Evolution of Project Management, Monitoring and Evaluation, with Historical Events and Projects that Have Shaped the Development of Project Management as a Profession

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Abstract: *The term 'project management 'was coined in the 1950s, initially with emphasis on activity scheduling, budgeting and control and remained so even with the advent of computers in management. In 1980s, it remained the same but with introduction of project information systems that ran on mainframe computers. In 1990's project management was redefined by wide range of fields such as operations management, systems thinking, new product development, risk management, the quality movement, organizational dynamics, industrial psychology and various other aspects of commercial management to become an independent discipline and profession. The understanding of what entails project management has evolved over the years and is still evolving today. Project management has grown from the stage of non-functional component of the management science, to the stage of strategic component of organizational development. In project management two of the most important processes within project management cycle, i.e. project monitoring and evaluation, are usually approached as side-activities by project managers and project management teams, whose unfortunate result is project or program failure. Project monitoring and evaluation has grown in significance and today it is part and parcel of the project cycle from conception to termination and beyond. The formation of Project Management Institute in 1969 marked the first major step in transforming project management into a profession. With increased globalization, the project manager should be able to work across networks, cultures, languages, geographical features and increased competition as well as collaboration. Project management has changed from an art to a science over time because of increasing standardization, continuous refinement of concepts and development and use of computer software. Scholars generally agree on the future of project management as a profession, but no agreement has been reached on when exactly modern project management started. It is however evident that modern project management is a direct result of the effort by the schedulers of 1960s to develop their discipline. The evolution of monitoring and evaluation has been influenced by developments in transport and communication, advances and application of management science, the invention and increased use of the personal computer and related software and continuous influence and application of modern technologies in all functions of project management. The growing complexity, technology advancement and changing legal environment and stakeholder concerns and challenges in managing projects has given rise to new fields directly related to project management like safety and sustainability. Concerns over sustainability of projects and programs are the main drivers for monitoring and evaluation today and hence the need to inbuilt sustainability in all aspects of project management.*

Keywords: History of project management; history of monitoring and evaluation; monitoring and evaluation; future of project management; historical projects; project management profession

1. Introduction to Project Management

1.1. Definition of Project Management

A project is an activity or undertaking that has definite start and end date(Atkinson, 1999)). It is unique in nature and brings change. Project execution is associated with some degree of uncertainty which introduces some risks (Alkin, & King, 2016). Project Management is concerned with delivering undertakings 'on time, within budget, to scope or specifications (Geraldi & Morris, 2011) by application of tools and techniques such as critical path method Atkinson, 1999). Seymour & Hussein (2014b) argues that at its core, project management is concerned with creating a conducive atmosphere for people to work as a team and achieve a common objective and deliver projects successful projects on time and within budget. Project management is about managing projects from conception to completion. A project can be viewed as a dynamic system changing from one stage to another in a lifecycle (Drop, 2009; Evaristo & Fenema, 1999). On what role projects should play Abbasi & Jaafari (2018) remarked that projects and programs should business benefits to organizations. The field of project management

continues to evolve (Seymour & Hussein, 2014). The projects can be single or multiple (Evaristo & Fenema, 1999. According to Söderlund & Lenfle (2013) projects played a significant role in the second industrial revolution and there is interest in understanding the role that projects played for evolution and transformation of society because among other reasons, there is a lot to learn from past land mark projects like the Pyramids of Egypt and The Great Chinese Wall. The history of projects and project management is a global phenomenon with variations across the globe.

1.2. Origin of Project Management

A number of projects like the canal projects, railway projects, road projects, power plants have played a significant role in industrial development and growth but not all have played a role in emergence of management theories and practices in projects and project organization. However the challenge is that the numerous and substantial projects that have been undertaken in history have little or no documentation about methodologies or techniques use and useful learning generated (Seymour & Hussein, 2014a). Therefore understanding the history of projects and project

management will help in understanding the roots of project management and evolution of current managerial practices. This may lead to recognition of innovative managerial salutations from the past on which to build on in improving the practice of project management (Söderlund & Lenfle, 2013). In his view Flyvbjerg (2006) argues that project managers and practitioners should not underestimate the power of examples and the generalizations borrowed from rich historical narratives and that historical examples can constitute such global and powerful examples that researchers can talk about, compare and use to support their decisions and positions. Seymour & Hussein, (2014a) argues that understanding the past enables better understanding of the future and hence prepare for it.

Therefore a better understanding of project management history has the capacity to create an improved understanding of challenges encountered in the process of shaping, creating and managing projects. Understanding project history will also help in creating a common ground between and amongst academics and practitioners in the context of knowledge and learning.

Several known old structures including the pyramids of Egypt, the Pantheon or the aqueducts of ancient Rome were projects in every respect and had individuals responsible for the management and actual construction. Therefore whereas the history of project management is relatively new, project management itself is not new in the wider scope of management practice. It's only after the project management discipline had been codified that reasonable effort was made to identify historical developments and events that contributed to its development, such as the creation of the Gantt chart and the Agile Manifesto. Today project management continues to grow and influence the way people do almost all that has a start and a finish or an end (Haughey, 2014; Geraldi, & Morris, 2011; Westland, 2018).

It should be noted that before project management was defined as profession, projects did exist, although they didn't share many of the foundations of today's project management. The pharaohs of Egypt built the pyramids around 2500 BC, but it is not quite clear how they accomplished such a huge task although records do show that the project was organized and had managers, who were responsible for each of the four faces of the Great Pyramid. Another example is the 208 BC construction of the Great Wall of China, which have records that indicate the planning went back even further. There is evidence in terms of historical data that the workforce for this large project was organized into groups. The three known groups were soldiers, common people and criminals. Millions of workers were ordered to complete the project.

Project control has existed for many centuries. According to Weaver (2007) the evolution of and scope control as dimensions of project management occurred during the 14th and 18th centuries respectively, but time management as the other dimension of a project lacked effective measurement and control too later dates. In the recent past, the increasing need for a clear and organized structure in industries like construction, transport and manufacturing in the 19th century led to the birth of project management as we

recognize it today. Beneficiary projects include the building of the Transcontinental Railroad and reconstruction of the southern states after the American Civil War (Haughey, 2014; Geraldi, & Morris, 2011; Westland, 2018). This suggests or implies that there was certainly leadership at play, and that there must have been some budget, even if open-ended, and scheduling of some sort. But with practice came process and refinement, as we shall see moving forwards.

It was not until the 1900s that project management as we know it began to take form. As projects became industrialized, the process to manage them also experienced a revolution (Westland, 2018). The modern form of project management as characterized by the tools used, techniques applied, language used ,and concepts that we now associate with it, first appeared in the early 1950s after which significant development has taken place to improve on knowledge, performance in, and management of projects. According to Seymour & Hussein (2014b) modern project management started in 1958 with the development of Critical Path Method (CPM) developed in 1957 by DuPont Corporation the Program Evaluation Review Technique (PERT) developed in 1958 by US Navy. In their view Abbasi & Jaafari (2018), project management as it is today was developed by the US military in 1950s and that the starting point for modern project management was development of tools like CPM and PERT.   A lot has developed on what project managers need to do in order to deliver them successfully. Later on, effort has been on how to realize project successes including recognition of the important role management plays in project realization (Geraldi, & Morris, 2011).

From the discussion, there is no agreement by historians and scholars on when modern project management started.

1.3. Project Management and Scientific Management

Project management is a problem solving method which involves planning techniques and methods that are similar to optimization theory and applied mathematics (Abbasi & Jaafari, 2018). The roots of project management are related to the appearance and development of scientific management theories developed by Frederick W. Taylor, Frank and Lillian Gilbreth, Henri Fayol and Henry Gantt (Grob, 2009). In 1911, a reference work was produced entitled "The Principles of Scientific Management" written by Frederick W. Taylor. In his work, Taylor postulated the scientific management principles, which in his opinion according to Drob (2010) are;
1) Use of scientific methods of work;
2) Scientific selection of employees and improving the skills of employees;
3) Good cooperation with employees;
4) Scientific division of labor in skilled and unskilled labor and its proper allocation between managers and workers.

Frank and Lillian Gilbreth had an important contribution to developing scientific management, mainly in the field of industrial psychology with their work regarding with this area was written by Lillian Gilbreth and entitled "The

Psychology of Management" which was published in 1912 (Grob, 2009).

