Instructor’s Manual

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Case Title
Dealing with Uncertainty and Ambiguity in a Complex Project: The Case of Intravenous (IV) Pumps in a Healthcare Center

Knowledge Modules
1. Strategic Project Management
2. Strategic Governance in Projects
4. Behavioral–Identifying and Engaging Stakeholders
5. Technical–Project Planning and Integration
6. Technical–Project Scope Management

Abstract
The case tells the story of a real-life complex project during its very first stages with a high level of uncertainty and ambiguity. It focuses on the organizational transformation that is often overlooked in major construction projects. Indeed, the project manager has to deal with several constraints and opportunities from the internal context (project team, engagement, technology) and the external environment (regulations). Students are invited to analyze and assess the strategy of the project manager to build her project team and to engage stakeholders toward the project’s goal. They will be asked to develop their view on the project risks management for this project to proceed.

Intended Audience/Placement/Course
This case study is mainly designed for post-graduate students enrolled in project management programs or executive MBA programs. While the case is situated in a healthcare hospital, the learning objectives are universal. This case study is flexible in the placement within the curriculum:

1. At an early stage, this case can exemplify the use of basic tools and practices such as environment analysis, stakeholder analysis, and risk analysis. Students are provided with a real life example of actions to be taken at an early stage of the project to engage and mobilize different stakeholders in a complex bureaucratic environment.
2. At a later stage, the case shows the need for the project manager to take organizational politics into consideration. The students will analyze the decision-making mechanisms and will work on the project organization and governance structures.

Learning Objectives
1. Organizing a project
2. Identifying the internal politics
3. Creating a strategy to engage stakeholders in the project
4. Developing a strategic decision-making process and an ongoing internal communication plan.
5. Identifying the key issues of a project and developing the appropriate risk identification and evaluation for different options.

This field-researched case study is part of a large research program dedicated to the study of organizational transformations started in 2008. The overall data were mainly collected during the research program. However, more data collection has been done recently to get more detailed information on the specific project of intravenous pumps.

Discussion Questions
1. Governance of the project: Who is part of the project management team? What is the role of the different committees? What is the role of the TSO manager? Who is accountable for those decisions?
2. Politics/Stakeholders: Who are the key stakeholders? What are each stakeholder’s objectives and interests vis-à-vis this project? What has to be done to bring them in the “same” project?
3. Evaluation of the three options for the volumetric pump implementation strategy (as dumb, smart or both): Evaluate the risks of each option using the table supplied in Appendix A. What are the key elements that discriminate the different options on risks? What is your recommendation to the decision-making committee for the preferred volumetric pump implementation strategy?

Recommended Teaching Strategies
At the end of the case study, the project team is asked to make and justify a recommendation on one of the three options on the volumetric pump implementation strategy (smart, dumb, or both). A role play is suggested as an alternative to a traditional classroom discussion in the form of a steering committee that has to make the final decision on
the choice of options given the analysis and recommendation of the project team. All students must have read and analyzed individually the case before engaging in this role play.

**Ice Breaker Questions**

1. Who has ever experienced the uncomfortable position of not knowing exactly what to do and how to do it at the early stage of a project?
2. Who has ever been tempted by the *easy* approach of taking control of a project without leaving space to stakeholders?

**Role Play/Steering Committee**

This role play stages a steering committee meeting at the moment to make a decision on the preferred option regarding the volumetric pump implementation strategy. The role play has three main types of participants, whose numbers may vary depending on the size of the group: the head of the committee (CEO), the IV pump project manager, and other executives of the steering committee. For a larger group, the project manager can be accompanied by two or three members of the project team and the number of participants of the steering group can be up to 12 to 15. For smaller groups, only the project manager is present and the number of executives of the steering committee can go down to three or four.

Prior to the meeting, the project team will have to prepare their analysis of the situation and make their recommendation. On the other side, the steering committee and the CEO will meet together and share on their vision of this project. The meeting will go as follows:

1. The CEO and participants to the steering committee sit together around a table.
2. The project manager and team members are invited to come in and sit at the table.
3. The CEO introduces the context and the objective of the project. He or she invites the project manager to present the recommendation and justification. He gives a limitation on time: 30 minutes to make the decision.
4. The project manager presents the options and the main determinants for the recommendation within 20 minutes.
5. Members of the steering committee have 10 minutes to ask questions.
6. At the end of this period, the CEO asks the steering committee members to render a decision regarding the recommendation. Depending on the decision, the project manager and her team may react by pointing out other potential impacts.
7. Then, the class abandons their roles. An open discussion follows on what has been learned from this role play.

