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# The New IT Product/Project Lifecycle

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# The New IT Product/Project Lifecycle

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## ABSTRACT

Recent studies have found that Information Technology (IT) project success hovers around 40%, despite the increased adoption of project management methods by the IT community. This paper explores the possibility that the project lifecycle, with distinct beginning and ending points, may not be the best model to understand the implementation of an IT product. Using project data from two organizations, and incorporating ideas from the product management literature, this paper presents an enhanced project lifecycle that incorporates the need for ongoing support that is unique to IT products. This analysis discusses the need to incorporate product management thinking and lifetime support into a project management construct, and identifies the deficiencies in trying to apply a pure project management lifecycle structure to IT implementations.

## KEYWORDS

IT Project Management, Product Lifecycle, System Development Life Cycle, Product Lifecycle

## INTRODUCTION

When a project begins, it is defined in terms of scope, budget, and time. Each of these three factors is viewed as a zero-sum game: an increase to one requires an impact to at least one, if not both, of the other factors. Such thinking has created the concept of the project “iron triangle,” the hallmark of today’s project management methodology (Gray and Larson, 2008). The project management methodology that subscribes to this thinking is intended to be technology and industry agnostic. The information technology (IT) industry adopted the concept of a “project” to manage the development and implementation of technology-based applications. This has led to the adoption of project management methodologies, most recently exemplified by the methods and procedures defined by the Project Management Institute (PMI) (Cheah, 2007).

Project “success,” as measured by meeting the estimates of the three factors, has improved over the last ten years, but with project “success” rates hovering around 40%, the IT industry continues to investigate ways to improve project management (Ambler, 2007).

This paper proposes that while investigations have been plentiful into which obscure portion of the project methodology is failing the industry and thereby creating the success log jam, the investigations have missed the larger picture: it is the project methodology itself, as well as the focus on specific fixed duration timelines, which are potentially at fault. This paper suggests that for lasting success to be achieved, the IT industry must move away from the strict, dogmatic project management methodology now held and instead move towards a product management approach. An IT project generates a product that should add value to an organization for a period of time (Gable, et al., 2008) so better understanding the point at which to evaluate the success of its implementation could help refine the project lifecycle for IT projects.

This paper compares and contrasts the two lifecycles, product and project, and brings into focus the strengths and weaknesses of the current project lifecycle methodology. We then use completed projects at two organizations to explore the creation of a new project development lifecycle for IT that incorporates components of a traditional product management curve, to better understand the unique characteristics of IT product implementation.

## PROJECT LIFECYCLE ANALYSIS

In comparison to industries like defense and aerospace, project management within the IT community is a relatively recent field of study (Birkhead, Sutherland, and Maxwell, 2000). Where several industries adopted project management much sooner, a broader scope of industries have joined the project management bandwagon later in the process. This has been driven by a need to achieve results faster, with tighter budgetary and resource constraints (Birkhead, Sutherland, and Maxwell, 2000). While it has been found that the core competencies required for project management professionals are similar across industries, it cannot be said that the results are similar. Where many industries have found that their success rates have benefited from the adoption of project management methodologies, IT has only recently begun to see improvement in the overall success rate of projects and project deliverables as measured by the traditional project success metrics (Rubinstein, 2007). Bridges may be built on time and on budget, but IT software projects rarely fall in this grouping (Ambler, 2007).

Over the years, project management has grown from a relatively little accepted and little applied structure (Kerzner, 2006), to one with “an intricate framework of organizational behavior and structure that can determine project success” (Kerzner, 2006). Initially, project management was forced upon contractors by government agencies like the Department of Defense and NASA. In time, project management became more acceptable outside the bounds of aerospace, defense, and construction. (Project Management Institute, 2004).

The Project Management Institute (PMI) has become the de facto knowledge repository for the manner by which to build a project management office, manage individual projects, and establish portfolio management practices (Cheah, 2007). PMI states that a project is comprised of three basic components (Project Management Institute, 2004):

1. *A defined beginning and end;*
2. *A unique product, service, or result; and*
3. *Is progressively elaborated – distinguishing characteristics of each unique project will be progressively detailed as the project is better understood*