In 1916, yet another book that had significant impact on management theory was published. The book was entitled "Administration Industrielle et Generale" (Industrial and General Administration), authored by Henri Fayol, a French engineer. Henri Fayol was regarded as the father of classical management theories of organization (Glob, 2009). Fayol noted that the basic principles of management should consider are;

1) Division of labor, which involves breaking down complex works into simpler and more consistent work and their allocation of specialized workers
2) Authority, which is viewed as the legitimate right to give orders;
3) Discipline, which implies the respect of the intern rules;
4) Unity of command, which means that each employee should receive orders from only one manager;
5) Unity of direction, which means that the entire organization to have the same vision and direction to pursue common objectives using a single plane;
6) The subordination of individual interests to those of the organization;
7) Remuneration, which must be properly determined according to performance of the workers;
8) Centralization, which implies that power and authority are concentrated at the upper levels of the organization's management;
9) Hierarchy, which involves establishing an adequate number of hierarchical levels, allowing for efficient movement of information both from the top to its base organization and vice versa;
10) order, which must be set up in the organization so that every employee and material object to have its place and to find there;
11) Equity and fairness set up in relations between managers and his staff;
12) Staff stability;
13) Encouraging initiative;
14) Development of team spirit.

The theories of scientific management have significantly shaped the development and practice of management. Project management is also grounded in these important theories of scientific management (Drob, 2009). According to Seymour & Hussein (2014a) advancement of science and technology have transformed project management to a full profession today. The origin of modern project management can be traced to quantitative research in planning oriented techniques and applications of engineering science and organization theory (Abbasi & Jaafari, 2018). In the United States, the father of project management is considered Henry Gantt, who developed a technique of planning and control, called the Gantt chart that is currently used in the project management (Drob, 2009). All these developments are grounded in scientific management.

1.4. The Study and Practice of Project Management

1.4.1. The practice of project management
The history of project management as a practice or profession dates back to the Construction of the pyramids of Egypt. As a practice or profession, project management was heavily influenced by research from the civil and construction industry. At the beginning, project management was closely associated with civil and built industry, and defense. The situation is different today and project management cuts across all industries from manufacturing, information systems, design, finance, service, arts and IT. The Project Management Institute has seen its membership grow from 334,000 members in 2010 to 445,000 in 2017 (Abbasi & Jaafari, 2018).Therefore project management continues to entrench itself as a popular profession globally in all industries as a result of the role of the Project management Institute.

1.4.2. Project management as an academic field
The understanding of project management has expanded beyond the original target or focus of executing and delivering projects. As an academic field, project management continues to grow with as demonstrated by growing number of project management related academic papers in peer reviewed academic journals and growing membership in project management related professional bodies (Abbasi & Jaafari, 2018).

1.4.3. Emerging fields in the study and practice of project management
The growing complexity, technology advancement and changing legal environment and
Challenges in managing projects has given rise to new fields directly related to project management of projects and programs like safety and sustainability (Abbasi & Jaafari, 2018).

1.5. Institutionalization of Project Management

Project management has evolved from a one-off independent undertaking to an institutional or organizational undertaking today. Abbasi & Jaafari (2018) observed that since 1950s organizations have enhanced the use of projects and programs to realize their strategic objectives. According to Geraldi & Morris (2011) there has emerged a third category in the development of project management which they called the institutional level. They proposed that project management can be thought of in terms of three levels, viz.

1) Level 1:Technical level
The nature of project management which emerged in 1950s and 1960s was mainly technical. This was in terms of the operational and delivery orientation or requirements. The technical, nature was both in terms of the engineering management character that combines project management, systems and engineering management. It involved use of tools and techniques that developed work breakdown structures, earned value, PERT, and value analysis. These have grown and developed to become the core to project management practice (Geraldi & Morris, 2011).

2) Level 2: Strategic level
The strategic level as presented by Geraldi & Morris (2011) involves managing projects as organizational holistic entities, covering project front-end development and definition and with a concern for value and effectiveness. As project management continued to develop, challenges of

sustainability started to appear in the late 60s and 70s, with growing cases of project failures, both in number of projects and visibility or impact. There are cases where projects failed due to lack of effective project management e.g. the case Concorde. In the 70s and 80s and beyond, the project environment became increasingly complex. This brought concerns and need over, safety and environment, risk and opportunity, value and benefits, ICT, new Supply Chain methods of management including partnerships, and new ways of procuring progressively. This more demanding environment with underlying challenges, and high rate of project failures in technology-intensive fields like nuclear power, oil and gas, software, and weapons systems, further stimulated evolution of project management to address these new challenges.

The focus of this level was to align projects strategy with sponsors managing technology, influence od stakeholders, establishing an appropriate communication platform, leadership, teamwork and putting in place appropriate governance structures and control mechanisms.

3) Level 3: Institutional level

This level involves managing the institutional dimension hence creating the context and support for project success. In this level, issues are raised against treating projects in isolation. According to Geraldi & Morris (2011) the institutional level operates outside and around the project. It requires that projects be treated not just as unique but should fit in the institutional framework for synergy. Particular challenge of the institutional level is how the enterprise can best gather, organize, deploy and use knowledge and improve its organizational learning, more so the long-term health and stability of the enterprise. There is still a tendency to emphasize the recording of explicit knowledge whereas tacit knowledge is widely seen as more valuable. This stage has seen more and more institutionalization of projects. At this institutional level, professional associations become useful as they play a central role in the development of project management, and at institutionalizing discipline, which is a requirement for any professional practice. At the heart of Level 3 is the concern with the relationship between agency and the institution. Managing within this third level is to work on or for projects while managing at the other two levels i.e. technical and strategic is to manage in them. Other concerns at institutional level are;

a) Organizational learning is a challenge of institutional level and includes issues on how best to gather, organize and deploy knowledge and improve performance.

b) Governance systems and structures to ensure accountable management and leadership including project structure with reporting and working relationships with and outside project teams. .

c) Stakeholder engagement which requires identification and recognizing needs and concerns of all stakeholders who should be treated as external customers.

d) Portfolio management which may involve prioritization in deployment of resources on basis of availability, risks, competition, potential sales, costs, benefits efficiency.

Therefore institutional level is concerned with organizational level issues which have a bearing on project performance and delivery but in a complete manner that is not limited to

any specific project or program requirements. It creates synergy among all projects and programs in an organization.

2. Historical Events that have Shaped Project Management

History is dotted with written and artefacts of projects undertaken many years ago. According to Haughey (2014) and Drob (2009) a number of major developments and events have contributed to the development of project management. They include among others;

1) 2570 BC: The Great Pyramid of Giza Completed in Egypt

The Pharaohs built the pyramids with ancient records showing there were managers for each face of the Great Pyramid, who were responsible for overseeing their work to completion. There are indications that there was some degree of planning, execution and control involved in managing this project (Haughey, 2014). Therefore project organization is not a new concept in project management based on this historical evidence.

2) 208 BC: Construction of the Great Wall of China

The Great Wall of China is yet another wonder of the world that was built since the Qin Dynasty (221BC-206BC). Available historical data, shows or indicate that the labor force was organized into three groups consisting of soldiers, the common people and criminals. The overall command was Emperor Qin Shihuang who ordered millions of people to finish this project (Haughey, 2014). This shows emergence of organization, and command structure in project execution.

3) 1917: The Gantt chart Developed by Henry Gantt (1861-1919)

Henry Gantt, can be described as one of the forefathers of today's project management. He created his self-named scheduling diagram, called Gantt chart which is in wide use today in project planning and management. This was a radical idea and an innovation of worldwide importance in the 1920s. One of its first uses was on the Hoover Dam project which commenced in 1931. Today, Gantt charts are still in use and they form an important part of the project managers' toolkit globally (Haughey, 2014).

4) 1931-1936: The Hoover Dam

This was a huge project that involved the construction of a giant dam on Colorado River, in the United States of America. It was named Hoover in honor of Hebert Hoover, who was the US president. The Hoover Dam 201 meters thick at the bottom and 221 meters in height and it remains one of the most impressive hydroelectric power plants in the world. The planning and execution of the project applied the Gantt charts (Drob, 2009).

5) The Manhattan Project(1942-1945)

This project will remain historic and significant globally due to its size and historical consequences. The project led to the production of the atomic bomb and involved 125,000 people (Drob, 2009). This is a historical project in that the atomic bombs were used during the World War II and consequently

brought the war to an end with death and destruction in Japanese cities of Hiroshima and Nagasaki.

