2010

Projects as Social Movements: A Case Study

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ABSTRACT

This paper uses MTS, a supplementary Project Management (PM) methodology informed by Actor Network Theory. MTS Maps the emerging social movements that are possible from the project outset, Tracks their evolution as the project evolves, and aims towards a useful Stabilization of actors' relations to reach project closure. We believe that MTS enhances existing hard PM methodologies by providing practitioners with a new lens to manage projects as social movements by enabling them with three soft methods, Mapping, Tracking and Stabilizing. These address many of the shortcomings pointed out by contemporary PM scholars and practitioners. This paper used a quasi-experimental design for comparing the performance of two independent project teams tasked with the implementation of the same IT artifact across four different sites; the treatment team used MTS supplementing the Project Management Body of Knowledge (PMBOK), the control team only PMBOK. Preliminary conclusions about the MTS methodology effectiveness are presented.

Keywords

Project Management, Sociopolitical, Mapping, Tracking, Stabilizing

INTRODUCTION

Our review of the literature over the past ten years related to PM suggests that hard methodologies—including PMBOK, which focuses primarily on scope, time, and cost management—leave project managers making educated assumptions about project contingencies such as complexity, ambiguity, and uncertainty, and their corresponding effect on the project's environment and desired outcomes based on information available at the project's onset. This somewhat deterministic, preliminary, and oversimplified view of the sociopolitical processes involved in PM is often accepted by project teams and their sponsors because it facilitates the generation of a project plan and the overall project progress. (Pich, Loch and De Meyer, 2002)

A supplement to the hard planning process, without these assumptions, is the methodology used in this case study. MTS can be used for Mapping the sociopolitical project network, and then for Tracking and Stabilizing it throughout the life of the project. We argue that the MTS methodology can be used to reassemble and supplement the hard planning process by means of both conceptually and practically formalizing the process of depicting the project's environment in terms of its contingencies and by providing a management strategy to reduce such contingencies so that subsequent project activities are incrementally less affected by them, ultimately aiming to collectively transform the definition of success and mobilizing towards it.

This case study attempts to show the improved usefulness of hard project tools such as Project Charter, Project Scope Statement, Project Management Plan, if they are initially produced staying away from poor or incorrect representations of the project's environments and its contingencies, and if they are constantly evolved as new actors come into play, modifying the project's environment and overtime engulfing it through the use of MTS. As a result, the context and the project get fused into the project's network such that the; "strategy could be considered as a matter of overcoming distances and that what the actors usually thought of as external factors beyond their control (they often referred to environment, culture, context issues) could be drawn into the process of strategizing as entities among the connected network" (Neyland, 2009). If this is the case, then MTS becomes a supplementary strategy that effectively addresses the lack of managerial direction characteristic of hard PM methodologies and tools.

This case study is organized as follows: the introduction is followed by a literature review and a focused exploration of ANT's concepts relevant to PM. Then the research methodology section describes both the design and methodology that facilitated the quasi-experimental study. A detailed MTS methodology section provides the

required data and information for allowing us to compare and draw preliminary conclusions about the effectiveness of MTS.

LITERATURE REVIEW

As the importance of projects has increased overtime, so has the visibility of their outcomes, most often characterized by partial or total project failures. Evidence for the continuing prevalence of project failure continues in the literature, including both partial (e.g. cost or schedule overruns) and total (e.g. cancel or rejected projects) project failures. Significant research (Morris and Hugh, 1987), (Tatikonda and Rosenthal, 2000), and (Johnson, 2006) providing a comprehensive review that spans over a decade of data about project failure shows that despite some recent improvements, the prevalence of project failure remains significantly high.

As a consequence, a critique arising from project failure in general and the inadequacy of current hard PM approaches to deal with project contingencies in particular has prompted a "rethink" of PM practice, its current methodologies, and its theoretical foundations. The most comprehensive, contemporary, and widely accepted critique of hard PM approaches was produced by (Winter, Smith, Morris and Cicmil, 2006) as part of the Rethinking Project Management Research Network, a massive research effort that involved hundreds of scholars and practitioners extending more than two years.

