The Impact of The Planning Phase Survey Summary

Introduction

Background

Traditional wisdom is that planning and analysis are very important and the more there is in a project, the more successful the project will be, Wang, and Gibson (2008) , Dvir, Raz and Shenhar (2003). Time spent on these activities will reduce risk and increase project success. On the other hand, inadequate analysis and planning will lead to a failed project, Morris (1998), Thomas, Jacques, Adams and Kihneman-Woote (2008).

If poor planning has led to failed projects, then perhaps billions of dollars have been lost, Sessions (2009). But how much is too much? “Light weight” project management techniques such as Agile are gaining popularity. Part of their ethos is that less initial planning is better and an evolutionary process is more efficient.

Project Success

Before it is possible discuss the impact of the project planning phase on success, it is useful to define what a successful project is. Shenhar, Dvir, Levy and Maltz (2001) define four levels of project success:

1. Project efficiency
2. Impact on the customer
3. Business success
4. Preparing for the future

Thomas, Jacques, Adams & Kihneman-Woote (2008) state “Examples abound where the original objectives of the project are not met, but the client was highly satisfied.” as well as the reverse (p. 106). While the measure of project success has focused on tangibles in the past, current thinking is that

ultimately, project success can best be judged by the judgment of the primary sponsor. Cooke-Davies (2002) makes a similar point. Therefore we will refer to:

project efficiency – meeting cost, time and quality goals
project success – meeting wider business and enterprise goals

Zwikael and Globerson (2006) however state that efficiency and success are often correlated as do Dvir, Raz & Shenhar (2003).

Project Planning

Mintzberg (1994) describes planning as the effort to formalizing decision making activities through decomposition, articulation and rationalization. In construction, Pre-project planning is defined as the phase after business planning where a deal is initiated and prior to project execution, Gibson and Gebken (2003). Another definition of planning is "what comes before action", Shenhar (personal communication, 2011).

For the purpose of this review, we will use these definitions:

Planning Phase: The phases and associated effort that comes before execution in a project.

planning effort - The amount of effort in money or work hours expended in planning

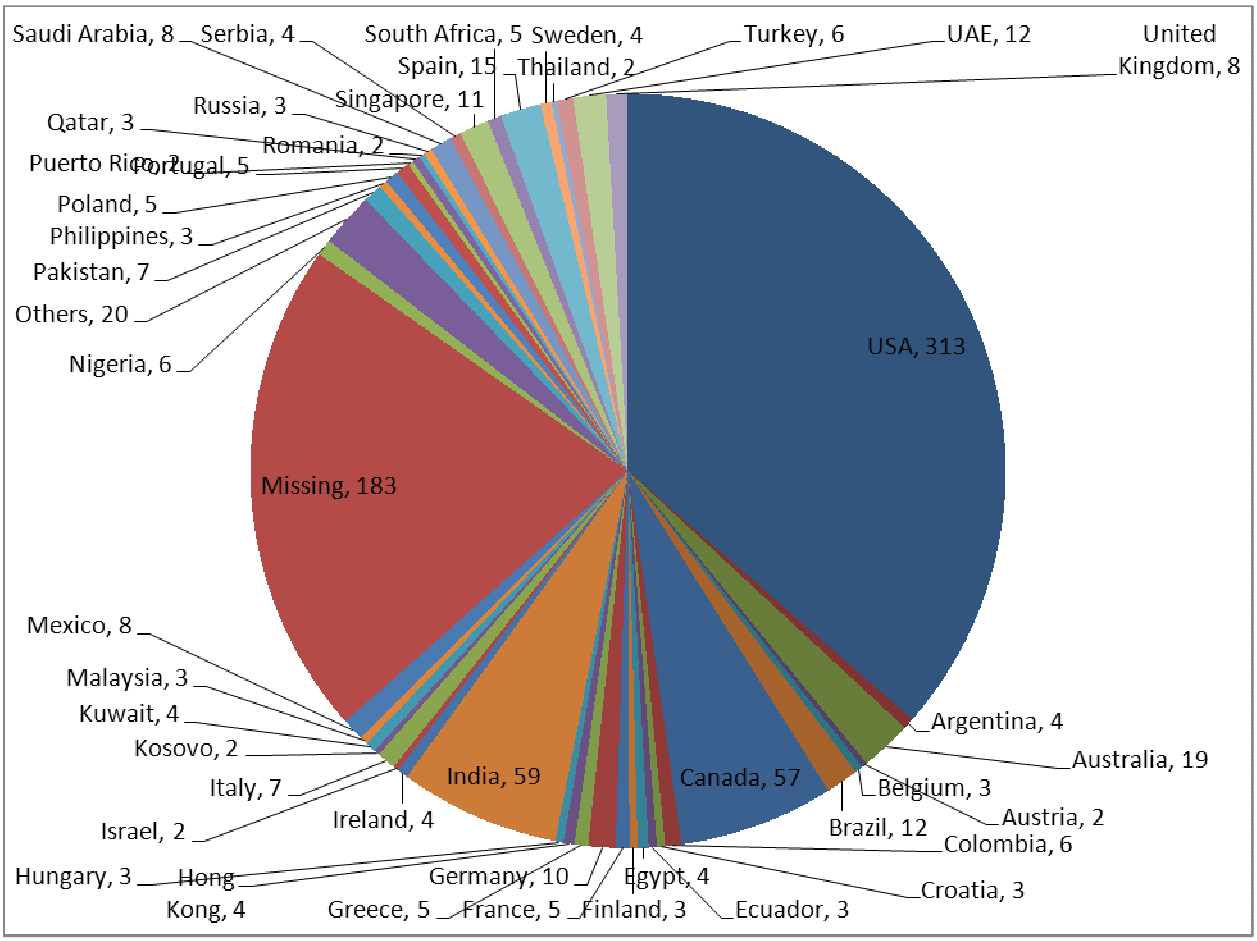
Results and Analysis

Data collection commenced on October 29, 2011 and was completed January 31, 2012 for a collection period of approximately 12 weeks. A total of 865 people started the survey with 859 completing at least the first portion of it which requested information on one more successful project. Each participant was asked to provide data on two projects, one more successful and another less successful. However, not all

participants entered data for two projects; therefore the total number of projects available for study was 1539. After removal of outliers and bad data, the usable total was 1,386 projects.