6) 1956: The American Association Of Cost Engineers (Now AACE International) Was Formed

The AACE was formed in 1956 by the very early practitioners of project management and the associated specialties like planning, scheduling, cost estimating, cost and schedule control and few others. Today, the association remains one of the leading professional society for cost estimators, cost engineers, project schedulers, project managers and control specialists since its formation. In 2006, the association released the first integrated process for portfolio, program and project management with their Total Cost Management Framework. This was the first step in professionalizing project management (Drob, 2009; Haughey, 2014). Therefore it can be argued that the development of project management as a profession started in 1956.

7) 1956/1957: The Critical Path Method (CPM) Invented by the DuPont Corporation

CPM is a technique used to predict project duration by analyzing and identifying a sequence of activities with least amount of scheduling flexibility. This was historically the first project to introduce science into process time management and control. In 1956/57 Kelly and Walker embarked on the development of an algorithm which became CPM for E.I. du Pont de Numours (Weaver, 2007). The objective was as to address the complex process of shutting down chemical plants for the purpose of carrying out maintenance, and then upon completion of maintenance restart the plants. CPM proved effective and quite successful that it saved the corporation $1 million in the first year of implementation. The technique is still in use today in activity planning and scheduling in project management (Haughey, 2014).

8) 1958: The Program Evaluation Review Technique (PERT) was Invented for the U.S. Navy's Polaris Project

PERT was developed by The United States Department of Defense's US Navy Special Projects Office during the development of the Polaris mobile submarine-launched ballistic missile project. This was during the era of cold war that witnessed an arms race globally and hence the desire to attain military superiority and defensive capability was a priority. PERT is a method used to analyze tasks involved in completing a project. It is used analyze mainly the time needed to complete tasks and identify the minimum project duration. (Haughey, 2014). PERT technique involves building a PERT chart which is a network graph with details about project activities, their duration, and their dependencies. PERT takes consideration of risks and uncertainties using probabilities on activity. They are divided into three, namely, optimistic, pessimistic and one being considered as most likely event (Drob, 2009).

9) 1962: United States Department of Defense Mandate the Work Breakdown Structure (WBS) Approach

The United States Department of Defense (DOD) created the WBS concept as part of the Polaris mobile submarine-launched ballistic missile project. After completing the project, the DOD published the work breakdown structure that was used and allowed the use of the procedure in future projects of similar scope and size. WBS is a tree structure of deliverables and tasks that need to be performed to complete a project being undertaken. The WBS was later adopted by private sector project practitioners and today it remains one of the most commonly used project management tool (Haughey, 2014).

10) 1965: The International Project Management Association (IPMA) Founded

IPMA was the world's first project management association. It was started in Vienna, Austria as a forum for project managers to network and share information. It was registered in Switzerland, as a federation of about 50 national and internationally oriented project management associations. The vision of IPMA is to promote project management and to lead the development of the profession. Since its birth in 1965, IPMA has grown and spread worldwide with over 120,000 members in 2012 (Haughey, 2014). Therefore the development of The International Project Management Association was another step in entrenching project management as profession that it is today around the world.

11) 1969: Project Management Institute (PMI) Launched to Promote the Project Management Profession

PMI was founded by five volunteers as a non-profit professional organization dedicated to advance the practice, science and profession of project management. PMI was subsequently issued with Articles of Incorporation by the Commonwealth of Pennsylvania in 1969 this marked its beginning and in 1970, PMI held its first symposium in Atlanta, Georgia that was attended by 83 people. One of its significant contribution is publishing 'A Guide to the Project Management Body of Knowledge (PMBOK)' considered one of the essential tools in the project management profession today. The PMI offers two levels of project management certification, Certified Associate in Project Management (CAPM) and Project Management Professional (PMP). This certifications go a long way in ensuring professionalism in practice of project management (Haughey, 2014). The Project Management institute offers professional credibility in the field of project management. In 2006, there were over 200,000 people with recognized certification after passing exams administered by the project Management Institute (Drob, 2009).

12) 1975: PROMPTII Method Created by Simpact Systems Limited

Development of PROMPTII was in response to an outcry that computer projects were overrunning on time estimated for completion and original budgets as set out in feasibility studies. It was common to experience huge variations on the original estimates. PROMPTII was an attempt to solve this problem with computer projects. In show of success, in 1979, the UK Government's Central Computing and Telecommunications Agency (CCTA) adopted the method for all information systems projects (Haughey, 2014).

13) 1975: The Mythical Man-Month: Essays on Software Engineering by Fred Brooks

In his book, Fred Brooks's central theme is that "Adding manpower to a late software project makes it later." This idea is called Brooks's law. The book covers software engineering and project management .The extra human communications needed to add another member to a programming team is more than anyone ever expects. It naturally depends on the experience and sophistication of the human programmers involved and the quality of available documentation. It does not matter how much experience you have, the extra time discussing the assignment, commitments and technical details as well as evaluating the results becomes exponential as more people get added. These observations are from Brooks's experiences while managing the development of OS/360 at IBM (Haughey, 2014).

14) 1984: Theory of Constraints (TOC) Introduced by Dr. Eliyahu M. Goldratt in his Novel "The Goal"

TOC is an overall management philosophy that is geared to help organizations continually achieve their goal. The title comes from the view that any manageable system is limited in achieving more of its goal by a small number of constraints, and there is always, at least, one constraint. The TOC process seeks to identify the constraint and restructure the rest of the organization around it by using Five Focusing Steps. The methods and algorithms from TOC went on to form the basis of Critical Chain Project Management (Haughey, 2014).

15) 1986 Scrum Named as a Project Management Style

Scrum is an agile software development model that is based several small teams working in an intensive and interdependent manner. In their paper, 'The New New Product Development Game' published by Harvard Business Review in 1986, Takeuchi and Nonaka named Scrum as a project management style which was elaborated later by themselves., Although Scrum was intended for management of software development projects, it can be used to run software maintenance teams, or as a general project and program management approach. IT was therefore a significant contribution to project management practice (Haughey, 2014).

16) 1987: A Guide to the Project Management Body of Knowledge (PMBOK Guide) Published by PMI

PMBOK Guide was first published by the PMI as a white paper in 1987, the PMBOK Guide was an attempt to document and standardize accepted project management information and practices. The first edition was published in 1996, followed by a second in 2000, and a third in 2004. The guide is one of the essential tools in the project management profession today and has become the global standard for the industry (Haughey, 2014).

17) 1989: Earned Value Management (EVM) Leadership Elevated to Undersecretary of Defense for Acquisition

Although the earned value concept has been around on factory floors since the early 1900s, it only came to prominence as a project management technique in the late 1980s early 1990s. In 1989, EVM leadership was elevated to the Undersecretary of Defense for Acquisition, thus making EVM an essential part of program management and procurement. In 1991, Secretary of Defense Dick Cheney cancelled the Navy A-12 Avenger II program because of performance problems detected by EVM. The PMBOK Guide of 1987 has an outline of Earned Value Management (EVM) subsequently expanded on in later editions (Haughey, 2014).

18) 1989: PRINCE Method Developed from PROMPTII

This was published by the UK Government agency CCTA, Projects IN Controlled Environments (PRINCE) became the UK standard for all government information systems projects. A feature of the original method, not seen in other methods, was the idea of 'assuring progress' from three separate but linked perspectives. PRINCE method developed a reputation for being too rigid and applicable only to large projects, leading to a revision in 1996 (Haughey, 2014).

19) 1994: CHAOS Report First Published

The Standish Group collected information on project failures in the Information Technology (IT) industry with the objective of making the industry more successful, showing ways to improve its success rates and increase the value of IT investments. The CHAOS report is its biennial publication about IT project failure (Haughey, 2014). This was deliberate effort to improve on project success.

