



Project Management Tracking Approach and Its Effect to Energy-Saving Projects

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ABSTRACT

For a long period, people engage in various projects innovation. Projects have some distinctive traits which separate them from other activities. However, they are temporary in nature. Projects are mostly indicated by their starting and ending date. These periods are essential since they help an organization to understand various activities that should be engaged. In an organization, projects are essential activities which help to introduce new products. Product's introduction is a critical activity that helps to maintain and attract new customers. Furthermore, it helps a business to survive in a competitive environment. Therefore, electrical organizations must engage in projects which will help to introduce new energy saving products. In a project management, companies must ensure that all technical aspects are well integrated to enhance

Key words: Electrical Power, Project Management, Tracking approaches, agile project management, Risk management, Project Review Technique

1. RESEARCH OBJECTIVES

To investigate the role of project managers in a project

To analyze the current tracking system in an energy project

2. RESEARCH QUESTION

What roles do project managers play in identify and applying current tracking approaches in a project?

Which are current tracking approaches that are mostly used in project management?

3. LITERATURE REVIEW

A project is complete once the goals and aims are fulfilled. Therefore, planning and management are essential to ensure that these goals are achieved (Verzuh, 2015). Poor management techniques subjects a project in risk which may

affects its success. In nature, projects are unique, hence, they require particular management techniques. Projects are important in the field of electrical engineering since they help

to form a ground for innovation (Buiab, Merschbrock, & Erik, 2019). Engineers try to engage themselves in various practical activities to ensure that their products use low energy.

In project implementation, electrical organizations use various approaches to track and monitor the performance. A tracking system helps to address challenges that occur within the channels effectively (Schwaber, 2015). As such, an organization is able to prevent and remove internal constraints which may hinder its performance. Additionally, tracking approaches help an organization to adapt to various changes that occur during the implementation process (Mahmud, Town, Morsalin, & Hossain, 2018). Currently, the development of technology has introduced new ways of tracking a project such as the application of project management software. The software is the easiest way that organizations can use to track power rating and other energy consumption trend (Muller, 2017). To enhance effective implementation, most companies currently employ commercial agencies, energy service organization, or contractors. These bodies have a modern system which helps to track and manage efficiency based on its audit.

4. PROJECT METHODOLOGY

A qualitative research method was applied in the research, which included literature review from several articles and relevant books. The research was completed in three steps. First, the research questions were formulated and the objective highlighted. It was then followed by a literature review which formed a base for the study. The research relied on literature from the past twenty years. Lastly, primary investigation was done and data extracted to assist in drawing the conclusion.

In a solar panel project installation, a project manager must establish an initiation, designing, and planning. However,

these aspects are influenced by the size and type of a project. After establishing these aspects, a project manager is required to ensure that the system is installed, completed. This action is done by regular monitoring and supervising. Below is an example of a solar panel project and the technical steps a project manager must ensure they are followed.

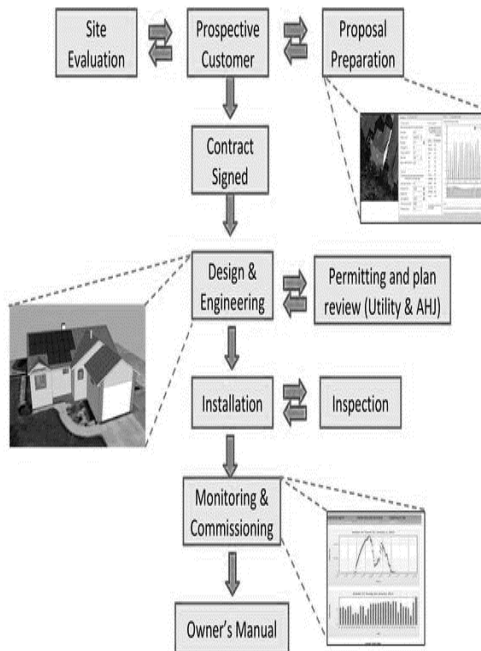


Figure 1:Process Cycle

5. RESULTS

From the review, project managers have vital roles in the success of a project. It is the duty of project managers to ensure all activities are done according to the plan. Managers have essential roles in resources and duties allocations. Resources allocation affect the quality and nature of a project. On the other hand, the duties allocation helps to create a good working environment where workers can easily communicate and solve issues together. Time, risk, quality, team, and skills are other vital roles of a project manager. Currently, application of software has created an easy way of tracking how a project is doing. For instance, Agile Project Management, Project Evaluation Review Technique, Extreme Programming, and Extreme Programming are some of the current tracking approaches used by project managers.

