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Design of an ITIL Implementation Model in a Company

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Abstract: *The purpose of this paper is to design and develop an ITIL (Information Technology Infrastructure Library) implementation model in a company that allows for effective implementation of the framework. To do so, we will first analyze the critical success factors of the ITIL implementation approaches, described in previous studies, in order to select the most important among them. Then, we critique ITIL implementation approaches by identifying the strengths and the limits of each approach. After, we examine a case study of the implementation of ITIL in an enterprise by identifying the main advantages and the limits of this implementation. Finally, we will compare our model with the implementation approaches studied. The model developed will be based on the advantages of these approaches and the proposed solutions to their limits. The model consists of four phases: planning, implementation, assessment and improvement. Each phase consists of one or more steps to implement as well as the related activities. Our contribution consists in proposing a model, which is inspired by previous research work related to ITIL implementation. The originality of our work is that we have taken into consideration the academic research works as well as ITIL experts' proposals***.*

Keywords: *Critical success factors of ITIL implementation approaches, ITIL, ITIL implementation approaches, ITIL implementation model.*

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I. Introduction

Nowadays the success of the governance of any organization depends closely on its information technology (IT) governance. Indeed, this dependence is reflected by the fact that this governance contributes directly to improving the effectiveness, efficiency and measurability of business processes. It provides the structure that connects processes, resources and information to the organization's strategy and objectives.

In order to succeed in the IT governance, companies use best practices that are formalized in guides in the form of frameworks such as COBIT (Control Objectives for Information and Related Technologies), ITIL (Information Technology Infrastructure Library), CMMI (Capability Maturity Model Integration), PMBOK (Project Management Body of Knowledge), or others.

In the case of the ITIL, which is the subject of our topic research, it is a framework of best practices for the management of IT services. It also provides a detailed description of the main processes implemented within an organization's IT system.

However, ITIL does not propose the approach to implement it within a company. Companies use consulting groups to assist them in the implementation of the framework or train their IT team on its implementation. Each consulting group has its own ITIL implementation approach. This has raised the interest of researchers regarding the following issue: what approach to adopt for ITIL implementation in a company.

The purpose of our paper is to try to answer this question by designing an ITIL implementation model based on the advantages of the approaches proposed in previous research and providing solutions to the limits of these works.

The originality of our work is that we have taken into consideration the academic research works as well as the expert proposals of ITIL and a case study of ITIL implementation.

II. Researching methodology

The researching methodology used to design our model is presenting in the figure 1.

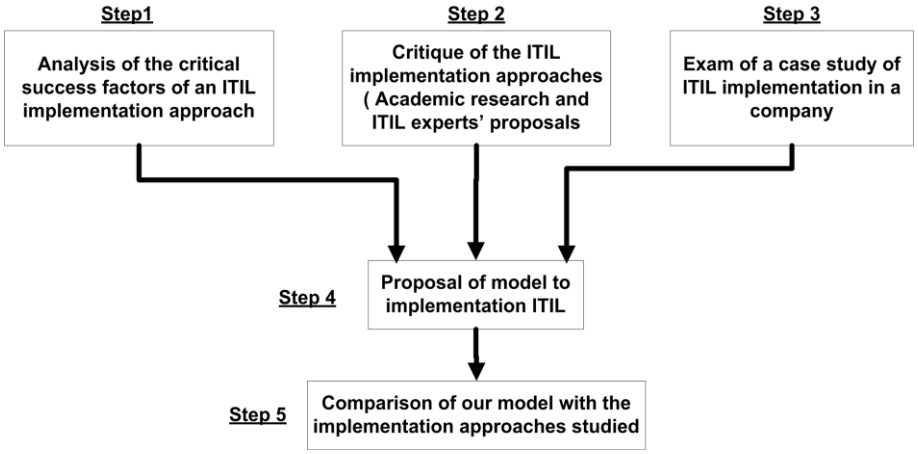

Figure 1. Methodology of model design

The methodology consists of the following steps:

2.1 Step 1

This step determines the critical success factors of an ITIL implementation approach. To do this, we will analyze the factors described in previous studies by classifying them according to the citation frequency of each factor in these works.

2.2 Step 2

This step critiques previous studies that have addressed the issue of ITIL implementation, identifying the strengths and limits of each of these approaches.

