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Continuous Technological Improvement Using Systems Engineering Principles to Achieve Sustainability:
An Investigation Into Related Literature

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ABSTRACT

The design of a continuous plan would benefit society, as seen in systems engineering. To understand complex systems and to uphold the principles of stability, systems engineering has shown that it is a discipline of great importance. The principle of continuous technological improvement has augmented this idea, as the quality improvement of the design to meet inherent objectives would be the focus. This study aims to present the necessity of continuous technological improvement through systems engineering principles for socioeconomic and community-oriented growth. Thus, the context that would tackle global concerns and facilitate humanity's growth toward knowledge would be the application of technology. The context at hand, the design of systems thinking, and the overall approach taken to promote deeper perspectives has been illustrated in various literature. Healthcare, chemical production and organizational development are various fields of distinction that have shown evidence from the investigation into related literature. To streamline quality, as well as to maintain high quantities of production, all employed systems engineering have focused on technological improvements. In the field of industrial engineering, for a stable industry in which the system operates, this line of thinking is crucial.

KEYWORDS

Continuous Improvement, Systems Engineering, Technology

INTRODUCTION

The delivery of theory to applications has been the focus of the field of systems engineering. In the course of understanding how applications can be utilized on a mass-scale, it is of great importance to the field of technological improvement to use design initiatives. According to Hitomi (2017) and Todorović et al. (2015), manufacturing systems "not only play a role inside each firm but are a part of the socially spatial interaction structure, settlement systems, and world systems as a whole" (p. 26). Hence, how systems engineering principles work as a whole and how they can inherently influence the outcome of the design is important to understand. Also, a feat that is desired by many is technological improvement. According to Langford (2016); Shenhar and Levy (2007); and Parast (2011), the integration of theory with the right application to solve a social problem (i.e., healthcare or construction) is the goal of systems engineering. This integration can yield endless possibilities to further delineate the nature of systems engineering as not only an emerging field of importance, but also

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as a stable field for the continuity of society itself. With these principles at hand, this study will look into the impact of systems engineering on the future of technology and its continuous development.

The goal of many engineers in the field of manufacturing, production, and process has always been continuous technological improvement. With this in mind, in the goal of streamlining the process and ensuring that quality and quantity goals be maintained without any compromise, the role of technology has taken the frontline. With the design element to be considered, the focus of system engineering can expand beyond theory to actual application. As noted in Suthersan et al. (2016); Nagel (2015); Zwikael & Smyrk (2012), the benefits of systems engineering were noted through remediation engineering: the utilization of knowledge to provide solutions of otherwise non-functional situations. Hence, to optimize what needs to be done and to ensure the recovery of actions that requires remediation (i.e., lost fuel, waste products, and other system concerns) is the goal of technology. Furthermore, as stated by Wasson (2015); Sutherland (2004); Gafi and Javadian (2018), the dynamics involved in systems engineering were an involved process; various elements of the process must be considered to enable a clear-cut solution while improving the overall development of a given system. Thus, the translation of the system into actual practice, which is enhanced through technological improvement, would yield success.

Integrating systems engineering principles into continuous technological improvement is a necessary action because of the expansive learning process involved. One example is noted in Benson and Magee (2014); Marcelino-Sádaba et al. (2014), in which they examine renewable energy technologies and the improvement of the integration process. Furthermore, the innovative approaches toward the management of energy have evolved, and the impact of these actions was noted through improved application and lowered losses. Furthermore, as presented by Acemoglu (2015) and Lee et al. (2013), technological improvement had diverse impacts. While technological change can radically impact socioeconomic landscapes, what people do with the technology is more important. Managing technology to maximize potential involvement and knowing the inherent influences that technology would have should be learned.

With technology and systems engineering, much can be learned in today's society. As emphasized in Penzenstadler et al. (2014); and Hoon, Kwak, and Dixon (2008), technology was involved in the sustainability of a system, its implementation of safety, and the upholding of security. These principles were critical for laying down the inherent requirements of improvement that were in demand at the time. With these considerations, engineering is a dynamic and adaptable field. So, inspecting the extent of the influence of technology and its role in applying the systems engineering principles to enhance overall development is critical. Afterwards, minimal impediments and other barriers to success can be facilitated through continuous technological improvement.

A feat that must be explored is the idea of integrating principles toward application, as understanding this discipline is filled with various principles that are relevant to today's society. However, the extent of knowledge applied is not the question, but rather how relevant it is in today's context. Since it is integrated in the field of expanding knowledge, systems engineering is very critical. Furthermore, to integrate the principles of engineering in a manner that would promote procedural improvement over time is the aim of systems engineering. In this respect, the growth of technology can be influenced by the discipline. As a result, understanding continuous technological improvement through systems engineering principles in the perspective that includes enhanced educational perspectives and community-oriented actions is the focus of this research.

More specifically, promoting deeper socioeconomic and community-oriented actions that would apply systems engineering in a holistic concept is the aim of continuous technological improvement. By understanding the role of technology in continuous improvement, society itself should never be isolated. While the principles are integral in promoting continuous improvement, they can only serve their purpose if they are put into actual practice. The idea behind understanding this initiative can effectively foster a deeper understanding of technology's important role; to successfully integrate the idea and the execution of the system at hand, it presents due evidence. Thus, a critical point of view should be taken by systems engineering to promote continuous technological improvement in the long run.

Since technology is applied by engineering, the concept is advanced by technology and brings to reality the idea. For the overall success of a systems-focused design, particularly in its progression toward success, these perceptions are vital. It is understood and contextualized that systems engineering is vital for societal improvement, infrastructure management, and production management in general. As technology improves, it is expected that disciplines would also respond accordingly. However, this is not always the case, and an investigation on the relationship between these two concepts and practices should be done. Understanding critical elements of continuous technological improvement is the focus of the originality of the research. The direction taken to enhance a deeper perspective of the matter will be crucial for developing further relevance of the issue at hand would be provided by the literature review. Furthermore, the clear perception of development, which continues to be presented through the lens of technology improvements, will be channeled by these ideas. The key idea is that continuous development is not an intermittent one, as it would imply a smooth progression of ideas that would be evident in a systems-focused design.

Different research perspectives and ideas are adapted to provide new solutions for current problems. Furthermore, this study uses a design-science-investigate strategy, and then it approves a valuable growth reveal for reasonable and hypothetical application. Finally, this study provides an assessment model of these variables, their concepts, and models, as well as an outline of development models. Also, the evaluation instrument is reviewed and the outline's approach is explained. There is an outline of the meetings in the analysis, as well. Initial discoveries and suggestions are in the conclusion to organize investigative limitations, as well as suggestions for future studies.

This study contributes to the scarce amount of literature on these variables, their concepts, and models in project management and operations management. Thus, it contributes to the profession considerably. In the findings, it is shown how beneficial these variables, their concepts, and models are, but the limitations are also explained when performance and sustainability are ignored. Additionally, there are realistic examples in this study that illustrate the importance of applying these theories to authentic circumstances, so this subject is assessed in theory and in practice.