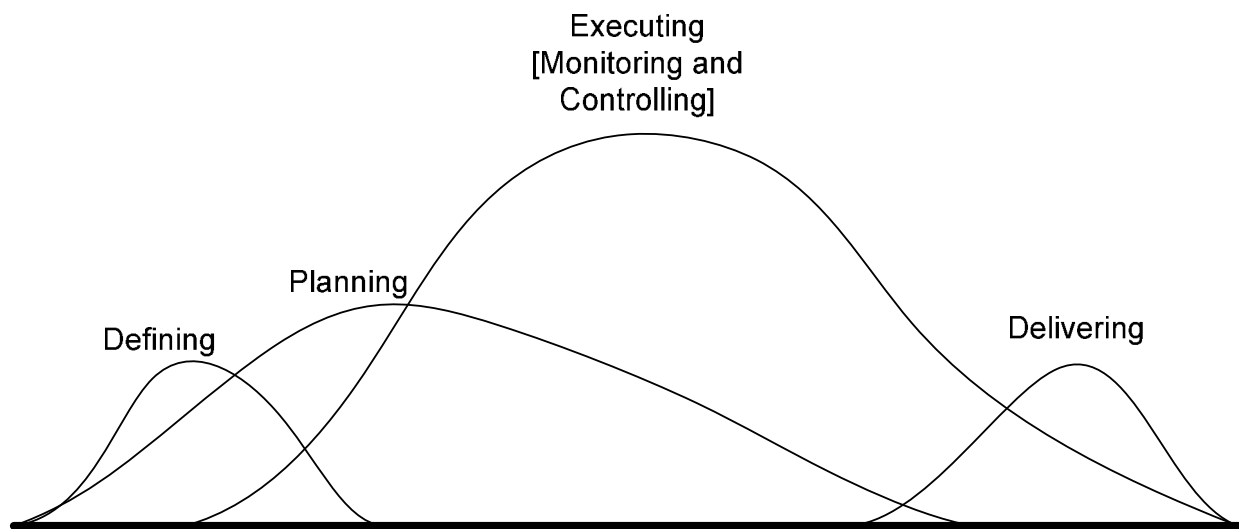


Figure 1 - Project lifecycle (Gray and Larson, 2008)

Figure 1 depicts the typical project lifecycle as defined by the Project Management Institute. This lifecycle is segmented into five sections: Defining, Planning, Executing, Monitoring and Controlling, and finally Delivering. This lifecycle does not explicitly include a section for the initial or ongoing support of a product.

### Defining Project Success

A substantial body of research has examined the definition of success for IT projects (Wateridge, 1998; Jugdev and Muller, 2005; Thomas and Fernandez, 2008). A recent study (Rosaker and Olson, 2008) measured success in the implementation of projects at state IT departments using a five point scale:

1. The project must have been completed in a timely manner
2. The project's overall cost[s] must have been within budget constraints
3. The implemented solution must have features and functionality requested by the end user
4. Use and Adoption
  - a. The project will be used by its intended clients
  - b. The project will have a positive impact on those who make use of it
5. Overall satisfaction

The first three points of the scale above refer directly back to the iron triangle factors in the PMI project definition. They measure only the success of completing the project, not the use of the product. The last two points, however, indicate a potential gap within the PMI structured definition. Such scales lead to the perpetual tension between the project management process and the delivery of the IT solution: Whereas the project management system is typically distinct and separate from the product delivered, the delivered product will be measured against the metrics available through the project management methodology, requiring a rigorous analysis of and adherence to strict timelines.

Project lifecycle management dictates that successful projects meet the requirements of the project requestors. Any deviation, positive or negative from this beginning point of defined project requirements, is by definition not delivering on expectations (Project Management Institute, 2004). As the logic goes, a project that delivers above the requirements included extra time for the development and implementation teams, and therefore over budget on time and cost; conversely a project that under delivers is not fulfilling the user's base expectations.

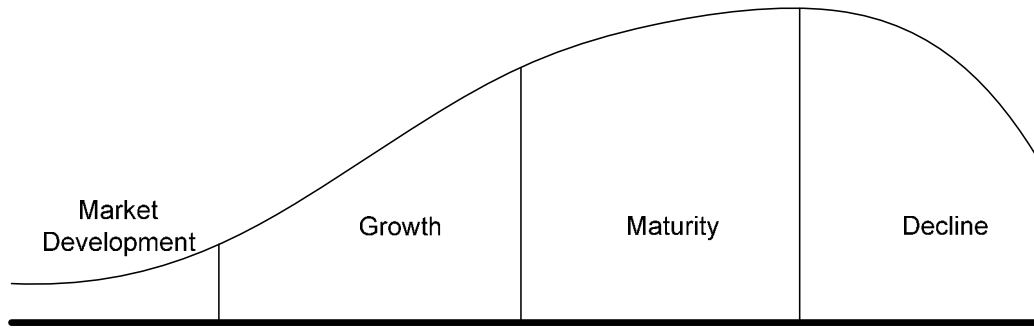
### PRODUCT LIFECYCLE ANALYSIS

Levitt (1965) characterized the development and formalization of a product lifecycle with four stages: Market Development, Growth, Maturity, and Decline. The concept behind a Product Lifecycle is that the inherent value of a product is derived from usefulness to the person or group adopting the product. The length, duration, and slope of the curve is not arbitrarily determined by external budgetary constraints or spuriously correlated to competing project concerns from elsewhere. It is directly attributed to the factors of a product defined as "its complexity, the degree of newness, its fit into customer needs, and the presence of competitive substitutes" (Levitt, 1965). Figure 2 depicts the product lifecycle.

It is important to review the factors of a product and identify how they relate to the IT environment. In most corporations where there is an internal IT staff, there are no competitive substitutes. IT departments have traditionally controlled the technical landscape and as such dominate the implementation/development of new solutions.<sup>1</sup> For the sake of this discussion, we will assume that the IT department controls the infrastructure and therefore competitive substitutes remain level.

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<sup>1</sup> This assertion has become problematic with the widespread corporate adoption of tools like Microsoft Access and Microsoft Excel. Home departments have developed mission critical applications with such tools, with little to no involvement of the IT department.