Below is a breakdown of the country of the respondents. For purposes of this study, this refers to the country where the respondent currently resides. Some chose not to respond to this question as all demographic questions were optional.

Figure 1 – Reported country of origin of respondents



We can see that a large percentage of respondents were from the USA (36%) but there is still a global level of participation in the survey with India, Canada, Australia, Spain, Brazil, Singapore and Germany having 10 or more respondents. The group labelled as others, consisted of 20 countries and contains one response each from: Bulgaria, China, Costa Rica, Ethiopia, Iran, Jamaica, Japan, Jordan, Lebanon,

Mongolia, Norway, Sri Lanka, Sudan, Switzerland, Syria, Taiwan, Ukraine, Venezuela, Vietnam and Yemen.

We now created some indexes and factors to facilitate the analysis.

Table 1 – Summary of indexes and factors

	Description
Planning Effort Index	Ratio of effort spent on planning phase compared to overall project effort.
Efficiency Factor	Summated scale of the time, budget and scope success of the project. (1-7)
Success Factor	Summated scale of the success of the project as reported by sponsors, clients, team and end users. (1-5)
Overall success Factor	Summated scale of the success of the project including the efficiency variables, success variables and project manager's assessment. (1-5)

The means of these factors were reviewed. First the success factors were compared based on industry. In addition, to the three calculated success factors above, the respondents' single question "Project Success Rating" was examined.

Next, the success factors were examined using subgroup analysis.

Table 2 – Descriptives by industry with ANOVA results

	Methodology type	**Planning effort index**	**Overall Success factor**	**Project success rating**	**Efficiency factor**	**Success factor**	**Valid N**
Construction	4.278	0.146	3.486	3.528	4.630	3.660	41
Financial services	4.092	0.133	3.328	3.355	4.618	3.354	257
Utilities	3.848	0.145	3.349	3.455	4.535	3.553	42
Government	3.385	0.126	3.382	3.423	4.731	3.438	152

Education	3.800	0.132	3.410	3.480	5.080	3.530	42
Other	3.904	0.140	3.284	3.231	4.455	3.233	157
High technology	3.649	0.123	3.401	3.477	4.784	3.538	223
Telecommunications	3.539	0.170	3.419	3.393	4.805	3.458	133
Manufacturing	4.214	0.132	3.214	3.286	4.298	3.295	122
Health care	3.789	0.145	3.408	3.303	4.895	3.408	113
Professional services	3.944	0.139	3.328	3.352	4.685	3.292	69
Retail	4.100	0.173	3.151	2.933	4.367	3.000	35
All Groups	3.838	0.138	3.347	3.361	4.656	3.397	1386
p(F)	***0.000***	***0.010***	***0.689***	***0.882***	***0.397***	***0.496***	

The ANOVA results show a significant p value for methodology type and planning effort index. This shows that planning and methodology varies with industry. We can see for example, that construction has both the lowest rate of use of agile methods but has the highest project success factor. This is in agreement with the literature review results in general that the construction industry had better quality of planning and better rates of success than other industries studied (Zwikael & Globerson, 2006). Since agile is a methodology originating in the software field (Dybå & Dingsøyr, 2008), it is not surprising that construction has one of the lowest rates of adoption of agile/iterative methodologies. High technology and government report the highest rate of agile projects and the lowest amount of upfront planning. This may be related to high amount of planning inherent in agile and the lesser amount of planning require upfront (Smits, 2006). Telecommunications reports the highest percentage of planning effort (Planning effort index) and slightly above average efficiency and success ratings.

Table 3 – Descriptives by project location with ANOVA results

	Methodology type	**Planning effort index**	**Overall Success factor**	**Project success rating**	**Efficiency factor**	**Success factor**	**Valid N**
Indian subcontinent	3.670	0.166	3.321	3.381	4.509	3.389	97
North America	4.202	0.151	3.442	3.417	4.788	3.465	756
Africa sub-Sahara	4.622	0.216	3.200	3.108	4.441	3.243	37

Australasia	4.327	0.156	3.221	3.347	4.449	3.224	49
Artic and Antarctica	5.000	0.175	4.732	5.000	6.000	5.000	1
Europe	4.085	0.126	3.260	3.235	4.520	3.291	213
Latin America	4.373	0.157	3.071	3.096	4.233	3.099	83
Russia and FSU	3.750	0.157	3.251	3.417	4.167	3.417	12
Pacific	3.833	0.164	3.391	3.375	4.806	3.365	24
Middle East	3.854	0.186	3.251	3.232	4.431	3.320	82
Far East	4.438	0.163	3.137	2.875	4.771	3.003	32
All Groups	4.196	0.165	3.389	3.408	4.647	3.438	1386
p(F)	***0.024***	***0.000***	***0.007***	***0.053***	***0.005***	***0.020***	

It is interesting to note that planning and success rating appear to vary by region. The ANOVA results show a significant p value for all of the factors examined. Europe reports the lowest amount of upfront planning as well as below average success ratings. Africa reports the greatest amount of upfront planning and also below average success ratings. One can speculate that Africa is a more challenging environment, therefore requiring more upfront planning and having less successful projects.

