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Business Process Improvement in Resource Management

Vamsi Niketh Manne

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Business Process Improvement in Resource Management

by

Vamsi Niketh Manne

A Starred Paper
Submitted to the Graduate Faculty of
St. Cloud State University
in Partial Fulfillment of the Requirements
for the Degree
Master of Engineering Management

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Starred Paper Committee:
Ben Baliga, Chairperson
Hiral Shah
Balasubramanian Kasi
Abstract

This project was implemented in a Medical Device Manufacturing company located in Minnesota, United States of America which is also known to be the world's largest standalone medical technology development company. This proposal will focus on Process improvement in resource management associated to projects. This project involves in utilizing reporting techniques which helps the management to have a high-level visibility on projects in terms of resource management so that, they can take data driven decisions accordingly to resolve issues in the process. This project was initiated by Project management office team and held solely responsible for executing the project and maintenance of the process after successful completion.
Acknowledgements

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Chapter I: Introduction

Introduction

This project is implemented in a medical device manufacturing company located in Minnesota, United States of America, which is also known to be the world's largest standalone medical technology development company. It is composed of six main business units which develop and manufacture devices and therapies to treat more than 30 chronic diseases, including heart failure, Parkinson's disease, urinary incontinence, Down's syndrome, obesity, chronic pain, spinal disorders, and diabetes.

The project is being implemented by the team in one of its major business unit in specific to Research and Development Technology function. Major work structure is being built from the project management office for this business unit consisting of project analysts and resource analysts. Vice-President and Directors are the primary stake holders for this project. Project managers and functional manager are the users for this initiative to analyze the current situation and align the new process initiatives into the system.

At present the business unit constitutes of approximately 2000 employees with around 300 project and functional managers across various functions such as Operations, Clinical, Mechanical, Quality, Regulatory Affairs, and Electrical etc. Being a matrix organizational structure business model, project managers are in need to request the resources from functional managers. Having visibility in this situation on resource level and skill level is a major challenge for functional managers and respective functional directors.
Hence, PDWare (Portfolio Decision Ware) tool is utilized for resource management within this business unit.

**Problem Statement**

To any organization or a business unit, resource planning, allocation and forecasting are the key elements to manage the projects. To accomplish this, currently the business unit uses PDWare tool starting from resource tracking to project time tracking, manage resource demand, capacity and to even forecast the projects.

The business unit’s primary stakeholders (VP’s and Directors) had trouble to have a high level visibility on the operational procedures and financial figures on a portfolio level using project, resource and financial data.

**Nature and Significance of the Problem**

Being a research and technology development unit the business has grown gradually with increase in projects and resources. In order to make sure that the resource allocation and forecasting towards these projects are being done in the manner they are supposed to, the business unit has implemented PDWare Portfolio tool to track the data of its resources assigned to the current projects.

At present functional, project and finance teams present data individually for monthly project review meetings. As there is an increase in the business, projects and resources grew potentially with the business unit from where it had a kick start. Off late due to this the functional and project managers are having a hard time to facilitate the resources to the prioritized projects across multiple functions. This resulted in an increased resource
forecast in terms of FTE (Full-Time Equivalent) and also the current resources are ending up working extra hours on some projects more than what they were forecasted for. Due to this, the project to resource expenditure is increasing but the capacity defined is not being met.

To overcome this situation, resource data assigned to the projects from PDWare tool is being utilized and is being integrated with financial data tracked from Global Planning System (GPS) within the business unit which allows to present the financial data in PDWare tool in specific to resources allocated to the projects. This can be accomplished by using Qlikview reporting tool available with in PDWare. This integration of the systems will help the finance team to collect the actual resources and forecast the data to present during the Annual Operating Plan (AOP) cycle. This project also helped the management in effectively governing the process throughout the portfolio using the knowledge that is projected by utilizing the Qlikview reports with the data that is present in the system.

**Objective of the Project**

The main objective of the project is to accomplish efficient data driven decision making on operational procedures, which involves a variety of stakeholder’s in order to develop better processes in resource planning and forecasting for the projects with in the business unit by using the PDWare portfolio tool.

**Project Questions**

The project aims at answering the following questions after successful implementation.
(a) What reports would help the primary stakeholders in data driven decision making?

(b) What is the process that is being automated with the integration to finance tool?

(c) How would you measure the process improvement after implementing this project?

(d) What future enhancements would help showcase the project level data through PDWare?

Limitations of the Project

One major limitation prior to the start of the project was to implement the process before the Annual Operating Plan gets executed. To any organization budget forecasting is the important operating procedure for the coming financial year, so that VP’s and Directors would have a rough estimate on how the forecast would look with the product releases and amount of expenditure incurred on the resource utilizations to the projects from respective functional areas.