2.3 Step 3

This step involves examining a case study of ITIL implementation in a company, listing the benefits made by the company and the limits of this implementation.

2.4 Step 4

This step involves making a presentation of our model to implement ITIL. It is based on the results of the three previous steps, and relies on the advantages of the approaches studied and proposes solutions to their limits.

2.5 Step 5

In this step, we will compare our model with the implementation approaches studied. The comparison is based on a number of criteria including: detailed approach, proposal of criteria to prioritize the processes to implement, proposal of tools to assess the processes maturity, implemented approach.

III. Results

3.1 Step 1

We will analyze the critical success factors of an ITIL implementation approach cited in previous studies (Table 1).

Table1. Presentation of critical success factors

Critical success factors	References
Training	[1],[2],[3],[4],[5],[6],[7],[8],[9],[10],[11],[12]
Senior management commitment	[13], [1], [2], [3], [4], [6], [7], [8], [11], [12]
Awareness	[1], [2], [3], [8], [11], [12]
Change management	[6], [7], [9], [11], [12]
Good tools and techniques for the implementation and maintenance of processes	[13], [1], [3], [7]
Project management	[13], [6], [7], [10]
Performance reviews	[1], [3], [7], [10]
Creating a friendly ITIL Culture	[13], [1], [4]
Having a clear vision of the project	[9], [11], [12]
Envisaging a progressive approach	[10], [11], [12]
Project governance and execution	[13],[7]

The study of these factors consists of classifying them according to the frequency of occurrence in order to retain the most important, using the Pareto diagram. This is a tool that allows classifying in descending order of importance the criteria of a list causing an important effect [13].

From Table 1, we calculate the frequency of occurrence, percentage and cumulative percentage of each factor in the studies analyzed. The result is shown in Table 2.

Table2. Frequency of occurrence of critical success factors

Critical success factors	**Frequency of occurrence**	**Percentage**	**Cumulative percentage**
Training	12	21%	21%
Senior management commitment	10	18%	39%
Awareness	6	11%	50%
Change management	5	9%	59%
Good tools and techniques for the implementation and maintenance of processes	4	7%	66%
Project management	4	7%	73%
Performance reviews	4	7%	80%
Creating a friendly ITIL Culture	3	5%	86%
Having a clear vision of the project	3	5%	91%
Envisaging a progressive approach	3	5%	96%
Project governance and execution	2	4%	100%
Total	56	100%	

From Table 2, we realize the Pareto diagram (Figure 2), representing the frequency of the occurrence of each factor and the cumulative percentage. The result is shown in Figure 2.

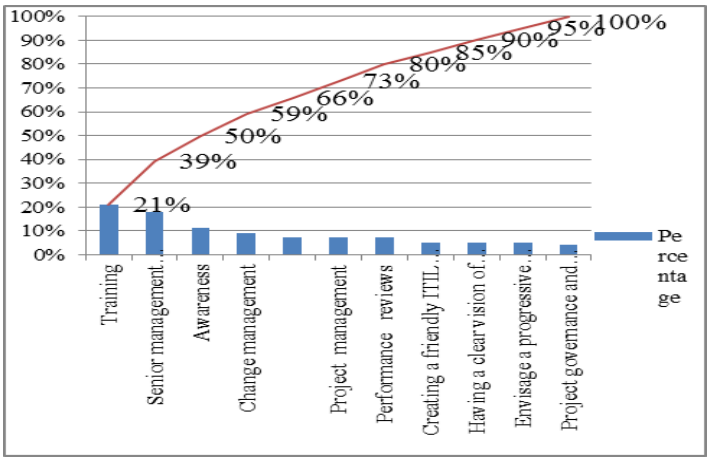

Figure2. Pareto chart of critical success factors

The results demonstrated by the Pareto chart (Figure 2) indicate that the most cited factors are training (21%), senior management commitment (18%), awareness (11%), change management (9%), good tools and techniques for the implementation and maintenance of processes (7%) and project management (7%). These six factors represent 73% of frequency of occurrence. This means that the company that intends to implement ITIL must take into account, primarily, these six factors in order to succeed in the approach.

Training is an important factor in the success of ITIL implementation. It involves training the IT team on the framework as well as the benefits to be gained. It increases the cooperation and the adoption of new processes [14]. It also allows the promotion of ITIL to the staff [1].

