

An Agile Framework for ITS Management In Organizations. A Case Study Based on DevOps

SAHID Abdelkebir
University Hassan 1st, Settat,
Morocco
Ab.sahid@uhp.ac.ma

Yassine Maleh
University Hassan 1st, Settat,
Morocco
y.maleh@uhp.ac.ma

Mustapha Belaisaoui
University Hassan 1st, Settat
Morocco
mustapha.belaisaoui@uhp.ac.ma

ABSTRACT

Agility means the capability to swiftly and efficiently respond to internal and environmental organization changes. For IT, it is the ability to provide new services and IT solutions to support the innovative business processes. In the ever-changing business world of today, improving agility is the best way to face future challenges. IT service management is the capacity to collect data, analyze, report and implement agile improvements. Successful IT must be efficient and agile to promote the traditional company transformation to a digital enterprise. The propose of this work is a holistic and practical strategic framework to improve ITSM service management processes with the additions of two drivers Agility management based on DevOps, and an agility Process Maturity Framework (APMF). This research will enable decision-makers to improve and measure agility enhancements and hence compare the agility of Information Systems before and after APMF deploying.

CCS CONCEPTS

Computer systems organization→**Information systems;**
Agility;

KEYWORDS

IT Service Management, Agility, Organization, DevOps.

1. INTRODUCTION

In the era of digitization, technology evolutions the world is growing at a constant pace. Companies must respond to environmental changes; agility is the main guarantee of survival. Globalization means that there is more competition [9]. The life cycle of products is shorter than ever. A disruptive technology can change markets overnight.

The company faces challenging challenges in maintaining security and compliance while achieving its business objectives, complying with current regulations, and managing staff and technology. We understand that the IT staff must be able to react quickly to changing business needs while maintaining the existing infrastructure. We also know that the management objective so

often quoted, "Doing more with less" is not only a goal, it is a corporate commitment [11].

Currently, with improved IT Service Management ITSM processes and the adoption of best practice guides and benchmarks such as ITIL [2]. Compliance appears to be a need rather than a strategic choice to improve rapidly and efficiently decisions about IT and business processes. Get better agility, which allows the company to benefit from a faster Return On Investment ROI and a constant competitive advantage.

Recent developments in the field of IT governance and IT service management have led to the introduction of new technology and concepts such as service oriented architecture SOA, decision-making, and of course agility[16].

If IT drags its feet, it will retain the company, and market opportunities missed. Although there is no framework for the agility development, it helps to think about how it contributes to the enterprise (or can do) at three primary levels:

- Run the company
- Expanding the business
- Transforming the business

In the literature and even references such as ITIL, ISO 20000, Cobit [5]there is no practical, concrete and agile model for the implementation of IT services management in organizations. In this work, we propose a global, practical and agile framework for supporting ITSM. The proposed framework surpasses the limitations of existing methods/referential and meets the needs of international standards regarding flexibility and agility to improve ITSM processes. This generic framework will help any organization in the implementation of an agile and optimal IT Service Center. We measure the proposed framework by adopting

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a continuous improvement process based on DevOps (DevOps is the concatenation of the first three letters of the word “development” and the usual abbreviation “ops” of the word “operations”) and the PDCA Deming cycle.

With this introduction, this article has five sections. First, the definitions of agility are discussed so that the basic concepts and ideas of the paradigms are explored. Secondly, a review of the literature on important models and approaches to design, implement and improve agility practices is presented, following, we discuss the strengths and the drawback of the proposed model in the literature. In section four, we define the different components of agility. In section five, we propose a practical conceptual framework for ITSM agility. Finally, the conclusion, limitation and future works are present.

2. RELATED RESEARCH

During the last two decades, the ITSM-related frameworks have provided a better systematic approach to the management of IT services in the fields of IT operation to continual improvement, implementation and design. For example, different studies have concentrated on the adoption of IT Service Management (ITSM) as a “particular service oriented best practice”. According to [17], about 45% of US corporations are operating an ITSM while 15% are preparation its usage. IT service management is somehow the quality customer service that tries to ensure that customer needs and met expectations at all times [15].