**Figure 2 - Product Lifecycle Phases**

IT solutions have a reputation of being far too complex for the typical end user. There are often features users do not want, and too many defects in what is delivered (Platt, 2006). A difficult balance must be struck between creating a complex solution that can never be adopted because it is never finished, and one that is so cumbersome that the user physically cannot adopt it (Levitt, 1965). Here, the driver is the cooperation of the user community with the IT staff. The key to the application of the product lifecycle is the creation of a product that fulfills the architectural and technical demands for short and long term maintenance, while still meeting the needs of the user (Platt, 2006).

Product Lifecycle Management has traditionally been employed for the improvement, augmentation, or extension of a market (i.e. Jell-O, nylons, etc.) (Levitt, 1965). Recently, however, product management has been introduced into more complex industries such as manufacturing. This has been driven by the ever increasing competitive nature of today’s global market, and the subsequent need to produce a wider variety of products in a shorter amount of time (Qian and Ben-Arieh, 2008). It would not be a far leap to equate the increased pressure to deliver applications from an IT department, to the increased pressure to deliver new, diverse products within the manufacturing world.

The usefulness of the product lifecycle curve comes in the ability to better understand the longevity of a technology-based application. The product lifecycle provides insight into the overall use of an IT application, rather than simply the development and delivery of that application.

**Project Management vs. Product Management**

On the surface, project and product management are similar philosophies with similar sections in their lifecycle. Table 1, however, clarifies the differences between the two lifecycles.

	<b>Product Management</b>	<b>Project Management</b>
<b>Life Cycle Sections</b>	Development Growth Maturity Decline	Initiating (Defining) Planning Executing/Monitoring and Controlling Delivering
<b>Common Success Measures</b>	Customer satisfaction Cost effective Reaches pre-defined targets such as intended value or market share	Delivered on time and within budget Meets pre-defined requirements Customer satisfaction
<b>Time when success is measured</b>	Ongoing over the life of the product	At the time of initial product delivery

**Table 1 - Product Management vs. Project Management**

Despite their similarities on the surface, the two philosophies are distinctly different. The project lifecycle is geared around the completion of a discrete deliverable based on time and budget. The project lifecycle focuses on the delivery of a project rather than the ongoing use of that product. Product management, on the other hand, encompasses the entire lifecycle of the

product focusing on the actual long-term use of that product. The importance in this distinction comes in the ability to quantitatively measure success for each strategy.

The purpose of this research is to explore whether the project or product lifecycle is a better fit for understanding and evaluating the effectiveness of an IT application implementation. The research questions addressed in this paper are:

RQ1: Do IT projects fit the conventional definitions for project and/or product life cycles?

RQ2: Does the trend within IT departments toward using project management methodologies affect the scheduling of resources and completion of projects?

**ANALYSIS SCOPE AND RESEARCH DESIGN**

This exploratory analysis focuses on the IT departments within larger organizations and the projects which they deliver to the organizational body. The data collected from the companies had to meet the following criteria for inclusion in this analysis:

1. The project must have been completed;
2. The project metrics per project phase must be available; and
3. At least three months of post go-live activity was recorded.

Data were collected from two organizations: One was a for-profit manufacturing company and the other a non-profit governmental entity. The data were collected by the use of semi-structured interviews with the management staffs of the two organizations and the use of a questionnaire to gather background information.

Company 1 (non-profit)			Company 2 (for-profit)			Average
Departmental Work Week (h) 40			Departmental Work Week (h) 40			40
Current IT size (people) 42			Current IT size (people) 121			74.500
Low		High	Low		High	
Overtime (% of standard)	0.11	0.20	Overtime (% of standard)	0.11	0.20	0.1550
Support Activities (% of standard)	0.51	0.60	Support Activities (% of standard)	0.61	0.70	0.6050
Current IT Hours available (total/w)			Current IT Hours available (total/w)			
	1520	1520.00		4440.00	4440.00	2980.0000
Current IT Hours including OT (total/w)			Current IT Hours including OT (total/w)			
	1687.20	1824.00		4928.40	5328.00	3441.9000
Support hours (total/w)			Support hours (total/w)			
	860.47	912.00		3006.32	3108.00	1971.6990
Average Simultaneous Projects per Organization			Average Simultaneous Projects per Organization			
	5	10		5	10	7.5

**Table 2 - Collected departmental data<sup>2</sup>**

Table 2 provides information about the relative size of the two organizations. The data are segmented into two sections: company centric data and project data. For the company information, the determination was made that it would be necessary to understand both the relative size of the IT department, and the general working conditions. These conditions include standard work week, overtime expectations, support hours, simultaneous projects.

<sup>2</sup> “Low” and “High” designate the low and high bar estimates provided by each company

**Projects Studied**

Data from five projects were collected: two from the non-profit organization, and three from the for-profit company. These projects were a mixture of COTS (Commercial-Off-The-Shelf) implementation, custom software development, and infrastructure projects. Table 3 provides data about the duration of the five projects as well as the average allocation of hours spent on each.

Project Name	Organization Type	Project Duration (in weeks)	Average Hours Spent (per week)
Project 1	Public	120	300
Project 2	Public	24	300
Project 3	Private	40	500
Project 4	Private	40	720
Project 5	Private	54	100
Total/Average	N/A	55.6	384

**Table 3 - Project Resource Duration and Allocation**

Project duration was collected directly from the organizations. Resource hours average is a calculated value based on the project resource range collected from the survey, multiplied by the standard work week defined by the respondent (see Table 4 – Departmental Work Week). The resource high/low range is a factor of the changing nature of resource counts during the lifetime of a project (estimated factor).

