

Managing Multiple Change Projects in Supply Chains: A Case Study of a Moroccan Multi-Technical Services Company

Abdelouahab Errida, Bouchra Lotfi , Elalami Semma

Abstract—In this paper, we try to address the topic of multiple change management by adopting an engineered research methodology, conducted within a Moroccan company during its implementation of several change projects that aim at improving its supply chain management performance. Firstly, we present the key concepts related to our research, namely change management, multi-project management and supply chain management. Then, we try to assess how the change management and multi-project management are applied in this company. Finally, we try to propose an approach that will help managers in dealing with multiple change projects. This approach proposes to integrate change management, project management and multi-project management for managing change projects according to three organizational levels: executive level, project portfolio level and change project level.

Keywords—Change management, multi-project management, project management, change portfolio, supply chain management.

I. INTRODUCTION

THE complexity of the business environment, including the shortening of product life cycles, increasing customer expectations and rapid advances in information technologies, all are factors that accelerate the speed of change and put pressure on companies to continually rethink and reconfigure their supply chains [1]. The project mode is one of the most widely used organizational forms for implementing changes within companies, especially for reorganizing and improving supply chains. Because of their complex and cross-functional nature, supply chain projects are more difficult to implement than those in other functional areas [2], [3]. This difficulty becomes more worrying when implementing a multitude of change projects. These need to be managed by taking into account, at the same time, the complex and cross-functional aspect of supply chains, the constraints arising from the simultaneous management of multiple projects, and also the human aspect related to each change project. Indeed, Bremer [4] reveals that the number one obstacle to success for major change projects is employee resistance and the ineffective management of the people side of change. To overcome this resistance and to better manage the human aspect during changes implementation, companies are looking closely at how they can ensure employee engagement and improve change readiness. As a result, the application of change management principles is growing rapidly [5] and is becoming

one of the key success factors for business transformation [6]. In this paper, we will discuss the theme of change management during the implementation of several change projects concerning the supply chain of a Moroccan company specialized in multi-technical services.

This paper is organized in the following way. First we will present the key concepts related to this theme, namely change management, multi-project management and supply chain. Then, we seek to identify the key factors that determine the success of changes in the context of multi-project management. After that, we will analyze how these factors are considered in managing changes within the company object of the present paper. Finally, we try to propose an approach that will help managers better manage change projects.

II. RESEARCH QUESTION AND RESEARCH METHODOLOGY

The number and the complexity of projects are growing [7], which creates a great need in terms of coordination, monitoring and control. Indeed, working on several projects at the same time may present some difficulties such as: lack of competencies and methods, unclear roles, poor project management, etc. This difficulty becomes even more important when it comes to organizational change projects. In fact, Balogun [8] and other authors show that 70% of all change projects fail in all organizations. Furthermore, because of their complex and multifunctional nature, it is difficult to implement a multitude of organizational changes in supply chains. Supply chain professionals often find themselves ill equipped to manage changes [9], hence the importance of an approach that will help them to overcome these difficulties when implementing several changes concerning supply chains. All of this raises the following research question: How to succeed in managing change when implementing several change projects regarding supply chain management?

In order to contribute to answering this question, we have opted for an engineered research methodology, conducted within a Moroccan company specialized in multi-technical services. This methodology is inspired from the constructivist epistemology. It promotes an understanding of complex processes in a learning or organizational change perspective [10]. It enables the researcher to become an organizational engineer who will build a tool, set it up and evaluate it with users [11], thus contributing to the emergence of new scientific knowledge.

In the next section, we will present the main concepts underlying our work.

Abdelouahab Errida is with the FST OF SETTAT, Morocco (e-mail: a.errida@uhp.ac.ma).

III. THEORETICAL BACKGROUND

To address the research question stated above, we have identified three key concepts which constitute the theoretical basis of our research, i.e.: multi-project management, supply chain management and change management.

