

# Standpoints of Government Engineers on the Performance of Private Contractors on Road Projects: Basis for Performance Quality Program

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## Abstract:

The research is undertaken to assess the performance of private contractors on road projects from the standpoint of government engineers and to develop an enhancement scheme on the basis of the findings of the investigation. Quantitative descriptive method was used in this study with 120 randomly, selected government project engineers and inspectors in district engineering offices in Davao City as respondents. Using an adapted survey questionnaire as primary data collection device and Mean and Analysis of Variance (ANOVA) as statistical tools, it was found that the performance of private contractors on road projects is very high level described as excellent. Further, no significant difference was noted when the level of performance of private contractor on road projects was analyzed by firm size and form of business organization. This suggests that the quality of services rendered by private contractors on road projects is not dependent on the amount of resource, number of employees or type of business ownership. Based on the foregoing results, a “Performance Quality Program” is proposed.

**Keywords** —business administration, performance, private contractor, enhancement, government engineers, Philippines

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## I. INTRODUCTION

Public infrastructure projects drive a country’s economic success as it provides the economy and the market the ability to grow and become more viable and competitive in the world (Oracle, 2014). The roots of government failures or successes lie in the economic policies and decisions around the appropriate economic mix and how best the government can yield optimal output (Khumalo, Choga & Manupo, 2017). Despite the government’s measures and goals, the effects still connote negative perception. Such common problems observed in the traditional methods of road maintenance are escalation of cost and time, contractor’s poor quality of work, contractor’s poor motivation, improper risk sharing between the owner and the contractor, overhead and inspection cost, delay in the project completion, high level of political influence and corruption, and contractor’s lack of project and site management (Sultana, Rahman & Chowdhury, 2013). A further emphasis on the lack of coordination among construction designers at the early stage of the project delivery resulted in incomplete designs and costly change orders, which are the major challenges facing of road infrastructure projects through traditional routes (Babatunde, Perera, Udejaja & Zhou, 2014).

Effective and efficient infrastructure is vital to the Philippine's future prosperity and driving sustainable economic growth. In terms of benefaction to gross domestic product (GDP), the construction industry is one of the most notable industries that has also a vital impact on the health and safety of workers especially its occupational safety and health that concerns with the development, promotion, workplace environment maintenance, policies and programs that guarantees the mental, physical, and emotional well-being of employees, as well as safeguarding the workplace environment relatively free from actual or potential threats that could harm employees (Suárez Sánchez, Carvajal Peláez & Catalá Alís, 2017). In addition, infrastructure development is the pillar of economic progress that relates to the overall economic development through properly delivered and resourced road infrastructure projects by providing services to households and industries and improving the quality of life of every household that serves primary benefits to the public (Asian Development Bank, 2012). In the report of Commonwealth of Australia (2012) states that as the economy experienced sustained growth, even during the recent worldwide economic downturn, the demand for new and enhanced infrastructure continues to fuel the infrastructure projects.

In the Philippines, the Department of Public Works and Highways (DPWH) is committed to the delivery of high-quality road infrastructure projects in which can be achieved through the identification of best practice processes and behaviours in planning, procurement, and delivery of the projects (Department of Public Works and Highways, 2020). The private contractors are the partners of the government in the delivery of road projects that can provide the best value investment in the local community through improved engineering capability and capacity. The local government is the captious front-line in delivering and maintaining community assets and services along with policies driving efficiencies that create job opportunities in the local communities (Institute of Public Works Engineering Australasia and Professionals Australia, 2017). A unified structure for project performance measurement is required to systematize the means of private contractors evaluate the performance of construction projects and implementing the set of performance objectives throughout the whole duration of the construction of the project, will provide consistent information that will enable project engineers to measure all aspects of performance against a quantitative and explicit set of targets. (Nassar, 2009).

Road infrastructure is a crucial driving force for economic growth in any country in which production cost, employment creation, market access and investment depends on the quality of road infrastructure and sustained access to roads is essential to improve living standards that affect the productivity, welfare, and security of both rural and urban people (Basheka & Byaruhanga, 2017). It is argued that the evaluation of government road projects by the performance of private contractors from the perspective of the government engineers is problematic. It includes difficulties in measuring the level of performance of the road construction project and setting objectives at an appropriate level of project accomplishments based on the proper time table of the government. Proper evaluation and improvements in performance require an examination of project objectives and the processes involved in pursuing them (Ward, Curtis & Chapman, 1991). In Davao City, many of the road projects were still on the delay of their accomplishments due to some factors like the right of way issues; inadequate planning, monitoring and supervision of projects and unfavorable weather conditions were likewise among the reasons cited for project delays (Department of Public Works and Highways, 2020). Thus, to ease this problem, government engineers must strengthen the close monitoring of project implementation, evaluating the factors affecting project performance of private contractors. This study measures the performance of the contractors based on predetermined criteria or factors as perceived by

government engineers. It is on the above context that the researcher would like to conduct this study in order to determine the factors affecting the performance of the private contractors in delivering road projects that are supervised and evaluated by the government engineers and to develop an enhancement that addresses the root causes of delays, budgetary overruns and others factors affecting the performance of a project. Findings may contribute to the many literature that discusses performance delivery, particularly in the local setting.

## **II. RESEARCH OBJECTIVE**

This study aimed to evaluate the performance of private contractors on road projects in Davao City as the basis for an enhancement program. Specifically, the study had the following objectives:

1. To evaluate the performance of private contractor on road projects in terms of:
  - 1.1 cost
  - 1.2 time
  - 1.3 quality
  - 1.4 productivity
  - 1.5 client satisfaction
  - 1.6 regular and community satisfaction
  - 1.7 people
  - 1.8 health and safety
  - 1.9 innovation and learning
  - 1.10 environment
2. To ascertain the significant difference in the performance of private contractors on road projects from the perspective of government engineers of engineering offices in Davao City when analyzed according to:
  - 2.1 firm size
  - 2.2 form of business organization
3. To propose an enhancement scheme based on of the results of the study.

## **III. HYPHOTHESIS**

This study tested the null hypothesis at the 0.05 level of significance.

Ho1 There is no significant difference on the performance of private contractors in road projects when analysed by firm size and form of business organization.

#### IV. REVIEW OF RELATED LITERATURE

Presented in this section is the discussion about road project performance in the context of private contractors. In the adapted study of Shaban (2008) entitled “Factors affecting the performance of construction projects in the Gaza Strip,” it was indicated that the cost, time, quality, productivity, client satisfaction, regular and community satisfaction, people, health and safety, innovation and learning and environment could influence the performance of construction projects (Shaban, 2008). The discussion of the concepts, ideas and viewpoints from various authors was taken from books, newspapers, magazines, online articles and journals, government reports and other electronic resources.

Performance is defined as the action or process of carrying out or accomplishing an action or task. In the construction industry, the level and quality of projects delivered to clients is the measurement of contractor’s performance and poor performance and productivity exhibit ineffective management of construction project (Lee, Ismail & Hussaini, 2014). Therefore there is a need to assess the contributing factors in measuring the performance of the contractor in delivering projects, especially roads and highways. Moreover, the Philippine government has its implementing guidelines for infrastructure projects known as the Constructors Performance Evaluation System (CPES), in general, Section 12, Annex E of the Revised Implementing Rules and Regulation (IRR) of R.A. 9184 or the Government Procurement Reform Act, requires all procuring entities implementing government infrastructure projects to evaluate the performance of their contractors using the NEDA-approved Constructors Performance Evaluation System (CPES) guidelines for the type of project being implemented (Constructors’ Performance Evaluation System, 2011).

The objective of CPES was developed in order establish a uniform set of criteria for rating the performance of constructors, develop a centralized base of information on the performance rating of constructors for licensing, pre-qualification, quality improvement, and other purposes of government agencies, project owners, financing and insurance companies and other interested parties; and contribute in ensuring that infrastructure projects conform with the specified requirements of project owners (Constructors’ Performance Evaluation System, 2011). By this kind of system, it would be a great help for the government engineers to adopt measures to improve further performance of contractors in the prosecution of government projects (Government Procurement Policy Board, 2017). The DPWH is mandated to undertake (a) the planning of infrastructures, such as national roads and bridges, flood control, water resources projects and other public works, and (b) the design, construction, and maintenance of national roads and bridges, and major flood control systems (Department of Public Works and Highways, 2020). In this study, the scale of Shaban (2008) was adapted and contextualized to ensure the achievement of the study objectives.

The first factor identified affecting the performance of the private contractor is *cost*. As attested by research, cost is the financial valuation of effort, material, resources, time and utilities consumed, risks incurred, and opportunity forgone in production and delivery of a good or service (Nwokoye & Ilechukwu, 2018). In the field of engineering, it is used to measure the performance of projects and defined not only constricted to the amount tendered, but the overall cost of a project from inception to completion phase, which includes incurrence of any costs arises from variations orders and modifications during the period of construction (Ali & Rahmat, 2010).