20) 1975-1983; Development of Project Management Soft wares

In 1975 by Bill Gates and Paul Allen created Microsoft Company which revolutionized computer technology. Project specific software were developed for project management. Other software companies came up for example Artemis (1977), Oracle (1977), Scythian Corporation (1979) and others. All of these companies later contributed to project management by developing project management specific software. In 1983, the Harvard Project Manager was launched, and was considered one of the first integrated software specialized for project management. This computer program could make planning of tasks, budget and resources. Subsequently, on the market dedicated to the project management programs appeared and other companies that proposed various solutions for solving specific problems of project management(Drob, 2009;Haughey, 2014). In 1998, in an article published in "Project Management Journal", identified top 10 seawares as;

a) Microsoft Project;
b) Primavera Project Planner;
c) Microsoft Excel;
d) Project Workbench;
e) Time Line;
f) Primavera SureTrak;
g) CA-Super Project;
h) Project Scheduler;
i) Artemis Prestige;
j) FasTracs.

After 1995, starting with the widespread diffusion of the Internet, the software used for project management began offering the option to connect and work jointly in an intranet or Internet network. Today, the softwares for project

management, are found in great diversity, both in terms of functions they develop and price that are sold on the market. In the late 90's of the last century, Project Management Institute has proposed a set of standards and practical guidance for this area, that are incorporated in a document known as PMBOK (Project Management Body of Knowledge), which defines the fundament of management project for several fields, such as engineering, construction, IT and so on (Drob, 2009; Haughey, 2014).

21) 1996: PRINCE2 Published by CCTA
This was an upgrade to PRINCE that was considered to be in order, and the development was contracted out, but assured by a virtual committee spread among 150 European organizations. Originally developed for Information Systems and Information Technology projects to reduce cost and time overruns; the second revision became more generic and applicable to any project type (Haughey, 2014).

22) 1997: Critical Chain Project Management (CCPM) Invented
The critical Chain Project Management (CCPM) was developed by Eliyahu M. Goldratt. The Critical Chain Project Management is based on methods and algorithms drawn from his Theory of Constraints (TOC) introduced in his 1984 novel titled, 'The Goal'. A Critical Chain project network keeps the resources levelly loaded, though need them to be flexible in their start times and to switch quickly between tasks and task chains to keep the whole project on schedule (Haughey, 2014).

23) 1998: PMBOK Becomes a Standard
The American National Standards Institute (ANSI) recognizes PMBOK as a standard in 1998, and later that year by the Institute of Electrical and Electronics Engineers (IEEE). This was a milestone in development of project management as a profession (Haughey, 2014).

24) 2001: The Agile Manifesto Written
In February 2001, 17 software developers met at The Lodge, Snowbird, and Utah resort to discuss lightweight software development methods. They published the Manifesto for Agile Software Development to define the approach known by the same name. Some of the manifesto's authors formed the Agile Alliance, a nonprofit organization that promotes software development according to the manifesto's 12 core principles. This was a step in promoting use of computers in project management practice (Haughey, 2014).

25) 2006: "Total Cost Management Framework" Release by AACE International
Total cost management is the name given by AACE International to a process for applying the skills and knowledge of cost engineering. It is also the first integrated process, or method of portfolio, program and project management. AACE first introduced the idea in the 1990s and published the full presentation of the process in the 'Total Cost Management Framework'. (Haughey, 2014).

26) 2008: 4th Edition of PMBOK Guide Released
The fourth edition of the guide continues the PMI tradition of excellence in project management with a standard that is easier to understand and implement, with improved consistency and greater clarification. The updated version has two new processes, not in the previous versions (Haughey, 2014).

27) 2009: Major PRINCE2 Revision by Office of Government Commerce (OGC)
A major revision has seen the method made simpler and more easily customizable, a frequent request from users. The updated version has seven basic principles (not in the previous version) that contribute to project success. Overall the updated method aims to give project managers a better set of tools to deliver projects on time, within budget and with the right quality (Haughey, 2014).

28) 2012: ISO 21500:2012 Standard for Project Management Released
In September 2012, the International Organization for Standardization published "ISO 21500:2012, Guidance on Project Management" after five year's work by experts from more than 50 countries. The standard was designed for use by any organizations, whether public, private or community groups. It can be used for any project (Haughey, 2014).

29) 2012: 5th Edition of PMBOK Guide Released
The fifth edition of the guide, published in December 2012, provides guidelines, rules and characteristics for project management recognized as good practice in the profession. The updated version introduces a 10th knowledge area called, 'Project Stakeholder Management' and also includes four new planning processes. This further enhances professional growth and development of project management practitioners.

After 1990s, project management developed to become an in depended discipline Globalization has brought greater challenges and the need for increased speed-to-market with products and services. Projects have become larger, more complex and increasingly difficult to manage. Teams are more diverse and spread across the world as opposed to one location. The world is changing, and project management must change to (Drop, 2009).

The appearance and development of project management occurred as a result of need to apply theory and practice of management to projects. The use of specialized software for project management has facilitated application of various tools and techniques (Drob, 2009). Therefore software development has made significant contribution to development and of project management tool and techniques.

2.1 Introduction to Monitoring and Evaluation

Monitoring and Evaluation (M&E) is a process whose main aim is help improve project Performance and achieve expected or planned results. The objective of monitoring and evaluation is to improve current and future management of inputs, outputs, outcomes and impact in projects and programs being executed by assessing the progress, performance and results of projects and programs, or even institutions, and organizations, whether international or local NGOs, government or individuals (United Nations Development evaluation Office, 2002). Successful

monitoring and evaluation requires participation of different players or stakeholders (Edmunds & Marchant, 2008). Monitoring and evaluation should be part and parcel of program and project design. This means that it should be embedded in every project and program and should not look like it is imposed later on (Sports and Development Organization, n. d.). Therefore, project monitoring and evaluation should be part and parcel of the project cycle from conception to termination and beyond.

There has been a growing desire for development effort to be more effective from scarce or limited resources and funds. For this happen, projects and programs must be well managed or executed for better outputs or results. According to Sports and Development Organization (n. d.) and Edmunds & Marchant (2008), the main objectives of monitoring and evaluation are;
a) Align monitoring and evaluation with results based management
b) Promote evaluation environment and learning around results in the process of execution.
c) Simplify policies and procedures used in project/program implementation.
d) Support internal and external accountability of a program/project.
e) Built organizational or program/project capacity.
f) Promote empowerment of beneficiaries and stakeholders of the project and program.

Monitoring and evaluation help improve performance and results. The overall purpose of evaluation is measurement and assessment of performance meet outcomes and outputs also called results. Traditionally, monitoring and evaluation focusses on assessment of inputs and implementation process. Today focus has shifted to assessing contributions of various activities to a given development outcome with such factors as outputs, participation, policy, procedures, brokering or coordination Project management uses information gained through monitoring and evaluation to improve strategies, programs and activities (Edmunds & Marchant, 2008).

2.2 Monitoring

Monitoring is a continuous function that aims at providing management and stakeholders with indications of progress or lack of progress in realization of project or program results. According to Edmunds & Marchant (2008), monitoring of inputs and outputs is monitoring and evaluation (M&E) at its very basic level where inputs are tracked. These inputs recorded or noted include human, physical and financial resources as well as how they are converted to outputs i.e. project goods and services. The indicators monitored are both financial and non-financial and are usually stored in a computer management system (MIS). At its basic level therefore monitoring is about keeping books or records of progress. According to Development Organization (n. d.), evaluation involves assessing in a systematic and objective way a project or program that is completed or a phase of an on-going project or programme that has been completed. Evaluations appraise information and data that guides strategic decision making hence leads to improvement.

Monitoring is a periodically recurring activity that begins in the planning stage of a project or programme and allows results, experiences and processes to be documented or recorded. Therefore monitoring is an integral part of evaluation (Development Organization, n. d.). Monitoring focuses on the following;
a) Quantity and quality of executed activities and how they are managed to give outputs.
b) Process used in the project and programme e.g. effects or changes that took place due to the interventions undertaken during implementation.
c) Processes that are external to an intervention i.e. impact triggered by implemented activities and other environmental factors.

Project monitoring and evaluation can be divided into two basic parts, namely costs side and benefits side which are explained below;
a) Costs side: This side is concerned with efficiency and dispatch of with which the project was implemented.
b) Benefits side: This side is concerned with the extent to which a project or program objectives were realized

Monitoring and evaluation of impact of an intervention is often more complicated while gathering evidence on benefits side may also be really expensive. The common denominator in both monitoring and evaluation is that both depend on baseline survey or study done prior to program/project implementation (Stanford University, n.d). Therefore monitoring and evaluation are significantly related and have common reference points.