In the field of industrial engineering and its allied fields, technology holds a significant place. Moreover, the research on innovative and rehabilitative measures that would propagate thoughts into actions has been contributed to by technology. As noted in Hitomi (2017), Detert (2000), and Arumugam (2016), the characteristic influence of technology was prolonged, and it must be given context through engineering. Thus, this research aims to bridge technology with engineering even further by applying systems engineering concepts to a continuous technological improvement framework. To fully understand the influences of the idea on people, this is one critical idea that must be upheld.

Primarily, one significant contribution to the field is the cognitive framework that is associated. Since this research focused on analyzing literature, the systems engineering framework can be better-presented and related through thought elements. According to Nielsen et al. (2015); Al-Kadeem et al. (2017a), the model of systems engineering focuses on operational independence, managerial independence, evolutionary development, emergent behavior, and geographic distribution. These elements are critical because of how they influenced the cognitive framework of development (Langford, 2016; Andersen, 2014; Xue, Baron, & Esteban, 2016; Yun et al., 2016; Azar, 2012; Gholizad et al., 2017). Also, this is integral in improving the field because of how integrative these elements are in systems-oriented design.

Secondarily, there can be a significant contribution to the field of research by industrial engineering with the management approach taken through systems engineering principles. The technological improvement would not only mean more streamlined processes, but it would also mean an institutionalized approach that would enhance management of production overall. According to Rebovich and White (2016); Svejvig and Andersen (2015); and Khan et al. (2019), there could only be an improvement in the production scenario if actions were taken toward enhancing efficiency through the systems engineering approach.

Thirdly, to enhance the integration process of different ideas, the research shall have an impact on the field of industrial engineering. As noted by Wasson (2015) and Galli et al. (2017), the element of systems design was founded on the principle of flow, which was vital because of its start and an end. Also, it was critical for identifying bottlenecks, contained points of integration, and had points of separation. With these key concepts put in place, taking note of interactions among the elements would widen the perspective of systems engineering and industrial engineering as a whole. Additionally, evidence on the potential success of the action or failure if certain conditions are not met would be presented.

These points clarify the inherent impact that the approach would have, so these points must be examined in detail with respect to the literature of systems engineering principles. In the context of process engagement, manufacturing, and societal improvement, this role can be specified. Thus, because a system dictates the foundation of society, studying the topic is essential. Without a system, society cannot function, just as a plant needs a system and technology that must support this system for the whole industry to flourish.

It is apparent that the field of industrial engineering continues to grow. Particularly, when considering the global picture and the influence of the industrial revolution on society, no environmental impact can go unwarranted, so manufacturing and process must be streamlined. With these initiatives put in place, the field of industrial engineering can be contributed to by the research, as systems engineering, and sustainability initiatives are emphasized. The process itself may be viewed as tedious, but the outcome is rewarding because of how effective the development would be in terms of propagating change and a deeper sense of coordination.

With this study, industrial engineering (IE) research can find information that could facilitate the work process by saving on time, money, energy, work hours, machine time, and other resources. Thus, an improvement in productivity could occur because this model presents new product ideas and more useful information for practitioners.

The organization of this article is presented in the following way. In section two, there is a high-level literature review for pre-existing literature in the research fields. In section three, there is a research methodology to carry out the research study. In section four, the findings are presented from the study and analysis. In section five, there is an outline of the implications for the practitioner, as well as ideas for future research, research limitations, and general conclusions.

LITERATURE REVIEW

As a means of understanding continuous technological improvement in the context of systems engineering, a comprehensive literature review was done to tackle pertinent topics and relevant studies. This review encompassed each keyword of the title to derive a direct connection between the two concepts. The exhaustive literature review facilitated the effective determination of findings that would fuel the research's outcome: to determine socioeconomic and community-oriented connections related to technological improvement. Thus, the review of relevant literature focuses on the discovery of principles that would be applied in human development and systems design. Overall, the goal of sustainability is explored to give due context to the importance of the study in determining what actions to take in applying systems engineering, technological improvement, and continued development.

Systems Engineering Principles and Societal impacts

The primary determination of impact lies on understanding systems engineering principles and other relevant details that can establish context to the matter at hand. According to Walden et al. (2015); Galli (2018a); and Detert (2000), it is an interdisciplinary field of engineering that engages in the practice of designing and managing systems and lifecycles that are too complex for conventional analysis.

Utilizing systems thinking is the focus of systems engineering, which is a cognitive approach that is focused on upholding strategic principles for the betterment of a certain process (Haines, 2016; Ahern, Leavy, & Byrne, 2014; Besner & Hobbs, 2012; Zelinka & Amadei, 2019; Epstein, 2018). The logic behind using systems thinking for an engineering approach is essential in the development of success.

Biegler, Lang, and Lin (2014) emphasize that operations management is integral for maintaining smooth process systems engineering with an emphasis on the development of multi-scale frameworks. Also, they emphasize that there was an increasing demand for a better process modeling that would only gain merit after the utilization of enhanced systems engineering. The idea has been supported by Garcia and You (2016); Brown and Eisenhardt (1995), in which they examined how process orientation has influenced the development of decision-making models to improve the current water, energy, and food crisis. While there were uncertainties that should be addressed in the process, it became inherent that improvement could only be supported by the integration of the method toward applied modeling. Furthermore, Von Stosch et al. (2014); and Labedz and Gray (2013) examined that hybrid semi-parametric modeling was an important means of optimizing processes: "Hybrid semi-parametric modeling also appears promising for (bio) medical research, where challenges are multi-scale ranging from the sub-cellular level up to patients response and where the integration of data from several scales along with mechanistic models seems necessary" (p. 48). Thus, the systems engineering principle focuses on the actual application toward improving health situations, which was a focal point in the assessment of effective management of processes. As a support to this initiative, systems engineering principles were also focused on industrial biotechnological processes, in which there was a collaborative effort to improve the global conditions of organismal management (Kiss, Grievink, & Rito-Palomares, 2015; Zhang, Bao, Wang, & Skitmore, 2016; Hartono, Wijaya, & Arini, 2014). The integrative nature of systems engineering, particularly in modeling life systems that would promote sustainable economies and living conditions, is a testament to such a fact.

To understand the clear significance of the discipline on the overall application by humankind, the context of understanding systems engineering principles from a societal point of view is important. Because of the abiotic behavior that it has in viewing one system as another as a set of networks and operations, people may view the principle as disjointed. However, utilizing the system can reveal the reality and applicability of the matter. Many authors have noted how systems engineering has streamlined the approach in reaching the goal (Biegler, Lang, & Lin, 2014; Kiss, Grievink, & Rito-Palomares, 2015; Galli, 2018b; Papke-Shields & Boyer-Wright, 2017). These actions were important because of the quality and quantity demands of many industries (Walden et al., 2015; Galli, 2018c; Tariq, 2013; Winter et al., 2006a). Hence, there should be a proactive focus to the utilization of systems engineering principles.

