ISSN 2278-3091
Volume 8, No.6, November – December 2019
International Journal of Advanced Trends in Computer Science and Engineering
Available Online at http://www.warse.org/IJATCSE/static/pdf/file/ijatcse114862019.pdf
https://doi.org/10.30534/ijatcse/2019/114862019

Proposal of a framework and integration of artificial intelligence to succeed IT project planning

Rachida HASSANI[1], Younès EL BOUZEKRI EL IDRISSI[2]
[1]National School of Applied Sciences of Kenitra, Morocco, rachida.hassani22@gmail.com
[2] National School of Applied Sciences of Kenitra, Morocco, y.elbouzekri@gmail.com

ABSTRACT

The integration of IT projects has become one of the main concerns of companies, especially in an era of digital transformation. A time, which has shown its exponential evolution.

The IT project-planning phase is one of the anticipated stages in the IT project life cycle that decides the success of IT projects. The planning of an IT project is also considered as an essential factor in measuring project success, as it defines the duration of the project that has a very direct impact on the cost of the project.

In this article, we have analysed the impact of digital transformation on the failure rate of IT projects, based on investigations carried out by international groups. Then, we analysed this data by adding to this a direct observation in the field for IT projects, in order to identify problems and risks related to IT project planning. Finally, the proposal of a solution that allows the integration of artificial intelligence for IT project planning. The proposed solution is in the form of a well-defined framework that addresses the issues identified. This framework makes it possible to define the inputs of an intelligent system that, in its role, questions a knowledge base that makes it possible to exploit the potential of feedback in order to generate a planning in the output.

The knowledge base must be initiated by the former projects, respecting the defined framework. This initialization data phase allows the system to learn in the most correct way, limiting the different risks to carry out a project planning (Training phase of the proposed system).

Key words : IT project management, Artificial intelligence, IT project schedule, digital transformation, standardization of the planning phase.

1. INTRODUCTION

According to the investigation data announced by the Standish Group International, in 2003 (Figure 1), among the 13,522 investigated projects in terms of the standards Group International, only 34% of projects were completed successfully, 15% of projects were cancelled before completion, and 51% of projects were completed but were doubted, because they were over budget, over schedule and so on. [1]

Figure 1: Success rate of IT projects, CHAOS Report, 2003

In addition, according to the CHAO Manifesto published by the Standish Group in 2013 (Figure 2), only 39% of projects are successful, while 43% of projects are challenged because they were over budget and over schedule, and 18% of projects are failing and was cancelled before completion. [2]

While each project has its own unique reasons for failure, most can be connected to these three areas: poor budgeting and scheduling, a lack of communication and transparency, and resistance to change. [2]

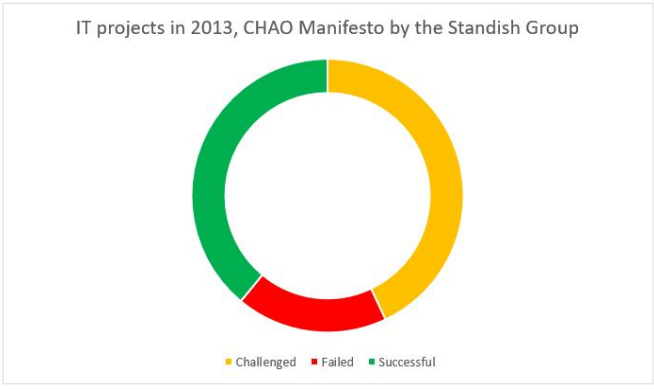

Figure 2: Success rate of IT projects, CHAOS Report, 2013

As well, in the recent Standish Group International's 2015 (Figure 3) pulse of the CHAOS report, among the 50000 international investigated projects, which includes an enhanced definition of success looking at some additional factors that were covered in previous surveys, it has revealed that only 29% of projects were completed successfully, 19% of projects were cancelled before completion, and 52% of projects were completed but were doubted. [3]

In the same report, it revealed that there is still work to be done to improve cost estimation, which impact directly the schedule, the cost and the quality of the project, because all the three are related in software projects. [3]

