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PRINCIPLES, CHARACTERISTICS, AND METHODOLOGY TO DEVELOP A PROJECT MANAGEMENT ASSESSMENT TOOL AT THE CONSTRUCTION PROJECT LEVEL

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Motivation

- ❑ **In the Construction industry, weak PM practices are still common**
 - ❑ particularly among project owner organizations.
- ❑ **Estimated cost of poorly managed projects:**
 - ❑ \$150 billion per year in US (Larson & Gray, 2011).
- ❑ **Project management profession:**
 - ❑ Management schools preparing well rounded PM professionals
 - ❑ PM professional code and standards



Observation

❑ **Two contributing factors**

1. Project organizations are unaware of how their PM practices compare with best practices,
2. Project organizations are unaware and unconvinced about the value offered by various PM practices.



Approach

- ❑ **Develop a PM assessment tool that can:**

- ❑ Assess the PM on individual projects to **benchmark** the PM performance relative to PM standards of best practice.
- ❑ Assess the success of construction projects and relate this to the assessed PM performance as a measure of PM **value**.

- ❑ ***Side Motivation:***

- ❑ *We see this as a starting point for longer-term interests in project **assessment** issues and tools.*



1. General Approach for Assessing Project Management and Measuring the Value of PM



Project Management Assessment Tools: Literature Review

- ☐ **Boston Corporate Education Center**
 - ☐ **The Atlantic Management Center**
 - ☐ **The Business Improvement Architects**
 - ☐ **The Enterprise Information**
 - ☐ **Harold Kerzner's P.M. maturity model**
 - ☐ **PM/ROI Assessment- Ibbs Consulting**
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- ☐ **Mostly on-line questionnaire-style assessment tools**
 - ☐ **These approaches focus on assessing either:**
 - ☐ Practices within a firm
 - ☐ Practices/expertise of an individual



Project Management Assessment Tools: Approach

- ❑ **Generally similar approach**
 - ❑ On-line questionnaire-style self-assessment tool.

- ❑ **Focus on assessing individual project rather than the company or the individual.**
 - ❑ Complementary to previous approaches.



Measuring The Value Of P.M.: Literature Review

1. Maturity-Based ROI Metric
2. Balance Scorecard-ROI
3. Resource-Based View
4. Implementation-Context-Fit based



Measuring The Value Of P.M.:

