Toward a Decision Making Framework for IT Portfolio Decisions

ABSTRACT

The literature suggests that IT Portfolio Management (ITPM) has not been widely adopted by organizations because its practical aspects are not readily apparent. This paper is a preliminary attempt to create a practical decision framework of ITPM that is tightly linked to business functions and levels. Our goal is to develop a framework that will have utility not only to academics, but also to practitioners. This paper presents our motivations for the framework, provides some background on ITPM, and presents our initial framework.

Keywords: IT Portfolio Management, education, framework

INTRODUCTION

As the competitive environment in which business organizations operate becomes increasingly complex, the decisions on what investments to make in an organizational IT portfolio become critical to the livelihood of the organization. IT portfolio management is a tool that managers can use to make these decisions. The purpose of IT portfolio management (ITPM) is to maximize the business value that IT delivers to the organization while improving the alignment between IT and business strategy (Maizlish & Handler, 2005). However, while many managers are aware of ITPM, one study found that less than 20% of companies had an active ITPM framework that they maintained (Jeffery and Leliveld, 2004). This could be a result of a lack of widely accepted definitions of IT management terms and the practical aspects of ITPM are not obvious to most managers (Maizlish & Handler, 2005). While this presents an obvious

challenge to industry it also presents a challenge to academia in that there is no effective pedagogical tool to instruct students on how to make IT portfolio decisions.

The general lack of clarity surrounding IT portfolio management also inhibits the ability of organizations to develop maturity in their IT portfolio management processes. The IT portfolio management maturity model (Jeffery & Leliveld, 2004) differentiates those companies that have identified and defined their IT portfolios (Stage 1) from those that are actively managing their IT portfolios (Stage 2) in part by the presence of an applied method to segment the IT portfolio by asset classes and by having a well-defined method for ranking IT investments (Jeffery & Leliveld, 2004). Because of this, it seems that there is a need for a decision making framework to assist companies in the adoption of IT portfolio management. This framework must be detailed enough to be effective in helping organizations deal with the complexity of IT portfolio management. However, it also needs to be simple enough to allow managers to utilize the framework in practice as well as to be able to be used in the classroom to teach the tenants of IT portfolio decision making to future managers.

This paper is a preliminary attempt to create such a framework. In our decision making framework, we classify the projects in the IT portfolio based on the constituency that the system is supporting (Executives, Middle Managers, or Operations) and the generic functions of the firm (Accounting and Finance, Operations, Human Resources, Sales and Marketing) supported by the system. By laying out the foundation for our framework in this manner, we hope to provide a tool that is simple enough to clearly convey the fundamentals of ITPM to students and relevant enough to be used in industry so that present managers can leverage the business knowledge that they already possess in making IT portfolio decisions and more explicitly tie these decisions to the business operations of the firm, thus helping to increase alignment with business priorities.

The remainder of this paper will present a brief background on ITPM, discuss the development of our initial framework, and finally conclude with some closing remarks and directions for future research.

BACKGROUND

ITPM is a relatively understudied field in information systems, but has received increased interest in light of questions about the value that information technology can bring to an organization (Kuman, Ajjan, and Niu, 2008). ITPM is founded on the principals of financial portfolio management and thus, many of the studies have focused on many of the individual aspects of financial portfolio management such as the risk associated with the portfolio (McFarlan, 1981; Drake and Byrd, 2006), the health of the portfolio (Weill and Vitale, 1999), and the selection of projects in the portfolio (Bardhan and Stougstad, 1999). Other studies have looked at the maturity level of the ITPM process within organizations (Jefferey and Leliveld, 2004) the structure of the assets within the portfolio (Weill and Broadbent, 1998), and the effective implementation of ITPM within organizations (Weill and Aral, 2006).

Kuman, Ajjan, and Niu (2008) provided a comprehensive review of the literature and a framework for ITPM while offering some directions for future research. They characterize a IT project portfolio as being characterized by its components (applications, projects, and infrastructure) of the portfolio and their interdependencies, the strategic alignment of the portfolio with the long-term goals of the organization, the costs and benefits of the portfolio, and the risk associated with the portfolio (Kuman, Ajjan, and Niu, 2008). The framework that resulted from this work is based on a set of 7 steps of decisions and processes listed in Table 1 below.

Table 1: ITPM Decisions and Processes (Kumar, Ajjan, and Niu, 2008).