Definition of Terms

Project Management Office: Project management office, abbreviated to PMO, is a group or department within a business, agency or enterprise that defines and maintains standards for project management within the organization. The PMO strives to standardize and introduce economies of repetition in the execution of projects. The PMO is the source of documentation, guidance and metrics on the practice of project management and execution (Darling & Whitty, 2016).
**Resource Management:** It can be defined as the process of identifying initiatives for resources based on priority, planning resource allocation, tracking resource usage and productivity, improving allocation, and measuring effectiveness of resources.

**Annual Operating Plan (AOP):** Annual Operation Planning (AOP) is a detailed projection of all estimated income and expenses based on forecasted sales revenue during one year.

**Resource Allocation:** It is the process of allocating scarce resources among the various projects or business units.

**Resource Actuals:** It is actual amount of time the resource worked or utilized on a project.

**Full-time Equivalent:** A resource who is supposed to work for the entire 40 hours.

**Summary**

The focus of this chapter was mainly towards the project introduction segment which explains the main outline of the project is. Also, this chapter focuses on the problem statement, project objective, nature and significance of the project, project questions that will be answered after the completion of the project, limitations during the project progress and all the terms and definitions that are of primary importance for this project. Next chapter explains background and literature review of the project.
Chapter II: Background and Review of Literature

Introduction

This chapter deals with background related to the problem undertaken, about the company, what kind of services they offer, literature related to the problem, which explains how the articles are related to the problem that has been the underlying cause for this project. Also, it includes the literature related to the methodology followed towards the project.

Literature Related to the Problem

Resource Management is one of the key element in Project Management across an organization to execute the projects in most efficient way. Resource management is a process of managing and using an organization’s human resources optimally so that no resource is underutilized or over utilized. An organization’s growth and return on investment is directly proportional to utilization of its time and human resources and this is especially true for the organizations that provide services to others. The two main pillars for resource management are resource allocation and resource forecasting. Resource allocation is a function of project start date, project end date, skill set required, percentage of involvement required (Innotas© by Plainview, n.d.).

In a simple case scenario, the company’s organization have multiple projects running and those projects may not be sharing the resources at all. A little more complex situation raised where the resources are shared in some proportions and those numbers are published regularly so that someone can analyze the utilization numbers. In this case, when
the number of projects increases and are huge, size has also become humongous involving more than 100s of team members. The dynamics of such projects have proved very difficult to manage manually. The project costs have got altered where the resources are underutilized or over utilized.

Hence, there is definitely a need to manage resource actuals and forecast resource allocation. To fix this, business unit uses PDWare tool as a resource management tool to capture the resource data in accordance to the project they are assigned and working for which allows the PMO to help functional managers to allocate resources to one or more projects with different allocations in percentage and for different intervals of time in terms of FTE.

PDWare tool helps analyze which team member is already overcommitted or out of the users on bench which all can be used for a project based on skill set matrix (as shown in Figure 2). It is so amazing if a team member’s present as well as past and future allocations to the same project are available on the same page. If a positive value is generated by calculating the staffing gaps report (which is the difference between planned and actual available resources) a corresponding position can be opened and then recruitment process can be initiated for that position. Figure 1 illustrates the entire resource management process in general.
To have a better understanding on project resource management process, understanding the major components of resource management process is of importance (BizMerlin, 2015).

**Skill matrix.** Skill management is the practice of understanding, developing and deploying people and their skills. Well-implemented skill management should identify the skills that job roles require, the skills of individual employees, and any gap between the two. Skill matrix is a visual tool to aid in the management, control and monitoring of skill levels of the organization’s employees.

PDWare displays all tasks and skills of each individual, specifying their requirement to work in an area or team thus enabling proper resource planning by the project managers. It can also be used to guide training programs and review project composition (PDWare Product Help, n.d.).
**Project team formation.** A project team is a group of team members who join together to accomplish some specific tasks that are related to that project. These team members may belong to different functional groups. For example, in case of developing an ecommerce website there is a need for programming developers, UI designers, QA personnel etc. Therefore, members from different functional areas work together to form a team for delivering the commitments.

**Resource planning.** A project's resource plan contains the profiles of the resources required, a count of each profile and the required start and end dates. While creating a resource plan it can be decided about how many users of a given profile type are required for a project and for what duration of time.

**Actual team.** Actual team is the group of selected specific individuals (team members) for the project, along with their role in the project, reporting structure and their start and end dates. Resources can be added to a team for different intervals of time, i.e., resources can be added multiple times with different allocations for different time periods.

**Staffing gaps.** An organization may have too few staff (a gap or deficit) in some job categories with specific skill set to implement project plans effectively. In order to create staffing strategies, first define the staffing gaps that are expected for a definite date. Staffing gap reports may be generated for any date where the gap between planned and actual resources for a project can be obtained. If any resource gap has been identified, an open position can be created in order to hire the candidate with the right profile for the required position.
A basic view of how the PDWare tool on how the effort is allocated to the project or forecasted can be seen in the Figure 2. This shows on how the resources and the required information looks in the tool. Figure 2 also shows the capacity, demand and availability of the resource to a specific project.

