2016 in two consecutive workshops with the Deans and GJU upper management common strategic goals to foster the collaboration with the Jordanian industry and the implementation of GJU's industrial dimension.

This led to the establishment of the Industrial Relations Committee (IRC) in May 2016 in which each School is represented through the new established academic position of a "Dean Assistant for Industrial Relations", in addition to the directors of the Office for Industrial Links, the University's Training and Consultation Center, and the Program Innovation and Entrepreneurship.

The IRC aims to be the umbrella that coordinates the strategic relations of the university with the industry. The committee seeks to achieve the goals mentioned in section 3 through achieving the following objectives:

1. Coordinate the Academia–Industry cooperation, which can be in the form of teaching, training, and advising
2. Coordinate conducting research with the industry, which can be in the form of research proposals, graduation projects, "Faculty for Factory" projects, and cooperation with Amman Chamber of Industry / Trade
3. Coordinate and promote the utilization of the university services to the industry
4. Follow up on the implementation of the action plan for the university-industry cooperation
5. Supervise the industrial partners' database and keep record of MOUs with the industry

## Results and Outcomes

The introduction of different units at the university to foster industrial cooperation and to put GJU's industrial dimension on a high

strategic level led to the successful implementation of partnership agreements, workshops, and activities that will help to bridge the gap between Academia and Industry, and build a platform for trustful and mutual cooperation.

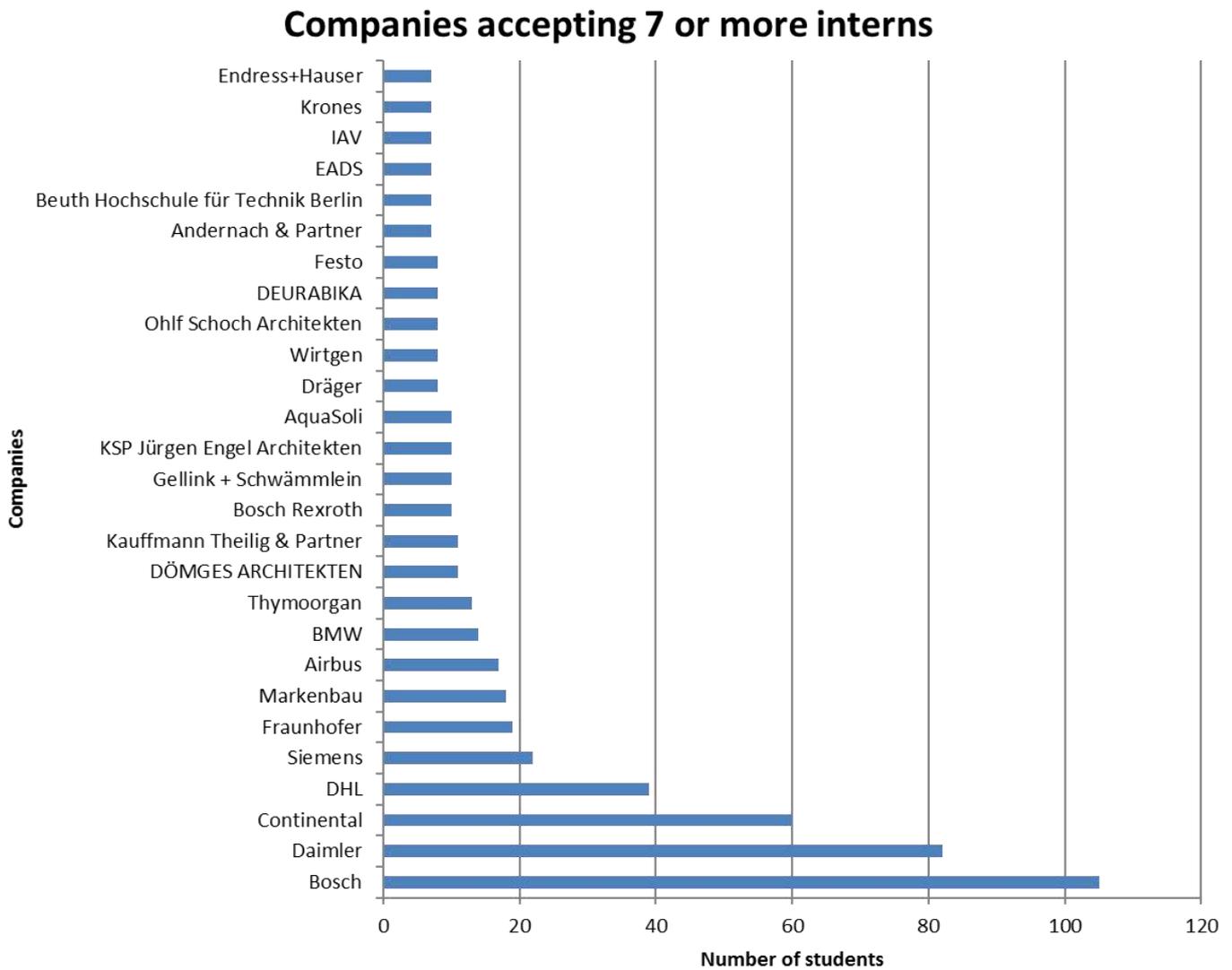
## Partnership Agreements

The university established successfully several partnerships with local, regional and international private sectors to sustain industry and market linkages. Over the last years, several Memoranda of Understanding (MoUs) have been signed between the university and the industry to foster the cooperation, whereas other partnerships have been established on a more informal level of cooperation with no written agreements. These partnerships define the cooperation in terms of applied projects for students and professors, job and training opportunities, company visits, entrepreneurship support, sponsorships, professors' training and teaching in companies and industrial representatives lecturing and exhibiting at GJU. In addition, special cooperation opportunities were introduced to companies in Germany by GJU's German project office, to support GJU's internship program as "Official Industry Partner".

## Internships in Germany

One of the key features of GJU is the obligatory study and internship fourth year in which all GJU students have to complete as an obligatory part of their studies. Until the study year 2015/16, 2,434 students conducted successfully a 5-6 months internship in Germany, more than 60% were evaluated "excellent" and "very good". The OIL provides intensive internship preparation seminars for students before going to Germany and supports their internship search while they are in Germany. Being exposed for several months to a German company and an international environment is one of the key factors led for GJU student's high employability after graduation. Figure 3 show selected German companies who accept GJU-interns.

**Figure 3: Selection of internship companies in Germany which accepted 7 or more interns**



## Workshops to support Industrial Cooperation

GJU organizes several annual workshops and conferences to reach out to national and international potential partners from both the academia and the industry, and to support other Jordanian universities in their outreach and employment programs. These activities included the introduction of best practice examples of existing university-industry collaboration projects at German partner universities to be further developed in Jordan, the enhancement of employability and career opportunities, soft skills and process management tools, as well as exhibitions (Made@GJU) to introduce GJU's capabilities to industrial partners. Since networking, exchange of experience, the introduction of innovative approaches and trust-building measures are the key factors to build

sustainable partnerships, GJU will continue with such activities and strive to follow up on the workshop outcomes and realize its developed action plans.

## Flying Faculty Program and Co-teaching

The Flying Faculty (FF) program was originally established to enhance the exchange of expertise between GJU and its German partner universities. It supports professors from partner universities to teach specific courses at GJU that add value and expertise to the regular curricula. To enhance the relevance of the applied science teaching, and to further the cooperation between faculties and industry partners, the program was expanded in 2016 to also include potential lecturers from industrial partners. With this new FF format, industrial

representatives from leading businesses (e.g. Airbus, DHL, IBM) brought hands-on and real-life experiences into the classrooms.

Similar programs were also implemented with Jordanian corporate partners, which not only enhanced the student's knowledge but also aimed at providing business solutions:

- Mixed Dimension: Training for Industrial and Mechatronics Students on 3D- Printing
- Maani Ventures: Applied project to develop buildings modules for Architecture students
- Nestlé (Marketing): Management students develop a marketing strategy for Nestle products in Jordan
- Adapt2job – 2win training (DHL/IBM): Logistics and Industrial Engineering students develop scenarios in supply chain for the Jordanian industry, co-taught by a German professor and industry representative

## Applied Graduation Projects

The university promotes conducting the graduation projects of students in cooperation with industrial partners. Accordingly, the university gives incentives for academics who solve problems for the industry and participate in expanding its network with industrial partners in Germany and Jordan, which mainly include:

### Companies in Germany:

- TÜV SÜD Industrie Service GmbH in München, Energy Engineering
- SAP AG, Computer Engineering
- EADS/Cassidian in Unterschleißheim, Computer Science
- Continental in Ravensburg, Computer Engineering
- Siemens AG, Computer Engineering
- Nokia in Berlin, Computer Science
- Sanofi Aventis in Frankfurt, Pharmaceutical, and Chemical Engineering
- Evonik Röhm in Darmstadt, Pharmaceutical, and Chemical Engineering

- Bayer Schering in Berlin, Pharmaceutical and Chemical Engineering
- Glatt Pharmaceutical Services in Binzen, Pharmaceutical and Chemical Engineering
- Vetter Pharma-Fertigung GmbH & Co. KG in Ravensburg, Pharmaceutical and Chemical Engineering
- Daimler AG (Mercedes) in Stuttgart, Industrial Engineering
- Phoenix Contact Electronics in Blomberg, Mechatronics
- Audi AG in Ingolstadt, Mechatronics
- Robert Bosch GmbH, Mechatronics

### Companies in Jordan:

- Hikma, Pharmaceutical and Chemical Engineering, Industrial Engineering
- Ayda, Pharmaceutical, and Chemical Engineering
- KAADB, Mechatronics
- Aramaex, Industrial Engineering
- Nuqul Group, Industrial Engineering
- Jetan Group, Industrial Engineering
- Fine Hygienic Paper Company, Industrial Engineering
- Zain-Jordan, Industrial Engineering
- Tahboub Woods, Industrial Engineering
- Sapartin, Industrial Engineering
- Petra Aluminium, Maintenance Engineering

## Entrepreneurship Development

## Culture

Since the establishment of PIE at the university, several programs and activities have been achieved. The main key achievement is not only the progress of the engagement of the students in the participation of the activities but also in organizing such activities. During the past three years, more than 30 external speakers' sessions provided informative and motivation speeches to increase the awareness of the students of the alternative career paths.

Moreover, Figure 4 shows the students participation in the hackathons that were directly related to solving local challenges.

Following the increased interest of the GJU hackathons not only by the students but also by the local companies and organization, the Innovation Space was established in early 2017 to enable the students and companies to further develop the prototypes resulted in the hackathons.

## Lessons Learned

What Went Well:

- University management and strategic objectives towards collaboration with the industry
- University management commitment to keep growing activities and structures to support the University-Industry collaboration
- Increasing number of industrial partners over the years
- The focus on building trust between the university and the industrial partners through slow steps and joint experimentation

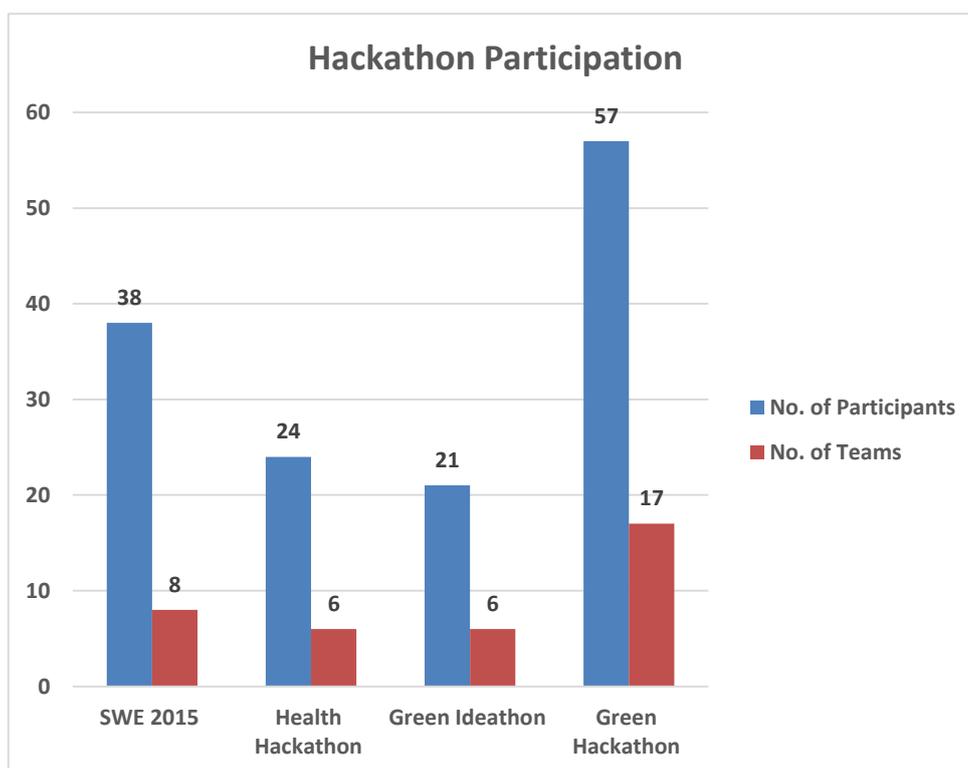
Even Better if:

- The university keeps expanding the number of committed partners
- GJU develops structured monitoring and evaluation systems for the collaboration with the industry to keep track for the impact of this collaboration
- The university publishes and announces the results of the collaboration on a broader scale to increase the awareness and motivation of both the university staff and the industrial partners
- The university invests and increases the number of university specialized staff focusing on the facilitation between the university and the industry

Keep on Doing:

- Introduce new approaches for the collaboration to show the commitment of the university
- Encourage GJU staff members through special incentive schemes to contribute more to GJU's industrial dimension.

**Figure 4. Students participation in GJU Hackathons**



**Table 2. Selection of Memoranda of Understanding signed with industrial partners**

Date of signing	Company name	Main fields of cooperation
08.03.2010	DHL Express	Training and internships in Jordan and Germany, field-trips, dual studies
28.02.2012	Jordan and Amman Chamber of Industry and EJABI (Euro-Jordanian Advanced Business Institute)	Cooperation in the field of SME support and graduation projects
03.05.2012	Akhtaboot	Career Fair
22.10.2012	DB International	Young Professional Engineers Program for Graduates
05.08.2013	GIZ Solar Cooling Project	Research/Testing for staff and students
01.12.2013	Maani Ventures	Internships, dual studies, overall support of university-industry cooperation activities
30.01.2014	Al-Layyan Company for Logistics Services (Easy Log)	Field-Training for students
07.02.2014	Tamweelcom	Microfinance, entrepreneurship support
26.05.2014	Jordan Green Building Council	Internship and training seminars
19.10.2014	Bayt.com	GJU Career Portal, Career Fair
23.10.2014	SAP	SAP Dual Study Program
29.01.2015	Palma Consulting	Internships and training seminars
20.12.2015	Mixed Dimensions Inc.	Job and internship opportunities, entrepreneurship
08.06.2016	iPark	TechTransfer, Commercialization, IP, invention disclosures
14.06.2016	Oasis 500	Entrepreneurship and startup support
21.07.2016	Intaj JSSO (Jordan Skills Standardization Organization)	Develop IT related study programs according to the market needs
12.10.2016	Palestine Hospital	Internships, Research and Graduation Projects
30.01.2017	Cewas Middle East	Entrepreneurship and startup competition

**Table 3. Official Industry Partnerships with German companies for the internship program**

Company Name	City
ACHE Engineering GmbH	Leun
Actensys GmbH	Ellzee
AquaSoli GmbH & Co. KG	München
ARAMCCO in Germany	Stuttgart
Architekturbüro Prof. Dr.-Ing. Suhail Yousef	Isernhagen
Bartec GmbH	Bad Mergentheim
Baumeel GmbH	Bonn
Bosch Sicherheitssysteme GmbH	Grasbrunn
Bosswerk GmbH & Co. KG	Nettetal
Brainlab Corporate Services GmbH	München
CDM Smith Consult GmbH	Bochum
Celanx GmbH	Isernhagen
Christine Berger GmbH & Co. KG	Werder

Table 3 continued...

Table 3 continued...

Company Name	City
DAFG - Deutsch-Arabische Freundschaftsgesellschaft e.V.	Berlin
DB Mobility Logistics AG	Frankfurt / Main
DeeaSolutions GmbH	Frankfurt am Main
Design Media Studio	Stuttgart
Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH / Green Cooling Initiative	Eschborn
DHL Express Germany GmbH	Bonn
Diehl Metering GmbH	Ansbach
Dömges Architekten AG	Regensburg
Dow Olefinverbund GmbH	Schkopau
Drees & Sommer AG	Stuttgart
Emlak AG	Köln
Entellgenio GmbH	München
ET Solutions AG	München
Forschungsverbund Hochschule Fulda am House of Logistics and Mobility (Holm)	Frankfurt am Main
Gellink + Schwämmlein Architekten	Stuttgart
Goodgame Studios	Hamburg
H.R. Hiegel	Karlsruhe
HEINRICH GmbH Agentur für Kommunikation	Ingolstadt
IHK Industrie- und Handelskammer Düsseldorf	Düsseldorf
Industrial Solar GmbH	Freiburg
Init AG für digitale Kommunikation	Berlin
Institut für Energie- und Umwelttechnik e.V. (IUTA)	Duisburg
Institut für Umwelttechnik und Energiewirtschaft (IUE)	Hamburg
International HuMan Power	Berlin
ITS International Training & Support GmbH	Bremen
KRAFTWERK Renewable Power Solutions GmbH	Weingarten
Leo Burnett GmbH	Frankfurt am Main
MBS Nürnberg GmbH	Nürnberg
MdR Consulting Management UG	Berlin
Medent GmbH	München
Mobile Teacher GmbH	München
Moreno + Seidler Architekten	Bad Salzdetfurth
Nassauische Heimstätte/NH Projekt Stadt	Frankfurt am Main
Ohlf Schoch Architekten	Stuttgart
PA-ID GmbH - Automation & Vermarktung	Kleinostheim
Profindis GmbH	Ettlingen
Puma SE	Herzogenaurach
Rongen Architekten	Wassenberg
Ruairi O'Brien Architektur.Licht.Raumkunst	Dresden
Spap GmbH & Co. KG	Dortmund
Spezialgeräte Schmölln Ablängtechnik GmbH	Schmölln
SpinDesk UG	Münstermaifeld
SSI-Student Services International Ltd	Berlin

Table 3 continued...

Table 3 continued...

Company Name	City
Stahlbau Rattey	Oberhausen (Osterfeld)
SystemKosmetik GmbH	Münster am Lech
Szenaris GmbH	Bremen
Tellows UG	Leipzig
Tholander Abluftechnik GmbH	Viernheim
Thymoorgan Pharmazie GmbH	Vienenburg
Tutoria GmbH	München
VitakidGemeinnützige GmbH	Düsseldorf
WHS Foundation GmbH	Berlin
Wirtschaftsregion Offenburg Ortenau	Offenburg
Zöllner Hans-Ulrich Architekten BDB	Hamburg

## Collaboration Workshops with Industrial Partners

### University-Industry Partnerships Workshop (08.-09.02. 2015)

To maintain the function as a role model for the region in its focus on applied sciences and collaboration with the industry, the OIL organized a workshop on University Industry Partnerships to present best practice examples of existing collaboration projects at German partner universities as well as at the GJU. The workshop was intended to lead to the enhancement of university-industry cooperation and the establishment of new partnerships.

### Workshop on “Strengthen the employability of Jordanian students through Career Services” (26- 02.07. 2015)

This national workshop, which was organized by the OIL in cooperation with the Career Service of Aschaffenburg University of Applied Science and the support of the King Abdullah II Fund for Development-Career Guidance Office (KAFD-CGO), provided a platform for Career Counselors from different Jordanian universities, academic staff, implementing organizations and the private sector to discuss the current situation of Career Services in Jordan and future steps to increase the employability of students from Jordanian universities.

### Workshop on Process Management in the framework of the DAAD DIES partnership “Establishing Career Service Structures and Processes at GJU” (09.-12.11.2015)

The workshop focused on building the skill capacity of GJU staff members. The objective was to introduce GJU staff members to basic quality management and process management issues so that they can achieve the objectives of the overall DAAD DIES cooperation, which is to establish Career Service structures and processes at GJU. GJU staff members were briefed also on a new process management tool called Prodbo. GJU purchased the software with funds from the DAAD DIES project and will cover the monthly running costs henceforth.