1. **Maturity-Based ROI Metric**

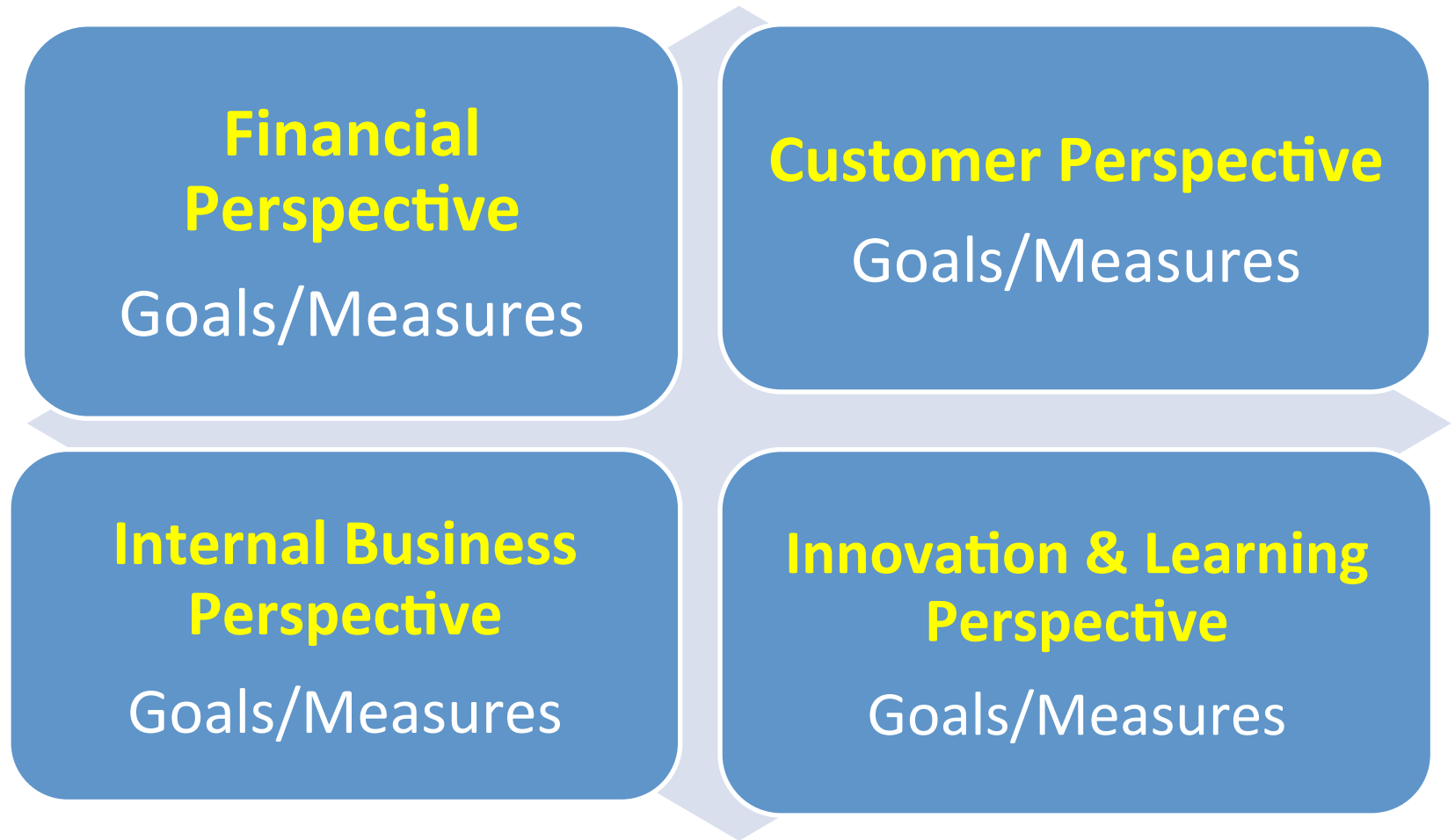
(Ibbs, Kwak, Reginato, Pennypacker, Crawford)

- ❑ **Examined correlation between Assessed PM maturity and cost and time variations from the original baselines**
- ❑ **Finding 1: Companies with more mature project management practices have better project performance.**
 - ❑ Less mature companies may miss their schedule targets by 40% and cost targets by 20%
- ❑ **Finding 2: Project management maturity is strongly correlated with more predictable project management schedule & cost performance.**
- ❑ **Finding 3: Good project management companies have lower direct costs than poor project management companies**



Measuring The Value Of P.M.:

Balanced Scorecard (Kaplan, Norton)



Balance Scorecard-ROI

(Phillips, Bothell)

❑ Calculating the Return on Investment

❑ The benefit/cost ratio:

$$\text{❑ BCR} = (\text{Project Solution Monetary Benefits} / \text{Project Solution Costs})$$

❑ The Return on Investment:

$$\text{❑ ROI} = (\text{Net Project Solution Monetary Benefits} / \text{Project Solution Costs}) \times 100\%$$

Resource-Base View

(Wernefelt, Barney, Grant, Peteraf, Jugdev)

- ❑ **Emphasizes the impact of superior resources and better organizational competencies in determining the long term, sustainable competitive advantage of firms**
- ❑ **PM relates to a firm's abilities & specific skills**
 - ❑ Is it capable of generating long-term competitive advantage?

Implementation-Context-Fit Based (Thomas, Mullaly)

- ☐ **Identify what each organization is doing and calling project management.**
- ☐ **Identify and documents evidence of all forms of value.**
- ☐ **Identify all relevant quotes from the interviews that commented on the value, then coding and sorting.**
 - ☐ 0 - not at all,
 - ☐ 1 - very little,
 - ☐ 2 - to some extent, or
 - ☐ 3 - to a very great extent.