A. Multi-Project Management and Portfolio Management: An Answer to Project Interdependencies and Strategic Alignment

Traditionally reserved for certain areas whose main activity is the realization of projects (buildings and public works, engineering, consulting, ...), the mode of management by projects is now used in organizations belonging to other sectors, private and public, to respond to various issues (e.g. development of a new product, extension of a production line, implementation of new software, certification and reorganization, change project ...). In this case, firms conduct the majority of their activities in project mode and/or privilege the project dimensions over functional dimensions in their structure and processes [12]. Managing multiple projects requires consideration of several constraints related to the interdependence between projects. In this context, multi-project management (MMP) aims to manage globally one or more sets of projects, taking into account the interdependencies between the projects of the same set [7].

Elonen and Arto [13] have identified six problems areas in managing multiple projects: inadequate and poor project management, lack of resources, competencies and methods, lack of commitment, unclear roles and responsibilities, inadequate portfolio level activities, inadequate information flow across organization, inadequate management of project-oriented business. Faced with these problems, the MMP aims to make permanent arbitrations between projects by ensuring several functions: resources allocation and coordination, risks mitigation, and interdependencies management [14]. It focuses principally on operative issues related to the coordination of the joint execution of individual projects including scheduling, resource allocation among multiple projects and integrated cost management [15]. On the other hand, project portfolio management mainly focuses on strategic alignment, project valuation, selection and prioritization. Its output is a collection of selected projects, prioritized according to strategic objectives and their values to the company [15]. A portfolio is defined by PMI (2013) as a collection of projects, programs and other work that is grouped together to facilitate the effective management of that work to meet strategic business objectives [16]. Portfolio management is the centralized management of one or more portfolios, which includes identifying, prioritizing, authorizing, managing, and controlling projects, programs, and other related work, in order to achieve specific strategic business objectives [16]. In the particular case of change projects, human aspects are of capital importance and must be managed by introducing change management techniques.

B. Change Management for Dealing with the Human Side of Change

Despite being widely studied, the change management theory may still offer several perspectives of research in various fields: sociology, management, industrial engineering and others [17]. This author reveals the evolution of organizational theory from the 1950s to present, moving from a static concept of organization to a dynamic concept which has allowed the emergence of the organizational change theory. Nurcan [18] defines organizational change as a process of transformation that brings an organization from a current state to a desirable future state.

Organizational changes within supply chain can be planned, as they can be emergent. Planned change have gained more attention in the academic literature and owes much to the work of Kurt Lewin [19]. A planned change can be thought of as a process consisting of a series of pre-planned steps (e.g. implementation of Lean manufacturing or six sigma, implementation of an ERP, production system reorganization, etc.).

Change management includes all the actions to be taken in order to introduce and sustain a change in an organization [20]. Change management theory offers models, frameworks and tools that can be used to help individuals make successful transitions resulting in the implementation of change.

There are many levers that can be used in order to succeed in the change management process, but it is up to each organization to determine them according to change impacts and specificities. In the particular case of supply chains, it is necessary to take into consideration the complex and multifunctional nature of change projects.

C. Importance of Change Management in Managing Supply Chain

Galasso [21] considers the supply chain as the set of entities, including suppliers, logistics services providers, manufacturers, distributors and resellers, through which materials, products and information flow. Based on data collected from interactions with nearly 400 companies, Sloane et al. determine five key pillars of excellence that form the foundation of an effective supply chain management strategy [9]. These are: (1) availability of right talents who are able to execute a strategy that is cross-functional and cross-organizational, (2) choice and implementation of the best technologies, (3) internal collaboration, (4) external collaboration with stakeholders, and (5) managing supply chain change. According to [9], the fifth pillar of an excellent strategy concerns the management of change projects in supply chain. These authors emphasize that the transformation of the supply chain in order to achieve excellence, requires particular attention to the management of changes and projects.

Other researchers have highlighted the importance of change management in the success of specific changes concerning supply chains. As examples, [22] reveals that the successful implementation of an ERP requires the mastery of five basic skills, among which are the use of change

management strategies. Also, [23] indicates that the failure of Lean Manufacturing implementation is caused in large part by human factors (resistance, reluctance, fear of unknown, feeling of insecurity, etc.).

