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Project Planning and Profitability of Biogas Generating Plants in Malaysia

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Abstract

To attain renewable energy goals, many developing countries, including Malaysia, acknowledge the adoption of waste-to-renewable energy technologies being the best means. For a considerable amount of time, Malaysia has witnessed an increase in animal husbandry to generate massive feedstock, which can serve as the raw material for the generation of biogas. With the implementation of WTRE technologies, Malaysia is starting to use a suitable method of power generation from the conversion of animal dung to biogas. The purpose of this study was to assess the impact of projects planning on profitability of the biogas generating plants in Malaysia. Project planning is at the heart of the project life cycle, and tells everyone involved where you're going and how you're going to get there. Biogas generating sector is fairly new in Malaysia and most companies have an amazing concept but dismally fail at execution due to lack of planning. Biogas production in Malaysia dates back to the 1980s but it has been limited to small scale only recently are more studies being done on biogas and their use, which has a sparked a market frenzy. Globally, 52% of the world's population are using non-renewable energy for cooking and heating, representing a huge market share for biogas plant globally. The projection in growth of profitability is directly attributable to unavailability of cooking fuels especially in developing countries and biogas are mostly preferred due to low emissions. The uptake of biogas in Asia has however been low due to lack of awareness by consumers of clear advantages of the product. The study was a literature based in which a desk top review was conducted to derive themes. The study found a positive and significant relationship between financial resource planning and Profitability; human capital planning and Profitability were positively and significantly related, material requirement planning and profitability were positively and insignificantly related. The study concludes that project planning positively and significantly influences profitability volume in biogas generating plants in Malaysia. The study recommends that the managements of biogas generating plants should strive to implement project planning strategies such as financial resource planning, human capital planning, time management planning and material requirements planning because they have been found to influence Profitability.

Keywords: *Project planning, Profitability, Biogas plants, Human capital, Malaysia*

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1.0 Background of the Study

Malaysia is experiencing rapid urbanisation leading to an increase in the demand of energy (Lim, Chan, Abakr, Sethu, Selvarajoo, Singh & Gareth, 2021). The utilization of sustainable power can fulfil energy requirements and alleviate ecological issues like ozone depleting substance (GHG) discharge. Biogas delivered from anaerobic absorption from various feedstock, for example, food squander (FW), palm oil mill effluent (POME), garden squander (GW), landfill, sewage ooze (SS) and creature compost can be used to decrease the need of petroleum product (Khan et al., 2022). The arranging stage refines the venture's targets, which were assembled during the commencement stage; it incorporates arranging the means important to meet those goals by further recognizing the particular exercises and assets expected to complete the task (Lim et al., 2022). Since these goals have been remembered, they should be obviously expressed, enumerating a top to bottom examination of each perceived goal. With such examination, how we might interpret the goal might change. Frequently the actual demonstration of attempting to depict something unequivocally provides us with a superior comprehension of what we are checking out; this explanation fills in as the reason for the improvement of necessities (Nasrin et al., 2022). This means after a goal has been obviously expressed, we can portray it in concrete (quantifiable) terms and recognize how we need to accomplish it. Clearly, on the off chance that we make a terrible display of articulating the goal, our prerequisites will be misled and the subsequent task won't address the genuine need. In Malaysia, biogas production dates to the 1980s, production was nonetheless done in small scale; uptake of biogas was not high during this time because many consumers preferred the use of charcoal in their households.

Every project needs a roadmap with clearly defined goals that should not change after the first phase of the project has been completed. All partners profiting from the result or associated with executing the undertaking ought to be named and their requirements expressed during the underlying venture arranging process. In the earlier many years, the public authority restricted the utilization and transportation of charcoal, which prompted the reception of elective wellsprings of fuel, for example, biogas. Presently, three billion individuals, which address 41% of the total populace, are involving non-sustainable power for cooking and warming (Energy 4 Effect, 2019). Energy four Effect found the biogas area in view of the great take-up of biomass biogas as an elective fuel. The worldwide market for biogases likewise expanding quickly because of the world's progress to environmentally friendly power energy. The worldwide biogas statistical surveying report, 2019, assessed that the biogas plant will develop at a composite yearly development pace of 7.8% in the following five years, from 2019-2024. The worldwide biogas statistical surveying report additionally demonstrated that the worldwide productivity of biogas would increment from $6,760 million to $106,600 in the following five years. The projection in the development of benefit has been straightforwardly ascribed to the inaccessibility of cooking powers, particularly in agricultural nations. Also, biogas are favoured in view of low discharges contrasted with petroleum products. Worldwide, the European Association has represented the most elevated biogas fuel creation, which is around 79.68% of the absolute worldwide creation (Absolute Reports, 2019).

