

The premiere workshop on Earned Value Management



SAND2016-8403C

IPM 2016

October 31 - November 2, 2016
Bethesda, Maryland

From C/S2 to EVM to IPPM: The Next Generation of Integrated Program Performance Management

Title:

Vicki L. Frahm, PhD, PMP, EVP

Sandia Corporation

Vlfrahm@sandia.gov (505)284-6065

Date: October 31 – November 2, 2016

Learning Objectives

- At the completion of this session, the participant should have an understanding of:
 - Management practices and theory that provided the foundation for EVM
 - Current EVM research
 - Related research from other fields of study
 - Opportunities for future research

Introduction

- Vicki Frahm, PhD, PMP, EVP
 - 36 years experience in project management
 - 31 years experience in EVMS
 - Boeing
 - B52 Mods
 - International Space Station
 - Honeywell
 - Future Combat Systems
 - Sandia Corporation
 - PhD in Organization & Management, Specializing in Project Management

EVM Research – Past and Future

- Theoretical Roots of EVM
- EVM Research
- Organizational Research



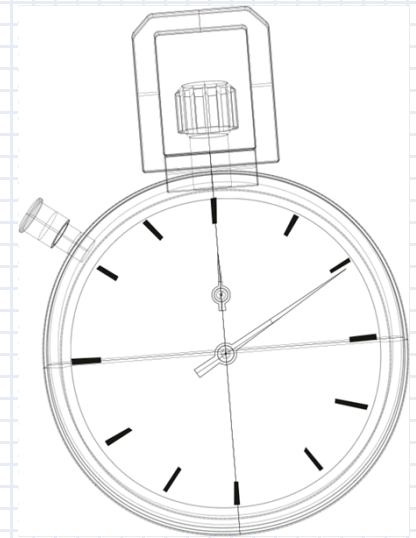
THEORETICAL ROOTS OF EVM

Scientific Management

- Frederick Taylor
- Frank and Lillian Gilbreth
- Henry Gantt

Frederick Taylor (1856-1915)

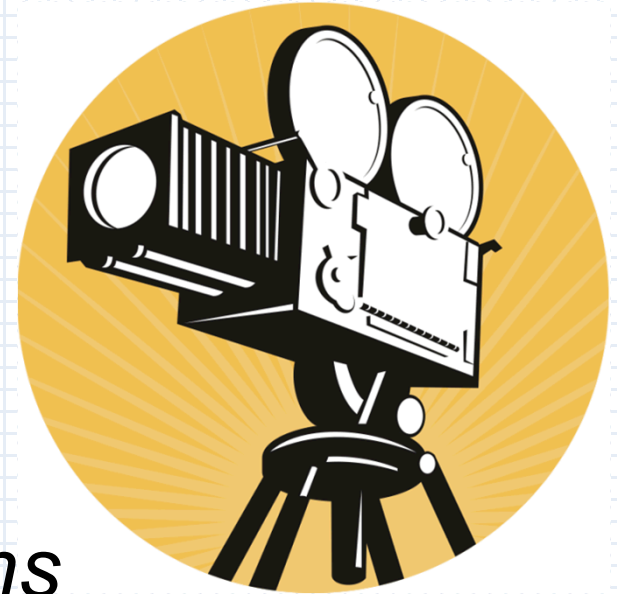
- Task management
- Process time reduction
- Father of Industrial Engineering



- *The Principles of Scientific Management*

Frank (1868-1924) and Lillian (1878-1972) Gilbreth

- Standardize processes
- Eliminate wasted motions
- Time and motion studies
- *The Writings of the Gilbreths*



Henri Gantt (1861-1919)

- Work planning
- Work efficiency
- Gantt chart

ID	Task Name	Start	Finish	Duration	Apr 2016				
					4	5	6	7	8
1	Task 1	4/4/2016	4/4/2016	1d	■				
2	Task 2	4/5/2016	4/7/2016	3d		■	■	■	
3	Task 3	4/8/2016	4/8/2016	1d					■

