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IMPACT OF DIGITAL TECHNOLOGY ON COST MANAGEMENT SYSTEM

Abstract

Cost management used to be something businesses only thought about when they were struggling. In recent years, it has become a standard operating practice that receives constant attention in good times and in bad. With the emergence of disruptive innovations such as robotic process automation, analytics, and cognitive technology, cost management is morphing into a strategic enable with the power to disrupt entire industries and fundamentally change how business is done. In digital era, making new information sources and technologies even more important to effective strategic cost management. Digital sources are providing larger volumes of structured and unstructured data with greater speed than ever before. At the same time, advances in analytical modelling methods and technology are making it easier to transform this data into insights that dramatically improve cost management by enabling greater optimization of existing operations and fundamental transformations in business models and cost structures. By using digital technology, companies have the potential to increase efficiency and effectiveness. Cost management can be a strategic lever, as opposed to a defensive response, and open up new opportunities for companies.

Keywords : Cost Management, digital era, efficiency, effectiveness

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INTRODUCTION

In recent years, cost management is not only done when the business has decreased. Cost management has become a competitive requirement or company operating standard. In general, cost management practices focus on defensive action on response cost pressures, reduced demand, and liquidity and credit problems. Faced with a rapidly changing global business environment, many companies are changing their approach to cost management.

Companies are becoming more proactive in using cost management as a strategy to help finance, sales growth and achieving sustainable profitability through structural and cost efficiency improvement. By implementing transformative technology that helps companies grow and compete more effectively.

According to cost management survey form (Aguilar O. , 2019) , cost management practices at the most companies are used to gain a competitive advantage over their competitors (65%) or to fund investment to support company growth (64%), with operating costs 47% for management improves the performance of their international business portfolios. otherwise, Cost management efforts in enterprises in China are only 17% driven by a reduction in consumer demand, 32% by unprofitable costs, 35% by changes in regulations, and 36% by a reduction in liquidity or tighter credit.

Use cost management to achieve competitive advantage and increase more growth stand out in China than in other parts of the world. The survey shows that the percentage of cost management programs to encourage increased competitiveness profits are only 58% in Asia-Pacific countries, 57% in the United States, and 46% in parts of Europe and Latin America. Supported also by a percentage of cost management initiatives which was driven by the need to fund growth of only 53% in Asia-Pacific countries, 43% in the United States, 36% in Latin America, and 36% in Europe.

According to cost management survey form (Aguilar O. , 2019), shows that one of the main factors that is significantly successful a cost management program is the implementation of new information technology business intelligence infrastructure, systems and platforms.

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COST MANAGEMENT

Cost management is a managerial process, which is produce information to support a decision making, the potential for cost reduction, value improvement and continuous improvement in the organization. Cost planning means improvement estimated initial costs and provides project cash flow, additional information generated throughout the project (time of payment to the supplier) which is formed based on the production plan. Additional activities usually need to be supported by dynamic decision making, so that the project's objectives are achieved. There are two aspects to this cost control that is, monitoring the actual cost performance and identifying the business opportunity. By implementing cost management proactively will enable companies to deal with construction that is dynamic, uncertain and complex the environment that exists in many projects (Raman, 2019).

Cost management has four processes. This process is grouped into two groups namely the planning group and the monitoring or control group (Cleopatra, 2020):



Figure 1 : Cost Management Process

1) Plan Cost Management Process

During the planning process, the project leader and members must work together to make plans to determine budgets, estimate costs, and manage costs for the project from start to finish. The cost management plan is the main output for the cost management plan process. There are three main aspects in the planning stage namely the life cycle costs, total cost of ownership, and value engineering.

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a) Life Cycle Costing

Life cycle costing is the process of gathering information on all costs owned by a company. For example, measuring how often you change your car. Generally, you replace every five years because that is the life cycle of a car product. This is important to measure the total cost to be incurred during this project.

b) Total Cost of Ownership

The company uses the total cost of ownership analysis to find the lowest total cost for buy and operate goods and services. The total cost of ownership analysis, it is very important to measure the estimate of the purchase order operating and maintenance costs become significant during the usage period. Total cost of ownership analysis is generally used to buy items such as: vehicles, property, computers systems and software, machinery and other equipment.

c) Value Engineering

Value engineering aims at making work effective and efficient. For example, if you plan a construction project and find that you will need heavy equipment for about two months, better to rent the heavy equipment than to buy it. Unless you buy the heavy equipment as an investment for another project in the future. In this case, taking into account renting means that you are not responsible for maintaining the equipment. It is often the cheaper option to rent it. To determine which option is better, the company must make possible scenarios and compare them with various financial ratios such as return on investment, return period, and so on.