Moreover, the cost is considered as the most relevant in a construction project and recognized as one of the most important indicators of a successful project because of the complex nature of the construction industry that needs to be properly managed and controlled so that projects are effectively completed within

the budget (Zhao, Mbachu & Domingo, 2017). Cost overrun is a major dilemma faced by the contractors as it makes the profit of the project unstable causing other problems to arise. It is defined as the exceeded actual over the budgeted margin of the project by which good cost control techniques are needed to solve cost issues and must encourage contractors to use the techniques by conducting training & awareness programs (Malkanthi, Premalal & Mudalige, 2017).

In addition, Alias, Ramasamy and Radhakrishnan (2015) elaborated the significant point and accuracy in the cost estimation of projects by maintaining the quality of materials or products used in the construction industry while also maintaining the quality of service of project construction and accordingly, developing the cost estimation methods in either traditional or modern techniques in order to meet up with the objectives of the project. Furthermore, the cost information system provides a solid foundation on financial control because it monitors the results of detailed analysis of costs, production cost, quantification of loss and the estimation of work efficiency (Lepadatu, 2011).

The second factor identified is *time*. As per research, time defines the measured or measurable period during which an action, process, or condition exists or continues. Construction projects need to be completed on time, as the clients, users and the general public usually translates a project's success to its completion time. Time variance is one of the methods for assessing project performance in construction projects (Leong, et al., 2014). Delays are always the cause of a number of conflicts that affect different parties involved in construction projects. Thus, in order to circumvent these conflicts and succeed in the delivery of construction projects, contractors should implement project management processes (Solis & Corona-Suárez, 2016).

Effective time management is vitally essential for construction project because it appropriately maintains allocation of time to the overall conduct of the project through the processes of time planning, time estimating, time scheduling, and schedule control and it needs the use of tools and policies in order to create a standard for monitoring and measuring project work and the assigned individual must be able to apprehend and manage time by utilizing the tools in processing tasks (Chin & Hamid, 2015).

Projects can possibly incur needless costs and delays as a result of ineffective time management, it is either by failing to allow for the full complexity of a project or by failing to effectively manage scheduled work or unexpected events, hence, ensuring timely delivery of projects is one of the predominant needs of clients of the construction industry and time is counted as the elapsed period from the commencement up to completion and delivered to the client (Ali & Rahmat, 2009). Acharya, Kim and Lee (2004) also cited that it is usual to undergo delays during the construction of projects, still it is not frequently resulted from a fatal event in which contractors are motivated to conceive contract provisions and project processes to anticipate, manage and expiate for such delays.

The issue of time overrun which occurs almost in every construction projects is a worldwide phenomenon. The effective methods for improving time performance are proper work planning, committed management and leadership, close monitoring, transmitting clear and complete directive to worker to ensure effective communication and hire skilled workers to achieve good progress, avoid poor quality, rectification and double handling of work (Memon, Roslan & Zainun, 2014).

The third factor identified in this study is *quality*. All material or services have characteristics that alleviate the identification of quality. Quality characteristics relate to the attributes, measures and methods attached to a particular product or service by functionality, performance, reliability, relevance, timeliness, suitability, completeness & consistency (Project Management for Development Organizations, 2016). Quality is the accomplishment of allowable levels of performance from construction activities and achieved when the task surpasses the demand or obligation and meets the desired specifications (Mishra, 2020). It is meeting the need of completing the construction project on time, within budget, life-cycle costs,

operation and maintenance (Ali & Rahmat, 2010). Furthermore, Ali & Rahmat (2010) added that construction companies need to consider quality in the tendering process, contract review, project planning, financing control, sub-contractor and supplier selection, leadership and utilization, resource allocation and other management aspects.

Setting up a quality infrastructure system is one of the most positive and practical steps that a developing nation can take on moving forward to an economy thriving for success, health and well-being and this also contributes to government policy objectives in industrial development, trade competitiveness in global markets, efficient use of natural and human resources, food safety, health, the environment and climate change (United Nations Industrial Development Organization, 2016).

In construction projects, quality performance is regarded as one of the important factor because quality in construction cannot exist without a project and a construction project cannot exist without quality. The quality of product or service also means to ensure complete customer satisfaction (Jose, 2017).

Furthermore, the key benefits of quality management offer several opportunities to enhance all aspects of a project by reducing both the time and cost of delivering a project to a higher standard. Excellence delivery enhances the reputation of the client of the provider, reducing waste materials or time lost through poor management and practices and lastly, complete involvement of all parties in quality delivery (Gray, 2020). Thus, it is necessary to understand the standard of quality in implementing construction projects and the factors that could aid in addressing and manage quality issues (Davidkumar & Kathirvel, 2015).

The fourth factor identified in this study is *productivity*. The measure of productivity is defined as a total output per one unit of a total input, which means high productivity means higher gains (Inman, 2020). In construction, productivity means labor productivity, that is, units of work placed or produced per man-hour (Shehata & El-Gohary, 2011). It also measures the overall efficiency of production of good or service and, specifically, resources in terms of quantity and quality that are managed to attain timely objectives (Inman, 2020). To improve project performance in construction project, it is important to be in control on the productivity factors such as labor, equipment and cash flow that contribute to the integrated production composition (Shehata & El-Gohary, 2011).

In construction, the output is usually expressed in weight, length, or volume, and the input resource is usually in the cost of labour or working hours. There are a lot of standards available in the construction industry for contractors as reference values for purposes of construction cost estimation that vary in values but almost similar in principle (Intergraph, 2012). The key to productivity improvement is through construction reinvention, and this is pertaining to inventing advanced materials and equipment and developing new operating systems for construction projects (Sabet & Chong, 2020).

The contractor's responsibility is to efficiently manage the construction resources, leading to higher productivity and helping achieve cost and time saving (Pro Crew Schedule, 2019). The key for productivity improvement is not to complete as many tasks as possible or to maximize workload, work output or work hours without following the work plan, rather, the key is to focus on maintaining a predictable work flow and be able to match the available workload with the work hours capacity (Shehata & El-Gohary, 2011). It is very all-important to improve production efficiency by improving labour productivity and saving the time and cost of the project without impeding the quality of work (Ghate & Minde, 2016).

The fifth factor identified in this study is *client satisfaction*. Client satisfaction in the construction industry can be defined as the ability of a contractor to meet the client expectations. It is the extent to which a physical facility (product) and a construction process (service) meet and/or exceed a customer's expectations by understanding, evaluating, defining, and managing expectations to ensure customers' requirements are met (Omonori & Lawal, 2014). The contractor must have an in-depth perception of client

expectations and be able to satisfy these expectations such as improvement of product delivery and enhances services quality (Rahman & Alzubi, 2015).

Client satisfaction is an important factor in the development of the construction process and can be conceived either as a goal or as a measurement tool in the development of construction quality and also enables contractors to modify themselves from their competitors and create sustainable advantage (Karna, Junnonen & Kankainen, 2004). While almost all research focuses on client satisfaction in the construction industry, contractor satisfaction towards client performance is a significant issue by which contractors and client's performance are inter-reliant, and their interactions essentially determine the overall project performance (Hatmoko & Khasani, 2016). In the construction industry, client's satisfaction has remained an elusive and challenging issue for some considerable time and dissatisfaction is commonly experienced by the clients due to overrunning project costs, delayed completion, inferior quality and incompetent service providers (Ali & Rahmat, 2010). The customers are considered as the most important partner in every construction project that bears the highest risks because of their needs and requirements that requires effort, process and activity concerned with the execution of a project categorized process and service (Omonori & Lawal, 2014).

Moreover, the client's expectation plays a crucial role in the evaluation of contractor's performance, and satisfaction on a project is therefore reflective of clients or users experiences, and reliance in the contractor's abilities and co-operation capability has become an essential part of performance criteria in construction (Karna, 2009). This way, improving client performance also means enhancing contractor performance for a successful project (Hatmoko & Khasani, 2016).

The sixth factor identified in this study is *regular and community satisfaction*. The key component in infrastructure development is public acceptance, and the key motivating factors for successful acceptance are public opinion, perception and satisfaction (Chesoh, 2010). The community perception has been promoted intensively in the fields of rural development and natural resources conservation (Chesoh, 2010). In addition, by applying community engagement is an opportunity of developing and delivering interventions in the implementation of the project (Adams & Sherar, 2018).