According to Winter et al., the most critical shortcomings of contemporary mainstream PM methodologies—characterized by a rational, universal, and deterministic approach to PM, also referred to as the "hard" systems model and widely featured in the most popular PM textbooks, professional associations, and bodies of knowledge—have to do with their strong emphasis on planning and control, which includes failing "to deal adequately with the emergent nature of front-end work, tending to treat all projects as if they were the same, and not accounting sufficiently for human issues, which are often the most significant".

Growing critiques of PM theory and the need for new research to further develop PM practice beyond the dominant view of hard approaches to PM, also include the work of (Jaafari, 2003), showing that "the normative model has a limited capacity in handling environmental complexity though it can handle a high degree of project complexity. Its limitation has already been reflected in reported project failures in complex IT and software systems, new complex products and organizational transformation (to name a few)"

One of the most prominent issues arising from hard methodologies is the assumption that "one size fits all", which has received substantial criticism (Shenhar and Dvir, 2001). In response, (Packendorff, 1995) suggests that a diversity of theories and methodologies should be employed in field research on "temporary organizations" (a term he used to refer to projects) in order to construct middle-range theories for different types of projects. This view motivates a need to recognize the unique nature of projects and to have different and alternative theories and methods to explain and manage them.

Following a similar conceptual line, Pich et al., considered how particular project contingencies such as uncertainty, ambiguity, and complexity raise issues about the project's information adequacy and how such adequacy affects the project's outcomes, suggesting that the appropriate PM strategy is contingent on the amount and type of complexity, ambiguity, and uncertainty exhibited by the project environment.

While the literature shows a variety of approaches to manage contingencies, there is a gap for a comprehensive methodology to define contingencies in terms of sociopolitical relations and provide the required depth of analysis to fully account for actors and their relational effects on projects. MTS was designed by (Zendejas and Chiasson, 2010) to fill this gap, using ANT concepts extensively, following (Zendejas and Chiasson, 2008) ANT-based problem-solving methodology and considering three main project contingencies: complexity, uncertainty, and ambiguity as defined by Pich et al. All three are considered to be directly related to the sociopolitical aspects of projects.

ACTOR NETWORK THEORY

There are many definitions of ANT, but probably the best one is also the shortest: ANT is the science of associations. It provides a methodological basis upon which human and nonhuman actors (i.e. technology, methods, managers, engineers, etc.) can be enrolled and associated into networks, a theoretical basis that explains the mechanics of how actors might engage in collective action by translating the various actors' interests into a common force and the ontological basis required for leaving actors free to create and understand their own realities (Latour, 1999). Given that ANT offers such an ample body of knowledge, this section focuses only on demonstrating ANT's ontological, theoretical and methodological concepts we used to build MTS.

Within a project context, using ANT provides a way of identifying and analyzing the set of human and nonhuman actors fused together into project networks that mobilize attention and action in realizing collective and individual interests. Therefore, as actors, related interests, and resulting associations are identified, project managers can map the initial project's environment as an evolving project network. ANT has been previously used for a very similar purpose: a qualitative study to increase understanding of what project managers do and how they understand and talk about what they do, was performed by (Blackbourn, 2002) using ANT concepts extensively in order to interpret the stories told by experienced project managers about their work and their use of project management techniques against the fluid and transient nature of projects. The study showed how project management processes act as allies, enabling the project manager to interest and enroll team members and stakeholders, and to mobilize the support of sponsors and other powerful actors.

PM practitioners can then use (Latour, 1987) theoretical definition of the "quandary of the fact builder" as a methodology and perspective for "enrolling others so that they participate in the construction of the fact" and for "controlling their behavior in order to make their actions predictable". Following Latour's resulting notion of translation as "the interpretation given by the fact-builders of their interest and that of the people they enroll", practitioners can use the two most effective strategies for translation defined by Latour—reshuffling actors' interest and goals entirely and becoming indispensable—to track and influence the often complex sociopolitical settings offered by projects. In doing so, managers can realize that other nonhuman actors, such as technologies, systems, or artifacts have to be brought into the project network in order to stabilize the network and reach project closure.

Finally, it is the task of the project manager, using enrollment strategies, to minimize project complexity by stabilizing actor's relationships. Managers can achieve this by reflecting and acting on the understanding of the network-stabilization process, which results in what is called the irreversibility of network relations or "the specific interplay among actors in a network that results in a black-box—socio-technical ensembles that are no longer in dispute due to their reliability" (Cordella and Shailch, 2006). According to (Latour, 1987) "When these strategies are successful, the fact which has been built becomes indispensable; it is an obligatory passage point (OPP) for everyone if they want to pursue their interest."