**Literature Review or Theory Review**

The case study presented here tells the story of only a piece of the full project. The interest of this selected piece is that it provides a rich situation describing the front-end phase of the project, the political context, and the decisions that have to be made under uncertainty and ambiguity. At the kick-off meeting, nobody understood the IV pumps project in the same way. The project manager has strongly worked on organizing a multidisciplinary team and the decision-making process. Her investment in developing a stakeholder strategy results in a common view of the IV pump project. The team was then able to assess the critical point around the Wi-Fi technology in order to be able to use the smart features in all clinical areas.

This case can be used within a variety of theoretical perspectives. We develop three of them as follows: organizational context, project context, stakeholders’ analysis.

**Organizational Context**

- Following the contingency theory, knowing the context in which a project will be realized is of prime importance. This means that best results from projects will be reached if there is a good fit between external and internal contexts (Morris & Gerald, 2011). The fact that this case happened in a hospital should be a pretext for students to review the different organizational structures, one of which is the professional organization (Mintzberg, 1979) where there are a strong bureaucracy and the power in the hands of one profession. In this case, one main challenge for Maggie was to engage all team members in a collective understanding of the project. The culture at MUHC is traditionalist where decisions are usually made within the hierarchy, which is similar in other hospitals.
- The project was realized in a matrix-type organization where the ownership of the project was in the hands of Gilbert, the pharmacist-in-chief. The project management was under the responsibility of Suan, the head of the TSO. Understanding matrix organizations and the difficulty of coordination associated with them is crucial to get the benefits of this form of organization over a functional type of structure (Hobday, 2000; Larson, 2004). The project being temporary (Lundin & Söderholm, 1995) within a permanent parent organization has an impact on the organizational power system (Clegg, Courpasson, & Phillips, 2006).
- Understanding the role of PMOs (Aubry, Richer, & Lavoie-Tremblay, 2014; Hobbs & Aubry, 2010). In this case study, we observe that the TSO has a mandate of supporting the project teams in harmonization of IV practices.

**Context of the Project: Complexity, Uncertainty, and Ambiguity**

- The project is at its early stage. When Maggie agreed to be the project manager, the project was understood as a simple matter to make a technical decision on IV pumps. This evolved dramatically as the project is not only about the material choice of the pumps but mainly the use of their smart features. As in any project life cycle, ignorance, uncertainty and ambiguity are the characteristics of projects at the initiating phase. *What* to do and *how* to do it are simply unknown (Turner & Cochrane, 1993). And it is only progressively, that
knowledge is developed and decisions can be made on both what to do and how to do it (Winter & Szczepanek, 2009).

- Complexity should be addressed and analyzed through the analysis of the environment (e.g., PESTEL model) and establish a relationship with the risk assessment (Cooke-Davies, Cicmil, Crawford, & Richardson, 2007).

**Stakeholder Analysis**

- Stakeholder analysis is of prime importance here (Eskerod & Vaagaasar, 2014). Beyond the instrumental understanding of the stakeholders, this situation requires more than a traditional approach. It needs to engage all of them in a common solution. Students will have to identify and analyze the main stakeholders in this project. They are also asking to observe and challenge how Maggie deals with each of them.

**Answers to Discussion Questions**

**Governance of the project:** In the introduction of this question, students should describe what a governance system in project management is.

**Politics/Stakeholders:** Identification of key stakeholders and their objectives and interest vis-à-vis the IV project is

