

## Innovation and Creativity Strengthened through Academic Industry Council Collaborations (AICC)

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### Abstract

*Solid Waste Management is one area, which is explored extensively to find solutions to eradicate the mountains of garbage piling up in all countries of the world -Perera, A. 2014; Perera, A. and Mersky, R.L. 2015; Perera, A. and Perera, M. 2017. Extensive studies have been done to minimize the amount of biodegradable waste reaching the landfill sites through bio gas production, commercial composting and converting waste to energy. The non-biodegradable waste is subjected to reuse, recycling and source reduction. With these mechanisms in place still land has to be made available for more landfill sites. Rehabilitation of the landfills for future use is a subject area of debate. Many argue that the reason for the non-stoppable increase in garbage piles is due to the sophisticated packaging materials, while others insist on strengthening policies, laws, by laws and regulations on producer responsibility (Perera A. and Perera, M., 2016).*

*This paper looks into the effectiveness and short comings of the Academic-Industry-Council Collaborations (AICC) in bringing about creative innovations and solutions for solid waste management. Using case studies from small island nations the author will put forward a framework for improving Academic Industry collaborations as an effective tool to popularize innovations and creativity towards waste minimization.*

*Keywords: Solid Waste, Academic- Industry-Council Collaboration (AICC), Innovation, Creativity.*

### Introduction

Universities and other Higher Education Institutions are pools of knowledge, whereas the Municipal Councils and Waste Management Authorities are mandated by law to remove, process and dispose of waste. The common expectation from any industry is the production of materials which contribute towards improving the economy of a nation. In the light of above, the purpose of the tripartite collaboration between the Academia-Industry and Council (AICC) with regard to solid waste management is firstly, to seek ways to minimize the waste in the form of solid from becoming a pollutant in the environment, secondly to consider them as a resource for the production of marketable or commercially viable items, and thirdly, to minimize the use of valuable land for disposal of solid waste. This paper will look into making an effective AICC through signing of a sustainable Memorandum of Understanding, sharing of knowledge, Information, and research findings, aimed at problem solving, determination of feasibility, evaluation of the end products and processes, ensuring financial support towards realization of the manufacturing processes or services, monitoring, and assurance of long term collaborations with one or several partners.

### Constraints Identified within the Academic- Industry Collaborations from Literature

First and foremost, we will consider as to what academic industry collaboration is and thus far identified constraints which lies within it.

Pertuze J.A. et al (2010) and Ivascu, L. et al (2016) speaks on the most effective ways to ensure success in academic industry collaborations. According to Pertuze et al (2010) the most important in a collaboration is not so much the research findings through the collaboration, rather the impact the new findings will make on the industry and its products, in other words whether the innovation of a new industrial process or effective new product or products are in the horizon. One of the key things that an industry looks forward to is the cost effectiveness of the new innovation. Until and unless the academia and the industry both speak the same language the academic industry collaborations cannot be

successful. One of the key areas Pertuze et al (2010) looked into in their research is the identification of the right partnerships. According to them once the Memorandum of Understanding is signed it is too late for modifications, therefore it is of utmost importance to formulate the correct collaboration. According to Pertuze et al (2010) who after surveying 100 companies have admitted that out of 106 Academic- Industry collaborations established, only 20% produced resulted in an advantage to the industry. About 60% did not make any impact on a process, or product or new innovation to the collaborated company or industry.

Bearing this in mind now we will evaluate how if we are to make a substantial dent in solid waste management which steps must be followed as laid out in Pertuze et al (2010). According to Pertuze when preparing for a memorandum of understanding the following are the guiding principles which need to be followed.

Practice 1: The collaboration must be in line with the industries research and development policy.

Practice 2: Use of Managers who are willing to go an extra mile for innovation and expansion. Such persons are called the boundary spanners and *must be utilized in the collaboration*.