### GJU Internal Workshops “How to Enhance the Cooperation between the University and the Industry” (17.3. + 14.04.2016)

In order to develop goals and strategies for GJU’s industrial dimension, two workshops were implemented upon initiative of GJU’s president and the organizational lead of the OIL. In these workshops, the Deans and Vice-Presidents developed and defined the top priorities and necessary next steps to increase the collaboration with industrial partners at the University as a whole and at the

different Schools. As further result, the Industrial Relations Committee (IRC) was established at GJU.

#### **Launch of GJU Career Portal (6.4.2016)**

As part of the preparation seminars for GJU's annual Career Fair, GJU's Career Portal was launched. It was initiated by the OIL and developed in cooperation with bayt.com as part of their CSR activities in order to serve in the future as the main means of job and internship announcements and job search platform for GJU students and graduates.

#### **University Industry Collaboration Workshop – Cooperation Opportunities and Challenges(1.6.2016)**

The workshop was the first of its kind at GJU aiming at strengthening GJU's applied strategic approach. It brought together 60 representatives from industry and the academics from GJU as well as other stakeholders, to discuss possible forms of cooperation and develop action plans for common activities. The workshop was rounded off by an exhibition Made@GJU in which GJU's Schools presented their capabilities and projects to the industrial partners.

# CASE STUDY

## **BUILDING HUMAN CAPITAL CAPACITY FOR A KNOWLEDGE-BASED ECONOMY IN THE ARAB WORLD: THE ROLE OF THE UNIVERSITY CURRICULUM – AHLIA UNIVERSITY**

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Organizer



## Abstract

In this age of globalization, universities play a crucial role in knowledge creation and skill development. Building capacity for knowledge-based development requires well-trained individuals to participate in the creation of new ideas and promote innovation. The stock of human capital represents an important indicator of a country's ability to increase productivity and foster economic growth. The aim of Ahlia University is to support the Bahrain 2030 vision by providing excellent educational services, which enable students to acquire skills and competences to meet projected labour market demands for specialists in their respective fields of specialization.

## Introduction

Human capital is a key driver in the development of all nations. In modern history, the rise of Western civilization and rapid improvement in human development has been linked to advancement in human capabilities to increase productivity, enhance creativity and promote innovation. Human capital represents the most valuable resource that nations require to build productive capacity for development. Unlike physical capital and natural resources, human capital is intangible comprising creative thinking and innovative skills used by society to generate new ideas, develop new technologies and create new knowledge.

The functioning of the new economy, also known as the knowledge-based economy, depends on the creative ability of the human mind to generate new ideas, develop new techniques, and produce new products. In the knowledge-based economy, human capital facilitates wealth creation and fosters economic growth. Investment in human capital not only increases capacity to create knowledge and promote development, but also enhances global competitiveness and deepens integration in global markets.

Countries with limited natural resources can diversify economically and increase productivity

by investing in education to harness the nation's scientific and technological capabilities as a mechanism for building capacity for development. To this end, long-term economic success of a nation will depend on the country's human capital endowment and its contribution to creativity, productivity, and innovation. The human factor and the quality of education must be developed to provide the skills needed to support development.

The aim of this paper is to highlight the importance of human capital in building capacity for development in the MENA region. The paper focuses on the role that universities play in building human capital capacity to empower people to acquire adequate skills and competences to take a more active role in the economy. The future development of a nation and its ability to sustain growth will depend on the quality and delivery of educational institutions to support labor market needs.

Among the leading private educational institutions in the Kingdom of Bahrain, Ahlia University strives to provide excellent educational services to support sustainable local and regional development and foster economic growth. This paper highlights initiatives and policies undertaken by the university to increase the stock of human capital consonant with the Bahrain Vision 2030.

## Human Capital

Human capital contributes greatly to economic growth and diversification of the economy. Most Arab economies, especially in the Gulf region, are currently making efforts to recover from the recent decline in oil prices and lessen the impact of this decline on the ability of these countries to support public expenditures and create employment opportunities. In developing countries, including the Arab world, human capital contributes to technological development through the adaptation of new technology. In this regard, the quality of education is critical for meeting the scientific and technological challenges facing these countries.

A nation's productivity is linked to the average years of schooling. Therefore, an additional year at the intermediate level of education could have positive impact on productivity of the economy. It is estimated that additional year of average school attainment increases the level of aggregate productivity by around 5% on impact and by a further 5% in the long run [1a].

As a concept, human capital is broadly defined to include several kinds of investment in people. Investment in education increases the capacity of the workforce to engage in productive activities. Education provides people with skills, knowledge and competences through schooling and training to make sound decisions and increase public participation in market activities. For the purpose of this research, we will define human capital as the stock of knowledge embedded in people that a society accumulates through education and training.

Human capital spans several echelons of human competences including skills, talent, knowledge, capabilities, experience, and training embedded in people. A society's stock of human capital represents the cumulative components of all these resources, which are used to contribute to a nation's productive capacity. The stock of human capital determines a country's productive capability, level of access to global knowledge, capacity to innovate, and rate of economic growth. In this regard, investment in human capital is the sine qua non to accelerate socio-economic transformation and economic conversion from a resource-based to a knowledge-based economy. As pointed out by the World Economic Forum [2]:

“Human capital is not a one-dimensional concept and can mean different things to different stakeholders. In the business world, human capital is the economic value of an employee's set of skills. To a policymaker, human capital is the capacity of the population to drive economic growth. To others it may include tacit knowledge acquired informally

through experience, non-cognitive skills, such as inter-personal skills and the physical, emotional and mental health of individuals. The Human Capital Index aims to accommodate this conceptual diversity and takes a holistic approach, while keeping an overall focus on maximizing a nation's human potential.”

Table 1 illustrates some of the important indicators for building knowledge capacity. Most Arab countries shown in the table need greater improvement in these indicators to strengthen knowledge readiness and support knowledge-based development.

Economic productivity is influenced by the quality of skills embedded in people. The stock of human capital increases the nation ability to generate linkages, create knowledge, and foster economic growth. Most knowledge is created at educational institutions through teaching, research activities and university-industry collaboration. These spill-over effects could increase labor market demand for knowledge workers and highly skilled individuals.

The human capital factor could be decisive in determining the economic success of a nation by allowing greater labor market flexibility and strengthening knowledge fundamentals necessary to build capacity for development. The importance of human capital lies in the role that human resources play in producing knowledge and disseminating technological innovation. In the knowledge economy, human capital is considered not only as an important input in knowledge production and use, but also as an instrument to promote equity and fight social exclusion. In this regard, human capital is defined to include three components: 1) general skills related to quantitative literacy and the ability to process information; 2) specific skills related to the operation of particular technologies and 3) technical and scientific knowledge related to a specific body of knowledge relevant to production of technology [1b].

**Table 1: Macro Indicators for Knowledge Readiness – Selected Countries**

Country	Human capital index	GCI	Technological readiness	Higher education and training	Innovation
Singapore	78.15	5.56	6.09	6.09	5.18
Finland	85.78	5.50	5.97	6.22	5.78
United States	79.64	5.54	5.78	5.82	5.49
Sweden	83.29	5.41	6.19	5.90	5.37
Malaysia	74.26	5.16	4.18	4.80	4.67
Saudi Arabia	61.38	5.06	4.54	4.64	3.80
Oman	---	4.46	4.24	4.17	3.29
Bahrain	72.69	4.48	5.01	4.66	3.32
UAE	69.39	5.33	5.48	5.90	4.41
Qatar	69.04	5.24	5.17	4.99	4.88
Kuwait	59.31	4.51	3.69	4.15	2.86
Egypt	61.38	3.60	3.21	3.27	2.65
Jordan	65.69	4.25	3.71	4.78	3.64
Lebanon		3.68	3.50	4.39	2.75
Morocco	59.04	4.21	3.57	3.56	3.11
Algeria	52.14	4.08	2.59	3.69	2.60
Tunisia	58.21	3.96	3.38	4.28	3.01

Source: World Economic Forum, *Global Competitiveness Index 2014-2015*.

## Role of Universities

Universities play an important role in training students and strengthening the economy's fundamentals to stimulate economic growth and improve human development. In addition, universities build an enabling environment, which enhances technological learning for knowledge localization and innovation diffusion. The knowledge-enabling environment is an 'integrated system based on the integration of educational, economic, social, political, technological, and media frameworks among others.' [3a] Thus, higher education serves as a key driver of the development process making universities a powerful venue for knowledge creation and technological learning.

Universities in MENA region are poorly equipped to meet the challenges facing the region. Programs offered by universities are not adequate to meet market demand for skills and promote knowledge creation. The Arab Knowledge Report 2014 [3b] highlights the inability of universities and higher education

institutions to produce the required critical mass of knowledge workers invested with a capacity to ensure the transfer and localization of knowledge. In other words, universities are not producing students who consider themselves as lifelong learners; instead, they consider university degree as the end to commitment to education.

Despite reforms undertaken in the educational system of several countries in the MENA region, little has been done to stimulate 'flexibility, innovation, and risk-taking. These are the features that lay the foundation for an effective education system in the knowledge-based economy and economic competitiveness.' "Education policies in many Arab countries lack an integrated vision of the education process and its objectives. Furthermore, these policies are characterized by inconsistency and lack of direction. Problems such as those relating to the content of the curricula, forms of examination, evaluation of students, and foreign languages cannot be settled without formulating a well-defined vision of educational goals and necessities." [4].

In the knowledge economy, universities increase capabilities of the incipient labor force to acquire skills, conduct scientific research, and engage in creative thinkers and effective decision making. Due to rapid changes in technology, labor market flexibility is essential for MENA to catch up with economies at a higher level of technological and scientific advancement. A successful university system is measured by its contribution to human capital development in a way that increases societal choices to allocate resources in a productive manner. Education helps societies solve problems through scientific research and knowledge acquisition and strengthens knowledge fundamentals that enhance competitiveness and support sustainability. Ultimately, the future development of a nation will depend on its ability to produce knowledge.

Universities and other higher educational institutions are viewed as engines of economic development and sustainable growth. In such countries as Singapore, Korea, Japan, Hong Kong, and Western countries, universities have contributed positively to advancements in scientific research, technological readiness, and human capital development. Trained and competent people are more productive than low quality labor. As pointed out by James Wilson, the most important contribution universities, and higher education make to development is the formation of human capital that produces significant research advances [5].

The role of universities in development is critical for not only producing scientific and applied knowledge, but also in sharing knowledge among individuals, enterprises, and institutions. Through research and development, universities likewise generate useful ideas which foster innovation and enhance economic diversification. These linkages between universities and the rest of the society facilitate creativity, productivity, and innovation. High human capital concentration in a particular geographical region facilitates linkage creation allowing knowledge to be communicated among a wide range of individuals. In the case of the GCC countries, factor mobility among the countries in the region induces knowledge

creation and facilitates innovation within the countries in the region.

Universities facilitate knowledge communication by improving the ability to learn through greater interaction and networking. Collaboration with local and foreign universities provides mechanisms for knowledge transfer and skill acquisition, which strengthen the fundamentals for individual contribution to the knowledge economy. Globalization has improved access to global knowledge and increased networking where individuals, universities and organization can establish linkages and obtain information.

Hiring in universities needs to be reassessed to increase the share of researchers and people with interest in sharing knowledge and conducting research. Ahlia University has introduced bylaws and allocated financial rewards for encouraging faculty to conduct quality research with local content to support the national economy. The university recognizes that globalization has increased the extent of interaction among individuals, organizations, and institutions at both local and global levels. Cooperation and collaboration among local, regional and global educational institutions are essential to facilitate knowledge creation, technology transfer and innovation diffusion. Globalization has increased access to global markets allowing countries to gain access to knowledge, skills and information with little or no cost involved.

In the Arab world, universities need to formulate strategies and offer impactful curriculums that help students acquire adequate skills suitable for labor market needs. In most universities, courses taught in current curricula have little or no connection to changes in technologies stymying students' abilities to apply their university knowledge and skills in the market place. Sustaining growth and creating new jobs for young people will require universities to offer innovative and up-to-date courses that cater market needs and support entrepreneurial activities.

Universities in Arab countries will be facing extraordinary challenges in connection with not

only enhancement of quality in education, but also collaboration with industry with a view to having joint research programs to support knowledge creation and innovation diffusion. Building a knowledge economy is driven by the use of existing knowledge and the creation of new knowledge by individuals and institutions of higher learning. The rise in demand for human capital in recent decades is a reflection of the changes in the economy with respect to knowledge application and use. Despite the fact that technology is important for knowledge sharing and knowledge communication, building capacity for a knowledge-based economy should be directed first at the human capital and the role that organizations play in knowledge management and innovation diffusion. It is the ability to share knowledge and learning from others that enhances capacity to contribute to knowledge creation.

Universities play special role in building such capacity by providing students with the necessary skills for knowledge production and technology diffusion. University graduates with adequate knowledge and good research skills contribute to local development by empowering private enterprises and encouraging investment in knowledge industries. These features of human capital have the potential to transfer knowledge among individuals, groups and institutions, i.e. 'knowledge spillovers.' Allowing individuals to communicate and share ideas strengthen knowledge creation as well as produces secondary pathways that increase the stock of human capital. In the Arab world, the exhaustibility of energy resources, countries in the region must rely on human capital if they have to sustain development in the future.

## The Knowledge-Based Economy

The knowledge-based economy depends more on the ability of human resources to produce knowledge and provide technical expertise for building knowledge-based industries. In the global economy, competition entails production and export of knowledge-based products and services in which human capital and new ideas are critical. Employment in the knowledge

economy requires attainment of high levels of skills and excellent vocational training. Accordingly, the educational system needs to be reformed to increase learning opportunities and provide appropriate skills to meet market demand. It must involve research units, centers of excellence and scientific and technological specialization to improve the quality of human capital and supply the knowledge-based economy with the required skills.

Globalization and advancement in information and communication technologies (ICTs) have been key drivers of the knowledge economy. Use of ICTs helps people in different geographical locations to communicate and exchange ideas, gain access to knowledge and acquire information. ICTs empower people with the means to create, codify, disseminate, and share knowledge [6].

In the new economy, economic growth depends on innovation and technology, which represent the core factors of the knowledge economy. "The knowledge economy is based on the generation and adoption of new knowledge created by scientific research and technological advances; investments in education and research; adoption of best practices; and openness to social, economic, and cultural innovations." [7].

In the knowledge economy, education and training is essential so that it can provide continues skills that allow the creation, dissemination, use and utilization of knowledge. The knowledge economy is a dynamic process which requires creation of new ideas and development of new technologies to improve productivity and produce goods and services. A highly skilled workforce enables access to global markets and encourages technology transfer to support development.

There are four important cornerstones for building knowledge economies: a well-educated and highly skilled workforce; a sound information and communications infrastructure; a dynamic innovation system and an effective institutional system capable of providing the necessary support for knowledge creation,

technology transfers, and innovation diffusion. Knowledge acquisition and technology transfer are necessary for speeding up the process of knowledge creation and innovation diffusion in the local economy. However, countries need to construct a development strategy and create an enabling environment for building knowledge capacity. Governments in the region need to construct effective strategy aiming at stimulating knowledge creation through the development of the national educational system. It is important that student learning outcomes be given high priority in the educational system to strengthen the ability of students to contribute to the development of the economy. Staff development programs should also be enhanced to update instruction knowledge and improve delivery in the classroom.

## Arab Economies

During the last hundred years, economic development in the GCC region has been financed by revenues derived from production and export of energy, mainly oil and gas resources. More than one third of global oil and gas reserves are located in the MENA region reflecting the importance of the region as a global supplier of energy. A lack of economic diversification and a low level of industrial production have subjected the economies of the region to a high degree of instability brought by

volatility in energy prices. The recent decline in oil prices has impacted the ability of the region to meet its fiscal need to support economic growth. Table 2 illustrates the heavy dependence of the Arab region on oil revenues and the impact that the recent decline in oil prices have on the region financial position.

In view of fossil fuel depletion in the long run, regional energy exporting countries need to invest in education and increase the stock of human capital for promoting social and economic development. Acting as veritable monopolists in the provision of most educational services, governments in the region employ the majority of graduates from the school system. This reflects the dominance of the public sector in economic development and the low contribution of private enterprises in the economy. It is estimated that the region needs to create 100 million jobs by 2030 largely due to high population growth and inability of the public sector to absorb more people. As described by the United Nations:

“Since independence, most countries have seen little change in economic structure. Manufacturing—the primary vehicle for job creation in emerging economies—has registered painfully slow and sometimes negative growth. The public sector has either crowded out and manipulated the private sector

**Table2: Gross oil export revenues in the Arab region, 2012-2017 (billions of US dollars)**

Country/sub-region	2012	2013	2014	2015	2016	2017
Bahrain	15.0	15.1	14.3	7.0	6.9	7.8
Kuwait	112.5	108.5	97.6	51.4	48.7	59.4
Oman	31.7	32.5	30.5	16.6	15.2	19.5
Qatar	34.4	32.4	28.8	13.2	10.3	11.0
Saudi Arabia	337.5	321.9	284.4	153.3	130.0	163.5
UAE	112.8	116.5	99.0	53.4	47.0	58.7
GCC countries	643.8	627.0	554.6	295.0	258.1	319.9
Mashreq	106.6	102.6	94.7	54.9	48.8	63.1
Maghreb	107.0	88.2	56.5	30.2	29.0	37.1
Arab LDCs	7.6	8.5	6.0	1.5	0.5	0.6
Arab region total	865.0	826.3	711.9	381.6	336.5	420.7

Source: United Nations, *Survey of Economic and Social Developments in the Arab Region 2015-2016*.

or forged uncompetitive and monopolistic alliances, while inhibiting the development of viable systems of public finance. With few exceptions, the private sector is weak and dependent on state patronage, and the business environment hampers the rise of young and independent entrepreneurs.” [8a].

The failure of the development model to improve the living standards and create jobs for young people has inflicted heavy cost on state treasuries and substantial loss in productivity. The model employed is driven by inefficient ‘forms of intervention and redistribution’ of society resources. For over 50 years, most Arab economies relied on single commodity, mainly energy, as a major source of rent to support public expenditures and pay for free services provided for their own people. Instability in oil prices and decline global demand for oil and gas in recent years has impacted the ability of the public sector to meet its financial obligation and continue support non-productive programs. Heavy involvement of the public sector in the economy has limited the scope of private enterprises and reduced individual contribution to creativity and innovation. Tacit knowledge plays critical role in building national capacity for supporting innovation and knowledge creation. Economic development in the Arab world is exclusive by limiting the participation of young people, women, underprivileged groups, and minorities from taking active involvement in market activities. Inequalities and political connection represent an important impediment for fostering economic and building a knowledge-based economy. Innovation, creativity and productivity induce linkage creations which facilitate economic diversification and knowledge localization.

The region exhibits inadequate readiness to support rapid transformation to a knowledge-based economy. In recent years, several countries in the region have recognized the need for building knowledge capacity by increasing investment in human resources, research and development, Information and Communication Technologies (ICTs) and effective institutions. Countries including UAE, Bahrain, Qatar and Jordan are allocating greater

financial resources to support the acquisition, transfer and creation knowledge. Several challenges hinder regional economic conversion from natural-resource-based to knowledge-based economies. Most Arab countries are still heavily dependent on oil production and export as a major source of income to support government expenditures and promote development. The economic structure of these countries reflects an abject lack of diversification with energy exports occupying center stage with other sectors of the economy being hobbled by poor or non-existent integration into the global economy.

In real terms, economic growth in the Arab region accounted for about 1 percent in 2015 and is expected at the same rate in 2017. Growth rates of other developing regions of the world dwarf that scale. Declining oil prices in recent years has pushed budgets of most Gulf countries into deficit impacting the public sector ability to finance development projects and meet other financial obligations. Many countries in the region are looking for alternatives to diversify revenues and create value through knowledge creation and innovation diffusion.

Building capacity for innovation will ensure economic sustainability by reducing dependence on oil production and exports. Currently, the Arab world spends on R&D less than 0.5% of GDP – a level too low to intensify innovation and develop new technologies. Most of the funding on R&D comes from the public sector with little contribution from private enterprise. Arab countries need to invest in building infrastructure to produce knowledge and support a knowledge-based economy. Given the dominance of the public sector in most Arab countries, the state is key in building such an economy. The state can increase allocation for R&D as well as to encourage private enterprises to take greater role in the economy.

Emphasis in the Arab world must shift toward increasing education attainment by investing in science and technology in tertiary education to strengthen the fundamentals for knowledge

creation and build capacity for knowledge economy. In this regard, the quality of education and investment in higher education are crucial for building up human capital for development. Arab societies perform below the world average on educational attainment, achievement and equitable access [8b].

