



# R&D Grant Guideline on Developing Project Plan

# Table of Contents

- About Research Project Plan
- Research Project Scope
  - Project Scope and Research Scope
- Research Project Schedule Plan
  - Attributes of Good Schedule
  - Example of Inadequate Schedule
  - Example of Better Schedule
- Research Project Cost Plan
  - Cost Definition and Terminologies
- Research Project Human Resource Plan
- Research Project Risk Plan
  - Risk Definition and Terminologies
  - Risk Code Definition
  - Risk Plan
  - Risk Statement

- CREST favors well-thought off research plan while recognizing the realism of progressive elaboration in the development of any typical project
- Properly documented research project plan provides indication to CREST how research project will be carried out
- This document guides research project plan to address primary CREST concerns only
  - Scope description
  - Schedule
  - Cost plan
  - Resource plan
  - Risk plan
- This document does not outline standard

- Research project scope should be defined with greater specificity
- Research project should be decomposable into several subcomponents and indicated accordingly in the research project plan
  - By objectives: according to research objectives
  - By parts: according to different units of research
  - By phases: according to logical research sequence
  - Combination of the above
- Research project plan should cover project scope as well as research scope

- Research scope and project scope should be well integrated to ensure desired outcome can be achieved

<b>Project Scope</b>	<b>Research Scope</b>
Describes work needed to carry out the research. E.g. hiring of researchers, buying equipment.	Describes the objectives, findings, analysis and results of the research. E.g. experimenting ABC.
Results in completion of the research and deliverables.	May include subsidiary research components.
Deliverables include student graduation, journal paper, IP submission, etc.	Results include theories, prototype, model, etc.
Completion quality is measured against project plan.	Completion quality is measured against research objectives.

- Schedule can be communicated in tabular or graphical form
- Complete schedule includes information on assumptions and constraints considered
- Consider using tools and techniques that aids development of good schedule
  - Critical path method
  - Critical chain method
  - What-if scenario analysis
- Schedule should indicate tasks or activities, milestones, owners, sequence, dependencies, date and duration

# Schedule Definition and Terminologies

<b>Subcomponents</b>	Research is broken down into distinct objectives, parts, phases, etc.
<b>Tasks/activities</b>	Each subcomponent is broken down into list of meaningful activities or tasks
<b>Sequenced Activities</b>	Activities are sequenced based on known dependencies and constraints
<b>Milestones</b>	Events that signify important direction are marked so that they receives special attention
<b>Activity owner</b>	Activities or tasks have assigned owner indicating types and quantities of resources
<b>Durations</b>	Valid estimates for the time needed to perform each activity or task are stated
<b>Overall Schedule</b>	Synthesized of individual tasks, durations and dependencies into a holistic view of the research

# Example of Inadequate Schedule

*inappropriate timeline resolution*

Task Name	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb
<b>Hire MSc student researcher</b>									
Candidates identified	█								
Administration and registration paperwork		█							
Student registered		█							
<b>Purchase software</b>									
Raise purchase order	█								
Software package arrived		█							
<b>Develop simulation model</b>									
Team meeting			█						
Trial and error			█						
Develop necessary functional blocks				█	█	█			
Testing #1							█		
Testing #2							█		
Validation with platform MNO								█	
Validation with platform PQR								█	
Simulation model complete									█