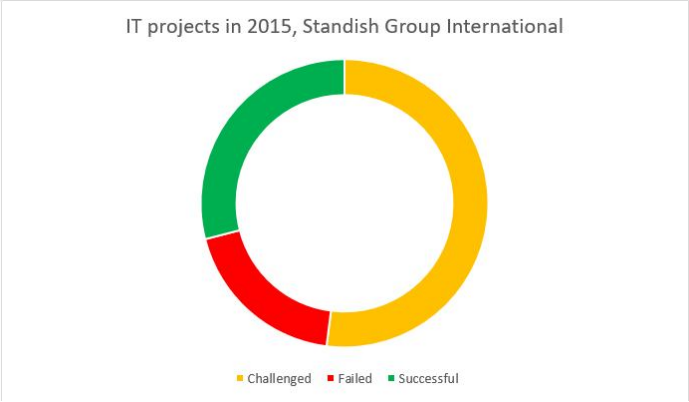

Figure 3: Success rate of IT projects, CHAOS Report, 2015

In addition, according to the annual survey of Wellington project management in 2017 (Figure 4), over than 34% of project schedules are not baseline. Baselining should occur at the end of the planning phase as part of approval to proceed. Actual progress can then be tracked against the baseline plan. Project managers should not only know where they are in the plan, but also where they are compared to where they should be. [4]

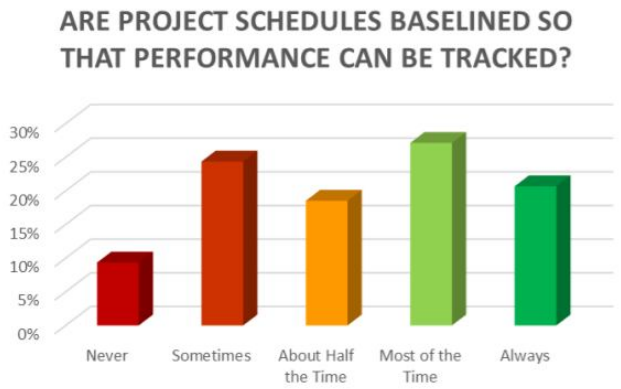

Figure 4: Project Schedules Baselined, Wellington Report, 2017

Project planning is one key element to succeed an IT project. However, there is no normalized guideline, methodology, or system which helps managers improve and control the cost estimation and scheduling of IT projects. The literature gives only some best practices in the project phase, without considering the era difficulties (as the era of digital transformation), the project complexity (which can be simple, medium or high), the manager and the team experience, what must be planned in IT projects, and what must be traced to limit risks and succeed the project implementation.

Could we accompany and guide the human intelligence in IT project management, especially in the planning phase, which decides on the project success or failure? In addition, could we put a framework for the planning process cycle to limit risks related to the planning phase?

2. LITERATURE REVIEW

Project Management Institute defines a project as a temporary enterprise initiated with the aim of providing a unique product, service or result [5]. In addition, PRINCE 2 defines a project as a temporary organization, created to deliver one or more project products in accordance with an agreed Business Case [6]. Both definitions agree that it is a temporary enterprise with a well-defined scope to deliver a project that is characterized by its uniqueness.

IT project refers to the information management systems of computer [7]. This is a specific type of project, which has its own characteristics. Indeed, IT projects are characterised by their emergency, uniqueness, one shot, short term and uncertainty [8]. These different definitions do not give a global vision on the project concept, and specifics of an IT project, which is also characterized by the complexity of its implementation, the risks that can occur at any stage of their production.

Three features define IT project management: abstractness, timeliness of information, communication, and uncertainty [9].

Project planning is an important aspect of project management, especially for projects that have a large number of tasks and are carried out over a long period. For example, in the field of IT development, there is a rule imputation saying that 33% of the total project time (including functional specifications and design) is reserved for planning [10]. General Dwight Eisenhower has said, “The plans are nothing. Planning is everything”. Which means that even if both concepts are necessary, the plans do not refer only to than static documents, but planning involves a series of actions reactive and dynamic to allow the uncertainty to be taken into account.

In project management, planning is defined as "the discipline whose purpose is to anticipate and monitor the objectives (deadlines, costs, etc.) of carrying out a project" [11].

Usually, the objective of project planning is as follows:

- Presentation of planned objects: tasks, activities, choices, intervals, dependencies, etc. as well as constraints and orientations
- Calculation and optimization of the parameters of duration, cost, and task margins

3. METHODOLOGY

Table 1 summarizes the statistics defined above (Standish Group International), that we are going to compare and to analyse in the next paragraphs:

Table 1: Comparison of the statistics published by the Standish Group International (2003, 2013 and 2015)

Year	Failed	Challenged	Successful
2003	15%	51%	34%
2013	18%	43%	39%
2015	19%	52%	29%

By analysing Table 1, the number of challenge and failed projects has evolved in a very remarkable way. To identify the cause of this change, we have tried to analyse IT development over the years. Indeed, in 1998, we talked about NICT (New Technologies of Communication and Information). In 2013, other technologies have appeared and the "Digital" has stolen the spotlight.