Next, we review the means for scope of projects: local versus international.

Table 4 – Descriptives by local versus international projects with ANOVA results

	Methodology type	**Planning effort index**	**Overall Success factor**	**Project success rating**	**Efficiency factor**	**Success factor**	**Valid N**
One city or region	4.123	0.149	3.348	3.296	4.679	3.366	577
National	4.234	0.165	3.396	3.362	4.735	3.415	367
International	4.109	0.149	3.312	3.357	4.532	3.357	442
All Groups	4.155	0.154	3.352	3.339	4.649	3.380	1386
p(F)	***0.488***	***0.067***	***0.437***	***0.607***	***0.090***	***0.703***	

There does not appear to be strong differences between the means for this factor though national projects appear to plan the most and have the highest reported success rates. The ANOVA results confirm this with no significant p values found.

Next, the relationship between the planning effort index and the success factor was examined using subgroup analysis.

We will now examine means and complete an ANOVA analysis for planning effort index vs. the project success rating.

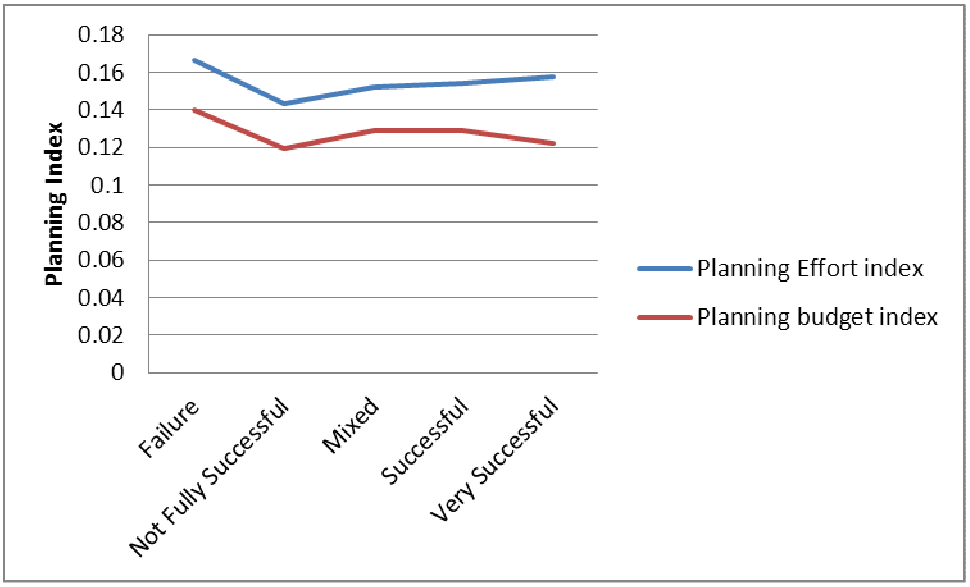
Table 5 – Planning effort index and project success rating for all projects with ANOVA analysis

	Planning effort index	**Valid N**
Failure	0.166	98
Not Fully Successful	0.143	259
Mixed	0.152	345
Successful	0.154	451
Very Successful	0.158	233
All Groups	0.153	1386
p(F)	***0.178***	

We can see that in general the planning index increases within the success category. The exception is the failure category that shows the highest mean planning effort index of any group. The ANOVA analysis does not show a statistically significant relationship.

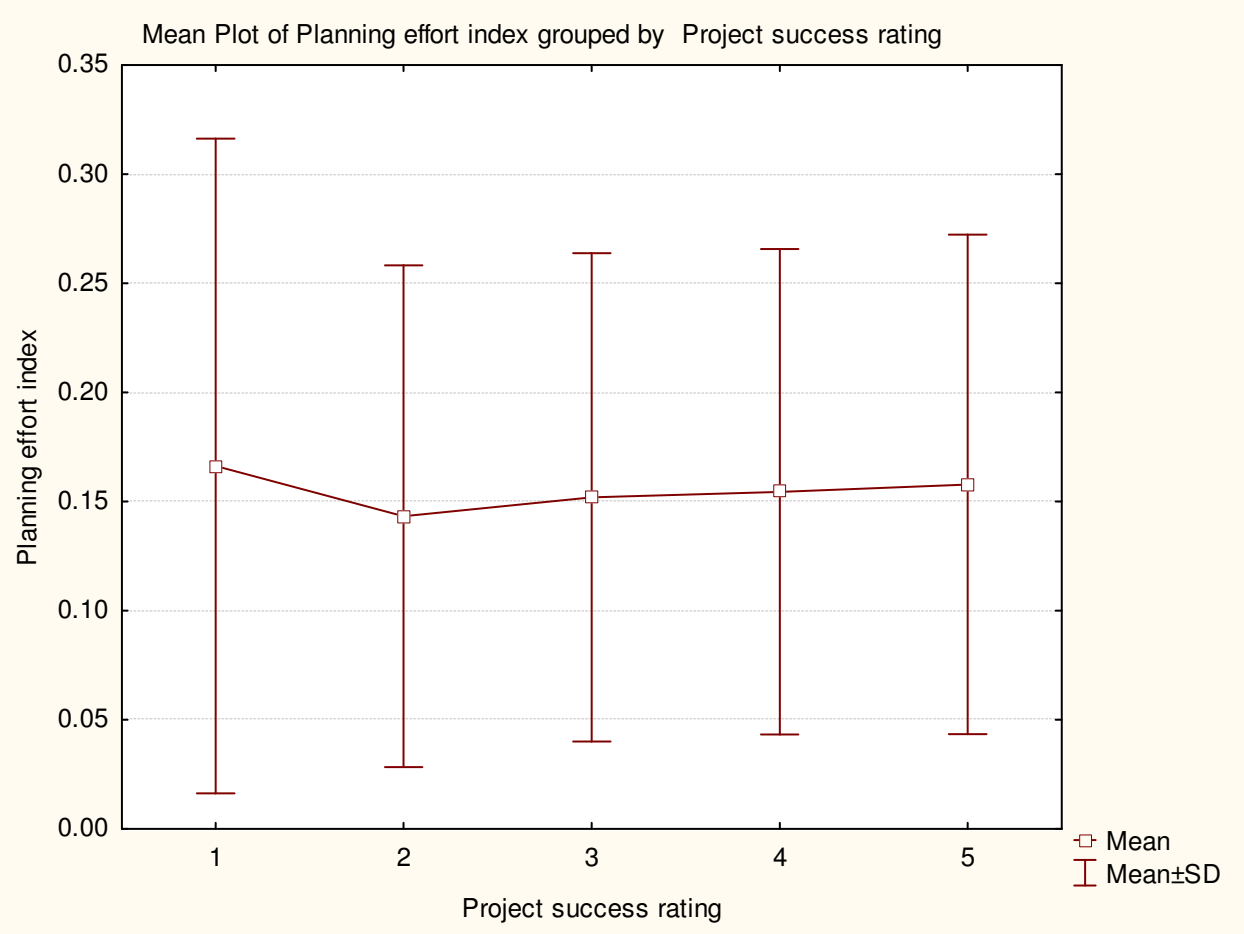
This data were now graphed to get a visual picture of the relationship.