RESEARCH METHODOLOGY

The data for assessing the MTS methodology was gathered from a large IT healthcare project involving the implementation of an Electronic Synoptic Reporting (ESR) system, a clinical reporting innovation that replaces the traditional and long established dictated/transcribed reports by using predefined templates for capturing standardized structured data in electronic format.

This innovation was implemented within the largest provincial organization, after the recent merge of its seven regional healthcare authorities into a single organization. As a result, it currently offers a highly complex-uncertain-ambiguous environment, characterized by large, multidimensional and unstable chains of command (complexity), recently amalgamated and often overlapping staff struggling to find its place in the new organization (uncertainty) and frequent unexpected changes to policies, procedures and practices (ambiguity), therefore offering a suitable test scenario for measuring the effectiveness of MTS.

This case study compares the performance of two independent project teams tasked with the implementation of the same ESR artifact in four different sites; one team used MTS supplementing the Project Management Body of Knowledge (PMBOK), the other only PMBOK. A quasi-experimental Non-Equivalent Groups Design (NEGD) was used for comparing these two intact groups (project teams); the treatment or MTS team and the control or PMBOK team.

Team(Group) / Sites	Pre-Test Sites	Treatment	Post-Test Sites
Treatment team	Pre-Test Score based on Site One	MTS	Post-Test Score based on Site Two
Control team	Pre-Test Score based on Site Three		Post-Test Scored based on Site Four

Table 1. Quasi-experimental design with two project teams and four implementation sites

The project manager acted as a researcher and spokesperson for the Treatment team, employing an Action Research Methodology (ARM). In accord with ANT's ontology, the goal of the researcher is to understand the associations that stabilize the network and make an innovation maintainable and irreversible, implying that the researcher's role can include an active part in the production of networks, participating and observing how actors create reality. Therefore, ARM could use ANT's ontology to lay the groundwork for both documenting and participating in the construction of a collective reality. Furthermore, (Chiasson, Germonprez, and Mathiassen, 2009) suggest that action research lends itself to pluralist approaches that facilitate the production of both problem-solving and theoretical knowledge in an iterative and cyclical process.

In order to ensure the validity of the quasi-experiment, the following design considerations were taken;

Validity Strategy	Controls for
Group Equivalence was supported by the following control factors; 1. Very similar pre-test scores as measured by the significant negative variances exhibit by each group; 48% (control) and 58% (treatment) for schedule and 34% (control) and 36% (treatment) for cost. (See tables 3 and 4 for further details) 2. Team average ages; 31 (control) and 33 (treatment) years respectively 3. Total years of project work experience among team members; 38 (control) and 39 (treatment) years respectively 4. Total years of healthcare work experience among team members; 23 (control) and 21 (treatment) years respectively 5. Total years of healthcare work experience in the regarded organization among team members; 19 (control) and 17 (treatment) years respectively	Selection, Maturation, History, Instrumentation, Measurement. (Due to the paper length limitations no further discussion is provided regarding group equivalence)
The implementation of the two post-test sites started simultaneously	Maturation
No significant organizational, group or personal events occurred during the pre-test, treatment and post-test	Maturation, History

Table 2. Internal Validity Strategies

In order to measure MTS effectiveness, borrowing from PMBOK, five process groups (project phases) and nine knowledge areas were cross-referenced to produce a table that identified most of the major project management tasks performed during the project. Then, using the Earned Value Management (EVM) method as a technique for measuring project team performance, both schedule and cost variances were identified for each outlined task. Negative variances greater than five percent in relative terms to their original estimates were considered significant. (See Tables 3, 4, 5, 6, 7 and 8 in the Quasi-Experimental Results section).

Additionally, a cross validation of the data was conducted via semi-structure interviews with at least two team members of each group respectively, the control group project manager, the project sponsors, several ESR final users, and one independent evaluator who produced a comprehensive qualitative and quantitative analysis of the project results and outcomes. Both the data extracted from semi-structure interviews and the evaluation report provided strong evidence supporting the findings presented by this paper, however due to the paper length limitations the cross validation discussion is brief and it is provided in the conclusions section.