**Resource Allocation per Segment of the PMI Lifecycle**

Respondents were also asked to detail the allocation of resources during the phases of the PMI project lifecycle, as a percentage of the overall project duration, as shown in Table 4.

	Project 1	Project 2	Project 3	Project 4	Project 5
Initiating	10%	10%	5%	5%	5%
Planning	50%	30%	25%	25%	10%
Executing	25%	40%	55%	55%	75%
Monitoring and Controlling	10%	10%	10%	10%	5%
Delivering	5%	10%	5%	5%	5%
Total	100%	100%	100%	100%	100%

**Table 4 - Project Resource Allocations per PMI Lifecycle Segment**

Average Allocations (Percentages)		Average Duration (weeks)		Average Allocations (Hours/week)	
Initiating	7%	Initiating	4	Initiating	26.88
Planning	28%	Planning	16	Planning	107.52
Executing	50%	Executing	28	Executing	192
Monitoring and Controlling	9%	Monitoring and Controlling	5	Monitoring and Controlling	34.56
Closing	6%	Closing	3	Closing	23.04
SUM(Project 1 Phase : Project N Phase)/ Project Quantity		Average Allocation per Phase * Average Project Duration <sup>3</sup>		Average Allocation per Phase * Average Project Resource Allocation <sup>4</sup>	

**Table 5 - Calculated Averages across all respondent projects collected**

Using the resource allocation per project and PMI lifecycle segment, we derived the average allocation across all the projects, the average duration of the phases by weeks, and the average allocations (hours/w) per PMI Lifecycle section as shown in Table 5. The calculations used are provided in the last row of Table 5.

**Resources used in Post Implementation Support**

The respondents were asked to provide a monthly breakdown of the hours spent per project on support after implementation, as a percentage of project duration. This means that if there were 100 hours assigned to the project during an average month in the project phases, a response of 50% would equate to 50 hours spent on support after the implementation of the solution for the given support month. Table 6 provides a breakdown of support hours per month per project.

Month	Project 1	Project 2	Project 3	Project 4	Project 5
1	30.00%	30.00%	40.00%	40.00%	50.00%
2	30.00%	30.00%	30.00%	30.00%	50.00%
3	30.00%	30.00%	10.00%	10.00%	40.00%
4	20.00%	20.00%	5.00%	5.00%	30.00%
5	10.00%	20.00%	0.00%	0.00%	20.00%
6	10.00%	10.00%	0.00%	0.00%	10.00%
7	5.00%	0.00%	0.00%	0.00%	10.00%
8	5.00%	0.00%	0.00%	0.00%	10.00%
9	0.00%	0.00%	0.00%	0.00%	10.00%
10	0.00%	0.00%	0.00%	0.00%	5.00%
11	0.00%	0.00%	0.00%	0.00%	5.00%
12	0.00%	0.00%	0.00%	0.00%	5.00%

**Table 6 – Surveyed Support Percentages Post Project Implementation**

Additionally, the respondents also stated that their organizations were working on approximately 5-10 new projects at any given time, not including standard support cases and issues.<sup>5</sup>