Practice 3: A project manager must serve the purpose of a link between the company and the university but also the university and the other departments within the company, *thereby the activities or changes proposed by the university are accepted and implemented by all departments through their consent and not compulsion. The said project manager must communicate all matters pertaining to the collaboration with all relevant persons of the company or industry.*

Practice 4: Guidance should be given to the university on what the company aims to gain through the collaboration- *Clear outcomes and KPIs to be prepared prior to the collaboration.*

Practice 5: Long term collaborations should be built in order to receive better more fruitful outcomes. *Normally the academic collaboration span depends on the length of the study program, whereas the company's interest lies with the production cycles and economic benefits.* Hence long-term collaborations enable the two parties to understand each other and develop a better working environment.

Ivascu, L et al (2016) who also emphasize on the need for industry and university collaborations for innovations spells out key areas which need to be taken into consideration if university and industry collaborations are to succeed. They are as follows:

1. For the universities to succeed they must have a well-established research policy, facilities and competent staff- *it must be a research-based university.*

2. An effective implementation and monitoring mechanism need to be in place within the academic institution- *most academic institutions do not have a well-established monitoring program for ensuring that the expected outcomes of collaboration are achieved. This can damage the trust in the collaboration and not promote further collaborations in the future with the existing institute or any other institute.*

3. The research institute must employ young researchers who will do a good analysis of the economic status of the country and identify the need base.

4. Based on the economic need base of the country new partnerships with industry must be developed with a view to succeeding.

5. A strategic plan propelling the organizational culture towards industry-university collaborations must be in place- *A university with a well-developed strategic plan will have the academic industry collaboration embedded within it and this will facilitate any industry who would like to develop a collaboration with the university or any higher education institute.*

6. The knowledge and experience gained through collaborations must be shared at large for it to be effective in attracting new partnerships.

### **Solid Waste Management Needs of All Nations**

Solid waste comprises of all materials which are in a solid form, which are thrown away as waste. The solid waste originates from households, commercial sector, industry, agricultural sector, sludge from waste treatment plants. All types of solid waste including paper, plastic, tin, rubber, aluminum cans, polythene bags, triple laminates create a significant hazard if not managed properly (Perera, 2014). A substantial amount of literature exists on the consequences of haphazard disposal of solid waste and on the importance of recycling (Perera, 2014). Looking at the solid waste management policies of the developing and developed countries and the small island nations reveals a picture that unless the solid

waste is converted into reusable profitable items their management would be extremely difficult (Perera, A and Perera, M. 2016). One of the best ways to solve the solid waste problem is to consider reduce, reuse, recycle concept efficiently and effectively.

The major financing organizations of the world pays less attention to the role of Academic Industry Council Collaborations in the area of solid waste management. According to the World Bank report on solid waste (2012) in the year 2012 the total amount of solid waste generated in the world amounted to 1.3 billion Tonnes and this figure was expected to rise to 2.2 billion Tonnes by the year 2015 (World Bank- solid waste brief of March 27, 2018). According to the report the expenditure on Solid waste at present borne by the Councils amounts to 20 to 50% of the income. According to the report the World Bank, it generally finances solid waste management projects in terms of infrastructure, legal structures and institutions, financial sustainability, citizen engagement, social inclusion, health and safety and knowledge creation. However, most of these projects are linked to Governmental organizations or non-Governmental organizations, and only the awareness creation is at times linked to the academics depending on the availability of researchers in the field of solid waste management. Hence Academic – Industry-Council collaboration for solutions in the field of solid management are rarely funded by the World Bank.

The World Bank estimates that by 2025 the amount of garbage collected per year will increase to 4.3 billion with the urban residents generating approximately 1.42 kg/capita/day of municipal waste and per year this amounting to 2.2 billion tons per year. The situation will become worst as the land available for landfilling will decrease with time due to increase in population.

According to the guidebook for policy makers and practitioners towards Sustainable Municipal Organic Waste Management published by the Asian Development Bank in 2011, 70% of the solid waste of the South Asian countries consists of organic waste which can be converted to commercial compost, to anaerobic digestion or made into “Refuse Derived Fuels”. According to the report the 8 million tons of compost which can be produced from the biodegradable waste amounts to nearly 709 million Dollars or 3,340 million kilowatt- hours per year of electricity with a market value of around 701 million Dollars a year. The above will most certainly save the land space which otherwise would have been used for disposal of waste.