2.1 ITSM in Referential ITIL, ISO 20000

ITIL presents a set of best practices information systemse management. This approach to IT Service Management highlights the effect of coordinating and controlling the different functions, processes, and systems needed to manage the complete lifecycle of IT services. Figure 1 presents in a simplified manner an overall representation of the vision of the process according to ITIL. The latter breaks down into a cycle formed of five phases.

ITIL Processes & Function

ITIL Processes	
Service Support	Service Delivery
Incident Management	Service Level Management
Problem Management	Availability Management
Change Management	Capacity Management
Release Management	IT Service Continuity Management
Configuration Management	Financial Management for IT Services
ITIL Functions	
Service Desk	Service Desk

Figure 1: ITIL Processes & Function

In “ITIL: What It Is and What It Isn’t”, [13]examined in the measuring techniques of successful companies when implementing

the ITIL-best practice. He describes Service Support and Service delivery and explains its stress on an ITSM-ITIL best practice that it does not stand alone, and it could be successful when applying to other practices. The authors define three primary tasks, which define appropriate goal setting through a Process Maturity Framework (PMF), rigorous auditing, reporting through a Quality Management System (QMS); Project Management and a Continuous Service Improvement Program (CSIP), to support ITIL-usage. Furthermore, he also provided more information about business-aligned IT process and ongoing development of the tactical and operational components especially those processes that focused on service quality by clients and users [10].

Apart from the other works on improving the efficiency of IT

service management field, there is a real life example of a case study, which is focusing on IT framework, and Service Strategy process of Steel Manufacturing Enterprise (SMC), which are related to the subject area of this thesis. In a manufacturing enterprise [18]used integration of COBIT and ITIL best practice to implement and improve ITSM framework. They introduced an approach to service strategy evaluation framework in SMC by providing indicators for the different assessment process to improve the result from ITIL implementation and to increase the improvements on changed IT processes; they use different approaches to find the problem of Business-IT-alignment in SMC. The approach aims at minimizing the difficulty of business-IT-alignment in importance within the IT community. In the same article [1], has suggested an IT Management by Business Objectives (MBO) method, which is a particular way to ensure business strategic objectives-IT alignment, by defining a new system for decision support in ITSM. It is closely related to the ITIL component in operational level and tactical level of theoretical.

In “E-government: ITIL oriented Service Management Case Study”, [12]developed a service management self-assessment plans for the government agency to support continuous quality improvement of IT processes based on ITIL governance- gap analysis methods concerning ITIL standards. In Their work entitled “Managed IT-Services: the role of IT standards”, [18]argues the practical issues based on standards and the management of IT services delivered by external or outsourced service providers. Here, the purpose of the authors is to assist IT organizations to recognize the significance of having a mutual standard for managing IT services.

2.2 ITSM in Researches

In IS research, the agility concept has been Introduced in early 1990 [3][19] After the success of agile methods in computer development. In research, the concepts of flexibility and agility were associated with the broader challenge of combining sophisticated computer systems with unexpected

Changes, sometimes surprising in user needs, business processes, company structure, strategy, markets, and society in overall. At the beginning of the year 2000, the emphasis was on other attributes of (IS) explain agility through IT, development methods (IS) and IS outsourcing practices.

Guided by our research question, we have used a provisory classification, to identify research that addresses the relationship between ITSM and agility. In the literature, we deduced that is a lack of a unique definition of the agility concept; The Agility Research in (IS Agility) was devised on several axes [4][7]. However, there is a lack of research regarding agility in IT Management Systems. Although the IT function, in all its

In recent work [17]. The authors argue that more than ever, effective technology management is essential for business competitiveness. For decades, technology leaders have struggled to balance agility, reliability and security. The book does not focus on tools such as infrastructure such as code, containers or configuration management. These are people, culture and processes.