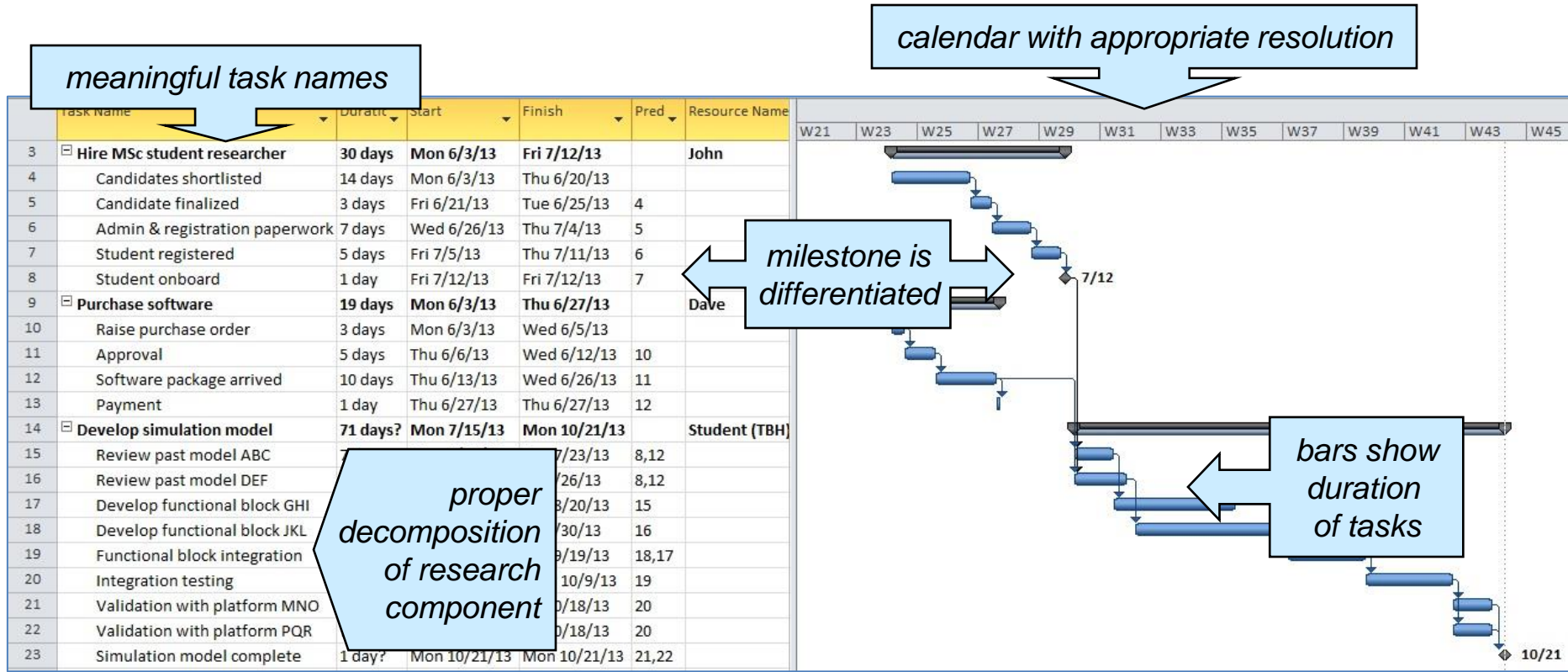
*important milestone not indicated*

*task names are not meaningful*

*start date, dependency and task owner are missing*



# Example of Better Schedule



*proper decomposition of research component*

- Thorough cost plan should be comprehended during research project planning
  - Activities eligible for CREST funding should be included in CREST R&D Grant application
  - Activities not eligible for CREST funding should have plan for other funding source
  - Certain cost elements i.e. industry contribution, should be declared in CREST R&D Grant application although not eligible for funding
- Good cost estimates can be obtained from
  - Activity/task cost estimates
  - Resources to perform tasks
  - Expected contract, equipment, material
- Basis of estimates and assumptions should be clearly noted

<b>Cost Plan</b>	Overall cost plan for the research project encompassing both non-eligible and eligible CREST funding items.
<b>Requested budget</b>	Eligible but unapproved amount requested during CREST R&D Grant application, or unapproved change amount requested throughout the project.
<b>Plan of record budget</b>	Amount for the whole research project or for each expense category which were approved during grant application review. The plan of record budget shall reflect the updated budget after change request is approved.
<b>Expense category</b>	(1) Allowance and Study Fees, (2) Other Personnel Cost, (3) Rental, (4) Procurement of equipment, (5) Procurement of Software, (6) Procurement of Research Material, (7) Maintenance and Repair, (8) Miscellaneous.