Step 1	Assess alignment, benefits, costs, and risks of new individual projects.
Step 2	Assess new project fit relative to existing portfolio components.
Step 3	Prioritize the new projects that are feasible based on the results of steps 1 and 2.
Step 4	Review the on-going individual projects in the portfolio.
Step 5	Review and reprioritize all of the projects in the portfolio as a whole.
Step 6	Assess the health of the application and infrastructural components of the portfolio.
Step 7	Assess the health of the portfolio as a whole and make balancing decisions such as the upgrade or retirement of portfolio components.

While the type of comprehensive framework presented by Kumar, Ajjan, and Niu (2008) may be effective in enabling researchers to engage in ITPM theoretical development, it is our contention that these types of comprehensive frameworks may be too resource intensive to be feasible for use in practice. For example, the systems development life cycle is generally accepted as the standard structured methodology for application development, but it is rarely used in practice except for the development of highly complex, mission critical applications. Instead, many organizations use an alternate, less resource intensive methodology such as rapid application development (RAD) to develop applications in a manner that still employs a methodology, yet allows them to keep pace with changes in the organizational environment.

Our model is, in many ways, analogous to this situation. We seek to develop a model that will allow students and managers to quickly and effectively assess the content, health, and alignment of an IT project portfolio. The initial attempt to develop this model is detailed in the following section.

MODEL DEVELOPMENT

Model development begins with the functions of the organization that are supported by information systems. While organizations may have more, they are generally agreed to have at least four primary functions (Laudon and Laudon 2011): Production, Sales and Marketing, Accounting and Finance, and Human Resources. Production includes managing suppliers, product creation, product quality, and product inventory. Sales and marketing includes managing the market, the product, and the customers. Accounting and finance includes managing the cash flow, the balance sheet items, and the income statement items. Human resources include the hiring, care, evaluation, and termination of employees. Applications in this paper are defined as that software directly used to support these organizational functions (see Figure 1).

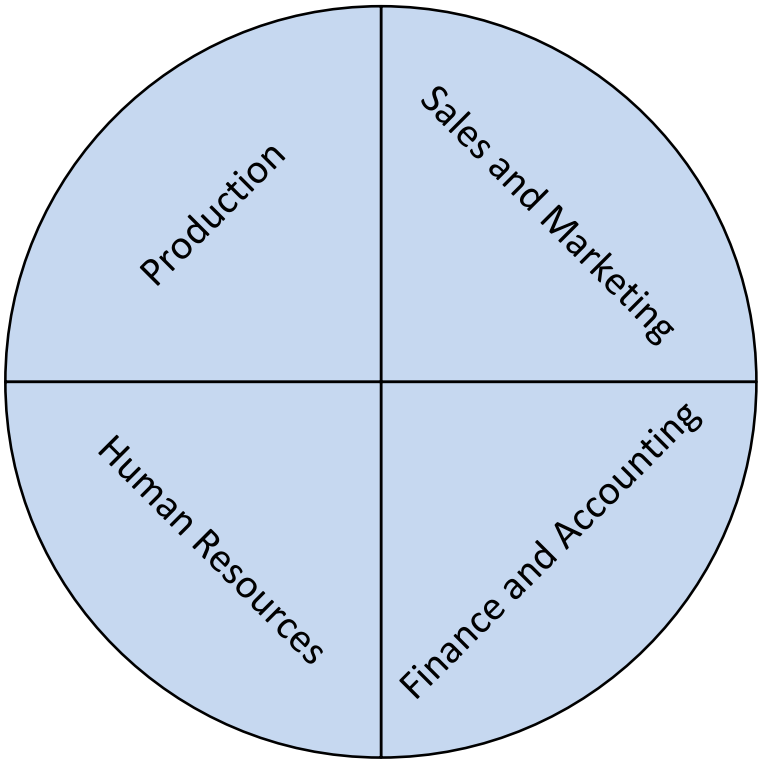

Figure 1: Organizational Functions

In addition to supporting organizational functions, different kinds of applications, support different levels of the organization. While organizations may have more, they are generally

agreed to have three levels (Laudon and Laudon 2011). Operations are at the first level of the organization. The day-to-day activities of the organization are performed in operations. Transaction processing systems support operations through the recording and controlling of those day-to-day activities. Middle management is at the second level of the organization. The organization's goals are monitored and controlled in middle management. Reporting and decision support systems support middle management by comparing organizational goals to actual results, performing analysis of variance, and enabling what-if analysis that drives the redirection of operations. Executive management is at the third organizational level. The direction, strategy, and goals of the organization are determined at the executive level. Dashboards support the executive level by providing summary performance data for comparison with external data about customers, suppliers, competitors, regulators, shareholders, and other external stakeholders, which enable the executive to match organizational capabilities to the environmental opportunities and challenges. Applications in this paper are defined as that software directly used to support these organizational levels (see Figure 2).