The era of digital transformation is an era where the integration of digital technology into all areas of a business, fundamentally changing how operating and delivering value to customers. It is a cultural change that requires organizations to continually challenge the status quo, experiment, and get comfortable with failure. This new era has its own constraints and difficulties to implement a successful IT project (as the urgency of implementing those projects, the change management, including innovation in the existing systems, improving the user and customer experience, etc.).

Creating the project plan is also identifying activities, tasks, dependencies and time, while coordinating the preparation of the project budget, which provide the estimated cost of the labour, equipment and materials, and which is used to control cost expenditures during the project development.

The essential components of the planning process are:

- Identifying the work of the project team;
- Identifying the project team;
- Preparing the schedule;
- Estimating the costs.

When the planning process is completed, the management must identify and try to deal to succeed the project. This is called risk management, where the potential problems and actions to countermeasure them, are identified, while reducing the probability to occur them, and where all the stakeholders are identified, the communication plan is established to keep the team informed.

The Planning Phase start when the project has been formally funded, and the Project Charter is approved. This Phase requires study and analysis culminating in the full Project Management Plan and that may lead to system development activities. [12]

Acquisition activities are performed, if necessary, to obtain contractor support. The project work is broken down into specific tasks and sub-tasks, including the identification of project deliverables and assignment of allocated resources to each task. Control documents relating to that effort are produced. The degree of project management rigour that is to be applied to the project is determined and milestones are established. Specific plans for management and governance of the project are established and documented to guide ongoing project execution and control. The Planning Phase ends with a formal review during which the adequacy of the Project Management Plan is determined. [12]

In the planning phase, sufficient requirements detail is required to support the development of the project's Project Management Plan and permit outside validation of this deliverable. [12]

This early step is also a mechanism to establish and communicate what tasks need to get done and which organizational resources will be allocated to complete those tasks in what time. It is a document collecting all the work needed to deliver the project on time, which occurs during the planning phase of the project.

Cost Estimate is an anticipated or approximation cost of the specified work scope of a project, or operation that is the process of predicting the cost of a facility through quantitative analysis of the work required by the design documents to evaluate a single total value and may have identifiable component values.

Before creating the project schedule, the project manager needs to answer the following issues:

- What needs to be done?
- When will it be done?
- Who will do it?

Then, define the following steps:

- Devising the project to many tasks and producing the deliverables diagram;
- Determining the time and effort which must be taken to complete every task, which will be helpful to calculate the correct schedule;
- Defining the task dependencies, because some tasks cannot be started until other tasks are completed;
- Giving a start and end (due date) for each task, while considering the availability, the vacation or leave dates of each member of the team and the non-human resources as machines, buildings or meeting rooms;
- Identifying the needed resources to get those tasks done on time.

To summarize, Figure 5 presents the necessary tasks for the realization of a planning according to the literature:

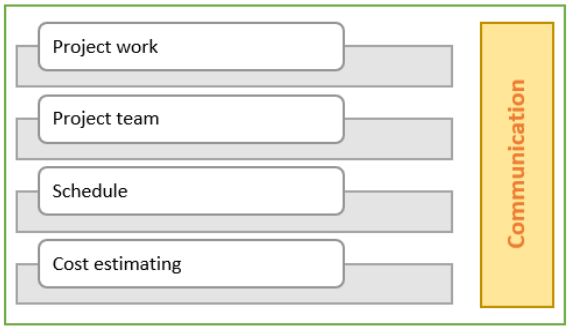

Figure 5: IT project planning according to the literature

To better understand how this phase unfolded, and beyond the points raised in the literature, we opted for direct observation on three companies for three years. The companies selected are IT development companies, in order to allow us to analyse more than 100 IT projects in different phases in order to identify the different risks and problems related to the project-planning phase.

4. RESULTS

The observed projects allowed us to group the risks and problems related to the planning of IT projects into themes. These themes were chosen in accordance with the major IT project planning phases identified in the literature, in order to highlight the concerns related to each theme.

4.1 Project work

Some project managers because of their lack experience and their personality may fill shy to ask the customer many questions, and get some details. Because of this, they put the general idea of what they understand without considering some details which may influence negatively the project implementation, and which may change the true requirement meaning.

Most of IT projects possess a large part of already produced tasks (or with some small evolutions). Then, if the project manager did not have the experience in this kind of tasks, he cannot either optimize their treatment, or anticipate their risks.