Arab countries lag in provision of skills needed for the workforce partly because there are too few school facilities and qualified teachers. In most non-Arab countries, higher education, and a university degree generally ensure positive labor market outcomes among recipients. In many parts of the Arab region, on the contrary, unemployment rates, already very high especially among youth, tend to rise with skill level, although vulnerability to unemployment appears highest among people with secondary educational attainment [8c].

Countries in the MENA region have made progress in recent decades to improve human development and increase productivity. Economic development in the region is fueled by public expenditures reflecting the contribution of regional governments to socio-economic transformation as well as the influence they exercise over the economy. Public expenditures have been financed largely by revenues derived from production and export of energy resources, mainly oil and gas. As a consequence, economic development has been subjected to fluctuations in prices and demand for oil in the global market impacting the level of economic activities, unemployment, government revenues and expenditures and the quality of life for all people.

The inability of the countries in the region to make use of foreign technology to build local knowledge capacity has kept regional economies dependent on natural resources for promoting development. Due to duality of the economic structure, Arab economies were not able to attract FDI that requires highly skilled labor. Economic activities did not provide adequate incentives to invest in knowledge creation and technology to promote local entrepreneurship and gain access to foreign technology.

Arab countries need to invest in education in order to close the knowledge gap and build foundations to sustainable growth. A new model for development needs to be driven by education and well-trained people to strengthen the capacity for building a knowledge-based economy. History has shown that dependency on production and exports of limited primary commodities cannot sustain growth due to instability in export earnings and changes in global demand. A development model driven by the public sector reduces incentive to work and discourages private enterprises from taking part in market activities. As a consequence, 'the gains in human development have rarely translated into gains in productivity and growth.' [8d]. Income in Arab countries, especially in oil producing states, is a product of non-productive activities, mainly oil rents, distributed through government welfare schemes to citizens employed by the government sector. In other words, the model currently in place discourages economic activities by concentrating wealth in a few hands and dividing the society into few rich and influential people and the majority living on the margin. Such economic system does not promote creativity and innovation to support knowledge creation and foster economic growth. Private investment in the Arab region accounts for a small percentage compared to total public expenditures.

"Since independence, most countries have seen little change in economic structure. Manufacturing – the primary vehicle for job creation in emerging economies – has registered painfully slow and sometimes negative growth." [8e].

Building capacity for development entails new or alternative approach based on new thinking to support economic restructuring and product diversifications. The new model for development will require generating strong linkage creation to create jobs as well as to compete in the global markets. Speeding up the process of economic conversion will require Arab countries to build suitable business environment to increase FDI inflows, encourage private sector participation, enhance quality of education, and promote global integration. Localization of knowledge in

the MENA region requires greater cooperation and collaboration within and among countries to build capacity for development.

Localization of knowledge entails the creation of an appropriate working environment to ensure that graduates will be able to find suitable jobs. Improving the quality of education will require the development of new curricula comprising courses closely aligned with market demand for skills. To enhance the quality of higher education, there is a need for improving the quality of education at the secondary level. The educational system should pay greater attention to science and technology in the early stages to ensure that graduates will be prepared for attending university. In addition, the educational system should be designed in line with national needs of human capital. In the early stages of development, education needs to be diversified graduating students with higher-order vocational degrees as well as applied university degrees to meet market demand for labor. Technology is rapidly changing reflecting the need for greater labor flexibility to meet the changes in skill requirements and take advantage of the new economy. In recent years, the demand for labor has shifted toward soft skills away from technical skills. In the MENA region, the quality of education remains inadequate to meet international standards and contribute to knowledge creation.

The educational system needs to be more flexible and more reflective of changes in the labor market. In this age of globalization, attention in education should be directed at learning to promote creativity and create knowledge. Rapid changes in global competitiveness mandate that educational institutions improve curricular quality and enhance opportunities for lifelong learning. It is essential that governments in MENA region introduce reforms to update the existing education system and make it accessible to all. It is time to diversify the educational system by allowing private institutions to provide educational services in addition to public sector education. To meet the skills and competences required by the new knowledge-based economy, the educational system should permit

lifelong learning while fostering flexibility to adapt to technological change and labor market demand. The new economy requires people able to think creatively and solve problems unconventionally.

By facilitating ability on the part of educational institutions to communicate, acquire, absorb, and create knowledge through networking, MENA countries can take advantage of global knowledge and create local knowledge appropriate to the domestic business environment. “In promoting local or adaptive research or encouraging the adoption of modern technologies, care must be taken not to undermine useful traditional knowledge.” [9] “Localization of knowledge is the transition from consumption of knowledge, and recycling it from its original form, to its acquisition, use and deployment.” [3c]. Knowledge localization involves three key elements: the transfer of knowledge; the production of knowledge; and the employment and diffusion of knowledge for development purposes to benefit society,[3d].

## Science, Technology and Innovation

Science and technology today are the culmination of centuries of knowledge. The industrial revolution boosts science and technology to a new era of welfare. However, the progress reaches a saturation level because of the lack of theoretical framework that advances further the human knowledge. In 1900, quantum mechanics emerged as a rescue to the situation, and by the early 1920 a full-fledged theory was available to project science and technology to new horizons not thought of before. Nevertheless, the scientific community had to wait until 1947 to witness, as a by-product of quantum mechanics, the invention of the transistor, considered to be the greatest invention in the history of mankind after electricity. In early 1960s, the invention of the laser, another by-product of quantum mechanics, adds a valuable contribution to the advancement of science and technology. Both these inventions made the digital world accessible to wide range of applications, and enhance the pace of development. The launch

of the first satellite (Sputnik) in 1957 by the Soviet Union triggered the race to conquer space as a strategic objective. The telecommunication systems and GPS are but some of the outcomes of the Space Age. After the end of cold war, Russians, Europeans, and Americans, in the face of unsustainable costs of separate national space programs, endeavored to pool resources collaborating on the International Space Station. By providing a laboratory for conducting a series of experiments in a zero-gravity environment, the space station serves as a platform for scientific and technological breakthroughs serving as the basis for next generation innovations. In this collaborative effort, developing countries, largely because of lack of resources and scientific backwardness, have been sidestepped. Alone among MENA countries, however, the UAE has established a space agency in 2014 with the aim of initially sending a spacecraft into orbit around Mars (<http://nypost.com/2017/02/02/uae-planning-first-ever-islamic-mission-to-mars/>) but in the long term, establishing a city on the surface of the red planet by 2017!

<http://www.dailymail.co.uk/sciencetech/article-4227854/UAE-build-CITY-MARS-2117.html>

Most developing countries, back on Earth, are suffering from the absence of a well-structured educational system that provides the necessary skills to support sustained economic growth. Aimed at nurturing economic growth, education plays critical role in building capacity for a knowledge-based economy.

The interplay of cultural with political issues may constitute, in some cases, major impediments to formulation of long range plans to solve potential problems associated with the main requirement of survival; namely, the problem of water, energy, and financial resources.

How have developed countries planned to face these futuristic issues? Developed countries consider science and technology as the main foundation underpinning their economies. They set ambitious strategic plans to solve these issues looking ahead to the far future. These plans are based on long range forecasting

driven by a well-organized research structure. One of the most important challenges that humanity will be facing in future is the problem of energy, since it is expected that the reserve of fossil fuel will be exhausted by the end of this century. The future crises of energy has been anticipated by developed countries since 1970s and huge fusion nuclear research programs have been set to mimic the energy production in the sun. Considerable advancement has been achieved towards this goal using either Tokomak machines or lasers. It is expected that this technology will be implemented and commercialized beyond the year 2050, which is, after about one century of research and development costing trillions of dollars. Unfortunately, developing countries lack a commensurate ability and vision to engender such societal transformation through mobilization of science and technology.

Only governments can provide the necessary resources to implement a national strategic plan of such a magnitude. A key element in a successful plan is knowledge creation requiring, in MENA, reform of the educational system that fosters implementation of an innovative scheme designed to enhance economic outcome.

Innovation is a key factor to find new or better solutions to satisfy new requisite, implicit needs, or existing market needs. It entails new ideas, devices, or original methods that are accomplished through the combined interplay of efficient services, technologies, and business models readily available to markets, governments, and society. Innovation in developed countries is supported by a whole structured system in which industry, educational institutions, and government function collaboratively in harnessing technology. In developing countries, on the contrary, innovation, in most cases, runs into pitfalls stemming from fractionated support and a feeble enabling environment characterized by an absence of a clear vision and planning to use innovation as an essential means of economic growth and by the isolation of educational institutions from other actors in the economy.

## Ahlia University

Ahlia University is a leading private university in Bahrain. The vision of the University is to promote excellence in education and support the local economy. The university provides high quality educational services to empower the youth in the region and prepare them to become future leaders in various societal fields. Ahlia University aims at becoming a world class university by promoting high quality talent of both academic and student bodies. The university provides equal opportunity to all without discrimination of gender, race, religion, and nationality.

The university's academic staff comprises a mixture of people from different nationalities with qualifications from different countries reflecting the university global outlook and its support for multicultural diversity. The rise of China as a global economic power in recent decades has promoted the university to hire graduates of Chinese universities.

To strengthen teaching and learning, the university is a strong believer in establishing a rich learning environment with up-to-date technologies and high quality resources to encourage research and support innovation and creativity. The university policy is to establish strong links with universities outside the region not only to attract talent and enrich local quality, but also to increase collaboration with well-established universities in student exchange and research.

The university strategy is to diversify its curriculum by offering students wide range of programs to choose from in order to increase educational flexibility and meet projected demand for labor in the local market. In a recent survey by The Economist, January 14th – 20th 2017, it is pointed out that a college degree does not answer the need for the continuous acquisition of new skills and thus people need to update their skills over and over again during the time of their careers. Educational systems in the Middle East need to correct the imbalances that exist within the labor market to broaden the skill bases of students and offer greater choices

for learning. In the knowledge-based economy, workers are required to acquire competence and technical skills to adapt to rapid changes in labor market.

The university is aware of the fact that high unemployment in some countries in the region reflects the inability of universities to produce students with adequate skills addressing market demand. Educational institutions are currently poorly geared to deliver such skills and competencies. The way students develop higher-order competencies and skills is through a balance of teaching, demonstration, practice, rote learning, synthesizing knowledge, and problem solving [10]. To develop the full range of requisite skills across this spectrum, Ahlia University has instituted a range of intended learning outcomes (ILOs) that are standardized across all university programs below doctoral level that include a balance of skills ranging from:

- A Knowledge and Understanding
  - A1 Concepts and theories
  - A2 Trends and research in the field
  - A3 Knowledge of professional practice
- B Field Specific (Quantitative) Skills
  - B1 Problem solving
  - B2 Modeling and design
  - B3 Tools and techniques (software)
- C Thinking Skills
  - C1 Analytical skill
  - C2 Synthetic skills
  - C3 Creative Skills
- D General and Transferable Skills
  - D1 Communication
  - D2 Team work and leadership skills
  - D3 Lifelong learning and organizational skills
  - D4 Ethics and social responsibility

Of course, not every course contains every such enumerated ILO but includes an appropriate range that feeds into the desiderata stipulated by Gamino. [10] ILOs of each particular course

are tailored, detailed and elaborated consistent with the nature of the field of study and in light of market demand.

To bridge the gap between the classroom and the workplace, a 6-credit internship is integrated into all undergraduate degree programs offered at Ahlia University increasing the demand for its alumni/alumnae.

With respect to all its academic programs on offer, Ahlia University has instituted a 4-year long-term program review system (LPRS) and annual quality improvement plan per program, which are part and parcel of each College's annual operational plan that feeds into the objectives stipulated in the 5-year university strategic plan designed to maintain the currency and improve the content of all programs with a view to meeting programmatic intended learning outcomes (PILOs). Achievement of PILOs ensures the marketability of graduates whose skills are geared to labor market demand. To further enrich its programmatic offerings, Ahlia University, pursuant to cooperative alliances with foreign universities, offers a Master of Science of Engineering Management (MSEM), in which the degree issuing institution is George Washington University, USA, and a PhD in business and IT, in which the degree issuing institution is Brunel University, UK. In so doing, Ahlia University is able to infuse in its postgraduate student's technical skills highly valued by local labor markets.

Greater cooperation is needed between private and public universities, especially in higher education, to share knowledge and increase research. For several decades, educational institutions in MENA region have largely been under government control by providing the funding and all other facilities for educational services. In Bahrain, the government granted licenses to private educational institutions to operate in the country. Private universities can benefit from the experience and the facilities provided by public universities to conduct research and enhance teaching and learning qualifications. It has been recognized that knowledge is a key driver of development and thus universities should strengthen the country

capability to create and apply knowledge by strengthening the capacity to deliver.

In this context, Bahrain has introduced a full suite of regulations, strategies, and policies to develop higher educational institutions and improve quality of education. In 2005 the government of Bahrain introduced guidelines for restructuring the system of higher education to meet the country demand for human capital. These guidelines include:

- Enacting a national admission system in higher education institutions
- Improving investment opportunities in higher education in the Kingdom of Bahrain
- Relying on assistance from higher education institutions as houses for expertise for the state and private sectors
- Following up the outputs of higher education
- Project on academic accreditation for higher education
- Coordination Committee for Academic Accreditation in GCC States project [11].

Bahrain Vision 2030 recognizes the importance of human capital resources and the role that universities play in achieving such objectives. Building capacity for knowledge creation requires government institutions playing active roles in human resources management through funding of higher education and providing incentive for research and development. Governments must work closely with universities to create an appropriate environment that encourages research, enhance quality, and increase linkages. The government must transform its educational system with a view to the latter becoming more competitive and flexible.

As mechanisms to enhance programmatic flexibility and competitiveness, Ahlia University has established several centers including Center of Statistical Analysis, Ahlia Center of Entrepreneurship, and Center for Quality Assurance to ensure that students will have greater choices. The quality of education is measured by the achievement of student

learning, which Ahlia University is committed to achieving. Recently, steps were taken to embed research into the curricula as well as attention is given to entrepreneurship training. Below are some of the steps already taken by Ahlia management to enhance quality and support:

- Teaching and learning to enable faculty deliver in an effective manner
- Continuous student assessment and testing to ensure student acquisition of competency, skills and core knowledge
- Improve class size and student-teacher ratio
- Balance attention between theory and practice in the curricula. Students must be oriented toward linking theory to practice, especially job attachments to industries.
- Encourage women to go into science and technology by removing the socio-cultural impediments.
- Introduce courses that produce skills more applicable to the market needs
- The university encourages student exchange programs to expose Ahlia students to the knowledge else where
- The university internship program helps students gain practical experience and qualify them to participate in the labor market.
- Maintain close linkage with industry to gain practical experience in training and research.
- The University is conducting peer review to close imbalances in teaching and improve delivery of educational services.

## Ahlia's Main Successful Features for Promoting Education

- As a young institution, Ahlia University has strived to enhance the quality of its delivery by continuously reviewing its programs through benchmarking and enriching and updating course materials to be aligned with the most recent pedagogic developments in the field. Ahlia strongly believes in global partnerships and exchange programs at all levels including those embracing faculty,

students, researchers and administrators. International collaboration enhances the ability of the university to acquire knowledge and disseminate information – links which enhance the educational services provided by the university. At present, Ahlia University has been ranked number one among private educational institutions in the kingdom of Bahrain by virtue of its earning full confidence in all its programs reviewed by the Quality Assurance Authority for Education and Training in line with the National Qualifications Framework.

- Ahlia University recognizes the importance of cultural diversity in human communication and knowledge transfer. Faculty members at Ahlia are highly diverse in terms of both nationality and educational background. This has imparted a unique multicultural and pluralistic university environment in which a variety of cultural, social, and linguistic ideas are exchanged and synthesized.
- The University has introduced a program for peer review to empower teaching and learning methods by arranging for frequent visits by specially trained peers to classes to observe time management, class participation, use of technology and pedagogical techniques employed by the instructor. It is a monitoring system that serves to enhance the quality of teaching at Ahlia University with a view to ensuring that graduates will be equipped with the needed skills and competences to meet demands of the labor market and to engage in community service.
- Ahlia University places a high priority on the use of modern technologies as a powerful tool in teaching and learning. E-learning, the internet, digital library, smart boards, and various other computer applications are widely used across all academic programs offered by the university. This is to ensure that learning is facilitated university-wide delivering learning outcomes on a par with those provided by top universities globally.
- A directorate for student exchange and international collaboration has been established by the university dedicated to

increasing global linkages and improving communication with other academic institutions worldwide. Students gain exposure to new knowledge and new ideas through direct contacts and communication with other students in different parts of the world.

- Ahlia University strongly supports postgraduate education to increase the stock of human capital and strengthen the region capabilities to create knowledge and promote innovation. Ahlia, in collaboration with Brunel University in the United Kingdom, is first private university in Bahrain offering a PhD program designed to encourage students to conduct research and find solutions to some of the pressing challenges facing the Gulf region. Sustainable development and future sustainability are among the important research priorities highlighted by the program.

In addition to Brunel, Ahlia University is also a host for another program, Master's in Engineering Management offered by George Washington University. Graduates of this program are specialized in technical and engineering management studies.

- Research is given top priority at Ahlia University reflecting the university recognition of the importance of research in academia. The university has undertaken new initiatives to embed research in teaching and learning by organizing workshops for faculty. The curriculum is continuously revised to incorporate research and help students hone research skills in technically challenging and wide-ranging areas of study.
- Ahlia University has adopted curricula that put emphasis on employability to meet market demand for skilled labor and creative thinking to strengthen the fundamentals for building a knowledge-based economy.

## Conclusion

In recent decades, development studies have identified knowledge as a key driver of economic growth and global competitiveness. A knowledge-based economy represents an

economy that uses knowledge and information as inputs to produce goods and services. Creation, dissemination, and acquisition of knowledge are important features of the knowledge economy. The knowledge economy requires highly skilled labor force, effective institutions, sound ICT infrastructure, and innovation system.

Knowledge and innovation represent a key driver of economic growth. In the Arab world, several initiatives have been taken towards building capacity for converting the economy into knowledge-based activities. Governments in the region have been under pressure to introduce radical economic reforms by moving away from oil-based development and encourage alternative development to create jobs and foster economic growth. The knowledge economy entails the creation of an appropriate business environment capable of building capacity for knowledge transfer, technology dissemination, innovation diffusion, and human capital accumulation. This paper recommends that development strategy in the Arab world should be directed at enhancing the quality of education and training to strengthen the fundamentals for building capacity for a knowledge-based economy. Regional governments should increase allocations for research and development to promote innovation and diversify the economic base. Human capital contributes to productivity of the economy both as inputs and outputs.

This paper focuses on the role that Ahlia University plays in building capacity for knowledge creation and innovation diffusion. The human capital represents a key input in production and use of knowledge. Investment in education becomes essential for promoting innovation and supporting knowledge-based development. As a leading private University, Ahlia is to take active role in building human capital capacity and strengthening the foundation for knowledge society.

Ahlia University, as an educational and research institute, has the obligation to highlight the importance of science and technology in our society by offering innovative programs that

cope with the latest state of the art advancement in various disciplines. Knowledge creation becomes a driving force for all nations aiming at taking part in science and technology as an essential mean of transformation to the digital age. Therefore, Ahlia University considers science, technology, and innovation as an essential footstep in the foreground of its programs and activities.

The quality of human capital is influenced by various courses and programs offered by universities and colleges. To support development, universities must be integrated into the national economic vision of a nation to ensure that programs offered by universities are aligned with market demand for employment.

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# CASE STUDY

## CREATING SYNERGIESTHROUGH ALLIANCES, NETWORKS AND PARTNERSHIPS



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Institutions are no longer just knowledge dispensers but they need to be the canvas where the learner is the artist to create his own creation based on the guidance provided by the mentoring programs. These mentoring programs help the learner in transitioning to develop skills, habits, and attitudes that are conducive to employment success and personal growth. This will help learners to prepare realistically to choose careers. How productive the people employed are depends on available opportunities to acquire relevant skills. Industry perceives skill requirements as the biggest strategic challenge to set up investments in skill development for workers to adapt to the changing market demands and to benefit from innovation. New emerging occupations are replacing traditional ones and within each occupation, required skills and competencies are evolving, as is the knowledge content of processes for production and services.

In a rapidly changing, complex technological society, where jobs for the unskilled are disappearing, old skills are fast becoming obsolete, and new and flexible skills are increasingly in demand, work experience can become a vital component of modern education. The rationale for having a Work Experience Program is the changing nature of work in our society and the need for learners to be aware of career opportunities. Through partnerships with local businesses as career-training laboratories, learners can develop a positive work ethic, learn, and develop skills to improve performance in actual work settings.