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<th>Sub-questions</th>
<th>Answers</th>
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| Who is part of the project management team | The project management team is referred to as permanent multi-disciplinary individuals representing critical sectors in the project. They are the ones making decisions on the management of the project. Students may use appendices included in the case study to help them in answering this question. In this case study, the project management team includes:  
  - Maggie, as the project manager  
  - Gilbert, as the pharmacist-in-chief and project sponsor  
  - Nicole, representing the clinical practices  
  Following Figure 1, there are also six specific workgroups that have to develop parts of the solution:  
  - Drug library sub-workgroup  
  - Education sub-workgroup  
  - IV pump implementation sub-workgroup  
  - IV pump centralized process sub-workgroup  
  - IV pump evaluation sub-workgroup  
  - Harmonization of practices sub-workgroup |
| What is the role of the different committees? | There are two main committees who participate in decision making:  
  - Harmonization of IV practices workgroup: this is a consultative body where results from all the sub-workgroups are presented. This committee has also a crucial role in the decision-making process as they formulate the recommendations to the steering committee for final decision regarding (1) selection and use of IV pumps as well as the number of pumps needed, (2) the harmonization of clinical practices, and (3) the deployment strategy. Maggie makes use of this committee to ensure the recommendations are clinically grounded and evidence-informed. The timely and complete exchange of relevant information is crucial between these two committees.  
  - Harmonization of IV practices steering committee: This is a strategic and decision-making body made up of middle and senior-level managers. They will decide on the scope of the project, the overall vision, as well as make decisions related to the harmonization of IV practices, the financing aspects, IV pump selection process and purchase, as well as the deployment strategy. The timely and complete exchange of relevant information is crucial between these two committees. It is essential that these members are convinced of the legitimacy of the recommendation before making the decision. |
| What is the role of Suzan, the TSO manager? | Suzan does not seem to play a crucial role in the story. However, three things can be said, which have important consequences on the project evolution:  
  - Suzan accepted this project as being part of the project portfolio based on the need for harmonization of practices  
  - She appointed a project manager with strengths in clinical aspects of projects and with legitimacy in the context. She also provided support of experts in project management to support Maggie in project management best practices.  
  - Suzan brought her advice to Maggie when required. For example, at one point Maggie felt discouraged in moving the project ahead. She naturally turned to Suzan to get advice on how to go on. |
| Who is accountable for those decisions? | In this case study, it is made clear that “business” decisions have to be made by the sponsor, Gilbert, the pharmacist-in-chief. This is an important point, making this clear who will make decisions. Maggie was seen as someone who will help the pharmacist-in-chief to reach his objective through the project. |

Table 1 IM: Answers to discussion questions.
<table>
<thead>
<tr>
<th>Key Stakeholders</th>
<th>Interests and Objectives</th>
<th>Power and Influence</th>
<th>Potential Actions</th>
<th>Project Strategy</th>
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<tbody>
<tr>
<td>Pharmacist-in-chief (Gilbert)</td>
<td>This project offered many opportunities and was important to him. He strongly believed in implementing technology for safety of the patients and efficiency of his service.</td>
<td>High</td>
<td>He was involved in many of the decisions and was very influential in bringing other major stakeholders on board. Certain aspects of the project could be compromised if not supported by him.</td>
<td>Manage closely</td>
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<tr>
<td>TSO manager (Suzan)</td>
<td>Suzan strongly believed in the role of a TSO for the success of the overall MUHC project. In this regard, she is a missionary. This project must be a success to establish the TSO legitimacy. She will strongly support the project and can influence individuals.</td>
<td>High</td>
<td>In her transdisciplinary role, she influenced her colleagues in favor of the project. She regularly informed the senior managers of the project progress and the difficulties and road blocks that we faced. She obtained the permission to carry out the business case for the Wi-Fi.</td>
<td>Manage closely</td>
</tr>
<tr>
<td>Harmonization of IV practices steering committee</td>
<td>This project is important to the group as they are personally faced with IV pump challenges and the impact of these challenges on the financial, strategic, and operational aspects of their respective departments.</td>
<td>Medium-High</td>
<td>They made important strategic decisions around the vision, the goals, infrastructure, deployment, and sought out senior-level commitment and support when needed</td>
<td>Keep satisfied</td>
</tr>
<tr>
<td>Harmonization of IV practices workgroup (nurses, physicians, pharmacists, etc.)</td>
<td>This project is important to the group as they are personally faced with IV pump challenges.</td>
<td>Medium-High</td>
<td>They recommended the best options based on their respective expertise.</td>
<td>Keep informed</td>
</tr>
<tr>
<td>Representing clinical practices (Nicole)</td>
<td>Nicole strongly believes in the project and does everything in her power to see its success.</td>
<td>Medium-High</td>
<td>Nicole provided important support to the project; she went above and beyond to see the project through.</td>
<td>Keep informed</td>
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done by the identification of stakeholders, using the following template. Then, the strategy holistic view of them is done to illustrate the best strategy to bring them in the “same” project.

1. Evaluation of options on volumetric pump implementation strategy (as smart, as dumb or as both): What are the key parameters that discriminate the different options on risks? What is your recommendation to the decision-making committee for the preferred volumetric pump implementation strategy of the IV pumps?

Recommendation
There is no right or wrong recommendation. Different recommendations can come up. The objective is to make a recommendation that fits with the interpretation of the context. The teacher should pay particular attention to the coherence between the analysis and the recommendation.

