

Is Earned Value Management (EVM) consistent with Sharia Law Will it help in fighting corruption?^{1, 2}

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ABSTRACT

This paper will observe another potential area in the EVM and its relationship with the Sharia law. Countries around the world are facing many challenges. One of the big problems that affect the achievement of the state is Corruption. Corruption is attracting a lot of attention around the world. Based on Transparency international corruption Index, North African and Middle East Countries have a high level of corruption. One of the main reasons for corruption is a problem with payments, lack of planning, and absence of incentive plans in government organization and contract term. North African and the Middle East nations don't use EVM or prompt payment inside the government organizations.

One of the main reasons to ensure that the project is on time and within budget is to make sure employees, contractors, and subcontractor's performance is high. There is no better way to do so than to use EVM and integrate the concept of pay for performance. These being said, means that pay for performance and earned value are significant in the success of the project; thus, fighting corruption. A simulation model will show how the money supply chains flow in a plan; and its correlation to the selection of payment method, Long versus Prompt payment duration, and how it is measured will help in fighting corruption in Muslim countries.

Regarding this, the author will highlight the problem of corruption and give a thorough analysis of this dilemma by providing a practical tool to find a solution such as using EVM, integrating incentive plans and planning. Besides, stressing the history of EVM, scheduling and incentive plan and how it was proven that they complement each other. Finally, describing how important it is that the Middle East and North Africa embrace Earned Value Management, not only because it is a "best tested and proven" practice but also, more importantly, it is consistent with their religious beliefs and teachings.

Key words: Earned value, pay for performance, Sharia law, project management, Performance, incentive plans, payment term, pay when paid, owner company, Main Contractor, Sub Contractor.

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INTRODUCTION

According to the global survey reports of the Transparency international corruption has been identified as one of the most fundamental problems facing the world today.³ The World Bank estimates that consistently, "the measure of cash paid in rewards is just about 1 trillion USD (World Bank, 2004) and now, current assessments of the worldwide expense of defilement have expanded to 2 trillion USD, around 2% of worldwide GDP" (International Monetary Fund, 2016). The Arab world is one of the most corrupted nations in the world. In spite of the political changes that shook the Arab world six years ago, the desire for Arab countries to battle bribery and end exemption has not seen any improvement. yet. Despite what might be expected, the more significant part of Arab nations has neglected to satisfy the desire of the general population to assemble popularity-based frameworks taking into account more noteworthy straightforwardness and responsibility. The inability to battle corruption clarifies the sharp drop of the vast majority of Arab nations in the Corruption Perceptions Index 2016. 90 percent of these have scored underneath 50, which is a failing grade.⁴

In North Africa and the Middle East, an area with the dominant Muslim population, the Islamic belief frequently assumes an outstanding job in culture, society, and government. More than 50% of the countries in the region have communities that are approximately 95% Muslim or greater⁵. Muslims are obliged by their religion to do great with the goal that Islamic values are carefully integrated into their lives. While that according to Islamic teaching, corruption is forbidden (Haram) and there are several narrations (Hadiths) of the Prophet Muhammad and the Quran (PBUH) that prohibit it. God (PBUH) said: "May the Curse of Allah be upon the briber and the bribe recipient."⁶ Although corruption has been forbidden by sharia law, the Arab nations have failed to condense it.

One of the main reasons for corruption is the problem in prompt payments, lack of planning, and absence of incentive plans in government organization and contract term. Most of North African and the Middle East nations don't use EVM or prompt payment. There are unfair and late payment terms in government and privet organizations. Moreover, whether civil servants are appropriately compensated or grossly underpaid, this will affect motivation and incentives.

If the wages of employees in the public sector is too low, employees may have no choice rather than to enhance their salaries in "informal" ways. There are some theories related to the relationship between increased pay and corruption reduction. Putting an incentive plan as part of the organization compensation method will help in motivating workers on performance and doing their work correctly and without corruption. Besides, many employees, contractors, and subcontractors have numerous issues with getting paid on time. A portion of the issues of installment force numerous organizations out of business, put others off working together in the

³ LOPEZ-CLAROS, A. (2014). *Six Strategies to Fight Corruption*. [online] Future Development. Available at: <https://blogs.worldbank.org/futuredevelopment/six-strategies-fight-corruption> [Accessed 5 Nov. 2018].

⁴ OPEZ-CLAROS, A. (2014). *Six Strategies to Fight Corruption*. [online] Future Development. Available at: <https://blogs.worldbank.org/futuredevelopment/six-strategies-fight-corruption> [Accessed 5 Nov. 2018].

⁵ Mooney, L. (2015). *How to ensure prompt payments*. [online] ArabianBusiness.com. Available at: <https://www.arabianbusiness.com/how-ensure-prompt-payments-580881.html> [Accessed 5 Nov. 2018].

⁶ Haseeb, M. (2015). *Islam And Human Resource Management*. [Online] LinkedIn. Available at: <https://www.linkedin.com/pulse/islam-human-resource-management-muhammad-haseeb/> [Accessed 12 Jul. 2015].

region and destroy some excellent ideas before they even begin. EVM “pay for performance” and prompt payments are part of project management since it helps project managers to measure project performance. Project management can be identified as “the art and science of managing a project from inception to closure as evidenced by successful product delivery and transfer.”⁷ It is the key element to either the success of a project or its failure. The project as defined in Wideman Comparative Glossary: Any undertaking that has a defined objective, a cost parameter, and a time element for its development, a cluster of activities that are pulled together to deliver something of value to a customer.⁸ (Wideman,2000) Any project depends on assets an asset is “anything owned that has a monetary value.”⁹ The Project Manager has limited authority, and most major decisions have to be made by either the Asset or Operations Manager in their role as project SPONSORS or more commonly, are made by a “steering committee.”¹⁰ Any project is part of program and portfolio management. According to GAPPS Program Typology,¹¹ there are four types of programs. A program can be defined as a gathering of related projects managed undertakings to acquire advantages and control not accessible from managing them separately¹². Programs may incorporate components of related work outside the scope of the discrete tasks in the program¹³.

It is also part of portfolio management since a “portfolio of projects” is no different from any investment portfolio, the objective is to minimize the risk and maximize the return. Any organization, be it Owner or Contractor has a portfolio of assets (resources) available to dedicate to projects, with the objective being to develop the best “mix” of projects which will generate the most favorable return on those assets¹⁴. To follow the progress of a project, Earned Value Management (EVM) will be helpful to measure the performance. According to Max Wideman’s Comparative Glossary’s definition, Earned Value Management is a management technique that relates resource planning to schedules and technical cost and schedule requirements. “All work is planned, budgeted, and scheduled in time-phased increments constituting a cost and schedule measurement baseline.”¹⁵

That circumstance above has brought me to look at particular subjects of project management and how it is related to the Islamic Sharia practice; especially when dealing with payment and earned value. Islamic teaching is rigorous in payment for performance, and it forbids any delays in

⁷ Wideman Comparative Glossary of Project Management Terms. (2017). Retrieved from http://www.maxwideman.com/pmglossary/PMG_P16.htm#Project%20Management

⁸ Wideman Comparative Glossary of Project Management Terms. (2017). Retrieved from http://www.maxwideman.com/pmglossary/PMG_P16.htm#Project%20Management

⁹ Wideman, M. (n.d.). Wideman Comparative Glossary of Project Management Terms v5.5. © R. Max Wideman, 2000-2017. Retrieved October 31, 2018, from: http://www.maxwideman.com/pmglossary/PMG_A05.htm

¹⁰ Planning Planet. (n.d.). Guild of Project Controls Compendium and Reference. Retrieved October 30, 2018, from: <http://www.planningplanet.com/guild/gpccar/introduction-to-managing-project-controls>

¹¹ Planning Planet. (n.d.). Guild of Project Controls Compendium and Reference. Retrieved October 30, 2018, from: <http://www.planningplanet.com/guild/gpccar/introduction-to-managing-project-controls>

¹² Planning Planet. (n.d.). Guild of Project Controls Compendium and Reference. Retrieved October 30, 2018, from: <http://www.planningplanet.com/guild/gpccar/introduction-to-managing-project-controls>

¹³ Planning Planet. (n.d.). Guild of Project Controls Compendium and Reference. Retrieved October 30, 2018, from: <http://www.planningplanet.com/guild/gpccar/introduction-to-managing-project-controls>

¹⁴ Planning Planet. (n.d.). Guild of Project Controls Compendium and Reference. Retrieved October 30, 2018, from: <http://www.planningplanet.com/guild/gpccar/introduction-to-managing-project-controls>

¹⁵ Wideman Comparative Glossary of Project Management Terms. (2017). Retrieved from http://www.maxwideman.com/pmglossary/PMG_P16.htm#Project%20Management

payment. Prophet Muhammad highlighted that: “Pay the worker for his work before his sweat dries”¹⁶ and “Prohibited from taking someone to work until notified rates of wages.”¹⁷ Also, in Islam for each good thing that a person carries out in this world will be positively rewarded by God as mentioned in the Qur’an: And those who believe and do righteous deeds, We will surely remove from them their misdeeds and will surely pay them according to the best of what they used to do¹⁸ (Surah Al-Ankabut 29:7).