3. THE PROPOSED ITSM FRAMEWORK

In theory, the gains of using Open Source are significant financial savings. Concerning commercial desk service and asset management solutions, a company with several technicians could save \$ 1200 to \$ 20,000 (or even more) per year. It is serious money.

both compatible with ITIL. Also, supports the management and improvement of continuous IT changes. Figure 2 below describes the architecture of the IT service center proposed for the organization.

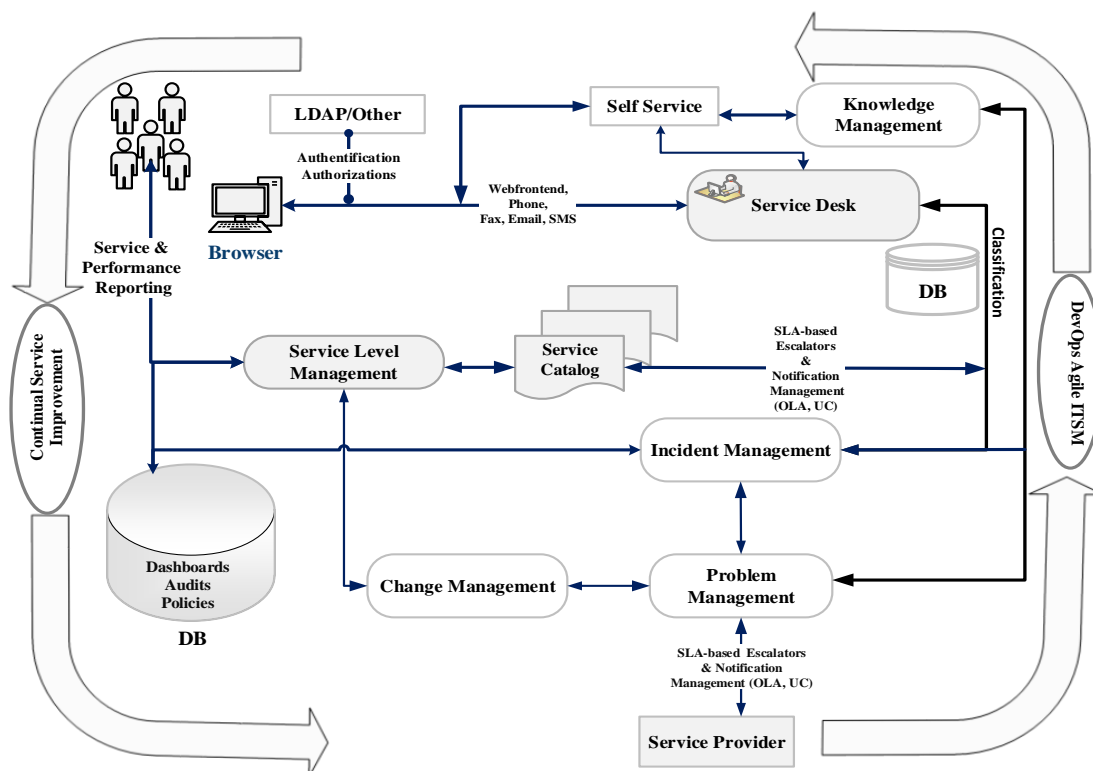


Figure 2. The proposed architecture of the agile IT

3.1 Model Components:

- **Configuration management database CMDB**

The CMDB as defined is the federated and integrated base allowing feed many processes: Incident Management, Problems, Release, Change, Capacity, Availability, Continuity, Financial, Asset Management & Configurations...

- Identification of CIs and associated attributes,
- Lifecycle management of configuration elements, from point of entry to flow,
- Complete history of all activities related to a configuration item (displacement, technical evolution, ...),
- Intuitive modeling of relations between CI,
- Impact analysis on IS, on users
- Valuation of assets,
- Contract management.

- **Change Management:**

Controls the lifecycle of all changes

- **Problem Management:**

Allows specialists to analyze trends and avoid future interruptions to the service.