Technological Improvement

After understanding systems engineering, looking into technological improvement, particularly in the context of being the medium in which the idea becomes the application, is important. Many authors have presented evidence of the systems thinking as a means of getting from one point to the other. Furthermore, feedback, logic controls, and other dynamic actions that would provide a recursive yet focus-driven solution were emphasized. Because of the channeling of technological improvement, this line of thinking is important.

Through an in-depth analysis of studies that utilized the idea of increasing overall efficiency, technological improvement can be evaluated. For instance, de Fonseca Oliveira & do Nascimento Rebelatto (2015) presented a study on electric energy consumption in a residential sector in Brazil. There, an economic and financial evaluation noted that investment is needed to ensure the sustainability of the energy sector through implementing tax exemption and investing on energy-efficient technologies. The idea of technological improvement was also supported in the studies by Yatsenko and Hritonenko (2015); Xiong et al. (2017), which focused on rational asset replacement. The strategy employed was to redefine technological strategies by taking note of a two-cycle optimal solution to create a streamlined design, rather than exponential, which can affect managerial decisions. Furthermore, another application that focused on technological improvement involved the study by Peng and Tao (2018), in which they emphasized how carbon intensity decomposition is related to electricity production. They illustrated that "carbon emission intensity in electricity production (ECI) has been considered an indicator to reflect the contributions of power industry in mitigating climate change… compared to structural adjustment, technological innovation effect has exerted a strong influence on the decrease of carbon intensity since 1980" (p. 29). Thus, for improvement in society with the innovation element of reducing carbon emissions, there is a strong potential.

Technological improvement has also had an extensive impact on global concerns, particularly those that are associated with climate change. As noted by Simpson (2014); Burnes (2014); and Gimenez-Espin (2013), the climate change concern was a global issue, and the transfer of technology has facilitated this direction through the influences taken in managing coalition among countries and the mechanisms that reduce carbon footprints. Other than these, attaining higher efficiencies of a given process is the goal of technological improvement. This was noted in Simpson (2014); and Zhang et al. (2016), as productivity in industries depends on the technology that is used. As a result, processing would improve, and the efficiency would increase, so there would be fewer losses and a more integrated solution at hand. Additionally, the study by Chowdhury et al. (2014) focused on the impact of technological changes in hospital services. The localized findings of the study showed that varying interpretations of case mix, as well as the outcome, illustrated that productivity and efficiency increased over time. The system's overall improvement through integrating technological change was a defining basis for the overall outcome of the study at hand.

Continuous Development

The inherent aspect of technological improvement must complement systems engineering principles and integration. With this perspective, how continuous development can impact the outcome of success in a given scenario at hand is important to look into. According to Weaver et al. (2017), the context of sustainable development can best explain continuous development. Furthermore, a study by Gutmann, Cantillo, & Kappe (2015) presented evidence that continuous flow technology, which is the core of continuous development, has been vital for the success of the manufacture of pharmaceutical ingredients. Thus, the design of a system focused on ensuring that continuous flow would have a positive outcome compared to a batch design. Continuous flow reactors have been noted to accept an inflow of materials and to generate products without halting the process. As a result, this has contributed to the system's outcome, with an emphasis on the dynamics at hand. Wiles and Watts (2014); Sharon, Weck, and Dori (2013); and Galli and Kaviani (2018) supported this initiative by focusing on the element of sustainable production. They mentioned that for sustainability, continuous flow reactors are important and are critical to the stability of the system. In this manner, through the process design that must be put in place, the role of sustainability is maintained. For the management of continuous development, continuous flow is just one of the parameters that are responsible.

The stability of feedback in the process is another focus for continuous development. Jansson, Lundkvist, and Olofsson (2015); Parker, Parsons, and Isharyanto (2015) examined the dynamism of feedback in continuous development, as their study focused on house-building platforms because of the innovation in the construction itself. The authors found that communication was important for the stability of a system, which would allow the designers to engage in a more lucrative development for the benefit of all. Thus, "efficient innovation diffusion processes are created when the platform developers are involved... with individuals working on those projects and through the routinization of project improvements on the organizational level" (Jansson, Lundkvist, & Olofsson, 2015, p. 254; Schwedes, Riedel, & Dziekan, 2017; Cova & Salle, 2005). Hence, the assertion for continuous development is fueled on the premise that stability is gained through feedback. Pieters (2017); and David, David, and David (2017) supported this claim by taking point on the organizational element to the system's design with an emphasis on the changing measures that exist. Organizations, the products of systems, can only thrive if feedback mechanisms were given due importance. Because feedback does not only promote a measure of change, it is critical, as upholding elements of the system to facilitate this inherent change is also a focus.

Thus, the machinations of a system should not be the limit of continuous development, as the intent of human development to support the overall underlying idea for growth should be the fuel. According to Sessa and London (2015); and Nikabadi and Hakaki (2018), organizational growth can only occur if the system is augmented with feedback measures that would support the mission's communication aspect. As a result, the learning process should be supported. While the algorithmic nature of the system still holds true with its essential advantage, it is inherent to note that the human involvement plays a more vital role in maintaining the stability of the system. Sterman et al. (2015) agreed with the contentions that were presented by Sessa and London (2015), in that the dynamics of the system are essential for operations improvement. As a result, this involved more than just the algorithms and the abstract plans. Focusing on overcoming the contingencies without being too restricted by stringent logic and limited approach should be the aim of the measure in the system. Having that in focus, the system can improve without limitations on what can be done for managing outcomes.

The overall design of continuous improvement is to present a condition in which no compromise would be evident, as upholding outcomes and maintaining quality at all times would be the focus. When affirmative action is maintained, the goal of the system is to protect itself and to attain the goal that it is intended, which would be optimizing the process in the long run. Without the inhibitions posed by batch processes, the goal is stabilized. Thus, in systems engineering, particularly with the sense that there is a definitive continuity presented and protected, continuous development is sacred.

Integration Processes

When systems engineering, technological improvement, and continuous development are factored in together, then sustainability can be achieved. The design of optimization has always emphasized the idea that systems should be focused on the ultimate goal of attaining zero losses, which is a condition known as steady state. According to Wasson (2015), the emphasis on maintaining sustainability was given due focus in protecting the environment and ensuring that the raw materials were utilized without any compromise. Liu et al. (2015); and Easton and Rosenzweig (2012) have mentioned that the design for systems integration can ensure global sustainability because frameworks are utilized to understand how "different human activities contribute to human impacts at local to global levels" (p. 2). With that regard, viewing systems as contributory mechanisms toward understanding the bigger picture is essential.

Additionally, the need for integrative practice must be upheld for sustainability initiatives to be put into practice. Nazzal et al. (2015); Badi and Pryke (2016) emphasize that the concept of sustainability is vital in industrial engineering because of how those involved would influence the inherent outcome of the process. Hence, to ensure that the continuity of the process would be maintained, there must be much care, and facilitating the effective integration at all fronts is the inherent goal. According to Halbe et al. (2014), functional development became integral in the design of engineering systems that focused on sustainability. It involved the efforts from all aspects of the organization to successfully achieve a feedback system that would inherently overcome any trials associated with the system's deficiency. Indeed, the hierarchical approach was part of the systematic initiative to promote a deeper integration of technological input elements and the engineering principles at hand. Without the integration of these ideas, disjointed results would be inherent, and the chaotic outcome would not fall well for systems that rely on accuracy and quality.