- *Organizing for Work*

Scientific Management vs EV

	Scientific Mgmt.	Earned Value
Context	Production	Project
Ecology		
	Stable	Dynamic
	Repetitive	Innovative
	Linear	Non-linear
	Localized	Distributed
	Simple	Complex
Quality Objective		
	Incremental improvement	Unique product / service to meet defined scope
	Time & motion studies	Lessons learned
Tasks / activities		
	Well-defined steps	Activities specific to project and functional type
Forecasting		
	Based on standards; learning curves	Based on estimates: expert opinion, past performance
Variance		
	Eliminate variance	Understand & mitigate variances

Earned Value

- Applied work measurement methods to project management
- Integrated cost, scope, and schedule
- Established set of criteria to define the project performance measurement system

EVM - Since 1967

- EVM criteria has not changed significantly
- **Interpretations/rules have been added**

Interpretations/Rules

- Interpretations/rules established to
 - Promote consistent understanding
 - Ensure consistent application
 - Ensure traceability
 - Ensure auditability
- If the EVMS does not work
 - Add more rules
 - Tighten interpretation of existing rules

EVM - Since 1967

- EVM criteria has not changed significantly
- Interpretations/rules have been added
- **EVM recognized best practice**

Best Practice

- Established as a better alternative than a previous method
 - EVM provides better information than the alternative method of tracking actuals to budget
- Determination of best practice based on experience, expert opinion and, possibly, research
- Best practices change or may be shown to be ineffective
 - Total quality
 - WBS level of detail

EVM RESEARCH

Theoretical Roots of EVMS

EVM Research

Organizational Research

What Does Research Include?

- Applied
- Basic research
 - Quantitative
 - Surveys
 - Experiments
 - Computer simulation
 - Qualitative
 - Case studies

Overview of Current Research

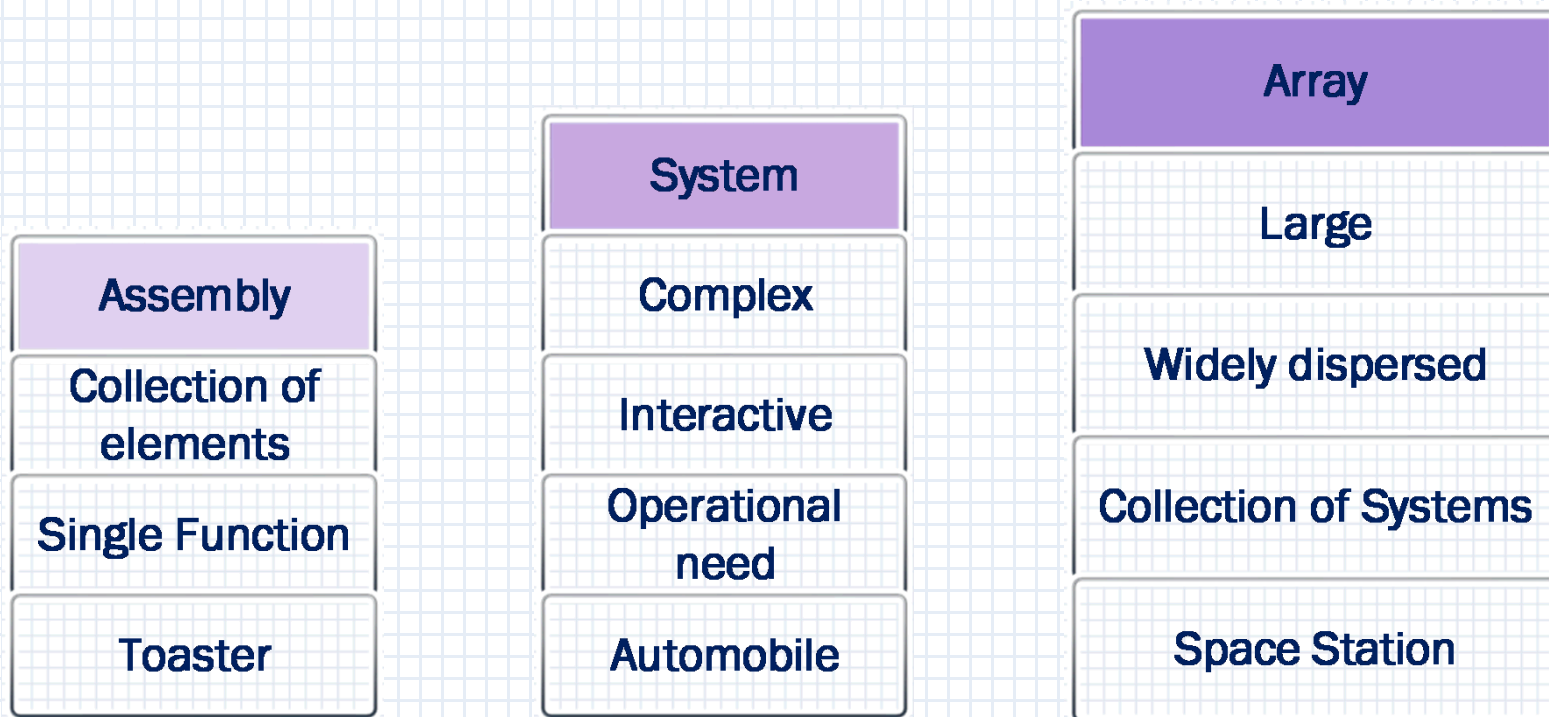
- Two dominant themes in EV research
 - Estimate at completion
 - Christenson
 - Project duration
 - Lipke
 - VanHoucke