As claimed by research, perception is what the individual perceives on a unique and subjective basis, and also, it is an immediate or intuitive recognition or appreciation, as of moral, psychological, or aesthetic qualities; insight; intuition; discernment (Yildirim, 2017). At the same time, satisfaction is the act of pleasure or the state of being pleased, the gratification of desire, contentment in possession and delight; repose of mind resulting from compliance with its desires or demands (Yildirim, 2017). The definition of terms for perception and satisfaction is much related to regular and community satisfaction because this tends to measure the performance of private contractors in complying with the regulatory requirements of the operating environment. In the construction of projects, especially roads, compliance with the regulations and laws is a statutory requirement (Windapo and Cattell, 2010). In addition, perception refers to a process and not a product and involves different parties who determine how and what services are to be delivered and the community must be allowed to participate and use their own views and convictions to give what they feel and think about such services (Chesoh, 2010).

Regulatory and community perception need to be considered in decision-making, implementation maintenance and evaluating successes and failures of project performance because it influences the direction and implementation of community development projects rather than receiving benefits (Chesoh, 2010). On the other hand, public's perception on managing environmental risks arising from construction has become a major issue for the community, such as environmental disruption and pollution classified as air, waste, noise and water pollution (Rahman & Esa, 2014).

The formation of community or public perception is to stimulate contractors to provide information to the public of the preparation phase of the project until its completion and promote participation in every step to make rapport by working as partners in the project (Chesoh, 2010).

The seventh factor identified in this study is *people*. The workforce is an important source for increasing efficiency and productivity in the performance of the construction project. There must be a focus on increasing human development relatively than the increase in income, wealth and economic growth (Chesoh, 2010). The human factor is an important aspect in determining the outcome of a project. The quality of a project depends on the skills and experiences of project team leaders in the managerial structure such as decision making, choosing right strategies, setting up specific objectives, selecting people, delegating responsibilities, and evaluating results are the procedures during the construction process (Azmy, 2012). As part of project management, the project manager must possess personal traits by being ultimately responsible for project results that affect and improve project management performance and that could lead a positive impact in an organization (De Moura, Carneiro & Diniz, 2018).

On the researcher's viewpoint, private contractors must have people who have good experience to manage the job properly, good communication skills and understanding their responsibilities to achieve success on project management performance and also, a project is considered successful by having an effective people management that pursues the efficient utilization of labour, material and equipment to improve productivity. As the study of Alshammari, Yahya & Haron (2020) found that teamwork, effective communication with staff and contractors, and effective resource management, effective planning and training, and risk management are the important factors in achieving an excellent project performance.

Shabin and Ramesh (2014) observed that contractors do not have a system of reporting data about internal working safety. Their workforce faces accidents in daily routines, which cause heavy losses in terms of workforce, money and time. However in ergonomics, there should be a fit between the worker and the physical demands of the workplace in order to reduce injuries, improve productivity and reduce the cost of doing business. Generally, when a project is finished on time, within the budget, to an acceptable quality and the client's satisfaction, it is considered a successful project because of the workforce (Ali & Chileshe, 2009).

The eight factor identified in this study is *health and safety*. The construction industry is considered hazardous and dangerous. The intense acceleration and overlapping task interaction of labour and machine to the environment in which the situation results to accidents and fatalities that are detrimental to all parties which leads to additional costs and delay to the project (Gunduz & Khader, 2020).

The construction industry is concurrently recognized as a major economic force and one of the most unsafe industries and it emanates accidents not only result in considerable accidents but criticized productivity, quality, time, and negatively affect the environment and consequently add up to major construction cost (Enshassi, 2006). Successful management of project means execution according to the specifications within the stipulated time, budgeted funds and with the optimum safety (Vitharana, & De Silva, 2015). Unfortunately, the health and safety and the environment are frequently mistreated in construction sites and are hardly well managed, hence frequent and high accidents rate and ill-health problems to workers and end-users are experienced and also, in reality, safety and health take less priority to budget and time discussions in management meetings (Muiruri and Mulinge, 2014). Nevertheless, strengthening safety performance in construction site is difficult but attainable through improving site safety by advising contractors in construction sites to have proper administration of organizational safety policy, provide a formal and safety training for the workers and conduct daily safety reminders (Vitharana, & De Silva, 2015).

The Department of Labor & Employment (2018) enforced its implementing rules and regulations of Republic Act No. 11058 entitled “An act strengthening compliance with occupational safety & health standards and providing penalties for violations thereof” and Department order no. 13 series of 1998 guidelines governing occupational safety and health in the construction industry. So therefore, the researcher cited the Occupational Safety and Health Administration (2016) nine steps of recommended practices for the health and safety of the workers on the construction site for the project implementation as follows. First, always set safety and health as the top priority. Contractors must ensure their workers’ safety and fix any hazards that could injure them and making sure that workers have finished their job for the day and go home safely. Second, lead by example. Contractors must practice safe behaviours in dealing with workers. Third, implement a reporting system. This is to develop the communication of a simple procedure for workers to report any injuries, illnesses, incidents (including near misses/close calls), hazards, or safety and health concerns without fear of retaliation. Fourth, provide training. Contractors should train workers on how to identify and control hazards. Fifth, conduct inspections. Inspecting the construction sites with the workers and ask them by using a checklist and other resources to identify any activity, piece of equipment, or material that concerns them. Sixth, Collect hazard control ideas. Collecting ideas from workers on safety improvements throughout the project. Seventh, Implement hazard controls. Assigning workers the task of choosing, implementing and evaluating solutions. Eighth, Address emergencies. Identify foreseeable emergency scenarios and develop instructions on what to do in each case. Meet to discuss these procedures and post them in a visible location at the job site. And lastly, Make improvements. Set aside a regular time to discuss safety and health issues, with the goal of identifying ways to improve the program.

The ninth factor identified in this study is *innovation and learning*. Innovation is an idea that must be replicable at an economical cost and must satisfy a specific need. It involves deliberate application of information, imagination and initiative in deriving greater or different values from resources, and includes all processes by which new ideas are generated and converted into useful products. In the study of Benita et al. (2016), the results showed that there is an adequate condition for the success of innovation projects within the organization along with the combination of organizational innovation, firm size and cooperation with national and international firms. Collective effort and strong commitment proved to be the primary supporters of innovation, while reluctance, inexperience and cost are roadblocks to innovation (Ozorhon, 2013).

Innovation in consulting engineering firms is used an impromptu basis by project managers to support a competitive edge without understanding the concept and how it is applied to organization. Nevertheless, innovation appears to be the only way for an organization to transform change into opportunities and success to the growing need of sustainable, holistic, structured and integrated decision making tools that leads to the investment of innovative ventures that best suit on business and will have a most positive impact on the project performance (Mian, 2015).

The application of innovation to the construction industry is very complicated, despite the importance of the development and growth of the wider economy; therefore construction companies need to adopt innovation to their processes and resources from mere application of good ideas to a process that can be managed, measured, controlled systematically and must be considered as a management process so that every part of the organization can control and enhance different aspects of innovation and integrate into the construction processes as part of the performance of the project (Pellicer et al.,2008).

Innovation in the construction industry can take many forms. It identifies such innovation according to whether it is ‘incremental’ meaning small and based on existing experience and knowledge, or ‘radical’ meaning a breakthrough in science or technology, or ‘modular’ meaning a change in concept within a

component only, or ‘architectural’ meaning a change in links to other components or systems), or ‘system’ meaning multiple, integrated innovations (Blayse & Manley, 2004). In many cases, creative individuals can lead innovation provided they are given an environment conducive. They can make use of their talents and creativity and open innovations of external knowledge acquisition are the key to gaining competitive advantage (Guo et al., 2019).

Lastly, the final identified factor is the *environment*. The concept of construction project development may be impaired without good knowledge and successful management of the impact of environmental factors influencing the performance of such projects and the construction environment is the aggregate of surrounding things, conditions, or influences as all external influences on the construction process (Enshassi, Kochendoerfer & Rizq, 2014).

With the global concern of environmental protection and sustainability, construction firms are required to develop and implement environmental practices (EP) to mitigate the negative impacts of project activities on the environment, and accordingly, the results of the study indicated that a project team’s knowledge and skills, rather than government regulations, are the key driving factors for the implementation of environmental practices (EP) in construction projects and its implementation is proved to have a positive impact on both environmental and organizational performance (Li, Ding & Sun, 2019). Environmental impacts are defined as any change to the environment whether unfavourable or beneficial, fully or partially resulting from an organization’s environmental activities that make use of the resources and produces waste, odours, noise and harmful excretions to land, water and air (Metin & Tavit, 2016).

In building road projects, there is an immense need to protect the environment and there must be preventive measures to protect nearby residents who are living close to construction sites. Enshassi, Kochendoerfer & Rizq (2014) also highlighted the enacting measures of strict laws to enforce institutions to make environmental impact assessment (EIA) in the early stage of projects and enhancing the awareness of construction participants of the impacts of construction to the environment. The Department of Environment and Natural Resources (2003) enforced administrative order 2003-30 with the subject Implementing Rules and Regulations (IRR) for the Philippine Environmental Impact Statement (EIS) to rationalize and streamline the implementation of the Philippine Environmental Impact Statement (EIS) System established under Presidential Decree (PD) No. 1586, Presidential Proclamation No. 2146 defining the scope of the EIS System and pursuant to Administrative Order No. 42 issued by the Office of the President on November 2, 2002.