2.2.1 Measuring impact and outcome
Monitoring and evaluation for outcomes and impact shifts from performance monitoring to results measurement where the system attaches the highest importance to providing feedback on results at the level of outcomes and goals. In performance monitoring, data can easily be obtained from internal institutional information systems, but in results based monitoring, beneficiaries are targeted for information on the project and how it has affected them. The main objective of monitoring results at the outcome level is to show who is benefiting and how the benefits are realized as well as show those who are not benefiting and so as to understand why they are not benefiting. This needs to be done while the program is being implemented so that corrective action can be taken. It is advisable to separate the monitoring of short-term (or early) indicators from the monitoring of medium- to long-term indicators. For the early indicators, rapid reporting is a critical factor, which as a consequence affects the choice of indicators and means of compiling or verification. Indicators that change slowly are not good indicators for measuring short-term outcomes, nor are those that are subject to extreme random fluctuations, evaluators should select and use indicators that respond quickly and that are easy to collect (Edmunds & Marchant, 2008).Therefore successful monitoring and evaluation requires careful selection of indicators to measure and there means of verification or measurement.

2.3   Evaluation

Evaluation is selective exercise whose objective is to systematically and objectively assess progress towards achievement of outcomes or results as planned. This involves assessment of scope and depth carried out at several points in time in response to changing needs for the purpose of knowledge and learning. Evaluation should never be a one-time event or activity, but rather continuous. The project and program relevance, performance and the processes ought to be assessed in evaluations (United Nations Development evaluation Office, 2002). The evaluation of a project or program can take many forms and, in general, requires specialist skills but independence of the evaluation team is important. Many evaluations are carried out as an internal exercise but in order to ensure that the evaluation is unbiased and fair and, more importantly, perceived as fair and unbiased by relevant stakeholders, it is preferable to use an independent team or expert having no connections with the project or program. Evaluation involves taking outcome indicators and establishment of a trend or relationship if any between the indicators and results. In the case where the objective or purpose is to determine the extent to which the change can be attributed to specific project interventions, the domain or level changes to impact evaluation and social policy and impact analysis. This requires information on key indicators before, during, and after the specific intervention in project execution. The complete evaluation should also identify any unexpected or unanticipated outcomes of project/program activities. This exercise requires relevant and sufficient data and information. Impact analysis requires information on key indicators before baseline data, during, and after the specific intervention or reform has been executed (Edmunds & Marchant, 2008).Therefore evaluation is an analysis or interpretation of data that is collected through monitoring and considers relationships between results of a project or program effects and overall impact.

2.3.1 Evaluation criteria and its origin/development

Evaluation criteria according to Atkinson (1999) and DAC (n.d.) is concerned with relevance, effectiveness, efficiency, impact and sustainability. The criteria was first articulated alongside evaluation principles in 1991. The overall objective of the criteria is to support better evaluation which will then lead to sustainable development or project/program success. The evaluation criteria includes;

a) Relevance; In evaluating relevance of a program or project, it is useful to consider whether or not and to what extend are objectives of the program still valid as originally proposed, are activities and output consistent with overall goal and objectives. Are activities and outputs consistent with intended impacts and effects?

b) Effectiveness; to evaluate for impact consider what happened as a result of the program or project, difference made by the activities to the beneficiaries and number of people affected.

c) Sustainability; When evaluating sustainability of the project or program, consider the extent to which benefits continue after funding ceased, what factors influenced the achievement or non-achievement of sustainability

d) Impact; Evaluation for impact of project or program considers what happened as a result of the program or project, real difference made by activities to beneficiaries and how many were people were affected.

e) Efficiency: Efficiency measures outputs in relation to inputs and generally requires comparison of alternative approaches. When evaluating program or project efficiency, evaluation should consider whether or not activities were cost effective, objectives were achieved within time and whether or not the project/program was implemented cost effectively.

2.4 Monitoring and Evaluation Analysis

M&E analysis uses data to make the following comparisons:
a) Comparisons over time or time series analysis,
b) Comparisons over space called cross-sectional analysis, and
c) Counterfactual comparisons with/without project/program.

A key aspect is to establish the extent to which interventions have yielded desired impact on the problem that the original analysis identified. It therefore have to establish a causal link between policy and outcome which statistical analysis alone may not determine (Edmunds & Marchant, 2008).

2.4.1 Comparisons over time

The most common use for monitoring and evaluation data is time series analysis which involves the tracking of one or more indicators over time to see how they change. The indicators don't have to be complex but the prerequisite is a continuous supply of consistent and reliable data over the period under consideration. The data may come from the service providers' own records and reports, from focus group discussions and community surveys, random sample surveys of intended beneficiaries or other techniques (Edmunds & Marchant, 2008).

2.4.2 Comparisons over space

Making comparisons over space requires the comparison of one population group with another which often involves making comparisons between different geographic areas or projects/programs. Sample surveys can be used but have a limit on size and there is a danger that, in trying to satisfy this data demand, the samples may be expanded to such a degree that the surveys become totally unmanageable or unsustainably expensive. A viable option is to employ a combination of tools and to use them to impute values at highly disaggregated levels. These techniques have been successfully developed and used in the context of poverty mapping (Edmunds & Marchant, 2008).

2.4.3 Counterfactual comparisons

Counterfactual comparisons seek answers to questions like "what would have happened had there been no intervention?" or "Suppose the project was designed differently?" This opens up opportunities for multi-strategy modelling and is where the analysis goes beyond such basic questions as "Are incomes rising?" and additionally probes the data to discover why incomes are or are not rising, and what they would have been like without intervention. The observation is that, there are several tools now available for monitoring and evaluating programs than before (Edmunds & Marchant, 2008)..

2.5 Reporting in Monitoring and Evaluation

Reporting is an integral part of monitoring and evaluation and is a systematic and timely provision of essential information at periodic intervals. Reporting on results or findings is used for both internal management purposes and for external accountability to stakeholders. The reporting provides program/project managers and stakeholders with an opportunity to reflect on what worked or what failed, thus enabling learning and correction actions to feed into the next stages or phases (Edmunds & Marchant, 2008).

2.6 Levels in Monitoring and Evaluation

According to Edmunds and Marchant, (2008), monitoring and evaluation takes place at two distinct but related levels;
a) Outputs level where specific products and services that emerge from the process inputs through the program, project and related activities.
b) Outcome level where changes in development conditions that are aimed at by the implementation agencies or donors and funders.

2.7 Feedback

This is the process within the framework of monitoring and evaluation where information and knowledge are disseminated and used to assess overall progress through results or confirm achievement of results realized. Feedback communicates findings, conclusions, recommendations and lessons leant from the program (Edmunds & Marchant, 2008).

2.8 Lessons Learnt in Monitoring and Evaluation

This is an instructive example based on experience that is based on the experience to a general situation rather than to a specific circumstance. Lessons learnt from an activity through evaluation are considered as evaluative knowledge which stakeholders are more likely to internalize if they are involved in the evaluation process. Lessons learnt can reveal good practices and strategies that can be adopted or bad ones to be avoided (UNDP Project office, 2002). Monitoring and evaluation are typically the core processes used in learning from experience. Leaning implies an analysis method or process that requires evidence as basis. Monitoring and evaluation in this case provides pointers or indications of how to do things better through better understanding of what worked better. Therefore monitoring and evaluation brings together information and teach (Edmunds & Marchant, 2008).

2.9 M&E, Accountability, and Governance

M&E has emerged as a tool for promoting development in its own right but only if M&E reports and findings are disseminated, stakeholders, civil society wider community. The information can then be used to make the management accountable. M&E information should not be used as a mere tool for policy-makers and planners. It should be readily available to all stakeholders thereby making monitoring and evaluation to tools for promoting democracy, good governance, and accountability (Edmunds & Marchant, 2008).