6. PROJECT DISCUSSION

6.1 Money Allocation

Electrical projects require a huge amount of money to be completed. This cost includes all expenses that are used to provide the materials and other human resources when the projects are running (Turner, 2016). Therefore, it is the responsibility of project managers to balance money effectively to avoid running out. Additionally, project management ensures that money is not underspent because it may affect the kind of resources available for project operations (Desha, Robinson, & Sproul, 2015). According to most organizations,

project managers emphasize the principle of “using it or losing it” to ensure a project is well funded. In most cases, projects receive a huge amount of money; therefore, it is the role of project managers to plan on how to allocate the fund. Poor money allocation may facilitate a project failure due to lack of necessary materials such as specialists (Crespin-Mazet, Romestant & Salle, 2018). There are several claims that some projects have failed in the final steps due to poor budget planning. In commerce, money is a limiting factor, and thus, all activities that use these resources require effective management. Most of energy saving projects can take a long period before they are complete. Project management ensures that enough money is supplied so that all activities are kept running (Walker, 2015). In an electric energy saving, money influences project design, planning, and initiation. Therefore, project managers must technically integrate all the processes to ensure effective outcome.

7. QUALITY REGULATION

Quality is another critical aspect project management tries to achieve. Quality is an integration of standards and criteria which an emerging saving project is required to portray. The effectiveness of a project is determined by quality achievement. Poor project management can lead to low-quality projects due to failure in the allocation of resources (Faheem, Shah, Butt, Raza, Anwar, Ashraf, & Gungor, 2018). A product must perform as expected so as to fulfil its standard requirement. Therefore, if a project does not handle all the problem that is required, then it may be perceived as a low-quality project. Effective project management ensures a project delivers the benefits and values expected (Cho, Park, & Kim, 2018). Additionally, a project must meet other value requirements such as maintainability, and reliability to be classified as high quality. In most organizations, project management has a quality assurance department which measures and evaluates the quality of all energy saving products (Fanson, McCarthy, Bernstein, Angeli, Ashby, Bigelow, & Figueroa, 2018). This evaluation helps an organization to provide confidence that the project will fulfil all the requirements. In most cases, introducing low-quality products subject an organization into a risk due to low sales rate. Customers mostly look for products which will offer the best services (Chen & Landry, 2018). For instance, if an energy saving bulb has a low lifespan, most customers may opt to shift to other products which will last for a long. Additionally, quality is achieved through effective engagement of all activities which are highlighted in the planning forum. It is the role of project managers to ensure all procedures and materials are followed and used effectively (Cleden, 2017). For instance, in solar system installation project, manager must ensure that all procedures are followed during the installation process. This will be done through monitoring all activities throughout the project.

Risk Management

Every new product is associated with many risks leading to a negative effect. In a project, there is a probability that activity may lead to a negative impact. For instance, a bulb project

may produce rays which will have negative effects on human skins (Fonseca I Casas, Fonseca I Casas, & Casanovas, 2016). Therefore, projects management ensures that a product has minimum negative effects before being taken to the market. This activity is done by integrating various probability the event may take place based on the current performance (Burgers, 2018). Effective project management reduces the rate of risk that a project is exposed by ensuring that all material and activities are effectively followed (Gardiner, 2005). High risk potential subject a project to a high failure. Due to huge resources incorporated, project management ensures that common risks are highly minimized to avoid unnecessary loss. It is the role of project manager to identify potential risks which may affect the success of a project (Charles, Schmidheiny, & Watts, 2017). Additionally, project management helps to understand ways on how to avoid these risks to boost the chances of project success.