![Figure 2. Effort forecasts tab of PDW.](image)

**Literature Related to the Methodology**

The literature review has been carried out to identify the criteria that need to be considered in resource management and critical factors which need to be shaped out for better reporting techniques. Other relevant issues like integration with financial system, metric reporting and issue tracker strategies have also been identified and captured which ultimately serve as the foundations for the final outcome of developing an effective model for the overall business. Tools used to accomplish this project are as followed.

**Portfolio Decision Ware (PDWare) tool.** PDW is a real-time, excel-based analytical tool for use in resource assignment and allocation. The purpose of this application is to help
the organization define and manage an achievable portfolio of projects which is done by capturing and analyzing what resource managers know about the deployment of their resources and also project managers know about the status and critical parameters of their projects. Additionally, resource views and reports can also be showcased to the management which detail the problem areas for discussion and resolution with the data.

Characteristics of the application;

- Identifies portfolio resource and balance issues.
- Stimulates discussion of exceptions among project managers, resource managers, and portfolio/pipeline managers.
- Low overhead method for resource managers to plan the deployment of their resources.
- Simple rollup of resource deployment plans.
- Captures history (baseline, forecasts, actual) for analysis and improvement.
- Uses resource allocation by priority to highlight portfolio planning problems.
- Uses baseline (contract) versus resource forecast (staffing plan) to highlight execution problems.

The PDWare Portfolio application highlights resource contention problems in the portfolio and provides methods for examining alternative solutions. PDWare Portfolio allocation does not produce a recommended solution to resource contention problems but surely helps the management and stake holders to have a great visibility of their resource on the broader view across cross functional projects.
• The PDWare portfolio application consists of a client front-end that reads and writes data to a database on a server. The front-end is made up of different modules (“books”) which allow users to enter, manage, and analyze data in various ways. These data entries and display components were constructed using a Microsoft Excel™-based framework to provide a familiar, easy-to-use environment (PDWare, 2015).

Following are the main components for PDW to be used by the users to utilize the utmost functionality of the tool:

• **Resource Manager:** A line or functional manager who has direct (people) reports. A resource manager who has individual contributors only (no resource managers) among the direct reports is a first level resource manager.

• **Resource Assignment:** A resource assignment is an association of a resource listed on the resource data sheet with a project listed on the project data sheet.

• **Skill Assignment:** A skill assignment is an association of a skill and a resource organization breakdown structure node with a project listed on the project data sheet. A skill assignment is indirectly a resource assignment where the demand for a skill can only be satisfied by one or more people from the resource pool defined on the resource data sheet.

• **Resource Demand:** Resource demand is the total demand by time period for a resource from all projects in the downloaded project list.
- **Allocation**: The PDWare portfolio allocation algorithm uses the capacity of a resource (as specified in the resource capacity sheet) to meet demand starting with the highest priority projects. When there is no remaining capacity, allocation to meet demand for that resource gets stopped.

**Figure 3.** Roles and responsibilities followed currently.

In Figure 3, author states the process of resource management activities within the business. If responsibilities are observed on a role by role basis, it is clear that VP’s are the final decision makers to resolve the issues. Resource manager and portfolio management analyst are the two key resources for this process to work as it is intended to. Figure 3
proves that there is a requirement of utmost synchronization required in order to achieve maximum productivity for the business.

**Global planning system tool.** Oracle Hyperion Planning is an agile planning solution that supports enterprise wide planning, budgeting, and forecasting using desktop, mobile and Microsoft Office interfaces. It provides a robust modeling framework that helps develop reliable financial forecasts based on sales and operational assumptions to produce cost effective enterprise alignment. With Oracle Hyperion Planning, there is always a best in class solution and it is proven in the market place to provide timely, actionable plans to help make informed business decisions. Oracle Hyperion Planning can be deployed on-site or in the Cloud (Oracle, 2015).

Enterprise alignment is challenging to achieve in financial plans due to disconnect between the office of finance and sales and operational business units. Financial planning and forecasting often end up being a resource and time consuming process of gathering information spread across a multitude of disconnected spreadsheets or point solutions used by the office of finance and various sales and operational business units. Oracle Hyperion Planning provides the required agility to the enterprise planning process by quickly aligning financial plans, models and forecasts across cost centers and lines of business thus enabling decisions to be made at a speed which business demands. The impact of changes to key plan drivers and assumptions can be evaluated instantaneously, and revisions made available immediately to all stakeholders without the reliability risks from manual interventions. Oracle Hyperion Planning has built in time intelligence and allocation logic and comes with a
powerful calculation engine that can be used to express a range of business requirements, from simple arithmetic formulae to complex allocations. Oracle Hyperion Planning offers guided task flows and supports both bottom-up and top-down agile planning processes. Its robust workflow capabilities support efficient review and approval processes.