Senior management commitment is the guarantor of the implementation approach. It allows policy approval and ensures compliance with the framework following recently implemented processes [13]. It provides the necessary funding for consulting, tools and training [1].

Awareness allows showing the interest and benefits for the company by implementing ITIL. It reduces users' resistance [1]. It also allows communication between stakeholders [15].

Change management involves managing the transformation from the implementation of new processes in all its technical, organizational and human aspects. It allows changing from the culture focused on technology to one that emphasizes on service [13]. It involves the demystification of the approach to the users, the communication of its profits and creation of values among them [9].

Good tools and techniques for the implementation and maintenance of processes is a critical success factor in the success of ITIL implementation. These tools facilitate the end-to-end vision and lifecycle of ITSM (IT service management) by integrating incidents recordings with change management, problem management, and all other ITIL processes [1].

Project management is a critical success factor that ensures the implementation of ITIL. It involves designate a project manager. This project manager must dispose all the assignments to achieve the objectives. He will be the interlocutor of the top management by reporting on the progress of the project and being able to communicate to the process managers [10].

3.2 Step 2

We reviewed several studies (Table 3) that have addressed the issue of how to implement ITIL in an enterprise. These works are grouped into two categories: academic research and ITIL experts' proposals.

Table3. ITIL implementation approaches

Reference	Category	Purpose
[16]	Academic research	Propose an ITIL implementation methodology more accessible to small companies in Quebec.
[17]		Propose a methodology for implementing ITIL to companies of all sizes and levels.
[18]		Propose to Egyptian companies a methodology to implement ITIL.
[9]		Identify the main frameworks used within IT departments of large companies
[19]		Propose a guide for implementing ITIL.
[20]		Propose a guide to implement frameworks ITIL, COBIT and ISO27001 within a company.
[21]		Propose a set of critical success factors and a generic implementation model for ITIL with an implementation roadmap.
[22]		Propose a roadmap to implement ITIL.
[23]	Proposals of Experts	Propose to the small and midsized companies a methodology for implementing ITIL.
[24]		Propose an ITIL implementation in companies.
[25]		Propose an approach of five steps.
[26]		Propose an implementation approach of ITIL based on best practices of the PMBOK.

Among the strengths of these approaches, we cite:

- Academic researches are detailed because each phase of the approach is well explained in particular [16] and [21].
- Some researches propose a tool to assess the processes maturity ([17], [18], [24], [26]).
- Some researches propose the critical success factors of an ITIL implementation ([22], [21]).

For the limits of these approaches, we cite in particular:

- ITIL comprises about 20 processes; however, neither approach proposes criteria to prioritize the processes to be implemented.
- No approach provides propositions to document processes such as process identity card, for example.
- Two approaches cited the change management without explaining how to manage it ([21], [9]).

3.3 Step3

This step involves examining a case study of the implementation of ITIL in a large services company, with a workforce of more than 500, organized in the form of headquarters and several subsidiaries in large cities. The implementation involves implementing the incident management process in accordance with ITIL framework.

The implementation approach adopted is as follows:

- Initialize the project: presenting the project and obtaining the commitment of top management.
- Assess the current situation: assess the practices of the IT department compared to ITIL.

- Define the process: design and document the process.
- Implement the tooling: install the tools necessary for the implementation of the process.
- Put in place the process: launch the process conceived to practice.
- Assess and improve: assess the process implemented, and based on this result implement the actions of its improvement.

The result of this implementation allowed a number of benefits for the company, especially:
- Establishment of a single contact for taking responsibility for managing and treatment of incidents; prior to the implementation there was no contact point to resolve users' incidents.
- Procedures for managing incidents are formalized and implemented; prior to the implementation, there was no procedure for this activity.
- A clear definition of the responsibilities of the team dealing with incidents; this was not the case before the implementation.
- Use of a tool to manage incidents to facilitate the handling, treatment and monitoring of incidents; prior to the implementation no traceability was assured.
- An incidents dashboard is defined and monitored (number of incidents created, number of incidents resolved, number of incidents being treated, and number of escalated incidents); prior to the implementation, we could not determine the number of incidents treated.
- The quality of service provided by the IT department has realized remarkable progress, which was not the case before the implementation.

Although this implementation has allowed for a number of gains, some limitations are to be cited, especially:
- The awareness is not sufficiently large compared to the importance of the project.
- The commitment of the top management is not strong due to the insufficiency of the budget allocated to meet all expectations.
- The tooling setup is suitable for the incident management process and cannot be used for all ITIL processes.