IV. CASE STUDY

The case study presented in this paper concerns a Moroccan company, created in 1975, and a subsidiary of a European multinational corporation and specialized in multi-technical works in the fields of energy, infrastructure and communications. This company adopts a project-based organization to execute the projects for the benefit of its customers (electrical installations, facility management, etc.) and also for its projects of change. It is organized around four business divisions (telecommunications, multi-technical maintenance, substations and power lines, industrial electricity), each of which is composed of a few business units. In addition to these entities, there are other departments for support functions (quality, HSE, finance, logistics, etc.). The logistic department handles all the logistical operations (reception, inventory management, warehousing, etc.) involved in supplying materials and tools to the central warehouse or to several project sites. As part of supply chain improvement projects, the logistic department has initiated several change projects under the direction of the logistic manager. Five ongoing change projects are presented in Table I.

V. CURRENT STATE OF CHANGE MANAGEMENT AND MULTI-PROJECT MANAGEMENT WITHIN THE HOST COMPANY

In order to propose an approach for managing change projects, adapted to the host company, we think that the assessment of the current state regarding the practice of change management and multi-project management is a very crucial step, which will help us identify the areas of improvement and therefore to determine the areas to be integrated into the approach.

A. Current State Analysis of Change Management

We have attempted to develop a framework for analyzing the current state of change management based on Creasey's work [24], notably by drawing inspiration from other publications. This author has identified 10 change management practice factors to investigate for assessing the change management effectiveness: (1) sponsorship, (2) use of a structured approach, (3) availability of resources, (4) integration of change management and project management, (5) employee engagement, (6) communication, (7) Involvement of managers, (8) training, (9) resistance management, and (10) reinforcement strategy. In addition to these factors, which are considered as areas of analysis by other authors, we have identified two additional factors that we consider very relevant in the case of the host company: (11) change strategy and (12) change readiness. These two factors are considered to be among the key success factors for change management [25]-[27]. An extract of our analysis is presented in Table II, indicating the strengths and the weaknesses observed within the company, the proposed improvements and the bibliographic references.

TABLE I
 CHANGE PROJECTS LIST

Project	Change area	Change Project	Initial state	Desired state
P1	Organization	Logistic department Reorganization	Central warehouse is used for components, tools and materials storage, pending its shipment to worksites. It is organized around three cells. The first cell is responsible for the management of tools. The second one deals with logistic operations that concern three departments (telecommunications, substations and power lines, industrial electricity). The third one handles logistic operations for the other two departments.	Central warehouses will be organized around three functions (reception, shipping and tools management). It will be composed of three cells, each of which will be responsible for one of the three functions.
P2	Information System	Implementing an ERP system	Use of several non-standardized IT applications	A single information system integrating several modules for different functions (project management, purchasing, accounting, logistics, control, inventory management, finance, etc.)
P3	Environment, reverse logistics	Creation and installation of a waste management system	Informal waste management and absence of a process for managing waste at worksites.	Establishment of a system (including associated processes) for collection, sorting and treatment of waste in accordance with OHSAS 18001.
P4	Innovation and continuous improvement	Implementing innovation and continuous improvement process	Poor innovation culture and lack of continuous improvement process within the logistics department.	Development of a culture of innovation including the creation of a KAIZEN cell.
P5	Flow management within large worksite	Reorganization of worksites by creating new local management positions	Logistic operations at worksites are managed by the site managers who operate under the authority of the project manager (business division).	Logistic operations at large worksites will be controlled and managed by the logistic department by assigning storekeepers to major construction sites.