- **Incident Management:**

An incident is defined as an indication of certain errors or the failure of certain components in a computer system. In a typical customer service center, the incident is reported by the customer or automatically generated by the surveillance system [18] The main objective of the incident management is to minimize the unavailability of the activities and ensure the continuity of the service. Restores normal service operations as quickly as possible

- **Self-servicing**

It is a process to communicate and manage customer expectations when planning and deploying late versions. For example, for each server, "there should be an account for all devices with attributes such as type, configuration, equipment time, diagnostic history, change and repair reports" etc.

- **Service Level Management**

The objective of Service Level Management (SLM) is to support and enhance the IT services quality, to control and report on the accomplishments of IT services and to investigate the steps to be taken to eradicate the bad service.

- **Knowledge Management**

The objective of this Process is to collect, analyze, store and share knowledge and information within a diiferents stackholder in IT service center.

4. METHODOLOGY

To be able to meet the proposed ITSM Framework requirements, all employees must feel concerned and involved. To this end, the quality department has undertaken a series of strategic actions. These activities are planned following an agile model based on DevOps. Inspired by Deming wheel and DevOps, we organize the reports into four phases DDAO: Discover Do, Act, and Optimize, as shown in Table1. Our goal is to develop a quality approach for

continuous IT improvement. With the auditing of all the functional and practical aspects of the organization services management and the desired need, including the implementation of a roadmap for the desired organizations levels of maturity regarding services management. We define an agile approach based on the proposed model DevOps, to guarantee a continuous improvement of the processes and services organization and contribution in the organization business.

Table1. Continual quality improvement

DISCOVER	DO	ACT	OPTIMIZE
Vision And Strategy	Assessment	Organization	Performance Management
Auditing	Strategic Plan	Processes	Benchmarks
Key Performance Indicators	Roadmap	Tools And Technology	Continuous Improvement

4.1 Discover

The first step of the proposed quality model DDAO, a service management policy is defined. An audit of the existing is also planned to meet the various objectives of this policy to determine an action plan to reach them. To successfully execute the service strategy, and to effectively integrate the business and IT, someone needs to be accountable and responsible for the services IT provides. Rules, policies, processes, and procedures are critical success factors for operating a prosperous business. Vision, Strategy, policy, and plan

The main activities of governance are to evaluate, direct, and monitor the strategy, policies, and organizational programs. Numerous items need to be assessed for the organization, such as the services, financial performance, opportunities, threats, and customer feedback. The direction needs to be given to vision, policies, and delegation of authority. Those who govern the organization also need to monitor compliance efficiency and the effectiveness of the governing.

- **Service management system**

It is essential to put a service management system (SMS) in place to direct and control the service management activities. A regular SMS helps organizations efficiently, and economically deliver and support services to their customers. The SMS should include the strategy, policies, objectives, plans, processes, procedures, documentation, and resources required to enable services for clients. The management services policy makes it possible to define the goals following the management review. During this study, the results obtained during the year or the last six months are examined and analysed. Based on these results, a strategy is put in place and set out in the service management policy. The primary objectives are:

- Continue to reduce variable costs by reducing the TCO per user
- Involve the end user in the incident management process (Self Servicing)

- Increase the satisfaction rate of computer users by 75% to 90% for 2016, ensuring the quality of the services delivered through a survey quality system
- Make the profiles versatile (admin driver) internal or for client projects
- Continue to improve the configuration management process by operational practices (car inventory, life sheets, ITSM tool). With the Quality Manager, continue to strengthen
- Reporting
- Making the management system more efficient
- Extend the scope of SLAs (backups, and ensure consistency between SLA with OLA / UC).
- Review the incident/problem relationship (status of the incident after opening a problem).
- Formalize any structure to manage all goods, regardless of the kind of products, business applications or equipment, etc.
- Provide decision-makers with detailed information on the allocation, cost and forecast of assets.
- Reduce risk by avoiding penalties and expensive litigation due to regulatory or contractual non-compliance, especially in software licensing.
- Reduce costs by eliminating unnecessary acquisitions if the property already exists.
- Proactively manage the warranty and support and maintenance +contracts for optimal utility.
- Negotiate better contracts by properly managing assets and suppliers.
- Improve productivity by automating the movement of goods in the business environment.
- Facilitate data-based internal compliance and accountability audits to improve processes continuously

To determine the organization's desired state, we start by assessing the organization's current state. The external environment also needs to be assessed. The results of these assessments help with risk management, business case preparation, and defining program and project objectives.