MTS METHODOLOGY

In order to fully understand the outcomes presented in the upcoming results section, it becomes imperative to understand the MTS methodology and to conduct a careful exploration of how it was used in this case study. This section is organized chronologically, starting with the Mapping activities, following with the Tracking and ending with Stabilizing ones.

Mapping

In addition to developing both the project charter and preliminary scope, the main objective of this phase was to "map" all fundamental sociopolitical contingencies across actors, as to their current or potential association with other actors in the project. The initial listing of these actors provided the team with preliminary perceptions of the human and nonhuman actors needed to make the project "work". Then actors were tagged as to the certainty, uncertainty, or ambiguity they were bringing to the project with respect to their roles and associations:

a. Those actors with a clear role that produces consistent associations with other important actors in the project were considered to be *certain*. Such actors included all members of the project team, the project sponsor, the vendor team, and at least one physician that acted as the local project champion. Total number of certain actors was 7.
b. Those identified actors who were known to be important to the project, but their role and the resulting associations had yet to be determined, were considered *uncertain*. This realm of actors included the various approvers from the IT executive, financial, and procurement teams as well as the yet-to-be-engaged final system users, including at least a dozen nurses and a handful of physicians. The local IT helpdesk associates were included in this group. A total of 27 actors without specific roles were identified, thus introducing significant uncertainties to the project.
c. Finally, there may be a need for actors to fill particular roles, but we cannot identify who these specific actors will become and what their specific role and corresponding associations will and should be. These potential associations are said to be *ambiguous*. This was the most difficult group to identify. Actors such as independent evaluators, other executives among the organization, supporters of Synoptic Reporting technologies, and peers not actively working in this project were identified for a total of 5, thus suggesting a low level of initial project ambiguity.

The resulting map, with all of the various relations, indicated these characteristics about the network:

a. *Complexity* assesses the number of actors involved in known relationships. The project started with 7 certain actors who have been successfully enrolled into the project by means of having their interests translated into the project's interests. Therefore, initial complexity was low.
b. *Centrality* measures the number of key actors that are connected with most of the other actors. A few key actors would produce a high centrality, whereas a large number of key actors would produce a low centrality. From an ANT perspective, centrality measures the contingencies related to the degree of relational separation between actors within the associated network. The initial project centrality was high, since the project manager was the single key actor.

Through managerial action, the initial actor's relations started to move from higher to lower levels of ambiguity and uncertainty by using enrollment and translation. The complexity of the network increased, based on the increased number of certain actors. So did the effort to produce an initial project charter. The charter needed to consider all aspects of the mapping process and therefore extended what is traditionally known as the stakeholder management section. This took considerably more time than anticipated, incurring significant negative variances in schedule (8%) and cost (11%). At the onset, it seemed that MTS was introducing significant overhead to the initiation and planning process. And without being able to see the outcomes yet, it clearly demoralized the actors comprising the project team and to some extent the project sponsor.

Tracking

Tracking-related tasks extended from the start of the planning phase to the end of the execution phase. As a result, this affected tasks such as risk identification, which under the new and amplified lens provided by MTS, took almost twice the amount of time and effort initially anticipated, requiring expediting in order to keep to the schedule.

Tracking therefore incurred a significant negative cost variance of 10% in relative terms. Conversely, budget approval showed no significant negative variances anymore and the plan-contracting tasks showed only the same negative schedule variance of 5%, but with no cost variance at all.

The objective of this method was to track and influence the following contingency-based transformations for specific actors:

a. *Uncertainty* reductions as a result of actors taking on a role that produced associations with other actors. As a result of establishing a sponsorship relationship with a VP-level executive within the IT domain, many uncertain actors became certain ones, including the majority of the approvers and related staff, resulting in 15 actors moving from uncertain to certain roles, and 3 new certain actors not previously identified. The total number of certain actors grew to **25 (7+15+3)**, leaving only 12 uncertain ones and so decreasing uncertainty significantly.
b. *Ambiguity* reductions as new actors joined the network with or without specific roles assigned to them. A total of 3 new actors with a role joined the network as noted above, thus accounting for neither *ambiguity* nor for *uncertainty*. Two initially ambiguous actors joined the network, but without a role, thus increasing uncertain actors to **14 (12+2)** and reducing identified ambiguous actors from 5 to **3 (5-2)**.