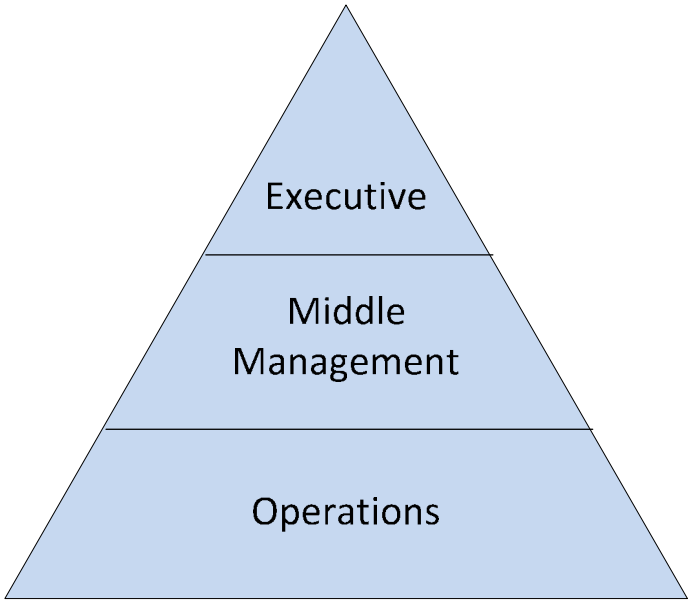

Figure 2: Organizational Levels

The Application Portfolio Framework (APF) is derived through combination of organizational functions (Figure 1) with organizational levels (Figure 2). The APF organizes and illustrates the organization's application assets. This combination of functions and levels creates twelve categories that are defined in Table 2. The APF may be illustrated using a target shaped diagram as shown in Figure 3.

Application Category	Category Definition
Operation Applications	
Production	Control and record day-to-day conversion of material received from suppliers into products delivered to customers
Sales and Marketing	Control and record day-to-day conversion of market prospects into customer sales within the sales pipeline
Accounting and Finance	Control and record day-to-day transactions for revenue, expenses, profit, cash, assets, liabilities, and owners equity
Human Resources	Control and record day-to-day flow of employee hiring, care, evaluation, and termination
Management Applications	
Production	Perform analysis of variance between production goals and actual production and facilitate redirection of production operations
Sales and Marketing	Enable periodic analysis of variance between sales pipeline goals and actual sales and the redirection of sales pipeline operations
Accounting and Finance	Enable analysis of cash flow, income statement, and balance sheet variance and redirection of accounting and finance operations
Human Resources	Perform analysis of employee performance variance and facilitate

	improvement in employee performance
Executive Applications	
Production	Enable the matching of internal production capabilities to external production opportunities and challenges
Sales and Marketing	Facilitate the matching of internal sales pipeline capabilities to external marketing and sales opportunities and challenges
Accounting and Finance	Facilitate the matching of internal accounting and finance capabilities to external opportunities and challenges
Human Resources	Enable the matching of internal employee capabilities to external employee opportunities and challenges