Educational curriculum, which includes a combination of hands-on work experiences and related classroom instruction, will provide the opportunity to observe and sample a variety of conditions of work for ascertaining learners' interest and suitability for the occupations they are exploring. On a limited and sampling basis, learners can perform non-paid work activities while exploring the occupation. The Work Experience (WE) program can provide an opportunity for a broad spectrum of learners to explore career paths with the goal of clarifying career directions to enable learners to become productive, responsible individuals

through supervised experiences to develop appropriate work habits and attitudes that may be transferred to a variety of employment situations (16).

The value of education and industry alliance lies in the fact that the business community serves as an expansive training laboratory for the education community. Potential benefits for participants in Work Experience are:

**Learners:** WE increases learner engagement, independence, self-image and prepares them for choosing a career suitable to their capabilities and interests.

**Society:** WE offers improved citizenship and socio-economic system with learners equipped with employability skills when they enter the professional world.

**Industry:** Long-term alliances, networks and partnerships between institutions and businesses for providing opportunities for employing nurtured talents.

**Institutions:** Avail learner development opportunities for specific skills for mapping the effectiveness of program outcomes.

The success of the Exploratory Work Experience program will, however, depend on how much support can be generated for these activities through creating synergies between institution, industry, and society alliances.

**Key Words:** Work Experience, alliance, institution, industry, business, innovation, professional development, benefits, collaboration

We seem to be sitting at the heart of a storm where things are happening faster than our ability to predict and strategize. We have the know-how to reinvent education in ways that will address problems of the globalized era by shifting from traditional ways to innovative experimentation, which however does not as yet have the evidence of effectiveness.

Innovators grab and apply ideas from other fields to apply them in interdisciplinary context. There is no 'right or wrong'; instead all approaches are tested, prototyped and learned from. This globalized era builds its own habits,

values, and mindset creating a culture, which needs to be nurtured and managed. Globalization has positive connotations for those who advocate greater international integration, while being criticized by those who perceive it as a threat to social cohesion. Globalization requires a holistic approach for restructuring education for the workforce of the future.

At this stage of transformation, where preserving the strengths of formal education alongside the potential of technology will be a key balancing act in designing new education models. The new learner of this globalized era requires deep relevant, applicable learning and credential with the signaling strength to reflect it to employers. Education needs to shift to competency-based education, accelerated learning, 24/7 access to content and facilitators are the ways of responding to the 'new traditional' learner who needs flexibility and options. Convenience is a strong strategy for innovation.

Education is a primary means for learning through formal and informal institutions, media and all kinds of social interaction. Effective education goes beyond formal education articulated by educational institutions, parents, leaders and authorities to embrace a person's knowledge, will, feelings and actions to face realities of life. The forces of globalization create more opportunity but less certainty – punishing stasis while rewarding creativity, flexibility, and agility. A growing number of knowledge economy professionals are taking more entrepreneurial approach as they pursue the goals of intellectual and economic independence and balance in an unbalanced world.

Globalization requires extensive restructuring of broad based knowledge, information, and educational needs in terms of function, curriculum, and approach for the workforce of the future to engage in life-long learning. A holistic approach adopted for manifestations of increased interdependence of (a) trade and investment liberalization; (b) technological innovation and the reduction of communication costs; (c) entrepreneurship; and (d) global social

networks as driving forces for global economic integration.

## New Framework for Education

The new framework for knowledge, education, learning, and the accumulation of skills will occur increasingly outside the traditional institutions of formal education. Knowledge and skill accumulation and enhancement will be based on:

- a. **A focus on abstract concepts:** In this rapid-fire global economy the problems are rarely de-fined clearly and those seeking employment gather the necessary information, and make decisions and choices based on complex uncertain realities.
- b. **Use of a holistic as opposed to discrete approach:** Much of the education and learning environment today is divided into rigid academic disciplines focused mainly on discrete units. However, the emerging information society and global economy requires a holistic understanding of systems thinking, including inter-disciplinary research approaches that are as critical to achieving a more comprehensive understanding the complex reality currently facing the world education systems.
- c. **Enhance the learner's ability to manipulate symbols:** Symbols are highly abstracted manifestations of some concrete form of reality. Highly productive employment in today's economy will require the learner to constantly manipulate symbols, such as political, legal, and business terms and concepts, and financial systems and accounting concepts.
- d. **Enhance the learner's ability to acquire and utilize knowledge:** The world's store of know-ledge is increasing at such a monumental rate that no single person can hope to adequately absorb and convey. The current global situation demands the workforce to acquire education that enhances the ability of learners to access, assess, adopt, and apply knowledge, to

think independently, to exercise appropriate judgment, and to collaborate with others to make sense of new situations. The objective of education is no longer simply to convey a body of knowledge, but to teach how to learn, problem-solve and synthesize the old with the new.

These new technologies allow for academic practitioners to move from being "sages on the stage" into the role of the "guide on the side" and assist learners in gaining the skills and abilities required to acquire and utilize knowledge contained in various forms around the world.

- e. **Produce an increased quantity of scientifically and technically trained workforce:** The emerging industries demand that employees remain highly trained in science and technology. Research and development is critical to harness the combined resources of academic institutions with the research enterprises in public and private sectors.
- f. **Blur the distinction between mental and physical labor:** Innovation requires a much more holistic approach to the business enterprise and appreciates the intellectual contributions of all employees as most of the learning and production processes include ICT to support communication and collaboration. This fundamental shift in the working model is the result of underlying teaching and learning strategies.
- g. **Encourage learners to work in teams:** Working in teams requires learners to develop skills in group dynamics, compromise, debate, persuasion, organization, leadership and management skills.
- h. **Collaborate with virtual teams around the world:** Globalization requires the learners to work in global networked virtual teams as collaborative learning enhances team performance through tools for communicating each person's ideas, structuring group dialogue and decision making, recording the rationales for choices, and facilitating collective activities.

- i. **An agile and flexible system:** Education needs to become less rigid and more flexible to meet the varied needs of learners and the global economy. This includes variety in time, place, approach, and curriculum offerings. As new occupations and industries emerge within the global economy, academic course offerings should be adapted to reflect these new knowledge, education and learning requirements.

j. **Break the boundaries of space and time**

Using advanced information and communications technologies, a new system of knowledge, education and learning should apply a wide range of synchronous and asynchronous activities that aid the facilitators and learners in breaking the boundaries of space and time. Synchronous activities can include real-time lectures quizzes and group discussions. Asynchronous activities can include archived lectures and other archived course material that can be accessed at nearly anytime, anyplace.

Businesses often complain that graduates lack the capacity to learn new skills and assimilate new knowledge hence, redesigning of education is required to meet the demands of the era of globalization by systematically providing input into the analytical, and decision making processes in areas such as strategic shifts, curricula, restructuring, standards, and evaluation.

## Creating Synergies through Alliances and Collaborations as a Second Role for Education

Connecting scientists, information technologists, policy makers, practitioners, and industry for the purpose of redesigning education in the age of globalization requires support mechanisms for the exchange of ideas and experiences to create synergies through alliances (1):

- Forging knowledge and academic partnerships with the industry to translate skills needed to innovate relevant curricula and training programs

- Creating partnerships with industry professional bodies for industry input and redefining of curricula
- Integrating internship and work study programs into current curriculum to ensure workforce readiness
- Looking at ways that private sector can contribute to the sustainability of higher education through offering scholarships, research grants and funding for industry specific needs
- Support the design of information technology that is most appropriate for education and that is cost-effective, implementable, and sustainable at large scales.
- Encouraging explorations and experimentation to push the frontiers of the potential of Information technologies and communications for more effective learning
- Engaging in the design of pilot "learning communities" that expands the time and space dimensions of education
- Help learners develop skills, habits, and attitudes conducive to job success and personal growth.
- Assist students in career exploration and forging rewarding relationships with employers.
- Develop a positive work ethic and acquire or refine work related skills and job performance in actual work settings.

Fast paced multitasking next gen learners provided with the mentoring programs can link the academic curriculum with the world of work to improve transition outcomes through Work Experience programs:

- Provide workforce exploratory and preparatory experiences;
- Provide learner development and leadership opportunities;
- Tailor services to individual learners;
- Demonstrate awareness and attention to equip learners with specific skills
- Have quantitative or qualitative competency development data; and
- Effectiveness validated through best practices

Learners develop ready-to-work attitudes/interview skills; financial literacy; knowledge of workplace safety and rights as workers; business operations; career decision making; making a career goal plan and much more. The work experience programs integrated in educational process will: (1) help learners to choose a career path based on their interests and aptitudes; (2) prepare them for college and career success; and (3) afford learners the opportunity to learn to work with others in ways that are successful and rewarding. Development of "non-cognitive" skills (soft skills) plays an important part in career success. Non-cognitive factors featured in work experience include motivation, time management, perseverance, and self-regulation. A work experience program connects inputs from facilitators, counselors, students, parents, and employers to achieve the following purposes:

- Link the academic curriculum with the world of work and promote learners' school-to-career transitions.

To link the academic curriculum with the world of work and to promote learners transitions to develop skills, habits, and attitudes conducive to occupational and personal growth to choose careers wisely. Through business alliances learners can develop positive work ethics and develop skills to perform in an actual work setting. The major goal of Work Experience is to provide career guidance through paid or non-paid opportunities to observe and sample a variety of conditions of work for ascertaining their interest and suitability for the occupations they are exploring. The learner may perform, on a sampling basis, nonpaid work activities while exploring the occupation (16).

## Industry Alliance can be through

- Serving on institutional Advisory Boards
- Assisting in developing institutional curriculum

- Providing guest speakers for related work experience
- Hosting field trips to give learners a perspective of the workplace
- Being career-related role models and mentors in the field of training
- Providing summer and part-time jobs

For the rapidly changing nature of work and the need for learners to be aware of evolving career opportunities, Work Experience will provide an opportunity to explore a spectrum of career paths with the goal of clarifying career directions. The learners can then develop appropriate occupational competencies, habits, and attitudes that may be transferred to a variety of employment situations.

## Unique Features about Work Experience

Work Experience can provide a transition from the rigid daily schedule of most comprehensive institutions to a more flexible college schedule where learners may spend less time in class and more time studying independently.

- Establish ongoing partnerships among institutions and employers
- Provide for the voluntary participation of learners.
- Include a mentor program where each learner is partnered with a business committed to training and evaluating the learner's progress on the job site.
- Provide additional motivational activities with business involvement.
- Provide tutoring, study skills training for summer employment opportunities that are directly linked to academic and occupational learning
- Provide opportunity for paid and unpaid work experiences, including internships and job shadowing;
- Provide leadership development opportunities, which may include society

service and peer-centered activities encouraging responsibility and other positive social behaviors during non-institution hours,

- Provide comprehensive guidance, counseling, and support services after the work experience completion

## Preparation for Work Experience Programs

- Selection and approval of sites for work and training
- Required preparation in classroom instructions by recognizing relevance of curriculum content to career requirements
- Appreciate the importance of work to personal and professional development through analysis of career opportunities and their requirements with personal potential, interests and expectations of learners
- Learners participate in roles and responsibilities of the work under supervision
- Alliance agreements and plans
- Learner-mentor ratios
- Paid and unpaid work experiences
- Credit for participating in programs
- Strengthen academic and occupational skills to choose appropriate career path

In our rapidly changing, complex technological society, where jobs for the unskilled are disappearing, old skills are fast becoming obsolete, and new and flexible skills are increasingly in demand, work experience has become recognized as a vital component of modern education. Work Experience Programs extend learning experiences outside the classroom in to the society. Learners can develop their skills and assess their on the job capabilities while systematically observing work being carried out in the actual work setting in order to determine the suitability of an occupation and how much saleable employment skills preparation is required for that career. The value of this extension lies in the fact that the business community serves as an expansive training laboratory for the education community.

## Work Experience Benefits for Stakeholders

Work experience helps to differentiate learners, institutions, industry, and largely the society, as an important thing to factor in when competition for jobs is so fierce and society changes are taking place so rapidly.

### Effect of Work Programs on Learners' Performance

- Increased interest in institution and better attendance
- Improvement in grades
- Complete the requirements for graduation on time
- Have better relations with their peers and be better able to choose a career
- Learners with work experience are more likely to progress to meaningful career paths and get higher wages than the other graduates

### Secondary benefits include learner's personal growth (16):

- Sense of responsibility and self-reliance
- Self-image and personal pride
- Economic security and independence
- Incentive for academic effort and achievement
- Personality and poise
- Self-understanding and appreciation of others
- Ability to work cooperatively with others
- Knowledge, skills, and attitudes necessary for successful job performance
- Work habits, which meet employer expectations
- Awareness of society educational, training, and employment opportunities
- Awareness of social and economic realities of the occupational world

## Benefits to the Institutions

As more learners become aware of the importance of education to their personal goals, the institutional climate, and the institutional image in the society improves. Among the benefits of work experience to the institutions are:

- Improved classroom performance by learners
- Greater retention of at-risk learners
- Better relations between institution and society
- Increased support from the business community
- Greater society involvement and cooperation

In addition, research studies suggest that work-based learning may increase institution attendance, decrease dropout rates, reduce institution suspensions, and increase institution engagement (6). One study found learners who participated in work-based learning were more likely to attend college or go to work compared to their peers (5).

While work experiences are beneficial to all learners, it helps them acquire jobs at higher wages after they graduate (3). Also, learners who participate in occupational education and special education in integrated settings are more likely to be competitively employed than learners who have not participated in such activities (2; 3; 4; & 8).

## Benefits to the Society

Work experience programs readily gain acceptance and support in society because their short and long-term benefits relate to recognized society concerns. Work experience program out-comes supported and endorsed by the society include:

- Increased participation in economic development as wage-earners
- Learners become focused on development
- Improved society participation

- Better relations between society and institution
- Tangible economic value to employers
- Educating employers about development of learner which ultimately helps in the society development

## Benefit to Industry

Employers get an opportunity to engage, inspire and inform learners about what working life is really like. Offering work experience can bring a number of benefits to an employer (14):

- **Raise industry profile** – Being known, as a business that offers work experience opportunities will raise the profile and appeal of business.
- **Improve staff retention** – Investing in young people brings commitment and loyalty, which means they are more likely to stay with the business, which helps maintain productivity, and reduce recruitment costs.
- **Nurture own talent** – Get access to the up and coming talent of the future.
- **Develop employees** – Providing opportunity for professional development of employees by involving them in the placement and providing potential management opportunities can help employees feel motivated and loyal to the business.
- **Achieve new perspective and ideas** – Young people often bring fresh ideas and approaches which may open up new and emerging markets for the business.
- **Gain new understanding of modern learning** – Increase employer's understanding of modern learning processes and current educational qualifications.

## Innovative Strategies to enhance the Value of Work Experiences

Work experiences are both paid and unpaid opportunities to work and practice career readiness skills. When work experiences are a part of a supervised program sponsored by an

education or training organization that links knowledge gained at the worksite with a planned program of study, they are referred to as work-based learning opportunities (11).

Work experiences are a critical component for preparing a learner for transition to being a professional. As highlighted by industry experts potential benefits for learner who participate in work experiences include:

- Gaining career readiness skills including the “soft skills” that employers look for in entry level workers
- Increasing knowledge of specific occupational skills and workplace settings
- Establishing a work history and connections with employers that can aid in future job searches
- Developing an understanding of different occupations in order to make informed career choices

## Common Types of Work Experiences

Work experiences can take various forms including internships, summer jobs, learner-run businesses/entrepreneurship, service projects and volunteer work, and part-time jobs. While some work experiences lead to permanent, competitive employment, even short-term work experiences can be valuable as a way for learners to develop skills, contacts, and awareness about career options (11). Many programs engage learners in one or more types of work experiences. The most common types of work experiences are described below.

- Internships:** Some internships are paid while others are unpaid. Developing employer partnerships with a variety of businesses and organizations that commit to serving as worksites for interns can link learning to real-life situations. Where possible, a learner is matched with an employer that closely aligns with his or her career interests and goals (12). Some long-term internships can lead to full-time employment.

- b. **Summer Jobs:** Learners in the program receive training in work environment.
- c. **Learner-Run Businesses/Entrepreneurship:** A recent Santander Universities UK report revealed how 24 per cent of current university students are running a business venture of some sort (7).
- d. **Service Projects and Volunteer Work:** Learners can offer skills-based volunteering by leveraging the specialized skills and the talents of individuals for nonprofits organizations, helping them build and sustain their capacity to successfully achieve their missions or on environmental preservation projects during their off hours.
- e. **Part-time Jobs:** Institutional staff can help learners find jobs by assigning an employer representative to work with each individual on identifying and applying for jobs that match their personal goals, interests, and skills.
- f. **Field Trips / Job Shadowing:** Increasing the society's knowledge and support can be accomplished through greater visibility of the program's learners. A field trip for a group of learners to view a business site can increase the scope of jobs, which would be of interest to many learners.
- g. **Career-Vocational Training Opportunities:** Involve local businesses in conducting career-vocational training courses for institutions. These courses can be for learners, for institution staff, and others. An outcome of this type of working relationship is that the employer feels some "ownership" of the institution, becomes supportive of institution programs, and as an extension, becomes an available work station for work experience learners.
- h. **Adopt-An-Institution:** Education professionals can work with business personnel in developing and implementing an Adopt-An-Institution program and organize scholarships and awards for both learners and employers for participation.

**Promotional Ideas:** All educators need to keep the public, institution administrators, and learners aware of their programs. Guest speakers can enrich the work experience curriculum, but they can also help to promote the program. To retain and promote a Work Experience Programs, good social relations are necessary and the program coordinators should consider all methods for communication. Society surveys, service clubs, the media, window displays, advisory committee meetings, and program brochures can promote the program. However, nothing can take the place of personal contacts in building good public relations. The continued success of the program depends, to a great extent, on how much support can be generated for work experience activities. Without excellent public support, a work experience program cannot survive. The public must be kept informed of the program's goals and objectives (16).

## Strategies and Tools for Providing Work Experiences (11)

Trends regarding strategies for engaging learner in work experiences:

- Programs prepare learners for work experiences through training and guidance in soft skills
- These are skills that employers expect workers to have from day one including communication skills, interpersonal skills, decision making skills, and lifelong learning skills
- Help learners develop problem solving, communication, and team work skills, and teach them how to select and use technology
- Learn about professional work culture, career planning, competitive interviewing strategies, self marketing techniques, and networking skills. Employers assist with the training by leading workshops and providing workplace tours

The curriculum designed to help job seekers master knowledge, skills, and abilities in main competency areas:

- Communication: To articulate thoughts and ideas clearly and effectively; public speaking skills; writing work-related materials clearly and effectively
- Critical thinking and problem-solving: Sound reasoning and analytical thinking; use knowledge, facts, and data to solve workplace problems
- Professionalism: Personal accountability and effective work habits, such as punctuality, working productively with others toward a goal, and time and workload management
- Teamwork and collaboration: to match learner to work experience opportunities based on interests and skills and build productive and professional working relationships with colleagues, supervisors, and customers; to work with diverse teams; to negotiate and manage conflict in the workplace.
- Acquire technical skills, or hard skills, needed for specific career pathways or work settings.
- Provide on-going support to learner and employers throughout the work experience.

## Synergies through Two-way Alliances

Colleges and universities developing partnerships with organizations seek to provide continuing education to employees. The benefits of such arrangements run in both directions, often giving institutions captive audiences for their programs (10). Below are tips from four higher education administrators about how they have found success.

When it comes to creating coursework, Indiana University Kelley School of Business created a course in enterprise risk management for its partners General Motors, the course has become core content for several programs for all learners. It's often that specific courses

created for industry become popular courses for learners from other industries.

At the other end of the spectrum, Champlain College – Burlington, VT has forged more than 60 partnerships growing at a rapid pace by returning learners who are the employees of these partners. Champlain created truED Alliances with organizations that understand the importance of higher education in remaining competitive, improving employee retention and enhancing recruitment.

The partnerships put Champlain College in close contact with subject matter experts who offer curriculum support to build entire courses, and even work at the college as adjunct faculty. They also shift some of the recruitment burden onto employers, who push information about Champlain to their workforce. The employers also support institutions for providing support and academic advising for their employees (13).

Peirce College Corporate Partnership program is committed to workforce development to stay competitive in the marketplace. Peirce College provides exceptional education packages to over 40 companies on the basis of no-frills model that prioritizes academic excellence and workforce preparation. Innovation and flexibility is key to ongoing success of the delivery model of their coursework (15).