In a major review of project management theories, it has been established that the environment interferes with the planned progress of construction projects, which mean the less predictable the environment is, the greater its potential effects become; hence, the more it must be taken into account in managing the development of construction projects (Akanni, Oke & Akpomimie, 2015).

In this study, the researcher referred to the Infrastructure Development Cycle in the Department of Public Works and Highways (DPWH) where the development of infrastructure projects (e.g., roads, bridges, flood control facilities and water supply) follows a cycle process consisting of four phases as follows (Department of Public Works and Highways, 2020). The first phase is project identification, which collects potential projects with expected return of investments. The second phase, project preparation, which comprises of project feasibility study, inclusion in the medium-term, fund appropriation, detailed engineering of a project and inclusion of the project in the annual program. The third phase, project implementation includes fund releases, right-of-way, bidding and contracting, the construction, completion and acceptance, and payment. Lastly, the last phase is project operation and evaluation that includes operational and maintenance and impact evaluation or post-project appraisal.

Essentially, the above-related literature supports the importance of the performance of private contractors on road projects from the perspective of government engineers. Road infrastructure is very necessary so the public can move in and out to their respective cities and regional areas more accessible and efficiently (Puentes, 2015). As claimed by the news and research, the Philippines has launched an ambitious programme of infrastructure projects to help fuel the country's economic development. The Hong Kong Trade Development Council (2017) has emphasized the country's deficiencies in finance provision and services expertise to carry out such an intensive programme in such a tight timeline. Nevertheless, there still good opportunities for foreign businesses to fill the funding and services gaps. Reports showed that the spending on infrastructure accounted for only 2-3 percent of the country's GDP under the previous Aquino administration. As infrastructure depreciates and requires continual maintenance, this level of investment has not been sufficient to upgrade or raise the quality of existing infrastructure (The Hong Kong Trade Development Council, 2017). This has meant that the quality of the country's infrastructure has failed to keep up with the rising income and expectations of Filipinos. During the time of President Duterte, he has made infrastructure improvements a prime development priority in his "Dutertenomics" economic strategy. The "Build, Build, Build" programme is at the centre of his Socio-economic agenda. The idea is that infrastructure projects will increase the productive capacity of the economy, create jobs, increase incomes and ultimately reduce poverty. The government aims to raise infrastructure spending to 5 percent of GDP by the end of 2017, and further increase it to 7percent of GDP over 2018 and 2019. Public infrastructure spending is targeted to reach PHP8-9 trillion (about US\$180 billion) during the period 2017-2022 (Hong Kong Trade Development Council, 2017). Given this vision and direction on Philippine infrastructure, there is a need to fill the research gap on determining the status of the performance of private contractors on road projects, particularly in Davao City.

## **V. METHOD**

### **Research Design**

This study used the quantitative non-experimental research design using descriptive study approach. The term descriptive research refers to the type of research question, design, and data analysis that is applied to a given topic (Knupfer & McLellan, 2001). Descriptive statistics is used to describe the basic features of the data in an investigation and provides simple summaries about the sample and present quantitative descriptions in a manageable form (Trochim, 2020). The descriptive survey method is appropriate for the present investigation for it deals with the factors affecting the performance of private contractors on the government implemented road projects as assessed by the government engineers of Davao City. The data of this study described the performance of private contractors on road projects with reference to a set of predetermined criteria, hence the basis for an enhancement program.

### **Research Locale**

The study was conducted in Davao City as shown in Figure 2. It is one of the regions in the Philippines, located on the South Eastern Mindanao. Figure 2 shows the map of the Philippines showing Davao City. The projects being evaluated as implemented by private contractors are located in Davao city.

Davao City is approximately 588 miles (946 km) southeast of Manila over land, and 971 kilometres (524 nmi) by sea. The city is located in southeastern Mindanao, on the northwestern shore of Davao Gulf, opposite Samal Island. The economic activities in the city is Agriculture and Commerce. Davao City is

named as a "Fruit Basket of the Philippines" the products are mangoes, pomeloes, bananas, coconut products, pineapples, papayas, mangosteens and cacao.

Davao Region, particularly Davao City, is showing sustained economic growth as Mindanao is at the forefront of the Philippine government's aggressive infrastructure plan. One of the major projects in the region is the Php 19.8 billion Davao City Coastal Bypass Road Project, which started construction in 2017. The road, which stretches from Bago Aplaya in the south to R. Castillo in the north, is expected to be partially opened before the end of the year, after the Department of Public Works and Highways had to make adjustments to its design to address the concerns of fisherfolk on the limited space left for their boats (Lamudi, 2019).

### **Population and Sample**

This study had a total of 120 government engineers who participated in the study from district engineering offices in Davao City. They were chosen as respondents because the researcher wanted to find out the factors affecting the performance of private contractors on road projects from another, objective party as basis for enhancement program. In addition, the respondents were the ones who better understand the content and context of the survey and the research objectives. They have the capability to evaluate private contractors based on their meaningful experiences and as experts as to technicalities of the said performance.

Moreover, simple random sampling technique was used in selecting the respondents. Simple random sampling is the basic sampling technique where a selection of group of subjects (a sample) for study from a larger group (a population) and each individual of the population is chosen entirely by chance and being included in the sample (Easton & McColl, 1997). As mentioned, the respondents were from different government engineering offices in Davao City to include: DPWH – Davao City District Engineering Office that covers the 1st and 2nd district and DPWH – Davao City II District Engineering Office that covers the 3rd District. The researcher was very clear to exclude respondents that are not willing and do not qualify as government engineers and were not involved in the implementation of road projects. Furthermore, the respondents can anytime withdraw and discontinue from the participation of the study without penalty or loss.

### **Research Instrument**

In this study, a structured survey questionnaire was used to collect the required data. In this study, the survey questionnaire was accompanied with a cover letter, which explains the purpose of the research study and ensured confidentiality of the data gathered. The participants were made aware that the research was being conducted to explore the factors affecting the performance of private contractors on road projects and that the participation in the survey was purely voluntary. The questionnaire used was adapted from the study of Shaban (2008). The instrument covers the following measures of performance: cost, time, quality, productivity, client satisfaction, regular and community, people, health and safety, innovation and learning and environment.

The instrument was subjected to experts' validation having been obtained a mean rating of 3.63 described as good. Further, the instrument was also tested for reliability through the Cronbach alpha with a score of .955 indicating the acceptance of the questionnaire. Also, a five-point Likert-type scale was employed that assumes the linearity of the responses. To interpret the data collected, the following scale was used:

<b>Range of Mean</b>	<b>Descriptive</b>	<b>Interpretation</b>
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	<b>Level</b>	
4.20 – 5.00	Very High	The performance of the private contractors on the criteria set is always evident, hence outstanding
3.40 – 4.19	High	The performance of the private contractors on the criteria set is often evident, hence very satisfactory
2.60 – 3.39	Moderate	The performance of the private contractors on the criteria set is sometimes evident, hence satisfactory
1.80 – 2.59	Low	The performance of the private contractors on the criteria set is rarely evident, hence unsatisfactory
1.00 – 1.79	Very Low	The performance of the private contractors on the criteria set is never evident, hence poor

### **Data collection**

The data collection started with the review of related literature scouting for the appropriate questionnaire from the internet. Since the instrument is based on foreign context, the questionnaire's item statements were rephrased and contextualized to the local setting. The modified questionnaire was subjected to content validity by the panel of experts. After the expert's validation, questionnaire revision was made and the final copy of the questionnaire was presented to the adviser. Upon approval, the researcher drafted the letter of permission to conduct the study addressed to the concerned Davao City District Engineering Office and Davao City II District Engineering Office. Then after the approval has been sought from the approving agencies, the questionnaires were immediately distributed to the targeted respondents of the study. The questionnaires were personally administered and were interpreted in vernacular language for better understanding. The researcher collected the accomplished forms and the results were tallied and submitted for statistical treatments with the help of an assigned statistician. The data collection happened from October to November 2019.

### **Statistical Tools**

The following statistical tools were used in the study:

**Mean.** This was used to determine the extent of performance of private contractors on road projects from the perspective of government engineers.

**ANOVA.** This was utilized to determine the significance of the difference in the level performance of private contractor on road projects from the perspective of government engineers in Davao City when grouped according to firm size and form of business organization.

## **VI. RESULT & DISCUSSION**

The data obtained and the analyses made from the responses of study participants on the factors affecting the performance of private contractor on road projects are presented in this chapter in order of the research objectives. The sequence of presentation are as follow: level of performance of private contractor on road projects; significant difference of the level of performance of private contractor on road projects

when analyzed by firm size and form of business; and the recommended enhancement scheme for the improvement on the performance of private contractor on roads projects.