Table 2: Application Category Definitions

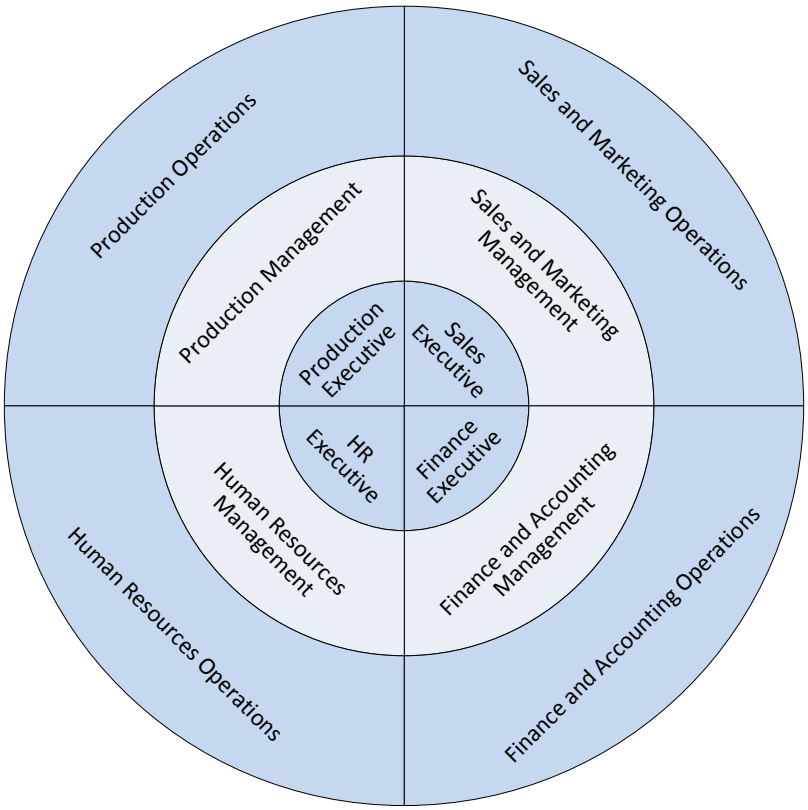

Figure 3: Application Portfolio Framework (APF)

MODEL UTILIZATION

There are four steps in an application portfolio management process (Simon, Fischbach et al. 2009): data collection, analysis, decision-making, and optimization. Data collection captures the current state of the application portfolio. Analysis gains insights into the current state of the application portfolio. Decision-making plans and shapes the future state of the application portfolio. Lastly, optimization puts the plan into motion. The APF helps to organize and illustrate the first three application portfolio management process steps.

The data collection process step goes beyond a simple list of current applications. A crucial step in this process links the applications in inventory to the organization's business processes (Simon, Fischbach et al. 2009). The APF aids converting lists of applications into usable decision-making information by organizing the inventory by organizational function and level. This organization illustrates the linkages between the application inventory and the critical business processes. For example, an organization with twenty applications in inventory may see their critical organizational functions and levels supported as shown in Figure 4.