Also, making a fast planning without having a clear image of what the client needs, comparing the client requirements to the initial expectations are the essential reason for proposing a solution, which will be over budget and time. Before starting a project, the business leaders are so eager to get the client's project, so they oversee many details that will eventually influence the project budget and time, and which will be the guarantee for the project failure.

$$\text{DISAPPOINTMENT} = \frac{\text{EXPECTATIONS}}{\text{REALITY}}$$

As it is known, the devil is in the details, and when the business lead and the project management do not understand the client needs early, the outcome will not meet his expectations, and finally we will get a dissatisfied client.

4.2 Project team

One of the most common reasons that software project fails is that the right people with the right skills were not affected to the right tasks, and at the right time. In addition, when estimating tasks, the project manager does not consider their team, without considering that people will take differing lengths of time to complete their work because of their different levels of skill, experience and confidence and that affects how they approach their work.

4.3 Schedule

Every software project is a subject to change, especially when we talk about an era of digital transformation. Every change costs time and money. Many project managers underestimate how little changes can conduct a software project to fail.

Preparing the project planning process is not only about estimating tasks and assigning each task to a team member, but it is also considered the risk assessment by identifying what could go wrong and putting plans to remove or reduce those risks. It is also the application of the Murphy's law, which « if something can go wrong, it usually will » to limit risks related to the schedule phase.

Usually, the client sets a fixed deadline for the completion of its project, and usually the business leaderships challenge the managers to respect this deadline. Then, the managers create the project plan by working backwards from the fixed completion date, and they may decide about the new system will be useful to have in production, without a preliminary analysis and technical knowledge necessary to determine if it is possible to accomplish success in the given period or not.

Working backwards from a fixed deadline, is a sure way to increase the risk of the project, to:

- Impact the project quality
- Make the team members work in stress (which can cause their resignations in the middle of the project)
- Forget some important details (data migration, for example)
- Skip some tests (to deliver some tasks quickly)
- Other risks, which will conduct to the failure of the project.

There is no IT project, which was created without bugs, sometimes, the testing phase spent more time comparing to the production period. Conducting in IT project without including a test plan in the planning and schedule phase is like conducting a car without seeing the road, so it is the fastest way to conduct a failed project.

The test plan needs to describe not only the tests to be run, but also how test failures or variances will be handled, especially for the large and complex projects.

4.4 Estimating cost

Usually, before starting a software project, the customer looks forward to communicating him the budget and the project schedule. To satisfy this need, the estimation of the cost and the project duration are made in a very optimistic and fast way, without specifying some helpful details, which allow a better understanding and the early project control. Because of this, an excessive spending and a lot of time reduced to market, and finally the project failed while exploding its cost and reducing its quality.

In addition, there is no standard or methodology for estimating an IT task. It is known that in IT projects, several tasks are repetitive, or are as small evolutions on some existing modules. Generally, estimating a task is based on the project management experience and the team, the skills and experience of the resource who will work on it, and on how the project manager had divided the project in too small and easy tasks.

4.5 Communication

Many IT projects fail, when the project management focus only on getting the software installed, and underestimating telling their employees about the expensive software on their computers.

In addition, many IT projects fail because of an inefficient communication between all the stakeholders and because no

one has a global idea about the project activities, and the project progress compared to the project objectives.

4.6 Lack of information of old experiences

Conducting a successful software project requires some good managerial skills. A good manager is especially the person who learns from his mistakes and exploit the potential of its own old experiences to anticipate the project risks.

Many project managers' focus only on delivering, installing and running the project, but they forget to capture everything that is done through a project.

4.7 System which depend on the project complexity

There are many solutions to schedule IT projects, some are specialized in complex and large projects, others, in small and simple projects, how can we choose between them? It is helpful to use a different solution for each project to respond to its special need. Alternatively, it will be helpful if we can use one solution for every project, which can be small or large, simple or complex?

To summarize all the above, Figure 6 groups together the various risks related to the planning of identified IT projects:

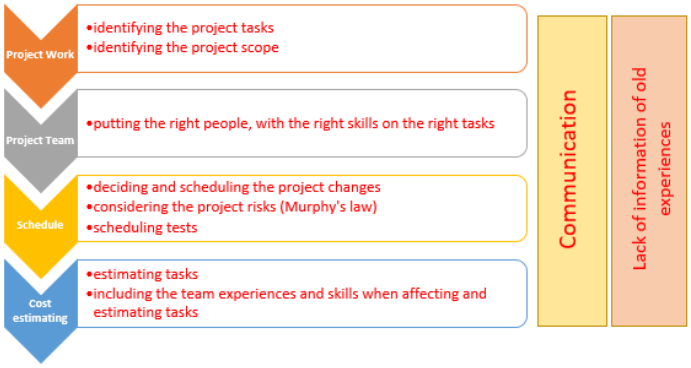

Figure 6: The key factors of failure in planning IT projects

5. DISCUSSIONS

5.1 Presentation of the different modules of the proposed solution

In order to circumvent the various risks and problems identified, we propose an intelligent system allowing the integration of artificial intelligence in the planning of IT projects, as well as the accompaniment of the project team for the respect of the schedules carried out. This solution is composed of different modules:

A framework: This framework has been realized on the basis of the different problems and risks identified during the observation phase. Indeed, for each problem, we had identified and tested the various possible solutions, which we grouped together in the form of themes to build this framework. This framework was tested on several projects and was improved as the period of observation and experimentation with solutions progressed.