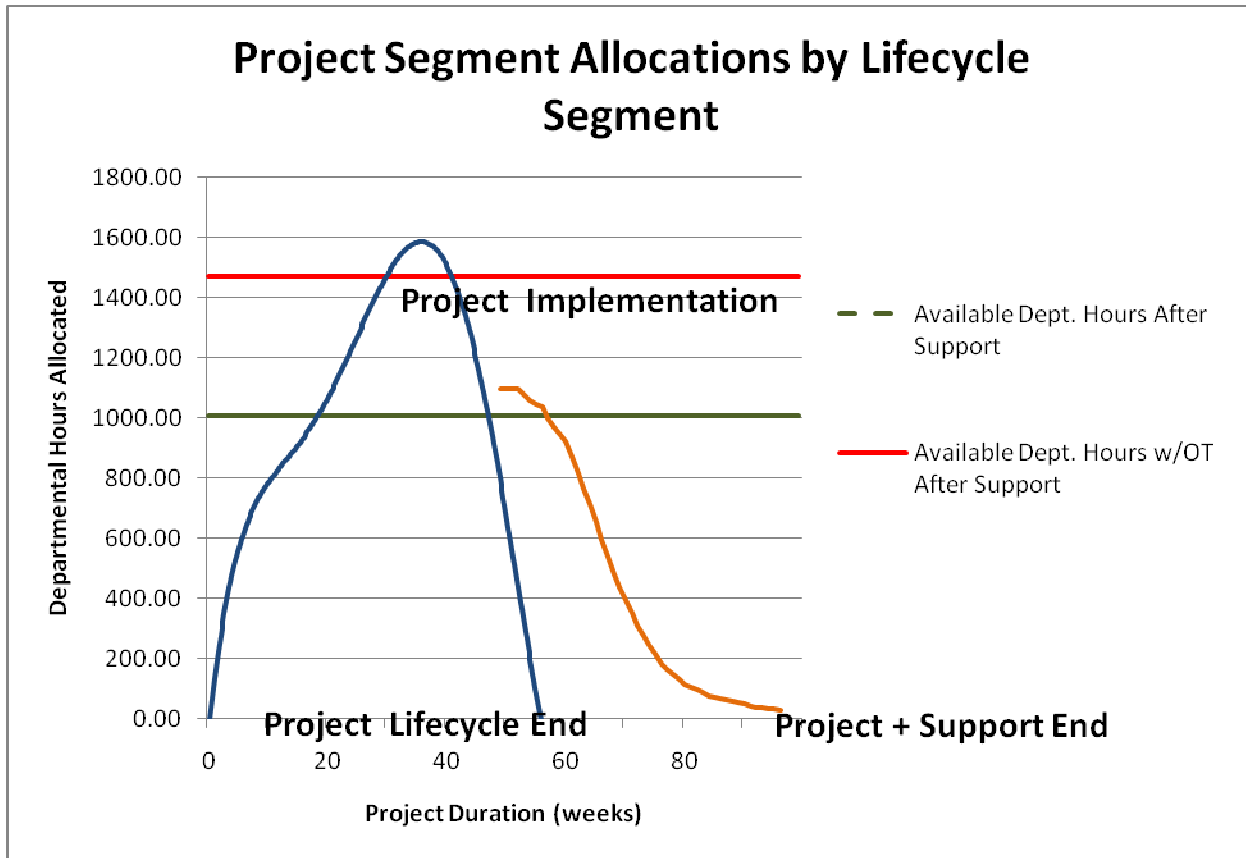
<sup>3</sup> See Table 2

<sup>4</sup> See Table 2



**Project/Product Lifecycle Determination**

With this data, it is possible to model the situation for a single average project, but more importantly to identify how an average portfolio stack of 7.5 projects would behave during each point in time.<sup>6</sup> The subsequent project curve utilizes the average rate calculations from the above tables.



**Figure 3 - Project Segment Allocations**

Figure 3 represents the 7.5 projects occurring concurrently for the average duration and allocation per PMI segment. It is possible to see from this graphical representation that with the average number of projects being implemented simultaneously, the organizations must utilize the overtime block to complete scheduled work. Additionally, the findings show that the Post Implementation support pulls the actual completion timeframe far beyond the expected average, from 55.6 weeks to over 80 weeks.

Upon examination of Figure 3, it is easy to see the similarity between the resultant curve and the PMI curve. Each has a roughly skewed bell curve type of shape, allowing for the concentration of time to be spent in the Executing phase. Table 4 shows that nearly twice as much time is allocated to the Executing phase, than the nearest other phase, which is Planning.

Also of note is how the project curve shows that the respondents considered the projects closed before the completion of required support. Additionally, support trails to nearly nothing after 7 months, with 3 of the 5 projects stating there was no support after 7 months, and 4 of 5 listing no support after 9 months. Only one of the projects listed any support time one calendar year after implementation.

Although there is no individual project support hours listed, the department says that an average of 60% of total personnel hours is spent on project support (see Table 2). Yet, if the support time isn't being allocated to the implemented solution, what is it being spent on? How is it possible that projects that incur no support one year after implementation still create an

<sup>5</sup> Support work was defined as non project work for the purpose of this analysis; see table 1

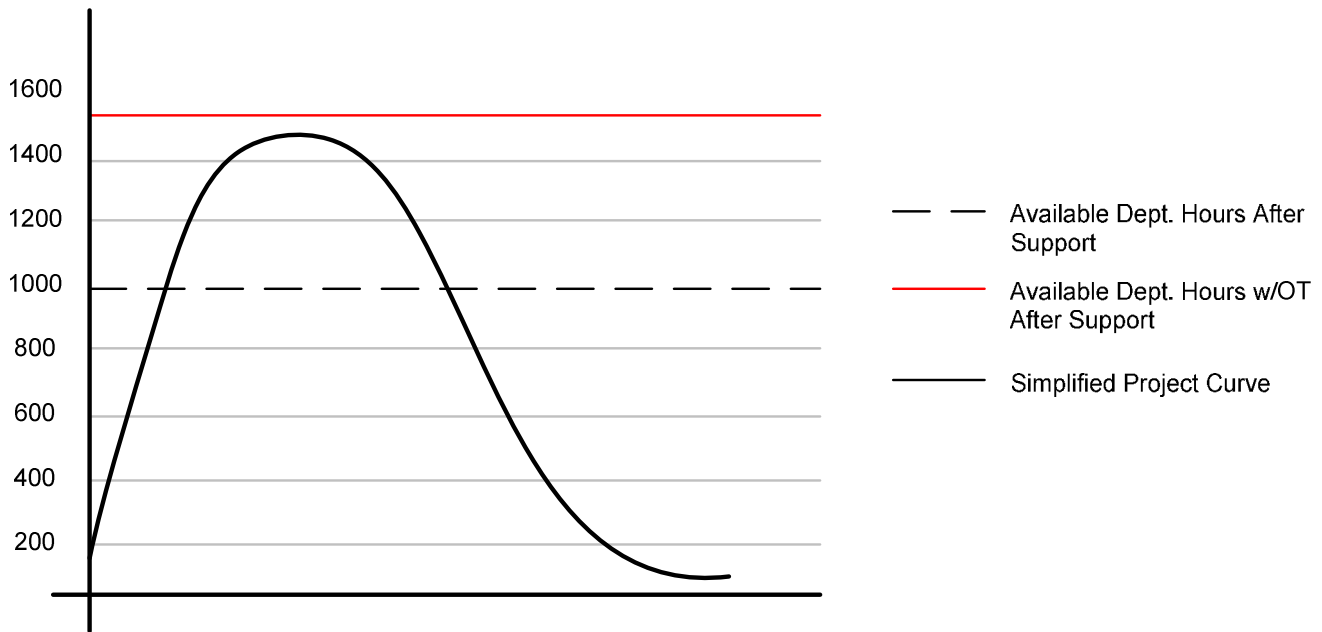
<sup>6</sup> Note that the 7.5 average projects is based on each of the two companies responding that they run approximately 5-10 project simultaneously