Key Benefits include:

- Reduce budgeting and planning cycles by weeks or months
- Improve forecast reliability
- Appeal to a wider user community through an intuitive web user interface
- Provide familiar user interface for users with full Microsoft Office integration
- Reduce planning cycles with anywhere, anytime mobile
- Eliminate time lag between when plans are updated and reports are refreshed
- Reduce cost of ownership through superior application deployment, management tools and packaged data integration
- Lay the foundation for making the transition to enterprise business planning

QlikView reporting tool. QlikView offers a complete analysis solution—dashboards and alerts, multi-dimensional analyses, slice-and-dice of data—without the limitations, cost or complexity of traditional OLAP cubes. Solutions can be deployed in days, users can be trained in minutes, and end users get answers in seconds—not hours—to refine their decisions.

QlikView’s revolutionary approach is completely aligned with—and ahead of—the industry with fast, powerful and affordable analysis for anyone in the organization. QlikView
is able to analyze massive amounts of data at unprecedented speed because of its in-memory data model design. As a result of this design, users get sub-second response times on queries and calculations and the ability to process massive datasets; companies can deploy to large user populations quickly and affordably. QlikView provides the capabilities that traditionally required a complex and costly suite of products—all in a single, affordable and flexible solution—today.

Strategic business benefits include:

- Make better decisions faster
- Improve monthly, quarterly, annual and long-term planning direction
- More proactive, agile and responsive organization
- Improve business process and confidence in business controls
- Consistent internal reporting and “vocabulary” with
- More knowledgeable and empowered workforce.

**Summary**

The concentration of this chapter has been focused towards understanding more about the background of the problem, in depth details of the company and what business it executes in the market. Also, all the background literature review towards the methodology of the project as well as literature review associated to the problem has been portrayed. Next chapter concentrates towards framework of the project, how the data was collected and exhibition of the data, analysis of data, budget involved and the project timeline.
Chapter III: Methodology

Introduction

This chapter focuses on explaining about the framework behind the project study. It also gives a detailed description about the data collection process, tools and techniques that were used to analyze the data, budget and the timeline behind the project completion.

Design of the Study

To start with the design of this project, PMO team assembled to have a brainstorming session on how to address the issue and came up with an action plan to address the problem statement. An idea of having a graphical view of data with resources assigned to the projects projected by the PMO team gave a clear picture on how to go about the process improvement and enhance the portfolio visibility of resource management to business leaders. PMO team further analyzed and came up with the solution to use QlikView reporting tool embedded within the PDWare software to create reports on focusing resource to project alignment. In order to achieve this, they needed data from GPS tool. This way of approach is determined to be a qualitative approach. This approach involves gathering and analysis of data, but it is more of non-numerical and involves people in it. It is usually more exploratory in nature. Qualitative research is always the best to come up with a solution in the earlier stages as it involves presentation of data in the form of words (from interviews) and images (videos) or objects (such as artifacts). While conducting a qualitative research what will most likely appear in discussions are figures in the form of graphs. During
this stage PMO team followed a systematic approach of finishing the deliverables needed as follows:

**Planning:** During this phase resource management and finance team discussed and decide upon data accessibility, confidentiality of human resource data and user security level within the tool. Then both the teams developed a requirement document in which the process and specifications are clearly defined. Then the requirement document is handed over to the IT Analyst.

**Functional Design:** In this stage the IT Analyst will need to create a functional design document on how to integrate the systems with the help of the development team in order to achieve the functionality. The analyst discussed this process with the technical architect and work on the best suitable solution for this project. IT developers help the analyst to create a functional design document which explains the technical design flow for the interface with clearly defined technical specifications. Resource budget, in and out of scope variables are also tracked with in the document.

**IT Development Phase 1:** Once the functional design document gets developed, the IT developers develop the code that integrates both the systems. During this phase the IT team have performed testing the interface in the development instance and create installation documents.

**Testing:** In this phase development team moved the changes to test instance and request the PMO (Project Management Office) and the finance teams to test the
functionality. Both the teams perform their respective test cases and see if the functionality is as desired. If any test case fails, the team has reported it back to IT team to fix it.

Then comes the second stage of addressing the problem at stake where by using the reporting tool functionality and analyze the resource to project aligned data view which mainly focused on gathering analytical data and performing a perfect analysis in order to build a dynamic metric model to filter the data as per the requirements of the business. Data here involves numbers, statistics and graphs which gives a clear understanding that the framework behind the project follows a quantitative approach. Quantitative research can be defined as an approach which involves the collection of data; it is analysis in a numerical form. Quantitative research tends to represent the data in form of tables containing data in numbers and statistics. By these the primary stake holders have a clear view on how the resources are aligned with the projects and maintained. Quantitative approach is always a leader in such kind of dynamic situations when compared to qualitative approach because there would be no analysis without any numerical data. Although qualitative analysis focuses towards driving solutions. During this stage PMO team considered various inputs both from the Directors and Manager level users in order to develop the reports. They have used a systematic approach to accomplish the task in hand.