Epilogue
The following recommendation has been made. After a few hours of discussion emphasizing advantages and impacts of each of the three options, the overall team came to a consensus to recommend Option 2. The major argument was that this option is the most secure for patients, as it provides the MUHC with state-of-the-art technology of which the safety features will be used to their full potential. In addition, this option will ensure consistency of safe practice across all the MUHC sites.

From there, at the 26 September 2013 Steering Committee meeting, the TSO Director informed the group that the Wi-Fi dossier had been identified as a priority, and it would be financed. This dossier was discussed with the Director of the IT Department and the Executive Director of the Redevelopment Project at the Ministry. The latter asked that the absolute need for the installation of Wi-Fi at the MGH be justified in writing.

In November 2013, Wi-Fi was being implemented at the MGH on schedule in the clinical areas that would be using the smart pumps and the project was closed as planned at the end of February 2014 in time for the implementation of the use of smart volumetric pumps at the MGH in March 2014. The initiative was rolled out successfully at the time of the inauguration of the new Glen site.

The IV pump project ultimately served as an example and set a standard about how equipment would ideally be selected and purchased at the MUHC—with significant clinical consultations, evidence-based information and knowledge translation, as well as collaboration across organizational silos. The case speaks to the level of persistence, creativity, and responsiveness required from a project.
management team to seize strategic opportunities and overcome the difficulties posed by the decision-making process of a complex, bureaucratic organization. It also epitomizes the importance of business acumen and analytical rigor on the part of the project manager. It finally shows how the very organization of a project can facilitate communication, buy-in, and engagement.

**References**


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<th>Criteria</th>
<th>Option 1</th>
<th>Option 2</th>
<th>Option 3</th>
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<tr>
<td>Benefits from the project investment</td>
<td>Implementation of IV pumps as smart (with DERS) in Wi-Fi clinical areas and as dumb (without DERS) in non-Wi-Fi clinical areas</td>
<td>Full security benefits from DERS when used as smart pump with Wi-Fi.</td>
<td>No added security benefits, it is the status quo.</td>
</tr>
<tr>
<td>Deployment strategy for Wi-Fi</td>
<td>Implementation of IV pumps as smart (with DERS) in all clinical areas (Wi-Fi required)</td>
<td>Added pressure and urgency to implement the Wi-Fi in all clinical areas in order to deploy the volumetric pumps as smart (with DERS)</td>
<td>No added pressure or urgency to implement Wi-Fi.</td>
</tr>
<tr>
<td>Cost of training programs</td>
<td>No added pressure or urgency to implement Wi-Fi.</td>
<td>Depending on the deployment strategy, trainings will last for a long period of time.</td>
<td>Two training programs to develop but only one to be given at a time (use of pumps as dumb first then use of pump as smart once Wi-Fi is available).</td>
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<td>Impact of changes in transition from dumb to smart pump</td>
<td>Extremely difficult to change to new practices with the same device as users will have developed their routines.</td>
<td>NA</td>
<td>Extremely difficult to change to new practices with the same device as users will have developed their routines.</td>
</tr>
<tr>
<td>Security in drug administration</td>
<td>Floating staff used to DERS moving to areas where there is no DERS may have a false sense of security that the pump will alert if outside safe limits and cause grave medication errors.</td>
<td>Minimum risk of error if using pump as smart with the drug library (DERS).</td>
<td>Risk of medication error when not using the safety features of the pump.</td>
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<tr>
<td>Impact on resources</td>
<td>Extremely difficult to change to new practices with the same device, as users prefer the ease without the use of DERS.</td>
<td>Working without DERS is faster so workarounds can develop and will require audits, retraining, and liberating workforce to retrain.</td>
<td>Users will use the pump one way (dumb) and they will be asked to change how they use it (smart) knowing it is faster when not using DERS so we can expect that workarounds will be developed widely.</td>
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<tr>
<td>Impact on time</td>
<td>Two training sessions to give for some areas, areas where they used the pump as dumb (without DERS) and then as smart (with DERS).</td>
<td>Only one training program on smart pump to develop and to provide. Training will be given at different intervals.</td>
<td>Training twice for all, once for the use of pump as dumb (without DERS), and once for training of pump as smart (with DERS).</td>
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<tr>
<td>Impact on institution</td>
<td>Risk of liability issues because not the same safety feature will be in place for dumb (without DERS) and smart pumps (with DERS).</td>
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1DERS: Dose Error Reduction System

Table 3 IM: Answers to option analysis.
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