2) Estimate Costs Process



Figure 2 : Estimating and Budgeting Process

In this phase, you will estimate the costs needed for each project activity, including tools, materials, and equipment needed to support each activity. Based on the estimated costs, you can estimate the overall project budget. Finding cost information means the buyer determines

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the cost of the components they need from raw materials, machinery and labor used for a project. Direct costs are determined by combining raw materials and labor costs. There are also indirect costs, or overhead, i.e. costs that are not directly related to the manufacturing process, such as promotion, office space, tax, etc. Projects will have various types of costs. You will be charged a fixed fee, which is things like building rent and land. . You also have variable costs, which are employee costs and material costs. This fee will vary depends on the number of people or the amount of material.

3) Determine Budget Process

After all planning is complete, the estimated cost is complete combined to determine the overall project budget. The project budget consists of several ie components, activity costs and contingency reserves are added to the budget to accommodate risks that may occur during the project.

4) Control Cost

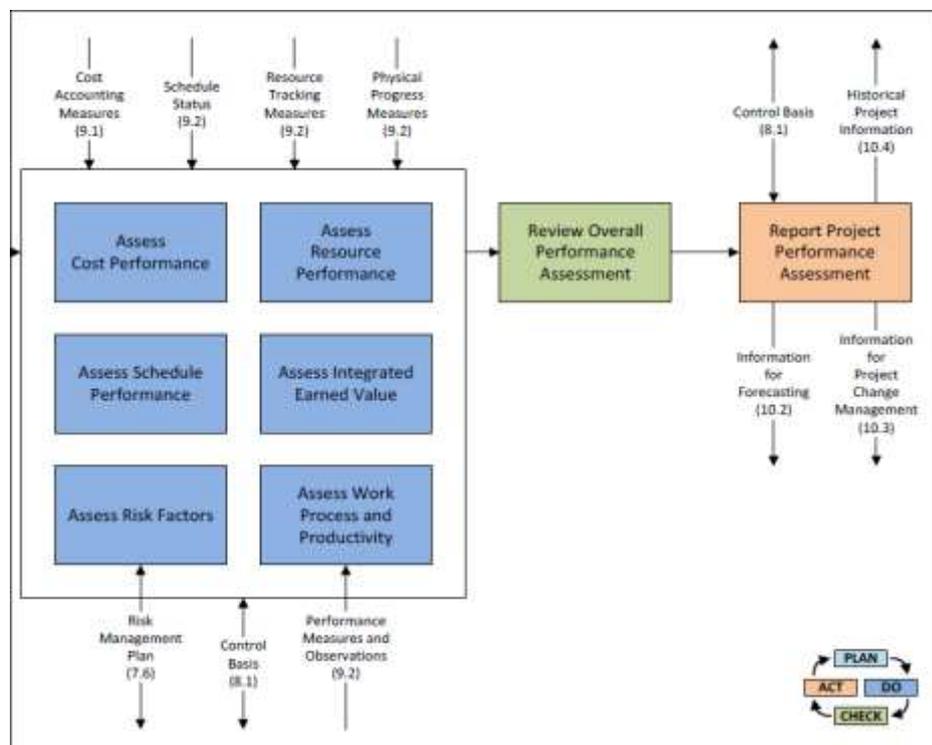


Figure 3 : Process map for project performance measurement

The last process in cost management. Designed to control project expenses while the project is running and efforts to complete the project in specified budget.

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PROBLEMS IN COST MANAGEMENT PRACTICES

Because the project process is long from the project and many are involved in it, so some problems arise project cost management:

a) Estimated costs in the previous period are not yet accurate

In the initial stages, information about the project must be clear and accurate. So there is no mistake in making estimates for the project. There are also economic indicators published by the local cost information website has problems such as small project coverage, delayed release time, and incomplete indicator types, fail to provide comprehensive and reliable support for estimation , so investment estimates based on indicators are not accurate enough (Boya, Zhanyong, & Zhenqiang, 2013).

b) Information processing speed is slowing down

Nowadays, China is conducting both fixed pricing and list pricing. During and after the transaction, list pricing is mainly used. In the process of preparing the engineering quantity list, mistakes can occur because there are quantities of project items and the engineering information needs to be provided. At present, data is mainly processed manually, but it is slow in calculating engineering quantity, and the accuracy cannot be guaranteed. In the actual construction process, the site is complicated, the information opaque, making the construction unit cost difficult to control, the progress difficult to control accurately, the progress payment unclear, the process information collection incomplete, the information processing degree low, and the whole process of construction cost management slow and inefficient (Chao, 2012).

c) Outdated cost management information preservation method

Most of the completed historical data of most enterprises now are archived in paper documents and word texts, making the engineering cost information stored difficult to be refined from basic data to effective information based on correlation calculation and analysis, thus the purpose of obtaining the cost index for the proposed project is hard to achieve (Fanglin, 2015).