Implementation-Context-Fit based (Thomas, Mullaly)

- ☐ **Half of the organizations realized tangible values:**
 - ☐ cost savings,
 - ☐ revenue increases,
 - ☐ increase customer share,
 - ☐ customer retention,
 - ☐ reduce write-offs & rework.
- ☐ **Most of the organizations demonstrate intangible values:**
 - ☐ attainment of strategic objectives,
 - ☐ more effective human resources,
 - ☐ staff retention,
 - ☐ improved reputation,
 - ☐ corporate culture,
 - ☐ social good,
 - ☐ overall management,
 - ☐ quality of life,
 - ☐ regulatory compliance.

Measuring The Value Of P.M.: Approach

- ❑ **Measure PM by assessing the degree to which projects are following best practices**
- ❑ **Measuring project success by assessing a set of success indicators**
 - ❑ E.g., on budget, on time, changes, customer satisfaction, etc.
- ❑ **Explore correlation between assessed PM practices and assessed project success.**

- ❑ *PM assessment adds value as a best practices benchmarking approach even if no significant correlation can be shown.*

2. Assessment Targets



Assessment Targets: Assumptions

- ❑ **In order to assess PM quality and best practices, we must determine what PM best practices are.**
- ❑ **This is a substantial, open-ended issue that is beyond the scope of this work.**
- ❑ **We take established PM standards to be reasonable, consensus-based identifications of PM Best Practices**



Assessment Targets

Top Ten Critical Success Factors in Construction

	<i>Critical Success Factor Identified in Construction Projects</i>	<i><u>No. of Citations</u></i>	<i><u>Case Studies</u></i>
1	Multidisciplinary/competent project team	10	661
2	Clear objectives and scope	9	542
3	Time performance (project schedule/plans)	8	860
4	Formal & Structured Selection of subcontractors	8	648
5	Competent project manager	7	565
6	Clear information and communications channels	6	619
7	Project team commitment	6	454
8	Power and Politics	5	932
9	Client's competencies	5	539
10	Continuous involvement of stakeholders in the project	5	528



Assessment Targets Approach

- ☐ **PMBOK- PMI**
- ☐ **IAPM-COMPETENCE BASELINE**
- ☐ **PRINCE2**
- ☐ **ISO 9000**



PM Integrated Framework

PM Knowledge Areas:

- Scope Mgt.,
- Time Mgt.,
- Cost Mgt.,
- etc.

PM Process Groups:

- Initiating
- Planning
- Executing
- Monitoring
- Closing

KNOWLEDGE AREAS	INITIATING / START UP (ICB)/ STARTING UP & INITIATING (PRINCE2)	PROJECT MANAGEMENT / PLANNING	PROJECT MANAGEMENT / EXECUTION	MEASURING AND IMPROVEMENT (8.1)
	1. Develop project charter / Project Brief	1. Develop project management plan	Direct/Manage project execution	1. Monitor/Control Work
	2. CONTEXTUAL COMPETENCES			2. Perform integr control
	3. BUSINESS CASE (PRINCE2)			3. Problem Resol
	4. Configuration Management Strategy			4. Changes
	5. Determining the criteria for product acceptance (ISO 9000, 7.1c)			5. Change
				6. Product verification, validation, & mon (ISO 9000, 7.1c)
				7. Changes to pre requirements ISO 7.2.2)
		1. Collect requirements		1. Verify Scope
		2. Define scope		2. Control scope
		3. Create WBS		
		4. Project Requirements & Objectives		
		5. Project Structures (WBS)		
		6. Product Breakdown Structure		
		7. Determining customer/product requirements (ISO 9000, 5.2, 7.2.1)		1. Meeting customer requirements (ISO 9000, 5.2)
				1. Control schedule
	1. Product Description	1. Define Activities		
	2. Planning product realization process (ISO 9000, 7.1)	2. Sequence Activities		
		3. Estimate activity resource		
		4. Estimate activity duration		
		5. Develop schedule		
		1. Estimate cost		1. Control cost
		2. Determine budget		
	1. Prepare the Quality Management Strategy	1. Plan quality	1. Perform quality assurance	
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Specific PM Practices from PMBOK, ICB, PRINCE2, etc.