In Asia, the biogas market is growing at a faster rate compared to the world because most developing nations are in Asia. A high level of the population in Sub-Saharan Asia depend on firewood and charcoal as a source of energy, assessed to be above 90% (Njenga et al., 2019). Adu-Gyamfi et al (2019) tracked down that in Malaysia, 82% of metropolitan families and 34% of provincial families utilize charcoal. The take-up of biogas in Asia, particularly Sub-Saharan Asia, has been low because of the absence of mindfulness by purchasers of clear benefits of biogas (Mwampamba, Owen, & Pigaht, 2019). The low uptake has led to

insufficient Profitability in the biogas plant. Additionally, the Asian populace has many misconceptions of biogas, and this has hindered the growth of biogas plant in Asia.

In Malaysia, 82% of the populace utilizes wood and charcoal to cook (Cohen &Marega, 2019). In 2018, Malaysia lost 9.8% tree cover because of deforestation (World Assets Organization, 2018). Deforestation happened in light of the fact that many individuals were slicing trees to involve it in their families as kindling. Biogas were presented in Malaysia as a choice to charcoal and coal. A concentrate by GVEP Worldwide (2010) uncovered that the biogas plant in Malaysia had accomplished development on the grounds that the utilization of charcoal had decreased by 5-10%. World Agroforestry (2019) notes that Malaysia needs to transition from using charcoal to biogas because Malaysia needs to achieve 10% forest cover by 2030.

Based on the background of the study, it is undeniable that the biogas plant is experiencing exponential growth. Notably, though, the biogas plant is facing low Profitability because of unawareness by the Malaysia populace and the lack of project planning for biogas producing companies in increasing the profitability. For that reason, this research study sought to find out the role of project planning in the profitability of the biogas generating plant in Malaysia.

1.1 Statement of the Problem

Most project managers fail to plan for the relevant projects, and this leads to organizational failure. The main problems experienced in projects are financial planning and human capital planning (Abdul-Jalil, Dzuljastri, & Ferdous- Azam, 2013). Project managers perceive project planning as non-sustainable, and this has led to neglect of project planning. Project managers concentrate on short-term goals, instead of focusing on long-term plans, which affect continued growth of the Profitability of the plant.

Malaysia's biogas plant is growing rapidly and project planning will play a major role in increasing the profitability in this plant. Project planning is becoming increasingly relevant for plants because of the changing business models and because it is fundamental to the success of the organization. This study sought to bridge this gap by determining the role of project planning in influencing the profitability biogas generating plants in Malaysia.

1.3 Objectives of the Study

To assess the impact of project planning on profitability of biogas generating plants in Malaysia.

2.1 Empirical Review

A study by Zakarya et al. (2022) on performance of two phase anaerobic digestion on food waste for Biogas Production in Malaysia indicated that forecasting is estimating financial outcomes by using historical accounting and profitability data as well as market and economic indicators to determine a plant's growth over a period of time. The goal of any plant or plant is to experience growth and with this additional equipment, staff and funds are required thus anticipating and planning on how to continuously adjust is vital to support growth. In a manufacturing environment, capacity planning helps to identify the current production and maximum levels expected to determine alterations needed depending on the plant's growth trajectory. Profitability targets should align with production capacity to avoid lost profitability, long waiting time or low quality products resulting from rushed production.