**IT Development Phase 2:** In this phase the PMO team provides the requirements for the QlikView developers to develop the reports with the data specifications that should be displayed on the reports. Developers will work on developing the reports according to the requirements specification document provided by the PMO team.
**Testing Phase 2:** In this phase PMO team is responsible to do a regression testing on the functionality desired from the interface between GPS and PDWare and also the QlikView reports. In case of any test case failure, immediate fix should be done on the issue and tested again.

**Go-Live:** After the successful user acceptance test phase, IT team moves the interface and reports to production instance. PMO team continues their support on the new implementation and works with IT team to see if there are any issues occurring due to the new interface in the production environment. PMO team also provides the required training to the primary and secondary stake holders in understanding the portfolio level reports that are developed.

As per the detailed design of the project execution, it can be understood that it always depends on the factors to a particular situation on which approach and methodology to choose to get maximum outcome that suits best to respective business model. It is quite evident that both approaches work different, but using the qualitative approach during the earlier stage is the best option as there is no appropriate data available to use Quantitative approach. But in case of second stage there is an option of reporting tool designed in the first stage which helps in acquiring essential data to analyze the situation and spot the gaps with in the process.
**Data Collection**

Initially, during the planning phase PMO team should find a way to fetch the required data related to projects, resources and associated financial data. PMO team worked closely with the development team data architect to identify the required fields that need to be fetched to fulfill the conditions and avoid duplicates in the data. PMO team was in a need of integrating GPS and PDW in order to fetch the required financial data of the resources.

PMO team worked closely with QlikView development team to see if there are any data attributes that are required. During this time, PMO organized joint application development sessions to swift the development and requirement analysis process. During these JAD sessions, development team identified the tables that need to be loaded with the data into the PDW database. Figure 4 explains on how the data is integrated and data is fetched.
Figure 4. High level data flow between PDW tables to GPS Hyperion tables.

Development team took the responsibility of developing the process mappings in order to identify the successful data flow between the databases. They have created error handling tables and reconciliation tables in order to make sure that unnecessary data is missed out during the interface as shown in Table 1.
Table 1

Entire Nodes that Need to be Excluded from the Interface

<table>
<thead>
<tr>
<th>Folder</th>
<th>Mapping Name</th>
<th>Session</th>
<th>Workflow</th>
<th>Server</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEURO_PROD</td>
<td>m_delete_cc_pdwdata</td>
<td>s_delete_cc_pdwdata</td>
<td>ef_pdw_to_hyperion</td>
<td>mspr28</td>
<td>Clears the target table</td>
</tr>
<tr>
<td>NEURO_PROD</td>
<td>m_update_rpa_node_excl_hyp</td>
<td>s_update_rpa_node_excl_hyp</td>
<td>ef_pdw_to_hyperion</td>
<td>msp28</td>
<td>Updates any node exclusions in NRM</td>
</tr>
<tr>
<td>NEURO_PROD</td>
<td>m_load_rpa_error_hyp</td>
<td>s_load_rpa_error_hyp</td>
<td>ef_pdw_to_hyperion</td>
<td>msp28</td>
<td>Loads errors to the rpa_log table in NRM</td>
</tr>
<tr>
<td>NEURO_PROD</td>
<td>m_load_rpa_error_zero_fcst_hyp</td>
<td>s_load_rpa_error_zero_fcst_hyp</td>
<td>ef_pdw_to_hyperion</td>
<td>msp28</td>
<td>Loads errors to the rpa_log table in NRM</td>
</tr>
<tr>
<td>NEURO_PROD</td>
<td>m_load_neuro_cc_pdwdata</td>
<td>s_load_neuro_cc_pdwdata</td>
<td>ef_pdw_to_hyperion</td>
<td>msp28</td>
<td>Loads the target table</td>
</tr>
<tr>
<td>NEURO_PROD</td>
<td>m_load_rpa_error_file_hyp</td>
<td>s_load_rpa_error_file_hyp</td>
<td>ef_pdw_to_hyperion</td>
<td>msp28</td>
<td>Load and email error file</td>
</tr>
</tbody>
</table>

Table 1 represents the entire data collection process that has been used throughout the project. This data collection process has proved to be one of the critical deliverable in order to accomplish the project objective. As the project is solely for the reason of data driven decision making, data quality is the key element in order to measure the success for the project. Every data element has been taken into consideration during this data collection process to achieve the quality of data. Development team made sure that the integration path is open to both systems, so that in future the data flow can be utilized either ways. By doing this, GPS can also fetch data from PDWare for future enhancements if needed.