Software part: proposal for the design of an intelligent system to translate this framework into a tool that should be accessible to all team members. The latter represents the core of the proposed solution as it makes the connection between the tested framework and the artificial intelligence part, represented by an inference engine and a knowledge base.

Artificial intelligence part: the knowledge base must be initiated by several projects (data initialization), by defining as inputs, the projects already completed, and as outputs the logical deductions for the generation of the project schedule, while passing through an inference engine, which makes the necessary reasoning. Each project is defined by parameters (defined in the proposed framework), and each project represents an opportunity to learn from our knowledge base. This artificial intelligence module goes through a learning phase (projects already completed) in order to return the predictions necessary for the success of the planning phase of IT projects.

5.2 Presentation of the algorithmic part and artificial intelligence

In recent years, computers are able to perform tasks that humans were only capable of. This capability is termed to be Artificial Intelligence (AI). AI refers to the big umbrella of computer technology, that allows to performing human requirements including human intelligence, decision-making analytics, recognition of pattern, visual & speak recognition and language translation using a subclass algorithm within the environment of artificial intelligence, but our discussion focusing on the planning phase of IT project management [19][20].

The operation of the proposed solution is summarized in Figure 7, through the following steps:

Expert system:

In this phase, it is necessary to start with the data collection, which in our case represents the projects. Then, we need to prepare this data, and organize it in the form of parameters defined in our framework. To finish with the learning phase of our expert system.

Intelligent system:

In this part, the project manager initiates the project initialization by defining the different project parameters (the entries) that we proposed in the framework.

The algorithm represented by the intelligent system sends these data to the expert system, in order to return the predictions (See the part of the algorithm presentation).

These predictions represent the results of analysis via the knowledge base, which result in the generation of the project schedule, defining the level of success of the schedule following each modification and as the project progresses.

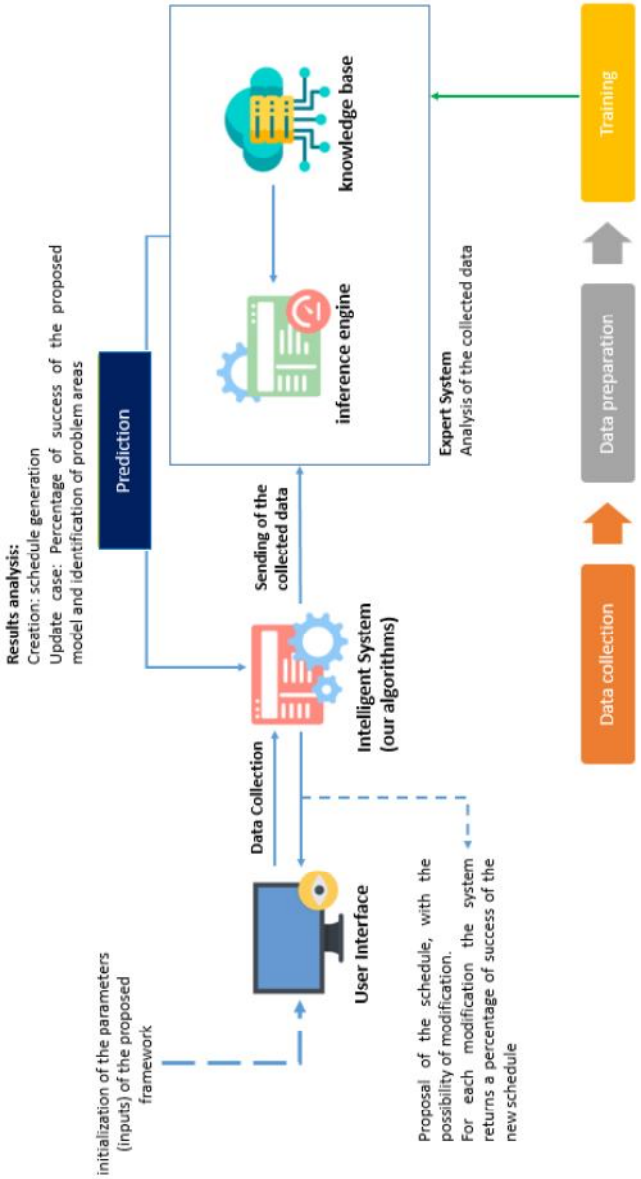

Figure 7: Proposal of an algorithm for the implementation of an intelligent IT project planning system by integrating artificial intelligence

5.3 Presentation of the proposed and tested framework

A. Scheduling tasks

Defining tasks: Breaking down the larger project into small tasks, which can be a page or a module. Each task represents a small goal, which must have a high potential for success.