aggregate 60%-70% support baseline for the IT department? An explanation for this phenomenon is that support is not allocated to a given project, but instead is allocated to a new category of “general support.” Thus, hours required to complete support activities are never tracked back to the project that actually required the support.

The scheduling of additional projects does not take into account the existence of this support activity after the implementation of projects. According to one manager, in many ways, this support work is considered, “off the books” and “non-value add”. Furthermore, the support incurred by the additional solutions yields additional support which then further drains IT resources.

**Portfolio Structure – A theoretical construct**

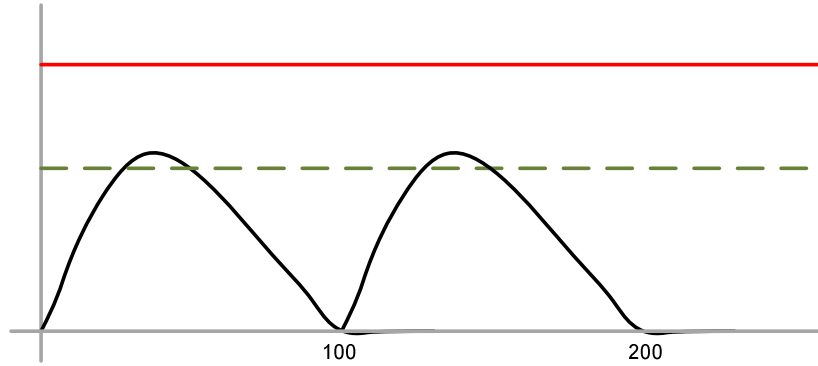
Despite the fact that the respondents did not consider the post implementation support as a portion of the actual project deliverable, project and post implementation support will be represented as a single curve for the remainder of the analysis as shown in Figure 5.



**Figure 4 - Simplified project lifecycle curve with Post Implementation Support**

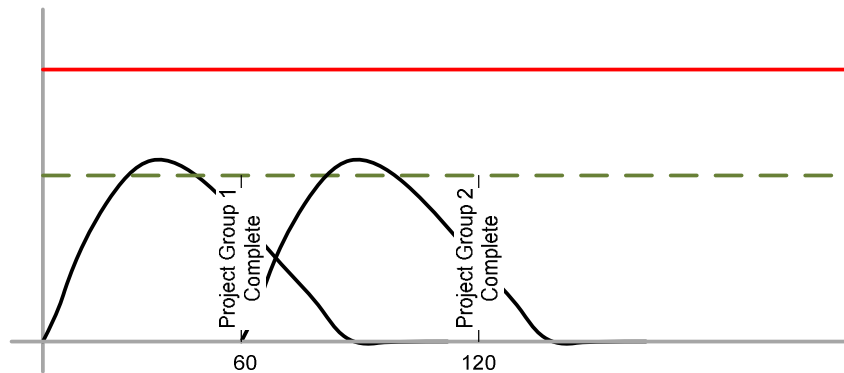
Utilizing the above project curve derived from the findings (shown in Figure 4), it is possible to extrapolate the following theoretical portfolio structure progression. This model helps to explain how the IT departments may have found themselves in the current support backlog.

Given the curve shown in Figure 4, it would then be expected that the portfolio planning would follow the subsequent pattern:



**Figure 5 - Consecutive scheduling of project groupings**

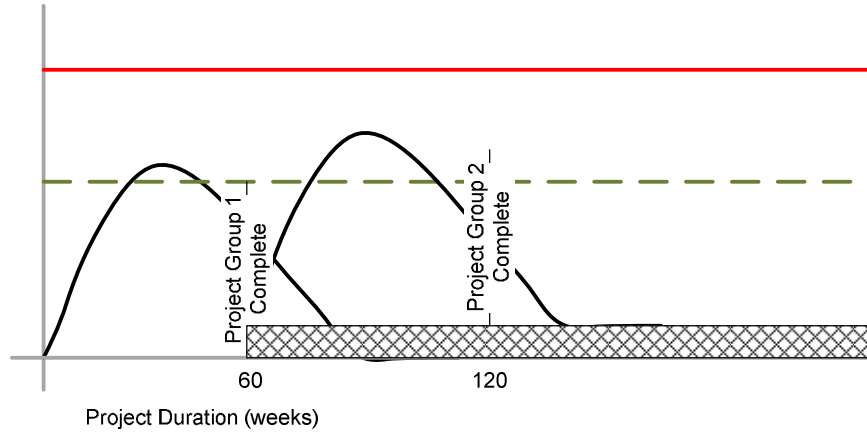
However, as project support is not considered as part of the general lifecycle, the resultant allocation looks more like this (Figure 6):