As such, sustainability is reliant on the network in which it operates. As examined by Agostinho et al. (2016), the model for sustainability is only fueled through the integrated networks in which the systems exist. Operability and feedback mechanisms are also guided by these principles of loops and critical paths to achieve a definite end to a particular beginning. Furthermore, Bakshi, Zib, and

Lepech (2015) assert that the sustainability initiative dealt with an ecological focus, which protected the environment at all costs through loss reduction and impact analysis. These actions help to maintain the systems because of the emphasis on stability at the same time. Stable measures would mean control systems, which would mean augmentations to the design (Weaver et al., 2017; Eskerod & Blichfeldt, 2005; Milner, 2016).

Thus, sustainability is possible with a designs approach in which sustainable manufacturing must factor in contributions to change and the inherent outcome through the analysis of the perceptions contextualized (Chan et al., 2017; Medina & Medina, 2015; Von Thiele Schwarz, 2017; Nabavi & Balochian, 2018). This idea was supported by Stock and Seliger (2016); Galli and Hernandez-Lopez (2018) in the notion that manufacturing must focus on the framework in which it operates as an initiative to enhance development toward the future. Smart logistics, enhanced integrated practices, appraisal of end-of-life phases into remanufacturing, recycling, and recovery would be applied. Furthermore, reinvention of the process to protect the environment and to contribute to the inherent role of successful development is sustainability. If the system is oriented toward utilizing the resources in a manner that does not compromise, then sustainability can be achieved. Overall, when the system itself is designed to uphold its principle, then it is attained and maintained.

The emphasis on directing an idea toward maintaining production makes systems engineering a useful tool. Additionally, its focus is the determination of a framework for complex systems, which would involve a deeper understanding of these. The ideas and studies reflected on systems engineering provide insight that the discipline is relevant. Since it requires the directive of technological improvement, continuous development, and the integration of these ideas, then it cannot stand alone. Within the review of the related studies, the idea is presented there. To draw out the contentions presented in this study, this should be further analyzed.

RESEARCH METHODOLOGY

Research Focus

The objective of this study is to understand the inherent relationship between continuous technological improvement through Systems Engineering and sustainability. Determining distinct relationships can be quite difficult, but it can be done through the following measures. The focus of the study looked into related literature to address merits and other relationships that can be drawn in the process. Furthermore, the literature review process integrated various findings from other studies to develop a collated view on the matter. With this insight drawn, the correlations and other important aspects can be drawn in the process.

Hypothesis

The assumption of the study focused on that there is an inherent relationship between technological improvement through Systems Engineering and sustainability. The contention of this relationship was directly relevant, in that sustainability can only be attained through the inherent projection of continuous technological improvement. When this measure is carried out, a projected form of stability is attained, and the outcome is noted to be a direct cause of the concept at hand.

Literature Review Research Approach

The two major steps of this literature review were as follows: first, relevant information was searched for, such as any input from keywords. Secondly, a more structured approach was used for the review process, which utilized databases and search strong. Also, there was a search through the tables of contents from two applicable journals.

Part 1: Explorative and Unstructured Literature Review

The research focus was to reassess certain keywords, so publications about the keywords had to be examined. This yielded various research fields and connections between the keywords for a total of 19 journal articles and 12 books. Finally, the keywords of all 31 publications were assessed to serve as search terms in the structured review.

Part 2: Structured Literature Review

Subsequently, a structured and systematic approach was utilized from other literature to apply methods for conducting reviews. This section consisted of four phases: preparing and scoping, planning the review, searching and evaluating literature, and evaluating the selected literature.

Phase (1) involved a scope that concentrated on project-relevant research on marketing and strategic planning serving as key concepts in studies. As a result, the search was expected to yield a sufficient amount of evidence and journals for the study.

Phase (2) involved connecting the keywords with other concepts to gain more information. Such concepts consisted of the keywords, their relationship, and their interaction. Certain terms (success, evaluation, and impact) were considered too vague, as they yielded impractical and unfocused results.

In phase (3), relevant results were compiled by searching through databases (i.e. ProQuest, Business Source Complete, Elsevier, EBSCO, ABI/Inform Global, and ScienceDirect). Overall, 17 conference papers and 30 journal-related results were collected. This yielded a total of 47 results of conference and journal papers.

The end of the search involved looking through the Table of Contents for academic and practitioner-based tier 1 and tier 2 journals. Even if the journals did not match the keywords (which would be the premier specialty journals for the keywords), all relevant articles were used. Figure 1 (below) shows that there were three streams for the search and selection method: the explorative and unstructured search, the structured search with search strings, and scanning the tables of contents.

Pursuing the streams in Figure 1 condensed the results to 41 publications. The selection process yielded about 29 and 12 results from academic journal articles, literature reviews, conference papers and proceedings, and books. Additionally, triangulation methods were applied. In the first selection, there was a search to see if the resulting publications were linked to the keywords and project research. This evaluation was done with a set of inclusion and exclusion criteria based on the abstract, and some publications either featured the introduction or the entire paper.

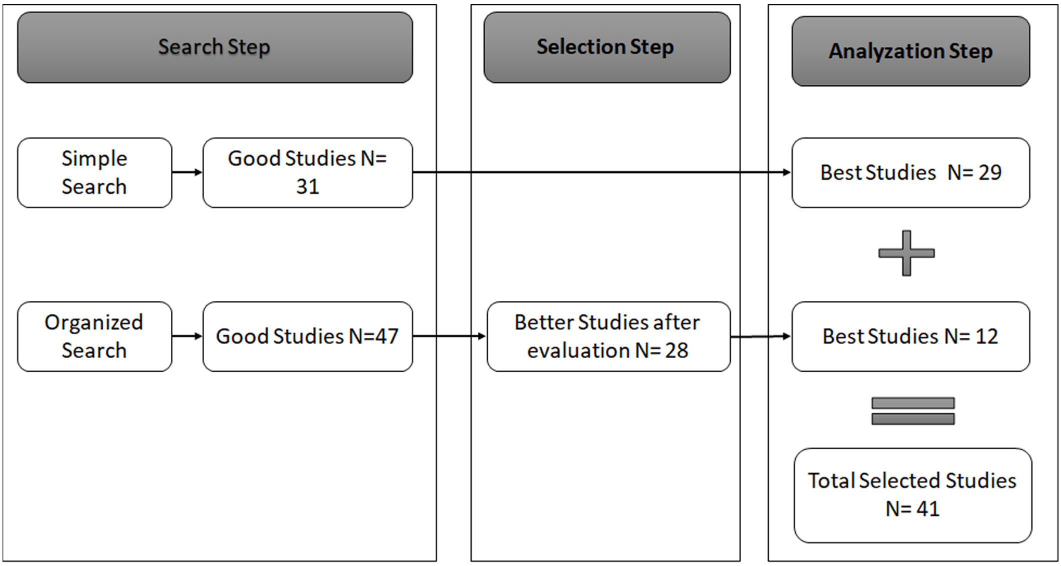
Furthermore, phase (4) involved the arranging of information into an inductive and deductive analysis. This was also documented with a software package, and the university and country of each author was documented in the deductive analysis. Each research genre was noted as empirical research, theory development, research essays and literature reviews, or into an "other" category. If the publication applied frameworks, such as through a research-based view and contingency theory, then the deductive coding was added. Lastly, it was documented if a model was featured in the publication.