The report also blames poor segregation of waste, lack of investment on composting by the municipal councils, lack of community awareness hence lack of community participation in the segregation process, inadequate land space for composting and lack of skilled human resource for not reaching the feasible solutions through composting.

Just as the World Bank report (2012) the Asian Development Bank report (2011) also pays very little attention to the Academic-Industry Council Collaboration in the waste management process.

### **An Example of an Academic Industry Collaboration in Solid Waste Management Sector Which Brought Positive Results from 2015 to 2016 (Perera A., 2015)**

Reduction in waste sent to the landfill by the Punjas Ltd. through reuse of waste (Perera, A. 2015).

The year of study is 2015 to 2016. The tripartite collaboration: The Author- Solid Waste Management Specialist, Punjas Ltd, the industry and the Lautoka Municipal Council. Punjas is a group of companies diverse in productions, which has commenced in 1935 and employs nearly 800 persons. It is one of the largest group of companies of the South Pacific. The companies which constitute the group of companies include biscuits, tea, rice, spices, oil, soap, detergents, household commodities and packaging. The waste from the factories was immense, diverse and unless managed would be a hazard to the environment. The Punjas group of companies has given a lease to a private company to collect waste from their factories and transport them to the Lautoka landfill site at Vunato. Twice a week the waste is collected by the waste company and is disposed at the dump site. The solid waste from the factories was considered completely as garbage.

Strategy utilized: All managers of the different companies such as flour, oil, tea, rice and spices were educated by the solid waste specialist, the Author on the importance of reuse, reduction and recycling of solid waste. Each Manager was given the opportunity to become a member of the Green Scouts Movement and was allowed to participate in programs such as beach cleaning and mangrove planting. Once the enthusiasm was created towards protection of the environment, each manager was given the mandate to form a team within his company to identify and quantify the waste generated. A timeline was prepared through their consent and the progress of the identified activities was monitored

through senior management. A common target was given to all the companies to reach the status of eco friendliness. Each manager reduced the waste according to the waste generated, and their performances were monitored and evaluated weekly by the group manager. This was done for one year.

The appropriate education was continuously provided and effective strategies were drawn by the solid waste expert, the Author. The Lautoka Municipal Council monitored the waste that was brought from the Punjas Ltd. to the landfill site. From the records of the waste data of the Lautoka City Council and the in-house waste data of the companies it was observed that a visible deduction of waste sent to the Vunato dump was observed from June, 2015 to March, 2016. The reduction in terms of payment to the private company for removal of waste reduced from FJD 2800 (Fijian Dollar Two thousand eight hundred) to FJD 210 (Fijian Dollar Two hundred and ten) only. The Punjas Group of companies received the Green Scouts Award from the Ministry of Environment, Fiji on the 5th of June 2016.



The workers collecting and separating the waste, thereby reducing the amount of waste reaching the landfill site. The waste retained were used for packing materials and for recycling. Incentives were given to the staff of Punjas who were involved in the collaboration.

### **Reawakening of Academic-Industry-Council Collaborations (AICC) for Finding Sustainable Solutions in the Area of Solid Waste Management**

- Need of well-defined strategic Plans for research universities, with clear guidelines on Academic-Industry-Council (Local Authorities responsible for waste management) Collaborations
- Higher Education Institutes to recruit more academics specialized in the field of solid waste management
- Regular need assessments in the field of solid waste management
- Accredited programs on Solid Waste Management with long term student/research attachments at industries and waste management authorities
- Identification of sustainable solutions which are important for the country
- Regular dialogs between the higher education institutions and the Local Councils on the steps already taken
- A proposed set of actions put forward by the academic experts through research as solutions for waste management. These will guide when deciding on collaborations
- Tripartite discussions among the higher education institutes, the councils and industry aiming towards possible collaborations
- Availability of adequate human resources, lab facilities within the academic institutions
- Time Span of collaboration determined by the AICC (Academic-industry- Council)
- A Memorandum of understanding developed for two years, with a view to extending upon acceptable results
- Sustainable communication within the academic collaborations through a brief report after 3 months, followed by regular submission of reports as determined by the parties to the MoU.

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