- e.g., Develop Communication Strategy Plan



PM Integrated Framework For HR Management Area

MANAGEMENT AREAS	PROJECT MANAGEMENT PROCESS GROUPS				
	INITIATING / START UP (ICB3)/ STARTING UP & INITIATING (PRINCE2)	PLANNING/ PLANS (PRINCE2)	EXECUTING/ DIRECTING (PRINCE2)	MONITORING & CONTROLLING / CONTROL (ICB3)/ PROGRESS (PRINCE2)/ MEASURING, ANALYSIS, & IMPROVEMENT (ISO 9000, 8.1)	CLOSING / CLOSE-OUT (ICB3)/ CLOSING (PRINCE2)
PROJECT HUMAN RESOURCES MANAGEMENT / RESOURCES (ICB) / ORGANIZATION (PRINCE2)		1. H.R plan/ Responsibilities (5.4)	1. Acquire project team		
	1. Ensuring availability of resources (ISO 9001, 5.1e)	2. Project Organisation	2. Develop project team/ Training Needs (5.3.3.2)	1. Competence of personnel (ISO 9001, 6.2.1)	
		3. Teamwork	3. Manage project team	2. Work environment (ISO 9001, 6.4)	
		4. Team Plans (7.2.6), Project Management Team (5.3.2)	3. BEHAVIOURAL COMPETENCES		
		5. Defining responsibility & authority (ISO 9001, 5.5.1)	4. Acquire, deploy, maintain, & dispose resources (ISO 9001, 6)		



3. Survey Questions



Question #	Question	"Latent Variable"	PM Implementation							Standard				Characteristic	
			Competence	Knowledge	Skills	Tool	Technique	Process	Practice	PMBOK	ICB-3	PRINCE2	ISO9001:2008	How Well/Quality	Frequency
55	HR plan: identified roles/responsibilities/skills, reporting relationships, staffing management plan?	Implementation	Technical					YES		9.1 to 9.4	1.06, 1.07, 1.09, 1.12	7.2.6, 5.3.2	4.1d, 6.2.1, 6.1, 6.2	YES	
56	PM of client experience in years?	Implementation	Technical	YES	YES					9.1.3.1	1.2	2.2	6.2		
57	Developer/owner organization experience?	Implementation	Technical	YES	YES					9.1.3.1	1.2	2.2	6.2		
58	Constructor organization experience?	Implementation	Technical	YES	YES					9.1.3.1	1.2	2.2	6.2		
59	PM of constructor experience in years?	Implementation	Technical	YES	YES					9.1.3.1	1.2	2.2	6.2		
60	PM highest level of education?	Implementation	Technical	YES						1.7.1, 9.1.3.1	1.2		6.2.1		



Scoring Criteria Based on Critical Success Factors

	PLANNING				EXECUTING					MONITORING & CONTROLLING				
	Yes	No	Don't Know		Yes	No	Don't Know			Always	Often	Sometimes	Rarely	Never
PROJECT HUMAN RESOURCE MANAGEMENT & BEHAVIOURAL COMPETENCES	Identified & Documented:				Exploded into anger during the project life cycle	1	2	3	4	5	Preference for energy:			
	Roles & Responsibilities	10			Requested input before changes	5	4	3	2	1	Extroverted			1
	Required skills	1			Spent time thinking about improvement	5	4	3	2	1	Introverted			
	Reporting relationships	1									Preference for information gathering:			
	Staffing management plan	10			Would you hire your brother?		1				Sensing	1		
	Project manager (developer) experience	years	10								Intuitive			
	Project manager (Constructor) experience	years	20								Preference for decision making:			
	Organization (developer) experience	years	10								Thinking	1		
	Organization (constructor) experience	years	20								Feeling			
	PM(Constructor) highest level of education	years	10								Preference for lifestyle:			
	Related to construction	10									Judging	1		
	Leadership skills	10	5	3	2	1					Perceiving			
					Average hours of work per day:		hours	5						
					Managing more than one project		1							
					If yes, how many?		project							
	Acquire the necessary project team	10			Recognition & Reward system	1								
					If yes, with clear criteria	1								
	Performance assessment	10			Number of project managers for this specific project:		project managers	3						