2.10 Differences between monitoring and Evaluation

Monitoring and evaluation are important management tools that are necessary to track the progress and facilitate decision making for present and future interventions. However, there are lots of differences between them. Some major differences between monitoring and evaluation are listed below:

Evaluation
1) Evaluation is the periodic assessment of the programs/projects activities
2) It is done on a periodic basis to measure the success against the objective i.e. it is an in-depth assessment of the program
3) Evaluation is to be done after certain point of time of the project, usually at the mid of the project, completion of the project or while moving from one stage to another stage of the projects/programs
4) Evaluation is done mainly done by the external members. However, sometimes it may be also done by internal members of the team or by both internal and external members in a combined way.
5) Evaluation provides recommendations, information for long term planning and lessons for organizational growth and success
6) It focuses on outcomes, impacts and overall goal
7) Evaluation process includes intense data collection, both qualitative and quantitative
8) Data collection is done at intervals only
9) It assesses the relevance, impact, sustainability, effectiveness and efficiency of the projects
10) Evaluation studies the past experience of the project performance
11) Evaluation checks whether what the project did had the impact that it intended
12) Helps to improve project design of future projects
13) Evaluation does not look at detail of activities but rather looks at a bigger picture
14) It looks at the achievement of the programs along with both positive/negative, intended/unintended effects.
15) Information obtained from evaluation is useful to all the stakeholders
16) Evaluation result is used for planning of new programs and interventions.
17) Answers the question "Are we doing right thing?"
18) Reports with recommendations and lessons act as a deliverable here.
19) Good or effective evaluation relies to some extent on good monitoring.
20) There are many quality checks in evaluation.
21) It provides information for proper planning

Monitoring
1) **Monitoring is the systematic and routine collection of information about the** programs/projects activities
2) It is ongoing process which is done to see if things/activities are going on track or not i.e. it regularly tracks the program

3) Monitoring is to be done starting from the initial stage of the projects
4) Monitoring is done usually by the internal members of the team
5) Monitoring provides information about the current status and thus helps to take immediate remedial actions, if necessary
6) It focuses on input, activities and output
7) Monitoring process includes regular meetings, interview, monthly and quarterly reviews etc. Usually quantitative data.
8) It has multiple points of data collection
9) It gives answer about the present scenario of the project towards achieving planned results considering the human resources, budget, materials, activities and outputs
10) Monitoring studies the present information and experiences of the project.
11) Monitoring checks whether the project did what it said it would do
12) Helps to improve project design and functioning of current project
13) Monitoring looks at detail of activities
14) It compares the current progress with the planned progress
15) Information obtained from monitoring is more useful to the implementation/management team.
16) Monitoring result is used for informed actions and decisions
17) Answers the question "Are we doing things right?"
18) Regular report and updates about the project/program act a deliverables here
19) Good or effective monitoring does not rely on evaluation results
20) There are few quality checks in monitoring
21) It provides information for evaluation

3. Historical Development of Monitoring and Evaluation

3.1 Introduction to evolution monitoring and evaluation

In the early days of project management practice, the focus was on the planning and execution of an Individual project. Emphasis in 2010s is on linking multiple projects with corporate organizational level strategies to enhance corporate competitiveness and performance. As a result projects are viewed as investments that form part of portfolios of projects. Organizations handling multiple projects need to make complex decisions to structure portfolios and to allocate resources to the individual projects, based on several criteria that include the strategic relevance and relative priority of each project. Computer systems have become essential in supporting these decisions. Despite some excellent developments in IT systems, software alone does not provide the ultimate answer to managing multiple projects – people skilled in the science and art of project management will always be required to make decisions (Steyn, 2010).The history of monitoring and evaluation is generally integrated with the history of program/project evaluation. The evaluation history is as long as the history of human activity which is full of problem identification, generation of alternatives and select the best

solution. The basic rationale of evaluation is to provide information needed for action or decision making and therefore contributes to rationalization of the process of decision making (Alkin& King, 2016; Shadish&Luellen, 2011). Evidence suggests that evaluation of personnel dates back to about 2200 B.C. in China. A number of developments in the first half of 20th century like the growth and refinement of theories and methods in social sciences, methods to improve evaluation of student achievement and the action research movement but Kurt Lewis made significant contribution to modern era program evaluation (Shadish&Luellen, 2011). Rapid expansion of government social programs of 20th century after the greatdepression of 1930s, the crash of stock market and collapse of banks had crippled the economy. After World War II, rapid economic growth in the US further contributed to the development of monitoring and evaluation (Shadish&Luellen, 2011; Hogan, 2007).

The beginning of 1960s saw evaluation grow and flourish as a profession through legislation and funding. Between 1968 and 1978, evaluation was so popular that in the US alone, 100 federal statutes advocated for evaluation of in the field of education alone. Additionally, state and governments funded program evaluation hence legitimizing evaluation as a core practice in project management and by 1980s there was a lot of financial motivation through funding for people to carry out project and program evaluations. With rapid rise in demand for evaluations, governments looked to evaluators in private sector and academia to fill the demand. At this time most evaluation related activities were in private sector aimed at improving profitability. The demand led to new training programs to train highly needed evaluators with relevant skills (Shadish&Luellen, 2011).

The 1970s and 1980s also so the transition of evaluation into a profession. Indicators included the creation of professional codes of conduct, professional publications, and professional societies. This include journals like Evaluation Review, American Journal of Evaluation, Evaluation and program planning, New Directions for Evaluation as well as two professional societies. They were Evaluation Network (ENet) and Evaluation Research Society which were founded in 1970s. In 1986, ENet and ERS merged to form American Evaluation Association. In 1994, AEA facilitated development of guiding principles for professional evaluation (Shadish&Luellen, 2011; Hogan, 2007).

3.2. Evolution of Monitoring and Evaluation in Project management

There has been some form of project management from the early civilization, but project management in its modern sense and form began in 1950s. Even though people have been managing projects for years, the term project management emerged at the end of the 20th century. However, a number of concepts that are important in modern project management can be traced to the protestant reformation in the 15th century. These among others include liberalism, capitalism, views that focus on individual or private wealth to improve society, Newtonianism in which people consult science for solutions. In this sense, Fredrick Taylor who is considered as the father of scientific

management made significant contribution to early project management concepts (Cleland. &Gareis, 2006; Tache&Spăşoiu, 2013; Haughey, 2014; Ramachandran, nd.). Project management has been evolving over many years and 1950s literature began to reflect the evolving theory and practice of project management. Project management has shown it's a rich heritage throughout its development of artifacts and cultural enhancements around the world. As the science of project management evolved, in complexity and application, monitoring and evaluation processes likewise got greater importance, in terms of methods and techniques from simple control tools, to sophisticated mechanisms, that combine one or more methods of tracking project progress (Cleland. &Gareis, 2006; Tache&Spăşoiu, 2013).

One of the challenges facing M&E is that it means different things to different people, and that they are disciplines that have been in a state of evolution. M&E began as a branch of applied research with much of the initial emphasis being placed on evaluation. But this view was soon challenged by those who saw it much more as a management tool. This school of thought placed the focus of the M&E reporting systems on project-level budget management and performance budgeting, and the users were mainly those with a financial or management interest in the project. By the early 1990s, there was a shift in focus from projects to sectors. A sector-wide approach (SWAP) became increasingly popular as a means of promoting and coordinating sector-wide and national development planning. Monitoring and evaluation became functions of sectoral ministries and appropriate M&E units were established at the ministerial level. In this period, expertise and skills were primarily on the data collection and processing side, not on the analysis of the data which often requires a good knowledge of the subject matter and related government policies. The analysis undertaken was primarily descriptive and the analysis of crucial links between specific poverty policies and their outcomes in living standards was missing. One had to turn to universities and research centers to find the appropriate analytical capacity. Still, useful capacity for poverty analysis was created during this period, and a number of excellent poverty assessments were prepared (Edmunds & Marchant, 2008).

3.3 Basics of Monitoring and Evaluation

The basics of monitoring and evaluation mechanisms have been established by Henry Gantt (who developed Gantt Diagram, recognized as the first tool for project planning and monitoring) and by Henry Fayol, who defined five management functions, of which control – evaluation function that still represents the base for the monitoring and evaluation processes is one of them. The two authors' papers are practically the precursors of resources allocation theory and of the WBS definition, two fundamental concepts that describe the objective, respectively the track of the monitoring and evaluation processes within the projects (Tache&Spăşoiu, 2013).