Why Should We Care About Research?

- Research validates and confirms best practices
 - Projects have become more complex
 - EVM is applied to a more and different types of projects
 - Organizational structures are changing
 - Project success rates have not changed over past 20 years

Earned Value and Complexity

Per Shenhar and Dvir, DoD project management standards should not be used on Array Projects.



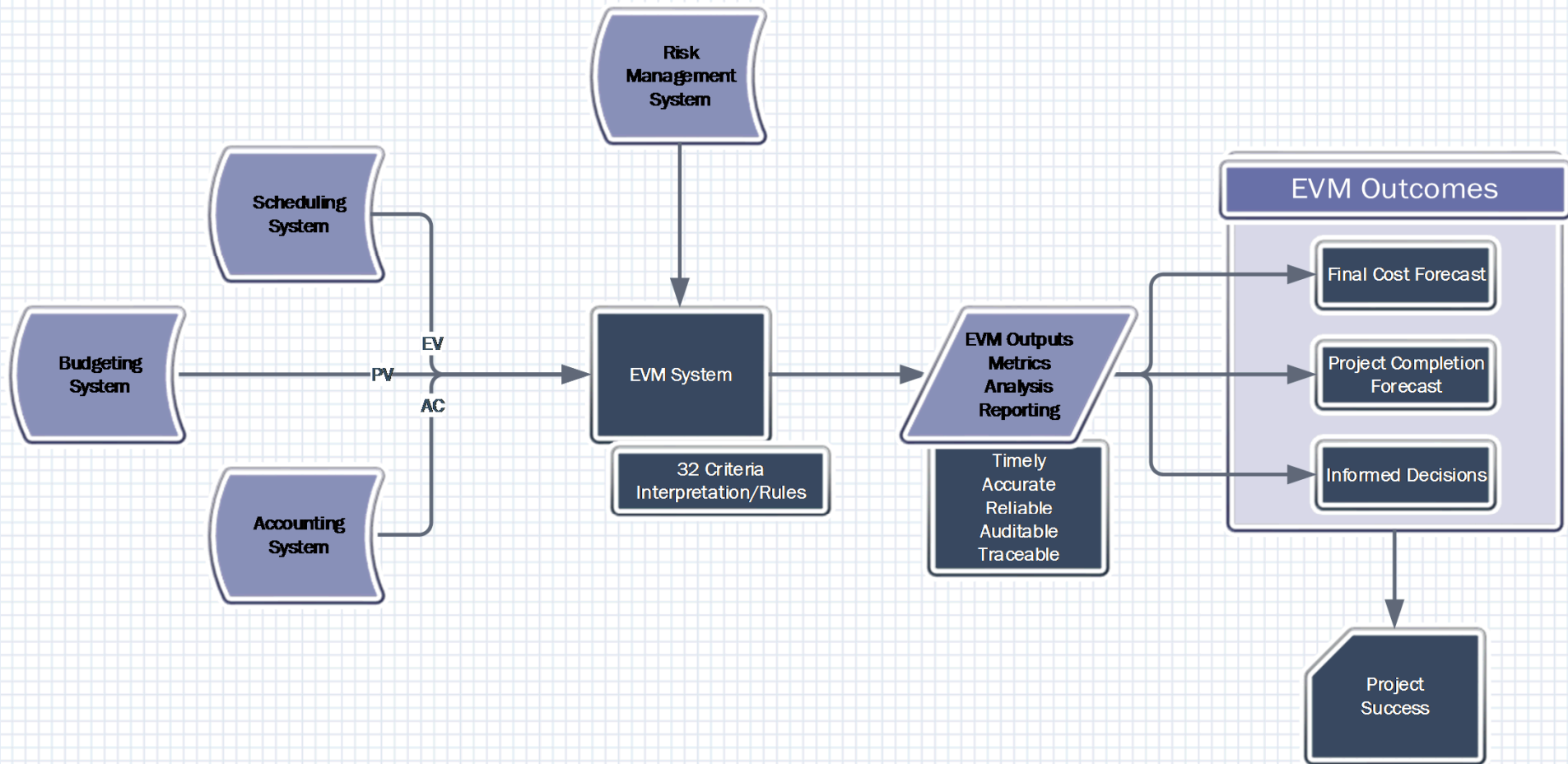
Tailoring Management Standards

Array projects must have the flexibility to develop their own standards for managing large, complex projects. (Shenhar & Dvir, 2007)

“None of the world's project management methodologies were designed to be dropped lock, stock, and barrel into organization without first tailoring them to the organization's needs and then separately, to the project's specific needs.” (Avery, 2015)