8. TIME MANAGEMENT

In every activity that one engages, time is an essential factor that one should consider. The time frame that a project will take to be complete is another crucial role in project management. As such, time is the most common problem in a developing project. This mostly occurs due to poor time planning whereby a project misses its deadline (Bricca, Gimber, Martin, Rollings, Schwartz, & Smith, 2017). Additionally, a project may take more time than required. Time frame requires a careful approximation. Project management helps to track the progress of a project, and thus, managers can easily identify and approximate the remaining time (Lock, 2017). Therefore, in case there are extra resources needed, managers can easily organize on how to provide all materials. Time also affects how resources are allocated in a project (Binder, 2016). For instance, time illustrates when a product may be expected and how many experts are required to run the project. Using a time frame, managers can explain how a project is performing (Frefer, Mahmoud, Haleema, & Almanlook, 2018). In most cases, a project is given a certain duration before it is complete. Thus, if the duration is almost over and little change has taken place, management can easily analyze and explain what should be done. For that reason, project management is an essential factor that controls a project based on time movement (Timilsina, & Shah, 2016).

Knowledge and Skills Management

During the whole process, project management must ensure the required knowledge and skills are incorporated. Skills and knowledge are approaches that are needed when carrying out an activity. Therefore, project management ensures that all resources that are used in a project meet the requirements (Gomez-Exposito, Conejo, & Canizares, 2018). Additionally, skills and knowledge help experts to follow and apply all rules that are required. Governments have also rules which must be followed to ensure the welfare of citizens is maintained. Every organization has its rules and guiding principles which need to be fulfilled. Lack of knowledge and skills in a certain field can subject a project to failure (Archibald & Archibald, 2016). Human resources that are deployed in the project must

have achieved a certain experience and academic requirement to ensure all procedures are highly followed. In most cases, electrical projects are more complex and thus, they require specific skills (Godsell, Masi, Karatzas, & Brady, 2018). This complexity makes the project managers recruit only those individuals who have high experience level. In some case, some companies are forced to hire experts outside a country to ensure that all necessary activities are carried out (Fewings, 2013). For one to instance, the A photovoltaic system, manager must ensure that all people involved in the process have the PV system skills.

9. ENVIRONMENT CONTROL

Project management is also mandated to determine and understand the environment. These are factors such as cultural, social, political, and much more within the working environment. Project management must ensure that all these factors are maintained (Andrisano, Bartolini, Bellavista, Boeri, Bononi, Borghetti, & Fava, 2018). Integration of these factors may influence the acceptance of a project within communities. For instance, if a project violates the cultural policies of a certain community, people may protest and hinder its development. In some cases, some project violates some cultural and international policies due to either misunderstanding or ignorance (Keegan & Den Hartog, 2018). How a project is received is influenced by the cultural practice of a particular area.

10. PLAN IMPLEMENTATION

It is also the role of project management to set a plan that will be used in a project. This is associated with the scope to integrate throughout the whole process (Kerzner & Kerzner, 2017). This planning is highly associated with the goals and objectives that the project wants to attain. Planning is then followed by monitoring and controlling. Monitoring and controlling entail the assessment of all activities that are taking place (Andersen, 2016). Monitoring helps the organization to respond and tackle any issue that may occur during the period. After all, activities are done, it is the role of project management to close the whole process and explain the results to organization management. These processes help the management to understand if the objective of a project has been attained (Tariq, Othman, Akhtar, & Tariq, 2019). Therefore, organization management can make any decision based on the final product.

Enhancing Communication

Additionally, it is the role of project management to ensure there is free communication between individuals involved. Communication affects how people handle problems in a project. Therefore, promoting clear and unambiguous ways of sharing ideas increases the chance of a project's success. Data recording helps to keep people informed about how various activities are going (Kiravu, Diaz-Maurin, Giampietro, Brent, Bukkens, Chiguvare, & Musango, 2018). Additionally, it is the role of project management to set an outline which illustrates what is expected from them. If project members are not aware of what is expected, there is a

high chance that the activity will fail (Talman, 2018). Furthermore, project managers should also understand what staff are doing. These actions create an environment which is easy to monitor how a project is going. An organization needs to be updated on what is expected is going on in the project (Karti, 2016). This helps to negotiate in case there are extra materials needs. Good communication creates an environment which motivates workers to work hard toward the achievement of the goal (Lechler & Yang, 2017). In some case, management uses some rewards to motivate workers who are working on a project. This action is achieved due to good communication between all parties involved (Lientz & Rea 2016). Integration is one of the critical activity that can be used to solve problems (Kumar, Ferdous, Luque-Ayala, McEwan, Power, Turner, & Bulkeley, 2016). Integration brings various ideas together thus, creating more effective ways of solving issues.