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DIGITALISATION IN COST MANAGEMENT

There are two related fields in digital cost management namely, cognitive technology and automation. Like the quantity, variety and speed of data available through increasingly growing digital means. the ability of that information can be obtained and analyzed to exploit a cost. Predictive analytics uses various statistical modeling techniques and cognitive technology to develop predictions models for future activities, trends, and behavior based on high volumes of different data. With the growth of cognitive technology now such as artificial intelligence, natural language processing, and machine learning that can accurately analyze structured and unstructured data such as images, diagrams, text, videos or tables. Put the company in a better position to identify hidden and sometimes unexpected relationships in complex and seemingly ambiguous information (Bhimani, 2016).

The benefits of predictive analytic applications and cognitive technology for cost management are, to encourage companies to develop their insights in moving costs and between companies. Thus increasing their ability to optimize existing operations and estimate costs the consequences of future decisions. Analysis of revenue drivers can also help companies to determine which expenses are of less value to customers so that they need to be reduced or eliminated, and which expenses need to be increased because of their positive impact for profit. Predictive analysis can be used to improve quality and efficiency, for example, you predict when a machine needs maintenance. Fraud analytics can help prevent losses by predicting which ones potential employees, customers, and suppliers who have the potential to commit fraud. Application of predictive analytics and cognitive technology for planning, forecasting, and budgeting can be very beneficial. With accurate planning and estimation in cost management practices, companies can react to it competitive threat, holds opportunities, and grows profitably (Farrar, 2019).

According to (Aguilar O. , 2019) companies that increase budgeting, estimates and reporting processes as part of their cost management process are more likely to make it happen the target of reducing costs and achieving maximum operating costs and saving working capital. By collecting, analyzing, and modeling various structured and unstructured data, companies can make accurate decisions based on that information. In addition, predictive analytics and sophisticated modeling can improve a company's ability to consider risk. Sophisticated modeling techniques are useful for simulating and analyzing actions in cost management

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practices. Thus, managers can test various scenarios and modify budgets and estimates are needed, and can develop contingency plans if the expected results of cost management efforts fail to materialize.

DIGITAL MANAGEMENT COST IN PRACTICE

With digital technology, the cost management process has become renewed. By using the power of digital technology to increase efficiency and effectiveness, which was originally focuses on automation and analytics, such as integration income analysis and cost drivers into decision making, reimbursement, and addition of labor in existing business processes. With cost management that is supported by sophisticated digital can be potential to provide increased savings over time due to the digital exponential nature technological growth (e.g. "Moore's Law"), and the ability to apply faster, thus allowing companies to achieve greater savings in far less time. In the following section, I will provide some examples of digital technology that can drive the cost management process.

a) Automation

Automation can support the cost management process, usage automation has traditionally focused on increasing efficiency and effectiveness in the production process. Yane is changing because digital innovation is an increasingly knowledge-based, labor-intensive process. For example, Robot Process Automation (RPA) using special computer programs to automate and replace repetitive human processes. RPA not only does repetitive work much faster, more accurately, and is tireless than humans. Cognitive technology also makes it possible to automate tasks that require human perception skills, such as recognize handwriting or identify faces, and those who need cognitive skills, such as planning, reasoning from partial information, and learning. Because cognitive technology expands the power of information technology for tasks traditionally performed by humans; they can enable organizations to break trade-offs between speed, cost, and Quality (Ittner & Michels, 2017).

b) Artificial Intelligence

AI is a general term that includes machine learning, deep learning, speech recognition, and cognitive computing. AI is not a new concept, AI has existed as an academic discipline since the 1950s. The elements of AI are used together to find complex patterns and provide automatic

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insights taken from the increasing amount of data that can be accessed by organizations. One area of technology that has changed the world is social media and platforms. Now we can access data more easily, which means that companies must now be more transparent. The new transparency created by social media means that everything the company does can be seen in the public domain. Current stakeholders can hold the organization accountable, because the costs of finding and disseminating information have been reduced. Customers can also compare prices of all products, and read other customer's product reviews or ratings in seconds via the existing platform (Farrar, 2019).