North African and Middle East government and organizations face new challenges. These Challenges are incredibly critical to enhancing the performance of the projects as for Schedule and Cost. To better measure project performance, progress and prompt payment to employees, contractors, and subcontractors, one of the best methods to use is earned value management. So what is EV? EV means that the value of the piece of work is equal to the number of funds budgeted to complete it.¹⁹ Thus, the “value” earned by a project is the value to the delivery organization which is equal to the price agreed with the customer – this explains the focus of the earned value method on “work performed” and on the corresponding allocated budgets. EVM can be an essential tool for successful program and project delivery within the organization structure.

When it comes to contract terms of payment organizations, usually apply pay when paid payment terms, which is a trade, credit, the credit from the supplier, which reached out to the owner/organization as a buyer when the contract is granted²⁰. By having an exchange credit from the supplier, the government commits to purchase now and pay later. The fundamental contractual worker will keep cascading a portion of their scope of work to the subcontractor worker and primary suppliers. A similar pay when paid term could continuously follow down the supply chains, from subcontractor of the subcontractor, or supplier of the subcontractor and so on. The bigger the supply chain is, the more delays in the payment term.

To conclude, the objective of this report is to show the following:

- The evolution of EVM, scheduling, and incentive plans over time
- How the application of Earned Value Management method will resolve the problem of corruption
- How payment term is observed from Sharia law perspectives that urge to pay the work done after it is accomplished.

¹⁶ Malouni, F. (2010). *PROJECT MANAGEMENT: EARNED VALUE AND PROMPT PAYMENT PRACTICES OBSERVED FROM VIEW OF ISLAMIC SYARIAH LAW*

¹⁷ Mooney, L. (2015). *How to ensure prompt payments*. [online] ArabianBusiness.com. Available at: <https://www.arabianbusiness.com/how-ensure-prompt-payments-580881.html> [Accessed 5 Nov. 2018].

¹⁸ Malouni, F. (2010). *PROJECT MANAGEMENT: EARNED VALUE AND PROMPT PAYMENT PRACTICES OBSERVED FROM VIEW OF ISLAMIC SYARIAH LAW*

¹⁹ Ziyash, A. (2018). *Earned Value Management and its Applications - Project Management World Journal*. [online] Project Management World Journal Available at: <https://pmworldjournal.net/article/earned-value-management-and-its-applications/> [Accessed May 2018].

²⁰ Business Credit Bulletin, National Association of Credit Management, “When must A Subcontractor Be paid under A” Pay-When-Paid” clauses? Patrick Devine, Esq, July/Aug 2006

- How important it is that the Middle East and North Africa embrace Earned Value Management, not only because it is a "best tested and proven" practice but also, more importantly, it is consistent with their religious beliefs and teachings.

Methodology

To understand the importance and benefits of using EVM and why it should be implemented in government and organization, first we need to be familiar with the history of earned value management, scheduling and incentive plan way before CE until the present day. This will give us a more comprehensive understanding of how it was proven that EVM contributes to the success of projects inside government organization. And why nowadays it is considered a best practice to measure performance. The author has created a timeline that illustrates this evolution and the relationship between EVM, scheduling and incentive plans. The timeline is divided into four periods:

1. Combined History of Scheduling, Incentive pay and Earned Value Management (EVM) 2500BCE to CE

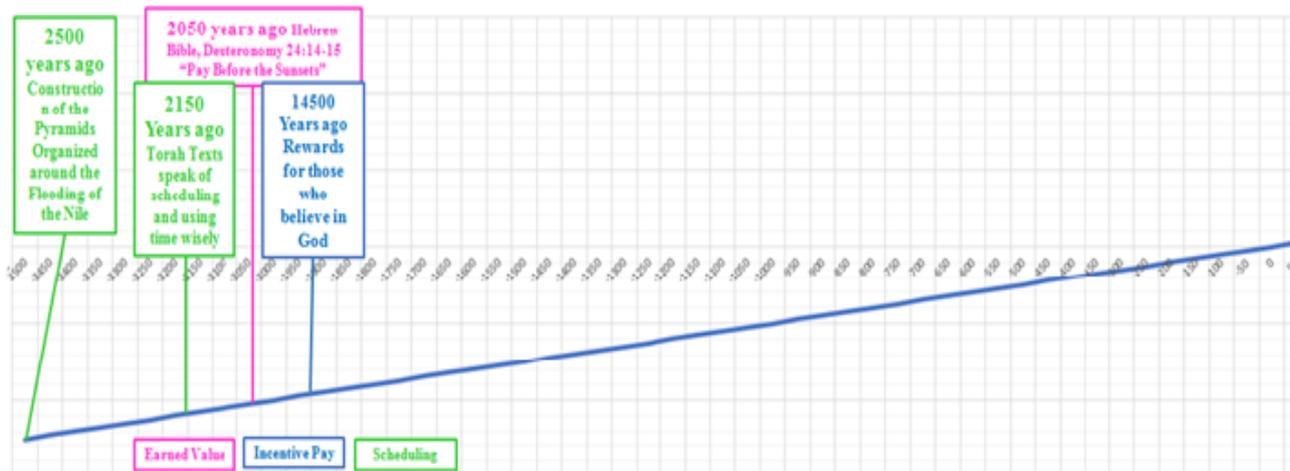


Figure 1: History of Scheduling, Incentive pay and Earned Value Management (EVM) 2500BCE to CE ²¹

The history of EVM, scheduling and incentive plans start way before CE. The idea of 'scheduling' isn't new; the pyramids are finished 2500 years old, Sun Tzu wrote about scheduling and strategy 1500 years ago from a military perspective²², none of these activities could have been accomplished without some form of a schedule. The concept of EVM has its roots with the Old Testament. Judaism enforces the idea of EVM the Hebrew Bible, Deuteronomy 24:14-15 reads: You shall not oppress a hired servant who is poor and needy Each day you shall give him his

²¹ By Author

²² Weaver, P. (2018). A BRIEF HISTORY OF SCHEDULING - BACK TO THE FUTURE -. [online] Mosaicprojects.com.au. Available at: https://mosaicprojects.com.au/PDF_Papers/P042_History_of_Scheduling.pdf [Accessed 4 Apr. 2006].

wages, and not let the sun go down on it(Torat,2000)²³. Torah texts also discussed the concept of scheduling and how to organize time efficiently and spoke about the reward “incentives” for all people who follow the guidance from God²⁴.

2. Combined History of Scheduling, Incentive pay and Earned Value Management (EVM) CE to 1800.

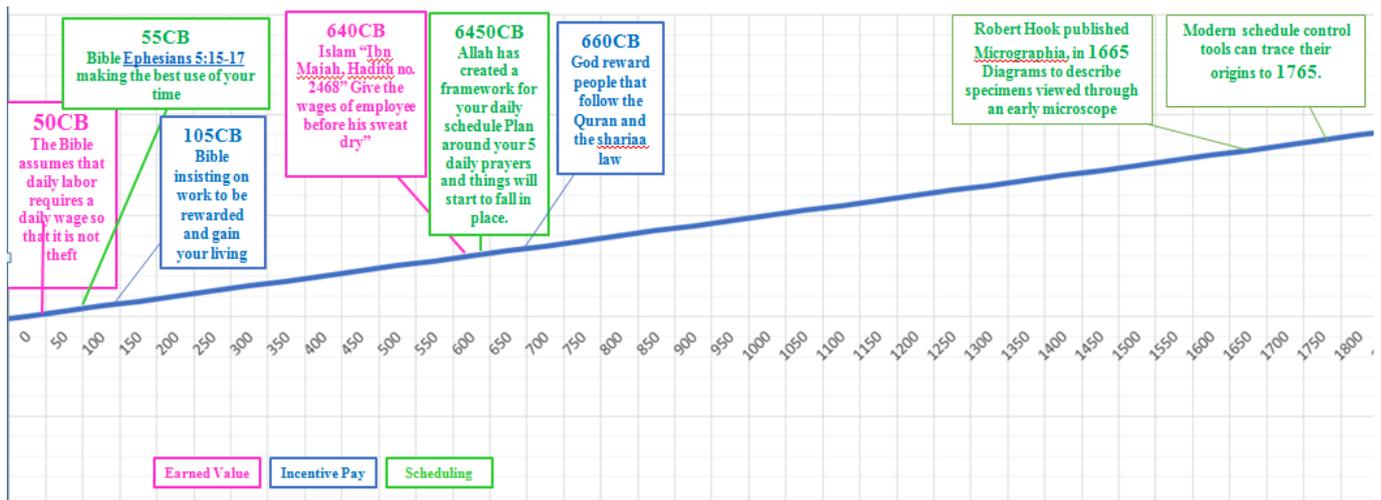


Figure 2: History of Scheduling, Incentive pay and Earned Value Management (EVM) CE to 1800²⁵

From CE to 1800, EVM, incentives, and scheduling have evolved during this time. The main book of the Bible was very much aware of what he viewed as the scourge of humanity from the earliest starting point of its history. With the expulsion from paradise, hunger, thirst and the need for shelter became certain incentives for work. With sweat on your brow shall you eat your bread, until you return to the soil, as you were taken from it(Ephesians 5:15-17)²⁶. The Bible assumes that daily labor requires a daily wage so that it is not theft. God requires people to be paid for the time and effort that they spend at work, without exception and how to make the best use of time.