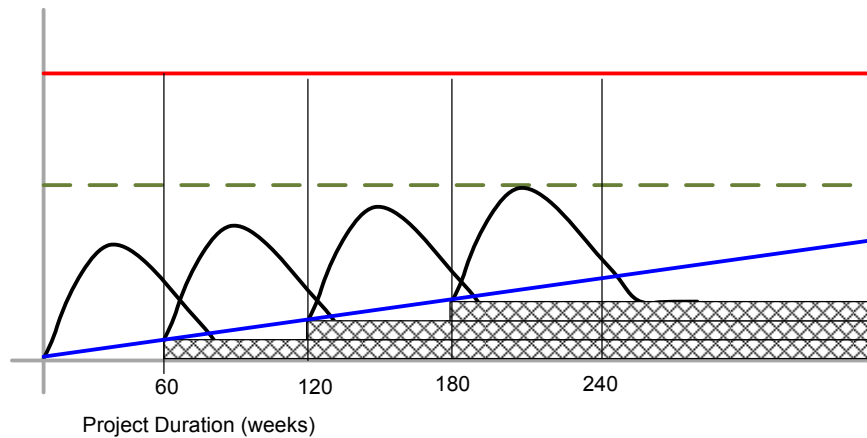
**Figure 6 - Overlapping project grouping scheduling**

This is due to a lack of acceptance that post go live support is in fact an official part of the project lifecycle. Resources are therefore assigned to projects after the final phase of the project lifecycle, rather than after the successful decline of a product cycle. The result is an unaccounted overlap of resource allocations, which compound from project to project. In time, this unallocated time adds to the existing support burdens. This unallocated time could be the unexplained gap between the total regularly scheduled time and the total overtime hours.

The accumulation per project lifecycle differentiation can be seen as an additional “step” of hours upon which the project works sits (Figure 7). This can be done because we assume that the support incurred is a result of the project implementation. If each project group creates support which must be addressed by existing IT personnel, thus removing available work hours from the pool, then the subsequent project group does not start at the base line of hours, but rather “steps up” from the base, and starts from the new baseline (base + support). Following the construct where each project cycle is the accumulation of the average quantity of simultaneous projects, it is possible to then expect that the support incurred after each implementation would be similar.



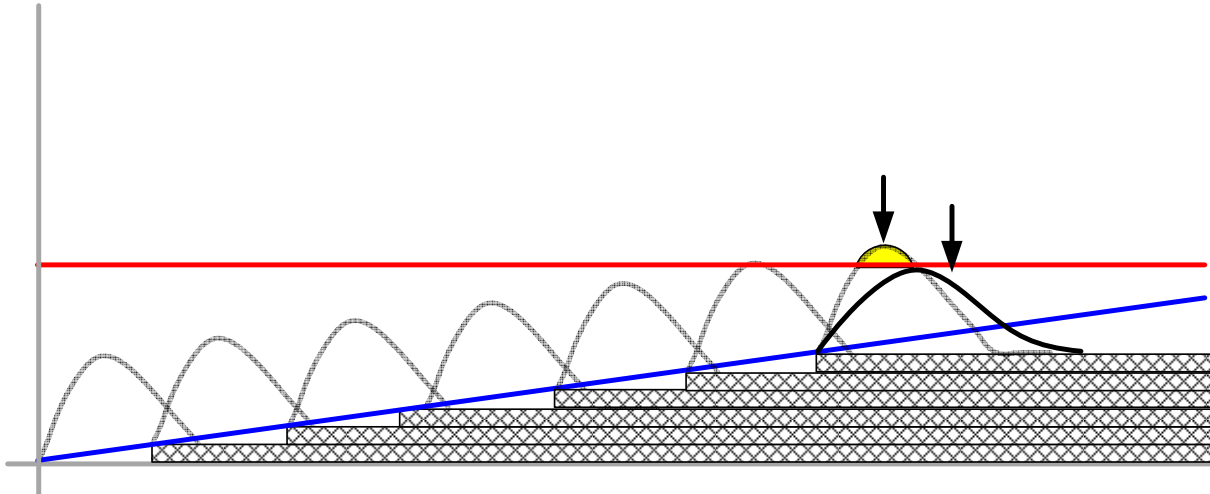
**Figure 7 - Project scheduling - example of first incremental support step**



**Figure 8 - Project scheduling - sample of year over year support**

This cycle will continue until such a point where the hours available per project are less than the required hours for completion (Figure 8). Assuming a cost averse organization, a project will need to adjust one of the other two factors in the iron triangle (i.e. time or quality). If we further assume that the organization will be unwilling to falter on the other given assumption requiring the project to fulfill a given corporate goal and requirement, then the only constraint that can be adjusted is time.

This process results in a flattened product lifecycle curve as shown in Figure 9.