4.1.1 Audit of Existing IT System

The following section presents the part of the empirical study that concerns and identifies the measuring system of IT in the organization. During the empirical study, different possibilities in measuring and comparing the KPIs in different groups were found. In the following section, measuring operations, visualization of measurements and Key Performance Indicators will be presented. IT managers described that there are different parts of ITIL that are incorporated in the fields of IT Support, Service Desk SLA's, Incident and Problem management and Deployment fields. The most important parameters to measures are targeting Time Deliveries in different channels such as General Service management of core system functions, Business Projects, Activities, Operational maintenance and Admin. Another aspect that could be measured is Service improvement with providing surveys based on a yearly basis (on process and maintenance object level) to improve and monitor the overall performance of the systems.

4.1.2 ITSM audit result

We conducted an audit of the organization's ITSM practices. This audit was piloted based on the maturity models described in **figure 4**, in order to define the current levels of maturity and to define the desired level to be attained by the organization. The

figure 3 below shows the current ITSM maturity level. As shown in ITSM the **figure3** above, the level of maturity of the organism in terms of IT Service Management is still at the initial and reproducible level 1 and 2. Our objective is to set up a service management and achieve level four.



Figure 3. ITSM Maturity results

4.2 DO

4.2.1 The Practical Framework to Enhance ITSM Efficiency

In this section, we have proposed different feedbacks about the system performance without modifying the new solutions for the future model. In this section, it would be helpful to be able to provide experimental model behaviour, which has been missing in the Service Quality of IT Service Management process with some suggestion to improve different approaches, which we have evaluated. To conclude the issue, we could say that organizations should seriously take advantage of learning from the system performance and should reduce the appropriate Incident management because successful approach and proper IT service management plan could make the difference between the organizations continued existence and sudden death. Having shown how changes in IT service management and system performance can help to overcome some of the challenges in ITSM framework and operational efficiency, we now want to briefly summarize the results of our evaluation based on provided metrics from the three sources.

However, it can be concluded that the five ITSM processes like Incident management, Problem management, Availability management, Operation management and Configuration management are common among three organizations. According to Gupta: "Incident is quickly resolving incidents that affect the normal running of an organization's IT service" [6] And Problem management pursues to become the main reason of incidents and then begin movements to improve or correct the condition. It is interesting also to see that establishing of Availability management process is ranked high between larger organizations as one of the important factors. Availability management process is to improve the capability of the IT infrastructure and service and supporting organization. Further, Release management can be considered as one of the top processes regarding the design and implementation

of an efficient method for the distribution and installation of changes following by Operations management process for planning and technical support. In addition, User satisfaction is mentioned both by the organization. According to the findings, high satisfaction manifestation will attract a good driver, which adds values to the company. For example, in the organization, they monitor overall performance like learning from the system; inquiry, feedback of the system or the measurement performance report on an annual basis.

The suggested framework is a structured approach to increase the perception of ITSM efficiency and to reduce incident management in new start-up companies.

In this part, we discuss the axes of improvement referring to the results of the empirical study and interviews with the IT managers in the ITSM.

4.2.3: IT Service Management

In this part, we will discuss the improved points treated in terms of IT service management: Self Service and Service Catalogue service and support organizations today are constantly under pressure to deliver business value. On the one hand, they must continually improve service delivery that maximizes user productivity while cutting costs and reducing business risks on the other. The more that organizations rely on IT to gain business advantage, the more employees rely on their IT service and support department. The volume of service desk service is increasing, as is the pressure on service delivery that employees need to remain productive.