3.4 Step4

Our model designed to implement ITIL is based on the results of the three previous steps. To build it, we heed the advantages of the approaches studied, in particular:
- The initialization and modeling phases of the case study.
- The detailed approach taken by some of the implementation approaches studied.
- Forecasting a tool to assess the process maturity as predicted in some previous implementation methodologies studied.
- The most cited of critical success factors especially: training, senior management commitment, awareness, good tools and techniques for the implementation and maintenance of processes and project management.

The model proposes solutions to the limits of these approaches through:
- Defining the criteria to prioritize the processes to implement.
- Providing proposals for documenting processes such as the process identity card.

The model (figure 3) consists of four phases (planning, implementation, assessment and improvement). Each phase comprises one or more steps to implement as well as the related activities. Each activity responds to an objective and produces one or more deliverables.

3.4.1 Phase planning

This phase comprises the following steps: initialization, diagnosis and processes modeling.

The initialization step involves defining the processes to be implemented or improved as well as the project plan to be presented to the top management in order to obtain its commitment. The key activities of this step are:
- Elaboration of the process mapping: the advantage of this mapping is, on the one hand, to allow a better steering of the IT department, and on the other hand, it makes it possible to link and connect the processes to the framework [16]. This will subsequently identify the processes to be implemented for the organization.
- Identification of the processes to implement: this activity involves identifying the processes to implement from the mapping elaborated in the previous activity. In order to select the primary processes to implement by the company, we propose a number of criteria in order to be able to assess the priority of each process (Table 4).