11. PROJECT INTEGRATION

In a project, resources are supposed to be integrated systematically. This helps to create a way for the success of a project. All activities that are taking place in the process needs to be effectively integrated (Kerzner, & Kerzner, 2017). This integration can help to understand minor challenges that may affect members operation. Additionally, integration helps to create a supportive forum which can be used to help each other (Mafimisebi, 2017). Stakeholders and sponsor are an essential component of project development. These two components offer financial and other types of support (Lewis, Gertsakis, Grant, Morelli, & Sweatman, 2017). Effective integration of sponsors and stakeholders create a good ground which supplies a project with all materials needed. In most organization, project managers must ensure that they create a happy environment for stakeholders (Dressler, Ripperger, Hierold, Nowak, Eibel, Cassens, & Kolpin, 2016). Stakeholders are mostly required first to be identified so as to start creating a good relationship when the project is being introduced (Binder, 2016). Stakeholders have an expectation which needs to be managed and hence, it is the role of project managers to keep informing them about the progress. Based on the information provided, stakeholders evaluate to understand whether their needs are met and thus, in case there is any other form of disagreement, parties solves early to about later conflict.

12. TEAM MANAGEMENT

A project team is an essential component of success. It is the role of project managers to ensure these members are happy (Hanna, Gross, Speirs, Heptonstall, & Gambhir, 2015). As such, they will be motivated toward achieving the goals of the project. Their roles should be clearly stated to ensure all activities are done under minimal supervision (Fuller, Valacich, George, & Schneider, 2017). The team should be monitored to ensure that all activities are carried out as expected. Internal conflicts are important challenges that may affect how the project will be carried out. Hence, the project

manager should ensure all people stay in a friendly way (Sutherland, Viktorov, Blount, & Puntikov, 2017).

13. AGILE PROJECT MANAGEMENT

Agile project management is a flexible approach that is also used to track the power rate. Based on this technology, companies measure energy efficiency based on the need of the project (Schwaber, 2014). Agile project management is a value-centered technique that sub-divided project into a cycle for easy assessment (Quarton & Samsatli, 2018).

For instance of data showing an agile project management. Due to its flexibility, the method can effectively collect information even with a small project (Schwalbe, 2015). Furthermore, the technology is compatible with small software which increases work efficiency. In this tracking system, the project management greatly respects the linkage between project and system. In a PV system project, an agile project management may mostly be used when planning, monitoring, and test the performance of the project. The diagram below indicates how an agile project management may be used in a PV system installation.

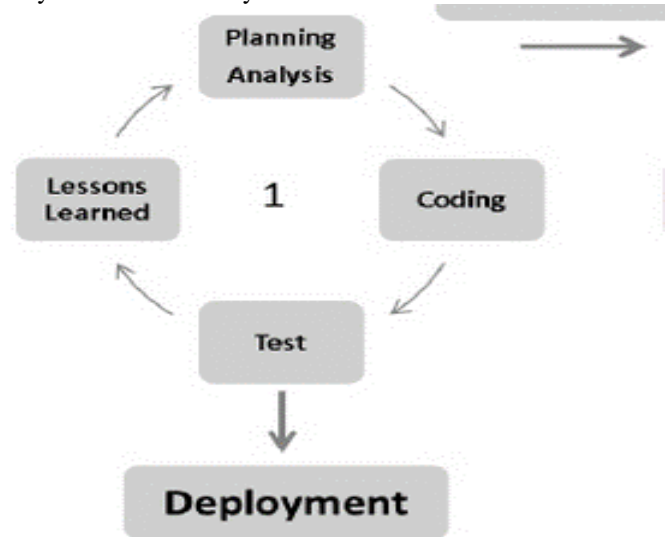


Figure 2: Plan Implementation Process

14. EXTREME PROGRAMMING (EP)

Extreme programming (EP) is another tracking technology that mostly focuses on teamwork and customers fulfilment. In this technology, communication is a key technique which illustrates how a certain energy saving project works. Companies that are using this system create a tracking structure which is mandated to a certain energy-saving project (Martens and Carvalho, 2017). For instance, in an automated energy saving, EP is used to determine the efficiency of a project. Test-driven development is the most technique which is used to the process to determine the data.