By 650 Islam carried on the same definitions of EVM, scheduling and incentives plans. The history of Islam has its rooted in a firm stand against economic exploitation. Prophet Mohammed

²³ Fraud. “Deuteronomy 24:14-15: The Wages You Have Withheld By Fraud.” *Edge Induced Cohesion*, 9 Jan. 2012, <http://www.edgeinducedcohesion.blog/2012/01/25/deuteronomy-2414-15-the-wages-you-have-withheld-by-fraud/>.

²⁴ Fraud. “Deuteronomy 24:14-15: The Wages You Have Withheld By Fraud.” *Edge Induced Cohesion*, 9 Jan. 2012, <http://www.edgeinducedcohesion.blog/2012/01/25/deuteronomy-2414-15-the-wages-you-have-withheld-by-fraud/>.

²⁵ By Author

²⁶ Fraud. “Deuteronomy 24:14-15: The Wages You Have Withheld By Fraud.” *Edge Induced Cohesion*, 9 Jan. 2012, <http://www.edgeinducedcohesion.blog/2012/01/25/deuteronomy-2414-15-the-wages-you-have-withheld-by-fraud/>.

(Peace be upon him) Said: Give the wages of the employee before his sweat dry²⁷(Ibn Majah, Hadith no. 2468). Allah has made a system for your day by day plan. Plan around your 5 daily prayers and things will begin to fall in place. Islam approaches the coordination of incentives by creating love among the hearts of Muslims and creating community and fostering cooperation²⁸(Q3:103). God reward peoples that follow the Quran and the Sharia law.

Back in 1700 and 1800s, EVM has been formalized by the productivity and scheduling of people. It was the period where many governments around the world pick up on EVM. According to the Guild of Project Controls Compendium and Reference (CaR), the notion of “Earned Value” has its roots in the 16th and 17th century’s industrial²⁹. It has been affiliated with a lot of advantages for both parts, the employers and the employees, as an increase in labor productivity, higher earnings, and lower job quit rates³⁰. It started with the publication of Micrographia in 1665 by Robert Hook followed by Modern schedule control tools, in 1750, finally the arrival of the Bar chart, in 1759 by Joseph Priestley³¹.

3. Combined History of Scheduling, Incentive pay and Earned Value Management (EVM) 1800 to 1900

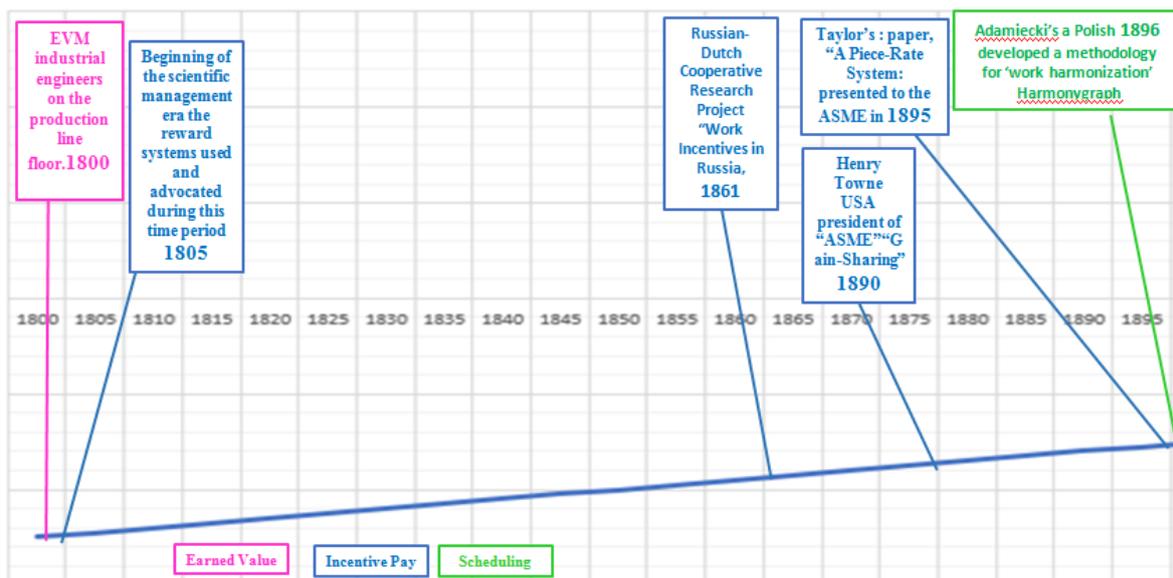


Figure 3: History of Scheduling, Incentive pay and Earned Value Management (EVM) 1800 to 1900³²

²⁷ Malouni, F. (2010). PROJECT MANAGEMENT: EARNED VALUE AND PROMPT PAYMENT PRACTICES OBSERVED FROM VIEW OF ISLAMIC SYARIAH LAW

²⁸ Abdul Majeed, Ajmal. "EMPLOYER -EMPLOYEE OBLIGATIONS IN ISLAM." LinkedIn, 8 Jan. 2016, www.linkedin.com/pulse/employer-employee-obligations-islam-ajmal-bin-abdul-majeed/.

²⁹ Planning Planet. (n.d.). Guild of Project Controls Compendium and Reference. Retrieved October 30, 2018, from: <http://www.planningplanet.com/guild/gpccar/introduction-to-managing-project-controls>

³⁰ Guild of Project Controls. (2015, November 2). Introduction to Managing Project Progress. Retrieved from <http://www.planningplanet.com/guild/gpccar/introduction-to-managing-project-progress>

³¹ Weaver, P. (2018). A BRIEF HISTORY OF SCHEDULING - BACK TO THE FUTURE -. [online]

Mosaicprojects.com.au. Available at: https://mosaicprojects.com.au/PDF_Papers/P042_History_of_Scheduling.pdf [Accessed 4 Apr. 2006].

³² By Author

A fundamental type of EVM can be traced back to industrial engineers on the production line floor in the late 1800s³³. This historical period spanning the late 1800s to the early 1920s known as the scientific management era is where the reward systems were used and advocated. It helped in understanding how and why systems of today have evolved. The International Institute of Social History started a three-year Russian-Dutch Cooperative Research Project “Work Incentives,” between 1861-1999. In 1895, a paper was written by Taylor’s., “A Piece-Rate System presented to the ASME, it was called scientific management. It identifies that workers would not increase their productivity unless assured a good liberal increase, which must be permanent. In 1889, Henry Towne a president of the American Society of Mechanical Engineers “ASME,” wrote paper “Gain-Sharing. It was a plan that ensured workers a guaranteed wage rate, or gains³⁴. The evolution of scheduling during this period began in 1896 with the Polish Adamiecki’s who developed a methodology of “work harmonious “Harmony graph” creating harmonious teams, efficient scheduling, and compatible, measurable means of production³⁵.