Additionally, a grounded theory approach for the inductive analysis was used. This was done to code publications with open and selective codes, and most of the publications were selected based on the average number of citations annually. Thus, the older ages of some of the publications were balanced out. Any relevant literature reviews that represented more relevant studies were included, including current publications that were important for the keywords research.

Phase (4) illustrated that studying the list of open codes, so as to gather them for axial and selective codes, produced key themes. The first two parts the literature review occurred between December 2018 and March 2019, as this corresponded with relevant research activities. Also, the relevant materials and their overlap in this time were evaluated.

The collection of these papers showed the key themes between the variables and concepts from descriptive and trait perspectives. The statistical analysis and investigation of other variables/factors gave more significance to the research conclusions. In Table 1, the 41 studies were identified and the key themes were addressed.

Figure 1. Research approach for literature review



An evaluation of the 41 studies has shown that the studies evaluated the keywords with different statistical methods that took relational and causal perspectives, which made the conclusions more substantial. Table 2 gave a summary for the statistical methods that were used for the 41 studies, and Table 3 showed how many factors or variables that were studied in the journals.

The findings for these research methods, based on the themes/topics that are addressed in the next section, are shown in the following sections.

FINDINGS

In integrating principles and technological advancement, the literature had much depth in exploring the various facets of technology and engineering. Thus, the outcomes presented that are based on the authors' discourse and the inherent outcome shall be provided by these findings. To provide insight on the inherent involvement and integration of technology, the presentation of each author would hold enough depth.

Primarily, in the context of systems engineering principles and societal impacts, the benefit of technology can promote proactive growth for society is the inherent narrative. The cognitive approach and the inherent outcome of integrating interdisciplinary practice in engineering would be focused on by the systems to be put in context. Hence, it was noted by Walden et al. (2015); Haines (2016) that the principle of systems engineering has had relevance in articulating complexity through logical enhancement. In other words, the process to develop a derivative for cognitive development was factored in by sustainability. The findings by Biegler, Lang, and Lin (2014); Garcia and You (2016) focused on the systems engineering dynamics for process orientation and decision-making integration. Additionally, these findings were supported by Von Stosch et al. (2014); Kiss, Grievink, and Rito-Palomares (2015) with the correlative integration in the process of management. Thus, the integrative role of promoting a reality for social growth and depth that would enhance outcomes and promote correlative thinking in the process were the basis of systems engineering principles. For promoting social growth, systems engineering is vital; its emphasis on feedback and logic controls has helped to ensure the continuity of the process in promoting depth. Also, for sustainability, depth

Table 1. Identified studies from research approach by theme

Theme #1	Theme #2
Ahern, Leavy, & Byrne (2014) Andersen (2014) Arumugam (2016) Bakshi, Ziv, & Lepech (2015) Cova & Salle (2005) da Fonseca Oliveira & do Nascimento Rebelatto (2015) David, David, & David (2017) Eskerod, & Blichfeldt (2005) Galli & Kaviani (2018) Galli et al. (2017) Garcia & You (2016) Gholizad et al. (2017) Hartono, Wijaya, & Arini (2014) Hitomi (2017) Jansson, Lundkvist, & Olofsson (2015) Kerzner & Kerzner (2017) Nielsen et al. (2015) Pieters (2017) Schwedes, Riedel, & Dziekan (2017) Souza et al. (2015) Xue, Baron, & Esteban (2016) Xue, Baron, & Esteban (2017)	Al-Kadeem et al. (2017a) Acemoglu (2015) Badi & Pryke (2016) Buchholz, Dippl, & Eichenseer (2017) Chan et al. (2017) Gafi & Javadian (2018) Gimenez-Espin (2013) Gutmann, Cantillo, & Kappe (2015) Halbe et al. (2014) Hoon Kwak, & Dixon (2008) Kiss, Grievink, & Rito-Palomares (2015) Liu et al. (2015) Medina & Medina (2015) Milner (2016) Nikabadi & Hakaki (2018) Parast (2011) Parker, Parsons, & Isharyanto (2015) Penzenstadler et al. (2014) Sharon, Weck & Dori (2013) Shenhar, & Levy (2007) Sutherland (2004) Yun, et al. (2016) Zelinka & Amadei (2019)
Theme #3	**Theme #4**
Agostinho et al. (2016) Aslani, Akbari, & Tabasi (2018) Benson & Magee (2014) Biegler, Lang, & Lin (2014) Detert (2000) Easton & Rosenzweig (2012) Epstein (2018) Galli, & Hernandez-Lopez (2018) Galli (2018c) Omamo, Rodriguez, & Muliaro (2018) Labedz & Gray (2013) Lee et al. (2013) Marangunić & Granić (2015) Nabavi & Balochian (2018) Peng & Tao (2018) Sterman et al. (2015) Suthersan et al. (2016) Svejvig & Andersen (2015) Todorović et al. (2015) Tariq (2013) Von Stosch, Oliveira, Peres, & de Azevedo (2014) Von Thiele Schwarz (2017) Wasson (2015) Weaver et al. (2017) Zwikael & Smyrk (2012)	Azar (2012) Besner & Hobbs (2012) Brown & Eisenhardt (1995) Burnes (2014) Chowdhury et al. (2014) Galli (2018a) Galli (2018b) Haines (2016) Khan et al. (2019) Langford (2016) Loyd (2016) Marcelino-Sádaba et al. (2014) Nagel (2015) Nazzal et al. (2015) Papke-Shields & Boyer-Wright (2017) Rebovich & White (2016) Sessa & London (2015). Stock & Seliger (2016) Walden et al. (2015) Winter et al. (2006a) Wiles & Watts (2014) Xiong et al. (2017) Yatsenko & Hritonenko (2015) Zhang et al. (2016)

is needed because it is a precursor to the enhanced initiatives taking place. With the evident role of promoting integrity in the process, systems engineering is designed to coordinate the outcome of the process through cognitive approach and integrated management.