Data Analysis

QlikView Reporting tool. Henrik Béen (2006) stated that, QlikView has proved the most flexible business intelligence platform for turning data into knowledge in this project. This tool enabled the users to easily consolidate, search, and visually analyze all their data for unprecedented business insight.
Effective data driven decision-making is based on having the right information available and easy accessible. QlikView helped the PMO team in creating endless possibilities for making ad hoc queries without requiring tediously defined structures and hierarchies, as is typical in other data analysis tools. QlikView helped in unrestricted analysis of application data, helping the primary stake holders and PMO team to make time-saving and accurate decisions.

It brought a whole new level of data analysis, insight, and value to existing data stores with user interfaces that were user friendly. Figure 5 show cases the basic view of Qlikview Dashboard.

![QlikView reporting dashboard view](image)
The visualizations and charts in QlikView are dynamic and always changing based on the user’s selections and interactions with the data which helped the project objective in filtering the data according to the matrix organization structure within the business unit. Sometimes if there is a need for the user to print a static report of what they see in QlikView dashboard to share with someone or refer to at a later time, the reports can be printed or exported. QlikView’s Report Editor provides users with an easy way to capture the QlikView objects in a formatted report that can be printed. Reports can be created by simply dragging objects from the user interface to the report sheet.

Figure 6. QlikView reporting user interface and printable report sheet.

Simply drag the object from the user interface and place them anywhere on the report. There is also the ability to add an image, text object or current selection box directly
from the Report Editor. In either case, static reports that are nicely formatted can be created in QlikView.

**Background Related to the Problem**

This project is having been executed in a company which is a global healthcare solutions company committed to improving the lives of people through medical technologies, services, and solutions. The company operates in more than 140 countries, employees over 85,000 people and has more than 53,000 patents. This company is composed of six main business units which develop and manufacture devices and therapies to treat more than 30 chronic diseases, including heart failure, Parkinson's disease, urinary incontinence, Down's syndrome, obesity, chronic pain, spinal disorders, and diabetes.

This project has been implemented in Neuromodulation business unit which produces products including Neurostimulation systems and implantable drug delivery systems for chronic pain, common movement disorders, and urologic and gastrointestinal disorders. This business unit alone consists of five functions with approximate of 2000 employees working full-time, part-time and contracting basis. A total of 324 projects exist to be executed in order to manufacture the products which helps the patients in controlling for chronic pain, common movement disorders, and urologic and gastrointestinal disorders. Hence, handling resource planning versus the project demand has been an issue with increased demand on the product line in accordance to the increase in patients (Wikipedia, The Free Encyclopedia, n.d.).
Budget

This project wasn’t involved with much cost. As per the tools like PDW, GPS and Qlikview are already implemented, so there was no cost incurred in terms of infrastructure investment to this project. On the other hand, although all the personnel on the PMO team, IT development team, and financial analyst were involved in getting the final output for this project, all the man power, labor hours, salaries will be covered in each activity under split costs.

Timeline

Figure 7 showcases the timeline and different phases involved in the project.

![Timeline and phases of the project](image)

Figure 7. Timeline and phases of the project.

Summary

This chapter serves as the backbone of the complete project, that explains in a very elaborate and detailed manner about each and every activity associated with the framework for this project, the tools and techniques used for analysis of the project, budget and timeline involved with the project. Moving forward, next chapter’s focus will be towards presenting the collected data and doing an extensive analysis on it.
Chapter IV: Data Presentation and Analysis

Introduction

Chapter III focused on explaining all the concepts which serve as the background for the project. With that being explained, chapter IV has its own identity by bringing to the front the data collected, analysis conducted and also the interpretation behind this analysis. This chapter also explains about how these tools have been imbibed within the project scope.

Data Presentation

This section presents on how the PDW data including the resource and project data can be interpreted in form of QlikView graphical reporting technique. Figure 8 and Figure 9 explain the functionality of Qlikview reports. Through this report, interpretation of the data seems to be easy and feasible to increase the productivity by business leaders in taking appropriate and prompt data driven decisions.

Dashboard is the terminology used in Qlikview. These dashboards consist of two or more reports imbibed into a single graphical user interface. Through this it will be easy to navigate and compare two or more reports and so the data mining efficiently.
Figure 8. Resource assessment report.

Figure 8 showcases the dashboard called assessment suite. This dashboard consists of two tabs namely resource assessment and project assessment. Currently, resource assessment tab is displayed with three graphical diagrams with variables namely “resource category”, “% of unique resources” and “Number of resources on multiple projects”. Other toolbar functionality and page functionality is explained in Figure 8.

Figure 9. QlikView dashboard reports toolbar.

To any data interpretation it is quite important to filter on higher-level as well as trace down to low-level specifics of the data available within the report. Qlikview has that
flexible feature in drilling down the according to Date, Month and Year. To this project an organization structure filtering process needs to be there which is similar to the node structure that is available in PDW, so that resource capacity, demand and allocation can be assessed. PMO team and development team have decided to utilize the customization ability of the application and customized to the appropriate functionality desired by interfacing the PDW data structural design.