B. Current State Analysis of Multi-Project Management

To assess the current state of the host company in terms of

applying multi-project management best practices, we have tried to identify the main factors contributing to the success of

projects in a multi-project context, and have then used these factors as areas of our analysis. Patanakul and Milosevic [28] identify five factors that determine the success of projects in a multi-project context: the successful assignment of projects, efficient allocation of resources, supportive organizational culture, project management processes, and multi-project management skills. For its part, [29] considers the use of processes and methods; the use of a central database for monitoring all projects and resources; appropriate prioritization of projects and initiatives; strategic resource planning; and tactical resource planning among the key success factors of multi-project management. Based on the work of these two authors and other publications, we have

identified the main success factors in the case of multi-project management, which are: (1) project management processes, (2) project portfolio management processes, (3) strategic alignment of projects, (4) competencies of multi-project managers, (5) human resources allocation (availability, relevance, performance), (6) organizational culture, (7) prioritization, (8) learning and knowledge management.

Basing on these eight factors, we have analyzed the current state of multi-project management within the host company. An extract of our analysis results is presented in Table III. We believe that this analysis is a preliminary study and should be supplemented by the assessment of project management maturity within the company.

TABLE II
 EXTRACT OF CHANGE MANAGEMENT CURRENT STATE ANALYSIS

Key success Factor	Strengths	Weaknesses	Proposed improvement
Change strategy [26], [31]	Establishment of specific objectives for each change project, to assess the degree of change success.	Absence of an overall strategy for improving the supply chain.	Establishment of a clear shared change strategy, based on internal and external diagnosis.
Change readiness [27]	Several factors may contribute to improve employees' willingness to change: individual and collective experience in old changes, seniority and the opportunity for individual progress.	Lack of tools and methods for assessing change readiness.	Assessing change readiness and the capacity of change before implementing projects change.
Sponsorship [26], [24], [32]	Wide degree of autonomy and wide margin of maneuver for the change manager.	Weak sponsorship of executive management.	Ensuring sponsorship and involvement of executive management in managing changes.

TABLE III
 EXTRACT OF MPM CURRENT STATE ANALYSIS

Key success Factor	Strengths	Weaknesses	Proposed improvement
Competencies of multiple Project managers [28], [33], [34]	The company is a project based organization (PBO), allowing teams to master project management tools.	Lack of a dedicated process for skills development.	Establishment of a process for skills development regarding project managers in a multi-project context.
Resource allocation (availability, relevance, performance) [13], [28], [29], [33]	Resources allocation when managing multiple projects is a common task that is not new to project managers.	Lack of experienced resources in change management.	Establishment of a skills development plan concerning the various levels of the company (Executive management, middle management, local management, employees).
Prioritization [29], [33]	Prioritization has already been developed in other situations, not relating to change projects.	Lack of an approved process and method for prioritizing projects.	Identification of a method and prioritization criteria.

VI. PROPOSAL OF AN APPROACH FOR MANAGING ORGANIZATIONAL CHANGE PROJECTS

Taking into account, on the one hand, both change management success factors and multi-project management success factors, and on the other hand, the current state of these two functions within the host company, we propose to manage change projects according to three organizational levels: executive level, project portfolio level and project level (Fig. 1). Also, we suggest to ensure feedback loops between the three levels for performance monitoring.

A. Executive Level

It is well recognized that changes that are initiated without an accurate analysis of the company environment are more likely to fail because they would not be aligned with the actual real needs of the company [30]. Both strategic alignment of projects and sponsorship of leaders are among the success factors in a multi-project context. As a result, projects initiated by the company must be aligned with the strategic objectives. To ensure this, we propose the following steps:

- 1) Analysis of the internal and external environment (situation As Is): change projects must be determined on the basis of a detailed analysis of the initial situation (As Is).
- 2) Detailed description of the desired situation (To be): Once the diagnosis is established, the company has to describe the desired situation by creating a vision to achieve this new situation.
- 3) Difference between the desired situation and the current situation: the objective of this step is to determine the gap between the desired situation and the current situation.
- 4) Identification of the strategic objectives necessary to compensate for the gap identified in the previous phase.

B. Change Portfolio Level

Taking inspiration from the process modeling proposed by PMI [16], we propose to implement the following processes in order to efficiently administer multiple change projects.