Strayer College redesigned a college degree for Chrysler. Course developers tailored the subject matter, courses, and curricula to Chrysler's needs, swapping out case studies from existing classes about other companies and replacing them with case studies about Chrysler. The result was that employee retention rates became higher, productivity increased, and profits increased. These programs help employees develop a growth mindset and foster curiosity, tenacity, and grit to take back to the workplace. Partnerships between colleges and employers can be designed in two ways — local programs, where employees get trained on site, and broader programs, where employers pay their employees to go to specific colleges (9).

## Having a Motivated and Skilled Workforce

The challenge that most businesses face is finding the right people to help them develop and grow. Work-experience programs designed around the needs of industry will help employers employ people with higher level skills benefiting both the economy and individual businesses by addressing skill shortages, increasing productivity, and improving the capacity of business to innovate. Work experience provides businesses with an opportunity to see the suitability of learners whilst assessing them as potential employees. Institutions can incorporate additional transferable skills in the curriculum, which will be recognized in wide range of sectors to harness fresh new talent. This can help equip workforce with the practical skills and qualifications that organizations need now and in the future. Businesses will enjoy the benefits of having motivated workforce that has been trained to meet their own specific business requirements. Many employers have reported that by employing work experienced graduates have realized a growth and improvement in productivity in their businesses.

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# CASE STUDY

## INTEGRATION OF EMPLOYABILITY SKILLS AND COMPETENCIES IN CURRICULUM



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Employers express the need for innovations in higher education to shape learning in order to help learners thrive and connect with the work environment. Competency-based education addresses stakeholders' needs and signals workforce readiness while improving quality of education.

Competency-based education (CBE) continues to gain favor across higher education because it customizes the learning activities for a particular learner providing ways to build on previous knowledge "Meeting learners where they are" allows learners who are fast to take on more than they could in traditional education.

Creating a competency-based education program requires institutions to rethink designing curriculum for lifelong learning. Technology changes have accelerated interest in competency-based education as it offers opportunities to engage learners in deeper and personalized learning in efficient manner. The best practices today involve learning analytics, adaptive learning technologies, and interactive components to track learner's progress to measure effectiveness of the program.

As new professions and industries emerge academic course offerings have to be adapted to reflect new knowledge, education, and required competencies. A growing number of knowledge economy professionals are pursuing the goals of balancing intellectual and economic interdependence in a currently unbalanced world. There are four main driving forces behind increased interdependence: (a) trade and investment liberalization; (b) technological innovation and the reduction of communication costs; (c) entrepreneurship; and (d) global social networks. Given the increasing global restructuring for knowledge and information, educational needs, in terms of structure, function, curriculum and approach at all levels, especially at the tertiary level, have changed.

Designing, developing, and delivering competency-based education is a six stage progressive and cyclical process that begins with deciding of competencies associated with skills and ends with implementation and

evaluation of the outcomes in learners' performances. Competency-based education instructional methods empower learners to know, to do, and become engaged, motivated, and independent learners ready for a diverse professional world. The 'new traditional' learner needs flexibility, a strong strategy for innovation and 24/7 access to learning resources and thus real education goes beyond formal education expressed by educational institutions, parents, leaders, and authorities, it involves a person's knowledge, will, feelings, and actions to solve problems in real life. Knowledge accumulation and the accumulation of skills occur increasingly outside and beyond the traditional modes of formal education for the workforce of the future.

**Key Words:** Competency based education, technology, skills, innovation, lifelong learning, personalized learning

The current globalized era builds its own habits, values, and mindset creating a culture, which needs to be nurtured and managed. In this stage of transformation, preserving the strengths of formal education alongside the potential of technology is a key-balancing act in designing new models of competency-based learning. The 'new traditional' learner needs flexibility, a strong strategy for innovation and 24/7 access to learning resources and thus real education goes beyond formal education expressed by educational institutions, parents, leaders, and authorities, it involves a person's knowledge, will, feelings, ideation and actions to solve problems in real life.

The forces of globalization are creating opportunity, rewarding creativity, flexibility, and agility. A growing number of knowledge economy professionals are pursuing the goals of balancing intellectual and economic interdependence in an unbalanced world. There are four main driving forces behind increased interdependence: (a) trade and investment liberalization; (b) technological innovation and the reduction of communication costs; (c) entrepreneurship; and (d) global social networks. Given the increasing global

restructuring for knowledge and information, educational needs, in terms of structure, function, curriculum and approach at all levels, especially at the tertiary level, have changed. Knowledge accumulation and the accumulation of skills occur increasingly outside the traditional institutions of formal education for the workforce of the future.

New occupations are emerging and replacing others. Within each occupation, required skills and competencies are evolving. The industry perceives skill requirements as the biggest strategic challenge in skill development for workers to adapt to the changing market demands and to benefit from innovation. Institutions are no longer knowledge dispensers but have to be the canvas where the learner is the artist to create his own creation based on the curriculum linked to the world of work. School-to-career transition requires learners to develop skills, habits, and attitudes conducive to success and personal growth to prepare realistically and wisely for careers. Work experiences are a critical component of preparing learners for transition to workforce (9). Potential benefits of work experiences include:

Gaining career readiness skills including the “soft skills” that employers look for in entry level workers:

- Increasing one’s knowledge of specific occupational skills and workplace settings
- Establishing a work history and connections with employers that can aid in future job searches
- Developing an understanding of different occupations in order to make informed career choices

The emerging global economy requires a holistic understanding of education approaches that enhance the ability of diverse learners to access, assess, adopt, and apply knowledge, to think independently to exercise appropriate judgment and to collaborate with others to synthesize the old with the new knowledge. As new issues and industries emerge academic

course offerings should be adapted to reflect new knowledge, education, and learning requirements. Rethinking of education to meet the demands of the era of globalization by systematically providing input into the analytical and decision-making processes in areas such as strategic shifts, curricula, restructuring, standards, and evaluation.

Educators are setting up systems that focus on learning starting from where the learners are and prepare them to improve along the way. Adapting or creating a competency-based education system requires institutions to rethink curriculum design, learner support, faculty involvement, and back-office processes such as registration, admission, transcription, data systems, etc (8). The role of higher education going forward is going to be lifelong learning and competency-based education that prepares the learner to adapt to the evolving job requirements.

A competency is typically defined as the knowledge, attributes, skills, behaviors, and attitudes that enable an individual to perform a specific set of tasks or objectives to a given standard (9). The newer CBE programs customize the learning activities for a particular learner providing ways to build on previous knowledge “Meeting learners where they are” allows learners who are fast learners to take on more than they otherwise could.

## Changing Perceptions

The technology ‘disruptor dragon’ keeps waving its spiky tail and breathing its fire of disruption and hopes for full transformation making tertiary education a complex business (9). Tertiary education is considered as a launching pad to produce adaptable digitally literate critical thinkers who can thrive in the ambiguity of the new globalized era. Industry is not waiting for higher education to help with a solution, it is instead choosing to create and adopt their own customized educational experience, procure talent to create groups of researchers who focus on areas that extend well beyond the industry’s core mission.

Technology changes have accelerated interest in CBE. The best practices today go far beyond lectures; they involve learning analytics, adaptive learning technologies and lots of interactive components to track learners' progress. As a whole, competency-based education is still in its infancy, especially when compared with the traditional collegiate model. As Burck Smith says, "It presents a high level of policy questions that traditional higher education isn't ready to recognize. A lot will be determined by seeing what providers do. I am very interested in education policy and what would happen as the market changes." And it also depends somewhat on day-to-day practicalities. Changes of technology and the growth of online education have accelerated interest in CBE (7). However, Goldberg optimistically concludes, "As the first graduates of these programs make their way into the workforce and demonstrate first-hand their intellectual capabilities coupled with their workforce readiness, we'll see interest in these programs continue to grow." Competency-based education (CBE) continues to gain favor across higher education because of its ability to get learners to degree completion faster, cheaper, and on a flexible learning schedule (8).

## Partnering

Employers are becoming more knowledgeable about competency-based education. They express the need for innovators in higher education to shape learning to help learners thrive and connect with industry. CBE responds to stakeholder needs and is developed in partnership with industry, clearly signaling workforce readiness and improving the quality of the education. Most feel the time-based model of education does not necessarily lead to qualified employees – instead, they prefer rigorous testing to find candidates that can demonstrate real skills and competencies. Many are excited about the idea of evaluating a candidate's work portfolio instead of merely a resume or transcript, as it can better demonstrate if the learner has the skills and knowledge to be successful in a job (7). As more employers gain comfort with the concept,

competency-based education can be expected to grow (10). It is certainly one of the most disruptive changes to occur in the history of education, and it's happening now. Processes in which education partners representing different educational approaches and backgrounds develop a shared understanding, common goals, and a framework of the curriculum will reach beyond core competencies and focus on knowledge, attitudes, and skills that encompass professional training. The common components of competency based models aim to reach standardized outcomes as assessment of competencies to align with their career interests and skills (14):

- **Communication:** To articulate thoughts and ideas clearly and effectively; public speaking skills; writing work-related materials clearly and effectively.
- **Critical thinking and problem-solving:** Sound reasoning and analytical thinking; how to use knowledge, facts, and data to solve workplace problems.
- **Professionalism:** Personal accountability and effective work habits, such as punctuality, working productively with others toward a goal, and time and workload management.
- **Teamwork and collaboration:** To build productive and professional working relationships with colleagues, supervisors, and customers; how to work with diverse teams; how to negotiate and manage conflict in the workplace.
- **Training in technical skills, or hard skills,** needed for specific career pathways or work settings.

Making the right match increases the success of the work experience by ensuring that learners feel motivated from the start to participate fully. Innovation and flexibility is key to success. Digital natives demand a more active approach to learning. Moreover, the acquisition and assessment of competencies, is becoming more relevant in the education world. The learning process in traditional learning systems has been widely studied, but there is relatively little

literature about the use of virtual worlds for learning, although the expectations are high and the possibilities immense.

Learning is nowadays shifting from merely transmitting knowledge to an active, learner-engagement approach. Simultaneously, lifelong learning for professional development emphasizes the need of higher-level abilities beyond just memorizing facts or understanding concepts. Despite this revolution in learning conditions and requirements, virtual worlds can be a solution to the motivation problem posed by the new generation of learners, but also to the activities that can be carried out to transmit knowledge and competencies. Nevertheless, a rich medium such as virtual worlds is expected to be useful not only to transmit knowledge, but also to promote and evaluate higher-level competencies (11).

This lends additional support to the psychosocial aspects of virtual environments. The implication is that the virtual experience impacted the relational aspects of the learning experience to a greater extent than the cognitive ones. Learner responses confirm that learners want increased opportunities for live, media-rich interaction in order to enhance their understanding and application of the course content. It will contribute to developing skills and competencies of professionals in order to face future challenges. When reviewing learning outcomes, learners who reported the most learning overall were also those who reported the highest degrees of affective learning.

## Learning Outcomes vs. Competencies

Many universities use learning outcomes for their program, curriculum, and syllabi design. Competencies take the currently defined learning outcomes of skills, knowledge, and abilities to the next step and put those to use in real-world situations. Programs built on competencies take a more granular approach and “choreograph” learning throughout the program. Extending the articulation of learning is done upfront and in a very detailed format—

instruction, program design, and learning support follow from that model of learning (8).

Learning outcomes means statements of what a learner knows, understands, and is able to do on completion of a learning process. However, to provide a unified and homogeneous reference framework for relating and comparing qualifications inputs related to the learning process itself are required. They are defined in terms of knowledge, skills, and competence, in which:

- *Knowledge* means the outcome of the assimilation of information through learning.
- *Skill* is the ability to apply knowledge and use know-how to complete tasks and solve problems.
- *Competence* means the proven ability to use knowledge, skills, and personal, social, and/or methodological abilities, in work or study situations and in professional and personal development.

Core competencies require basic skills: reading, writing, arithmetic and mathematics, speaking and listening, creatively, making decisions, solving problems and reasoning responsibility, self-esteem, sociability, self-management, and integrity.

### In an innovative and CBE learning environment:

- **Enhance the classroom experience** through team practice, feedback, or a guided peer review session. It extends the teacher’s role as a facilitator to keep learners engaged in an effective and instantaneous fashion.
- **Help learners get to speed up learning** it is an adaptive and interactive tool where the information is tailored according to learners’ abilities. This personalization helps both the learners and for the facilitator to determine the time and effort needed to learn.
- **Insure that learners are interacting** when content itself is interactive and multimodal and learners’ participation becomes spontaneous.

- Mean a wealth of data is being learnt: Technology is the future that simplifies the process of identifying learner needs and assessing learning outcomes and competencies attained. Technology can deliver learner-centered pedagogies (like adaptive, individualized learning sessions) that simply do not exist in a non-digital world. 'Real World Process' Technology advances in computer, visualization, and haptic technologies are fostering the rapid growth in the use of computer-based simulation for training and education. This can, not only help learners develop competencies but also help our institutions, faculty, and learners measure and assess those competencies. The use of real world processes on campus will continue to expand because they are effective pedagogical tools. It will also expand as the trend toward competency-based education and cross-discipline competency development expands (12).

## Designing and Implementing Competency-Based Education

To design and deliver programs aimed at traditional and non-traditional diverse learners from a curricular perspective, competency-based programs start with the knowledge and skills learners need by the time they graduate and design backward from there, starting with identifying a list of competencies that learners need to develop and demonstrate as well as how to achieve those competencies (8).

In higher education, competency-based education models can break the "iron triangle", expanding access, affordability, and quality, especially when it is combined with new technology to deliver, engage learners, and assess learning. It allows learners to navigate through the curriculum at their own pace, move fast for what they can learn quickly and slow down and get more support from teachers when they struggle. Learners will be able to change the delivery model of their coursework from week to week, depending on whether they are available to attend classes online or on campus. For all learners, it opens the possibility of

multiple pathways to college readiness and college completion. CBE offers opportunities to engage learners in deeper and personalized learning, which can include (6):

- Core academic content
- Critical thinking and problem solving
- Collaboration
- Effective communication
- Self-directed learning
- An academic mindset
- A strong belief in oneself

CBE embraces a view of the individual and individual difference as the source of diversity that can enrich the lives and learning of others. CBE learning and teaching recognizes all learners' entitlement to a learning experience that respects diversity, enables participation, removes barriers, and anticipates and considers a variety of learning needs and preferences (2). Learning takes into account educational, cultural, and social background; experiences; physical or sensory impairment; and mental well-being. All staff and learners benefit from learning that acknowledges and draws upon differences and commonalities and is based on principles of equity, collaboration, flexibility, and accountability.

Pedagogies that are learner-centered, inclusive of individual differences, and relevant in the context of the subject are likely to extend opportunities for academic engagement to a wider range of learners.

Personalized competency-based learning can take place in digitally enhanced environments. In personalized learning, no two educational experiences need to be the same but the college degree carries the same certification of what any learner knows and can do. Personalized learning can involve credit for prior learning, customized pathways through a rigorously defined competency set, multiple options for developing and demonstrating competency, coaches and mentors who guide learners as they craft their own educational

experience, and outcomes that have meaning for each learner—degree completion, workplace skill sets, and career advancement (6).

The implementation of a competency-based curriculum is a six-stage progressive process that begins with agreement on the competencies and ends with implementation and evaluation of the outcomes. The process is cyclical, as competencies need to be evaluated and updated in response to the continued evolution in the work environment. The six-stage process is built on a strong base of evidence and specific action steps (7).

### Stage One: Ramping up for Transformation: Decision on Competencies

A new vision for education involving both academic and employment settings work to incorporate an interdisciplinary curriculum, emphasizing on evidence-based competency demonstration, to achieve a set of core competencies, such as communication, knowledge, skills, reasoning, values, and reflection in daily work environment. These competencies serve as the foundation for the development of curricula, faculty development, and learner achievement (7).

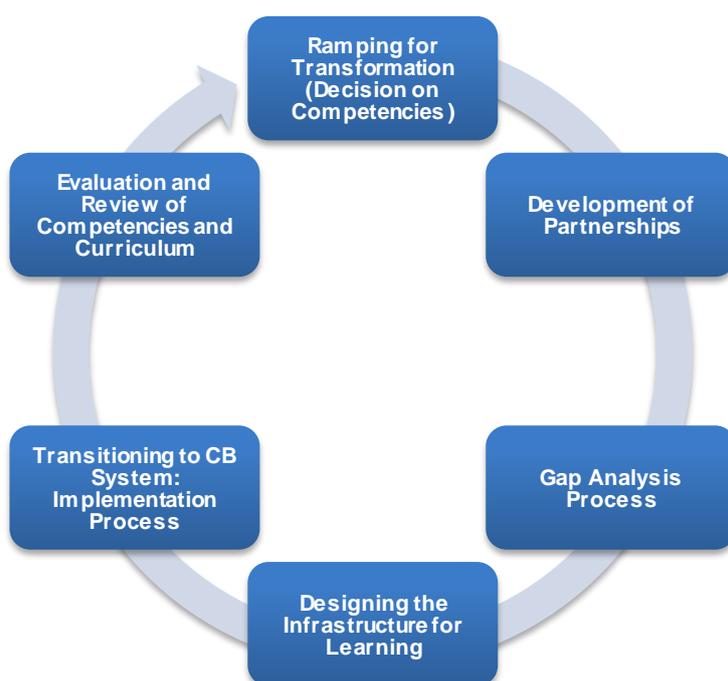
### Stage Two: Development of Partnerships

The industry and stakeholders partnerships for the competency model can include academic programs, knowledge of the workforce environment and new opportunities for learning and provide a roadmap based on agreement of competencies to be achieved (7).

### Stage Three: The Gap Analysis Process

This stage involves a process to determine the steps to be taken to move curricula from the current state to the desired future state. The process begins with an assessment of the current educational program and demonstration of evidence of competencies in curriculum objectives mapping with the outcomes in various measures of curriculum delivery and assessments. Each program examines their own curriculum in collaboration with their industry partners and then share the results with all involved in the partnership. The industry partners may examine their programs for presence of the competencies. This approach provides the opportunity to link the stakeholders more fully into the curriculum to design the future curriculum model (7).

**Table 1: Six Steps for Embracing Continuous Improvement and Innovation Process**



There is a need for a common language between education and industry. Competency demonstration needs to be incorporated early in the education process to more fully engage with faculty and learners.

## Stage Four: Designing the Infrastructure for Learning

The design phase may involve a full program model or an alignment of prerequisites and general education requirements. The new model may also involve a change in the credit transfer process to ensure seamless progression, no repetition of courses, and a more efficient, effective and quality completion of education. This design phase highlights the need to involve school administration as the new model may extend beyond the curriculum requirements. This phase of the model is where the competency model may begin to emerge as a linked or shared curriculum model (7).

## Stage Five: Transitioning to CB System: The Implementation Process

Integration of the competencies into the curriculum can be the final step of the process or the first step in moving to a shared curriculum model. To begin with a one (Associate) plus one (Bachelors) models for the internships so as to put into practice the competencies acquired till the associate level (approximately 60 credits) and then till Bachelors level (7).

The speed at which these models can be implemented is often related to the commitment of those involved, support from school administration to work on the project and funding. The Gap Analysis process is a time intensive process that moves slowly at the start but progresses more rapidly after the first competency-based program is fully reviewed (15).

## Stage Six: Evaluation and Review of Competencies and Curriculum

A process to evaluate the achievement of the competencies is one of the final components of the competency model process. The evaluation

methodology can be achieved through evaluation of the learners' achievement of course objectives and/or their performance within the practical setting. Engagement of the industry partners over the course of competency model development facilitates this evaluation process. With the ongoing advances in the employment environment, the agreed upon competencies and curriculum will need to be revised and updated on a regular basis (15).

## Learner Engagement

Pedagogies that promote deeper learning and technologies that enable self-directed learning, around core academic content, facilitate learning experiences that require critical thinking, problem solving, collaboration, and communication. In an education model where learners are truly at the center, learning is tailored to individual learners' strengths, needs, and personal interests. Learning opportunities take into account existing knowledge, skills, and abilities, set high expectations, and push learners in supportive ways to reach their personal goals (6). When learners are engaged across these competencies, their intercultural learning is more efficient and effective.

The instructional model **will be flexible and will focus on skill mastery through a holistic approach.** An integral part of the model will be individualized and intercultural learning experiences focused on flexible, self-paced, highly personalized, and interdisciplinary programs designed to increase mastery and minimize achievement gaps. This will guarantee growth for all learners. Empowering learners with this instructional model will promote learner engagement, motivation, and foster independent learners as leaders of their own educational experience. It will transform the traditional cycle of failure or disengagement experienced by many learners due to outdated teaching models (6).

