RESEARCH PROGRAM WORKING SESSION SUMMARY
EMEA – St. Julians, Malta
May 18, 2008

Morning Session

Complexity in Project Management and the Management of Complex Projects- An Academic-Business Roundtable Discussion and Workshop

Key Findings from this session are as follows:

- **Complexity in projects is increasing as are the number of projects**
- **There are many reasons for complexity including their alignment to business outcomes resulting in time pressure, stress and often unrealistic stakeholder expectations.**
- **We need to understand the reasons for complexity to effectively manage them.**
- **Emergent behavior (project and people) during the project cycle leads to complexity**
- **Mapping techniques and diagrams aid in simplifying complex projects into their components.**
- **Feedback loops need to be understood, recognized and evaluated for mitigating actions. Soft issues such as culture, language, leadership and personal relationship management all contribute to complexity and it's management.**
- **Communication technologies both increase complexity and can be used to manage it more effectively.**
- **Ongoing training and personnel development are essential for project teams and leaders**
- **Greater complexity requires greater flexibility for it's management.**

Panel Presentation notes (review slide set provided at the session)

Dr. Terry Cooke Davies:

Are projects becoming more complex or are we simply recognizing that this has been something that has been going on all along?

What are the implications for the profession?

Dr. Christophe Bredillet:

What are we to make of complexity on project and program management?
An epistemotical praxeological perspective:

- There is an increase of complexity in PM.
- According to research, complexity is part of our world and the way we manage organization is no longer working.
- We have complex socio-technical systems; in this case we call into play the law of requisite variety, and, we need to control variety.
- Project management also needs to be simple, as far as its principles are concerned (like white light is transformed into multiple colours through a prism, project management applications may be seen as coming from some general principles).
- Project management is a process of naming the revelation of creation.
- How to cope with these various complex management situations?
- Acting in complex situations involves "Modelling to understand" that is, as stated by Le Moigne (1995) *"an 'intelligent' action, 'ingenium', this mental faculty which makes possible to connect in a fast, suitable and happy way the separate things"*.
- Thus, we can consider that there is a systemic and dynamic link between mission, management of programs and projects, information, knowledge, learning and understanding in a given context and under given conditions.
- As project managers are we part of the system, are we under the scrutiny of an invisible superior?
- Basically what we can say is that if we consider projects as complex systems we have to consider that acting and learning are inseparable.

- We need to have some rules in order to model our understanding:
    - Learning is not cumulative—we need to develop our learning.
    - We are going to have a different view of the world through project learning.
    - We are learning in practice and acting to be connected and interrelated.
    - We need to understand projects- we need some kind of modeling perspective.
    - We need a specific mindset to express complexity.
    - We need an analogically situated experience.

Dr. Terry Williams:

A few thoughts on complexity in Project Management:

- If you don't understand how it reacts when you kick it…that's complexity.
- Systemic effects in Projects: The simple idea is that when we look at projects we are used to breaking things down into bits (work break down structures) when it starts to get into positive feedback groups quite simple behaviors become complex; in simple physical systems clearly emergent behavior is different than the simple things that come in.

Feedback and acceleration

- Catastrophic failure comes from positive feedback; perturbations to a project often create interactions that feed on themselves causing 'vicious cycles'
- Project managers usually have to respond to disruption by taking decisions which seek to *retain planned delivery and planned quality - acceleration*
- These actions are also disruptions that, in turn, must be contained within a shorter time scale, so *increasing the power of the vicious cycles*;

