Management of Uncertainties in Projects with Overlapping Phases

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Fast delivery of projects is very important for profitability and success of companies both in manufacturing and construction industries. This puts pressure on project managers to further reduce the project delivery time. One common compression strategy is overlapping activities which normally should run sequentially. This strategy is known as concurrent engineering. Although concurrency can theoretically help any project to finish faster, there are many factors (e.g. rework, productivity, communication, etc) which can turn such initiatives in a project to a failure and even result to increased duration of the project. Decision making on how much to overlap activities, when to exchange preliminary information from one activity to another and many more are difficult and complicated decisions for managers both in manufacturing and construction projects. A large part of reasons for this difficulty is because of inherited uncertainties in projects which by activity overlapping their effects are enhanced. Therefore, development of concepts and methods to help project managers for decision making under uncertainty is very important and essential. Although the problem of managing concurrent development processes has been investigated in extant literature, the approach in this study is different. Specifically, I aim to use a System Dynamics, a computer-based simulation tool, to construct a process model which can forecast the performance of the project using simulated data. The model will be induced based upon empirical data from two distinct case studies in which the overlapped approach has been applied: the first case project is a construction project to deliver the Scottish Parliament. The second case is a new product development project in a manufacturing company. Data collection will involve face-to-face interviews with project managers and design engineers, as well as reviewing secondary data sources like reports which are produced for other purposes. Because of more similarity (in terms of development processes) between construction and manufacturing projects in the product design, the case studies will be more focused to the product design phases within the case studies. After testing that the simulation model sufficiently represents the real situations in the case studies, the model will be simulated under different activity overlapping strategies and their effect on the project performance will be evaluated. Managerial insights will be drawn from analysis of the simulation results to help project manager in designing the most efficient activity overlapping strategies.



Initial set of questions for interview

- 1. Can you define a boundary for this project within this organization which can define who is involved and who is not involved in this project?
- 2. Do you have phases in your project?
- 3. Is there any problem concerning the targets like moving targets?
- 4. Is there any mismatch between the organizations functions regarding their understanding and expectations from the project?
- 5. Is the delays caused by assignment of resources to problem solving significant?
- 6. Do you have problems of inter-team communication?
- 7. Does postponement of dependent phases to take action under less uncertainty practiced or not?
- 8. How a decision to commence a dependent phase is taken?
- 9. Are you considering using any technology or method in your design which imposes any uncertainty in terms of its reliability?
- 10. Is the design of manufacturing processes organizationally separate from the product design?
- 11. How much manufacturing is involved in the design? How their concerns are taken into account in the design?
- 12. Is there any circulation of information between design and manufacturing?
- 13. Is design freeze practiced in this organization? What is the purpose of practicing design freeze?
- 14. Under what circumstances a frozen design may be considered for changes?
- 15. How information about the design communicated within the project team?
- 16. What metrics is used for measurement of the progress of the activities (e.g. open issues, consumed resources ...)?