When defining tasks, the intelligent system gets the feedback experience of similar old tasks (from the knowledge base).

Each task is presented by:

- Task title (which must me significate and resume the task goal)
- Task definition
- Task estimation
- Problems encountered during the old experiences to limit tasks risk
- Resources

The proposed system allows identifying similar tasks and reusing the existing to reduce and optimize the project cost and duration while improving the project quality.

Dependencies: For each task, we must define the related tasks with a chronological order. Because defining dependencies will allow the project manager to control changes and project risks.

The system allows getting a simple visual diagram, which track dependencies between tasks. Because one image is too simple to understand than 1000 words.

In addition, the system will allow sending alerts and notifications to the project manager, especially when there are changes in some tasks related to other tasks. Especially when there is a delay of a task, which will influence the following tasks.

Requirement detail: the algorithm of this part will invite you to divide some tasks on other sub-tasks to get some details, which allow having a high potential for task success.

On one hand is based on the return feedback: some similar tasks where we have as a prediction, to create some sub-tasks because they will be over budget and over schedule from the old experiences.

On the other hand, the algorithm will calculate the average length of unsuccessful tasks to invite the project manager to create and get more detail of it to limit risks of estimating tasks.

Plan tests: by defining tests which can be:

- testing failures or variances (each task or sub-task must be turned and passed the unit-level testing); re-auditing design process, performing system and user level tests;
- auditing the documentation quality;
- testing the internal controls and backup and recovery procedures.

Estimating task & tests: project manager must document all the task estimations on the knowledge-based system. When closing tasks, must also put the time spent on production, to exploit the potential of feedback experience when estimating tasks

The algorithm will allow getting an average length of every task title to propose those estimations to the project manager when estimating tasks.

B. Scheduling people

Resources requirements: the knowledge-based system must include resources profile, skills, holidays, vacations, personal days, experiences, technologies, salary, personality, etc.

In addition, the implementation cost of a task, depend on the resource who will produce it (salary, skills, etc.).

The knowledge base system allows recommending some resources to put on the project and on tasks (based on the documented information in the knowledge-based system and the feedback experience of the old implemented similar tasks "auto-training).

The proposed system includes an algorithm, which calculates the cost tasks by resources.

C. Scheduling project

Project deliverable & Deliverables diagram: once the tasks are identified and estimated, the system proposes the project deliverable, and the project manager must validate them to let the system draw the deliverables diagram. Which will be updated during the project production (achieved and remaining tasks).

Giving a start and due date for each task or sub-task: once the tasks and sub-tasks are identified and estimated, the system proposes a start and due date for each one.

The system will be able to compare due dates, achieved tasks, project deliverable to send notifications and alerts to the project manager and team members.

Project cost: getting the project cost is not only about getting the tasks cost, but also about identifying external needs, material, hardware and software requirements. Those needs related to the project must also be estimated and add their cost to the tasks cost.

Kickoff meeting: during this phase, the project manager must fix a kickoff meeting date where all the team members will be informed and briefed to start their tasks.

D. Others

Production strategy, because every project possesses its own production strategy which depends on the organization and on the management of every company.

Risk management:

- Application of the Murphy's law for each task to anticipate risk management;
- Defining risk plan;
- Defining an algorithm, which compares the achieved, the current and the provided tasks to create alerts and notifications to control the project planning and cost.

Communication: putting the communication plan and incorporating employee communication, training and support in the project plan.

Checklist planning phase: project manager shell checks the above points to ensure that all the planning parts are defined, and limit risks related to this early phase in IT project life cycle:

- IT Project Planning & Tracking
- IT Project Resource Management
- IT Project Budget, Cost and Billing Management
- IT Project Bug/Issue Tracking
- IT Project Risk Management
- IT Project Change Request Management
- IT Project Document Management
- IT Project Communication Management
- IT Project Stakeholder Management
- IT Configuration Management
- IT Integration Management
- IT Procurement Management

Feedback experience (IA):

The experience feedback is a process of reflection implemented to learn the positive teachings and the negatives of current or ended projects. In this process, we carry a look to the developed IT project, the identified tasks and their cost, the used methods, the realized productions, the role and the level of implication of the concerned actors, as well as on the used ways.