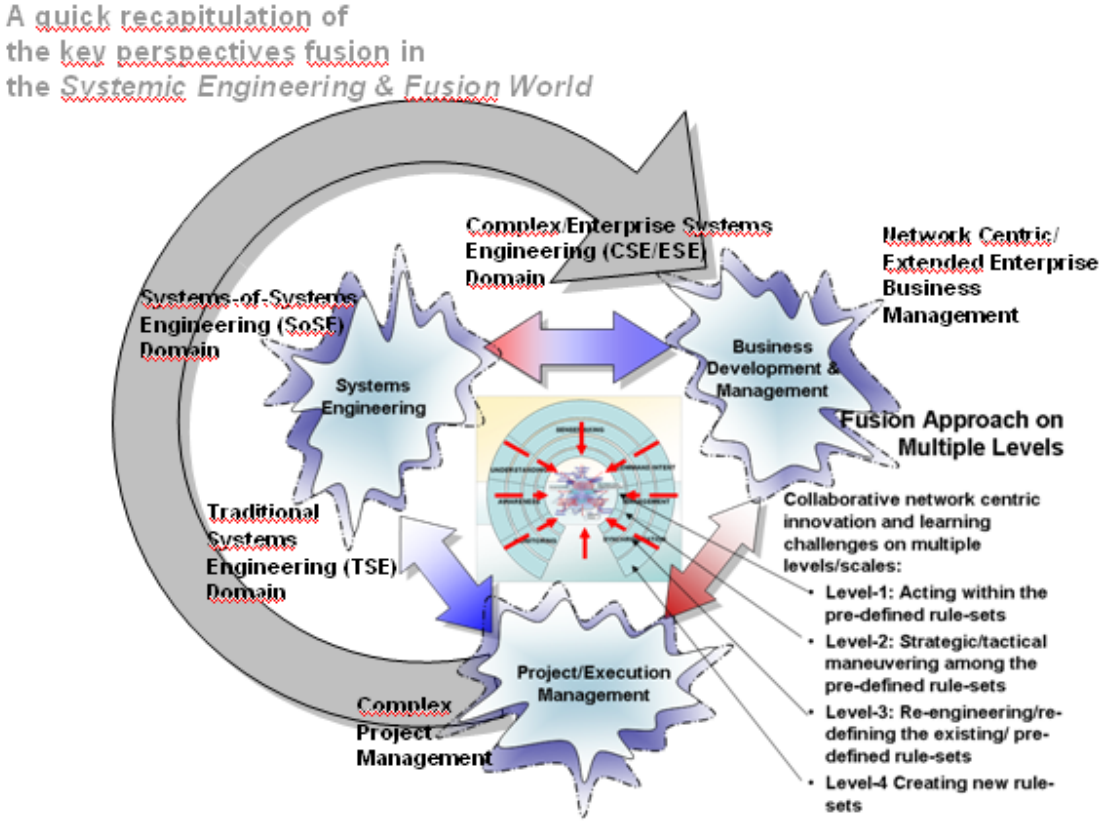
- You have to have some kind of method of how things happen such as mapping techniques and diagrams.
- You have to look at the ramified cause of change.
- We have to remember that there are soft causes that can happen and we have to model them.
- Not modeling something is the worst thing you can do.
- Soft effects can come from:
    - The client
        - Scope changes; delays; extra supporting work; excessive comments/design-proving/studies; interference; lack of trust
    - The workforce
        - Disincentivisation; schedule pressure, exhaustion, effects on quality; morale

    - Management
        - Management reacting to project slippage by accelerating; managers rely on measurements and perceptions of reality
- Projects are about teams of people coming together to do things; when you have physical teams together, strange behavior emerges. The larger the team, the more complex.
- Vicious circles contribute to complexity
- Even within the project we have to see how these vicious circles pan out.
- So what?
    - Remember Systemicity
        - Systemicity is important and needs to be taken into account (Cause mapping has been shown to help gather the risks and represent systemicity, particularly where cross-functional groups work together
        - Mitigation actions are important and need to be taken into account
        - In a complex project, actions or risks sometimes don't have the effect you expect; in particular, feedback loops must be recognised, analysed and controlled
        - Important in making up-front decisions on projects
    - Risk analysis: which are the big risks?
        - This suggests that we need to consider different types of risks, e.g.:
        - The type of client
        - A domain that has recently moved from the public to the private sector
        - The character of the project manager
        - AND that those that might set up positive feedback might be the most important risks
    - Learning from projects
        - If you try and look back at a project, determine what you can learn from them. The difficult part is mapping out what happened and what went wrong and learning the complex lessons.
        - Unless you sit down and really analyze what happened, you won't learn the lessons for next time.
    - The people basis of project management
        - We need to think a bit more about the theoretical basis of what we do, very complicated projects which move a bit, if you have time to think about it that's fine but when the three complicated projects you end up doing things immediately (without thinking) which can lead to negative impacts.
    - The theoretical basis of PM
        - Behavior complex & non-intuitive; causal feed-back, non-linear behavior, time-delayed effects;
        - Traditional methods suited to projects
            - with many elements, simple interdependencies
            - without high uncertainty
        - When uncertainty affects a structurally complex and time-compressed project, complexity starts to produce problems; we may need to think about adapting our project-management methods.