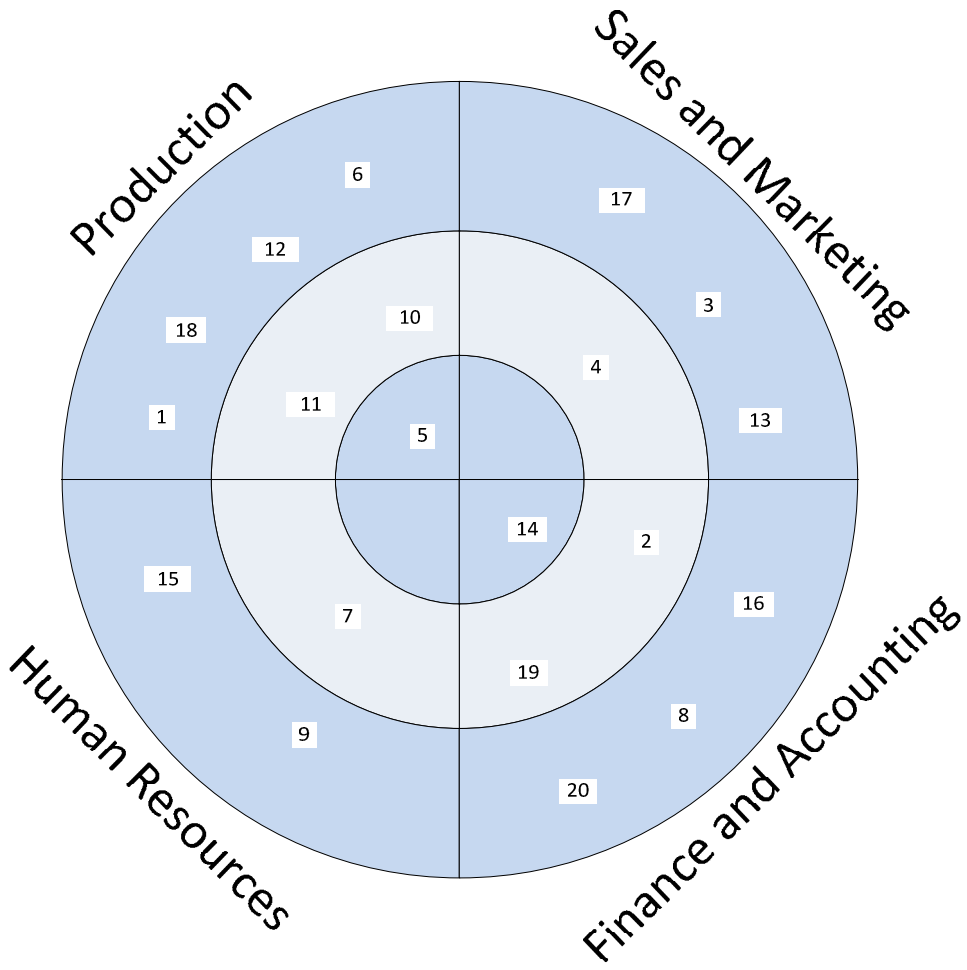

Figure 4: APF with Inventory

One aspect of the portfolio analysis step is the range of support for business processes (Simon, Fischbach et al. 2009). Once the application inventory has been illustrated using the APF, the APF can be used to illustrate sufficiency of the application inventory. Sufficiency is a judgment about the application inventory which says that the inventory: a) sufficiently supports the category, b) weakly supports the category, or c) insufficiently supports the category. This judgment can be made by performing analysis along the following dimensions Business Process Support, Strategic Fit, Value/Benefits, Costs, Risks, Lifecycle, Regulatory Compliance, Functional Wealth, Technical Health, Operational Performance, Relations and Dependencies, and Vendor Information (Simon, Fischbach et al. 2009). One way to illustrate this sufficiency is

to color code the categories of the APF based on the judgment. For example, the judgments about the inventory can be recorded on the APF as "green" for sufficient, "yellow" for weak, and "red" for insufficient as shown in Figure 5.

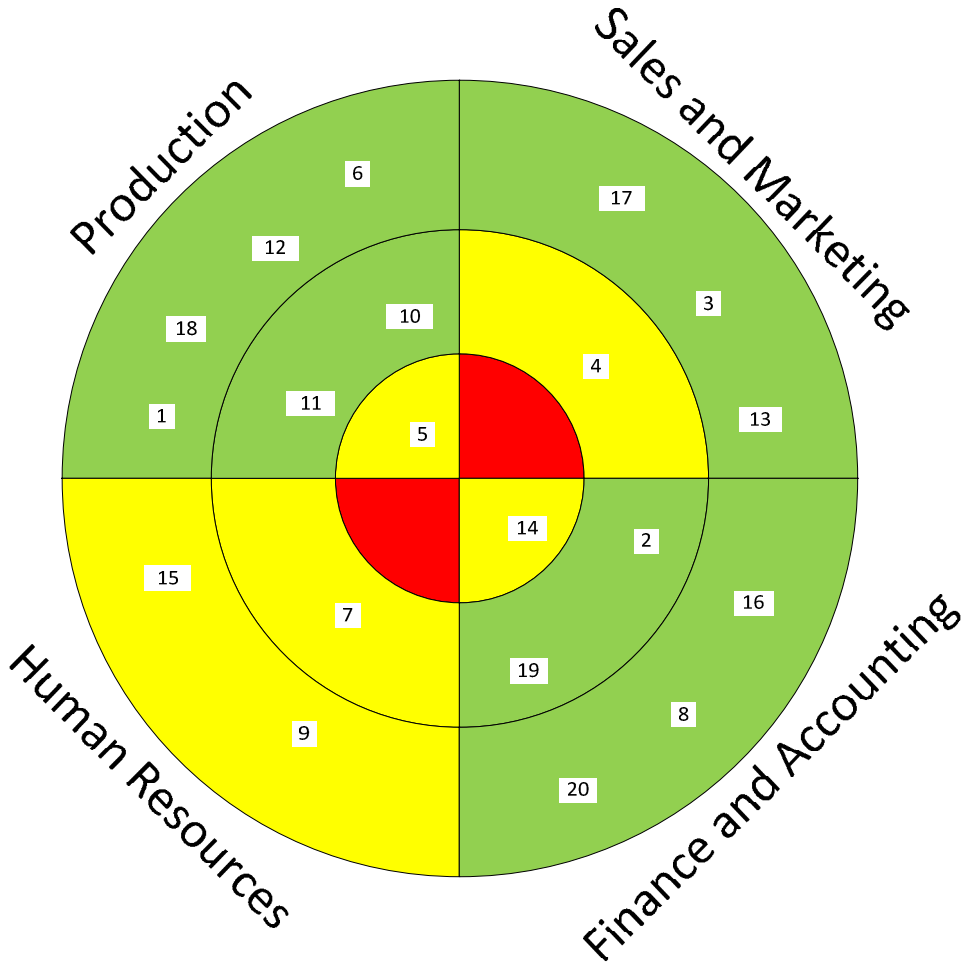

Figure 5: APF with Judgments

The decision-making process step of application portfolio management involves deciding how to allocate investments in the application portfolio (Simon, Fischbach et al. 2009). The APF, with judgments of application support sufficiency, provides a comparative picture that aids candidate project selection. Candidate projects can be overlaid onto the inventory sufficiency frameworks to rapidly identify a short list of candidate projects based on organizational needs. The overlay also identifies any gaps in the candidate project list where there is an organizational