4. Combined History of Scheduling, Incentive pay and Earned Value Management (EVM) 1900 to Present.

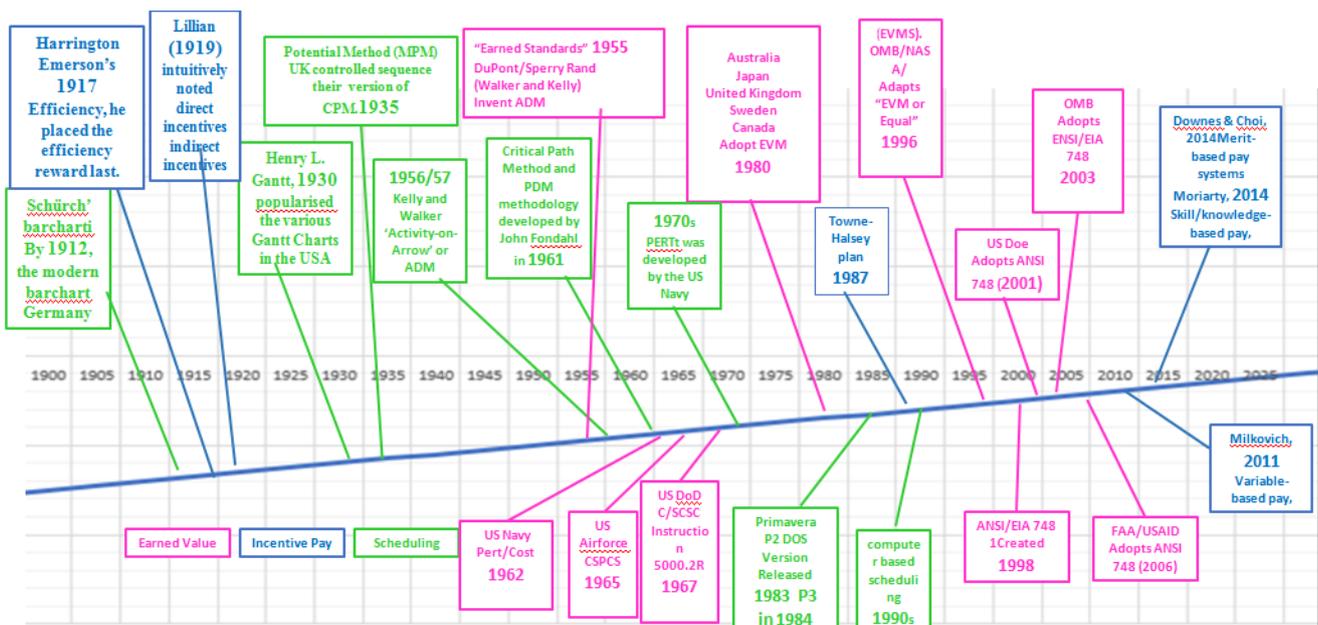


Figure 4: History of Scheduling, Incentive pay and Earned Value Management (EVM) 1900 to Present ³⁶

³³ Young, H and Anbari, F. (2012)“Project Management in Government: An Introduction to Earned Value Management (EVM)” [online] Available at: https://isulibrary.isunet.edu/doc_num.php?explnum_id=451

³⁴ L. Caudill, H. and D. Porter, C. (2014). *An Historical Perspective of Reward Systems: Lessons Learned from the Scientific Management Era.* [online] Macrothink.org. Available at: <http://www.macrothink.org/journal/index.php/ijhrs/article/viewFile/6605/5519> [Accessed 5 Nov. 2018].

³⁵ Weaver, P. (2018). A BRIEF HISTORY OF SCHEDULING - BACK TO THE FUTURE -. [online] Mosaicprojects.com.au. Available at: https://mosaicprojects.com.au/PDF_Papers/P042_History_of_Scheduling.pdf [Accessed 4 Apr. 2006].

³⁶ By Author

By the late 1950's-1960's, Governments picked up on EVM. First, it was presented by the U.S. government as an indispensable piece of the Cost/Schedule Control System Criteria (C/SCSC) to comprehend the budgetary parts of projects and to be utilized in comprehensive securing programs trying to set up a stable methodology dependent on the best practices. The process, varieties, or parts of it have been used under a few names, for example, Earned Value Project Management, Earned Value Method, Earned Value Analysis, and Cost/Schedule Summary Report. To empower the utilization of EVM, the national government chose to remove C/SCSC before 1996 and moved in the path of a more adaptable EVM System (EVMS). The American National Standards Institute (ANSI)/Electronic Industries Alliance (EIA) distributed rules for EVMS at first in 1998³⁷.

Scheduling evolved during the period between 1912 to 1990 many charts and methods have been created: in 1912, the creation of Modern Bar chart by Schürch' bar chart. In 1930, Henry L. Gantt created Grant chart. 1950, Milestone chart, 1955 the UK created Potential Method, 1956, the development of CPM which was a computerized project management tool, 1961, Critical Path Method and PDM methodology developed by John Fondahl, 1970s PERT was developed by the US Navy, and finally by the end of 1990 no one was doing computer-based manual scheduling the creation of minicomputers to do the CPM was created³⁸.

At the same period, Incentive plans have evolved as well. In 1915, the ASME problem of “wage problem” has been raised. It was just in the last quarter of the twentieth century that a “theory of incentives” was developed. In 1917, Harrington Emerson's book “The Twelve Principles of Efficiency” placed the efficiency reward last, which was not a fair deal. Lillian (1919) instinctively noticed that there are two sorts of motivations: direct incentives and In-direct incentives. Yoder (1948) notes that “... all the many plans are similar in many features. The name of their designer, generally attached to them, frequently appears as the biggest single difference”³⁹. By 1987, Towne-Halsey plan was developed, his system greatly rewarded workers who attained the standard, while giving a much lower pay to those who did not meet the standard. In 2011, Milkovich used Variable-based pay, which includes the use of bonuses, stipends, and other forms of incentivized rewards, offer organizations more flexibility in implementing their compensation strategies in comparison to fixed-based pay programs. In 2013, Snell and Bohlander employed variable-based pay that 80% of companies in the United States use it nowadays. Individualized compensation is highly promoted. By 2014 Moriarty introduced Skill/knowledge-based pay, and its close derivatives called competency-based pay and values-based⁴⁰.

³⁷ Young, H and Anbari, F. (2012)“*Project Management in Government: An Introduction to Earned Value Management (EVM)*” [online] Available at: https://isulibrary.isunet.edu/doc_num.php?explnum_id=451

³⁸ L. Caudill,, H. and D. Porter, C. (2014). *An Historical Perspective of Reward Systems: Lessons Learned from the Scientific Management Era*. [online] Macrothink.org. Available at: <http://www.macrothink.org/journal/index.php/ijhrs/article/viewFile/6605/5519> [Accessed 5 Nov. 2018].

³⁹ Weaver, P. (2018). A BRIEF HISTORY OF SCHEDULING - BACK TO THE FUTURE -. [online] Mosaicprojects.com.au. Available at: https://mosaicprojects.com.au/PDF_Papers/P042_History_of_Scheduling.pdf [Accessed 4 Apr. 2006].

⁴⁰ Weaver, P. (2018). A BRIEF HISTORY OF SCHEDULING - BACK TO THE FUTURE -. [online] Mosaicprojects.com.au. Available at: https://mosaicprojects.com.au/PDF_Papers/P042_History_of_Scheduling.pdf [Accessed 4 Apr. 2006].

Finding:

The above timelines show the evolution of earned value management, scheduling, and incentive plans. How they complement each other and contribute to the success of the project and how they were proven to be efficient in many government and organizations around the world.

Nowadays, EVM come to deal with all different kind of issues being able to offers favorable critical returns over opponent project monitoring and control methods (e.g., Gantt diagrams, CPM, PERT, and PRINCE2). It coordinates cost, schedual, and performance to check projects and takes into account the count of cost and schedule differences, performance indices and figure project cost and schedual. It likewise features the requirement for corrective action. What's more, make pay for performance as a need to help in the advancement of duration and cost estimation performance measures, enabling all stakeholders to review and evaluate the effectiveness of their planned costs and scheduled durations throughout the project.

Earned Value Management (EVM) is a system consisting of a “toolbox” of tested and proven project management tools, techniques or methods for capturing physical progress, measuring, assessing and evaluating that tangible progress against an approved baseline and looking at both historical performance and predicted or forecast performance, analyzing and assessing the impacts and making recommendation⁴¹. These recommendations along with the supporting analysis are then formally presented to the appropriate stakeholders as the basis for them to make decisions based on as close to real-time progress against the plan as possible, and for owners to use in paying contractors promptly for their performance against the plan — also, the Guild advocates linking performance based on earned value to prompt payment for work done in considerable conformance to the specifications and requirements and otherwise meeting or fulfilling the contractual obligations⁴². It provides a real-time analysis on the performance of the project that is priceless for both the owner and the contractor: the owner has an excellent overview on the project progress and can have confidence in it, and the contractor has a more natural way to identify and address project’s performance issues.