Figure 2 – Graph of planning effort index and planning budget index versus project success rating



We can see from this graph that the trend is for very successful projects to have relatively low amount of budget spent on upfront planning though effort is reported to be slightly higher than the other categories. One can hypothesize that this may be because these highly successful projects are less complex and are familiar to the organization which require less upfront planning to complete. This relationship was further analyzed. However, the reported complexities and novelty to organization ratings provided by recipients do not seem to support this relationship.

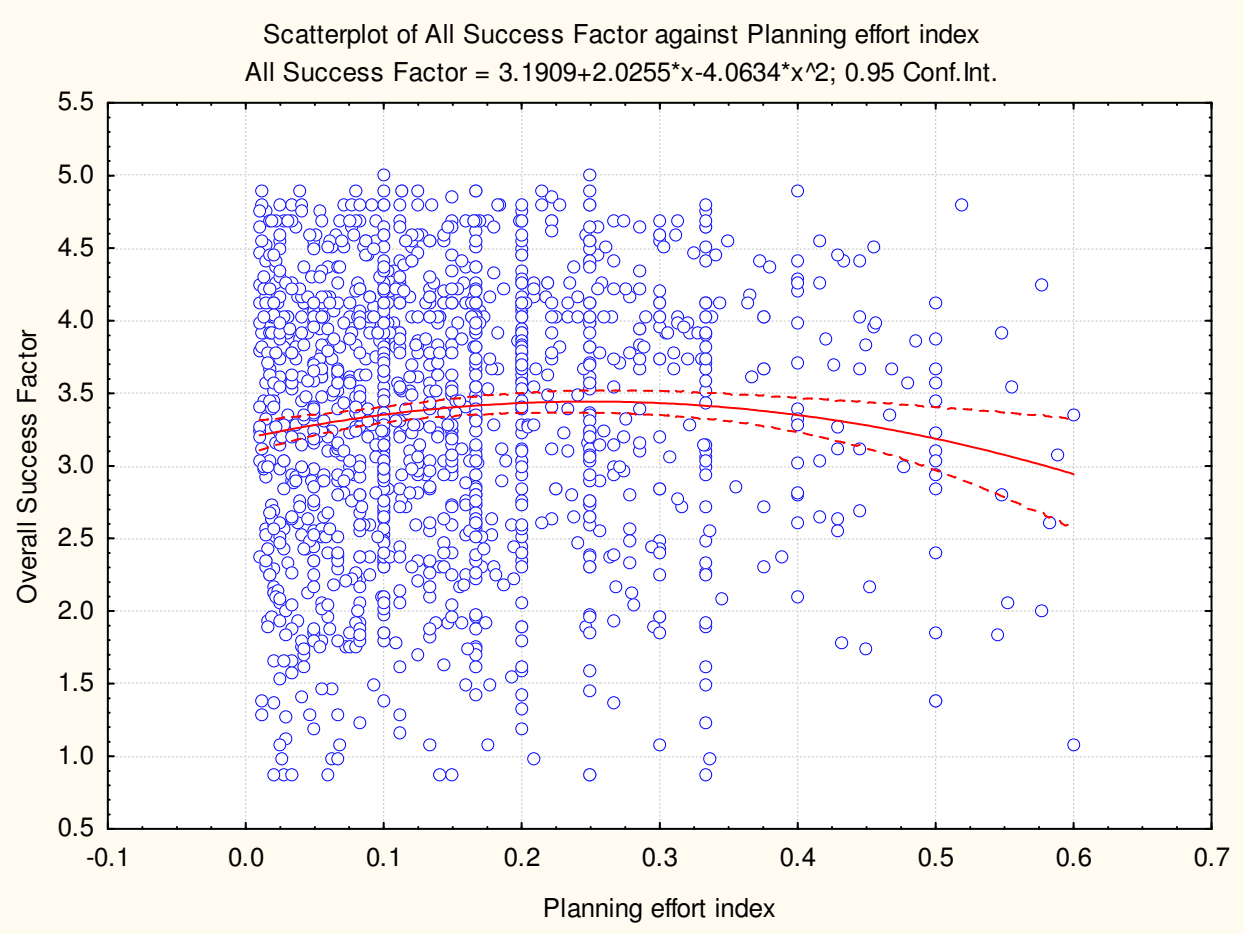
Figure 3 - Mean plot of planning effort index by project success rating with error bars