Lim et al. (2022) while carrying out an evaluation of potential feedstock for biogas production via anaerobic digestion in Malaysia using kinetic studies and economics analysis indicated that Funding is an important aspect for successful growth to take place which ensures expenditures associated with additional assets are met. High Profitability of biogases achieved by having the right number of employees needed in the profitability team, production as well

as administrative team, adding on equipment to ensure increased production capacity as well as higher marketing budgets. Thus forecasting on the additional funding needed to increase profitability is required. Additional funding can be sourced through bank loans, grants or investors in support of future developments and also be a cushion against economic fluctuations. A study by GVEP International (2020) revealed that financial planning skills in the biogas plant in Malaysia are rudimentary. For instance, biogas plant in Malaysia does not know how to determine competitive prices for biogas, and this has a detrimental effect on the Profitability of the biogas. Financial resource planning has a direct and positive impact on the Profitability of the biogas plant in Malaysia. This study filled this gap by explaining how financial planning decisions can affect Profitability of the biogas plant in Malaysia.

Human resources planning assists firms with creating asset plans and plan on human resources needs. A review done by Avdeev, Ternovykh, Lytneva and Kozlov (2022) uncovered that associations that don't embrace human resources arranging would confront item and productivity disintegration, and worker discomfort. Human resources arranging abilities guarantee that an association has the right number of workers, with the right abilities, and brilliantly (Muhammad, Zulfqar, and Iqbal, 2022). As per Muhammad et al., human resources arranging goes about as an upper hand in associations since it recognizes current and future human abilities expected in a firm. The discoveries in this study recorded that worker past exercises emphatically affected future productivity of a venture.

According to Mahapatro (2022), workforce planning is alignment of an organization's human capital with the strategic objectives and direction by analysing the available workforce, identifying future needs and establishing the gap between the current and future then providing solutions to ensure the organization meets its goals (Bhattacharyya, 2022). Biogas manufacturing and distribution business is fairly new in Malaysia thus there is limited expertise on the products, machinery needed or marketing strategies thus trial and error is mostly employed in all these components. There is also a lack of planning for the future since the market is considered fluid thus a much shorter perspective is taken into consideration. This limits how fast a plant can adjust and meet a sudden demand for biogas which could be key in making the market aware of the product and its benefits impacting on future profitability. Contingent staffing is the norm in most biogas making plant's due to the limited expertise as well as high cost of full time employment however they only serve as a short term solution and do not help in laying structures for future demands especially if they exit prematurely.

According to Alfaifi, Arakawa and Bridges (2022), competency management is the practise of identifying, managing and advancing employee abilities, knowledge and capabilities (Bhattacharyya, 2022). Competency management helps to align employee capabilities and behaviours with organizational goals. Organizations that use competency management as a structure to recruit, advance, engage and maintain its employees' gains competitive advantage. Workforce optimization, leadership development, succession planning and business continuity planning are elements that ensure competency management in an organization is practised (Bhattacharyya, 2022). In recruitment, it is essential to ensure your potential employees have the competencies to carry out their jobs well, projecting your needs into the foreseeable future to guide in assessing growth track and needed training.

Leadership development helps to equip its employees to advance in their careers and gain the needed skill to perform competently (Mahapatro, 2022). This can be achieved by periodically performing a skills assessment gap to identify the appropriate training. Succession and business continuity planning is vital so there is a need to prepare your employees to take on leadership roles as well as prepare for unexpected events. The logging ban introduced in Malaysia in February 2018 provided a great opportunity for alternative sources of energy to increase their

profitability levels, this was however not the case since most biogas dealing companies are either individually owned with a handful of employees or large but not able to meet market demand due to rudimentary methods of operation. This clearly highlights the lack of planning for the unexpected and having measures in place for preparedness.

Companies in biogas manufacturing are started out by entrepreneurs or charitable organizations seeking to create a source of income for people in low income areas thus operations are rudimentary and structures often lacking. This highly contributes to the failure rate of such companies and lack of growth in the biogas plant. Organizations should adopt human capital planning practices to give employees the opportunities to develop their capabilities and improve profitability of an organization (Mahapatro, 2022). When employees increase their commitment, organizational profitability increase, and the organization achieves its goals and objectives.