Secondly, in terms of technological improvement, dynamics of efficiencies and the dependency on technology are involved in the bottom line. For the sustainability of various aspects of society,

Table 2. Systematic analysis results by statistical analysis method

Statistical Method	Number of Articles (Frequency)	Author(s)
Regression	27 (27.84% of total articles)	Agostinho et al. (2016) Bakshi, Ziv, & Lepech (2015) Cova & Salle (2005) da Fonseca Oliveira & do Nascimento Rebelatto (2015) David, David, & David (2017) Detert (2000) Easton & Rosenzweig (2012) Epstein (2018) Galli et al. (2017) Gholizad et al. (2017) Gimenez-Espin (2013) Haines (2016) Jansson, Lundkvist, & Olofsson (2015) Loyd (2016) Nabavi & Balochian (2018) Nazzal et al. (2015) Nikabadi & Hakaki (2018) Penzenstadler et al. (2014) Sessa & London (2015) Sutherland (2004) Von Stosch, Oliveira, Peres, & de Azevedo (2014) Walden et al. (2015) Wasson (2015) Wiles & Watts (2014) Xue, Baron, & Esteban (2017) Zelinka & Amadei (2019) Zwikael & Smyrk (2012)
ANOVA	16 (16.50% of total articles)	Ahern, Leavy, & Byrne (2014) Acemoglu (2015) Brown & Eisenhardt (1995) Chan et al. (2017) Gafi & Javadian (2018) Galli (2018b) Galli (2018c) Gutmann, Cantillo, & Kappe (2015) Nagel (2015) Nielsen et al. (2015) Papke-Shields, & Boyer-Wright (2017) Sterman et al. (2015) Souza et al. (2015) Weaver et al. (2017) Xiong et al. (2017) Yun et al. (2016)
Q-Test	18 (18.56% of total articles)	Arumugam (2016) Aslani, Akbari, & Tabasi (2018) Azar (2012) Badi & Pryke (2016) Benson & Magee (2014) Garcia & You (2016) Halbe et al. (2014) Hoon Kwak, & Dixon (2008) Omamo, Rodriguez, & Muliaro (2018) Khan et al. (2019) Labedz, & Gray (2013) Marangunić & Granić (2015) Parker, Parsons, & Isharyanto (2015) Rebovich & White (2016) Schwedes, Riedel, & Dziekan (2017) Stock & Seliger (2016) Tariq (2013) Von Thiele Schwarz (2017)
t-Test	17 (17.53% of total articles)	Andersen (2014) Besner & Hobbs (2012) Burnes (2014) Chowdhury et al. (2014) Eskerod & Blichfeldt (2005) Galli (2018a) Hartono, FN Wijaya, & Arini (2014) Hitomi (2017) Kerzner & Kerzner (2017) Lee et al. (2013) Liu et al. (2015) Peng & Tao (2018) Sharon, Weck, & Dori (2013) Shenhar, & Levy (2007) Winter et al. (2006a) Yatsenko & Hritonenko (2015) Zhang et al. (2016)

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Table 2. Continued

Statistical Method	Number of Articles (Frequency)	Author(s)
Chi-Square Test	17 (17.53% of total articles)	Al-Kadeem et al. (2017a) Biegler, Lang, & Lin (2014) Buchholz, Dippl, & Eichenseer (2017) Galli & Kaviani (2018) Galli & Hernandez-Lopez (2018) Kiss, Grievink, & Rito-Palomares (2015) Langford (2016) Marcelino-Sádaba et al. (2014) Medina & Medina (2015) Milner (2016) Parast (2011) Pieters (2017) Sterman et al. (2015) Svejvig & Andersen (2015) Suthersan et al. (2016) Todorović et al. (2015) Xue, Baron, & Esteban (2016)

technology is vital. Various authors shared their findings on the manner of technology as tools of stability, and these findings would provide proactive growth in the context of managing these outcomes. For instance, de Fonseca Oliveir and do Nascimento Rebelatto (2015);and Yatsenko and Hritonenko (2015) shared that electric energy consumption changes and tax asset replacement are actions that would merit the outcome of technological improvement. Technological improvement is the production of the strategies employed, which can then be used to promote sustainability. Furthermore, the findings by Peng & Tao (2018) were used to provide the instance in which technology was used to promote proactive outcomes. As specified by Buchholz, Dipply, and Eichenseer (2017); Simpson (2014); and Chowdhury et al. (2014), technology had many impacts on the outcome of various systems. The dynamic involvement of each author showed that technology can be promoted in many ways to create sustainable futures. To promote overall sustainability, the prevalence of technology is vital. As these initiatives are put into place, the authors clearly showed that technology has promoted a development in society. The bottom line of how the integrative output has been put into considerable perspective has been continuously benefited by technological improvement.

Thirdly, in promoting sustainability, the principles of systems engineering have their merit. The findings by Weaver et al. (2017); and Gutmann, Cantillo, and Kappe (2015) contended that continuous development is crucial for sustainability because of how it emphasizes the innate growth of any system without any sacrifice. Moreover, continuous flow technology, a specific subset of continuous development, is very important in the process of proactive growth, which was noted in the findings. When the combination of both aspects is put into consideration, there is a fundamental premise to consider. A correlation between process design, continuous flow, and sustainability was noted by Wiles and Watts (2014); Xue, Baron, and Esteban, (2017). Because these elements add context to the measurements that would involve the utilization of systems engineering for upholding merit, they are vital. With this in mind, the findings by Jansson, Lundkvist, and Olofsson (2015) provided insight on the dynamism involved, especially in the effective innovation that was used to ensure that inherent outcomes be presented in a viable and sustainable manner. Pieters (2017); Sessa and London (2015); Sterman et al. (2015) all shared the notion that communication is necessary to promote continuous development, and these are critical ideas that must be put into stable perceptions. Thus, the design element of continuous improvement was noted to be important, especially in the process design portion. For systems engineering, the outcome of this design is needed for maintaining sustainability, so these aspects should be highlighted in a positive direction.

Finally, in the effort of maintaining a smooth development, integrating these principles is vital for sustainable development. Insights that would be used in the process of optimization were presented in the findings. As mentioned by Wasson (2015); Liu et al. (2015), the contributory mechanisms need to be considered to realize the impact of integration. These authors further contended that all