**Level of Performance of Private Contractor on Road Projects from the Perspective of Government Engineers**

Presented in Table 1 is the level of level of performance of private contractors on road projects from the perspective of government engineers of the engineering offices in Davao City. Results revealed that the overall level is very high with a mean rating of 4.31 and a standard deviation of 0.35. This means that the factors: cost, time, quality, productivity, client satisfaction, regular and community, people, health and safety, innovation and learning and environment which affect the level of performance of private contractors on road projects are always manifested.

When analyze individually, quality earned the highest mean score of 4.43 described as very high, while environment posted the lowest mean score of 4.16 though still described as very high. Generally, private contractors are compliant with the criteria set for the evaluation of their performance. Further, the standard deviation of .35 which is less than 1, signifies consistency in the responses made.

**Table 1**

*Level of Performance of Private Contractor on Road Projects from the Perspective of Government Engineers*

Indicator	SD	Mean	Descriptive Level
Cost	0.34	4.20	Very high
Time	0.39	4.28	Very high
Quality	0.42	4.43	Very high
Productivity	0.45	4.34	Very high
Client Satisfaction	0.45	4.40	Very high
Regular and Community Satisfaction	0.45	4.24	Very high
People	0.41	4.33	Very high
Health and Safety	0.54	4.35	Very high
Innovation and Learning	0.48	4.41	Very high
Environment	0.54	4.16	High
<b>Overall</b>	<b>0.35</b>	<b>4.31</b>	<b>Very high</b>

The very high result on the extent of performance of private contractor on road projects as perceived by government engineers of the engineering offices in Davao City shows that private contractors are competent enough to deliver the needed services based on the performance criteria set in this study.

The very high result obtained from the indicator cost is an indicative factor that private contractors have effective cost system that documents the cost of a project from inception to completion, which includes any costs arise from variations, modification before, during and after construction period (Lee, Ismail & Hussaini, 2014). The result also supports the proposition of Ali and Rhamat (2010) that it is the

overall cost of a project from inception to completion phase which also includes incurrence of any costs arises from variations orders and modifications during the period of construction.

The other indicator with very high result is the time. This shows that private contractors ensure the delivery of the projects to the public in accordance of the approved timeline of the government. The findings are cognizant with the study of Chin and Hamid (2015) connotes that effective time management is vitally essential for construction project because it appropriately maintains allocation of time to the overall conduct of the project through the processes of time planning, time estimating, time scheduling, and schedule control. As expressed by Chan, 2001; Zidane, et al (2015) that the construction industry relies on time-to-delivery to gain competitive advantages and increase profit margins.

The very high result obtained from the indicator quality connotes that private contractors value quality in their projects. This is because it is the general features required by a service to satisfy the clients or the public need. Without quality, there will be no success of the delivery of road projects and can be considered as failure of public service. It supports to the idea of Jose (2017) that in construction projects, quality performance is regarded as one of the important factor because quality in construction cannot exist without a project and a construction project cannot exist without quality so therefore, the quality of product or service also means to ensure complete customer satisfaction. Chan (2001) also emphasized the criteria of technical specification as the total workmanship guidelines provided to the contractors before commencing project execution.

The other indicator with very high result is the productivity. This result shows that private contractors are efficient and effective in doing their projects. The findings support the proposition of Shaban (2008) that in terms of construction projects, contractors revealed excellent performance on both improvement and monitoring measures. Improvement measures is the way of finding out the problem with the current practices while monitoring measures is used for continuous monitoring of operations of the duration of the project. In addition, this is cognizant to the idea of Sabet and Chong (2020) that the key to productivity improvement is through construction reinvention, and this is pertaining to inventing advanced materials and equipment and developing new operating systems for construction projects.

Another factor with very high result is the client satisfaction. This result shows that private contractors deliver results that are approved by the end users, in this case the public. Government engineers believe that the services provided or delivered by the contractors meet the user's expectation. This supports the proposition of Karna (2009) that the client's expectation plays a crucial role in the evaluation of contractor's performance, and satisfaction on a project is therefore reflective of clients or users experiences, and reliance in the contractor's abilities and co-operation capability.

The factor regular and community satisfaction has also a very high result, suggesting that private contractors have been successful in getting community approval for the projects they have implemented. These approval is due to their compliance of the regulatory requirements. It supports the idea of Chesoh (2010) that the formation of community or public perception is to stimulate contractors to provide information to the public of the preparation phase of the project until its completion and promote participation in every step to make rapport by working as partners in the project. It further implies that the community is happy with their projects (Savitri & Armando, 2019).

The other factor with very high result is the people. This factor is also an important measure that affects the performance of the project because without a competent workforce the project will not be successful. The result signifies that private contractors have strong, competent people in their board. As the study of Alshammari, Yahya & Haron (2020) expressed, found that teamwork, effective communication with staff and contractors, and effective resource management, effective planning and training, and risk management are the important factors in achieving an excellent project performance.

Private contractors value the competence of their people and have recognized their role and contributions toward good performance in terms of productivity, cost and time (Shaban, 2008).

The factor health and safety has also a very high result. This means that private contractors ensure the health and safety of its workforce while accomplishing the projects. Government engineers are confident that private contractors care for their employees so they could improve their participation and commitment to the project (Sitemate, 2020). Government engineers believed that private contractors implement established health and safety standards. This acquainted with the Department of Labor & Employment (2018) enforced its implementing rules and regulations of Republic Act No. 11058 entitled “An act strengthening compliance with occupational safety & health standards and providing penalties for violations thereof” and Department order no. 13 series of 1998 guidelines governing occupational safety and health in the construction industry.

The factor innovation and learning has also a very high result. This means that private contractors implement innovation in their processes and practices. Government engineers thought that contractors manifest discipline, openness and adaptive to change (Cristian & Avasilcai, 2014). They believe that contractors are searching purposefully sources of innovation and development in their operations. The findings supports the proposition of Pellicer et al.,(2008) that construction companies need to adopt innovation to their processes and resources from mere application of good ideas to a process that can be managed, measured, controlled systematically and must be considered as a management process so that every part of the organization can control and enhance different aspects of innovation and integrate into the construction processes as part of the performance of the project.

The last indicator that has only a high result is the environment. Government engineers believe that private contractors often consider the impacts of their operation to the environment. In several cases, the implementation of project less considers its effect to the environment like air quality and noise level which are not that apparent in the whole duration of the project implementation. But the wastes and the climate condition may vary sometimes because there must be a good and proper sanitation and good weather condition during the construction of the road projects. The Department of Environment and Natural Resources (2003) enforced administrative order 2003-30 with the subject Implementing Rules and Regulations (IRR) for the Philippine Environmental Impact Statement (EIS) to rationalize and streamline the implementation of the Philippine Environmental Impact Statement (EIS) System established under Presidential Decree (PD) No. 1586, Presidential Proclamation No. 2146 defining the scope of the EIS System and pursuant to Administrative Order No. 42 issued by the Office of the President on November 2, 2002.

### **Significant Difference of the level of performance of Private Contractor on Road Projects from the Perspective of Government Engineers when analyzed by Firm Size**

Presented in Table 2 is the significant difference on the level of performance of private contractor on road projects from the perspective of government engineers of the engineering offices in Davao City when analyzed by firm size. It revealed that the overall p-value was 0.583 which was greater than 0.05; hence the acceptance of the null hypothesis which indicate that there is no significant difference on the level of performance among private contractors when analyzed by firm size. This result suggests that whether small, medium or large the private contractor is, their performance based on the criteria set are the same, meaning no statistical difference. Further, when taken individually, all factors measured do not significantly differ when compared by size.

**Table 2**

*Significant Difference of the level of Performance of Private Contractor on Road Projects when analyzed by Firm Size*

Factor	Firm Size								F	Sig.
	Small		Medium		Large		Total			
	Mean	SD	Mean	SD	Mean	SD	Mean	SD		
Cost	4.25	0.30	4.18	0.35	4.22	0.35	4.20	0.34	.278	.758
Time	4.40	0.31	4.27	0.38	4.26	0.42	4.28	0.39	.720	.489
Quality	4.46	0.34	4.46	0.40	4.35	0.49	4.43	0.42	.816	.445
Productivity	4.46	0.42	4.35	0.44	4.28	0.48	4.34	0.45	.721	.488
Client Satisfaction	4.57	0.43	4.42	0.41	4.28	0.53	4.40	0.45	2.258	.109
Regular and Community Satisfaction	4.35	0.43	4.26	0.40	4.15	0.57	4.24	0.45	1.028	.361
People	4.29	0.47	4.33	0.36	4.32	0.50	4.33	0.41	.074	.929
Health and Safety	4.49	0.44	4.33	0.56	4.33	0.52	4.35	0.54	.501	.607
Innovation and Learning	4.46	0.43	4.39	0.49	4.42	0.50	4.41	0.48	.153	.858
Environment	4.31	0.40	4.10	0.56	4.24	0.55	4.16	0.54	1.255	.289
<b>Overall</b>	<b>4.40</b>	<b>0.30</b>	<b>4.31</b>	<b>0.32</b>	<b>4.29</b>	<b>0.43</b>	<b>4.31</b>	<b>0.35</b>	<b>.543</b>	<b>.583</b>

The study revealed that there is no significant difference on the level of performance of private contractor on road projects as perceived by government engineers in the engineering offices in Davao City when analyzed by firm size. This means that the performance of private contractors with reference to the criteria set forth herein does not differ when compared by firm size. Alternatively, regardless of the size of the contractors, be it small, medium or large, the key performance indicators are being practiced and manifested always and for the environment often. Therefore, it can be noted that statistically, the performance of contractors does not depend on its size in terms of capital and personnel but in its commitment to deliver and implement quality road projects. Furthermore, it is recommended that private contractors must make every effort while maintaining the level of performance in delivering and

implementing quality roads projects in partnership with the government whatever the size of the organization.