Overall PM Score

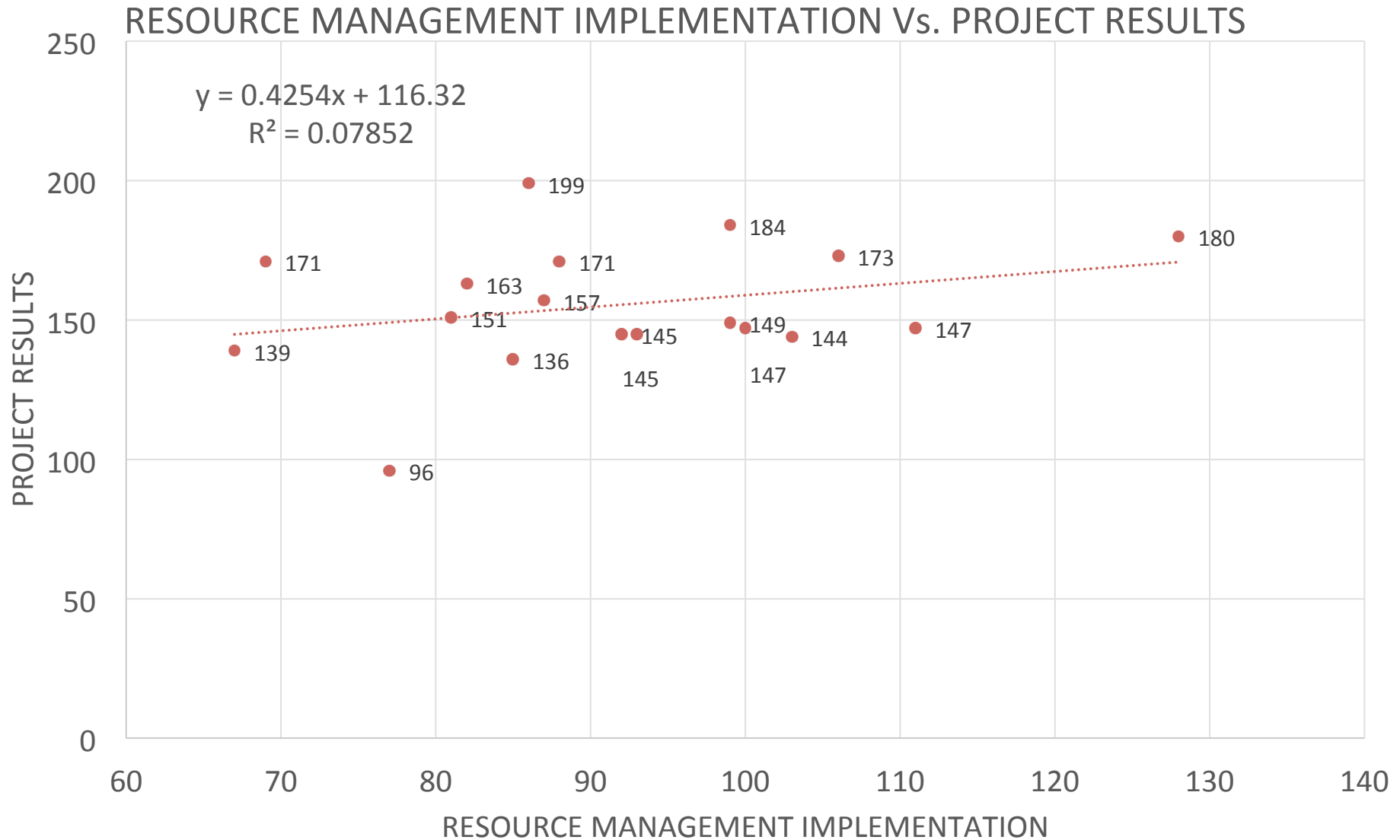
- ❑ **Scores of individual PM Practices combined into an overall PM score**
- ❑ **Weighting Criteria:**
 - ❑ Initially one point was assigned to each question.
 - ❑ Weighting adjusted based on evidence from success-factor literature sources.
 - ❑ We expect to explore further refinements to this weighting system.