EVM System – Notional Model



How could we apply the model?

- Test hypotheses related to:
 - Criteria and outcomes
 - Rule interrelationships
 - Tailoring impacts
 - Tailoring for specific environments
 - Project type
 - Project complexity

ORGANIZATIONAL RESEARCH

Theoretical Roots of EVMS

EVM Research

Organizational Research

Organizational Research

- Management Control
- Scheduling
- Decision Making



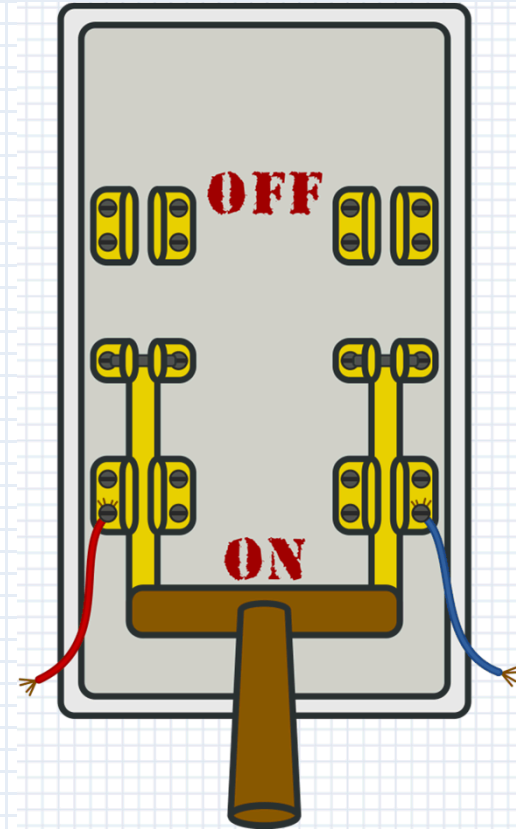
Management Control Theory

- Organizational level
- Research started in 1960's
- Objective: Goal congruence
- Accounting based
- Consists of
 - Goals and objectives
 - Feedback mechanisms