Eero Hollming:

How we can rise to the emerging project management challenges of today's world ?:

- Collaborative network centric innovation is a huge phenomenon.
- Complex systems are imbedded in this phenomenon.
- When we discuss complex project management we deal with deliverables and how to implement things.
- The business aspect-we are discussing how complex projects and business is interconnected-they are not clear anymore but they are in a way connected and this will be the core question in dealing with complex projects on the large scale.
- context—it is business change we are dealing with
- We must separate complex project management.
- Projects are complex because they are a larger system.



Chris Gumn

Practical Perspectives on Project Complexity:

- Which is most complex?
  - Stonehenge?—huge and impressive site—4000 years old—30 million man hours to do—which sounds complex
  - Great Wall of China? 2000 years old, 800,000 people involved.
  - Man on the moon? 39 years ago, 25.4 billion dollars.

    - Olympics? 7 year program, being developed on a piece of wasteland. 15,000 athletes, 34 sports.
    - SAP- 7 year program, 300,000 people, 100 countries bringing about business and cultural change in this huge organization.
- The answer is, it depends!
- You can measure absolute complexity in different ways: how many people involved, how many tasks.

Practical perspectives on project complexity

- Absolute complexity can be measured – tasks, resources, dependencies etc
- But projects also have relative complexity - time, tools, culture, people, environment
- Stonehenge would be simple now!
- Historically complex projects with simple or single objectives have proved achievable.
- In the post industrial, global world simple concepts such as a single integrated business appear to be increasingly complex, difficult to manage and prone to failure.
- In our practical experience this is due to 2 key factors:
    - Not understanding or taking account of cultural and human dimensions;
    - Forgetting a fundamental rule of project management – complex programmes can be made achievable by turning them in to less complex projects and managing the interconnections.

- Projects have relative complexity in addition to their inherent complexity.
- The length is a factor, when was it done, what tools were available, what experience did they have to deliver a project.
- Culture-environment is an important factor.
- Technology. We can build another Stonehenge now and it would be simple because of new technologies.
- Building physical barriers is complicated and causes complexity.
- Some of the projects we discussed have been simple since they had one single thing they had to achieve.
- We like our organizations to work in one specific way.
- Take a very complex program and turn it into a number of simple projects
- Underlying causes of perceived complexity in global organizations
    - Collection of thoughts in what makes projects to execute which makes complex projects.

- Kind of things that we see that cause problems such as logistics, geography, and time, stakeholders—the business, the organization, board—half the time they want what's being delivered.
- Technology—size and scale bring their own complexity.
- Culture and language—underplayed a lot, particularly in western organizations—forget the cultural complexity not only in terms of the teams, you have to really be careful how you put those teams together as well as the project culture.
- People forget the basics.

Dr. Lynn Crawford

Why is there a sudden interest in complexity?

- To get anything done you have to reduce it to something that is simple and straightforward. What we tend to lose the sight of in training is that we focused on the management of the project and lost sight of that requirement to understand it's interconnectedness.
- There is a need for managers of more challenging projects.
- Multiplicity of relationship models.
- While we have a level of authority, it reduces complexity—when you have no control over the people, complexity increases.
- Organizations stopped mentoring their own people, too much out-sourcing and now they are realizing the error of their ways—how can we suddenly have experienced managers that can handle their projects?
- Significant growth in number of projects.
- We have also had an aging work force
- And within that we have various perspectives and ways people talk about
  - Complexity of projects
  - Complexity of project environment
- We looked at how organizations categorize their projects that are complex
  - Organizations use an average of five attributes to describe complexity
  - As you look at the list you get down the list and get to the softer aspects—which do not get much attention.