**Significant Difference of the level of performance of Private Contractor on Road Projects from the Perspective of Government Engineers when analyzed by Form of Business Organization**

Presented in Table 2 is the significant difference on the level of performance of private contractor on road projects from the perspective of government engineers of the engineering offices in Davao City when analyzed by form of business organization. Findings showed that the overall p-value was 0.959 which was greater than 0.05; hence the acceptance of the null hypothesis which indicates that there is no significant difference on the level of performance among private contractors when analyzed by form of business organization. This implies that whether sole proprietorship, partnership or corporation the private contractor is, their performance based on the criteria set are the same, meaning no statistical difference. Further, when taken individually, all factors measured do not significantly differ when compared by form of business organization.

**Table 3**

*Significant Difference of the level of Performance of Private Contractor on Road Projects when analyzed by Form of Business Organization*

Factor	Form of Business Organization								F	Sig.
	Sole Proprietorship		Partnership		Corporation		Total			
	Mean	SD	Mean	SD	Mean	SD	Mean	SD		
Cost	4.18	0.37	4.41	0.00	4.21	0.31	4.20	0.34	.649	.524
Time	4.29	0.38	4.37	0.26	4.26	0.40	4.28	0.39	.140	.869
Quality	4.44	0.41	4.44	0.20	4.42	0.45	4.43	0.42	.066	.936
Productivity	4.35	0.45	4.33	0.12	4.33	0.47	4.34	0.45	.015	.985
Client Satisfaction	4.42	0.44	4.53	0.12	4.36	0.48	4.40	0.45	.362	.697
Regular and Community Satisfaction	4.25	0.42	4.17	0.29	4.22	0.52	4.24	0.45	.082	.921
People	4.32	0.36	4.08	0.14	4.35	0.49	4.33	0.41	.648	.525
Health and Safety	4.31	0.56	4.55	0.39	4.39	0.51	4.35	0.54	.532	.589
Innovation and Learning	4.40	0.49	4.27	0.46	4.43	0.47	4.41	0.48	.166	.847
Environment	4.14	0.50	4.50	0.43	4.17	0.51	4.16	0.54	.623	.538
<b>Overall</b>	<b>4.13</b>	<b>0.33</b>	<b>4.37</b>	<b>0.10</b>	<b>4.31</b>	<b>0.38</b>	<b>4.31</b>	<b>0.35</b>	<b>.041</b>	<b>.959</b>

The study revealed that there is no significant difference on the level of performance of private contractor on road projects as perceived by government engineers in the engineering offices in Davao City when analyzed by form of business organization. This signifies that the performance of private contractors with reference to the criteria of cost, time, quality, productivity, client satisfaction, regular and community satisfaction, people, health and safety, innovation and learning and environment does not significantly differ when compared by form of business organization. Alternatively, regardless of the form of business of the contractors, be it sole proprietorship, partnership or corporation, the key performance indicators are being practiced and manifested always and for the environment often. Therefore, it can be noted that statistically, the performance of contractors does not depend on the form of business but in its readiness to accept and complete a project efficiently, on-time, and successfully. Furthermore, it is recommended that private contractors must do one's utmost while maintaining the level of performance in delivering and implementing quality roads projects in partnership with the government whatever the form of the organization.

## **I. TITLE**

### **PERFORMANCE QUALITY PROGRAM**

## **II. RATIONALE**

Performance Quality Program as an enhancement scheme is a strategy intended to produce and develop the basic needs and services provided by the institution to satisfy the needs of its clients. This includes the process of evaluating the level of performance on the private contractors in the implementation of government road projects. The enhancement includes various approaches that are relevant in yielding favourable outputs in the implementation of road projects.

While the result of the study on the level of performance of private contractors on road projects as perceived by government engineers of the engineering offices in Davao City is very high in terms of cost, time, quality, productivity, client satisfaction, regular and community satisfaction, people, health and safety, innovation and learning, lastly the environment, hence there's a need to sustain the performance so not to go down. Individually though, it can be noted that the environment factor needs to be improved from high to very high.

The implementation of the enhancement program will provide and support engineering offices in Davao City especially the government engineers in monitoring and evaluating the performance of the private contractors in the implementation of government road projects so to ensure excellent performance. The enhancement could be used in the performance evaluation of private contractors undertaking government infrastructure projects.

## **III. ENHANCEMENT PROGRAM DESCRIPTION**

The **PERFORMANCE QUALITY PROGRAM** is designed to help the engineering offices in Davao City to help sustain the level of performance of private contractors in terms of the factors or indicators enumerated and evaluated by the government engineers in the implementation of government road projects especially on the area of environment. The enhancement program was also contributed by the summarized strategic results of each itemized questionnaire that yields very high for every factor. The enhancement program contains areas of concern, strategies and success indicators for realization of the implementation of the activity.

**IV. OBJECTIVES**

The enhancement program has the following objectives:

1. To sustain the performance of private contractors of Davao City Engineering Offices (Davao City I and II District Engineering Offices) monitored and evaluated by the government engineers thru a simple enhancement program on the basis of the results of the study.
2. To design simple enhancement program that sustains and strengthens every performance indicator in constructing infrastructures.

**V. TARGET BENEFICIARIES**

1. Private Contractors
2. Government Engineers
3. District Engineering Offices (Davao City I and II)

**VI. IMPLEMENTATION**

Implementation guidelines of the enhancement program shall be presented to the District Engineer of Davao City Engineering Offices. It will be pilot tested within the calendar year 2020-2021.

**PERFORMANCE QUALITY PROGRAM**

<b>AREAS CONCERNED</b>	<b>SPECIFIC SCHEME</b>	<b>OBJECTIVES</b>	<b>PERSON'S RESPONSIBLE</b>
Cost	Analyse and systematize the cash flow of the project as to the incurrence of cost of materials, labour and overhead for the whole duration of the project	To provide direction and improvement to the cost performance of the project	Private Contractor  Project Engineer/Inspector
Time	Strictly monitor adherence to the timeline of the government as to when the project must be completed at a specific time by having the right and complete work accomplishment	To minimize delay and hit the project deadlines of the government as part of time performance	Private Contractor  Project Engineer/Inspector  District Engineering Offices
Quality	Provide assurance to conform to and apply construction industry regulated standards through quality of	To ensure project implementation is within the goal or perspective of the	Private Contractor  Project Engineer/Inspector

	equipment and raw materials used for the project	government	or  District Engineering Offices
Productivity	Monitor the workers in the complexity of the project and immediately addressing on site issues and problems	To provide efficiency and adequate output to the whole duration of the project	Private Contractor  Project Engineer/Inspect or  District Engineering Offices
Client Satisfaction	Satisfy the public needs by having information and coordination between the implementing agency and the private contractors to discuss and resolve issues about the project	To remain publics' potential partner by delivering the project and assuring the service reliability to the public	Private Contractor  Project Engineer/Inspect or  District Engineering Offices
Regular and Community Satisfaction	Comply with the regular documentation and rightfully dealing issues on community	To ensure compliance to regulators and community	Private Contractor  Project Engineer/Inspect or  District Engineering Offices
People	Recruit and provide competence development among the employees or workers of the organization	To ensure effectiveness and timeliness in implementing the project	Private Contractor  Project Engineer/Inspect

			or  District Engineering Offices
Health and Safety	Apply primarily the health and safety measures by maintaining a workplace that has minimal risks and accidents that may result to injury or death before commencing on the implementation of the project	To help prevent injury and disease and mitigate any related health and safety risks and to ensure the health and safety of workers during the implementation of the project	Private Contractor  Project Engineer/Inspector or District Engineering Offices
Innovation and Learning	Send employees to attend specialized trainings and seminars offered from within or outside organizations  Analyse construction methods during the planning phase, potential alternatives and innovative ideas	To provide the organization with the industry accepted ideas to expedite project implementation and attain project company objectives	Private Contractor  Project Engineer/Inspector or District Engineering Offices
Environment	Handle waste disposal of materials within and outside properly and knowing the climate condition are necessary for the utilization of right equipment used for the project implementation	To promote safety and proper utilization of assets during project implementation	Private Contractor  Project Engineer/Inspector or District Engineering Offices