Table 3. Systematic analysis results by number of variables studied

No. Factors Studied	Number of Articles (Frequency)	Author(s)
1	19 (19.59% of total articles)	Andersen (2014) Besner & Hobbs (2012) Chowdhury et al. (2014) David, David, & David (2017) Gafi & Javadian (2018) Galli (2018b) Halbe et al. (2014) Langford (2016) Lee et al. (2013) Medina & Medina (2015) Nagel (2015) Nazzal et al. (2015) Papke-Shields & Boyer-Wright (2017) Sessa & London (2015) Sutherland (2004) Von Thiele Schwarz (2017) Walden et al. (2015) Wiles & Watts (2014) Yun et al. (2016)
2	21 (21.65% of total articles)	Agostinho et al. (2016) Al-Kadeem et al. (2017a) Acemoglu (2015) Benson & Magee (2014) Brown & Eisenhardt (1995) Chan et al. (2017) Galli, & Hernandez-Lopez (2018) Hitomi (2017) Omamo, Rodriguez, & Muliaro (2018) Jansson, Lundkvist, & Olofsson (2015) Marangunić & Granić (2015) Nabavi & Balochian (2018) Nielsen et al. (2015) Penzenstadler et al. (2014) Shenhar & Levy (2007) Souza et al. (2015) Von Stosch et al. (2014) Wasson (2015) Weaver et al. (2017) Xue, Baron, & Esteban (2016) Yatsenko & Hritonenko (2015)
3	16 (16.50% of total articles)	Arumugam (2016) Aslani, Akbari, & Tabasi (2018) Badi & Pryke (2016) Eskerod & Blichfeldt (2005) Galli et al. (2017) Gholizad et al. (2017) Gimenez-Espin (2013) Haines (2016) Loyd (2016) Marcelino-Sádaba et al. (2014) Rebovich & White (2016) Stock & Seliger (2016) Svejvig & Andersen (2015) Usman Tariq (2013) Winter et al. (2006a) Zhang et al. (2016)
4	13 (13.40% of total articles)	Ahern, Leavy, & Byrne (2014) Bakshi, Ziv, & Lepech (2015) Detert (2000) Easton & Rosenzweig (2012) Galli (2018a) Hoon Kwak & Dixon (2008) Labedz & Gray (2013) Parast (2011) Pieters (2017) Todorović et al. (2015) Wiles & Watts (2014) Zelinka & Amadei (2019) Zwikael & Smyrk (2012)
5	12 (12.37% of total articles)	Azar (2012) Biegler, Lang, & Lin (2014) Burnes (2014) Cova & Salle (2005) da Fonseca Oliveira & do Nascimento Rebelatto (2015) Galli (2018c) Gutmann, Cantillo, & Kappe (2015) Khan et al. (2019) Liu et al. (2015) Sharon, Weck & Dori (2013) Sterman et al. (2015) Xue, Baron, & Esteban (2017)

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Table 3. Continued

No. Factors Studied	Number of Articles (Frequency)	Author(s)
6	14 (14.43% of total articles)	Buchholz, Dippl, & Eichenseer (2017) Epstein (2018) Galli & Kaviani (2018) Garcia & You (2016) Hartono, Wijaya, & Arini (2014) Kiss et al. (2015) Kerzner & Kerzner (2017) Milner (2016) Nikabadi & Hakaki (2018) Parker, Parsons, & Isharyanto (2015) Peng & Tao (2018) Schwedes, Riedel, & Dziekan (2017) Suthersan et al. (2016) Xiong et al. (2017)

processes must be geared toward one specific end, which would mean sustainability. Further findings included those by Nazzal et al. (2015); Halbe et al. (2014), in which there was an intertwinement between environmental sustainability and systems development. Insight on stability, particularly in the context of utilizing systems design in presenting the outcome has been brought about by the inherent integration. Furthermore, as stated in the findings by Agostinho et al. (2016); and Bakshi, Zib, and Lepech (2015), sustainability arguments that would merit a positive outcome in the process at hand have been focused on by augmentations to the inherent design. These findings are also supported by those by Chan et al. (2017); and Stock and Seliger (2016) through the statement of sustainable design. In the efforts of providing stability, these findings reflect the inherent outcome of promoting continuous engagement. The idea behind sustainability is that the process must be put into consideration. When there is a coordinative measure to be done, the idea of sustainability is noted to be relevant in the design process, and sustainability becomes attainable and feasible. Thus, the dynamic is to be considered, which involves continuous development and technological stability.

DISCUSSION

Overall, various perspectives are indicated by the inherent outcome of these findings. Continuous development has been categorically involved in the process of maintaining sustainability, which is one perspective. In the context of systems engineering, continuous development may be a loose term. However, to ensure that the outcome is met with a positive, proactive, and streamlined approach, it would mean improving the design of continuous operation. Furthermore, the inherent outcome is driven by technological improvement, so the outcome of the system improves. There is a dynamic relationship to consider in which technological improvement can enhance the sustainability initiative of the system. Streamlined processes would mean efficiency improvements and effectiveness presentations. Finally, in the system at hand, sustainability is noted to be inherent. Process design continues to call for the assertive measure in lowering losses and promoting intake of stability. Sustainability has long been noted to be a term reminiscent of the idea that progress is done without compromise (Souza et al., 2015; David, David, & David, 2017; Galli, 2018c; Loyd, 2016; Omamo, Rodriguez, & Muliaro, 2018). Having these principles presented, considering the implication and applications of continuous technological improvement through systems engineering principles is important. When these measures are put into context, the reliability of the principles would be considered, and people can benefit from the outcome that is being promoted.

Implications to the Field of Industrial Engineering

Because of the emphasis on the system, Industrial Engineering continues to be a lucrative field. The sustainability of the design of the system is also factored in by the field, so it is important to draw connections that have been presented. The implication of the study on the field of Industrial Engineering is known to be vital in operations. When systems engineering is put into practice, the product line is also affected. According to Kerzner and Kerzner (2017); Aslani, Akbari, and Tabasi (2018), operations management is a highly sensitive field that requires process-oriented considerations through each initiative. The system being unable to benefit from this stability is the result of a lack of process-driven management.

Furthermore, another implication of the practice lies in the management of production. Ensuring that the process is carried out with minimal losses results in focusing on systems engineering. This emphasis on efficiency is a major contributor to management, which is characterized by continuous field of development and the focused approach taken to ensure that there are stable measures to consider.

Overall, because of the inherent outcome that they promote, these implications are important. For promoting overall stability measures that would enhance the other elements of the organization involved, the use of systems engineering has been considerably impacted.

Applications to the Field of Industrial Engineering

Furthermore, the applications involved in continuous development would mean a lot in terms of technology transfer and evolution. The systems engineering principles and the findings presented by the authors provided the due basis for improving the outcomes as presented. Improving the bottom line through an approach that is reminiscent of stability measures is the focus of systems engineering. With feedback, control, and integrated processes being put into the loop, stability can be attained after a few algorithms put in place. Thus, the application of the concept into the field of Industrial Engineering is integral and shall do more than just influence process management. Bringing innovation to the process of systems management as a whole leads much depth to consider.

More critically, a clear-cut application to the field is the promotion and the practice of sustainability. Because of its notion being founded on the premise that resources are not compromised, sustainability is a difficult task. However, through systems-oriented design because of the inherent outcome that would be put into context, it can be attained. When sustainability measures are upheld, the system itself would be self-sufficient, and then the proactive notion can be noted. Ultimately, providing benefits to society is the goal of systems engineering.

Organizational Implications

Conducting business projects and project management requires the use of these variables, their concepts, and models. These strategies show the research on the acquired skill and management strategies. The use of certain skills by a team, which can help to reach company or project goals, is encouraged by this approach. Also, the importance of strategic planning along with a top-down and bottom-up method to leadership, especially for elements of project management, operations management, and process improvement, are illustrated by the results.

Furthermore, these variables, their concepts, and models influence many aspects of a business, as shown by the results. The use of certain skills for project management and performance are required by leadership and management, but they also affect the business' overall growth. A lack of leadership is at the root of current issues in project management and operational performance, as indicated by this study. A bottom-line approach only ensures a temporary solution in reference to profits and costs. The use of certain skills is required by project management and operational performance to improve the performance, profits, and costs of a business, as problems still arise. In the long run, more than one aspect of a business should be managed by leadership, such as operations, project management, financials, performance, strategy, and human resources. Thus, leadership must understand that a business is only the sum of its parts.