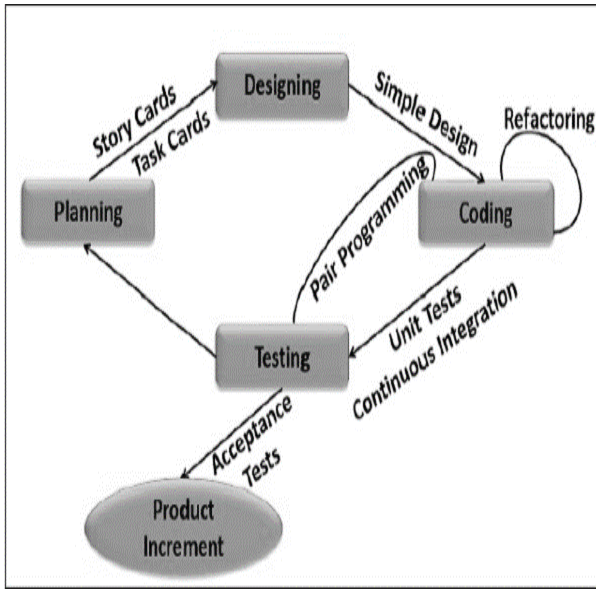


Figure 3: Extreme Programming Phase cycle

15. PROJECT EVALUATION REVIEW TECHNIQUE (PERT)

Project Evaluation Review Technique (PERT) is most commonly used in manufacturing companies because it helps track even more complex project (Nicholas & Steyn, 2017). Most of the energy saving projects are so complex and thus, they required high measuring technique to determining the change in power rate. PERT helps to effectively schedule and coordinate all activities that are taking place in a project (Verzuh, 2015). Using this technique, a company is required to create a chart which indicates the rate of energy movement. The method shows how activities take place from the start to end (Brantley, 2018). In this method, the time frame is a critical factor that affects how the technique performs. Before tracking a project, companies are first required to determine the critical path that the energy flows and possible failure that may occur during the process (Lee, DeLone, & Espinosa, 2006). This technique makes the energy rate to be more measurable. PERT shows the time a project is going to take. From the diagram, one can how long the project will take and the activities involved.

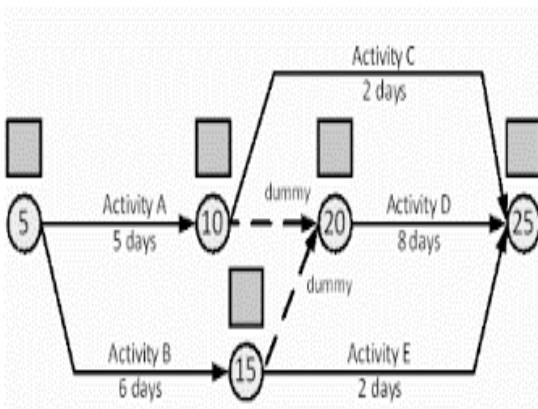


Figure 4: Activity Cycle

PERT may be calculated by

$$Te = (To + 4Tm + Tp) / 6$$

Te = Expected time
 To = Optimistic time
 Tm = Most likely
 Tp = Pessimistic time

16. EXTREME PROGRAMMING (XP)

Extreme programming (XP) is a software implementation program that is used to track how a project is performing. The program is mostly used to measures the quality and responsive of an energy saving project. In most cases, electrical companies that use these program are mostly intended to improve the quality so as to satisfy all customers (O'Donovan, 2018). Organizations are supposed to review all codes and then test the unit to understand how power rate is flowing. According to various research, code review is perceived as an essential practice because it creates a flow program which can easily help to track energy flow. In most cases, the software is used in a day-to-day investigation (Schulze, Nehler, Ottosson, & Thollander, 2016). Therefore, companies can easily track daily power rate based on how a project performs. Finally, the process takes three major steps; iterations, Continuous feedback, and idea sharing