## **CONCLUSION**

The identified factors affecting the performance of private contractors on road projects to include cost, time, quality, productivity, client satisfaction, regular and community, people, health and safety, and innovation and learning were all rated very high and the environment rated high by the government engineers. This indicates that the said factors are always evident in the operations of private contractors. The findings supported the Theory of Construction Management by Valence (2012), which identifies the actions that help contractors become efficient in doing infrastructure projects using the five CM strategies and these are the traditional construction, design-build, management approaches, partnering and total construction service. On the other hand, the study revealed that no significant difference was noted on the level of performance of private contractor on road projects as perceived by government engineers in the engineering offices in Davao City when analyzed by firm size and form of business organization. This means that regardless of the firm size and form of business organization of the private contractors, the factors are still evident at a high to very level. The findings is also supported by the Theory of Performance by Talbot (2013) that globally, the government had improved and implemented all sorts of policies aimed at improving performance, particularly in producing public services. The government agencies should be the engine of the development of the economy. Thus, to ensure sustainability of this excellent performance among private contractors, an enhancement program, titled, “**PERFORMANCE QUALITY PROGRAM**” is proposed.

## **VII. RECOMMENDATION**

In the light of the foregoing findings, the following recommendations are presented. The very high performance of the private contractors as perceived by government engineers in the district engineering offices in Davao City revealed that all the factors to include cost, time, quality, productivity, client satisfaction, regular and community satisfaction, people, health and safety, innovation and learning and the environment that affect the performance of private contractors in implementing road projects are always manifested regardless of the firm size or form of business organization, hence must be sustained and strengthened. .

Further, district engineering offices led by the District Engineer may need to provide feedback and support to private contractors so they can sustain their performance. Government engineers especially the project engineers and project inspectors may continue to regularly evaluate the performance of private contractors involved in the implementation of government projects. On one hand, the private contractors may continue to develop their human resources through proper and continuous training. As portion of supporting the performance of innovation and learning, the training programs may focus on upgrading the knowledge and skills of contractors in the latest advancement in road infrastructure construction. In addition to the environment performance, since it is the lowest among the indicators, it is recommended to develop and implement environmental practices that could sustain the environment while implementing road projects.

Another recommendation may be for the district engineer of district engineering offices in Davao City as the head of office, to provide better support services to private contractors so they could also improve their road project implementation. Further, a follow-up study maybe conducted to validate the results of the enhancement program as proposed especially in sustaining the current performance of the private contractors.

## **REFERENCES**

- [1] Acharya, NK, Kim, SY & Lee, YD 2004, Factors affecting time completion of construction projects, *Proceedings of the Fifth Asia Pacific Industrial Engineering and Management Systems Conference*
- [2] Adams, EJ & Sherar, LB 2018, Community perceptions of the implementation and impact of an intervention to improve the neighbourhood physical environment to promote walking for transport: a qualitative study, *BMC Public Health*
- [3] Akanni, PO, Oke, AE & Akpomiemie, OA 2015, Impact of environmental factors on building project performance in Delta State, Nigeria, *HBRC Journal*, vol. 11, no.1
- [4] Ali, M & Chileshe, N 2009, The influence of the project manager on the success of the construction project, The 6th International Conference on Construction Project Management (ICCPM) / 3rd International Conference on Construction Engineering and Management (ICCEM) Global Convergence in Construction
- [5] Ali, A & Rahmat, I 2010, The performance measurement of construction projects managed by ISO-certified contractors in Malaysia, *J Retail Leisure Property*, vol. 9, pp. 25-35
- [6] Alias, M, Radhakrishnan, D & Ramasamy, G 2015, Study on factors affecting the performance of construction projects and developing a cost prediction model using ANN, *International Journal of Earth Sciences and Engineering*, vol. 8, no. 5, pp. 2189-2194
- [7] Alshammari, F, Yahya K & Haron, ZB 2020, Project manager's skills for improving the performance of complex projects in Kuwait construction industry: a review, *The 2nd Global Congress on Construction, Material and Structural Engineering IOP Conf. Series: Materials Science and Engineering*, vol. 7, no. 13
- [8] Asian Development Bank 2012, Infrastructure for supporting inclusive growth and poverty reduction in Asia
- [9] Azmy, N 2012, The role of team effectiveness in construction project teams and project performance, *Graduate Theses and Dissertations*
- [10] Babatunde, SO, Perera, S, Udejaja, C and Zhou, L 2014, Challenges of implementing infrastructure megaprojects through public-private partnerships in Nigeria: a case study of road infrastructure, *International Journal of Architecture, Engineering and Construction*, vol. 3, no. 2, pp. 142-154
- [11] Ballard, G 2000, The last planner system of production control
- [12] Basheka, BC, & Byaruhanga, A 2017, Contractor monitoring and performance of road infrastructure projects in Uganda, *A Management Model Journal of Building Construction and Planning Research*, 2017, vol. 5, pp. 30-44
- [13] Benita, JRC, Segura, ER, Marcos, IO & Sanchez, LB, 2016, Innovation projects performance: Analyzing the impact of organizational characteristics, *Journal of Business Research*, vol. 69, no. 4, pp. 1357-1360
- [14] Blayse, AM & Manley, K, 2004, Key influences on construction innovation, *Construction Innovation*, vol. 4, no. 3, pp. 143-154
- [15] Chan, A 2001, Framework for measuring success of construction projects, *QUT Eprints, CRC for Construction Innovation*
- [16] Chesoh, S 2010, Community perception, satisfaction and participation toward power plant development in southernmost of Thailand, *Journal of Sustainable Development*, vol. 3
- [17] Chin, LS & Hamid, ARA 2015, The practice of time management on construction project, *Procedia Engineering - The 5th International Conference of Euro Asia Civil Engineering Forum (EACEF-5)*, vol.125, pp. 32-39
- [18] Cristian, I and Avasilcai, S 2014, Measuring the performance of innovation processes: a balanced scorecard perspective, *Procedia - Social and Behavioral Sciences*
- [19] Commonwealth of Australia 2012, The infrastructure planning and delivery: best practice case studies booklet 2, *Australian Government Department of Infrastructure and Transport*
- [20] Constructors' Performance Evaluation System 2011, Implementing Guidelines for Infrastructure Projects
- [21] Davidkumar, C & Kathirvel, P 2015, A study on factors influencing quality of construction projects, *International Journal for Research in Applied Science and Engineering Technology*, vol. 3, no. 5, pp. 200-207
- [22] Department of Public Works and Highways 2020, Infrastructure development cycle', *GOV.PH*
- [23] Department of Public Works and Highways 2020, About DPWH. *GOV.PH*
- [24] Department of Labor & Employment 2018, Department order 198-18 implementing rules and regulations of republic act no. 11058 "An Act Strengthening Compliance with Occupational Safety and Health Standards and Providing Penalties for Violations Thereof", *GOV.PH*
- [25] Department of Environment and Natural Resources 2003, Implementing rules and regulations (IRR) for the Philippine environmental impact statement (EIS)
- [26] De Moura, RL, Carneiro, TCJ & Diniz BD 2018, Influence of the project manager's personal characteristics on project performance, *Gest. Prod., São Carlos*, vol. 25, no. 4, pp. 751-763
- [27] De Valence, G 2012, A theory of construction management? *Australasian Journal of Construction Economics and Building*, vol. 12, no. 3, pp. 95-100
- [28] Easton, VJ & McColl, JH 1997, Sampling, *Statistics Glossary v1*
- [29] Enshassi, A 2006, Factors affecting safety on construction projects
- [30] Enshassi, A, Kochendoerfer, B & Rizq, E 2014, An evaluation of environmental impacts of construction projects, *Revista Ingeniería De Construcción*, vol. 29, no. 3, pp. 234-254
- [31] Ghate, PR & Minde, P 2016, Labor productivity in construction
- [32] Government Procurement Policy Board 2017, Manual of procedures for the procurement of infrastructure projects
- [33] Gray, T 2020, Why is quality important in construction projects?, *ThomsonGray Construction Consultants*
- [34] Gunduz, M & Khader BK 2020, Construction project safety performance management using analytic network process (ANP) as a Multicriteria Decision-Making (MCDM) Tool, *Computational Intelligence and Neuroscience, 2020*
- [35] Guo, Y, Wang L, Wang, M and Zhang, X 2019, The mediating role of environmental innovation on knowledge acquisition and corporate performance relationship—A study of SMEs in China, *Sustainability 2019*, vol. 11, no. 2315
- [36] Hatmoko, JUD & Khasani, RR 2016, Assessing contractor satisfaction towards client performance in construction projects, *Applied Mechanics and Materials*, vol. 845, pp. 338-343
- [37] Hong Kong Trade Development Council 2017, The Philippines: infrastructure opportunities and challenges, *Hong Kong Means Business*
- [38] Intergraph 2012, Factors affecting construction labor productivity managing efficiency in work planning, *IntergraphCorporation*
- [39] Inman RA 2020, Productivity concepts and measures, *Reference for Business*
- [40] Jose, CM 2017, Critical factors influencing quality performance in construction projects, *International Journal of Recent Trends in Engineering & Research*, vol.3, no. 4, pp. 65-72
- [41] Karna, S, Junnonen, J, & Kankainen, J 2004, Customer satisfaction construction
- [42] Kärnä, S 2014, Analysing customer satisfaction and quality in construction – the case of public and private customers, *Nordic Journal of Surveying and Real Estate Research*, vol. 2