As a result, what can be seen in Figure 10 is the data structure which resembles the organization hierarchy from VP’s, Directors, Managers and individual resources assigned to the functions or projects accordingly. Through this it is very feasible for the leaders to assess tiny bit of data and come up with a decision on how to improve or handle the projects in more efficient manner. It also helps the users to assess the data on a portfolio level resource management and give them the opportunity on how the resource allocation and forecast looks for the projects in present and future state.
Figure 10. Selecting filters according to the data required to analyze.

One of the best part in Qlikview was to present the raw data within the same application. For example, Figure 11 showcases the graphical representation of data along with the raw data that has been transformed. This is very useful for the users to look up the specifics of the data fields that are not available in the graphical representation.
Data Analysis

The basic idea of this project was to give the business leaders a feasible application that reports the data in the graphical format, so they can make data driven decisions. To achieve that, the data from PDW has been utilized and transformed it into QlikView.
graphical reports. Figure 12 portrays one of such reports which shows all the resource data that has been transformed into graphical representation. This section explains on how to interpret and analyze the data. The author shall walk through this report on User Role basis and explain how this report can be analyzed to make decisions.

As per Figure 11, it provides a quick view into the ratio and category of resources in the business unit portfolio by project or function broken down by selected parameters. This Pie chart gives a brief idea to determine if the mix of employees, consultants and planned new hires allows for successful completion of projects.

![Pie chart](image)

*Figure 12. Neuro resource category.*

Therapy Directors:

- Users of this role would analyze and see if the ratio of employees, contractors and planned new hires present a risk to the successful completion of the respective project or portfolio.
Functional Directors:

- Users of this role would analyze to see if the employee to contractor ratio in any particular department should align with organizational or department goals.
- Keeping a thorough check on contractors to employee ratio within the function.

Functional Manager:

- Manager analyzes and see the optimal alignment of employees to contractors for the set of projects which are supported by the resources.

Figure 12, provides a quick view of the ratio of Neuromodulation resources by function broken down by the selected pivoting arrow options and parameters. It also is useful to assess whether the current distribution of resources align with organizational goals.

![Resource Summary: # of Unique Resources](image)

*Figure 13. Number of unique resources working on different functions.*

Therapy Directors:

- Users of this role would analyze and see on which function there is therapy dependency with specific skill matrix.
Functional Directors:

- Users of this role would analyze to see if the distribution of skilled resources is evenly distributed and also have visibility on which therapy would need more uniquely skilled resource in order to finish the projects on time.

Functional Manager:

- Manager would have a visibility on which skills the projects are dependent on the most, so that they can forecast for new hires or contractors before the project initiates.

As per Figure 13, it is a pareto chart that shows the number of projects to which the resources are assigned to during a specified time. The y axis represents number of resources. The x axis represents number of projects that are forecasted against the actual resources. The red line is the cumulative %. The green line intersects the red line at the 80% mark.

**Figure 14.** Number of resources working on multiple projects.

For example, this graphs explains that 181 resource are working on 1 project, whereas 5 resources are working on 10 projects each.
Therapy Directors:

- Users of this role would analyze and see if the resources assigned to the projects are stretched too thin to have maximum productivity.

Functional Directors:

- Users of this role would analyze to see Resource allocation and planning of resource are well balanced with their workload across the projects.

Functional Manager:

- Manager would analyze to see if the resources are assigned to manageable number of project so that they can finish their deliverables on time.

**Monthly variance report.** This report is an indication of portfolio and project health based on actual time submitted by resources compared to the forecast. This proved to be the most important report as it makes the management to look into and see if critical resources are supporting the project as planned. This report explains if forecasted effort in PDW is matching actual time spent by the resource on the projects. For example, as shown in Figure 14, for the month of May a project has utilized some resources for 1.04 FTE more than the estimated effort workload at the same time they have resources who were underutilized for around 6 FTE. Through this graph resource manager will be able to coordinate with the project manager and see if there is any discrepancy on the effort forecasted or in need of any additional resource to finish the project. This report can act like as a key performance indicator to analyze any repeated issues with the portfolio.
Figure 15. Monthly variance report.

Director:

- User of this role would be able to analyze if the managers are effectively assuring about the resources that are working on what was planned.

Functional Manager:

- User of this role will be able to analyze and coordinate with project manager and see if the effort forecast was accurate and see if the resources of appropriate skill are working on right projects.

Project Manager:

- User of this role will be able to analyze and see if any more resources are required with specific skill matrix or see if the appropriate resource are available with the project to work on the deliverables.
Co-ordination with in the functional manager and project manager would make them understand, if there is any issue that is effecting the project.

**Resource forecast and capacity report.** This following report is very useful to analyze and see if the Actual capacity of the resources are matching with the forecast provided. Through this report, management would be able determine if there are enough resources to meet the forecast by priority as well as see the actuals trend.