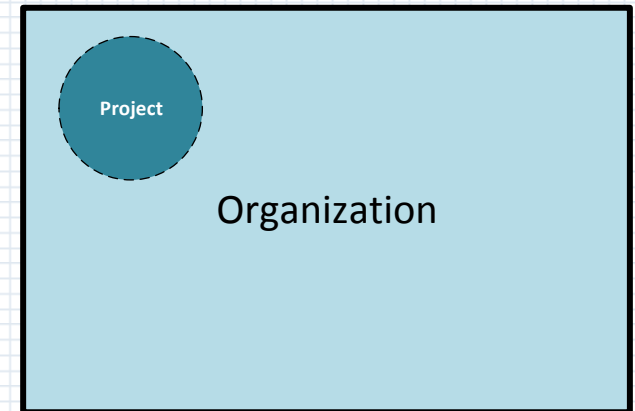
Levers of Control

- Four levers of control
 - Diagnostic Control Systems
 - Beliefs Systems
 - Boundary Systems
 - Interactive Control Systems



Relationship to Projects

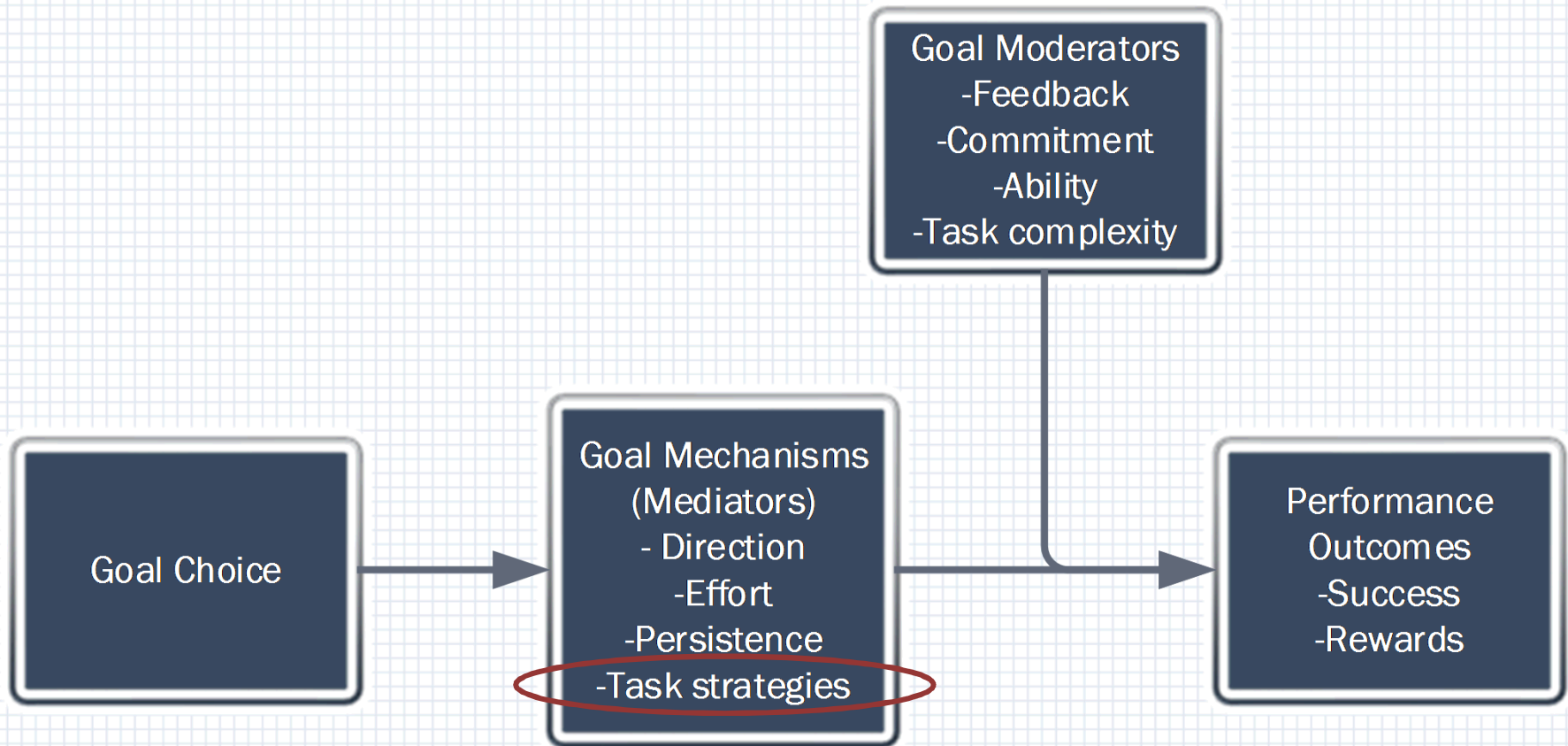
- A project represents a temporary organization with a larger organization
- Organizational level control mechanisms may influence project level control mechanisms