Managerial and Team Implications

There are several implications in this study. Most importantly, the variables, concepts, and models are examined in the results to fill a void in research. Furthermore, how the variables are affected by each other and by outside factors is assessed by this study. An outline for business projects and performances can be offered by this study, as knowing how these variables relate will yield more effective management. More comprehensive mentoring or managerial approaches can be offered by leaders. Thus, tools that will help to recognize any shortcomings, performance gaps, and their causes can be equipped to teams and businesses to improve efficiency.

Lastly, the advantages of a more comprehensive training program are illustrated by the implications. To improve team and organizational performance and effectiveness, the study can guide teams and businesses. Furthermore, there is training for project teams, project leadership, and organizational leadership on assessing a team, project or performance based on standard and industry-accepted concepts. By educating teams and leaders on how teams and projects affect the reliability of project and team performance, the training can also fine-tune leadership methods, which can greatly benefit businesses.

Implications and Applications to Fields of Project Management and Engineering Management

Though these variables, their concepts, and models are important for projects, engineers and technical professions require attention, as well. An engineer was once understood to be a person who used technology and mathematical tools for problem-solving. Recently, the definition has changed to a person who uses these tools to offer economically viable solutions. Thus, these variables, their concepts, and models can be used by engineers. A project is only as good as its basic constructs, so success is dependent on it being economically sound. The business management and maturity models to benefit investors need to be known by engineers.

Both management concepts and engineering are scientific, which is why there are different management schools of thinking. A scientific cause and effect relationship approach is taken by engineering, which makes it similar to management. By joining these concepts, they can both be improved upon. According to research, to identify a project's elements, rather than taking the usual business approach, the models can be used. The need to view these methods from an engineering perspective (i.e. budgeting, equipment, and purchasing material) is emphasized by this study. Thus, decision-making methods for engineering problems and help in screening projects for their viability can be found for engineers and project managers.

Identifying the best practices for these variables, their concepts, and models based on pre-existing literature is the aim of this study. In doing so, this study can become a future reference for research. It can even benefit those in need of information on project management, operational performance, and managing these elements with these variables, their concepts, and models. The principles of these variables, their concepts, and models are encouraged in this study, as it highlights helpful literature for managing projects and for improving current management standards.

To the IE/EM profession and the research field, project management and operational performance is necessary, as lean thinking could leave some problems unresolved. As a result, to produce a new environment in the IE/EM profession, these variables, their concepts, and models are essential. Also, players in the IE/EM can produce the necessary scopes of interest at any level because of a scope's structural orientation. Using these scopes has allowed for these variables, their concepts, and models to be implemented, as seen in the IE/EM profession.

Also, useful information on applying maturity to project management can be found for stakeholders (system engineers, project managers, and other industrial engineering and engineering management experts). Business projects will be more likely to succeed, as stakeholders will be encouraged to best use the system engineering and project management roles.

By deeply assessing these variables, their concepts, and models, this study approaches new territory on their effect on project management and operational performance development. By applying the logic of systems thinking to the new product development objectives, products can become more profitable. Lastly, this research offers a new look at how small companies that do not have many established processes can generate new products, as the product under consideration is the second product for the company.

CONCLUSION

Conclusions of Research

The study looked into how systems engineering is a discipline that is designed to promote continuous development. Furthermore, the focus of the discipline was important because of how it focuses on stability and promotes this notion of importance. In a socioeconomic context, the principles applied would work, especially in the interplay between community actions and sustainable development. Also, the use of literature to provide insight on various elements of sustainability through systems engineering was focused on by the study. When these elements are put into due consideration, the outcome would be promoted in a light that is proactive and development-oriented. Thus, criticality is involved, and these findings pursue a bigger message; sustainability is the source and solution to the feedback at hand.

Furthermore, the study revealed significant findings in how systems engineering has been applied to the context of promoting depth. Then, to show that systems engineering has been integrated into the premise of sustainability, these findings were used. When these details are put into perspective, the goal of understanding continuous development is strengthened. Sustainability remains an inherent premise for the success of any system. With the continuity element put into context, there is a viability that would be engaged in the process. To promote systems engineering at its core, process design is vital, particularly in the development of proper quality control and management potential for the stability.

Clearly, the study has various merits. Pieces of evidence were consolidated that would point toward the fact that continuous development and technological improvement are two vital components for promoting sustainability. When they are placed into the context of systems engineering, a conclusion can be made with upholding the idea of stability. The principle of process design is the focus of systems engineering, and this initiative has been vital in promoting an inherent understanding of the outcome. With the consideration of process design at hand, systems engineering principles would be put in effect. Additionally, in the context of developing sustainability options, the implication and application of systems engineering principles are noted. The utilization of these principles has been known to be present in various industries, which illustrates the inherent potential of systems engineering in industrial development.

The study has been an exhaustive review of relevant literature to denote inherent findings that would prove the relationship between continuous technological improvement through systems engineering principles and sustainability. This relationship was noted to be directly related, and with more technology and improvement, the action would be more integrated in promoting sustainability. Hence, for providing current content that would relate the ideas of promoting continuous development and technological improvement, the findings were notable.

In varied industrial applications, systems engineering principles have been useful, which may vary between healthcare, chemical processes, and production lines. By applying systems engineering principles, especially with the viability that would be put into due consideration, these industries benefit the most. Also, these principles are meant to promote continuity, and with the element of sustainability in consideration, there is an innate outcome that must be put into due consideration.

Recommendations for Future Research

To facilitate research in a manner that is proactive, the following recommendations shall be made. For one, specific design parameters are needed to determine what really promotes sustainability. When specific parameters are looked into, the dynamics of the proactive growth can be taken into consideration, particularly in the institution of understanding correlations involved. Furthermore, to determine simulated outcomes of the system, an experimental study could be conducted. This process may require a significant amount of time, but it would be a good indicator of sustainability.

There are many different arenas for future research to explore, such as how these factors and their relationship work in other businesses and managerial settings. Strengths and weaknesses can be studied within these different environments and what affects them. Also, these factors and their relationship can be explored from multiple perspectives: organizational, strategic, or cultural. Thus, how their relationship is viewed in these different environments can be discovered, as well as how culture, strategy, human resources, and operations affect these variables and their relationship.

Limitations of the Study

While there are many potential measures to consider in pursuing the study, the limitations of the study involve the following. Primarily, the study is limited to literature review with a focus on the context of the matter and the presentation of this initiative. Secondarily, there is only a focus on elements of continuous development and technological improvement. For the success of the endeavors involved, these elements are critical, but more could be done to improve the initiative at hand. Furthermore, the sample size is limited, so only certain factors from the sample were studied. A larger sample size could have avoided the potential bias and validity in the findings and conclusions. Additionally, the key factors were only assessed from a project environment, so the conclusions and analysis cannot be applied to other arenas (i.e. supply chain management, operations management, or strategic management). As a result, the findings may not be applicable to other industries or managerial settings.

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