Looking at this graph, we can see the lowest amount of effort was typically spent on projects deemed not fully successful. In this case, one can hypothesize that inadequate planning impacted project success. Projects deemed outright failures reported the mean highest percentages of upfront project planning. This is an interesting finding and in keeping with the effect reported by Choma and Bhat (2010): projects in trouble may spend extra effort in the planning phase due to a very complex or challenging project or problems early in the project.

Based on the above graphs, it was decided to review the available data with an assumption that the relationship between the effort index and project success is not linear but could be polynomial in nature. The following graphs were produced.

Figure 4 – Scatterplot and curve fitting for overall success factor versus planning effort index



There is clearly a quadratic relationship between the planning effort index and the overall success factor. This fits with the logical assumption that if a project spends too much effort in the planning phase, too much of the overall budget will be spent and the project will start later than it would otherwise (Chatzoglou & Macaulay, 1996). This would make the project less successful overall. Conversely, a project that spends too little upfront time planning will be less successful also (Dvir et al., 2003). Therefore a curve fits logical assumptions and the findings of the literature review.

Further analysis was completed. Here is the more detailed analysis for the curve based on a non-linear regression.

Table 6 - Non-linear regression analysis of planning effort index versus overall success factor

Regression Summary for Dependent Variable: Overall success factor R= .086 R^2= .007 Adjusted R^2= .006 F(2,1383)=5.151 p < .0059					
	Beta	B	Std.Err. - of B	t(1383)	p-level
Intercept		3.191	0.058	55.060	0.000
Planning effort index	0.255	2.026	0.631	3.209	0.001
Planning effort index **2	-0.239	-4.063	1.352	-3.005	0.003

The overall $p < .0059$ was obtained which shows statistical significance of the polynomial model specification. The fit of this relationship is quite low with R^2 less than .01. This suggests a small causal relationship indicating that less than 1% of project success can be attributable to the amount of effort spent planning.

Optimum Planning Effort

Since there is a quadratic relationship between planning effort and success factors, it was possible to calculate a maximum to the resulting quadratic curve as per Beyer (1987).

Table 7 – Summary of main findings of calculated optimum planning index values for relationship between planning indexes and success factors

	Overall success factor	**Success Factor**	**Efficiency Factor**	**Mean**	**Actual reported planning index average**
Planning Effort index	0.255	0.248	0.250	0.251	.153
Planning Budget index	0.213	0.218	0.213	0.215	.127

We can see from this table that the optimum planning amounts are relatively consistent between the three success factors. In addition, optimum planning values were calculated on subsets of the data at various points within the thesis. The results were consistently within the .20-.25 range.

The mean project planning effort reported by respondents was substantially lower than these values at .153 of effort and .127 of budget. This confirms a view that should not be surprising to practitioners; not enough planning is being done and that if longer planning phases were the norm, there would be higher overall project success.

We now calculate the planning effort index value which maximized the success factor and efficiency factor in the same way we did for the overall success factor. Table 8 below summarizes those calculations.

Table 8 – Optimum planning effort index values by success factors

Success Measure	**Planning Effort Index Value Which Maximizes Success Measure**
Overall success factor	0.255
Efficiency factor	0.250
Success factor	0.248
Mean	0.251

These results are interesting from a number of viewpoints. They are in line with the approximately 20-33% effort spent on planning identified in the literature review (Wideman 2000; Nobelius & Trygg, 2002; Chatzoglou & Macaulay, 1996). Secondly, this result is lower than the R^2 = .33 correlation with efficiency and R^2 = .34 with success reported from the literature review meta-analysis implying that there can still be a return on investment from spending 25% of effort on the planning phase. The three results are also with .01 of each other, which helps to validate the research methodology. Finally, it is higher than the averages found in this survey as reported in Table 5.

Table 9– Summary of moderator findings for dependent variable success

Moderator	**Role versus Project Success**
Industry	Potential predictor
Geographic location	Predictor
Local vs. International projects	Predictor
Stakeholder engagement level	Independent variable
Applicability/quality of the vision statement	Independent variable
Quality of WBS	Independent variable and moderator
Methodology type (traditional vs. agile)	Independent variable and potential moderator
Novelty to organization	Independent variable
Technology level of the project	No relationship
Project length	No relationship
Project complexity	No relationship
New product vs. Maintenance	No relationship
Experience level of team	Independent variable and moderator
Internal vs. Vendor based	Moderator
Team size	No relationship

Now if we complete a regression analysis using the interaction terms from the moderator and quasi-moderator terms, we get the following results.

Table 10 - MHRA analysis for team size as moderator in the planning effort index versus overall success factor relationship

Variables entered	**Step 1**	**Step 2**	**Step 3**
Main Effects			
Planning effort index	1.972**	2.030**	13.007***
Planning effort index**2	-4.044**	-4.103**	-25.064***
Moderators			
Internal vs vendor based		.028	.010
Interaction Terms			
WBS*Planning effort index			-2.927***
WBS*Planning effort index**2			4.662***
experience*Planning effort index			-3.965***
experience*Planning effort index**2			8.944***
internal*Planning effort index			.619+
internal*Planning effort index**2			-1.330+
F for Regression	5.404**	8.510***	26.851***
R^2	***.006***	***.016***	***.144***

* p < .05
** p < .01
*** p < .001
+p<.10

We can see that through the moderator analysis a more significant relationship between planning effort and project success has been uncovered. At R^2 = .14, we have a significant relationship between planning effort and success with p <.001.