Implementing an intelligent system in the field of the artificial intelligence, endowed with a knowledge based is the best way to exploit the potential of the old experiences, to improve, optimize and innovate in the new software projects. Especially in an era of digital transformation, where the implementation of IT project involves exponentially in a fast way, and which need a big part of innovation.

The knowledge base will stock all the project experiences (positive and negative teachings) to keep a traced data of all the project actions and activities. The documented data allow the project team to control and anticipate the project risks. In addition, it allows the algorithm of the intelligent system to learn from those data to alert, propose and improve the planning phase while accompanying the human intelligence, and reducing risk and cost management in the planning phase.

For each project, the matrix, which allows for stock data in the knowledge base, must include the modalities definitions. which can be an individual , and/ or collective questions, and reviews related to the project, data of stakeholders (skills, experiences, salary, etc.), collection and analysis of the information, capitalization of the feedback experience, valuation and put of these feedback experience (negative and positive teachings), and implementation of an action plan to modify the old practices to improve the old and existing ones.

Dashboard: creating a dashboard is the best way to easily communicate key project details. Because it allows to keep all interested parties (stakeholders) in touch with the status of the IT project (which can be team members, project sponsors or top management), and it allows to connect people and get an enabling teamwork (because every stakeholder can see what anyone else is doing).

Figure 8 summarizes the key points of the proposed framework from a human and algorithmic perspective.

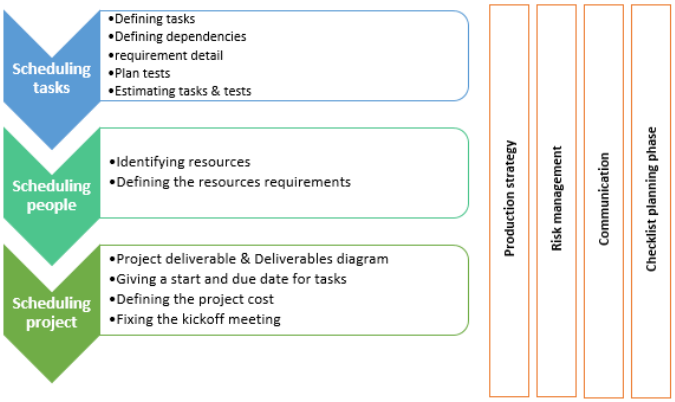

Figure 8: A framework to succeed IT project Planning

E. Resume

Table 2 summarizes the proposed solution, which combine between the artificial intelligence and putting strong steps (tested framework), that will allow conducting a successful IT project while controlling the planning phase:

Table 2: How the proposed solution countermeasure the problems of planning phase for IT projects

Problem	**How the solution handlers it**
Lack of detail requirements	The intelligent system comprised by a knowledge-based invite the project manager to devise some tasks on some sub-tasks, to get more details, which allows the project manager to avoid the under-estimation of some tasks, which influence directly the project cost and duration.
Lack of managerial experiences	The knowledge-based store all the old experiences (positive and negative experiences), and the intelligent system learns from it to accompany the human intelligence. This solution allows to control the planning phase, to succeed the current project while learning from the feedback experiences, to optimize the project duration and cost (by reusing and improving some old implemented modules and pages), as well as improving the project quality.
Inadequate communication plan	The project manager learns from the old experiences by using the intelligent system. The proposed steps allow the project manager to incorporate employee communication, training and support in the planning phase.
Identification of team members errors	The intelligent system proposes the best resources to put into the project, while considering their salary, vacation, skills, off days, etc. to control the project duration and cost. Which also allows avoiding the overlapping problems.
Project cost problems	The intelligent system contains different steps to define the project tasks. In addition, it allows to suggest tasks estimations based on the feedback experiences of old similar tasks. This method allows controlling the task estimations. However, the project cost is not only estimating tasks, but is also about estimating material, software and hardware needs. Respecting those steps and getting help from the intelligent system allow controlling the project cost and avoiding some bad surprises related to this.
Managing change problems	Defining dependencies in this early phase help to better decide on the implementation of the change or not by comparing the cost of the change with their benefits by the project manager (because the algorithm allows getting the cost by resource and duration). In addition, it allows alerting the project manager about the other modules and pages, which will be influenced (the defined dependencies in the planning phase or during the implementation of the project). Also, getting some advices based on the learned negative and positive old experiences.
Risk assessment	Which is required by the steps of the system, and accompanied by the algorithms of the intelligent system.
Working backwards	The system required some defined steps, which prevent working backwards.
Lack of planning tests	Plan tests from the planning phase is a better way to succeed an IT project. The system has some defined steps, and an intelligent system. Therefore, when the project manager does not respect those steps, he will get some alerts and notifications to invite him to define correctly those inputs.
Lack of information about old experiences of the company	The intelligence system that has a knowledge-based learn from the old experiences, which can be as positive or negative one. Over time, in the artificial intelligence, the system will improve their propositions, suggestions, alerts and notifications. To summarize, the proposed solution will allow talking about the system experiences and not only one-person experience. In addition, it will accompany the human intelligent while respecting the defined steps, which allow preventing forgotten; conceal the human gaps, reducing the implementation duration, increasing the project quality with the best cost.