- 1) Identify the list of change projects: Projects will be identified and selected with the aim of achieving the

- predetermined strategic objectives.
- 2) Analyze projects: Prior to implementation, change projects must be subjected to a detailed analysis to assess their feasibility, benefits, impacts and risks.
- 3) Select and prioritize projects: Projects will be selected and prioritized on the basis of the selection and prioritization criteria that will be determined taking into account the predetermined objectives.
- 4) Plan projects: Selected projects will be planned taking

- into account priorities and availability of resources by creating the optimal balance to achieve the strategic objectives.
- 5) Manage projects: Projects will be managed by integrating project management, change management and individual change management (project level).
- 6) Evaluate performance and offer feedback to strategic level.

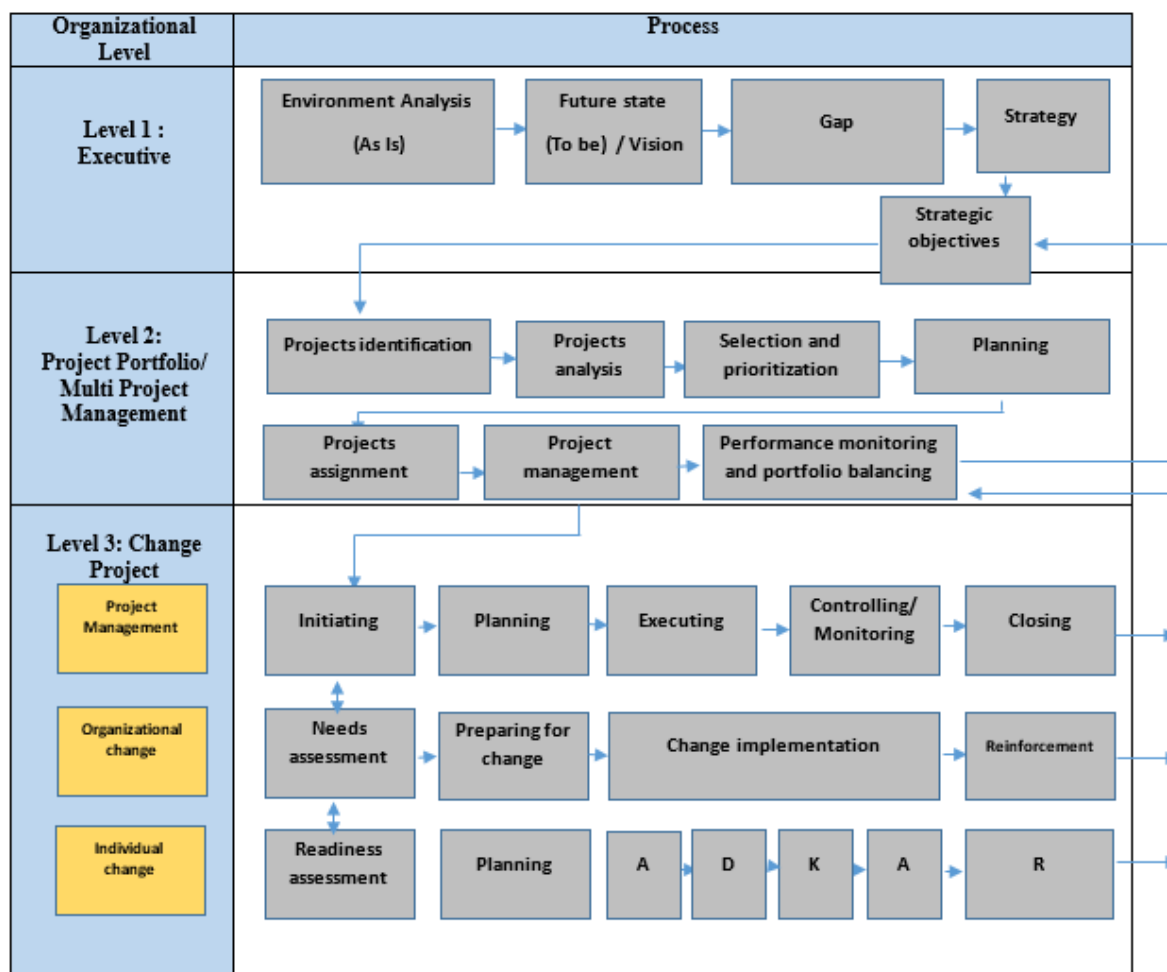


Fig. 1 Approach for managing multiple organizational changes

C. Project Level

For the individual management of change projects, we propose to integrate three types of processes:

1) Project Management Processes

We chose five macro-processes, based on the modeling proposed by PMI [35]. This includes initiating, planning, execution, control and monitoring, closing.