Categorizing for Complexity

	Attribute	Count	%
1	Project scope	45	16.0%
2	Technical complexity	39	13.8%
3	Number of functions and skills	30	10.6%
4	Organisational involvement	30	10.6%
5	Level of ambiguity / uncertainty	27	9.6%
6	Number of sites, locations, countries	26	9.2%
7	Organisational impact	24	8.5%
8	Clarity of goals / objectives	22	7.8%
9	Risk source and location	15	5.3%
10	Familiarity	13	4.6%
11	Standalone or component of larger project	11	3.9%
	N =	282	100.0%

Crawford, Hobbs & Turner, 2005

- If we look at the management of complexity: we see that there are a lot of soft things that have to do with people and relationships.
- We all know that all projects are not the same and that there are different types of projects and practical aspects of that. Different people to manage them with different characteristics.
- If people are involved it makes things more complex.
- PMI funded Research Project: 'Impact of Complexity Theory on Project Management' focused on Complex responsive processes of relating:
    - There is a human need to communicate and relate and interact
    - These processes of relating are complex and responsive
    - Interaction with humans is unpredictable
    - We use symbols which are created, reproduced, and transformed by our interactions
        - Models, words, we are creating and recreating meaning all the time and have to deal with it
    - Different interviews and examples of people experiencing complexity
        - Being in charge of projects is not about control-it's all about your interactions with people
        - Use your tools as part of that relationship-part of the negotiation
        - '*The emphasis shifts from the manager focusing on how to make a choice to focusing on the quality of participation in … conversations from which such choices and the responses to them emerge.'*
        - What we are attempting is difficult and very complex, everyone is in the process of finding out things about themselves, and if they had more experience they could have dealt with it differently so they had to work very closely together and with that is the increase in the complexity.

Group Discussion:

Are projects becoming more complex or are we becoming more aware of complexity?

1. Implications of complexity for organizations:

Group 1

- Time pressure is increasing and geographical space is increasing and those two factors make complexity
- Changes in technology
- Nonlinear development
- Democracy-control structure
- Contextual change
- Communication technology allows us to better manage projects but the counter argument is that we get so much communication that it makes things more difficult to manage.
- Projects are increasing and most of these seem to be more complex.

Group 2

- The changing nature of society and increase in communication
- New technology can develop during the life of the project
- Increase in the number of parties involved in the projects
- Impacts in the projects are global
- Perception of the current view
- Span control

Group 3

- Projects are becoming more complex
- Cultural reasons
- Human relationships in the past made it much easier to command a structure but now where there is more of a democracy
- More competition
- Time constraints
- Stakeholders demands are more unrealistic
- Geographical separation—virtual projects, not the same as having a workshop face to face.
- People are more aware of feelings that adds to the complexity, and people's dealings of how to handle stress and other factors
- In the construction field we took the example that technology is not becoming more complex but we are having to do more things in parallel
- Power plant in the 80's took three years to build and now it takes 1.4 years with no technology advancements, just the demand and the people
- Multicultural people involved in project teams- people say yes or no in many different ways.

Group Discussion Wrap Up:

Dr. Terry Cooke-Davies:

Evolution is a process of becoming more complex. Our culture has evolved. As long as evolution continues, we must get used to complexity changing and technological complexity. It is inevitable. Regardless of the implications, projects are becoming more complex now.

1. Implications of complexity for organizations:

Looked at organizations and what they would have to do to survive:

- Change the approach.
- Train people to understand cultural differences on a deeper level; to get into the psyche of people.
- The issue of focusing on how to organize teams—which people do we put together to deal with these cultural developments.
- Companies need to train people in stress management because that is increasing because of shortened project times.
- Organizations need to try to learn more about their clients, sponsors and adapt to be able to cater to this.
- One important thing is that since projects are getting more complex, organizations have to learn how to break these down to simpler structures and getting the basics right.
- A lot of organizations don't know when to kill a project—so getting the big picture right and knowing when to focus on the next big thing is important.
- Because of the stress factor and the fast pace, organizations need to give recreation time to people, encourage team building and things of this nature.
- Complexity is increasing the risk so organizations need to invest more time in commercial and risk management techniques.
- Implication for a lot of the discussion in complexity in project management: we need more complex systems to manage them—getting the basis right, if you don't have the clear basics right, and clear sponsors, no matter how complex your system is, it won't work
- A project is not complex but complicated; complexity cannot be split into pieces so define complexity in order to help you out.
- When you are talking about the human body, nature has designed us in a modular way, and functions as an entity; it is modular design which allows you to manage these complex projects.
- We have yet to discover some of the rules for managing complexity, but it doesn't mean they do not exist.