If we complete a general regression analysis with only the interaction terms, we see the following results:

Table 11 – Multiple regression of final model against overall success factor with moderator interaction terms

Regression Summary for Dependent Variable: Overall success factor R= .387 R^2= .150 Adjusted R^2= .145 p <.000					
	Beta	**B**	**Std.Err. - of B**	**t(1375)**	**p-level**
Intercept		3.222	.055	58.922	0.000
Planning effort index	-0.898	12.648	1.448	8.736	0.000
Planning effort index **2	0.629	-24.405	4.191	-5.823	0.000
WBS*Planning effort index	-0.984	-2.924	0.403	-7.248	0.000
WBS*Planning effort index**2	0.966	4.653	1.185	3.926	0.000
experience*Planning effort index	0.405	-3.960	0.488	-8.120	0.000
experience*Planning effort index**2	-0.358	8.928	1.458	6.125	0.000
internal*Planning effort index	0.405	0.713	0.178	4.011	0.000
internal*Planning effort index**2	-0.358	-1.495	0.532	-2.813	0.005

The result of this model is both a very good p value <.000 and a relatively strong R^2 = .145. Tests of residuals for this model also showed good results. Normal probability plots, p-p plots and homoscedasticity plots are included in appendix A.

This model was also regressed against the success factor and efficiency factor. The success factor produced very similar results, while regression against the efficiency factor had a good p value but a lower R^2 of .079.

Planning Effort and Project Success

This research did confirm the relationship between planning effort and project success. The initial findings were that a quadratic relationship exists between the percentage of effort spent planning and project success. This relationship showed statistical significance with a low p value but also had a low R^2 value, which showed a relatively weak relationship. After completing moderator analysis, a model was derived that showed that this relationship had an R^2 of .15, which is a notable relationship for factors in the study of project management. Projects are often large, complex efforts and any one factor that can account for 15% of that success is therefore important.

Below is a summary of the findings.

Table 12 – Summary of main findings of binomial relationship between planning indexes and success factors

	Base			**Moderators included**		
	Overall success factor (R^2)	**Success Factor (R^2)**	**Efficiency Factor (R^2)**	**Overall success factor (R^2)**	**Success Factor (R^2)**	**Efficiency Factor (R^2)**
Planning Effort index	.006**	.006**	.003*	.145***	.142***	.079***
Planning Budget index	.006*	.003	.009*	.083***	.074***	.060***

* $p < .05$

** $p < .01$

*** $p < .001$

From this table, we can see that with the moderator analysis complete, we have both a model with a better fit as well as higher statistical significance. This shows even more statistical significance for the full model including moderators. We can see from the table that the planning effort has a stronger relationship with success than does the planning budget. This is to be expected as budget includes material and equipment, which clouds the overall planning percentage since planning is almost completely a staff cost (Pinto & Prescott, 1988; Hamilton & Gibson, 1996). As well, the planning effort has a stronger link with overall success than with project efficiency. This may indicate that shortening planning cycles impact projects by reducing their final value to the company and stakeholders even though managers may still be able to deliver them on time and budget.

Robustness

The initial low R^2 value was a concern area in this research. Low R values with low p values can still be significant (Cooper & Schindler, 2008) though some question the importance of the relationship. A variety of investigations were undertaken to confirm the robustness of this result when the initial R^2 was lower than expected.

- Analysis of polynomials with higher powers - This did not yield solutions with better p or higher R.
- Linear analysis of subsets of the data from planning effort index of .01 to .24 - This did not produce a statistically significant result.
- Analysis using log of effort index - This did not produce a statistically significant result
- Regression of the hours spent planning rather than the index value- This did not yield solutions with better p or higher R.
- Alternative measurement specifications for project success were investigated and produced results comparable to the reported ones.

None of these attempts yielded results that had both an acceptable p value and higher R values.

As well, subsets of the data were examined in the analysis of some sub groups such as industries and regions. For those groups where there were adequate data for statistical significance, R^2 results were similarly low. They typically fall in the .005-.02 range. Subsets with p values in the .10 range, which are out of statistical range for this research, also showed similar low-R characteristics. This supports the validity of the research methodology. With the moderator impact removed, however, higher R^2 values became apparent.

Summary of Recomendations

As a whole projects may not be planning adequately. Planning is important to project success as numerous authors have previously written (Thomas et al., 2008; Morris, 1998; Besner & Hobbs, 2006; Zwikael, 2009; Johnson et al., 2001; Jones, 1986; Poston, 1985). It is clear from this research that the average project is not spending enough time on upfront planning to maximize success. This should not be surprising to researcher or practitioners; it appears that in industry not enough planning is being done and that if longer planning phases were the norm, there would be higher overall project success.

This could be a factor in the high project failure rates reported in the literature (Sessions, 2009; Standish Group, 2011). It is recommended that projects consider doing more planning upfront both for traditional projects and for agile projects. Projects that schedule more that 25% effort on the upfront planning phase should be reviewed for progress and risk factors.

The planning phase effort does not impact all aspects of success equally. The planning phase effort has the strongest relationship with overall project success. Reducing the effort spent on the planning phase may impact projects by reducing their final value to customers, stakeholders and the company. This may be the case even though managers may still be able to deliver them on time and within budget.

References

Andersen, E. S. (1996). Warning: activity planning is hazardous to your project`s health. *International Journal of Project Management* **2**, 89--94.