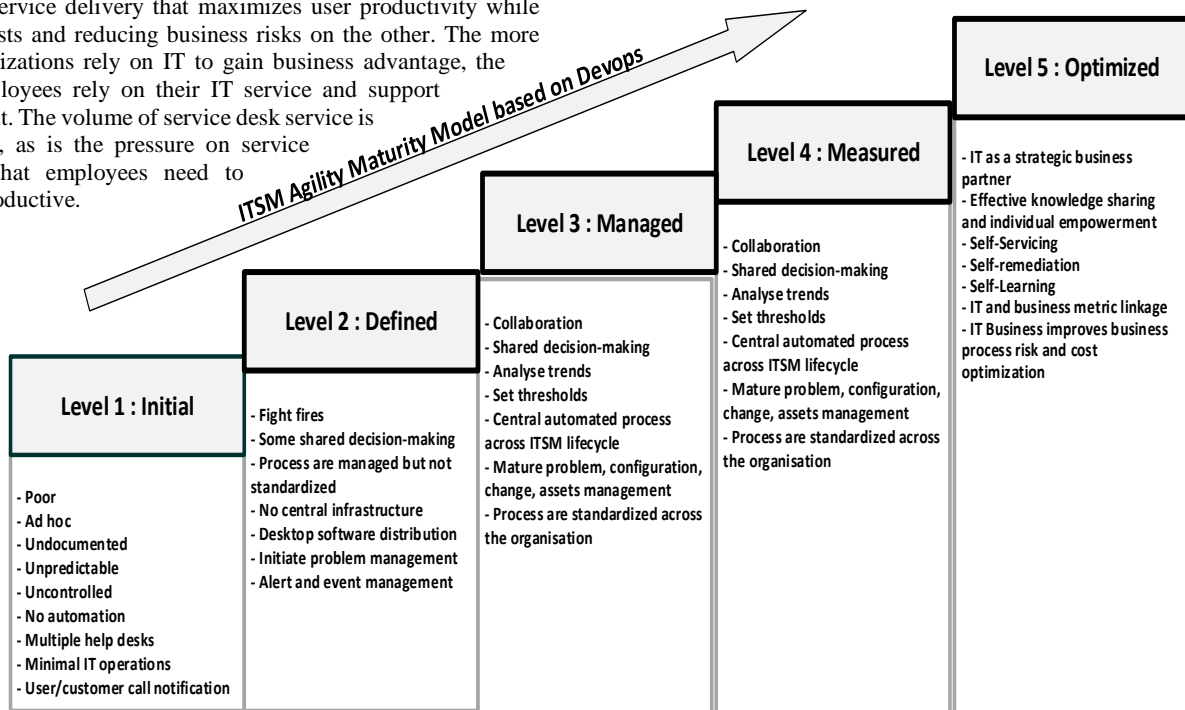


Figure 4. Practical Framework to Enhance ITSM

The use of computers has increased the expectations of employees for service delivery. They want services to be easier and faster to get, where and when they need them. Self Service and Service Catalog opens another window for service organizations, helping you meet end-user expectations for "anytime-anywhere" access, improving customer satisfaction and improving your service delivery. By adopting a self-service and service catalogue, we take many benefits:

- Improve service delivery
- Improve service provisioning
- Enjoy operational and cost efficiencies
- Reduce call volumes (incident and request workload)
- Reduce time to resolution and request fulfilment

- Enable fast end user access to the service desk anytime, anywhere.

In order to meet the Customer's needs and requirements, this aims to:

- Collect bids consistently.
- Define the perimeters of responsibility of the ISD
- Define service levels
- Set up the operating account by service
- track service updates

This catalogue will then be published in order to guarantee the transparency of the services provided, which will make it possible to define the agreements on service levels.

4.2 Act

This step will evaluate the decisions taken, and the approach was taken. The quality department and management will study the results and judge the relevance of the decisions made.