- [43] Khumalo, MJ, Choga I & Munapo, E 2017, Challenges associated with infrastructure delivery, *Public and Municipal Finance*, vol. 6, no. 2, pp. 35-45
- [44] Knupfer, NN & McLellan, H 2001, Descriptive research methodologies, *The Handbook of Research for Educational Communications and Technology - (AECT)*
- [45] Koskela, L & Howell, G 2002, The theory of project management: explanation to novel methods, *Proceedings IGLC-10, Gramado, Brazil*
- [46] Lamudi 2019, Davao's economy on the rise with road, infrastructure projects in the pipeline, *Lamudi Philippines Inc*
- [47] Lepadatu, G 2011, The importance of the cost information in making decisions, *Romanian Economic Business Review*, vol. 6, pp. 52-66
- [48] Lee, MR, Ismail, S & Hussaini, M 2014, Contractor's performance for construction project: a review, *International Journal of Engineering Research and Applications*, vol. 4, no. 7, pp. 131-137
- [49] Leong, TK, Zakuan, N, Saman, MZM, Ariff, MSM & Tan, CS 2014, Using project performance to measure effectiveness of quality management system maintenance and practices in construction industry, *The Scientific World Journal*, vol. 2014
- [50] Li, Y, Ding, R & Sun, T 2019, The drivers and performance of environmental practices in the Chinese construction industry, *Sustainability* 2019, vol. 11, no. 614
- [51] Malkanthi, SN, Premalal, AGD & Mudalige, RKPCB 2017, Impact of cost control techniques on cost overruns in construction projects, *Engineer: Journal of the Institution of Engineers, Sri Lanka*, vol. 50, no. 4, pp.53-60
- [52] Memon, A, Roslan, N & Zainun, NY 2014, Improving time performance in construction projects: perspective of contractor, *Journal of American Science*, vol. 10, pp. 46-50
- [53] Metin, B & Tavil, A 2016, Environmental performance assessment of the building construction process during architectural detailing, *6th International Conference on Harmonisation between Architecture and Nature*, vol. 161, pp. 261-271
- [54] Mian, D 2015, A model to assess the impact of innovation activity on project performance in consulting engineering firms, *Civil Engineering & Built Environment School Science & Engineering Faculty, Queensland University of Technology 2015*
- [55] Mishra, G 2020, Quality in construction industry -objectives, factors affecting quality, *The Constructor Civil Engineering Home*
- [56] Muiruri G & Mulinge K 2014, Health and safety management on construction projects sites in Kenya: A case study of construction projects in Nairobi County, *FIG Congress 2014 Engaging the Challenges – Enhancing the Relevance Kuala Lumpur, Malaysia 16-21 June 2014*
- [57] Nassar, NK 2009, An integrated framework for evaluation of performance of construction projects. Paper Presented at PMI® Global Congress 2009- North America, Orlando, and FL, Newtown Square, PA: Project Management Institute
- [58] Nwokoye, ES & Ilchukwu, N 2018, Chapter five theory of costs, *Principles of Economics*, vol.1, pp.144-184
- [59] Omonori, A & Lawal, A 2014, Understanding customers' satisfaction in construction industry in Nigeria, *Journal of Economics and Sustainable Development*, vol. 5, no. 25
- [60] Oracle 2014, The challenges of managing public infrastructure projects, Oracle Primavera Corporation World Headquarters 500 Oracle Parkway Redwood Shores, CA 94065 U.S.A.
- [61] Occupational Safety and Health Administration 2016, Recommended practices for safety & health programs in construction
- [62] Ozorhon, B 2013, Analysis of construction innovation process at project level, *Journal of Management in Engineering*, vol. 29
- [63] Pellicer, E, Yepes, V, Teixeira, JMC, Moura, H & Catala, J 2008, Construction management, *Construction Managers Library, Leonardo da Vinci: PL/06/B/F/PP/174014*
- [64] Pro Crew Schedule 2019, Measuring productivity in construction and why you should care, *Construction Management*
- [65] Professionals Australia and Institute of Public Works Engineering Australasia 2017, Building Victoria together: improving the infrastructure delivery capacity of local government. *Melbourne, Australia MECC Consulting*
- [66] Project Management for Development Organizations 2016, Project quality management
- [67] Puentes, R 2015, Why infrastructure matters: Rotten roads, bum economy, *Brookings, Metropolitan Infrastructure Initiative*
- [68] Rahman, A & Alzubi Y 2015, Exploring key contractor factors influencing client satisfaction level in dealing with construction project: an empirical study in Jordan, *International Journal of Academic Research in Business and Social Sciences*, vol.5, no. 12
- [69] Rahman, NNNA & Esa, N 2014, Managing construction development risks to the environment. in: Kaneko N, Yoshiura S, Kobayashi M (eds) *Sustainable Living with Environmental Risks*, Springer, Tokyo
- [70] Sabet, PGP & Chong, HY 2020, Pathways for the improvement of construction productivity: A perspective on the adoption of advanced techniques, *Advances in Civil Engineering*
- [71] Savitri, M & Armando, D 2019, A survey on the community satisfaction index based on Kepmenpan No. 25/m.pan/2/2004 at Kanujoso Djatiwibowo regional general hospital, Balikpapan in 2018, *Journal of Indonesian Health Policy and Administration*, vol. 4
- [72] Shaban, SSA 2008, Factors affecting the performance of construction projects in the Gaza strip, *The Islamic University – Gaza Deanery of High Studies Faculty of Engineering Construction Management Dep.*
- [73] Shabin, S & Ramesh, BT 2014, A study of human factors and risk related to the construction industry, *IOSR journal of mechanical and civil engineering (IOSR-JMCE)*, vol.1, pp. 67-73
- [74] Shehata, ME & El-Gohary, KM 2011, Towards improving construction labor productivity and projects' performance, *Alexandria Engineering Journal*, vol. 50, no. 4, pp. 321-330
- [75] Sitemate 2020, Key performance indicators for health safety and environment
- [76] Solis, R & Corona-Suárez, G 2016, Project time management and schedule performance in Mexican construction projects, pp. 2119-2128
- [77] Suárez Sánchez, FA, Carvajal Peláez, GI & Catalá Alís, J 2017, Occupational safety and health in construction: a review of applications and trends, *Industrial Health*, vol. 55, no. 3, pp. 210-218
- [78] Sultana, M, Rahman, A, & Chowdhury, S 2013, A Review of performance based maintenance of road Infrastructure by contracting, *International Journal of Productivity and Performance Management*, Vol. 62, no. 3
- [79] Talbot, C 2013, Theories of performance: organizational and service improvement in the public domain, *The Innovation Journal: The Public Sector Innovation Journal*, vol. 18, no.1
- [80] Trochim, WMK 2020, Descriptive statistics, *Research Methods Knowledge Base, Conjoint.ly*
- [81] Yildirim K 2017, Spatial perception and architecture, *TMD Studio ltd*
- [82] United Nations Industrial Development Organization 2016, Quality infrastructure building trust for trade
- [83] Vitharana, VHP, De Silva, SGHMJ & De Silva, S 2015, Health hazards, risk and safety practices in construction sites – A review study, *ENGINEER*, vol.48, no. 3, pp. 35-44
- [84] Ward, SC, Curtis, B & Chapman, CB 1991, Objectives and performance in construction projects, *Construction Management and Economics*, vol. 9, no. 4, pp. 343-353

- [85] Windapo, A & Cattell, K 2010, A study of building contractors compliance with national building regulations in Cape Town, *Construction, Building and Real Estate Research Conference of the Royal Institution of Chartered Surveyors*
- [86] Zhao, L, Mbachu, JIC & Domingo, N 2017, A better modelling and assessment of key factors affecting cost performance of building projects: the Case of New Zealand. *International Journal of Construction Engineering and Management*, vol. 6, no. 5, pp.187-196