As for the network, the following contingency-based transformations occurred:

a. *Centrality.* As a result of the entry of the VP-level actor, bringing existing associations with actors other than the project manager, the centrality decreased importantly and became a concern for the project team. The total number of key actors increased to 3: the project manager, the VP-level sponsor, and a new appointed director.
b. Changes in *complexity* were due to the increased number of certain actors, the decreased centrality, and the fragility of many incipient relations.

During the tracking process, some executing tasks were affected. Managing the project execution became somehow slower and more difficult with the introduction of tracking activities (negative schedule variance of 6%); however, developing the project team task showed some improvements (non-significant schedule variance and a negative schedule variance of 5%). It was evident to the treatment team that many other executing tasks were exceeding expectations as a result of an enhanced dialogue among certain actors, including a great majority of technical tasks not documented in this case study.

Stabilizing

The goal of stabilizing the network was to reach closure and to seek a stabilized position in the evolutionary process facilitated by the tracking method so that an OPP is established by and through the actors in producing outcomes and effects that are irreversible. The following contingency-based transformations were recorded starting from the monitoring phase and ending by the closing phase:

a. Almost all actors across the network were *certain* ones and were closely associated to the project manager and the ESR system, which according to ANT could be considered as the OPP. The final number of certain actors increased to **38 (25+12+1)**, as a result of 12 uncertain actors (clinical system users; 3 physicians, and 9 nurses) becoming certain ones by means of adopting the ESR system. Also, one other ambiguous actor (the independent evaluator) turned into a certain actor after compiling and reporting the results of the project.
b. *Ambiguity* and *uncertainty* were no longer the rule, but rather the exception. Only **2 (14-12)** actors remained uncertain and **2 (5-2-1)** actors remained ambiguous towards the end of the project. Their influence did not represent a threat to the project any longer and they will at least comply with the system usability expectations.
c. New actors incorporating into the network immediately recognized the value and permanence of the socio-technical artifact produced by the OPP, in a way that serves their purposes and reciprocally makes them willing to associate to the OPP by devoting time and effort to further authenticate and acknowledge it. The best example would be new physicians joining the MTS site, who started using the ESR system without further considerations.

As for the network, the following contingency-based transformations were noted:

a. *Centrality*. Actors produced the irreversible establishment of an OPP, so it became necessary for **37 (38-1)** actors (all except the project manager, by now rather regarded as the ESR champion) to reshape current associations and establish direct links with the OPP. The highest measure of centrality is achieved when in the end there is a single key actor who is then the ultimate measure of how successfully and incrementally translations were used.
b. *Complexity* reached a maximum point just prior to the establishment of the OPP, as *certain* actors reached their maximum count of 38 and then decreased to a minimum by the time centrality maximized.

The MTS methodology implementation here presented did not require using a software mapping tool since the number of actors involved with the ESR project was relatively small, however the literature suggests using such tools for larger numbers of involved actors. In fact, (Hossain and Wu, 2008) explored the correlation between actor centrality and project-based coordination and developed a text-mining tool designed to measure coordination from a large dataset on organizational communications and to provide an effective mechanisms for the construction of social network matrices using centrality measures. Following a similar conceptual line to the one exposed by ANT in general and the OPP in particular, they argued that actor centrality affects the ability of an individual to coordinate the actions of others and therefore their proposed concepts and developed tool might be highly relevant for future MTS implementations.

On the other hand and focusing on the importance of visualizing stakeholder networks, (Walker, Bourne and Shelley, 2008) suggested that highly complex problem solving activities, such as managing stakeholders in projects, can benefit from high level conceptual approaches that allow those involved to clearly visualize the situation being examined. Visual representations of complex situations often provide a level of understanding that can yield fruitful results in moving forward to developing managerial plans and actions. They explored the Stakeholder Circle® mapping tool that was developed to identify, prioritize, visualize, engage and monitor stakeholders and their positive or negative impact upon projects. This tool is also potentially highly relevant for MTS implementation purposes, since its five phases can be 'mapped' to the MTS methods very closely.