Learners' academic apathy will be met with targeted and engaging instruction, support, and encouragement. Immediate feedback, instructional data, assessments, and progress

affirmations will promote self-confidence, skill mastery, and academic growth. The personal and academic growth achieved by learners will ensure future prosperity for themselves, their families, and will be a positive reflection on the community in which they live (6). *Increasing learner engagement is key to develop the craft of pedagogy through the implementation of active learning principles.*

Smart classrooms offer educators the opportunity to provide immersive simulated environments for their learners to develop and practice their skills. More specifically, they offer an environment that will allow learners to develop their skills by practicing and interacting with other learners and their instructors in customized labs, as well as classrooms that simulate those environments in traditional education and commercial facilities. By using smart classrooms, instructors are able to create learning activities that emulate learning experiences that learners may have otherwise only had by means of simply replicating a traditional classroom. Gaming technologies such as virtual environments create digital representations of the real world. A virtual environment offers learners an opportunity to practice their skill development activities and obtain feedback from their peers and instructors (12).

## Assessments for Competency-Based Education for Next Gen

It has been said that we value what we measure. Therefore, next generation learning—which values more personalized, self-paced, mastery-based approaches—requires new approaches to assessment. Rather than multiple-choice bubble response forms that drive “teach to the test” or “bell curve” mindsets, next gen assessments have the potential to transform what and how learners learn (6).

Utilizing performance-based assessments, especially in project-based and experiential learning environments, **next gen assessments measure a range of cognitive skills, social-emotional development, and deeper**

**learning, and give learners and their instructors actionable feedback to help them continue to grow and learn.** Pre-tests at the start of competency modules help direct learners to the content they need to focus on and allow them to move quickly through what they already know and can do. Adaptive assessments tailor the testing process to a learner’s ability level. Integrated assessments further guide future instructional decisions and help learners direct their own learning (6). Working to bridge the gaps through comprehensive school/college partnerships, reforms in education when technology is **integrated into** a comprehensive educational model, tend to support a more efficient competency-based education system, learning analytics, adaptive assessments, and learning management platforms.

When learners leave an institution, what does their transcript really tell employers? What are the options for grading systems, options for learning transcription, and how those can be easily translated to discern, quantify, qualify, and communicate learner learning to employers (8). Assessment is the process by which academics form judgments on learner achievement and communicate those judgments’ to others. Assessment methods are multitudinous with no assessment method fitting all learning situations; requiring designing of assessments for a specific context so as to enable a feedback loop that enables learners to learn through reflection on their own performance.

Competency-based models give the program and institution a lot more latitude when measuring learning. Institutions can directly assess subsets of competencies by designing learning evaluation exercises that invoke observable behaviors from learners. A series of assessments can be used to evaluate learner learning, instead of more traditional tests and papers, and use the data to alert them to learners who are at risk (8).

When it comes to actually implementing of assessments, use of technology is most effective in diagnostics and personalized

learning. Technology can be used to shorten the feedback loop, which provides learners, parents, and educators with timely information that can be used to create an increased understanding of individual learner needs related to differentiation and individuation.

The goal of this broad-based measuring is to guarantee that diverse graduates are well rounded in all the typical skills that employers will value. Proficiencies measured are: Communication skills, Critical and creative thinking, Digital fluency and information literacy, Quantitative skills, Personal effectiveness, Ethics and social responsibility, Teamwork and collaboration, Science, and Society and culture.

The competencies and skills can be promoted and assessed in any course of the core curriculum. Assessment should therefore evaluate the performance of the learner for each of these aspects (11). Considering the intrinsic differences of such diverse categories of learning outcomes, distinct assessment methods would apply (8). Although knowledge can be properly appraised using traditional exams, assessing skills and competencies poses more difficult challenges and requires complex activities (11).

## Learning Analytics

Many innovative programs incorporate learning analytics to help guide learners along their personalized pathway to success. Learning analytics are used as part of early-warning systems to identify learners who are struggling so that faculty, advisors, and learners themselves can take action. Instructors are using learning analytics to understand how individual learners and diverse groups of learners are moving through curriculum in order to customize their instruction. Learners are using learning analytics to plan their educational goals and track their own progress (6). Learning analytics demonstrates flexibility, effectiveness, and correctness of tailored assessments to the rapidly changing work environment.

## Monitoring and Assessing Learner Progress

Evaluation of this new instructional strategy should be considered from the start. Building in simple assessment techniques will help faculty to monitor learner learning and make continuous improvements to the model.

## Tools and Strategies for Frequent Feedback

Robust feedback is essential for both learners and faculty within a course and it must be taken into consideration when designing more autonomous type learning. Demonstrate different technology tools used for continuous assessment and cost saving strategies to assist in automating feedback for learners.

## Paths to Accreditation

Professional accrediting bodies view competency-based models with considerations in mind that institution can design their programs to be effective for accreditation approval processes.

## Conclusion

In the past two decades, presentation of new innovative technologies has brought a change in how learners communicate, socialize, and educate. The novel technologies transfer and extend innovative software solutions in developing new education and training content and supportive learning tools based on units' learning outcomes and competencies. This will offer many opportunities for educators and learners to complete educational activities in simulated environments and ensure effective assessment, evaluation, and validation.

The competencies and skills can be promoted and assessed in any course of the curriculum. Assessment should therefore evaluate the performance of the learner although assessing skills and competencies poses more difficult challenges and requires complex activities. The feedback created by the assessment process

serves as a direct foundation for further development. This captures learner's motivation and builds on previous successes to enhance their confidence.

Competency-based education has passed a threshold from exotic to mission-critical at many institutions, a surge in efforts to promote best practices, partnerships, and coordination among the growth in competency-based education or competency-based learning has been observed.

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# CASE STUDY

## STRATEGIES FOR PROMOTING INDUSTRY-ACADEMIA PARTNERSHIP IN NIGERIA

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## Abstract

The Nigerian/African context of burgeoning youth population, with considerable frustration and hopelessness due to grinding unemployment, calls for a concerted effort at finding unique but practicable solutions to closing the chasm between the academia, the industry and governance structures. The perspective in this paper looks at the generic concept of “innovation value chain” to unravel the key elements of the chasm in terms of knowledge-mediated special purpose mechanisms and structures. An analysis of the current state of research and academic-corporate collaboration in Nigerian universities is presented to provide empirical basis and to elucidate the dominant issues to achieve better networking for enhanced uptake of research outputs, products and innovation for greater impact on national and human development, and on effective nation building.

**Keywords:** Youth unemployment, innovation value chain, triple helix, research uptake, nation building

## Introduction

A strength, weakness, opportunities and threats (SWOT) analysis of the Nigerian higher education system revealed weak linkage with industrial and real sectors of the economy, just as concerns continue to grow on the mismatch of the skills of university graduates with the needs of the industry (Kalu et al, 2013). Hence, there is growing unemployment of graduates and indeed youths, posing great threat to the security and stability of the country. It is considered that an enterprise development support and entrepreneurial motivating ecosystem is lacking in the country, and that the role of a strong partnership between the academia, research and development structures, the industry, civil society and government is to emplace such environment to enable the private sectors to assist government in instigating sustainable development. Our task in this paper is to identify ways to facilitate the much needed partnership, and foster enduring

uptake of R&D results, promote innovation, technology transfer both laterally and vertically, technological learning and engender economic development, nation building, and the wellbeing of the teeming populace.

Analysis of the 2016 World Economic Forum Global Competitiveness Index, showed that Africa was lagging behind in higher education and training, innovation and technological readiness. This was attributed to several challenges including occurrence of large population of inadequately educated workforce as well as insufficient capacity to innovate (WEF, 2016). Consequently, Zomahoun and Green (2016) “advocated for the development of an ecosystem of innovation in the mould of an African innovation pipeline” or in other words an effective African innovation value chain, noting that “the African Union’s Science, Technology and Innovation Strategy for Africa 2024 - STISA (NEPAD, 2016) aims to address Africa’s transition to an innovation-led, knowledge economy”, with focus on how African nations can create and sustain an ecosystem of innovation, particularly growing from higher education institutions.

Our analysis reveals that to be well equipped for productive civic engagement and relevance to the needs of the continent and her peoples, African universities must emplace policies, structures and processes for effective technology transfer. Two key generic university strengthening imperatives were identified as follows; (i) emphasis on the research function, and (ii) mainstreaming ICT into all university functions as driver of development, relevance to mission and impactful civic engagement.

## The Innovation Value Chain

To characterize properly the innovation value chain and hence the innovation-relevance of the research undertaken in Nigerian universities and research institutes, we consider the evaluation of the global innovation index. The global innovation index (GII) is a rating/ranking of the innovation capabilities of nations (or other such development entities) and their measurable

output/products using 84 indicators, which include the quality of universities, availability of microfinance and venture capital to support research, innovation and product development, etc. The index was developed by Cornell University, INSEAD and the World Intellectual Property Organization (WIPO, 2016). Of the 142 countries ranked, Switzerland, Sweden and Singapore have always been in the most innovative bracket. The grouping of the dominant indices or measures factored into the GII assessment is as follows:

- (1) Institutions (e.g. political environment, regulatory environment, business environment),
- (2) Human Capital & Research (e.g. Education, Tertiary Education, R&D),
- (3) Infrastructure (e.g. ICT's, General Infrastructure, Ecological sustainability),
- (4) Market sophistication (e.g. credit, investment, trade & competition),
- (5) Business sophistication (e.g. knowledge workers, innovation linkages, knowledge absorption),
- (6) Knowledge & technology outputs (e.g. knowledge creation, knowledge impact, knowledge diffusion),
- (7) Creative outputs (e.g. intangible assets, creative goods & services, online creativity)

In our earlier research analysis for Africa, we added to this listing, Research Centres of Excellence (RCEs) as special and major catalyst of innovation, on the basis of their emerging critical research and innovation activities, and proceeded to decompose the groupings into 4 critical blocks or homogeneous mega-groupings of the factors as follows (Faborode, 2017a):

**A. POLICY/OPERATING ENVIRONMENT:**

- (1) Institutions; (3) infrastructure; (4) market sophistication; venture capital/joint ventures.

**B. HUMAN CAPITAL AND RESEARCH:**

- (2) Human capital and research; (8) Research

Centres of Excellence (e.g. World Bank-funded African Centres of Excellence, RCEs).

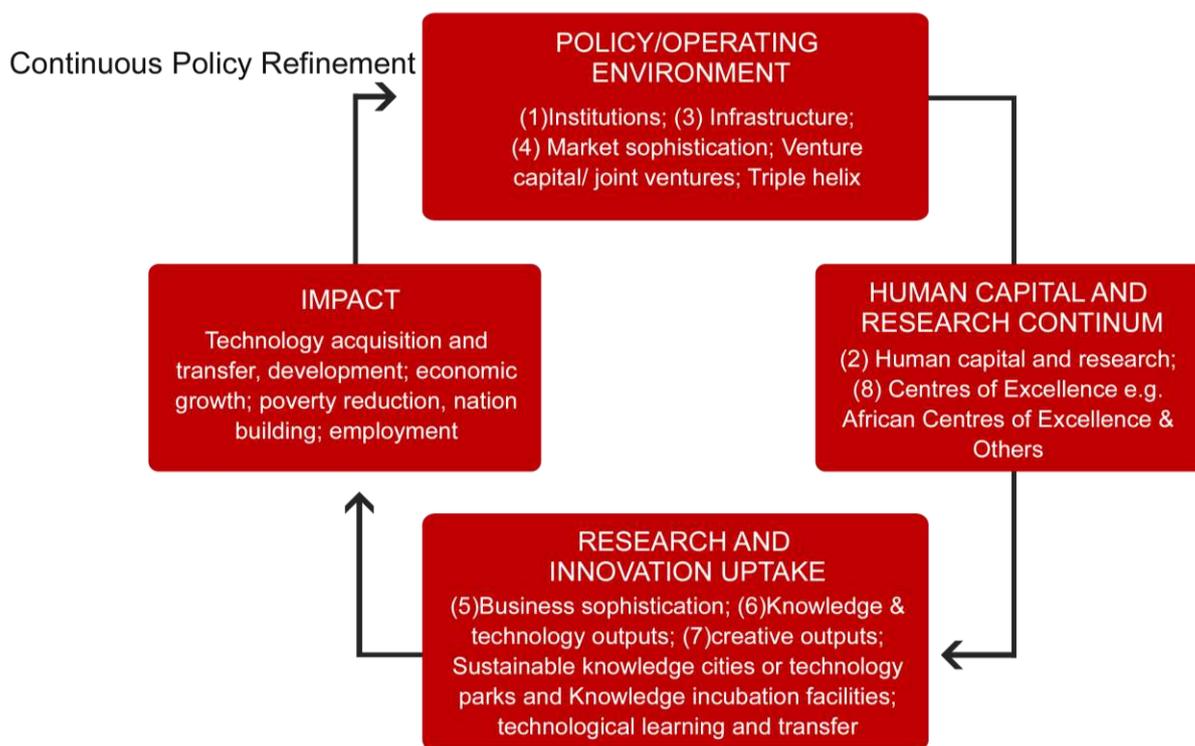
**C. RESEARCH UPTAKE/INNOVATION:**

- (5) Business sophistication; (6) Knowledge and technology outputs; (7) Creative outputs. We add sustainable knowledge cities or technology parks and knowledge incubation facilities etc, and technological learning and technology transfer.

**D. IMPACT:** Development; economic growth; poverty reduction, nation building; employment. **We added technology acquisition and transfer.**

Following from above, therefore, our construct of the innovation value chain entails the transition from how **policy** (political vision, legislation/laws, research and innovation funding etc) and the entire **national/global environment** (fiscal, monetary and industrialization policies, globalization etc) shapes a country's **human capital, education and research management** to generate knowledge and innovation, to how **innovation uptake** is managed by the National System of Innovation (NSI) to instigate the **impact** that grows and builds a nation sustainably (Faborode, 2017a). This is schematically depicted in Fig. 1 below, and represents the dynamic flow of innovation processes embodied in the evaluation of the innovative capability of an entity (region, institution, etc) or a nation. The development impact (or lack of it) felt by a nation provides the feedback for policy refinement, either to sustain, or vary a policy, try out new ideas, upscale the parameters for wider and better impact, and so on. Such refinement results in improvements in the operating macro-environment for innovation to thrive, and the cycle continues in a dynamic process of perpetual innovation for a better world. The innovation value chain demonstrates the centrality of human capital development and hence knowledge as a key driver of innovation and hence development. Our further analysis, as presented subsequently, provides the link of the innovation value chain to the tripartite partnership of knowledge/university-industry-government/civil society.

**Figure 1: Schematics of the Innovation Value Chain (Source: Faborode, 2017a)**



## University-Industry-Government Partnership

### Universities as Centres of Research and Innovation

The key role of science, technology and innovation (STI) policy is to instigate industrial progress. Though innovation fuels manufacturing, innovation is not an activity for or by itself, hence we need to properly establish this link; a firm innovates to create a new product, process or gain a new market superior to what exists in quality and/or in price. STI policy essentially links the laboratory, the design offices to the factory through the convergence of scientists, engineers, entrepreneurs, venture capitalists and consumers to create new markets locally to raise GDP (Oyelaran-Oyeyinka, 2012). Thus, we need to build a professional alliance to turn the current crisis in Nigeria into an opportunity to revive industrial production. This is a task for Nigerian research/innovation complex, with research universities providing leadership. The emergence of the World Bank sponsored African Centres of Excellence, ACEs (see Table 1) and their performance has ignited hope that

we really can have top rated research institutes that will be able to compete favourably with others in Africa and indeed the world. The ACEs are to be developed as top rated research universities, in consonance with the Bank's notion of world class universities. To the World Bank, "All world-class universities are research universities, and they always play a critical role within the tertiary education system in training the professionals, scientists and researchers needed for economic development and generating new knowledge in support of the national innovation system" (World Bank, 2002).

The Redeemer's University Centre for the Genome of Infectious Diseases (ACEGID) came first of all the 19 ACEs in west and central Africa, and is becoming a novel world class centre of excellence, having been instrumental in the diagnosis of the first case of Ebola virus disease (EVD) in Nigeria. It is instructive as indicated in Redeemers University Vice Chancellor's 7<sup>th</sup> Convocation Address that ACEGID scientists also successfully sequenced the Ebola virus from Sierra Leone, and have indeed developed a rapid response diagnostics tool that could detect Ebola virus in less than

**Table 1: Nigerian African Centers of Excellence (ACEs)**

S.No.	Lead Institution	Project Title	Scientific Discipline
1	Redeemers University, Ede	ACE for Genomics of Infectious Diseases	Health
2	African University of Science and Technology, Abuja	PAN African Materials Institute	STEM
3	Federal University of Agriculture, Abeokuta	Centre for Agricultural Development and Sustainable Environment	Agriculture
4	Ahmadu Bello University, Zaria	ACE on Neglected Tropical Diseases and Forensic Biotechnology	Health
5	University of Jos, Jos	Phytomedicine Research and Development	Health
6	University of Benin, Benin City	ACE for Reproductive Health and Innovation	Health
7	University of Port Harcourt, Port Harcourt	ACE Centre for Oil Field Chemicals	STEM
8	Bayero University, Kano	Dryland Agriculture	Agriculture
9	Obafemi Awolowo University, Ile-Ife	National Science Technology and Knowledge Park Initiative	STEM
10	Benue State University, Makurdi	Centre for Food Technology and Research	Agriculture

10 minutes. Publications from their work are finding space in top impact journals such as *Science*, *Nature*, *New England Journal of Medicine* and *Cell*. They have so far assisted the University to secure global research partnership and funding in excess of three (3) million dollars that may soon position it as an international hub of academic and research excellence in microbial infections and human genomics. The Centre has indeed become the reference point for laboratory analysis of cases not only in Ebola but in Lassa fever and other infectious mutations that are regularly coming out in Nigeria and the region.

The ACE centre in Benue State University is for food technology and research, and we see it as a potential ally of Raw Materials Research and Development Council (RMRDC), working with the Federal University of Agriculture also in Makurdi, to take advantage of the convergent knowledge and practices in genomics, molecular biotechnologies, agricultural and industrial biotechnology, as well as, material science and technology advances in nanotechnology, smart materials, high-performance materials and advanced catalyst materials, etc to chart new frontiers in food science and technology. Benue State being the conceptual food basket of the nation, can have

a strategic partnership with the Federal Government/RMRDC and its three universities can be positioned as the agriculture, food processing and technology centre of Nigeria, and West Africa.

### Case Studies of Successful Research-Industry Partnership

Partnerships between research institutes (universities and such other institutions) and industries are crucial to encouraging increased research and promote innovation, and the literature is awash with writings on this concept. Recent efforts in China to reform national innovation systems serve to demonstrate the importance of "motivating universities and research institutes, building up the innovative capacities of enterprises, and promoting industrial linkages." Trends in research-industry linkages illustrate three ways such collaboration has been experienced in the Nigerian agro-food processing sector, and represent glimpses of hope demonstrating that universities and firms in Nigeria can be made to work together to build capacity for innovation. The **first mode** is identified as "principal agent demand-driven" FUNAAB-Nestle Soya bean Popularization and Production Project (Juma, 2011), which involved interaction between the Federal University of

Agriculture Abeokuta (FUNAAB) and Nestle Nigeria since 1999. Nestle employed FUNAAB to help address its challenges in demand for soybeans. Nestle Nigeria employs about 1,800 people and soybeans are one of its major raw materials used especially for baby foods. The firm has been the only major external donor and industrial partner with FUNAAB. A number of benefits derived from the linkage, including learning by interaction between FUNAAB scientists and Nestle Nigeria farm managers and farmers, which contributed significantly to building capacity for innovation especially at the farm level. Production of improved quality seeds and grains and facilitating a new process for growing soybeans. Hence, Nestle Nigeria saved costs by finding alternative to the inefficient Nestle Nigeria farms located in northern Nigeria and securing a regular supply of high-quality soybeans from the linkage farmers. FUNAAB's extension activities were boosted, resulting in the popularization of its model of soybean cultivation in southwest Nigeria, which in turn became an important soybean producing region. Overall, the linkage improved the livelihoods of the people in the region and enhanced technology adoption for soybean processing, especially threshing technology.