3.4 Development of Stochastic Methods

The next stage in the evolution of monitoring and evaluation mechanisms is represented by development of the

management stochastic methods like CPM, PERT. CPM – Was developed as a joint-venture of DuPont Corporation and Remington Rand Corporation while PERT was developed by Booz Allen Hamilton Corporation. These development of project management with these two stochastic methods found application to project management within a number of fields, including engineering, and manufacturing projects. These made project monitoring and evaluation quiet attractive to investors and managers. Other methods that were developed are CCPM (Critical Chain Project Management), XPM (Extreme Project Management), CEM (Critical Events Management) and PRINCE (Projects in Controlled Environments). The need for developing these systems and methods derive mainly from the fact that most approaches regarding the monitoring and evaluation processes follow a rigid logic, focusing especially on data (and not on information), technology (and not on human resources), on processes (and not on services) and on project management structures (rather than knowledge) (Bennets, Wood-Harper, & Mills 2000.; Sarantis, Smithson, Charalabidis, &Askounis, 2010; Tache&Spăşoiu, 2013). Based on these considerations a number of mechanisms for monitoring and evaluation of projects, currently used by project management teams, of which the most relevant are:

1) Gantt Diagram, used both for planning and monitoring the projects;
2) Logical Framework Matrix (LFM), tackled within a systemic framework approach;
3) Matrix Organization, meant for optimizing the relationships between project team members and for facilitating information exchange;
4) Probabilistic Management Methods (PERT, CPM, etc.), designed for both project planning and for their monitoring and evaluation;
5) Monitoring with specialized information programs (Microsoft Project, BaseCamp, Quick Base, etc.), used for tracking in real time the projects' evolution, but also for the dynamic and computerized resources reallocation;
6) Benchmarking techniques, on their basis being defined performance indicators, for the assessment of projects, processes and management relations, by relating to different reference levels determined in terms of similar projects performance that were developed in competitive organizations;
7) Balanced Scorecard Management Systems, through which the team members are provided with the necessary informational flows for decisions making process, on the base of leading indicators or lagging indicators;
8) Internal audits, whose utilization is susceptible to provide the team management with relevant information regarding the compliance to applicable standards, procedures and regulations;
9) Initial, intermediate and final activity reports.

3.5 Latest developments

Latest contributions in the field of project management focus on the reconfiguration of already existing techniques and tools for monitoring and evaluation, or on the adaptation of the monitoring and evaluation methods taken from other areas of research to the specific of the management projects. Today, M & E processes include both qualitative and quantitative components in an attempt to capture as

complete as possible a certain project progress and development Tache&Spăşoiu, 2013). One of the most used tools encompassing directory lines applicable to the field of project management is Project Cycle Management Guidelines, which asserts also a set of tools used in projects operation: logical framework approach, Key Quality Assessment, risk management matrix, progress reports, annual operational plans, and initial, intermediate and final activity reports, their sequence and the way they are simultaneously or consecutively applied during project implementation depending on a set of subjective and objective factors, but also on the ability, experience and expertise of the project manager (Gokhale& Bhatia, 1997; Tache&Spăşoiu, 2013). Beginning with the year 2003, projects management science was added up with the notion of Management of the projects portfolio, which redefines the role of monitoring and evaluation of the projects in terms of two main coordinates

a) Simultaneous monitoring of more than one project is complex and hard to manage and needs complex tools and mechanisms, that exceed the simple techniques applied punctually in most of the individual projects;

b) Evaluation is essential, because an accurate evaluation of a sample of projects within a portfolio will provide with sufficient information and practical elements so that the iteration of same mistakes within future projects that will be attached to the portfolio be prevented, thus contributing, on long term, to the increase of its value (Jonas, 2010).

In the 2000s and the advent of poverty reduction strategies that one started to see the coming together of project- and sector-based M&E efforts with poverty monitoring activities. The driving force behind this was the growing interest in evidence-based development and the need to establish national M&E programs centered on the monitoring of results. This also marked the beginning of a recognition that M&E information had uses that extended beyond serving as a tool for policy-makers and planners, and that, when made available to members of the public and to civil society, it could promote accountability in public sector managers and good governance. There are several important lessons to be learned from this short history in that during the early days when the M&E activities consisted primarily of an un-coordinated and disparate set of project level activities.

In the 1980s monitoring and evaluation were seen primarily as project-related activities. It defined monitoring as a continuous assessment both of the functioning of project activities in the context of implementation schedules and of the use of project inputs by targeted populations in the context of design expectations. It was seen as an internal project activity, an essential part of good management practice, and therefore an integral part of day-to-day management. Evaluation was presented as a periodic assessment of the relevance, performance, efficiency, and impact of the project in the context of its stated objectives. It usually involved comparisons in time, area, or population requiring information from outside the project (Edmunds & Marchant, 2008).

Almost 20 years later these terms were revised and updated by the DAC Network on Development Evaluation (2002) which defined monitoring as "a continuing function that uses systematic collection of data on specified indicators to provide management and the main stakeholders with indications of progress and achievement of objectives and progress in the use of allocated resources Thus, monitoring embodies the regular tracking of inputs, activities, outputs, outcomes, and impacts of development activities at the project, program, sector, and national levels. Evaluation was defined by the DAC as "the process of determining the worth or significance of a development activity, policy or program so as to establish the relevance and fulfillment of objectives, development efficiency, effectiveness, impact and sustainability of a project or program. An evaluation should provide information that is credible and useful, enabling the incorporation of lessons learned into the decision-making process of both recipients and donors (Edmunds & Marchant, 2008).

3.6 The synthesis of the evolution of the monitoring and evaluation mechanisms in correlation with the project management dynamic

	Period	Stage	Evolution Of Monitoring And Evaluation Mechanisms
1	1860-1900	Inception stage	First concerns regarding management as a science emerge while the mechanisms for monitoring and evaluation have not appeared yet.
2	1900-1955	Empirical stage	First base concepts of the project management, being outlined. First definitions and approaches of the project concept, with regard to civil engineering or to military services. As monitoring and evaluation tools used the Gantt Diagram and simplified versions of it
3	1955-1970	Applied stage	Need for efficient activity generated an anachronism regarding the relation between theory and practice. The CPM and PERT methods are used as monitoring and evaluation mechanisms and was made the first reference to Logical Framework Approach, respectively to Logical Framework Matrix.
4	1970-1990	Scientific stage	Theorization of the project management as a science develop. There emerge magazines and publications with regard to the project management, most of them being still current. Project management bodies emerge e.g. IPMA or PMI. The monitoring and evaluation mechanisms remain focused on Gantt Diagram, CMP and PERT methods and Logical Framework Matrix
5	1990-2000	Information stage	Project management follows the world economy approach, detaching practically from the status of technical science and going quasi-definitively to the sphere of economics sciences with use of software. Flexible management structures, such as matrix organization emerge including management through projects or also new methods and techniques (Balanced Scorecard).
6	2000-present	Strategic stage	Project management emerge as the key field of the organization strategy, capable of producing added value and competitive advantage. There developed companies that have as activity object the elaboration, development, implementation and project monitoring

3.7 Modern Evolution Approaches of Monitoring and Evaluation Processes within the Context of Project Management

Currently, on the background of amplifying the concerns for using efficient mechanisms for monitoring and evaluation of the projects, there emerged and manifest a set of approaches for upgrading the use of monitoring and evaluation mechanisms, taking into consideration the fact that both internal and external stakeholders of a project are aware of the impact of exerting complete and coherent processes of monitoring and evaluation of the project results. In this context, professional literature reflects three major approaches that manifest within the exertion of monitoring and evaluation processes and that generate a significant positive impact also on the tools used for exercising these two utterly important processes.

1) Correlation of monitoring processes with the project lifecycle

Starting with the project lifecycle, defined by PMI (1996), the theoreticians and the practitioners came to the conclusion that each stage of the project lifecycle has certain features that demand using some monitoring and evaluation tools, to the detriment of others, in terms of their advantages and disadvantages. Furthermore, the correlation of the monitoring and evaluation processes with the project lifecycle does not only regard the differentiate selection of the tools used for exerting monitoring prerogatives, but also regard the intensity of which these processes are exerted, through relating to other processes that are specific to the project management cycle.

2) Correlation of the monitoring and evaluation tools in complex mechanisms designed to these projects exertion

Each of monitoring and evaluation methods and techniques previously mentioned, individually approached, represent tools that facilitate the exertion of monitoring and evaluation processes and that substitute both the traditional direct observation (the oldest monitoring method) and the direct comparison (the oldest evaluation method). Each of these tools, presents advantages and limits, their individual use being efficient only on short term. On the other hand, using an unstructured mix of monitoring and evaluation tools is not indicated, this process being time consuming, and in most of the cases, human resources and financial consuming.