Extreme Programming (XP) Methodology

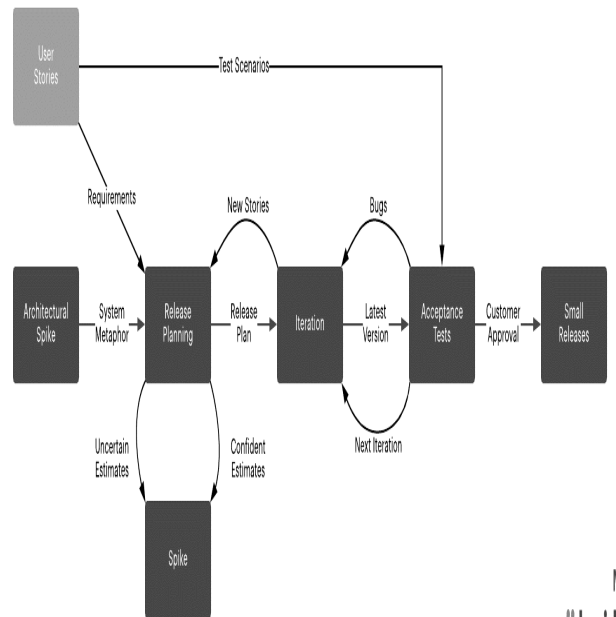


Figure 5: EP Framework

17. ADAPTIVE PROJECT FRAMEWORK (APF)

Adaptive project framework (APF) is a technique that helps to thrive any change that occurs in a project. This tracking device helps companies to learn and discover new ways on how to improve the project (Singh, Mathew, Granderson, Shukla, & Behera, 2018). Due to current change working system, energy evaluation is harder to measure. APF is more dynamic and hard to predict due to an effective network system that are integrated into the process (Milosevic, & Martinelli, 2016). Additionally, APF operates in both passive and active strategy by applying how codes in running currents. Most application of APF tries to achieve and improve how energy saving devices operate (Sisawo, 2018).

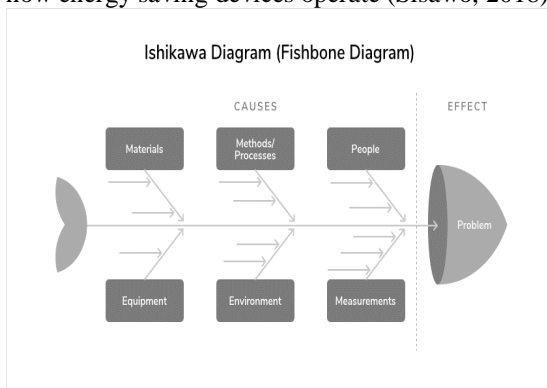


Figure 6: Ishikawa Diagram

In a solar system installation, APF may follow the following steps to ensure effective project management.

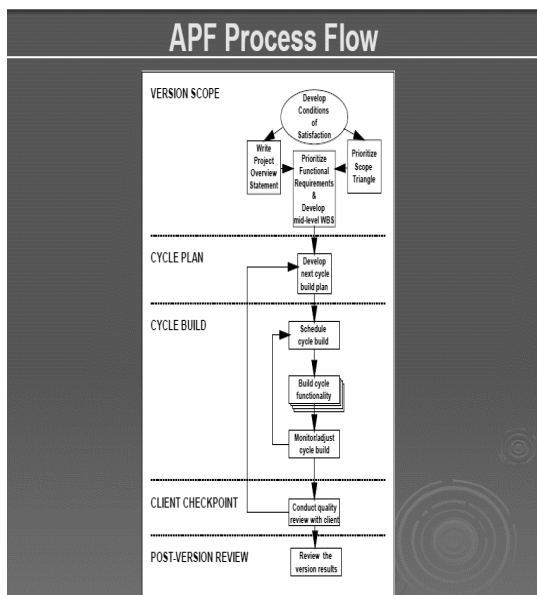


Figure 7: APF Process Flow Chart

18. CONCLUSION

It may be concluded, project managers have critical roles that influence how projects succeed or fail. Most projects require a huge amount of money before they are completed. It is the role of a project manager to ensure the capital available is effectively allocated. The quality mostly determines the