The **second case study** relates to Development Partnership in Higher Education for Africa (DeIPHE) Project 643: African Women and Rural Environment (AWARE), a collaborative intervention project between Obafemi Awolowo University, Ile-Ife, Nigeria, Institute of Agricultural Research and Training (IAR&T), Moor Plantation, Ibadan, and the University of Newcastle upon Tyne, Newcastle upon Tyne, United Kingdom. The other key partners and beneficiaries in this project are people/rural women. The project, funded by the United Kingdom Department for International Development (DFID) and coordinated by the British Council, was from September 2009 till August 2012. Like other DeIPHE Projects, AWARE was focused on directly and indirectly meeting some *Millennium Development Goals (MDGs)*, three in this case: MDG 3, promotion of gender equity and women empowerment; MDG 1, eradication of extreme poverty and hunger; and MDG8, developing a global partnership for

development. Essentially the project represented a bold attempt in research and civic engagement by collaborating universities. It sought to exploit and harness the inherent entrepreneurial capability of African women by motivating them to be aware of the immense possibilities open to them to start-off thriving rural enterprises in natural resource utilization and on and off-farm wealth generation activities, including crop processing, handling, storage, preservation and marketing, as well as profitable utilization of farm and domestic wastes. The fundamental participatory strategies adopted entail (Farinde *et al*, 2015):

- Nurturing and promotion of rural enterprises and entrepreneurs through Rural Women Trainees (WETs) and Young Women Enterprise Fellows (YWEFs) Programme;
  - Training of rural women in gainful on and off-farm agro-enterprises, such as cultivation and utilization of moringa oleifera, soybean fortification of weaning foods, cassava products development, etc.
  - Production and adoption of organic fertilizer from both livestock waste and effluents; and
  - Establishment of strategy for production of Biogas for on-farm and domestic uses among rural women.
- Packaging and dissemination of improved information on rural business enterprises and environment through improved information dissemination mechanisms among primary and secondary stakeholders;

A systematic approach was used to interact with the women to understudy their needs and natural environment, as well as motivate them to generate ideas that eventually led to the development of the bio-digester to handle the wastes and turn them into biogas and organic fertilizer from the process residues. Harnesses for capturing and storing the gas were developed as well as burners for utilizing the gas. The women were then trained in understanding the proper use and care of the devices, while local artisans were also trained in the fabrication of the relatively simple but

effective devices, to assure constant supply to the women groups. The women were also introduced to micro-finance, as well as development finance agencies to support their budding enterprises financially. An up-scaling program has seen the technology being adopted for massive rural biogas utilization initiative (O' Clean gas) by the host government of the University (Osun State Government of Nigeria). More rural communities are benefitting from the initiative, whilst fresh university graduates are being supported to set-up biogas and bio-fertilizer delivery enterprises under a youth empowerment/entrepreneurial development program. The wider impact extended to mentoring younger academic colleagues and students to enhance the relevance of higher education to the real challenges of developing economies.

The **third case study** is the "multi-stakeholder problem based" cassava flash dryer project, which was between one large privately owned integrated farm (Godilogo Farm, Ltd.) that had an extensive cassava plantation and a cassava processing factory; three universities namely the University of Agriculture, Abeokuta, the University of Ibadan, and the University of Port Harcourt; the International Institute for Tropical Agriculture (IITA), and Raw Materials Research and Development Council (RMRDC). The main outcome is the celebrated local design and fabrication of the first medium-sized cassava flash dryer in Nigeria. The technological learning generated was unprecedented in local fabrication of agro-food processing equipment, and there is evident improvement in capacity for innovation in agro-food processing. There was considerable interactive learning through experimentation by the research team. The impact of government policy through the Presidential Initiative on Cassava Production and Export (PICPE) and government support for the project through RMRDC demonstrated the crucial role of government as a mediator or catalyst for such linkages and innovation, with knowledge flows and user feedbacks also playing important roles in the success of the partnership.

It is indeed significant to note, in all the three case studies, the role of government/policy in assisting and accentuating the collaboration between knowledge/research and industry/civic engagement/practice as encapsulated in the innovation value chain – a practical demonstration of the Triple Helix.

## Agricultural Innovations and the Triple Helix

Incidentally, the three case studies pertain to agricultural innovations in relation to the mission of universities and their civic engagement. Hence, the relationship can be represented in the context of to the triple helix as noted above. Agricultural extension experts however have an integrated system named the research-extension-farmer-inputs-linkage system (REFILS) to represent the development, communication and extension of research results to farmers and enhance the supply of farm inputs for better uptake and adoption of such research outcomes (Adebowale & Amusat, 2005), with the implied feedback and interaction to improve system efficiency (Agbamu, 2000). Such research outcomes could be improved technologies, improved seeds, improved storage techniques, indeed all inputs that will enhance farm productivity and diversification. These are essentially agricultural innovations, hence REFILS can thus be considered as also representing the agricultural innovation value chain. According to Faborode and Ajayi (2015), "the rationale for REFILS is to link the various components in the food value chain in order to create a two-way flow of information from research to farmers both at the production and post harvest handling and vice versa". The innovation value chain as earlier described is a continuum which starts and ends with policy and its dynamic refinement. The triple helix even in its most simplified form recognises the place of policy in the complex interaction between knowledge/research and industry/practice. It would seem that this third compartment of influence in the triple helix was inadvertently and inexplicably omitted in the conceptualization of REFILS.

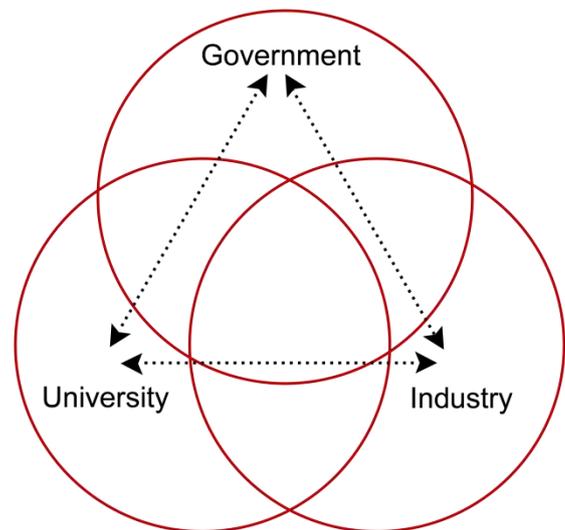
The seminal work of Faborode (2011) and her co-workers (Faborode and Ajayi, 2015) has revealed gaps in their findings and their uptake model based on REFILS. Without appropriate policy to enable full coordination of the linkage/interaction among the principal components of the model or construct as we observed in the case studies earlier presented, we would not have the results desired as in those research and industry linkages. This point is buttressed by the performance of the agricultural transformation initiative of growth enhancement packages under a former Minister of Agriculture in Nigeria. The singular policy on agricultural wallet, which enabled farmers to access fertilizer and other farm inputs directly using their mobile phones, not only eliminated the meddlesome middlemen in the input distribution chain, but ensured that unlike in the past, farmers had adequate fertilizer and other inputs for their farms, thus leading to increased farm productivity and bumper harvests. This cleared the pathway for inputs and hence innovation from research (improved seeds, fertilizer and herbicides) to reach the farmers. It is thus proposed that REFILS be modified to expressly and unambiguously to include the “policy nexus”. In other words a **Policy-Research-Extension-Farmer-Input-Linkage-System, PREFILS**, will be a better framework for fully representing agricultural innovation linkage/value chain.

## The Triple Helix and its Variants as Models of Research-Industry Linkage

The **Triple Helix innovation partnership model** captures the perspectives and manifestations of the partnership/collaboration/linkage between the knowledge system (research, academia, vocations) and the industry/firms, broadly conceived, as well as the government (Etzkowitz, 2008) for development. Thus, it focuses on the tripod of university-industry-government relations, contends that an economic entity lies on the three pillars/helices, with economic growth generated by clustering and concentration of talented and productive people, and is depicted by a trapezium (Fig. 2.). The Triple Helix acknowledges explicitly the

importance of higher education for innovation. However, in one line of interpretation it could be argued that the Triple Helix places the emphasis on knowledge production and innovation in the economy (Carayannis and Campbell, 2010) so it is compatible with the *knowledge economy*.

**Figure 2: The triple helix model: Knowledge/Research-Industry-Policy/Government Partnership (Mok, 2015)**



The **Quadruple Helix Innovation model** is advocated to embed the Triple Helix, adding as a fourth pillar/helix the ‘media-based and culture-based public’ and ‘civil society’. It encourages the perspective of the *knowledge society*, and of *knowledge democracy* for knowledge production and innovation. It contends that creative cities and knowledge regions are the true engines of economic growth, as the civil society demands for ever innovating goods and services (Afonso et al, 2010; Carayannis and Campbell, 2010). In a Quadruple Helix understanding, the sustainable development of a knowledge economy requires a co-evolution with the knowledge society. Yet, there is also **The Quintuple Helix innovation model**, which is broader and more comprehensive by contextualizing the quadruple helix and by additionally adding the helix (and perspective) of the ‘natural environments of society’. The Quintuple Helix stresses the necessary *socio-ecological transition* of society and economy in the twenty-first century. Therefore, the Quintuple Helix embodies sustainable development, and is ecologically sensitive” (Carayannis and Campbell, 2010).

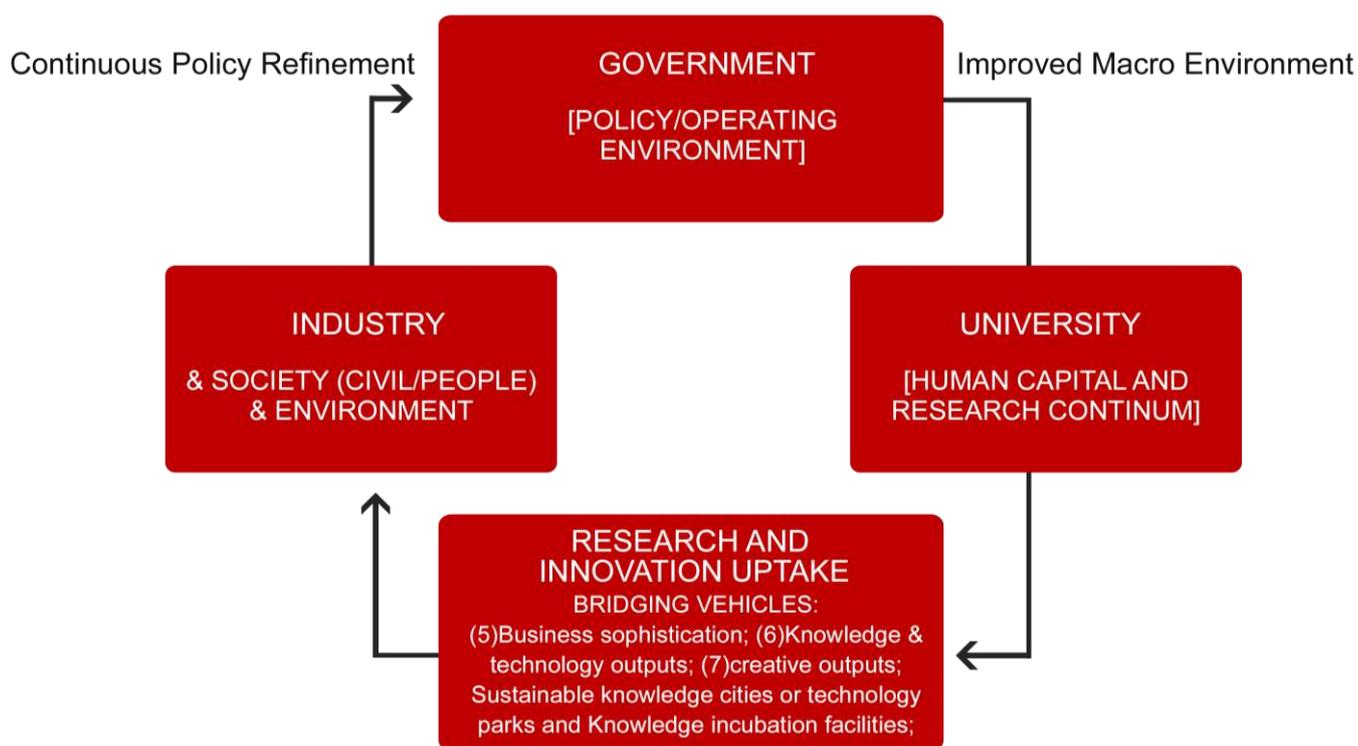
One can then regard the **triple helix** as the simplest depiction of the innovation partnership model that regards the “industry” in the broadest sense to include; industry/firms, people (poor, rich, women, etc) and society and the whole of the terrestrial environment. The variants **quadruple** and **quintuple helices** only add weight and emphasis to civil society/people and the social and ecological terrestrial environment as the fourth and fifth pillars respectively.

When the triple/quadruple/quintuple helices are examined in relation to the innovation value chain model of Fig. 1, we can deduce the model of Fig. 3, in which the policy domain actually depicts **Government**, the human capital domain depicts **University**, and the impact domain in Fig. 1 now represents **Industry + Civil Society + Environment** in Fig. 3 (Faborode, 2017b). In essence, the overall impact in the innovation value chain relates to human and terrestrial ecosystem, encompassing industry, society and people as emblemized by civil society advocacy, the land, water, plant and animal environment, the seas and oceans. **This is a significant novelty that links the helix representation of innovation to the innovation value chain.** It can only be inferred further that our dynamic and ever

changing or transforming world will continue to evolve with the exploits of knowledge, science, technology and innovation. We are currently in the 4th industrial/nano-digital revolution of the internet of things, and we do not yet completely know where artificial intelligence is taking us, with the emergence of thinking and feeling robots.

From the foregoing, we vividly see the intrinsic place of lateral technology transfer in the innovation value chain. When construed to also include some element of knowledge transfer as a precursor to technology transfer, then we see that causing it to happen requires careful planning and orchestration from human capital development, research conception and prosecution, such that in the case of agriculture for example, farmers are integrated into the planning process right from the beginning (Faborode and Ajayi, 2015), as we saw in the second case study earlier. The lesson in this for universities generally and universities of technology in particular is that the **research and innovation uptake function** which should be their hallmark and most distinguishing feature, **requires specialised/independent structures (or Special Purpose University-Industry Vehicles, SPUVs),** and there are several

**Figure 3: Schematics of the Triple, Quadruple and Quintuple Helices derived from the Innovation Value Chain.**  
**Source: Faborode (2017b)**



models including university ventures, incubation centres, knowledge parks, innovation cities, etc that should not impair their basic research and development function. Hence, governance of such entities must be handled by experts, and separated from academic functions.

## Nigerian Research Baseline Data

What is the present state of overall partnership of Nigerian universities with the industry, the people and development practice? The Association of Vice Chancellors of Nigerian Universities (AVCNU) had commissioned some studies of the Nigerian research base to benchmark the present state of research and its impact in the effort to adopt some proactive measures to enhance the research performance of Nigerian universities. It covers the following **4 major strategic areas**:

- *Research output, growth and impact report*
- *Brain circulation report and list of Nigerian researchers abroad*
- *Research collaboration report*
- *Academic-corporate collaboration and knowledge transfer report*

The full reports (Pan, Lei, 2015a-d) are available on the AVCNU/CVC website, but a few snippets of the findings are briefly discussed here.

## Research Output, Growth and Impact Report

We start with the overall publications output and growth from 2004-2013, with some comparator countries, Fig. 4. The comparator countries chosen include Ghana, Uganda, and Tanzania, who were also involved in similar studies being undertaken by Trust Africa and the British Council. Also included are the two research leaders in Africa, South Africa and Egypt. South Korea and Malaysia were also chosen to represent those at par with Nigeria in the past, but have now used research and knowledge to advance their economies, to make up the seven comparator countries. Fig. 4 shows that Korea led the pack followed by South Africa and Egypt

in sheer volume of publications. The compound annual growth rate for Nigeria was 11.99%, representing some progress since 2004, with the leading research field being agriculture and biological sciences. However, a most useful picture was obtained when the field weighted impact of citations is presented in Fig. 5, showing that Nigeria lies below the world average of 1.00 at 0.45, indicating the need for Nigeria to work harder at improving its share of world citation of articles.

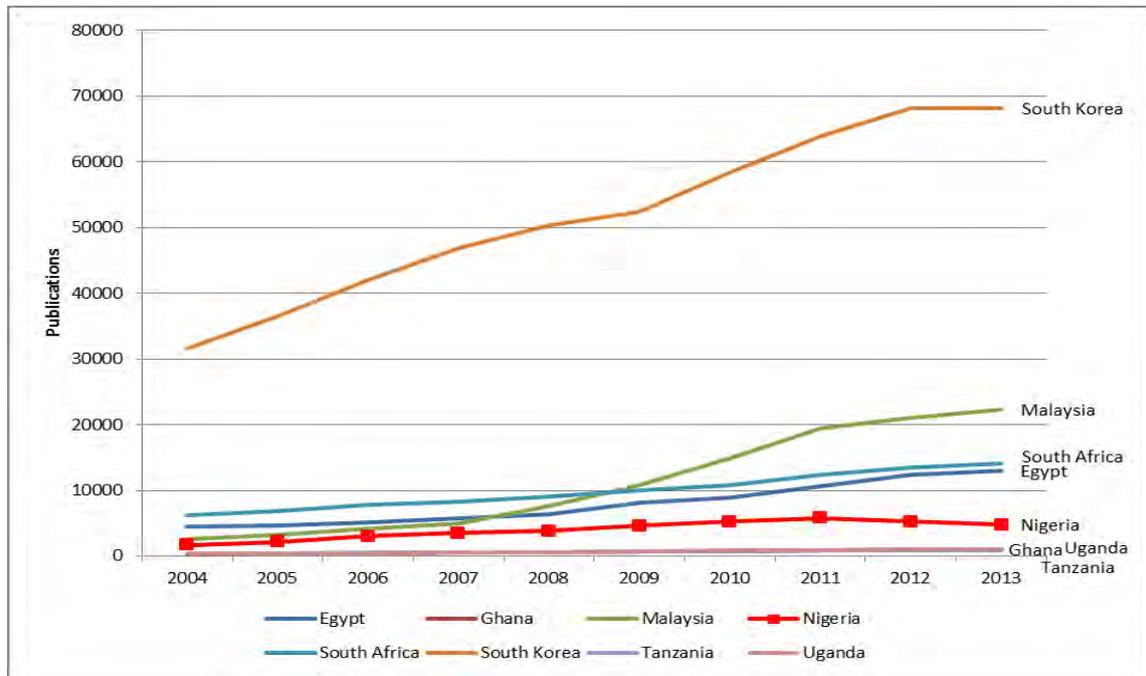
Field-Weighted Citation Impact takes into account the differences in research behaviour across disciplines, by normalizing the citations received by the article with the expected citation, for the given document type, subject area and year. It is an information diagnostic index as follows:

- = 1: the output performs just as expected for the global average
- > 1 : the output is more cited than expected according to the global average; for example, 1.48 means 48% more cited than expected
- < 1: the output is cited less than expected according to the global average.

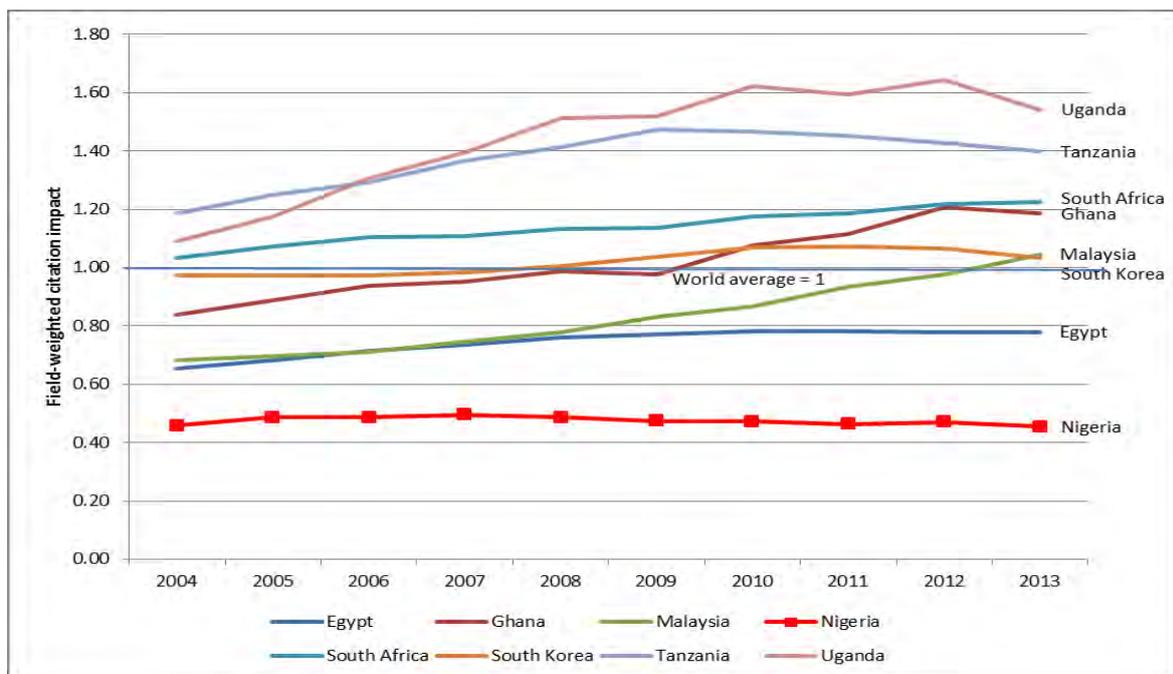
## Research Collaboration

Research collaboration, both at the institutional, cross-border/international and university industry level, is at the heart of the academic research enterprise. Our earlier discussion of imperatives was clear on the need for university-industry-civic society collaboration for effective uptake of the outcomes of research. The case for international cooperation is reinforced in an article published in Nature, Rees (2008), titled international cooperation is part of science's DNA, he noted that "many of the challenges that science faces today, for instance, climate change, food and energy security, and the spread of infectious diseases, are global in nature, and require a global response. These factors make international collaboration in science more important than ever." The experience of Egypt in developing world-class universities largely through collaborative research strategies is also note worthy (Ahmed, 2015).