Figure2. ITIL implementation model

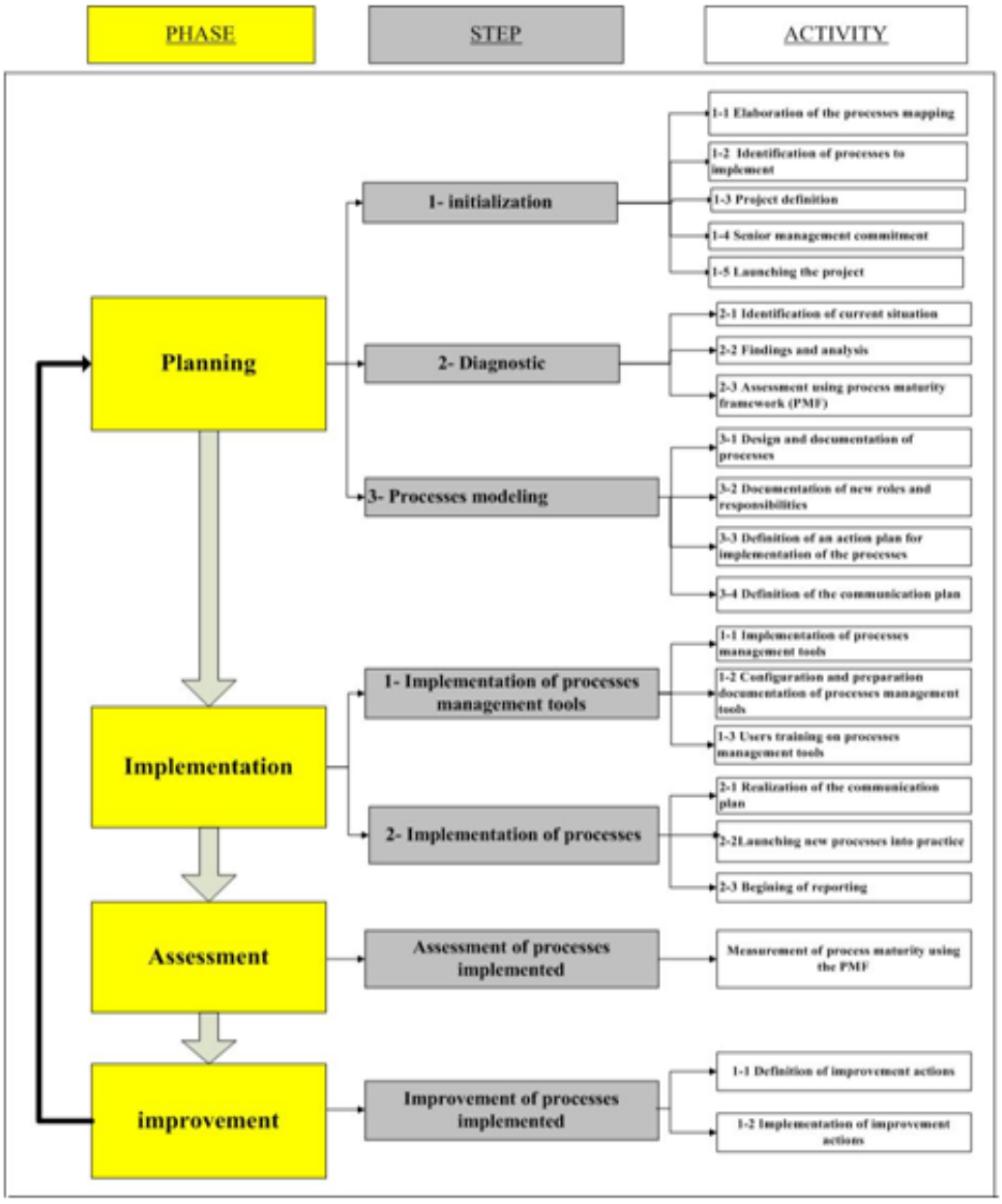

Table4. Criteria of process prioritization

Criteria				
Strategic alignment	Organizational impact	Economic dimension	Implementation risks	Company needs
1- Does not contribute to the realization of the strategy	1- Weak impact	1-Low Return On Investment (ROI)	1-Very risky process	1- Weak need
2- Contributes weakly to the realization of the strategy	2-Medium impact	2- Medium ROI	2- Delicate process to implement without complication	2- Medium need
3- Contributes strongly to the realization of the strategy	3- Strong impact	3- High ROI	3- Slightly risky process	3- Strong need

For each process, the value of its priority level is calculated as follows: the priority value is equal to the multiplication of the values of the five criteria listed in Table 4. Primary processes are those with the highest priority values.

- Project definition consists of describing the following elements: the purpose of the project, the scope of the project, the objectives of the project, the project management organization, the method of work, project risk management, a preliminary planning of the project, and the communication actions of the project. The deliverable of this activity is the project plan. It is also necessary before starting this activity to appoint a project manager as project management is a critical success factor retained in step 1 concerning the study of the critical success factors of an approach of implementation.
- Launching of the project comprises: (i) communicating the launching of the project within the company through a meeting of the IT department team with the project team; (ii) explaining to the IT department team, plus the actors involved in other departments, the interests of the approach along with the benefits to be gained (awareness is a critical success factor selected in step 1 concerning the study of the critical success factors of an approach of implementation); and (iii) providing training on ITIL for the IT department team and the stakeholders involved in other departments – the training is a critical factor of success retained in step 1 concerning the study of the critical success factors of an approach of implementation.

The diagnostic step: comprises an assessment of the practices of the IT department compared to the ITIL framework. The key activities of this step are:

- Identification of current situation: this activity allows being aware of the existing situation. It concerns in particular examining the documentation in force, considering the specific constraints of the organization, the professions and the interaction of the IT department with the other departments, and conducting interviews with IT staff.
- Findings and analysis: reporting the findings made during the various tasks carried out in the identification of the current situation. Then concluding with an analysis of the current situation.

The processes modeling step: comprises modeling and documenting the processes identified during the initialization step. The key activities of this step are:

- Design and documentation of processes: the purpose of this activity is to provide a description of the identity card of the process which specifies the information elements relating to the process, especially the purpose, activities, input and output elements. It allows documenting the procedures, flow charts and job description, as well as the defining of the responsibilities.
- Documentation of new roles and responsibilities: this activity comprises establishing the new organizational chart of the new organization of the IT department following the introduction of new processes and the improvement of others.
- Definition of an action plan for implementation of the processes: the purpose of this activity is to define the set of actions necessary to implement the processes. It involves especially the implementation of processes, training of users, and the implementation of the process management tools.
- Definition of the communication plan: the purpose of this activity is to define all the necessary actions to implement in order to ensure good communication of the project to all the stakeholders.

3.4.2 Phase implementation

This phase comprises the following steps: implementation of processes management tools, and implementation of processes.