4. Pilot Survey and Case Studies

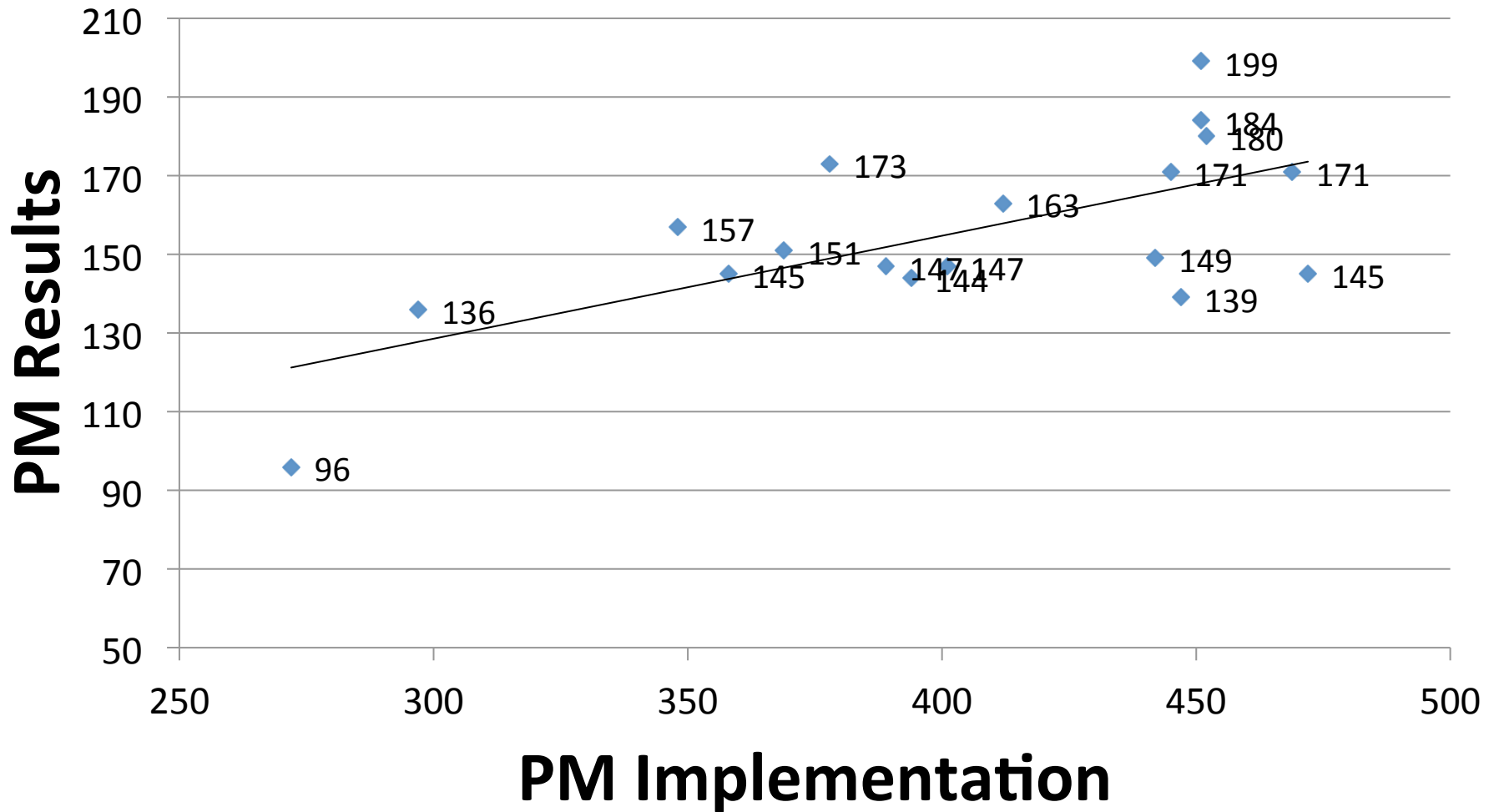


18 Case Studies



18 Case Studies

PM Implementation vs. PM Results



Conclusions

- ❑ **Developing a project management assessment tool at the project level.**
- ❑ **Exploring the relationship between assessed PM practices and assessed project outcomes.**
- ❑ **Developing an integrated framework of PM standards and critical success factors in construction.**
- ❑ **Benchmarking PM best practices in the construction industry.**