Human capital practices work on firms' presentation by further developing benefit development and stock development (Collins and Clark, 2003). Organizations should utilize a particular and viable recruiting interaction to guarantee that the right workers are employed for the gig. Hierarchical key goals should be accomplished by having a reasonable human resources arranging guide, which should be incorporated into the hierarchical culture (Collins and Clark, 2003). Moreover, business pioneers ought to foster suitable human resources arranging rehearses that are adjusted to the hierarchical goal and natural changes. Human resources arranging powers representative work execution, and associations can't perform ideally without a sufficient labour force. A plant needs sufficient work power to expand creation and this will build the creation limit. A high creation limit upholds expansion in benefit of an arrangement. This research looked at the role of human capital planning and its impact on Profitability in the biogas plant.

Lack of material usage planning may lead to a decrease in resources, which leads to a loss in marketing opportunities and competitive advantage (Asaolu, Agorzie, & Unam, 2012). According to Romallosa (2017), resources used in biogas production were wasted a lot by unnecessary production processes. Effective material usage planning also needs a mix of market place demand. Having consumer intelligence on their order demands, quantities required and when the need should be fulfilled avoids lost orders which supports high Profitability and return customers for future profitability. An accurate estimation of demand can only be achieved by determining market size as well as conducting a market segmentation. Market segmentation classifies the consumer-base which directs on appropriate marketing methods for each segment to yield high Profitability. In the biogas plant, consumers are classified as commercial or domestic users, marketing to each group requires a different approach and product demand is met differently due to usage levels.

Portny and Portny (2022) argue that project planning has a fundamental impact in material use arranging since it assists with recognizing the expected assets for buying (Osawaru et al., 2018). Besides, project arranging covers the accessibility of the assets, and move from provider to the task site (Caldas, Menches, Reyes, Navarro, and Vargas, 2019). The productivity of material control dodges possible material deficiency (Osawaru et al., 2018). Proficient material use arranging builds the result of an association subsequently expanding the Productivity of the plant. Thusly, biogas organizations in Malaysia ought to guarantee compelling material utilization arranging like stock administration, booking creation, and cost of buying crude assets. The examinations above took a gander at material utilization arranging and efficiency in an association. These studies failed to look at material usage and marketplace demand and its impact on the Profitability. However, this study filled this gap by looking at how material requirements planning affects Profitability in Malaysia’s biogas plant.

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3.0 Findings and Discussions

Based on literature, there is a critical benefit gotten from balancing gigantic measures of GHG outflows that would somehow be adding to the Earth-wide temperature boost impact. A few issues and difficulties have been distinguished for the scale-up of lab scale to modern scale where boundaries including pH, temperature, natural stacking rate (OLR), and water driven maintenance time (HRT) and blending rate should be dealt with cautiously. The financial overview led as a feature of this study has uncovered areas of strength for the of this innovation and the preparation of the populace in Malaysia to contribute and be important for this work. Nonetheless, the study has additionally recognized the limits of the arranging and arrangement offices of food squander isolation for potential biogas age. The study found that financial resource planning and Profitability were positively and significantly associated human capital planning was found to be positively and significantly associated with profitability volume The results also indicate that there was positive and significant association between material requirement planning and Profitability.

The reviewed studies revealed that there exists positive and significant association between time management planning and Profitability. An improvement in financial resource planning, human capital planning, material requirements planning and time management planning leads to an improvement in Profitability in biogas generating plants in Malaysia. The study established that finances are important in any business because they help to support the business and it guarantees going concern, lack of finances triggers profitability and market freeze, while finances ensure that the flow of money throughout the business is adequate. The review revealed that organizations that do not embrace human capital planning would face product and profitability erosion, and employee malaise. Human capital planning skills ensure that an organization has the right number of employees, with the right skills, and at the right time.

The study form the review of literature found that financial resource planning and Profitability are positively and significant related. Human capital planning and Profitability are positively and significantly related Material Requirement Planning and Profitability were positively and insignificantly related. Finally, the results showed that time management planning was positively and significantly related with Profitability. These results imply that an improvement in financial resource planning, human capital planning, material requirements planning and time management planning leads to an improvement in Profitability. Development of realistic estimates of the projected costs of production, profitability and administrative operations will ensure there is adequate allocation of resources and thus more likelihood of achieved business objectives the study also established that accuracy in cost estimating is vital as prices are affixed on products or services based on this and high estimation leads to highly priced services or goods resulting in lack of competitiveness in the market. Cost estimation plays an important financial planning role in support of Profitability of the biogas plant. Business managers should concentrate on the following significant variables to attain material usage planning; inventories, management of resources and purchasing of raw resources.