**Figure 4: Research Output and Growth**



**Figure 5: Field Weighted Citation Index**

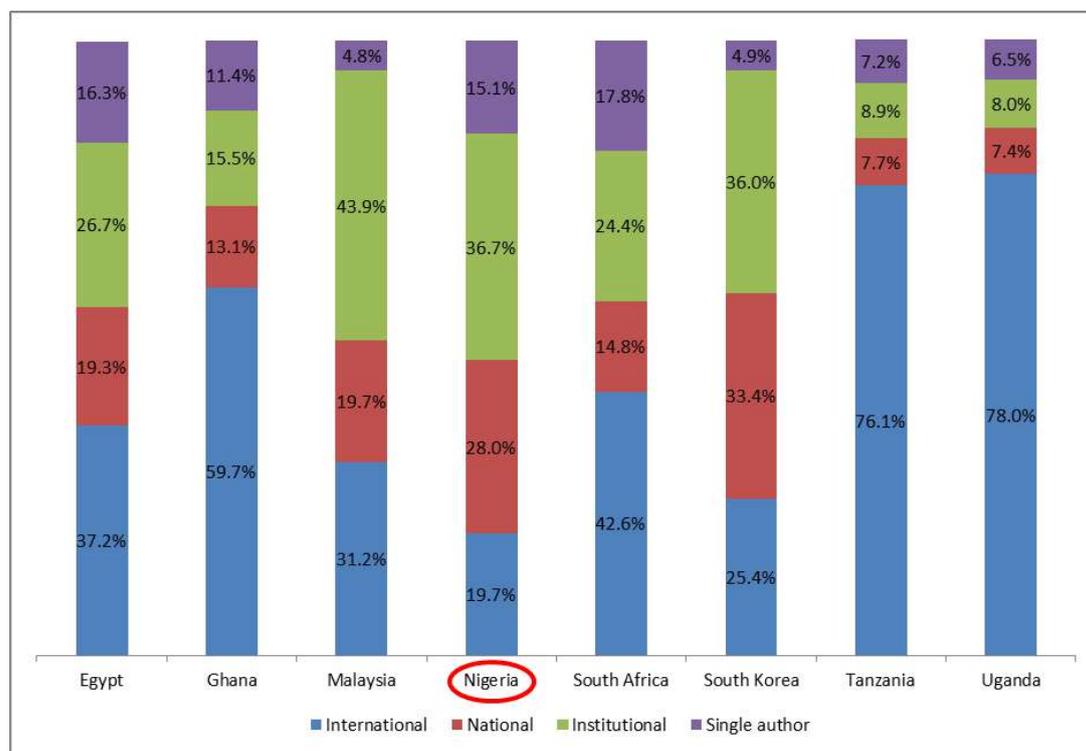


Hence, the study reported here also looked at these dimensions of the Nigerian research base and performance. In Fig. 6, we see how Nigeria fares comparatively in the various dimensions of collaboration. The striking features are summarized as follows:

- Only 19.7% of Nigeria’s publications in 2004-2013 are co-authored with researchers outside of Nigeria

- Tanzania and Uganda have the highest percentage of internationally collaborated publications (more than 76%), followed by Ghana (59.7%).
- The field weighted index of collaborated Nigerian publications; is 1.01, which is above the World average, compared to 0.45 for all publications.
- The country with highest collaboration with Nigeria is the USA.

**Figure 6: National Comparative Research Collaboration Performance**



**Explanatory Notes:**

- Single author publications: no collaboration
- Institutional collaboration: all authors are from the same institution
- National collaboration: authors are from different institutions, but within the same country
- International collaboration: at least one author is from an institution of a different country

**Academic-Corporate Collaboration and Knowledge Transfer**

The keyword for **university-industry collaboration** as noted in our earlier discuss is knowledge exchange, which is examined here in terms of:

- Intensity of academic-corporate collaboration in publications, Fig. 7
- Research usage – corporate downloads, Fig. 8
- Research usage – patent citation, Fig. 9

Each figure is annotated with explanatory notes as appropriate, while Fig. 11 presents a summary of the key findings on knowledge exchange.

The following key observations or trends are note worthy:

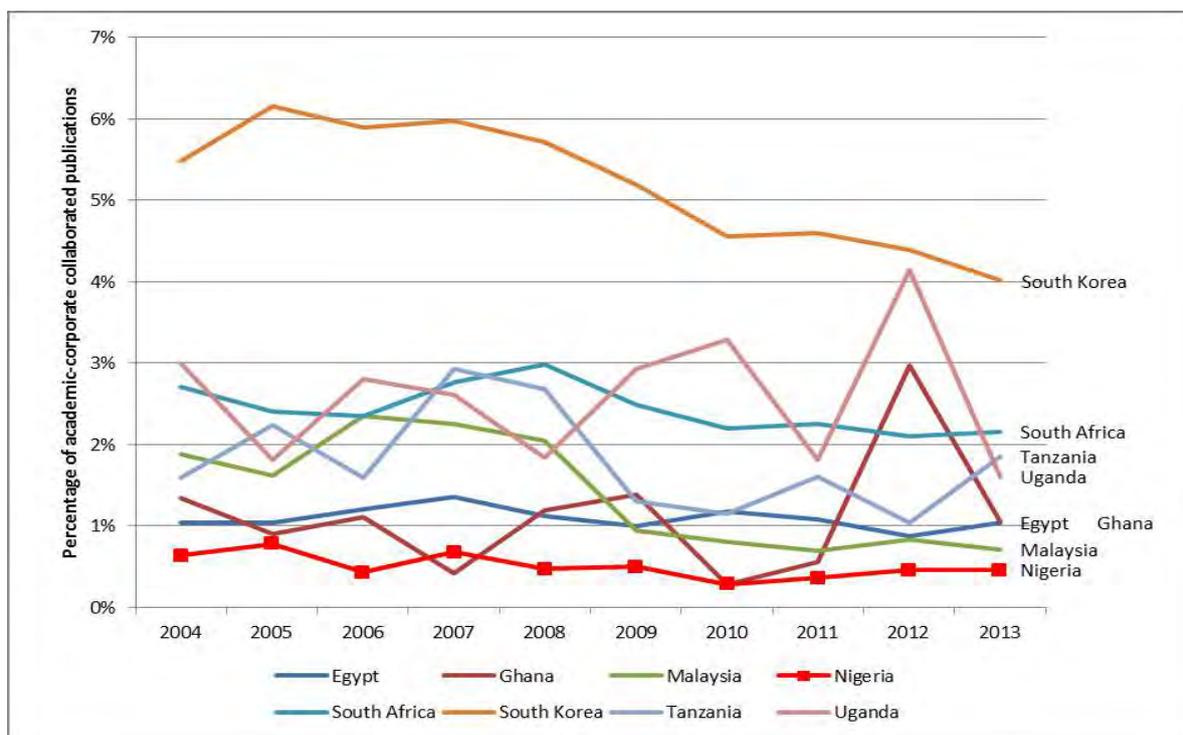
- In most of the years in 2004-2013, Nigeria had the lowest percentage of academic-corporate collaborated publications, fluctuating around 0.5%.

- South Korea had the largest number and percentage of academic-corporate collaborated publications
- South Africa’s publications were downloaded most often by the corporate sector in 2004-2013 with 3.88 corporate downloads per article
- Nigeria’s publications were downloaded less often than the comparator countries with on average 2.96 downloads per article.
- Relative to its world publication share, Nigeria’s publications were downloaded less often by the corporate sector than the world average. At the peak in 2008, they were down-loaded 15% less than the world average.

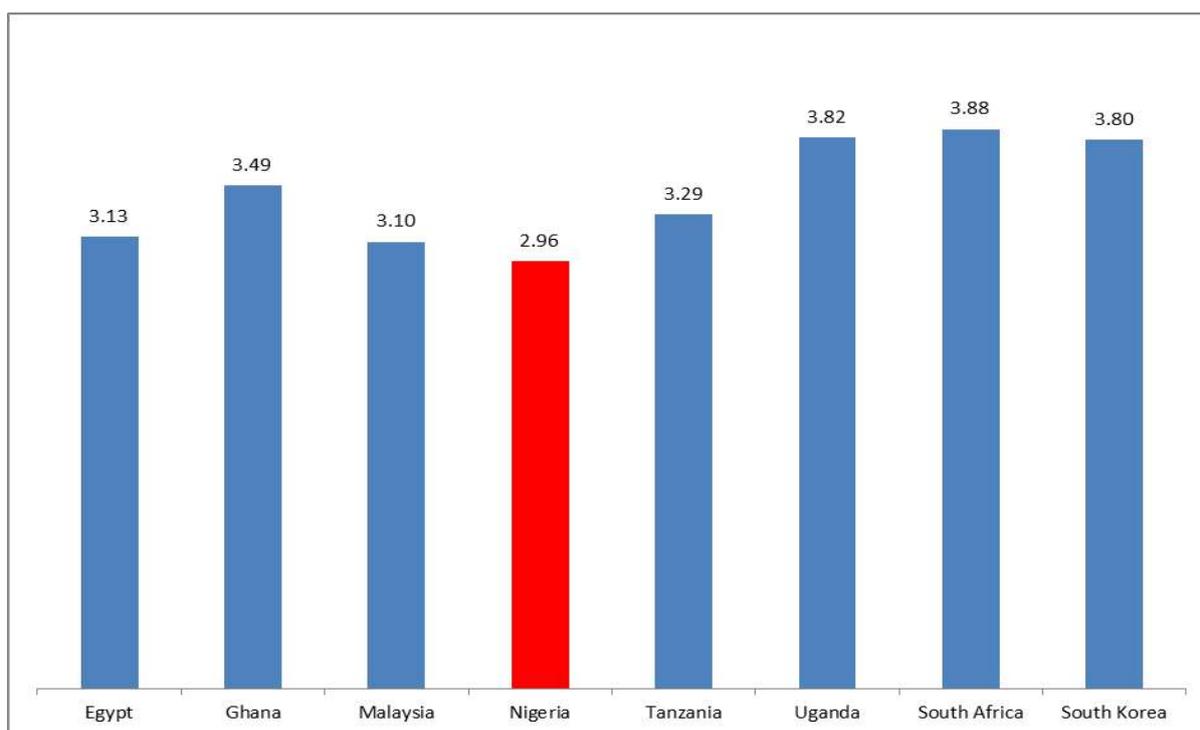
**Notes:**

- Nigeria’s publications received 88 patent citations in 2004-2013.

**Figure 7: Academic-Corporate Collaboration**



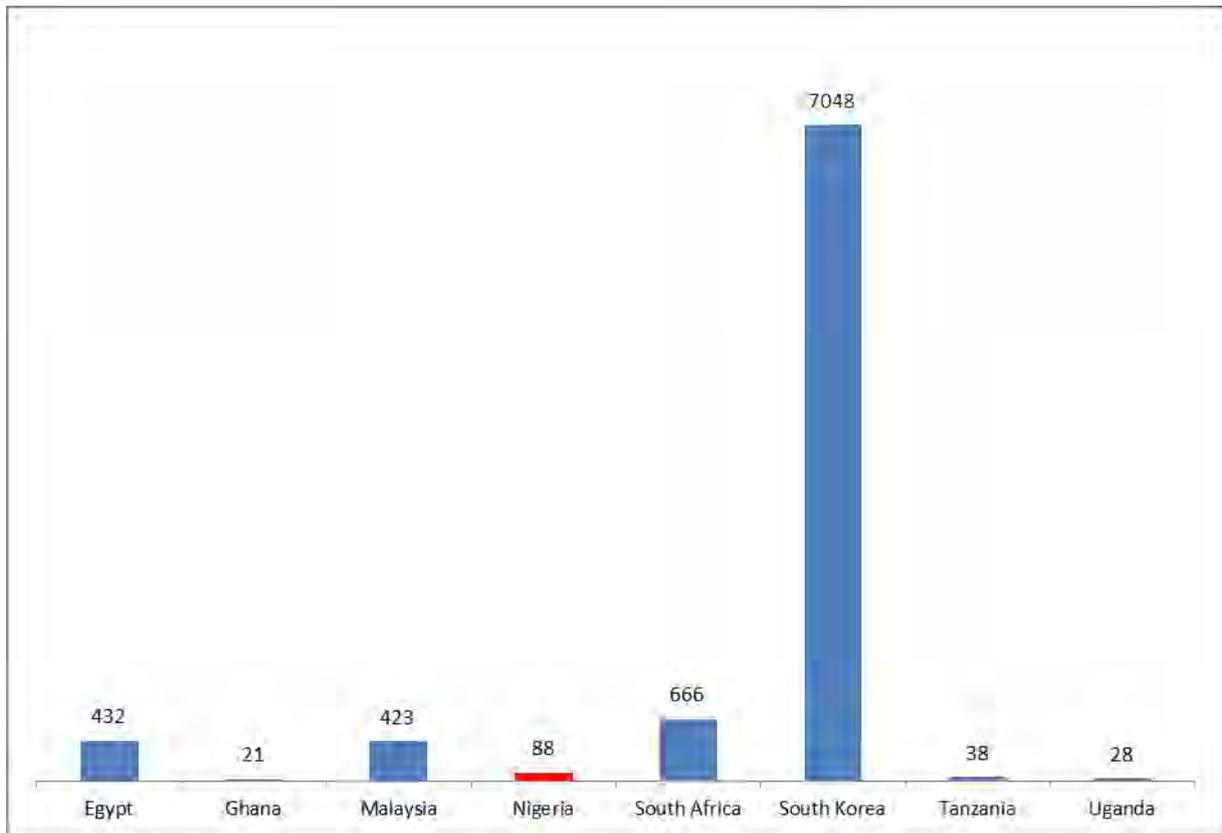
**Figure 8: Corporate Downloads per Article**



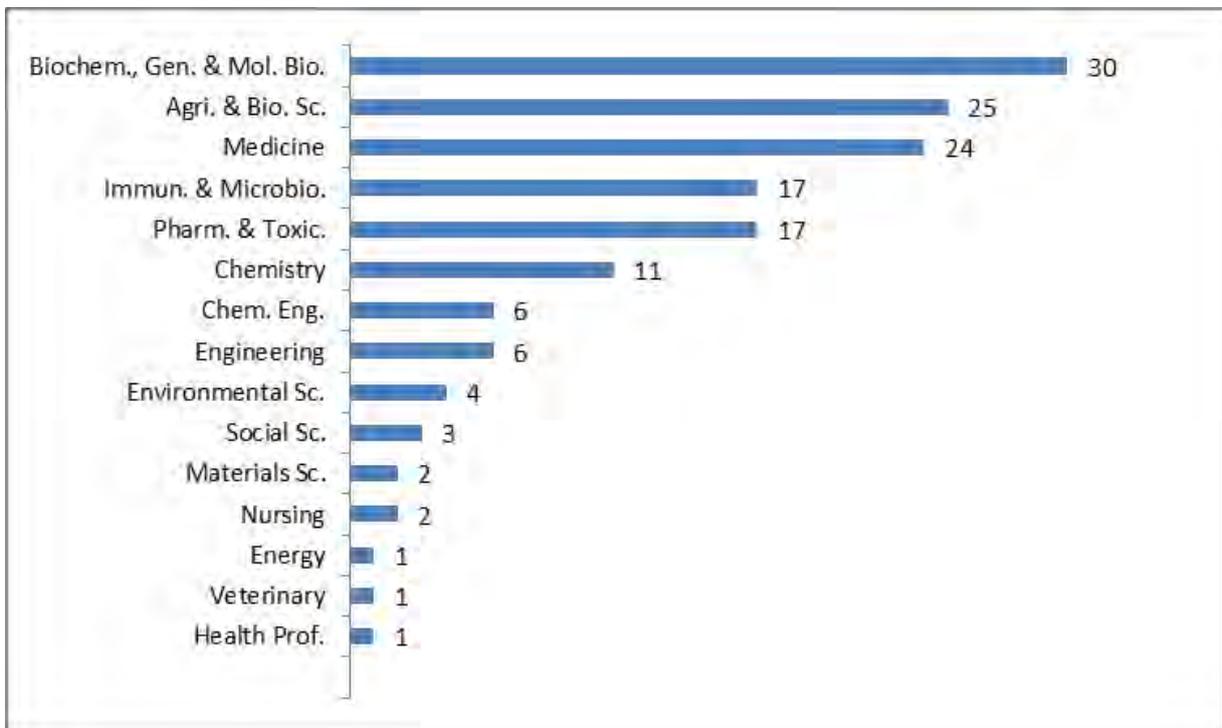
- Nigeria's world patent citation share is below 0.1% in all years 2004-2013. After normalizing it by the world publication share, the number is below 0.35 in all years 2004-2013, much below the world average – an indication that the connection between academia and industry need to be further intensified.

- As shown in Fig. 10, Nigeria's publications in Biochemistry, Genetics & Molecular Biology received the largest number of patent citations (30), followed by Agricultural & Biological Sciences (25) and Medicine (24).
- There is a clear concentration of corporate downloads and patent citation of Nigeria's

**Figure 9: Number of Patents**



**Figure 10: Patent Citation**



**Figure 11: Summary of Knowledge Exchange Parameters**

Academic – Corporate Collaboration	Field Weighted Citation impact
Only a total of 188 articles, rep on average 0.5% of total publications. Compare South Korea with 26,172 or 4-6.2% of total publication. South Africa was 2.5%	<b>4.69 for academic-corporate, very high compared with 0.45 for total publications in 2013. Much higher than the World Average</b>
Corporate Downloads & Patent Citation	Cross-Sector Mobility
CD average 2.96; South Africa high with 3.88. Subjects: Medicine, Immunology & Micro, Neuroscience – 4.54, 4.29 & 4.01 Only 88 Patent cites. Very low, S Korea = 7048, South Africa 666, Egypt 432	Very low academic-corporate exchange: 10 local moves 73 International corporate moves TOP Corporate firm: SHELL with 9 pubs in 2004-2008 and 22 in 2009-2013
<b>FWCI</b> – Field weighted citation impact is obtained by dividing the absolute citation of an article with the average citation received by articles in the same field, with same type and published in the same year, to remove any bias	

publications on medicine and health-related subject areas. This is closely related to noted research focus on these subject areas, an indication that the linkage between the academia and the corporate sector is closest in these subject areas.

- It is note-worthy in Fig. 11, that the field weighted citation index is 4.69 for academic-corporate publications, very high compared with 0.45 for total publications in 2013. It was 1.01 for international collaboration. Hence, the value of collaboration is clearly corroborated by these statistics, and does show us one of the ways forward to advance Nigeria’s academic output for greater global impact.

## Conclusion

In this paper, we have shown how crucial research-industry partnership is to nation building, and why government facilitation is key to such bonding. Specifically, we conclude as follows:

- A better understanding of the critical elements of effective university-industry-government partnership is provided by the framework of the innovation value chain.

- The relevance of universities to national development is anchored on how well they are linked to the industry and society for efficient uptake of the results of their knowledge and research.
- In this regard, universities generally should have the research uptake and innovation function as their hallmark and most distinguishing feature, requiring specialised/independent structures and expertise or special purpose innovation vehicles (SPIVs) that should not impair their basic academic, research and development functions.
- In the case of Nigeria, our research presents evidence of a wide gulf between universities and the industry, requiring the government and the universities to device urgent measures to close the gap.

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