The implementation of processes management tools step: comprises executing the tools necessary for the implementation of the processes. The key activities of this step are:

- Implementation of processes management tools: this activity facilitates the implementation of the processes and allows process owners an easy implementation of the processes especially using a tool that enables them to monitor the processes. Indeed, good tools and techniques for the implementation and maintenance of processes is a critical success factor retained in step 1 concerning the study of the critical success factors of an approach of implementation.
- Configuration and preparation documentation of processes management tools: this activity consists of configuring the process management tools. This means that the tool supports the necessary elements of the process so that it can be operational by the users.
- Users' training on process management tools.

The implementation of processes step: consists of the effective implementation of the processes with the necessary tools for their management. It is composed of the following activities:

- Realization of the communication plan: this activity comprises implementing the actions of the communication plan designed in the processes modeling step. These are all actions to communicate the launching of processes, to all stakeholders.

- Launching new processes into practice: this activity involves the implementation of new practices, namely procedures, indicators and process management tools.
- Beginning of reporting: within this activity, we measure the indicators, designed during the definition of the processes, allowing having a monitoring and a review of the processes implemented. These results will allow the measurement of progress after the implementation of the processes.

3.4.3 Phase assessment

This phase consists of the following step: assessment of processes implemented.

The assessment of processes implemented step: involves making an assessment of the processes implemented in order to emit improvement actions to be implemented to fill the slippages in relation to the objectives. It comprises the following activity:

- Measurement of processes' maturity using the process maturity framework (PMF): once the processes have been implemented, and after a period of their implementation (to be defined according to the number of processes implemented and according to the schedule defined with the top management) we assess the maturity of these processes using the PMF. It concerns making a similar review to that undertaken in the planning phase. This time, the maturity of each process is assessed compared to the level defined in the planning phase.

3.4.4 Phase improvement

This phase consists of the following step: improvement of processes implemented.

The improvement of processes implemented: involves determining the actions to improve the implemented processes. It comprises the following activities:

- Definition of improvement actions: this activity consists of taking action to reduce the gaps raised in the previous phase. This involves looking for improvement points in each evaluated process. We go out with a certain number of actions to implement. For each action of improvement, we define the person in charge and the deadline of its implementation.
- Implementation of improvement actions: this activity ensures the sustainability of the results of the actions implemented. It concerns elaborating or updating documents, such as procedures, processes, guides to best practices, or forms. It is also about identifying improvements and returning to the planning phase to implement them. And this will be the beginning of a new cycle.

3.5 Step5

In this step, we will compare (table 5) our model with the implementation approaches studied. The comparison is based on the following criteria:

- detailed approach,
- Proposal of criteria to prioritize the processes to implement,
- Proposal of tools to assess the processes maturity,
- Implemented approach,
- Proposal of critical success factors of an ITIL implementation approach,
- Proposal of process mapping activity,
- Proposal of tools of processes design,
- Proposal of an approach for change management.

Table5. Comparison of the model designed with ITIL implementation approaches

Criteria of comparison	References
Detailed approach	[16], [21], [Our model]
Proposal of criteria to prioritize the processes to implement	[91], [Our model]
Proposal of tools to assess the processes maturity	[17], [18], [24], [26], [Our model]
Proposal of process mapping activity	[9], [26], [Our model]
Proposal of critical success factors of an ITIL implementation approach	[18], [9], [21], [22], [Our model]
Proposal of tools of processes design	[20], [25], [Our model]
Implemented approach	[17], [18], [23], [24]
Proposal of an approach for change management	[9]

We note, from Table 5, that our designed model responds well to six of the eight criteria proposed for the comparison.

Our model responds well to the objectives of implementing the framework in an efficient and beneficial way for the company.

IV. Conclusion

This paper presented an ITIL implementation model. To do so, we analyzed the critical success factors of an ITIL implementation approach, proposed by previous research, in order to select the most important among them. We also critiqued the previous ITIL implementations. Then, we examined a case study of the implementation of ITIL in an company by identifying the main advantages and the limits of this implementation. The proposed model took over the strengths of these approaches and proposed solutions to certain limits of these works. The resulting model consists of a detailed approach, which allows for effective implementation of the framework. It consists of a set of phases to be implemented sequentially. Finally, we compared our model with the implementation approaches studied in order to show that our model responds well to the objectives of implementing the framework. Our future work is to implement our model within a company in order to test it and to determine the strengths and the aspects for improvement.

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