⁴¹ Planning Planet. (n.d.). Guild of Project Controls Compendium and Reference. Retrieved October 30, 2018, from: <http://www.planningplanet.com/guild/gpccar/introduction-to-managing-project-controls>

⁴² Planning Planet. (n.d.). Guild of Project Controls Compendium and Reference. Retrieved October 30, 2018, from: <http://www.planningplanet.com/guild/gpccar/introduction-to-managing-project-controls>

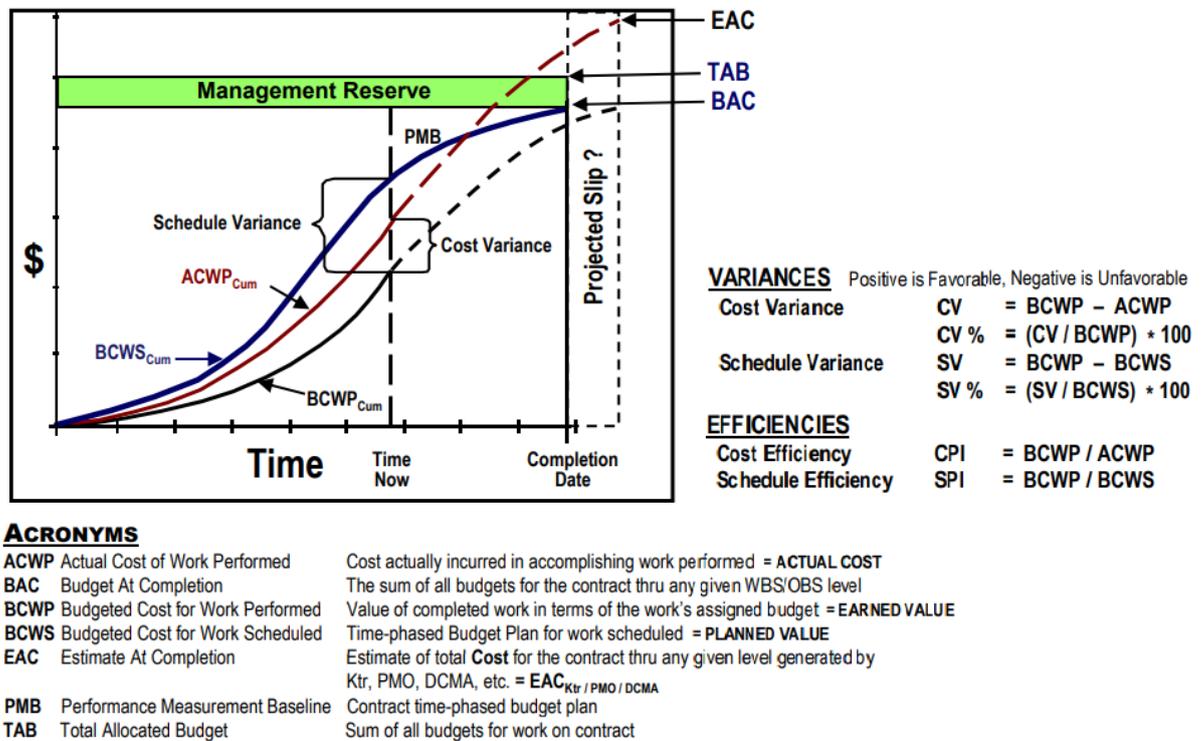


Figure 5 - DAU Earned Value Management 'Gold Card' ⁴³

According to guild “Performance management” or “pay for performance” is the process, which integrates the planning and scheduling processes and the cost estimating and cost budgeting processes to produce a Performance Measurement Baseline (PMB), which is approved by the appropriate levels of management. Once approved, this “PMB” which normally is shown, as an “S Curve” becomes the basis against which all physical progress is captured, analyzed and evaluated. The Performance Measurement Baseline is most often is viewed as what is known as the “S” Curve and it should consist of not one but TWO curves which have been defined by the project’s Cost and Resource Loaded schedule:⁴⁴

- **Early Date Curve** - generated with all activities scheduled to start AS SOON AS POSSIBLE
- **Late Date Curve** - generated by constraining all activities to start AS LATE AS POSSIBLE

This is what the PMB should typically look like from both the owner and contractor’s perspective:

⁴³ Defense Acquisition University. (2018, September). Earned Value Management 'Gold Card'. Retrieved from <https://www.dau.mil/cop/evm/Pages/Default.aspx>

⁴⁴ Planning Planet. (n.d.). Guild of Project Controls Compendium and Reference. Retrieved October 30, 2018, from: <http://www.planningplanet.com/guild/gpccar/introduction-to-managing-project-controls>

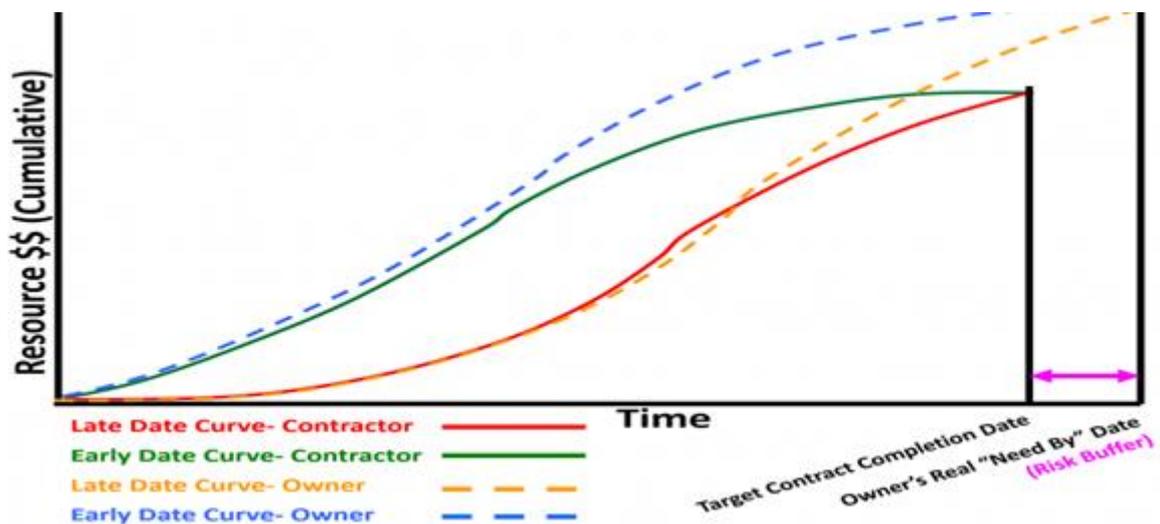


Figure 6: Showing owners Early and late date curves vs. Contractor’s early and late date curves⁴⁵

“Performance management” or “pay for performance” involves the 4 processes mentioned earlier: the planning, scheduling, cost estimating and cost budgeting processes. “Pay for performance” or “work incentive” is a scheme traditionally used by manufacturing companies to incentivize productivity or reward the achievement of quantity targets. According to the Guild of Project Controls Compendium and Reference (CaR), the notion of “Earned Value” has its roots in the 16th and 17th century’s industrial Revolution.⁴⁶ It has been affiliated with a lot of advantages for both, the employers and the employees, as an increase in labor productivity, higher earnings, and lower job quit rates, etc.

It is important to note that because one of the primary or most important objectives of a CPM schedule is to generate the early and late date “S Curves” or Performance Measurement Baseline (PMB) it requires that for both owner and contractor that every single activity be cost (resource) loaded as expressed in money over time. (Time phased budget).

CONCLUSION

To conclude, the above timelines show the evolution of earned value management and the relationship with scheduling and incentive plans and how it was proven to be efficient in many government and organizations around the world. There is a correlation between EVM and how government becomes clean. One of the most significant issues that the project manager in the government encounter when managing a project is how to maintain the performance of their employees. Talk with any Project Manager, in industry or government, and you'll see that two of the most widely recognized protestations are cost and schedule invades. In numerous cases there is no admonishing; plans slip, values slip, and the project manager is looked with the near-

⁴⁵ Guild of Project Controls. (2015, November 2). Introduction to Managing Project Progress. Retrieved from <http://www.planningplanet.com/guild/gpccar/introduction-to-managing-project-progress>

⁴⁶ Guild of Project Controls. (2015, November). Planning, Scheduling, Cost management and Forensic analysis. Retrieved from <http://www.planningplanet.com/guild/gpccar/introduction-to-managing-project-progress>

impossible task clarifying why each effect happened. Therefore, EVM, “Performance management” and “pay for performance” will be very beneficial in resolving the issue and they involve four processes, planning, scheduling, cost-estimating, and cost-budgeting operations.

Monitoring employees, contractor, and sub-contractor performance consist of measuring and assessing their advancement to survey the probability of meeting program and contractor prerequisites for cost, schedule, and technical suitability⁴⁷. Performance measurement is a piece of performance management, a procedure for making course amendments to accomplish a government organization's objectives by utilizing performance information to change assets, activities, and to monitor contractor performance, Governments must employ an performance based obtaining the management system, in light of ANSI/EIA Standard 748, to measure accomplishment of the cost, schedule, and performance goals⁴⁸. EVM is utilized to track a project's advancement and status and to estimate its presumable future performance. EVM doesn't only meeting the technical scope within cost and schedule parameters, reducing or eliminating schedule delays, and reducing or eliminating cost overruns which is a big problem in government organization and can leading to corruption inside an organization when there is no clear definition of how much it is going to cost and when is going to be done. But also when measuring the performance of employees contractor or subcontractor and define their wages based on their work will help in reducing corruption Whether civil servants are appropriately compensated or grossly underpaid this will affect motivation and incentives. And lead them to ask for bribery to pay for their wages. This concludes to never separate payment from performance since they are linked and adding incentives will not only motivate employees and contractor but also eliminate corruption and bribery.