2) Individual Change Process

Employees must be helped to make change. This begins with an assessment of the willingness of individuals to accommodate change. Then plan and implement the necessary actions following the ADKAR model which focuses on

individual coaching in five stages: Awareness, Desire, Knowledge, Aptitude, and Reinforcement.

3) Change Management Process

Kotter [25] points out that change management is a process that focuses on change progress through various stages. This idea underlies the majority of change management models that consider change as a process or set of steps [5]. We therefore propose to manage change by respecting four main stages: needs assessment, planning, change implementation and finally reinforcement.

VII. CONCLUSION

In this paper, we aimed to propose an approach for the management of several change projects within a Moroccan company, taking the case of its projects initiated to improve supply chain. To do this, we have highlighted the importance of change management when implementing changes in supply chain and the role of multiple project management in reducing project interdependencies. Then, based on the success factors related to change management and multiple project management, we have tried to assess the current state of both change management and multi-project management within the company, which is the subject of our study. On the basis of this analysis and referring to works from academic and professional fields, we have proposed an approach for managing multiple changes, according to three organizational levels (executive, project portfolio and change project), by integrating project management, multi-project management and change management.

REFERENCES

- [1] R. Cox, the Successful Implementation of Supply Chain Management Technology Initiatives, *Electronic Theses & Dissertations*. Georgia Southern University, 2015. (Online). Available at: <http://digitalcommons.georgiasouthern.edu/etd/135>, (accessed: 15 January 2018).
- [2] P. Dittmann, the supply chain drives shareholder value, 2010. (Online). Available at: <http://www.thenewsupplychainagenda.com/blog/>, (accessed: 15 December 2017).
- [3] M. Greer, W. Ford, "managing change in supply chains: A process comparison", *Journal of Business Logistics*, Vol. 30, No. 2, 2009.
- [4] M. Bremer, how can organizational culture make a difference in leading change? 2015. Available at: <https://www.leadershipandchangemagazine.com/organizational-culture-leading-change/>, (accessed: 5 January 2018).
- [5] D. Parker, J. Charlton, A. Ribeiro, "Integration of project-based management and change management", *International Journal of Productivity and Performance Management*, Vol. 62, Issue 5, pp. 534 – 544, 2013.
- [6] Autissier D, J-M Moutot, *Méthode de conduite de changement*, 4^{ème} édition, Dunod, 2016.
- [7] W. Fernez, C. Triomphe, "Le management multi projets : définitions et enjeux", *Faire de la recherche en management de projet*, Paris, Vuibert, FNEGE, pp. 189-207.
- [8] J. Balogun, V. Hailey, *Exploring Strategic Change*, 2^{ème} édition, Prentice Hall, London, 2004.
- [9] P. Stank, J. Paul, W. Autry, "The new supply chain agenda: a synopsis and directions for future research", *International Journal of Physical Distribution & Logistics Management*, V. 41 Iss. 10 pp. 940 – 955, 2011.
- [10] V. Chanal et al. « Vers une ingénierie de la recherche en sciences de gestion », *Revue française de gestion* 2015/8 (N° 253), p. 213-229.
- [11] B. Lotfi et B. Benchekroun. *Gestion collective du changement par la méthode ARC*. GISEH 2010, Sep 2010, Clermont-Ferrand, France.
- [12] M. Thiry, "Creating project-based organizations to deliver value". Paper presented at PMI® Global Congress 2007—Asia Pacific, Hong Kong.