2. Implications for PMI and other professional associations:

- PM professional associations have been largely involved with individual capabilities but a lot of these capabilities go beyond the individual.

- We have to go beyond the individual to the organization.
- There can be different takes on this where the professional associations should be going. One answer might be specialization.
- Systems engineering, project execution, who do they see as the expert practitioner, is it the manager, PM, program manager, or in fact their business manager or sponsor, or even CEO—who is the expert practitioner that you are trying to develop?
- One of the reason we are getting bigger and more complex is that there is a link to business strategy and their goals; enterprises look to transform themselves—people who are involved in the execution of the project are not just the PMs, people in those sponsorship positions are somewhat unaware of what needs to happen for these projects.
- There are a lot of people involved other than PM in managing projects—if our domain is to manage projects instead of project managers; some believe that the management of projects is a subset of management.
- Compare and contrast systems engineering and program manager: depending upon the kind of business you are in; there might be a high degree of overlap or a low degree of overlap.
- Systems engineering would be more product related and program management would be more process related.
- We are entering, more and more, into these kinds of transformation issues, what kind of capabilities are we dealing with? What kind of capabilities do we need to do the job and what is the lifespan of those capabilities? Systems including human activity systems.
- Greater complexity demands greater flexibility. Professional organizations have to cater to this flexibility. Cost management for example, scope changes, there are certain times where you do not have to follow the process in order to get things done.

3. The development of expert practitioners:

- Projects are lead by teams, executive leadership and facilitation skills important features.
- How we manage the interlinking of components is important.
- Development of expertise soft skills and leadership.
- Deciding and communicating a vision.
- Recognition and understanding of interaction.
- In terms of the domain of managing complex projects, how do we make sure that we are maintaining expertise provided for those plans of businesses? What difference does it make to development?
- Idea that should be studied: should we go further into specialization, into expertise, or in order to be able to go with complex projects should the necessary skills encourage flexibility?
- If we are going to develop people differently and organizations are going to have to be aware of many different dimensions, what are the implications for professional associations?

Afternoon Working Session on Organizational Needs and Expectations of Project Management in the EMEA Region—Jason Dolfi

Summary: Based on the individual work completed before the breakout session, most participants believe the majority of resources in their company are focused on *internal infrastructure projects.*

Q: Please indicate the allocation of resources across these three businesses in your company.

Business Area/Project Types	Average*
Internal infrastructure management	59%
Customer relationship management	21%
Innovation and commercialization	20%

**This is based only on those participants that completed and returned the individual work. Not a statistically valid sample.*

It is not surprising then that the area rated the highest when it comes to "tie to overall goals of the company" was also *internal infrastructure projects.*

Q: To what degree do the following project types within your company tie to the overall goals of the company?

Business Area/Project Types	Average Rating*
Internal infrastructure management	4.4
Customer relationship management	3.8
Innovation and commercialization	3.6

**Based on 5-point scale, 5=Critical to goal achievement, 1=Not tied to goals. This is based only on those participants that completed and returned the individual work. Not a statistically valid sample.*

When asked about the organizational expectations for projects in each of these business areas, *internal infrastructure projects* clearly were expected to increase profits for most. While it appears that this profit improvement is mostly geared toward increases in operational efficiencies, a few participants did note an expectation of increased sales as a result of *internal infrastructure projects.* Other common expectations include "on time delivery" and "enhanced quality of product/service".

Customer relationship projects are also expected to bring increased sales according to participants, both in terms of new customers and better customer retention. The increased customer retention is expected partly as a result of the better customer information that is gained through some *customer relationship projects.*

Increased market share (in current marketplaces) and penetration into new markets are the primary expectations of *innovation and commercialization projects.* However, several participants did mention that their organizations were expecting sustainable, environmentally-friendly products/services from these projects as well.

When asked of the barriers to achieving these expectations, the list was long. However, some common themes did emerge around resource issues, internal business culture and customer expectations. While most mentions of resource constraints focused on not having enough PMs or team members or not having PMs or team members with the right skills or experience for the project, there were several mentions of a lack of funding for projects and project management in general. Internal business culture issues such as "resistance to change" and "low risk tolerance" were also mentioned as barriers. Likewise, over-demanding customers and project change requests were also mentioned as common barriers.