Aubry, M., Hobbs, B. & Thuillier, D. (2008). Organisational project management: an historical approach to the study of PMOs. *International Journal of Project Management* **26** (1), 38 -- 43.

Bart, C. (1993). Controlling new product R&D projects. *R&D Management* **23** (3), 187--198.

Besner, C. & Hobbs, B. (2011). Contextualised project management practice: a cluster analysis of practices and best practices. In *10th IRNOP Research Conference, Montreal Canada*.

Besner, C. & Hobbs, B. (2006). The perceived value and potential contribution of project management practices to project success. *Project Management Journal* **37** (3), 37--48.

Blomquist, T., Hällgren, M., Nilsson, A. & Söderholm, A. (2010). Project-as-practice: In search of project management research that matters. *Project Management Journal* **41** (1), 5--16.

Boehm, B. (2002). Get ready for agile methods, with care. *Computer* **35**, 64--69.

Boehm, B. (1996). Anchoring the software process. *IEEE Software* **13** (4), 73--82.

Carroll, S. J. & Gillen, D. J. (1987). Are the classical management functions useful in describing managerial work?. *Academy of Management Review* **12** (1), 38 -- 51.

Catersels, R., Helms, R. W. & Batenburg, R. S. (2010). Exploring the gap between the practical and theoretical world of ERP implementations: results of a global survey. In *Proceedings of IV IFIP International Conference on Research and Practical Issues of Enterprise Information systems*.

Chatzoglou, P. & Macaulay, L. A. (1996). Requirements capture and IS methodologies. *Information Systems Journal* **6** (3), 209–-225.

Choma, A. A. & Bhat, S. (2010). Success vs failure: what is the difference between the best and worst projects?. In *Proceedings PMI Global Congress 2010 - Washington D. C.* .

Collyer, S., Warren, C., Hemsley, B. & Stevens, C. (2010). Aim, fire, aim - Project planning styles in dynamic environments. *Project Management Journal* **41** (4), 108--121.

Collyer, S. & Warren, C. M. (2009). Project management approaches for dynamic environments. *International Journal of Project Management* **27** (4), 355 -- 364.

Cooke-Davies, T. J. (2002). The real success factors in projects. *International Journal of Project Management.* **20** (3), 185--190.

Coram, M. & Bohner, S. (2005). The impact of agile methods on software project management. In *Proceedings of the 12th IEEE International Conference and Workshops on Engineering of Computer-Based Systems* (pp. 363--370). IEEE Computer Society. (ISBN: 0-7695-2308-0.)

Daly, E. B. (1977). Management of software development. *IEEE Trans. Softw. Eng.* **3**, 229--242.

Deephouse, C., Mukhopadhyay, T., Goldenson, D. R. & Kellner, M. I. (1995). Software processes and project performance. *J. Manage. Inf. Syst.* **12**, 187--205.

Dvir, D. & Lechler, T. (2004). Plans are nothing, changing plans is everything: the impact of changes on project success.. *Research Policy* **33** (1), 1--15.

Dvir, D., Tsvi Raz & Shenhar, A. (2003). An empirical analysis of the relationship between project planning and project success. *International Journal of Project Management*, 89--95.

Ewusi-Mensah, K. (1997). Critical issues in abandoned information systems development projects. *Communications of the ACM* **40**, 74--80.

Flyvbjerg, B., Holm, M. S. & Buhl, S. (2002). Underestimating costs in public works projects: Error or lie?. *Journal of the American Planning Association* **68**, 279--295.

Furuyama, T., Arai, Y. & Lio, K. (1993). Fault generation model and mental stress effect analysis. In *Proceedings of the Second International Conference on Achieving Quality in Software, Venice, Italy, October 18-20*.

Gantt, H. (1910). *Work, wages and profit, published by The Engineering Magazine, New York, 1910; republished as Work, wages and profits.* Hive Publishing Company, Easton, Pennsylvania, 1974.

Gibson, E. & Gebken, R. (2003). Design quality in pre-project planning: applications of the project definition rating index. *Building Research and Information* **31** (5), 346--356.

Gibson, E. & Pappas, M. P. (2003). *Starting smart: key practices for developing scopes of work for facility projects.* National Academies Press.

Gibson, G., Wang, Y., Cho, C. & Pappas, M. (2006). What is pre-project planning, anyway?. *Journal of Management in Engineering* **22** (1), 35--42.

Goetz, B. E. (1949). *Management planning and control: a managerial approach to industrial accounting.* New York: McGraw-Hill Book Co.

Gulick, L. H. (1936). *Notes on the theory of organization.* Papers on the Science of Administration.

Hamilton, M. R. & G. E. Gibson, J. (1996). Benchmarking preproject-planning effort. *Journal of Management in Engineering* **12** (2), 25--33.

Jones, C. (1986). *Programming productivity.* New York, NY: McGraw-Hill.

Kaner, C., Falk, J. & Nguyen, H. Q. (1993). *Testing computer software 2nd ed.* New York: Wiley.

Koontz, H. (1958). A preliminary statement of principles of planning and control. *The Journal of the Academy of Management, Vol. 1, No* **1** (1), 45--61.

Kotter, J. P. (1999). What effective general managers really do. *Harvard Business Review, March-April* **2**, 3--12.

Mann, C. & Maurer, F. (2005). A case study on the impact of scrum on overtime and customer satisfaction. In *Agile Conference, 2005. Proceedings* (pp. 70 -- 79).

van Marrewijk, A., Clegg, S. R., Pitsis, T. S. & Veenswijk, M. (2008). Managing public-private megaprojects: Paradoxes, complexity, and project design. *International Journal of Project Management* **26** (6), 591 -- 600.