Finally, it must be noted that there has been a recent proliferation of such mapping tools in the form of freeware, shareware and other commercial options, however it is not the focus of this paper to conduct a comprehensive review of all software mapping options available at the present time. Also, it is important to observe that further development and refining of MTS methods might lead into a unified approach that considers the organizational breakdown structure, the work breakdown structure and ultimately the project breakdown structure, as defined by (Heredia and Santana, 1991), as integral parts of the mapped project network and therefore bringing MTS a step closer to mainstream project management practices.

Quasi-Experimental Results

A cross-over pattern was found, suggesting a genuine treatment effect, due to the fact that the performance of the control team almost did not change from pre-test (82% aggregated negative variance; 48% schedule and 34% cost variances respectively) to post-test (73% aggregated negative variance; 41% schedule and 32% cost variances respectively) and the treatment team performance did significantly from pre-test (94% aggregated negative variance; 58% schedule and 36% cost variances respectively) to post-test (39% aggregated negative variance; 20% schedule and 19% cost variances respectively), therefore starting out a bit lower than the comparison group in terms of variances (12% worse overall; 10% schedule and 2% cost) and ending up significantly above it (34% better overall; 21% schedule and 13% cost). This is a strong pattern of evidence for the effectiveness of the treatment, MTS.

No threats to internal validity are reasonably plausible here. There is no evidence for either selection maturation or a selection regression effect since regression might only explain why the treatment team lower pre-test score approached the control team post-test score but it certainly would not explain why they cross over. The pre-test performance results are shown in Tables 3 and 4 followed by a performance comparison shown in Table 5. Tables 6 and 7 show the post-test performance results, followed by a performance comparison shown in Table 8.

Process Groups /Knowledge A.	Initiation	Planning	Executing	Monitoring and Controlling	Closing
Integration	Develop Project Charter Develop Project Scope Brief	Develop Project Management Plan	Manage Project Execution	Monitor/Control Project Work Manage Change Control	Close Project
Scope		Plan Scope Define Scope Create Work Breakdown Structure		Verify Scope Control Scope	
Time		Define Activities Sort Activities Estimate Activity Resourcing Estimate Activity Duration Develop Project Schedule		Control Schedule	
Cost		Estimate Cost Gain Budget Approval		Control Cost	
Quality		Plan Quality	Perform Quality Assurance	Perform Quality Control	
Human Resources		Plan Resources	Acquire Project Team Develop Project Team	Manage Project Team	
Communications		Plan Communications	Distribute Information	Report Performance Manage Stakeholders	
Risk		Plan Risk Management Identify Risk Analyze Qualitative Risks Analyze Quantitative Risks Plan Risk Responses		Monitor/Control Risk	
Procurement		Plan Purchases and Acquisitions Plan Contracting	Request Suppliers' Bids Select Suppliers	Manage Contracts	Close Contracts

Table 3. Treatment Team Pre-Test Site One Performance Results. Significant negative variances using PMBOK. Tasks that prompted significant schedule variances are identified in light grey, those that triggered significant cost variances are identified in dark grey and those that caused both variances are in red.

Process Groups /Knowledge A.	Initiation	Planning	Executing	Monitoring and Controlling	Closing
Integration	Develop Project Charter Develop Project Scope Brief	Develop Project Management Plan	Manage Project Execution	Monitor/Control Project Work Manage Change Control	Close Project
Scope		Plan Scope Define Scope Create Work Breakdown Structure		Verify Scope Control Scope	
Time		Define Activities Sort Activities Estimate Activity Resourcing Estimate Activity Duration Develop Project Schedule		Control Schedule	
Cost		Estimate Cost Gain Budget Approval		Control Cost	
Quality		Plan Quality	Perform Quality Assurance	Perform Quality Control	
Human Resources		Plan Resources	Acquire Project Team Develop Project Team	Manage Project Team	
Communications		Plan Communications	Distribute Information	Report Performance Manage Stakeholders	
Risk		Plan Risk Management Identify Risk Analyze Qualitative Risks Analyze Quantitative Risks Plan Risk Responses		Monitor/Control Risk	
Procurement		Plan Purchases and Acquisitions Plan Contracting	Request Suppliers' Bids Select Suppliers	Manage Contracts	Close Contracts

Table 4. Control Team Pre-Test Site Three Performance Results. Significant negative project variances using PMBOK. Tasks that prompted significant schedule variances are identified in light grey, those that triggered significant cost variances are identified in dark grey and those that caused both variances are in red.