need, but no project to address the need. For example in Figure 6, candidate project "Cj" might be questioned as the production operations category appears to be sufficiently supported, candidate project "Cb" may receive a high priority because the sales and marketing executive category is insufficiently supported, and the category of human resources executive category, identified with "Gap?" appears to need a project that, as yet, has not been defined.

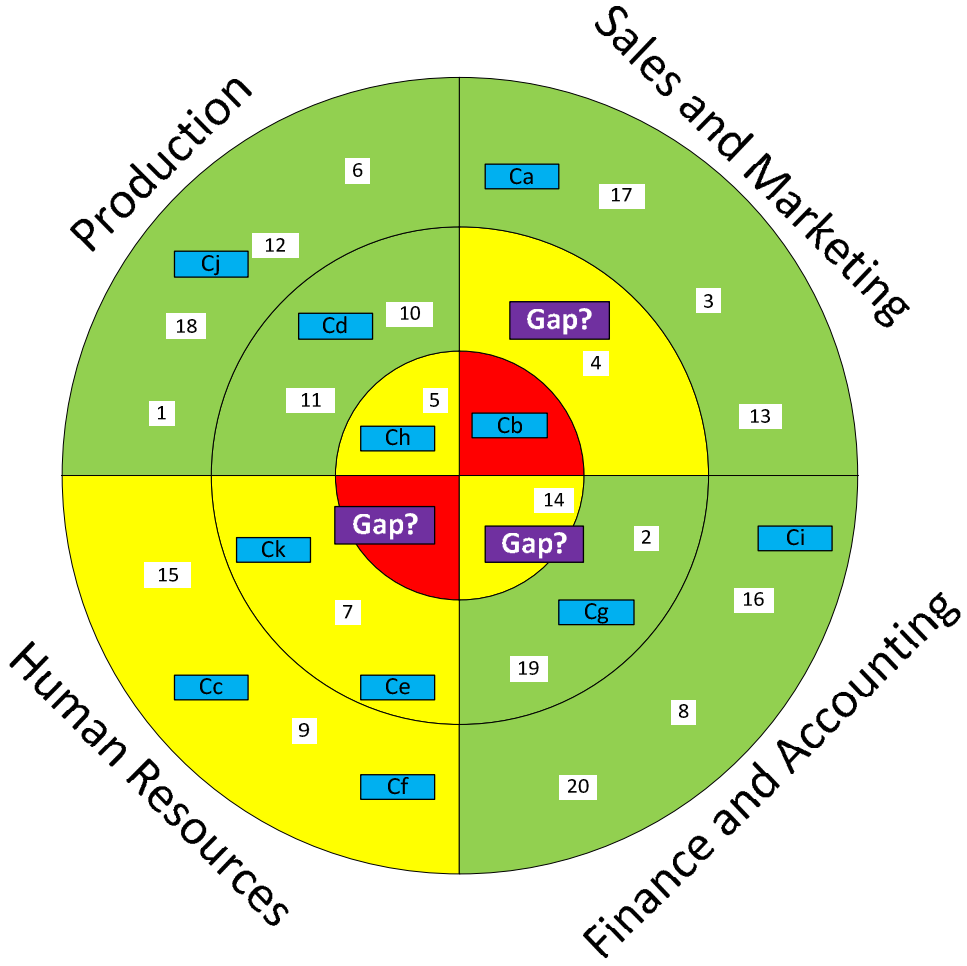

Figure 6: APF with Candidate Projects

CONCLUSION

As previously stated, the framework presented in this paper is a preliminary attempt to create an ITPM framework that will be effective in providing the benefits associated with ITPM while also being easy enough to use to make it practical for use in industry and academia. As such, there is much room for the development and improvement of the model. More research is needed to determine exactly what needs to be developed further and where improvements can be made that will make the framework more effective without making it too cumbersome to use. Therefore, future research with respect to this framework will include it being validated by professionals and academics as to its efficacy and ease of use. We also feel that this research has the potential to make a significant contribution to academia while also demonstrating that IS researchers can provide relevant solutions for the problems being faced in industry, thus helping to bridge the chasm that some believe exists between the two groups.

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