Using EVM, pay for performance and incentive plans for individuals and contractors will enable them to do the work on time and at a reasonable cost. It is essential to define how much to give (and under what circumstances) to elicit the most effective performance. This could be paying a “bonus” to subcontractors to have them move their work on your project and give them the ability to hire qualified people to do the work. Also added motivation (via a valued item or service) could affect the prioritization of the work and improve its schedule; for example, incenting a contractor to add additional workers to speed up your timeline to help make a critical date. You would not be “paying” someone to perform work they would not otherwise be doing, or to bypass governance regulations, but rather providing them performance incentives that may motivate them to improve their delivery on your project. U.S.A. government contracts sometimes include incentive payments for early project completion. Thus by doing so, you will reduce the temptation to slip over to “the dark side” and participate in corruption. There is a lot of benefit by using these EVM pays for performance and incentives correctly. Therefore this will end corruption and will focus on maintaining fairness, and proper governance.

⁴⁷ Suresh, S. and Ramasamy, G. (2015). *Analysis of Project Performance Using Earned Value Analysis*. [Online] Ijsetr.org. Available at: <http://ijsetr.org/wp-content/uploads/2015/04/IJSETR-VOL-4-ISSUE-4-1080-1085.pdf> [Accessed 4 Apr. 2015].

⁴⁸ Ziyash, A. (2018). *Earned Value Management and its Applications - Project Management World Journal*. [online] Project Management World Journal Available at: <https://pmworldjournal.net/article/earned-value-management-and-its-applications/> [Accessed May 2018].

The timeline illustrated a clear correlation between Sharia law and EVM. There are two main sources of Sharia law in Islam, the sacred text of Al-Quran and the day-to-day life of Prophet Muhammad, a Hadits. The Sharia law touches even the very basic of living aspect of humankind. There are Hadits and Quran texts, which were proven to relate to payment in Islam⁴⁹.

Sharia law urges every Muslim to pay any earned work as per agreed completion milestone promptly. Any delivered work by the employee or contractors needs to be rewarded as soon as it is accomplished with the reason of fairness and prosperity. There is one Hadits, which teaches us on prompt payment of the worker. The utterance from the prophet of Muhammad, “Promptly pay your labor/employee worker salary before his sweat is getting dry, and told them how much their will paid while they are working”⁵⁰ (Hadist from Baihaqi & Ibnu Majah). Getting paid is fundamental for the survival of any business. Prompt payment gives business security. The money would promptly have a more significant peripheral effect on hiring and investment. As it's the little organizations that are owed, that money would go to organizations with a more prominent need and would not be for putting away money on their balance sheet. Moreover, because of the multiplier impact, anyway quite a bit of that cash was then spent it would subsequently have a much more effect on economic development. There are two principal sources of Sharia law in Islam, the holy text of Quran and traditions assembled from the life of Prophet Muhammad, a Hadits.

The Middle East and North African countries are among the most corrupt countries in the world, according to the Transparency International, a non-government organization that was founded in 1993. TI publishes the ranking of all corrupted countries around the world in their Corruption Perceptions Index. The CPI positions nations by their dimensions of corruption, as dictated by expert assessments and conclusion survey. The organization, for the most part, characterizes evil as "the abuse of open power for private advantage (Transparency International). The CPI 2017 ranks 176 countries/territories on a scale from 100 (very clean) to 0 (highly corrupt)⁵¹.

⁴⁹ Fraud. “Deuteronomy 24:14-15: The Wages You Have Withheld By Fraud.” *Edge Induced Cohesion*, 9 Jan. 2012, <http://www.edgeinducedcohesion.blog/2012/01/25/deuteronomy-2414-15-the-wages-you-have-withheld-by-fraud/>.

⁵⁰ Translated from: Buku Pintar Hadits, page.1009, Upah (Gajih) ,Syamsul Rijal Hamid, Gramedia, August 2008.

⁵¹ International, C. (2018). *Corruption Perceptions Index 2017 by Transparency International – THE NAGA REPUBLIC*. [online] THE NAGA REPUBLIC. Available at: <http://www.thenagarepublic.com/files/corruption-perceptions-index-2017/> [Accessed 6 Nov. 2018].



Figure 11: Corruption Perceptions Index 2017⁵²

One of the principal purposes behind the high level of corruption is unfair payment terms and lack of payment management, scheduling and incentive plans inside government organizations among employees, contractors, and subcontractors. Transparency International has recognized the significance of tending to the conflict between performance-based motivators and corruption concerning bankers and money financial services organizations. In their Working Paper 02/15 "Incentivizing Integrity in Banks," they took a look at the issue of compensation for brokers specifically, and the impacts of pay bundles on corruption issues as follows:

“Up to this point, indicators for performance management have to a great extent neglected to represent non-financial performance, for example, conductor consistency, depending only on short-term quantitative benefit targets”⁵³. This added to honesty disappointments. According to a 2017 survey of experts, working in financial services, 33% said compensation structures or incentives pressure employees to compromise ethical standards or violate the law⁵⁴. To avoid the failures, employers should be given incentives for sustainable risk management.

Numerous organizations have been encouraged to build up a program for rewarding employees for whistleblowing regarding corruption.⁵⁵ “A more workable solution for making civil service salary competitive would be to focus on the performance-based component of gross pay, reflecting and rewarding each tax officer’s contribution to the success of anti-corruption policies and higher

⁵² International, C. (2018). *Corruption Perceptions Index 2017* by Transparency International – THE NAGA REPUBLIC. [online] THE NAGA REPUBLIC. Available at: <http://www.thenagarepublic.com/files/corruption-perceptions-index-2017/> [Accessed 6 Nov. 2018].

⁵³ *Human Resources Key Performance Indicators*. Journal of Competitiveness, Mar. 2012. Retrieved from <http://www.cjournal.cz/files/89.pdf>

⁵⁴ *Human Resources Key Performance Indicators*. Journal of Competitiveness, Mar. 2012. Retrieved from <http://www.cjournal.cz/files/89.pdf>

⁵⁵ Government Digital Service. “Whistleblowing for Employees.” GOV.UK, GOV.UK, 28 Jan. 2015, www.gov.uk/whistleblowing

collection rates”⁵⁶. It is assumed that the performance of any employee (public or private) will depend, to some measure, on how he/she is compensated. Based on that logic any sensible government needs to give priority to the issue of pay.

By making prompt payment to the contractor for work completed in substantial conformance to the specified quality standards and fulfilling the contractual terms and condition, also known as shall clauses, which will prevent or avoid contractor raising the interest rate. The government organizations have long struggled with payment delays, which reduce cash flow, decrease efficiency, and hurt small businesses and their employees. The Middle East and North Africa the investigation into corruption in the government organization established that payment delays carried organized crime into the company since sub-contractors were compelled to look for financing from unpredictable sources to pay their employees when their cash flow dried up⁵⁷.

By adopting EVM, scheduling and incentive plans all the above problems of corruption will be resolved inside North African and Middle East government organizations. According to Guild to realize the full value earned value management offers, it advocates linking performance based on earned value to prompt payment for work done in substantial conformance to the specifications and requirements and otherwise meeting or fulfilling the contractual obligations⁵⁸.

North African and Middle East government organizations should embed these global best practices into their delivery, to effect successful change management and continuous improvement. Within their structures, EVM can be an essential tool for successful program and project delivery within the government structure and can help in reducing the level of corruption among government organizations.

The Middle East and North Africa should embrace Earned Value Management, not only because it is a "best tested and proven" practice but also more importantly because it is consistent with their religious beliefs and teachings. As Muslim nations, it is essential to follow the Sharia law since it urges them to be fair and pay the workers on time. Any delivered work by the employee or contractors needs to be rewarded as soon as it is accomplished with the reason of fairness and prosperity. Getting paid is fundamental for the survival of any business. Prompt payment gives business steadiness. The money would quickly have a more significant marginal effect on hiring and investment. As it's the little organizations that are mainly owned, that money would go to organizations with a more prominent need and would not be for putting away money on their balance sheet. Besides, as a result of the multiplier impact, quite a bit of that cash was then spent it would thus have a much more effect on economic growth.

Fighting corruption inside North African and Middle East government organizations will have a lot of benefits on the future of the country. It will help these nations to gain it economics grow,

⁵⁶ Government Digital Service. "Whistleblowing for Employees." *GOV.UK*, GOV.UK, 28 Jan. 2015, www.gov.uk/whistleblowing

⁵⁷ Fraud. "Deuteronomy 24:14-15: The Wages You Have Withheld By Fraud." *Edge Induced Cohesion*, 9 Jan. 2012, <http://www.edgeinducedcohesion.blog/2012/01/25/deuteronomy-2414-15-the-wages-you-have-withheld-by-fraud/>.

⁵⁸ Planning Planet. (n.d.). Guild of Project Controls Compendium and Reference. Retrieved October 30, 2018, from: <http://www.planningplanet.com/guild/gpccar/introduction-to-managing-project-controls>

increase public revenue, Create more jobs, Fund social services, Improve infrastructure, Provide better health care, Alleviate poverty, crime rate will decline to Improve living standards, improved security, develop the country, and most importantly to make Muslim countries stand proudly among other nations. There will be peace and stability inside the country.