Research and Scheduling

- Goal Setting Theory
- Transactive Memory System (TMS)
- Cognitive Artifacts

Goal Setting Theory

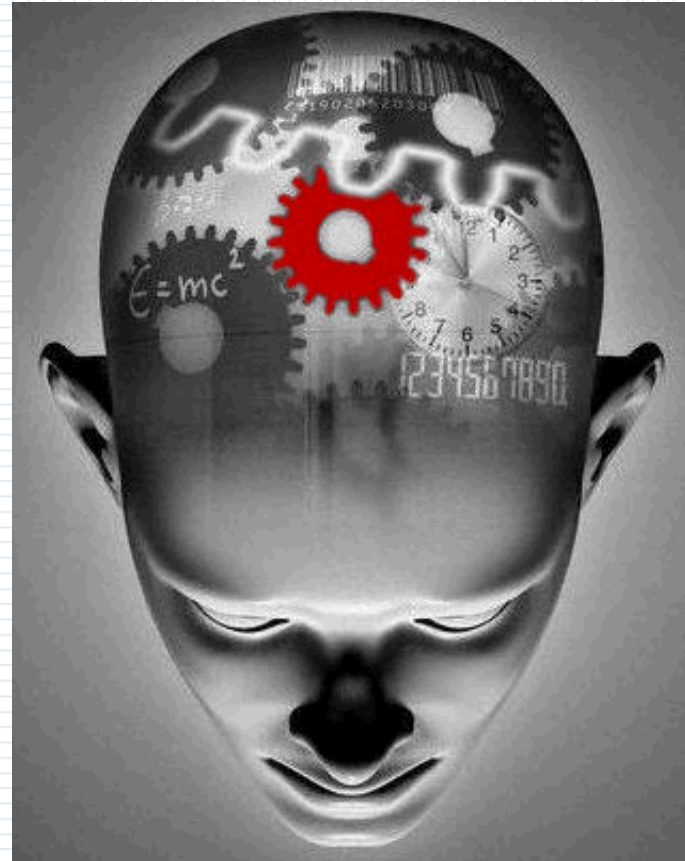


Transactive Memory Systems (TMS)

- We use other people as memory storage
 - Encoding
 - Storage
 - Retrieval
- Three dimensions:
 - Specialization
 - Credibility
 - Coordination – enabled by effective strategies

Cognitive Artifacts

- Schedules classified as cognitive artifacts
- Support coordination of distributed knowledge



Projects as Mental Prisons

- Critical theorists
- Projects as “set of disciplinary practices that control and monitor individuals for the sake of organisational efficiency and effectiveness.” (p.111)
 - Disciplining space
 - Disciplining the mind
 - Disciplining time – schedule



- **Projects more controlling than Taylorism**

Decision Making

- Team decisions may not be data driven
 - Groupthink
 - Normalization of deviance
 - Hidden profiles



Conclusion

- Theoretical Roots of EVM
- EVM Research
- Organizational Research



The premiere workshop on Earned Value Management



IPM 2016

October 31 - November 2, 2016
Bethesda, Maryland

From C/S2 to EVM to IPPM: The Next Generation of Integrated Program Performance Management

Title:

Questions?