energy saving project because they depend on how planned activities are exercised. Quality affects how a project functions and performs in the market. It is the role of a project manager to ensure that the project maintains its quality. Projects are surrounded by a lot of risks which may affect their success. Project management should have clear ways on how to overcome common challenges within the production process. Time is another limiting factor that facilitates to product's success or failure. Poor time management makes it hard for a project to meet its deadline. Therefore, it is the role of the project manager to ensure that all activities are carried out on time to facilitate its success. Skills and knowledge are other critical factors in project management. Project manager must ensure that the staff members have the required skills before assigning them a role. Project manager must ensure that a project observes all environmental factors before it is set to run. This helps to ensure maximum support from communities. A project must follow a particular technique. In a project implementation, the tracking system is essential component which indicates all progresses. Agile project management, extreme programming, project evaluation review technique, and much more are vital factors which energy saving projects should follow.

REFERENCES

- Andersen, E. S. (2016). **Do project managers have different perspectives on project management?** International Journal of Project Management, 34(1), 58-65. <https://doi.org/10.1016/j.ijproman.2015.09.007>
- Andrisano, O., Bartolini, I., Bellavista, P., Boeri, A., Bononi, L., Borghetti, A., ... & Fava, F. (2018). **The need of multidisciplinary approaches and engineering tools for the development and implementation of the smart city paradigm.** Proceedings of the IEEE, 106(4), 738-760.
- Archibald, R. D., & Archibald, S. (2016). **Leading and Managing Innovation: What Every Executive Team Must Know about Project, Program, and Portfolio Management.** Auerbach Publications.
- Binder, J. (2016). **Global project management: communication, collaboration and management across borders.** Routledge. <https://doi.org/10.4324/9781315584997>
- Brantley, W. A. (2018). **A New Research Agenda for Project Management Communication Theory.**
- Bricca, G., Gimber, J., Martin, B., Rollings, J., Schwartz, R., & Smith, P. (2017). **Energy Efficiency of Colgate University Buildings A Performance Based Approach to Sustainability.**
- Bui, N., Merschbrock, C., & Munkvold, B. E. (2016). **A review of Building Information Modelling for construction in developing countries.** Procedia Engineering, 164, 487-494.