BIBLIOGRAPHY

1. Giammalvo, P. (2013). *Practical Look at How Private Sector Entrepreneurial Contractors Use Earned Value (And what “Lessons Learned” this might offer for State and Federal Governments)*. [online] Pmworldjournal.net. Available at: <https://pmworldjournal.net/wp-content/uploads/2013/07/pmwj12-jul2013-giammalvo-practical-look-entrepreneurial-contractors-evm-FeaturedPaper.pdf> [Accessed Jul. 2013].
2. Taman, Salma. *THE CONCEPT OF CORPORATE SOCIAL RESPONSIBILITY IN ISLAMIC LAW*. 2013, [online] Available at: www.mckinneylaw.iu.edu/iiclr/pdf/vol21p481.pdf.
3. Haseeb, M. (2015). *Islam And Human Resource Management*. [Online] Linkedin. Available at: <https://www.linkedin.com/pulse/islam-human-resource-management-muhammad-haseeb/> [Accessed 12 Jul. 2015].
4. Suresh, S. and Ramasamy, G. (2015). *Analysis of Project Performance Using Earned Value Analysis*. [Online] Ijsetr.org. Available at: <http://ijsetr.org/wp-content/uploads/2015/04/IJSETR-VOL-4-ISSUE-4-1080-1085.pdf> [Accessed 4 Apr. 2015].
5. Devine, Patrick, Esq. *When Must A Subcontractor Be Paid Under A “Pay-When-Paid” clauses?*. July/August 2006. The Publication for credit & finance professionals, National Association of Credit Management-Business Credit.[online] Available at: <http://www.jml.ca/wp-content/uploads/publications/Pay-When-PaidClauses.pdf>
6. Aguilar, Jenifer. *A Reprieve for Pay-If-Paid Clauses*. March 9, 2009. Vol.35, No.10, Connecticut Law Tribune. [online] Available at: <http://floridaconstructionlawgroup.com/understanding-pay-if-paid-and-pay-when-paid-clauses-in-a-construction-contract/>
7. Koprince J, Steven. *Is Your Pay-When-Paid Clause Worthless?*. Jan/Feb 2008. Legal Commentary Constructor. [online] Available at: <https://documents.akerman.com/ASE%20Commentary.pdf>
8. Jenkins Marzban Logan LLP-Lawyers. *Pay-When-Paid Clauses*, Construction Law, Suite 900, Nelson Square Box 12144,808 Nelson Street Vancouver, Canada.
9. Ahmed, H., Ul Ain Khan, N. and Ahmad, Z. (2015). *The concept of Performance measurement system in Islam*. [online] Pu.edu.pk. Available at: <http://pu.edu.pk/images/journal/szic/PDF/English/7%20Zafar%20Ahmad%20Dr.,%20Hailey%20College.pdf>.

10. Ziyash, A. (2018). *Earned Value Management and its Applications - Project Management World Journal*. [online] Project Management World Journal Available at: <https://peworldjournal.net/article/earned-value-management-and-its-applications/> [Accessed May 2018].
11. Sabadie, M. (2018). *Terms and Conditions for Payments - Project Management World Journal*. [online] Project Management World Journal. Available at: <https://peworldjournal.net/article/terms-and-conditions-for-payments/> [Accessed Jun. 2018].
12. Weaver, P. (2018). *A BRIEF HISTORY OF SCHEDULING - BACK TO THE FUTURE -*. [online] Mosaicprojects.com.au. Available at: https://mosaicprojects.com.au/PDF_Papers/P042_History_of_Scheduling.pdf [Accessed 4 Apr. 2006].
13. Morad, M. and El-Sayegh, S. (2018). *Critical Success Factors for Earned Value Analysis in Managing Construction Projects I*. [online] Pmworldjournal.net. Available at: <https://peworldjournal.net/wp-content/uploads/2018/09/pmwj74-Sep2018-Morad-ElSayegh-critical-success-factors-for-earned-value-analysis.pdf> [Accessed Sep. 2018].
14. Christensen, D. (1998). *The costs and benefits of the earned value management process*. *Journal of Parametrics*, 18(2), 1-16
15. Pomsmeetings.org. (n.d.). *Earned value analysis in project management: Survey and research potential*. [online] Available at: <https://www.pomsmeetings.org/confpapers/060/060-1448.pdf>
16. Willems, L. and Vanhoucke, M. (2018). *Classification of articles and journals on project control and earned value management*. [online] Pdfs.semanticscholar.org. Available at: <https://pdfs.semanticscholar.org/292e/bd8a76443085866816bd94c296338d0af532.pdf> [Accessed 3 Jul. 2015].
17. Rhodes, K. (2017). *Strategies for Improved Earned Value Management Use by Defense Business Leaders*. [online] Scholarworks.waldenu.edu. Available at: <https://scholarworks.waldenu.edu/cgi/viewcontent.cgi?referer=https://www.google.com/&httpsredir=1&article=5061&context=dissertations> [Accessed Jul. 2017].
18. Ekung, Samuel, et al. "PLANT SCIENCE BULLETIN." *Plant Science Bulletin*, 2005, *Volume 51, Issue 3*, 2018, [online] Available at: www.botany.org/PlantScienceBulletin/PSB-2005-51-3.php.
19. Malouni, F. (2010). *PROJECT MANAGEMENT: EARNED VALUE AND PROMPT PAYMENT PRACTICES OBSERVED FROM VIEW OF ISLAMIC SYARIAH LAW*
20. Shma. "Types of Incentive Plans." [online] Available at: <https://ManagementEducation.managementation.com/types-of-incentive-plans/>.

21. Guild of Project Controls. (2015, November 2). Introduction to Managing Project Progress. Retrieved from <http://www.planningplanet.com/guild/gpccar/introduction-to-managing-project-progress>
22. Young, H and Anbari, F “*Project Management in Government: An Introduction to Earned Value Management (EVM)*” [online] Available at: https://isulibrary.isunet.edu/doc_num.php?explnum_id=451
23. van der Linden, M. and Lucassen, J. (2001). *Work Incentives in Historical Perspective Preliminary Remarks*. [online] Iisg.nl. Available at: <http://www.iisg.nl/publications/respap41.pdf> [Accessed 5 Nov. 2018].
24. L. Caudill, H. and D. Porter, C. (2014). *An Historical Perspective of Reward Systems: Lessons Learned from the Scientific Management Era*. [online] Macrothink.org. Available at: <http://www.macrothink.org/journal/index.php/ijhrs/article/viewFile/6605/5519> [Accessed 5 Nov. 2018].
25. LOPEZ-CLAROS, A. (2014). *Six Strategies to Fight Corruption*. [online] Future Development. Available at: <https://blogs.worldbank.org/futuredevelopment/six-strategies-fight-corruption> [Accessed 5 Nov. 2018].
26. Mooney, L. (2015). *How to ensure prompt payments*. [online] ArabianBusiness.com. Available at: <https://www.arabianbusiness.com/how-ensure-prompt-payments-580881.html> [Accessed 5 Nov. 2018].
27. International, C. (2018). *Corruption Perceptions Index 2017 by Transparency International – THE NAGA REPUBLIC*. [online] THE NAGA REPUBLIC. Available at: <http://www.thenagarepublic.com/files/corruption-perceptions-index-2017/> [Accessed 6 Nov. 2018].
28. Fraud. “Deuteronomy 24:14-15: The Wages You Have Withheld By Fraud.” *Edge Induced Cohesion*, 9 Jan. 2012, <http://www.edgeinducedcohesion.blog/2012/01/25/deuteronomy-2414-15-the-wages-you-have-withheld-by-fraud/> .
29. Abdul Majeed, Ajmal. “EMPLOYER -EMPLOYEE OBLIGATIONS IN ISLAM.” *LinkedIn*, 8 Jan. 2016, www.linkedin.com/pulse/employer-employee-obligations-islam-ajmal-bin-abdul-majeed/.
30. *Human Resources Key Performance Indicators*. Journal of Competitiveness, Mar. 2012. Retrieved from <http://www.cjournal.cz/files/89.pdf>
31. Halbert, G. (1909). *Cost keeping and Management Engineering*. [online] Play.google.com. Available at: https://play.google.com/store/books/details/Halbert_Gillette_Cost_keeping_and_Management_Engin?id=7XAQAwwAAQBAJ [Accessed 9 Dec. 2018].