In order to overcome these barriers, participants suggested their firms should implement standard project management practices/best practices across the organization. Those that did not have a PMO suggested one should be created in their organization and those that had many PMOs suggested that an Enterprise-wide PMO should replace the silos of PMOs. Perhaps most importantly, participants voiced a need to prioritize projects by analyzing each projects connection with the organization's strategy and focusing on those projects most critical to that strategy. Lastly, participants call for better PM knowledge management within their organizations; tracking lessons learned and project value delivery.

GROUP 1

Group Composition:
Composed of people in the following industries: Travel, construction, training, fashion (Gucci), consulting, IT, and procurement

What are the organizational expectations (*i.e.*, what business value should be created for projects supporting each of the following businesses in your company?

Expectations for Internal Infrastructure Projects:

1. Common:
    a. increased motivation and consistency
    b. on-time delivery
    c. on time budget
    d. improving third party relationships
    e. increase quality/reduce lead times
    f. improve functionality
2. Differences:
    a. nothing

Expectations for Customer Relationship Projects:

1. Common:
    a. sales growth, market presence
    b. repeat sales for market presence
    c. information availability and transparency
2. Differences:
    a. to learn customer behavior onsite and abroad

Expectations for Innovation and Commercialization Projects:

1. Common
    a. increasing market awareness
    b. keeping up the growth survival and profit of the organizations
2. Differences:
    a. to go paperless-to do things better
    b. use of new material such as leathers and fabrics (fashion industry)

For each business type, what if any, barriers/issues prevent projects from achieving these expectations within your organization?

Barriers for Internal Infrastructure Projects:

1. Common:
    a. resistance to change
    b. getting and retaining the right people because of market conditions and because of human resource procedures
    c. having the right people skills
    d. finance

2. Differences:
    a. Lack of organization among craftsmen (fashion industry)

Barriers for Customer Relationship Projects:

1. Common:
    a. reaching clients
    b. customer reliability
2. Differences:
    a. on time delivery
    b. management protects the exposure of high level clients and kept it within limited circle
    c. Privacy regulations in maintaining a customer data base
    d. Management doesn't recognize these types of projects as projects

Barriers for Innovation and Commercialization Projects:

1. Common:
    a. Financing/cash
    b. low risk tolerance
2. Differences:
    a. customer expectations might change
    b. Enough cooperation to know what the customer really wants. Redundant in the fashion industry.
    c. Technology overload among current staff
    d. Who are the right people and right skill sets: suffered from having not the right people—current market demand was pretty high, people across the board, retaining people as well is a problem.

GROUP 2

What are the organizational expectations (*i.e.*, what business value should be created for projects supporting each of the following businesses in your company?

1. Answers varied according to the level that a person sits within an organization
2. Sustainability is an expectation of innovation
3. Responses varied depending on whether the organization was employed creative thinking and/or service based or asset based.

For each business type, what if any, barriers/issues prevent projects from achieving these expectations within your organization?

Common to Infrastructure, Customer and innovation:

1. Number of things that were common:
    a. funding
    b. skills
    c. turnover
    d. culture

e. infrastructure
f. fragmented service providers
g. resistance to change
h. customer relationships
i. internal communications
j. attitudes towards customers
k. lack of resources
l. competing projects and or limited funding
m. vision

GROUP 3

What are the organizational expectations (*i.e.*, what business value should be created for projects supporting each of the following businesses in your company?

Internal Infrastructure:
1. Business Profitability
2. Business Efficiency
3. Legal Compliance

Customer Relationship Projects:
1. Business Growth

Innovation and Commercialization Projects:
1. Business Growth
2. Business Efficiency

Across the board- Customer Satisfaction is key

For each business type, what if any, barriers/issues prevent projects from achieving these expectations within your organization?

Internal Infrastructure:
1. Politics
2. change management
3. business model
4. portfolio management
5. cultural

Customer Relationship Projects:
1. Politics
2. lack of Portfolio Management
3. cultural barriers

Innovation and Commercialization Projects:
1. Politics

2. lack of Portfolio Management
3. Cultural