8. Burgers, C. A. (2018). **The role of project management in strategy execution within the South African telecommunications industry** (Doctoral dissertation).
9. Charles Jr, O. H., Schmidheiny, S., & Watts, P. (2017). *Walking the talk: The business case for sustainable development*. Routledge.
10. Chen, Y., & Landry, D. (2018). **Capturing the rains: Comparing Chinese and World Bank hydropower projects in Cameroon and pathways for South-South and North South technology transfer**. *Energy Policy*, 115, 561-571.
11. Cho, C., Park, J., & Kim, K. (2018). **Energy loss in cement-based material for efficient sensor deployment at a site**. *Canadian Journal of Civil Engineering*, 45(7), 547-553.
<https://doi.org/10.1139/cjce-2017-0406>
12. Cleden, D. (2017). **Managing project uncertainty**. *Routledge*.
13. Crespin-Mazet, F., Romestant, F., & Salle, R. (2018). **The co-development of innovative projects in CoPS activities**. *Industrial Marketing Management*.
14. Desha, C., Robinson, D., & Sproul, A. (2015). **Working in partnership to develop engineering capability in energy efficiency**. *Journal of Cleaner Production*, 106, 283-291.
15. Dressler, F., Ripperger, S., Hierold, M., Nowak, T., Eibel, C., Cassens, B., ... & Kolpin, A. (2016). **From radio telemetry to ultra-low-power sensor networks: tracking bats in the wild**. *IEEE Communications Magazine*, 54(1), 129-135.
16. M.S. Devi, P. Kumar, *Wireless sensor Network based Industrial Automation using Internet of Things (IoT)*, *Int. J. Adv. Trends Comput. Sci. Eng.* 7 (2018) 92–86. doi:10.30534/ijatcse/2018/01762018.
17. Munisha Devi, Nasib Singh Gill, "Performance Evaluation of Dynamic Source Routing Protocol in Smart Environment", *International Journal of Advanced trends in Computer Science and Engineering*, Vol.8(2), 2019
18. (7) (PDF) *Power and Area Optimized FRA-CSLA for High-Speed NoC Applications*. Available from: https://www.researchgate.net/publication/334283793_Power_and_Area_Optimized_FRA-CSLA_for_High-Speed_NoC_Applications [accessed Nov 11 2019].
19. (7) (PDF) *Simulation and Visualization of Acoustic Underwater Sensor Networks using Aqua-Sim and Aqua-3D : An Evaluation*. Available from: https://www.researchgate.net/publication/334283510_Simulation_and_Visualization_of_Acoustic_Underwater_Sensor_Networks_using_Aqua-Sim_and_Aqua-3D_An_Evaluation [accessed Nov 11 2019].
20. Fanson, J., McCarthy, P. J., Bernstein, R., Angeli, G., Ashby, D., Bigelow, B., ... & Figueroa, F. (2018, July). **Overview and status of the Giant Magellan telescope project**. In *Ground-based and Airborne Telescopes VII* (Vol. 10700, p. 1070012). International Society for Optics and Photonics.
21. Fonseca i Casas, A., Fonseca i Casas, P., & Casanovas, J. (2016). **Analysis of applications to improve the energy savings in residential buildings based on Systemic Quality Model**. *Sustainability*, 8(10), 1051.
<https://doi.org/10.3390/su8101051>
22. Frefer, A. A., Mahmoud, M., Haleema, H., & Almamlook, R. (2018). **Overview Success Criteria and Critical Success Factors in Project Management**. *Industrial engineering & management*, 2169-0316.
23. Fuller, M. A., Valacich, J. S., George, J. F., & Schneider, C. (2017). **Information Systems Project Management: A Process and Team Approach, Edition 1.1**. Prospect Press.
24. Gardiner, P. D. (2005). **Project management: A strategic planning approach**. *Macmillan International Higher Education*.
25. Godsell, J., Masi, D., Karatzas, A., & Brady, T. M. (2018). **Using project demand profiling to improve the effectiveness and efficiency of infrastructure projects**. *International Journal of Operations & Production Management*, 38(6), 1422-1442.
26. Gomez-Exposito, A., Conejo, A. J., & Canizares, C. (2018). **Electric energy systems: analysis and operation**. *CRC press*.
27. Keegan, A., & Den Hartog, D. (2018). **Doing it for themselves? Performance appraisal in project-based organisations, the role of employees, and challenges to theory**. *Human Resource Management Journal*.
28. Kerzner, H., & Kerzner, H. R. (2017). **Project management: a systems approach to planning, scheduling, and controlling**. John Wiley & Sons.
29. Kiravu, C., Diaz-Maurin, F., Giampietro, M., Brent, A. C., Bukkens, S. G., Chiguvare, Z., ... & Musango, J. K. (2018). **Proposing a master's programme on participatory integrated assessment of energy systems to promote energy access and energy efficiency in Southern Africa**. *International Journal of Sustainability in Higher Education*, 19(3), 622-641.
30. Waqar Tariq, Mohammad Lutfi Othman, Noor Izzri Abdul Wahab, Mansoor Ebrahim, **A Review on ESCO's Challenges and Project Management as a Solving Tool** *Indonesian Journal of Electrical Engineering and Computer Science* Vol. 12, No. 1, October 2018, pp. 269~274 ISSN: 2502- 4752, DOI: 10.11591/ijeecs.v12.i1.pp269-274
31. Lechler, T. G., & Yang, S. (2017).
31. Lee, G., DeLone, W., & Espinosa, J. A. (2006). **Ambidextrous coping strategies in globally distributed software development projects**. *Communications of the ACM*, 49(10), 35-40.
<https://doi.org/10.1145/1164394.1164417>
32. Waqar Tariq a, Lutfi Othman b, Norman b. Mariun c, Noor Izzri b. Abd. Wahab d, "What Smart Building Management System can offer: Brief Discussion by taking Malaysian power infrastructure as a sample

Advances” in Electrical and Electronic Engineering
(ISSN 1804-3119) .

33. Tariq, W., Othman, M. L., Akhtar, S., & Tariq, F. (2019). **Gait Feature Based on Human Identification & Classification by Using Artificial Neural Network and Project Management Approaches for Its Implementation.** International Journal of Engineering & Technology, 8(1.7), 133-137.