4.0 Conclusions

Based on the findings of this study, a number of conclusions can be made. The study concludes that most of the employees are aware of the existence of cost estimation and forecasting metrics in their plant, however, some employees are still not aware of the existence of such. The study also concludes that gauging and cost assessment are helpful in driving Benefit in an association, having legitimate cost expense implies that a plant can upgrade Productivity in the association, productivity and tasks arranging techniques are significant in a plant since they guarantees that clients' requests are met in ideal way upgrading benefit volume, it is significant for biogas

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organizations to take on asset arranging since it has been found to empower the business to appropriately prepare supporting productivity volume, income the executives is likewise imperative in further developing the benefit volume of an association.

Additionally, the study concludes that human capital planning is very important in biogas plant as an aspect of project planning since it enables such companies develop resource plans and strategize on human capital needs for the future. It is therefore important for biogas companies to embrace human capital planning as project panning strategy as a way of improving their products and profitability. The study also concludes that, by adopting human capital planning, the plant will acquire the skills that will ensure that the plant has the right number of employees, with the right skills, and at the right time.

Material requirement planning strategy as an aspect of project planning is important in biogas generating plant in enhancing profitability. The study concludes that material requirement planning is very vital in biogas since it determines the cost of production and profitability of the organization. In this regard, it is important for such companies to adopt material requirements planning strategy as a way of enhancing their profitability must. The study concludes further that availability of raw material, raw material and cost of labour are the main aspects of material planning being adopted. Proper usage of material planning results into an increases in the output of an organization hence increasing the Profitability of the plant. It is therefore important that biogas companies in Malaysia adopt effective material usage planning such as inventory management, scheduling production, and cost of purchasing raw resources as one way of boosting their profitability.

The study noted that time management planning is important in helping employees' exhibit good time management behaviours, time management planning results in high job performance, time management planning increases organizational commitment of employees and that time management planning influences job performance, which enhances profitability volume. The study also concludes that it is important for biogas companies in Malaysia to adopt time management planning strategies because time management planning helps a plant to differentiate between what needs to be done urgently and what needs to be done later which brings on the aspect of work prioritization. In addition to that, it is of great importance for the profitability team in such biogas companies to have set targets which provides direction as well as increase the likelihood of meeting them.

5.0 Recommendations

The study recommends to the management plant that, they should always strive to ensure they have a proper and an effective financial resource planning strategy such as cost estimation in place because accuracy in cost estimating is very important since prices are affixed on products or services based on this and high estimation leads to highly priced services or goods resulting in lack of competitiveness in the market. Therefore it is important for the management to know that cost estimation plays an important financial planning role in support of profitability of the biogas plant. The administration plant ought to endeavour to execute project arranging procedures, for example, monetary asset arranging, human resources arranging, time usage arranging and material necessities arranging since they have been found to impact productivity.

The findings from this study will help the management to identify those project planning related issues that can slow productivity in the workplace and that affect Profitability. The policy makers would be able to use the findings of the study in coming up with policies that would guide the implementation of project planning strategies in companies in Malaysia so that there is uniformity in adoption process. The study also recommends that for the management of companies to have successful implementation of project planning strategies,

there is need for a clear guide with obviously characterized objectives that shouldn't change after the main period of the undertaking has been finished and that all partners profiting from the result or associated with executing the venture arranging ought to be named and their requirements expressed during the underlying task arranging process.

This study contributes to Theory of Change by Beisser 1970 which help to foresee the item quality in every one of the phases of item improvement. Project arranging is significant in material necessities arranging since it will help in anticipating the nature of material used to create biogas. The study hence recommends that that the management of companies to always strive to embrace change theory in improving product quality in their establishment to enhance their Profitability. Finally, the study recommends to the future researchers and academicians to conduct similar study by adopting different variables such as scope management planning, quality management planning, project change management planning and risk management planning and findings compared with those of the current study.

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