- [13] S. Elonen, K. Arto, "Problems in managing internal development projects in multi-project environments", *International Journal of Project Management* pp. 395–402, 2003.
- [14] S. Loufrani. *Management des compétences et organisation par projets: une mise en valeur de leur articulation. Analyse qualitative de quatre cas multisectoriels*, thèse de doctorat de l'Université Nice Sophia Antipolis, 2006.
- [15] J. Pajares and A. López, "New Methodological Approaches to Project Portfolio Management", 27th IPMA World Congress, *Procedia - Social and Behavioral Sciences* 2014, pp 645 – 652.
- [16] PMI, *Project Management Institute, The standard for portfolio management*, 3^{ème} Edition. USA, 2013.
- [17] B. Cordelier, *Conduire le changement organisationnel*, Communication et organisation, available at: <https://communicationorganisation.revues.org/411>, (accessed: 28 Mars 2017).
- [18] S. Nurcan, "une méthode pour la définition de l'impact organisationnel du changement", *Revue des sciences et technologies de l'information*, V 7/4, pp.107.
- [19] M. Antwi, M. Kale, 2014, "Change Management in Healthcare Literature Review", the Monieson center for business research in healthcare.
- [20] L. Muller, contribution à la conduite de changement en PME: intégration de représentations organisationnelles au processus de changement participatif, thèse de doctorat, université de l'INPL, 1999
- [21] F. Galasso, Aide à la planification dans les chaînes logistiques en présence de demande flexible, thèse de doctorat de l'INPT, 2007.
- [22] A. Aladwani, "Change management strategies for successful ERP implementation", *Business Process Management Journal*, Vol. 7 No. 3, 2001, pp. 266-275.
- [23] J. Flauder, *Déploiement du Lean Management dans un atelier de conditionnement et conduite du changement*. Thèse de doctorat, université de Bordeaux, 2015.
- [24] T. Creasey, *Adapting and adjusting change management in an agile project*. 2017. (Online). Available at: <http://blog.prosci.com/adapting-and-adjusting-change-management-in-agile>, consulted 18/01/2018.
- [25] P. Kotter, *Leading change*, Boston, Harvard Business Review Press, 1996.
- [26] Prosci, *Prosci's Change Management Maturity Model*, 2004. (Online). Available at: <http://www.change-management.com/Prosci-CM-Maturity-Model-writeup.pdf>, (accessed: 29 January 2018).
- [27] C. Perkins, *Organizational Change Management Maturity*, change Management Institute, 2012. (Online). Available at: www.changemanagementinstitute.com, (Accessed: 15 January 2018).
- [28] P. Patanakul, D. Milosevic, "The effectiveness in managing a group of multiple projects", *International journal of project management*, 2008.
- [29] J. Strasser, *7 Crucial Success Factors for Multi-Project Management*. (Online). Available at: www.theprojectgroup.com/blog/en/success-factors-for-multi-project-management/, (accessed: 03 January 2018).
- [30] P. Jayashree, S. Hussain, 2011, "Aligning change deployment: a Balanced Scorecard approach", *Measuring Business Excellence*, Vol. 15 Issue: 3, pp.63-85.
- [31] W. Burke, H. Litwin, "A Causal Model of Organizational Performance and Change", *Journal of Management* 1992, vol 18; N3, 523-545.
- [32] Boston consulting group, *changing change management*, 2012. (Online). Available at: http://img-stg.bcg.com/Changing_Change_Management_Dec_2012_tcm9-98964.pdf, (accessed: 18 January 2018).
- [33] Chileshe, «Major challenges in managing multiple project environments in Australia's construction industry", *Journal of Engineering, Design and Technology*, Vol. 10 Issue 1 pp. 72 – 9, 2012.
- [34] P. Patanakul, "Key drivers to the effectiveness in managing multiple projects". *PMI Research Conference: Defining the Future of Project Management*, Washington, 2010.
- [35] *Project Management Institute (PMI), Project Management Body of Knowledge*, 5^{ème} édition, USA, 2008.