Task/Variance	**Control**	**Treatment**	**Differences**
Develop Project Charter	5% Schedule	6% Schedule	-1% Schedule
Gain Budget Approval	6% Schedule	6% Schedule	0% Schedule
Identify Risks	5% Schedule	5% Schedule	0% Schedule
Plan Risk Responses	2% Schedule	6% Schedule	-4% Schedule
Plan Contracting	5% Schedule 7% Cost	6% Schedule 8% Cost	-1% Schedule -1% Cost
Manage Project Execution	7% Schedule	6% Schedule	1% Schedule
Perform Quality Assurance	6% Cost	5% Cost	1% Cost
Develop Project Team	7% Schedule 7% Cost	8% Schedule 8% Cost	-1% Schedule -1% Cost
Control Scope	5% Cost	6% Cost	-1% Cost
Manage Stakeholders	5% Schedule 9% Cost	8% Schedule 9% Cost	-3% Schedule 0% Cost
Close Project	6% Schedule	7% Schedule	-1% Schedule
Results (the smaller the variance the better the performance)	***48% Schedule Var.*** ***34% Cost Variance***	***58% Schedule Var.*** ***36% Cost Variance***	***-10% (treatment worse)*** ***-02% (treatment worse)***

Table 5. Pre-Test Performance Comparison. Significant negative project variances used to compare the pre-test performance between the two teams, showing that the treatment group was initially slightly worse than the control group in both dimensions, schedule and cost variances.

PG (MTS) / Knowledge A.	Initiation (Mapping)	Planning (Mapping and Tracking)	Executing (Tracking)	Monitoring and Controlling (Tracking and Stabilizing)	Closing (Stabilizing)
Integration	Develop Project Charter Develop Project Scope Brief	Develop Project Management Plan	Manage Project Execution	Monitor/Control Project Work Manage Change Control	Close Project
Scope		Plan Scope Define Scope Create Work Breakdown Structure		Verify Scope Control Scope	
Time		Define Activities Sort Activities Estimate Activity Resourcing Estimate Activity Duration Develop Project Schedule		Control Schedule	
Cost		Estimate Cost Gain Budget Approval		Control Cost	
Quality		Plan Quality	Perform Quality Assurance	Perform Quality Control	
Human Resources		Plan Resources	Acquire Project Team Develop Project Team	Manage Project Team	
Communications		Plan Communications	Distribute Information	Report Performance Manage Stakeholders	
Risk		Plan Risk Management Identify Risk Analyze Qualitative Risks Analyze Quantitative Risks Plan Risk Responses		Monitor/Control Risk	
Procurement		Plan Purchases and Acquisitions Plan Contracting	Request Suppliers' Bids Select Suppliers	Manage Contracts	Close Contracts

Table 6. Treatment Team Post-Test Site Two Performance Results. Significant negative project variances using MTS. Tasks that prompted significant schedule variances are identified in light grey, those that triggered significant cost variances are identified in dark grey and those that caused both variances are in red. Significant positive variances are identified in green.

Process Group /Knowledge A.	Initiation	Planning	Executing	Monitoring and Controlling	Closing
Integration	Develop Project Charter Develop Project Scope Brief	Develop Project Management Plan	Manage Project Execution	Monitor/Control Project Work Manage Change Control	Close Project
Scope		Plan Scope Define Scope Create Work Breakdown Structure		Verify Scope Control Scope	
Time		Define Activities Sort Activities Estimate Activity Resourcing Estimate Activity Duration Develop Project Schedule		Control Schedule	
Cost		Estimate Cost Gain Budget Approval		Control Cost	
Quality		Plan Quality	Perform Quality Assurance	Perform Quality Control	
Human Resources		Plan Resources	Acquire Project Team Develop Project Team	Manage Project Team	
Communications		Plan Communications	Distribute Information	Report Performance Manage Stakeholders	
Risk		Plan Risk Management Identify Risk Analyze Qualitative Risks Analyze Quantitative Risks Plan Risk Responses		Monitor/Control Risk	
Procurement		Plan Purchases and Acquisitions Plan Contracting	Request Suppliers' Bids Select Suppliers	Manage Contracts	Close Contracts

Table 7. Control Team Post-Test Site Four Performance Results. Significant negative project variances using PMBOK. Tasks that prompted significant schedule variances are identified in light grey, those that triggered significant cost variances are identified in dark grey and those that caused both variances are in red.