c) BIM Technology

BIM (Building Information Model) is considered the second technological change in the construction industry after CAD. BIM technology adds information including project costs to the 3D model, forms a relevant information model of the integrated project development process cycle. This model aims to achieve information interaction and collaboration, which is the basis of cost management. BIM technology is displayed by virtualization, visual design decision making, collaborative construction, and transparent management (Guo, Liu, Wang, & Deng, 2019).

i. BIM-based information expression is intuitive and efficient

BIM is featured by visualization, meaning “what you see is what you get”. The engineering model established by BIM is a 3D effect picture, which is more intuitive than the traditional CAD picture. The designer can accurately express the content using BIM, and the constructor can accurately express the expected design requirements, in this way, the risk of design changes can be reduced.

ii. BIM-based information processing is efficient and accurate

The components in the BIM model contain a variety of attribute information, including the build type, component specifications, and material prices. They can also import the information of completed engineering, quota, and market price into the model. BIM is parameterized, so the project information can be updated synchronously, and the cost file can be formed on the basis of corresponding information, making investment estimation, design budget and construction draft simpler and more accurate.

iii. BIM-based information transfer is authentic and complete

BIM model can analyze and extract relevant cost indicators at various stages of the completed project in a detailed and accurate manner, and turn it to electronic data for convenient storage

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and sharing. The cost index and content index of the completed project are very important for the compilation of investment estimates for similar projects.

iv. BIM-based information interaction is efficient and convenient

Information platform of the project can be established based on the information gathered by BIM model, which can be used by each party involved in the project. This helps to break the information silo, which is the most important feature of BIM technology. This technology makes the once disordered and inefficient information interaction orderly and efficient, as shown in Figure 4

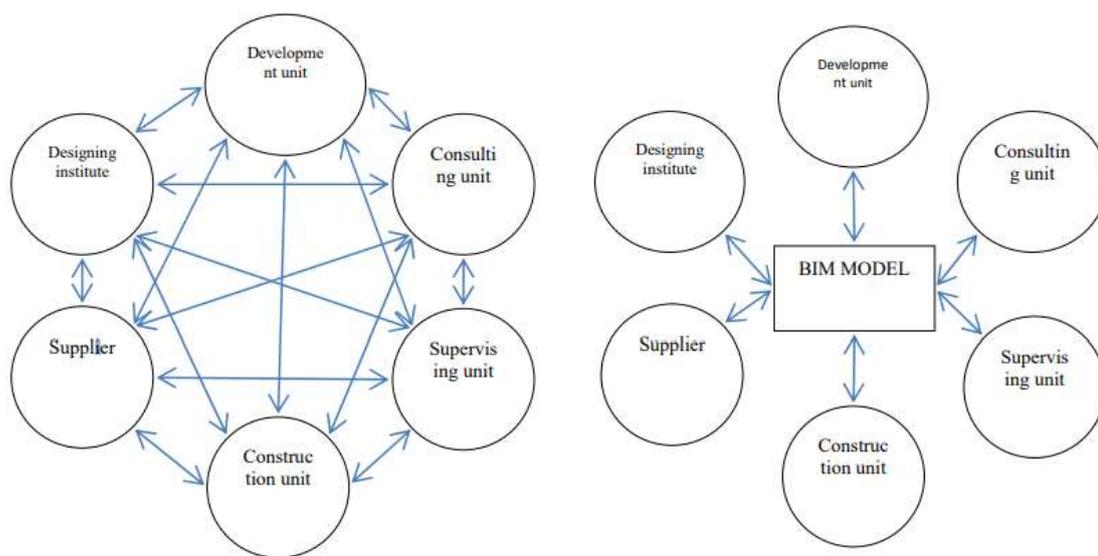


Figure 4 : Comparison of information interaction before and after applying BIM

CONCLUSION

With today's rapidly changing global environment, effective cost management can be a competitive advantage. One of the most important factors in a project process is cost, so it needs to be managed and controlled throughout the project. So cost management is an important factor to ensure project success. And with the advent of digital innovation such as analytics, cognitive technology, and automation of robotic processes, and Artificial Intelligence, cost management will be more effective so that opportunities and cost reduction margin increase to a completely new level. In general, cost management focuses on increasing product efficiency and effectiveness offering services and providing a superior customer experience. But going forward, that the biggest potential impact because of the digital presence is that business will be innovative with competitive model and provide ongoing cost reduction completely rearrange expectations about cost structures and efficiency.

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