Moreover, this stage is required to reduce the gaps and dysfunctions deplored during each review or audit. The planned management review each year takes into account the steps taken during the year or the last six months in trying to define opportunities for improvement.

We exploit DevOps approach to set up this step. DevOps creates a flow of values of people, processes and technology, which she believes should be familiar enough to people immersed in ITSM "It is based on processes and practices that underpin the entire service life cycle. It takes management of ITIL and IT services to the next level. "Integrating ITSM at the next level involves a meagre and agile reflection in strategy, design and development, transition, operation and improvement of IT services.

Unless you have left ITSM for 10 years, you know that an agile IT office is flexible, automates processes for faster resolution of incidents, and focuses on collaboration between technicians and Interactions with users. However, how do you adopt these seemingly rigorous principles to make your IT service desk truly agile? We have put in place five simple ways to help you evaluate your IT service desk and progress towards agility.

We measure the organization agility level by the proposed DevOps ITSM Maturity model for continuous organization's measure and improvement. The organization's level of agility is initial; our objective is to orient the ACT part towards an agile approach, in order to ensure a delicate change management and consequently a continuous improvement by supporting people, process and technology drivers. To creating an agile IT service center that delivers quicker resolutions, increases user satisfaction and evolves with rapidly changing technologies, we suggest following these steps described in figure 5 above.

4.3 Optimize

The most important thing that organizations that adopt agile and DevOps practices learn is that there is no end to the journey and that they need to improve to remain leaders continuously. Customers always expect more, and competitors will always be there to deliver it if you do not do it first. Remaining a leader requires adapting to customer feedback and continually improving products and practices, and recognizing when it is time to pivot. New metrics are defined to measure and manage improvement, as well as value delivered.

4.4 Agility Management:

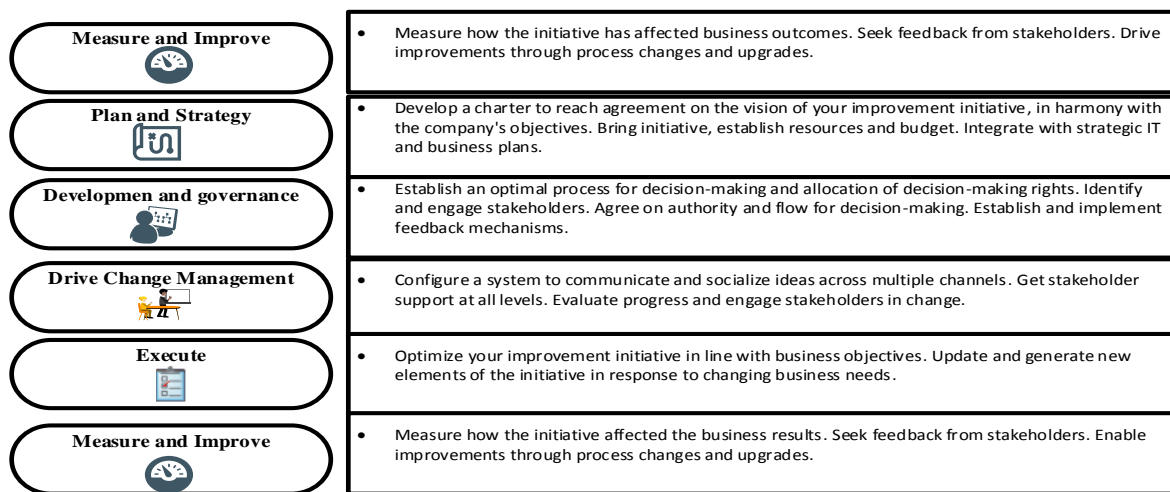


Figure 5. Devops Continues IT improvement Service

To take benefit of the digital era, organizations are recognizing that they must to achieve strategic responses efficiently. This requires that ITSM teams focus on improving or developing coherent processes that reduce downtime and improve productivity (Robert, et al., 2016). Service management teams become a consulting model for the company and your ITSM, integrated with processes, enables agility that supports business strategy [14].