APPENDIX

| | Timeline for EVM | Timeline for scheduling | Timeline for Incentive plans |
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| BCE | | Scheduling and strategy 2500 years ago pyramids, from military perspective, transcontinental railways have been being built for some 200 years. | |
| BCE | Judaism enforce the concept of EVM 1213-1203 BCE from the Hebrew Bible, Deuteronomy 24:14-15 reads: “You shall not oppress a hired servant who is poor and needy, Each day you shall give him his wages, and not let the sun go down on it, for he is poor and has set his heart on it; lest he cry out against you to the Lord, and it be a sign to you.” | Torah texts Talk about scheduling and how to organize time efficiently. | In Judaism as all the religions have an afterlife reward for all people who follow the guidance from god. |
| AD | 1st century AD The Bible assumes that daily labor requires a daily wage so that it is not theft We see therefore that God requires people to be paid for the time and effort that they spend at work, without exception | <u>Ephesians 5:15-17</u> ESV / 4 helpful votes Helpful Not Helpful Look carefully then how you walk, not as unwise but as wise, making the best use of the time | “With sweat on your brow shall you eat your bread, until you return to the soil, as you were taken from it.”a verse from the bible insisting on work to be rewarded and gain your living. |
| 600-700 | Prophet Mohammed (Peace be upon him) Said: “ Give the wages of employee before his sweat dry” | Allah has created a framework for your daily schedule. Plan around your 5 daily prayers and things will start to fall in place. Whether you are | Islam approaches the coordination of incentives by creating love among the hearts of Muslims and creating community and fostering |

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| | (Ibn Majah, Hadith no. 2468) The history of Islam has rooted in a firm stand against economic exploitation. | booking a flight or creating a seminar, there is embedded wisdom in pivoting your tasks around your prayers. | cooperation. (Q3:103). God reward people that follow the Qoran and the sharia |
| 1600-1650 | | | |
| 1650-1700 | | Robert Hook published <i>Micrographia</i> , in 1665b that used diagrams to describe specimens viewed through an early microscope; | |
| 1700-1750 | | Modern schedule control tools can trace their origins to 1750. | |
| 1750-1800 | | Bar chart appears to be Joseph Priestley William Playfair (1759-1823) in his 'Commercial and Political Atlas' of 1786. | |
| 1800-1850 | EVM 1800's can be traced back to industrial engineers on the production line floor. | | the historical period spanning the late 1800s to the early 1920s, a period known as the scientific management era the reward systems used and advocated during this time period will help in understanding how and why systems of today have evolved |

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| <p>1850-1900</p> | | <p>Adamiecki's a Polish 1896 developed a methodology for 'work harmonization' Harmonygraph creating harmonious teams, practical scheduling, and compatible, measurable means of production</p> | <p>The International Institute of Social History started a three-year Russian-Dutch Cooperative Research Project "Work Incentives in Russia, 1861-1999: Compensation, Commitment and Coercion</p> <p>Taylor's wort a paper, "A Piece-Rate System: presented to the ASME in 1895, called scientific management. Identify that workers would not increase their productivity unless assured a good liberal increase, which must be permanent.</p> <p>Henry Towne a president of the the American Society of Mechanical Engineers "ASME" in 1889, wrote paper "Gain-Sharing. Was a plan that ensured workers a guaranteed wage rate, or gains.</p> |
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| <p>1900-1950</p> | <p>“Earned Standards”</p> <ul style="list-style-type: none"> • DuPont/Sperry Rand (Walker and Kelly) Invent ADM Invent ADM 1950 | <p>Schürch’ barcharti By 1912, the modern barchart seems to have been fully developed and in use at least in Germany. e bar chart correlates activities and time in a graphical display allowing the timing of work to be determined but not interdependencies</p> <p>Henry L. Gantt, 1930 popularised the various Gantt Charts in the USA through his books. Interestingly, Gantt's charts are machine shop production control tools</p> <p>Line of Balance (flow line) used on the Empire State Building and Milestone charts 1950s.</p> | <p>Drury (1915)the ASME problem they considered almost exclusively was termed the “wage problem”</p> <p>It was only in the last quarter of the twentieth century that a “theory of incentives” emerged from a deeper examination of a cluster of problems related to conflicting objectives, asymmetric information, and coordination of group efforts</p> <p>In Harrington Emerson’s 1917 book, The Twelve Principles of Efficiency, he placed the efficiency reward last. This placement may have been due, in part, to his firm belief that “no other subject is so disturbing as wages or requires so much of the ‘fair deal’.</p> <p>bonus system which grouped efficiency ranges and equated a percent bonus for each range</p> <p>Lillian (1919) intuitively noted that there are two kinds of</p> |
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| | | | <p>incentives, direct incentives which include ambition and pride of the worker, and indirect incentives which include rewards and punishment</p> <p>Yoder (1948) notes that "... all the many plans are similar in a number of features. The name of their designer, generally attached to them, frequently appears as the biggest single difference"</p> |
| <p>1950-2000</p> | <p>US Navy Pert/Cost 1962</p> <p>US Airforce CSPCS 1965</p> <p>1967, EVM was presented by the U.S. government as an indispensable piece of the Cost/Schedule Control System Criteria (C/SCSC) to comprehend the budgetary parts of projects US DoD C/SCSC Instruction 5000.2R 1967</p> <p>Australia Japan</p> | <p>Potential Method 1955 (MPM) was developed independently in Europe. The UK - ICI and CEGB10 ICI's 'controlled sequence involved in developing their version of CPM.</p> <p>The development of CPM 1956, as computerized project management tool. Mathematics to management The schedule that included 61 activities, 8 timing restraints and 16 dummies.</p> <p>1956/57 Kelly and Walker 'Activity-on-Arrow' or</p> | <p>Towne-Halsey plan 1987 his system greatly rewarded workers who attained the standard, while giving a much lower pay to those who did not meet the standard.</p> |

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| | <p>United Kingdom Sweden Canada Adopt EVM 1980-1990</p> <p>the national government chose to remove C/SCSC before 1996 and moved in the path of a more adaptable EVM System (EVMS). OMB/NASA/DoE Adapts “EVM or Equal” 1996</p> <p>The American National Standards Institute (ANSI)/Electronic Industries Alliance (EIA) distributed rules for EVMS at first in 1998 EVM ANSI/EIA 748 Created 1998</p> | <p>ADM scheduling methodology for DuPont. Critical Path Method and PDM methodology developed by John Fondahl in 1961, non-computer’ alternative to CPM.</p> <p>1970s PERTt was developed by the US Navy Special Projects Office, Bureau of Ordnance (SPO) invention of the term ‘critical path ’. ‘Programmer Evaluation Research Task Knowledge of the sequencing of activities’ and ‘a careful time estimate for each activity.</p> <p>ORS-CEGB 1960 which by these systems migrated to the ‘mini computers’ of the 1970s and 80s but remained expensive computer based scheduling 1990s no one was doing manual scheduling gant the number of people creating schedules on a part time, untrained basis exploded more expensive mini systems.</p> | |
| 2000-2018 | DoE Adopts | | Milkovich, 2011 |

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| | <p>ANSI/EIA 748 2001</p> <p>OMB Adopts ANSI/EIA 748 2003</p> <p>FAA/USAID Adopts ANSI/EIA 748 2006</p> <p>Earned Value provides us with a Schedule Variance, experienced project management people always say, “Look at your physical schedule or you won't know if you have a meaningful schedule variance issue.”</p> | | <p>Variable-based pay, which includes the use of bonuses, stipends, and other forms of incentivized rewards, offer organizations more flexibility in implementing their compensation strategies in comparison to fixed-based pay programs.</p> <p>Snell and Bohlander (2013), utilize variable-based pay 80% of companies in the United States use it. Individualized pay is highly promoted.</p> <p>Moriarty, 2014 Skill/knowledge-based pay, and its close derivatives called competency-based pay and values-based pay, is an individual incentive system that rewards employees for skills, knowledge, and competencies, as opposed to the positions they hold</p> <p>Downes & Choi, 2014 Merit-based pay systems that reward employees for their individual and oftentimes, group performance, have their roots in equity theory. Organizations</p> |
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| | | | must then balance the need to reward top performers without alienating the remaining workforce. |
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About the Author



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Yasmine Taybi is an MSc student in SKEMA Business School Paris France, major in Project and Program Management & Business Development (PPMBD). Before coming to France, Yasmine completed her studies at an American University in Morocco and hold a Bachelor's degree in Engineering and management science.

She has been working for 'IP plus consulting Inc' as a Junior Network Engineer. She worked with the Network Engineering department to develop efficient ways of implementing large data communications networks. In addition, she held a position of Business Sales Account Executive for 4 years in a 'Wireless telecommunications company' (USA). She was responsible to deliver innovative business solutions that change the way businesses connect. As well as developing strategy, to regularly interact with leadership, employees and various IT teams. She was leading a team of nine sales professionals to bring in new large enterprise accounts.

Yasmine has the potential to be a promising project manager. At the same time, she has great enthusiasm and interest in the IT field. Yasmine is now working on a master in sciences in Skema business school in France. In her course she was doing International Contract Management under the tutorage of Dr Paul D. Giammalvo, CDT, CCE, MScPM, MRICS, GPM-m Senior Technical Advisor, PT Mitrata Citragraha, to attain Guild of Project Controls certification.

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