In these circumstances, the professional theory and practice put the problem of identification a sequence in using certain monitoring and evaluation tools, sequence that, through the combination of its elements, determines a monitoring and evaluation mechanism applied within a project, based on the principles of synergy effect. This approach manifests more and more significantly in the context of project management, the monitoring and evaluation mechanisms being organized either in terms of project team preferences, or in terms of the specific of the developed project. The emergence of new professions in the context of project management with attributions in monitoring and evaluation sphere.

Taking into consideration the fact that the monitoring process can prove time consuming and needs also capacities and personal abilities for its exertion in an efficient and compliant way, specialized companies in providing with services designed for project management generate qualified personnel in exerting monitoring processes. Additionally, more and more financing bodies (World Bank, EBRD, European Committee, commercial banks, credit cooperatives, etc.) double the guarantees claimed before grants through a monitoring process of the way the offered grants are used.

An eloquent example is represented by the situation of the projects that are financed from European funds, where to each project there is allocated a monitoring responsible, and within Management Authorities there are established committees/ departments or even monitoring directions of projects implementation, being thus emphasized their importance in the context of modern project management.

The materialization of these approaches leads to diminishing the negative impact currently exerted by a set of chronic factors on the efficiency of the projects monitoring and evaluation processes, respectively:

a) Lack of experience of the project managers and of the project implementation team regarding the correct and complete use of the monitoring and evaluation tools and mechanisms;

b) Inefficient use of budgets allocated for the exertion of the monitoring and evaluation processes, fact that makes them look insufficient in relation with the real existing needs within projects;

c) the mentality of traditionalist project managers, who consider the monitoring and evaluation processes as being preponderantly bureaucratic, that take much time and do not generate added value, reason why they subvert the role and the importance of these two processes in the good development of the projects;

d) Unsuitable combination of the methods and techniques, into inefficient

e) or illogical mechanisms, without realizing a correlation of the tools with the project lifecycle, with its dimensions, with its specific elements, or with other relevant factors for the correct definition of a monitoring and evaluation mechanism;

f) Concision lack and SMART objectives set, that lead to the impossibility of drawing some performance objectives;

g) Lack of a methodology for the collection of records and data regarding the projects implementation, so that these may be used as historical data sources for future similar projects;

h) Lack of project managers' involvement in the stage of fundamental monitoring of a significant information volume derived from the compliance monitoring of others similar projects.

The emergence and the dissemination of the three approaches, along with the obvious endeavors for repositioning the monitoring and evaluation processes in the context of project management represent sufficient arguments in order to justify the need for further study of the monitoring and evaluation mechanisms, thus to identify their applicability and vulnerabilities, so that the monitoring and evaluation processes can be developed in efficiency

circumstances and to achieve the goal for which they are included in the project management cycle.

Modern project which started in 1950s has been evolving subject to a number of developments in technology and applications. According to Seymour & Hussein (2014b) this developments can be used to divide evolution of project management into four as follows;

a) 1950-1957: First era characterized by advances in transportation and communication which affect logistics management.
b) 1958-79: Second era characterized by advances and application of management science
c) 1980-1994: This is second era characterized by innovation and development of the personal computer and application of related software and technologies.
d) 1995-to present : Advanced technology continues to influence project management in all fronts and functions

Therefore the evolution of project management has been influenced by developments in transport and communication, advances and application of management science, the invention and increased use of the personal computer and related software and continuous influence and application of modern high technologies in all functions of project management.

4. The Future of Project Management, Monitoring and Evaluation

The environment and dynamics of organizations continues to evolve in earnest. Therefore the challenges of future project managers continue to change and become more complex. Projects continue to increase in size and complexity and so the future project managers should adapt to new requirements, dimensions and specialty with respect to technology and methods used as well as skills requirements which continue to be unique and project specific. Information requirements too have increased and continue to increase with the project manager required to handle huge data in different forms. This implies growing need and use of information, communication technology (ICT). The project manager should therefore be able to understand the big picture and effectively communicate with stakeholders.

With increased globalization, the project manager should be able to work across networks, cultures, languages, geographical features and increased competition as well as collaboration. Therefore the future project manager should be able to cope with increased globalization and a complex project environment (Seymour & Hussein, 2014a).

Project management continues to grow as a profession and will become a leading player in the job market. According to Seymour & Hussein, (2014a) in 2009, project management ranked as the third most valuable skill by employers just behind leadership/negotiation skills followed by business analysis skills. This is a big indicator of the increasing importance of project management as a profession today and the future.

Increasing standardization, continuous refinement of concepts and development of software and its application in project management have together changed project management from an art to a science (Seymour & Hussein, 2014a).

5. Conclusion

Project management has developed based on scientific theories during 1950s and 1960s of the last century. From 1990s project management has grown into an independent profession or discipline. A more and more dynamic and complex business environment, effective project management is a key factor in achieving a sustainable competitive advantage in the market place. The term 'project management 'was coined in the 1950s, where it mainly involved scheduling, budgeting and control of activities. This continued even with advent of computers in management and in 1980s, it remained the same but with introduction of project information systems that ran on mainframe computers. In 1990s project management was redefined by wide range of fields such as operations management, systems thinking, new product development, risk management, the quality movement, organizational dynamics, industrial psychology and various other aspects of commerce. For the field of project management understanding the evolution of project management, monitoring and evaluation will create a better understanding of the project practices of the past, establish a stronger identity for those people interested in the project management of the past, and thereby also contribute to defining and redefining project management as a particular scientific management in the 1990s.

In project management two of the most important processes within project management cycle, i.e. project monitoring and evaluation, are usually approached as side-activities by project managers and project management teams, whose unfortunate result is project or program failure. It was noted that monitoring and evaluation tools for project managers, aimed to provide complete and relevant information about the progress of the project and that the present scientific approaches regarding project management are mostly focused on topics like resources' allocation, activities' scheduling, time management, forecasting various economic or financial indicators like IRR, NPV, Cost-Benefit Ratio while topics like monitoring or evaluating the projects' progress, during their entire lifecycle, are left optional. It is just recently that monitoring and evaluation was driven solely by observation and "trial and error". However, today knowledge and understanding has advanced and statistical and monitoring and evaluation methodologies have been formalized and are currently in use. One of the most visible gains from the pressure to monitor and evaluate progress towards the reduction realization of project and program been the reawakening of interest in and support for official statistics. Evidence-based development requires underpinning by statistical information and data. This focus on good data is supported by donors implementing the Paris Declaration on Aid Effectiveness, as its emphasis on the local ownership of development means that the donors are pulling back from actively managing the implementation of projects and programs to a more hands-off approach of

providing the resources and facilitating development partners' own efforts. With less direct control, donors are increasingly turning to setting objectives and targets to monitor whether development goals are being achieved.

Project management developed as a consequence existing desire to adapt the theory and practice of management to the projects. In practice, the application of the tools and techniques of project management is facilitated by the use of specialized software for project management. The real step to transform project management into a profession came with formation of Project Management Institute (PMI) in 1969 to promote the project management profession. PMI published 'A Guide to the Project Management Body of Knowledge (PMBOK)' considered one of the essential tools in the project management profession today.

Whereas there is agreement generally on the future of project management, historians and scholars have not agreed on when exactly modern project management started. However modern project management started in 1950s. The evolution of project management as well monitoring and evaluation has been influenced by developments in transport and communication, advances and application of management science, the invention and increased use of the personal computer and related software and continuous influence and application of modern technologies in all functions of project management.

As a science, the first project to introduce science to project management and control was the work undertaken by Kelley and Walker in 1956/57 by developing an algorithm that became the Critical path Method for DupontChemical Factory in the US. Therefore development of science has significantly influenced the evolution of project management, monitoring and evaluation.

The actual forerunners or catalysts for the development of discussions on project management and formation of associations to support new ideas and knowledge were the schedulers of 1960s. Therefore the development of project management to what it is today is a direct effort and result of the schedulers who needed a forum to develop their discipline.

With increased globalization, the project manager should be able to work across networks, cultures, languages, geographical features and increased competition as well as collaboration. Therefore the future project manager should be able to cope with increased globalization and a complex project environment. Project management has changed from an art to a science over time because of increasing standardization, continuous refinement of concepts and development and use of computer software. The growing complexity, technology advancement and changing legal environment and stakeholder concerns and challenges in managing projects has given rise to new fields directly related to project management like safety and sustainability. Concerns over sustainability of projects and programs are the main drivers for monitoring and evaluation.

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