Agility does not only mean "fast", but it is an important element. Agility in the ITSM is a measure of responsiveness, which cannot be summarized at the speed of ticket processing and the change of version by computer staff. On the opposite, agility means the engagement of the entire IT team that solves service demands while respecting optimized employment costs. In short, true ITSM agility is achieved by implementing processes that work smarter and more efficiently.

Infrastructure technology transformation forces organizations to re-engage IT processes - but too often reengineering leads to frustration and failure. In most cases, IT organizations implement new processes and tools without taking into account the impact of changes on the organizational structure and the people involved. Implementing a DevOps development process has confirmed to be a tool able of reducing publication time, automation, and improved repeat processes, which is a principal component of agile development. While agile development has led to an increased focus and development of the DevOps model, DevOps is not a change at all. DevOps can (and should) be included and realized in traditional development environments, where appropriate, and improvement can be measured. However, DevOps is not a unique technology, process or tool. The adoption of DevOps requires changes in team structure, division of responsibilities, and the need to integrate and deliver services that enable teams to succeed.

5. BENEFICES OF THE PROPOSED AGILE ITSMA AFTER IMPLEMENTATION

User expectations have changed, and the IT department has to develop other ways of communicating with them. The goal is to provide IT Service Management with a tool to anticipate their requests, optimize productivity, reduce downtime, and have all the necessary ITSM processes, including incident management, problem management, Changes, requests, self-service, as well as

SLA management, etc. The proposed solution fits easily into IT operations.

- Control of the support center with fundamental processes
- Improved service and support performance, and reduced unforeseen costs and business risks.
- Support center solution is easy to use and administer
- IT administrators can easily configure, design and modify the support center system. IT teams can configure it without coding to meet the changing needs of the enterprise and achieve faster profitability without disrupting users.
- Improved user satisfaction through the self-service portal: Secure self-service functions, available anywhere and all the time enable end users to log and resolve their own IT incidents, and display relevant information. The service catalogue allows the end user to view and use the services for which they have rights. Automatically provide and maintain services, linking them to the policy and objectives of the IT department.
- Improved visibility of operations through reports and dashboards: Quickly evaluate your performance against the company's goals, for continuous improvement. Easily create or configure multilevel reports based on the metrics used to demonstrate the value of (ITSM) for the enterprise. Dashboards with cascading analysis functions to trend charts based on KPIs to provide context for decision-making and planning. The benefits of the adoption of the practical ITSM framework are:
 - 95 percent success rate on SLAs
 - Reports meet auditor requirements
 - 50 percent reduction in end-user calls
 - Data confirms cost-cutting decisions
 - Set up an agile approach to deal with the different changes in the IS
 - Implement a continuous improvement strategy DDAO (Discover, Do, Act, Optimize).

6. CONCLUSION

An efficient, agile and practical approach to ITSM is vital for IT organizations to increase the quality of services they provide, to improve speed and agility of the service desk, and to deliver a superior user experience, all reducing the cost to run IT. The paper aims to identify the important aspects that propose a practical agile framework for ITSM efficiency. It was collected in a theoretical and empirical research study that generated answers to the sub-level research questions. The organizations are becoming more reliant on a comprehensive framework to control IT service management in organizations, how ITIL-ITSM best practices have an effect on organization efficiency and problem-solving.

In a theoretical study, the concept and the needs of ITSM in the organization are presented with applying different methods and improvements techniques, hence proving the most important of ITIL-ITSM best practice model. The objective of this work is to propose a global and practical ITSM framework. The proposed framework was defined based on empirical study and was implemented in the large-scale organization (+900 employees). The result of the adoption of this framework, gives a clear idea its efficiency, making it reusable in any other organization. Additionally, performing IT service management is a costly task. Small changes in the framework process can lead to major changes in profit and management process within the organization, like maintaining and operating an information infrastructure. Thus,

firstly, it is important for an organization to choose the comprehensive ITSM framework, which fulfils its required aims from a specific task, and secondly which has a better performing quality in an IT service management model.

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