![Graphs](image.png)

*Figure 16. Resource forecast and capacity graphs.*

Through these graphs directors can hold the managers accountable and see if the forecasted effort is meeting the actuals of resource utilization being maintained in the projects. If not, the directors can look into the root cause and see if the functional managers were able to recruit or provide the appropriate skilled resources to the projects or the project managers are able to forecast accurately when in need of resources to accomplish the project tasks. This enhanced the resource to project alignment process.

**Summary**

Chapter IV is the successive critical chapter following Chapter III. The data analysis part explains on how the reports can be used to identify the gaps in resource management process as well as user based usage according to the role on data to improve the project
productivity by assigning the resources appropriately. Next chapter would cover the result of the project, conclusions based on the results and possible recommendations for the betterment of the organization.
Chapter V: Results, Conclusion, and Recommendations

Introduction

Chapter IV focused on presenting the data that was collected and also analyzing the collected data. This chapter focuses on providing the final result of the project with conclusion from the result and also possible recommendations based on the result and conclusion.

Results

This project was started to improve the business process model of resource management with in the portfolio in specific to project management. To improve this, PMO team has used the qualitative and quantitative research model in order to obtain the inputs to find the process gaps. Using the reporting technique idea, the PMO team has given data capture ability to resource management team on a portfolio level which enhanced visibility for the managers and business leaders to depend on the data to take appropriate decision in growing the business.

Using the QlikView reports, PMO team was able to look up into the resource categories and resources who are assigned to multiple projects and time span of the projects a resource has been working. This gave the PMO team to analyze and iterate a process model of having a core team with the same project for a certain period of time to enhance the productivity.
Project Questions

1. What reports would help the primary stakeholders in data driven decision making?

Reports developed by the end of project are Project Assessment and Resource Assessment. These reports constitute of data related to resource by functions and their assignment to the projects.

**Project Assessment report:** This report explains the resource efforts assigned to the projects and project to resource demand. Through this the management will be able to assess the unmet demand and actuals versus forecast gaps that needs to be addressed with in the portfolio. This report also displays the data of resource actual time spent to the resource capacity, using this project manager or functional manager will get to know if the resources are spending extra hours on the project than the projected time, so that functional manager can have an estimate on skill level hiring positions.

**Resource Assessment report:** This report explains on how the resources are allocated to the project and with how much effort are the resources forecasted versus the actuals. These reports give the managers a brief idea on which project is consuming the percentage of unique skilled resources. It also shows how much resource workload is being incurred. Through these functional managers will be able to utilize the bench strength to the maximum.
2. **What is the process that is being automated with the integration to finance tool?**

Initially managers were entering the financial data in GPS and resource data in PDW tool which proved in data duplication and data. Due to this integration, managers are able to enter the data in PDW tool (single point data input) and the interface of the system is loading the required data into GPS automatically. This handled the issue of all the resource data and financial data flow from PDW to GPS. Hence, reduced involvement of labor, mismatch of data and data loss.

3. **How would you measure the process improvement after implementing this project?**

During the implementation of the project, PMO team wanted to have an issue tracker to be placed in identifying the most commonly occurring concerns, questions and issues on the resource management tool and process. To make sure that this issue is addressed, PMO team has come up with an inbox support model which helped in tracking all the requests that frequently occur. By doing so, PMO team created an excel metric sheet and prepared a pareto chart analysis in addressing the issues with in the process and take appropriate actions to reduce the issues.

4. **What future enhancements would help showcase the project level data through PDWare?**
Fetching project level financial data from GPS system enables to showcase the portfolio level view of data on resources, projects and financial data together using Qlikview reports embedded in PDWare. This enhancement shall create high level visibility on all the projects with in the portfolio to the PMO team to take appropriate steps in resolving the process gaps of project management within the business.

**Conclusion**

Business leaders were very satisfied with the effort by PMO team in showcasing the high level data visibility. This initiative not only helped the Director level users but also manager level users too. This project helped the managers in having a continuous update on the ongoing project statuses and new project initiations, which also allowed the managers to handle and estimate the resource planning. Directors were very happy in automating the data flow due to the tool integration which in turn helped in data quality and reduction the data entry issue in multiple places.

Management have very much appreciated in having the reporting tool in place which gave them the opportunity to fetch the reports with live data for their presentations in project review meetings and have visibility on resource allocation to projects along with project and financial details associated with it. This project achieved the data driven decision making objective to the maximum and proved to be a process improvement entity for future state.
**Recommendations**

Although this project proved to be a productive asset to the business portfolio in having the resource management process improved, management would need to concentrate on making PDWare tool be used as a centralized tool for Portfolio management. Integrating the PDWare with Microsoft Projects and fetching more necessary portfolio level financial data, management will be able to achieve maximum visibility to make decisions that improve the business results and have a disciplined business model. However, doing this involves lot of manpower and skill set resource incurring cost. If the business can afford it, this recommendation would definitely prove a valuable liability for future state.
References