Task/Variance	**Control**	**Treatment**	**Differences**	**Explanation**
Develop Project Charter	5% Schedule 2% Cost	8% Schedule 11% Cost	-3% Schedule -9% Cost	The project charter considered all aspects of the mapping process, therefore extending the stakeholder management section considerably, requiring frequent involvement with all identified actors and complicating the charter review process.
Gain Budget Approval	6% Schedule	2% Schedule	4% Schedule	The charter development facilitated early encounters with key approvers that were brought into the project network.
Identify Risks	5% Schedule 1% Cost	0% Schedule 10% Cost	5% Schedule -9% Cost	Considering and rationalizing project contingencies in terms of sociopolitical processes.
Plan Contracting	5% Schedule 7% Cost	5% Schedule 3% Cost	0% Schedule 4% Cost	The charter development facilitated early encounters with key procurement resources that were brought into the project network. No schedule improvement was gained based on fix approval times established in advance by the procurement group.
Manage Project Execution	2% Schedule	6% Schedule	-4% Schedule	Additional work related to tracking activities prescribed by MTS
Perform Quality Assurance	6% Cost	1% Cost	5% Cost	The charter development facilitated early encounters with the evaluation group bringing some of them into the project network
Develop Project Team	7% Schedule 7% Cost	2% Schedule 5% Cost	5% Schedule 2% Cost	Extensive use of translations as prescribed by MTS. Using MTS as a strategy to reduce distances.
Manage Stakeholders	5% Schedule 9% Cost	-3% Schedule -11% Cost	8% Schedule 20% Cost	Applying MTS for shortening distances among actors, thus reducing contingencies and progressively easing the project work in a way that no more variances were reported during the entire monitoring and closing project phases. The 20% cost improvement achieved here is by far the most significant and noteworthy among all.
Close Project	6% Schedule	0% Schedule	6% Schedule	Most project actors worked together redefining the terms of project success and moving towards it
Results	***41% schedule*** ***32% cost***	***20% schedule*** ***19% cost***	***21%*** ***13%***	***(treatment better)*** ***(treatment better)***

Table 8. Post-Test Performance Comparison. Significant project variances used to compare the post-test performance between the two teams, showing than the treatment group improved significantly, particularly in terms of Developing the Project Team, Managing Stakeholders and Closing the Project, all three identified in green.

CONCLUSIONS

Since a quasi-experimental research design allows for external validity and there is strong evidence suggesting a genuine treatment effect, we can conservatively conclude that MTS might benefit other similar projects within the same organization. In order to amplify the generalization of such statement, it is required to conduct numerous other experiments within and outside the studied organization.

Indeed, the main weakness of this quasi-experimental case study is that it only considered two subjects (project teams) to draw its conclusions. Therefore it is suggested conducting numerous future experiments with larger sample sizes, to gather enough data to conduct a valid statistical analysis of the results.

The overall results are clearly interesting and compelling enough to extend the analysis of the qualitative data here obtained (including data obtained via semi-structure interviews and the evaluation report), especially in regards to the significant improvements in stakeholder management (20% positive cost variance), team development and project closure as it might uncover further areas of improvement.

Semi-structure interviews revealed a consistent pattern of improved communications among stakeholders based on the common project-related interests they share such as expanding the benefits of the ESR technology to other regional sites, continue to reduce the cost of endoscopic procedures across the province and further supporting the organizational goals to implement electronic patient records by 2012.

Conversely, there were important setbacks during the initiation and planning phases (project charter development and risk identification) however later offset by the remarkable improvements shown in later phases. This pattern is consistent with ANT theory which suggests the possibility of later stabilization of affairs among actors, near the establishment of an OPP.

We therefore conclude that our selection of theory (ANT), ANT-based methodology (MTS) and quasi-experimental design is a powerful paradigm potentially useful in developing and testing other ANT-based methodologies.

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