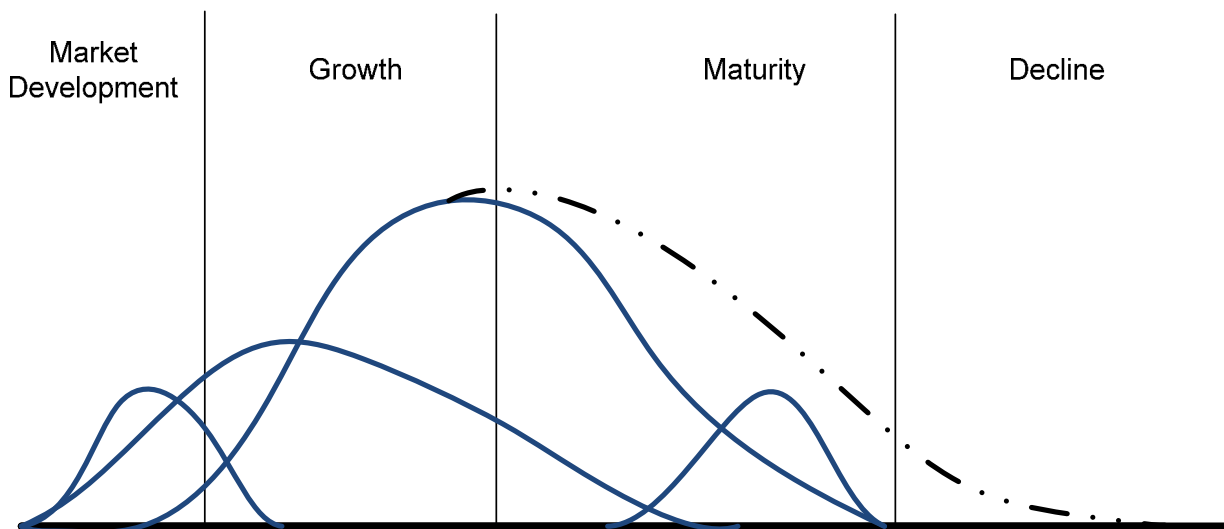


**Figure 9- Project Scheduling - the flattening of the project curve**

The amount by which the affected project curve is adjusted is a factor of the duration and budget of the impacted project and product.

The logical implication is that this would lead to situations where a project curve would eventually flatten, leading to a never ending project. Such a situation, while unlikely because of corrective action that would undoubtedly be taken by the IT management staff, would be the extreme scenario which would demonstrate the extreme case of this theory.

To combat this deficiency, it is proposed that there be a fusing of implementation curves (project management) with undefined duration post implementation support (product management) thereby creating this new hybrid construct of the IT product curve (Figure 10). This new IT product curve is defined by the project lifecycle steps, but includes the undefined factors of the product curve: maturity and decline, represented by the dotted line. These two last phases have a market driven lifespan which falls outside the influence of the project management schedule. The continuation of the project lifecycle therefore allows IT management to attribute support activities back to the specific product implementation.



**Figure 10 - Project/Product Hybrid**

It is important to discuss the behavior of the maturity and decline phases. In Figure 10, the phases have been represented as a finite curve which follows the current, collected post-implementation time line data. However, the intent of this curve is not

to rigidly follow the typical project management methodology. It is important to note that this curve is intended to be boundless, much like the product lifecycle curves. This allows further enhancements and support hours to be allocated directly to the product, rather than falling outside the tracking systems.

This new hybrid curve allows for the cost estimation and progression required by management during the implementation phase, and the care and feeding of the product requested by the user community.

### **Project Life Cycle as IT Departmental Construct**

The success metric of a project is only an IT departmental construct, one which CIOs can compare notes and see the respective successes and failures of project delivery within their organizations. The product and its functional state as measured by business conditions is the concern of the core business. For IT departments, the true value gained from project success comes from the analysis and cataloging of lessons learned for the purpose of creating a learning organization.

In the final analysis, does the “success” metric for projects really lead toward the improvement of the IT organization itself? This paper would submit that it does not. Sustained success comes not from the assignment of blue ribbons and gold stars for the meeting of arbitrary deadlines and cost estimates, but rather from the successful implementation of a product that moves the parent company forward toward their stated business goals. The project is a means to the end. The end is to deliver a successful business solution. The success is not the project; the success is the product.

### **CONCLUSION**

This exploratory analysis looked at whether a project or product lifecycle is a better fit for understanding the implementation of IT products. The process by which the increasing demands of support cause an inevitable shift in timeline for future implementation projects was also presented. This analysis showed that a hybrid model that includes ongoing support provides a better explanation for the unique attributes of an IT product.

While this exploratory analysis lays the groundwork for discussion, further data must be gathered to better understand the lifecycle of an IT product. Specifically, additional research needs to be conducted into the relationship between the support work after the project and the ceiling of work time available. It is especially important to identify support work and attribute it to a given project to get a complete picture of the resources required to implement an IT product.

It is important to note that with the current economic realities, IT departments will need to become smarter and more agile with their existing budgets. Moving away from a strict project implementation lifecycle and adopting a product management model is one way to more accurately represent the work being performed by the IT staff, and account for required support. Direct attribution of support back to an implemented project allows for greater accountability of not only the specific resource, but also the stability and worth of the solution itself.

By better depicting the true lifecycle, it should also force a deeper analysis of existing IT products and how they may be optimized, consolidated, or otherwise retired. If the majority of time within the IT department is spent on the support of existing solutions, the retirement of existing solutions creates cost savings far beyond the direct licensing and support contracts for the products and creates opportunity for newer solutions by increasing available project time.

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