Mintzberg, H. (1994). *The rise and fall of strategic planning: reconceiving roles for planning, plans, planners.* Free Press. (ISBN: 9780029216057.)

Mintzberg, H. (1975). The manager's job: folklore and fact. *Harvard Business Review* **53** (4), 49--61.

Morris, P. W. G. (1998). Key issues in project management. In J. K. Pinto (ed.),*Project Management Institute Project management handbook*.

Munns, A. & Bjeirmi, B. (1996). The role of project management in achieving project success. *International Journal of Project Management* **14** (2), 81--87.

Müller, R. & Turner, J. R. (2001). The impact of performance in project management knowledge areas on earned value results in information technology projects. *International Project Management Journal* **7** (1), 44--51.

Nobelius, D. & Trygg, L. (2002). Stop chasing the front end process–management of the early phases in product development projects. *International Journal of Project Management* **20** (5), 331--340.

Olson, B. & Swenson, D. (2011). Overtime effects on project team effectiveness. In . the Midwest Instruction and Computing Symposium, Duluth, Minnesota, April.

Pankratz, O. & Loebbecke, C. (2011). Project managers' perception of is project success factors - a repertory grid investigation. In *ECIS 2011 Proceedings, Vol. 170.*

Pinto, J. K. & Prescott, J. E. (1990). Planning and tactical factors in the project implementation process. *Journal of Management Studies* **27** (3), 305 -- 327.

Pinto, J. K. & Prescott, J. E. (1988). Variations in critical success factors over the stages in the project life cycle. *Journal of Management* **14**, 5--18.

Pinto, J. K. & Slevin, D. P. (1988). Project success: definitions and measurement techniques. *Project Management Journal* **19** (1), 67--72.

Poon, S., Young, R., Irandoost, S. & Land, L. (2011). Re-assessing the importance of necessary or sufficient conditions of critical success factors in it project success: a fuzzy set-theoretic approach. In *ECIS 2011 Proceedings, Vol. 176* .

Posten, R. M. (1985). Preventing software requirements specification errors with IEEE 830. *IEEE Software* **2** (1), 83--86.

Project Management Institute (2008). A guide to the project management body of knowledge (4th edition) . Project Management Institute Newtown Square, PA.

Sessions, R. (2009). *The IT complexity crisis: danger and opportunity*. ObjectWatch, Inc. Retrieved from http://www.objectwatch.com/whitepapers/ITComplexityWhitePaper.pdf.

Shehu & Akintoye (2009). The critical success factors for effective programme management: a pragmatic approach. *The Built & Human Environment Review* **2**, 1--24.

Shenhar, A J.and Levy, O. & Dvir, B. (1997). Mapping the dimensions of project success. *Project Management Journal* **28** (2), 5--9.

Shenhar, A. J. (2001). One size does not fit all projects: exploring classical contingency domains. *Management Science* **47** (3), 394--414.

Shenhar, A. J., Dvir, D., Levy, O. & Maltz, A. C. (2001). Project success: a multidimensional strategic concept. *Long Range Planning* **34** (6), 699 -- 725.

Shenhar, A. J., Tishler, A., Dvir, D., Lipovetsky, S. & Lechler, T. (2002). Refining the search for project success factors: a multivariate typological approach. *R&D Management* **32**, 111--126.

Smits, H. (2006). *5 levels of agile planning: from enterprise product vision to team stand-up* . Rally Software Development Corporation. Retrieved from http://www.rallydev.com/downloads/document/2-five-levels-of-agile-planning-from-enterprise-product-vision-to-team-stand-up.html.

Tausworthe, R. C. (1979-1980). The work breakdown structure in software project management. *Journal of Systems and Software* **1**, 181 -- 186.

The Standish Group (2011). *CHAOS Manifesto 2011* . The Standish Group. Retrieved from http://standishgroup.com/newsroom/chaos_manifesto_2011.php.

Thomas, M., Jacques, P. H., Adams, J. R. & Kihneman-Woote, J. (2008). Developing an effective project: planning and team building combined. *Project Management Journal,* **39** (4), 105--113.

Turner, J. R. & Cochrane, R. A. (1993). Goals-and-methods matrix: coping with projects with ill defined goals and/or methods of achieving them. *International Journal of Project Management* **11** (2), 93 -- 102.

Turner, J. R. & Müller, R. (2003). On the nature of the project as a temporary organization. *International Journal of Project Management* **21** (1), 1-- 8.

Umble, E. J., Haft, R. R. & Umble, M. (2003). Enterprise resource planning: Implementation procedures and critical success factors. *European Journal of Operational Research* **146** (2), 241 -- 257.

Wang, Y.-R. & Gibson, G. E. (2008). A study of preproject planning and project success using ann and regression models. In *The 25th International Symposium on Automation and Robotics in Construction. ISARC-2008* (pp. 688--696).

White, D. & Fortune, J. (2002). Current practice in project management: An empirical study. *International Journal of Project Management* **20** (1), 1--11.

Wideman, M. (2000). *Managing the development of building projects for better results* . Retrieved from www.maxwideman.com.

Yeo, K. T. (2002). Critical failure factors in information system projects. *International Journal of Project Management* **20** (3), 241 -- 246.

Zwikael, O. (2009). The relative importance of the PMBOK® Guide's nine Knowledge Areas during project planning. *Project Management Journal* **40**, 94--103.

Zwikael, O. & Globerson, S. (2006). Benchmarking of project planning and success in selected industries. *Benchmarking: An International Journal, Vol* **13** (6), 688--700.