5. CONCLUSION

The objective of this article is therefore the improvement of the way of planning phase and the optimization of resources during the monitoring of IT projects, in order to succeed at the cost and the duration of the implementation of those projects. The proposed solution consists in setting up a framework, which must be implemented in the form of a software. This software communicates with a knowledge base initiated by IT projects already carried out, in order to exploit the feedback, to generate the most adequate planning of the project to be implemented, and to guarantee a fluidity of follow-up of the

latter, as well as a better risk management. This second part, integrates an expert system within the framework of artificial intelligence, called in the context of this article "intelligent system".

The proposed solution has been partially tested during the 3 years of observation, and the proposed framework has been improved during these test phases.

The next researches can focus on the realization of the software part, as well as the implementation of this expert system.

REFERENCES

1. Y. Li, **Existing problems and their countermeasures in IT project management**, Information Research, pp. 115-117, 2007.
2. S. G. International, **CHAO Manifesto Report**, 2013.
3. J. Lynch, **Standish Group 2015 Chaos Report**, Standish Group, 2015.
4. Wellingtone et t. A. P. SIG, **The State of Project Management Annual Report**, UK, 2017.
5. PMI, **A Guide to the Project Management Body of Knowledge PMBOK**, 6th Edition, USA, 2019.
6. Axelos, **PRINCE 2 Guide**, 2013.
7. Z. Q, **Methods and thinking of IT project management,» Elecetric Power**, pp. 220-24, 2008.
8. L. Shuangqin et L. Cheng , **Management Innovation of IT project Managers**, International Conference on Information Management, Innovation Management and Industrial Engineering, pp. 62-65, 2010.
9. X. L et W. W.Y, **Requirement management of IT projects**, China Management Information , pp. 80-82, 2010.
10. T. H. NGUYEN, **Contrubution to project planning: proposal for a model for evaluating project risk scenario**, 2011.
11. AFNOR, **Project management dictionary**., 1992.
12. CDC Unified Process Project Management Guide, **Project Management Guide**, 2018.
13. R. Tassinar, **Value analysis**, AFNOR Edition, 2011.
14. Y. L. Z, **Solving problems in IT project management by psycology**, Science and Technology Innovation Herald, pp. 162-163, 2008.
15. W. Rautenbach, I. d. Kock et J. Jooste, **The development of a conceptual model for enabling a value-adding digital transformation : A conceptual model that aids organisations in the digital transformation process**, ICE/ITMC, 2019. https://doi.org/10.1109/ICE.2019.8792675
16. A. B. Gerth et J. Peppard, **The dynamics of CIO derailment: How CIOs come undone and how to avoid it**, Bus. Horiz, vol. 59, n° %11, pp. 61-70, 2016 https://doi.org/10.1016/j.bushor.2015.09.001
17. M. S. Mahdavinejad, **Machine learning for internet of things data analysis: a survey**, Digital Communications and Networks, vol. 4, n° %1ISSN 2352-8648, pp. 161-175, 2018. https://doi.org/10.1016/j.dcan.2017.10.002
18. K. Sharma et R. Nandal, **A Literature Study On Machine Learning Fusion with IOT**, ICOEI, n° %1 ISBN: 978-1-5386-9439-8, pp. 1440-1445, 2019.
19. Nawaz, N. (2019). **Artificial Intelligence interchange human intervention in the recruitment process in Indian Software Industry**. International Journal of Advanced Trends in Computer Science and Engineering, 1433-1442. https://doi.org/10.30534/ijatcse/2019/62842019
20. Daniel Lester C. Guillermo, F. R. (2019). **A Study on How Evolution Simulator Utilizes the Windows Operating System to Demonstrate Artificial Intelligence Learning**. International Journal of Advanced Trends in Computer Science and Engineering, 764-771. https://doi.org/10.30534/ijatcse/2019/67832019