- Research project plan should address
  - Research team composition
  - Roles and areas of responsibilities, e.g.
    - Project leader
    - Principal investigator
    - Researchers
    - Advisors
    - Stakeholders
  - Same person may hold multiple roles
  - Hiring plan: how and when they will be acquired if they are not on board
  - Training plan: what training is needed and how it will be fulfilled
  - Compliance: organizational and regulatory requirement considerations

- Research project plan should state identified risks and response plan
- Risk information needs to be accurate and unbiased to be credible
- Risks should be ranked and categorized according to its probability of occurrence and impact
- Grouping risks by categories can lead to developing effective risk responses. Categories can be by
  - Sources of risk
  - Rating of risk
  - Type of risk
- Risk response strategies can be to
  - Exploit, enhance, accept
  - Avoid, transfer, accept, mitigate, minimize
- Risk plan used in CREST R&D Grant applicant should be in line with risk plan used during project monitoring

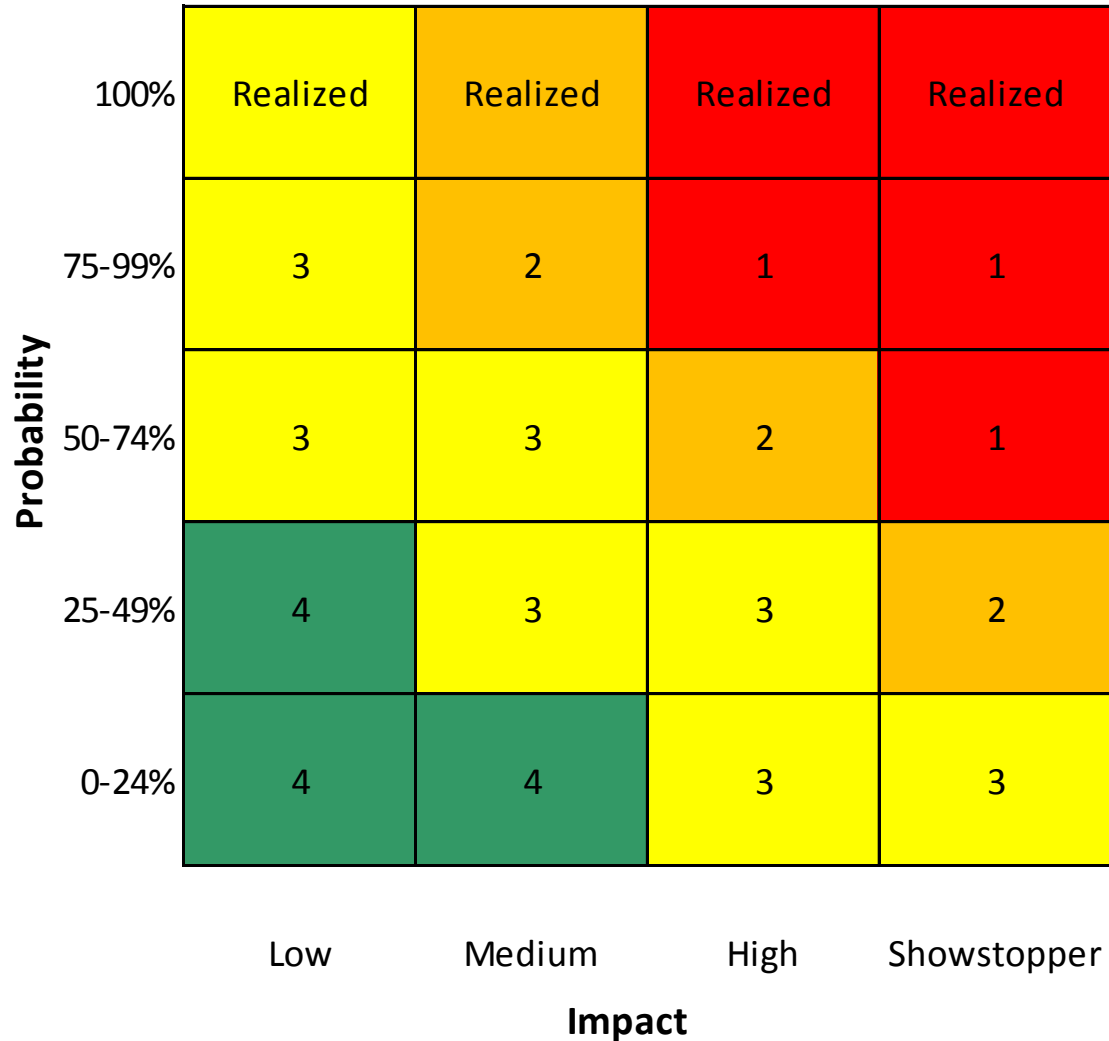
<b>Risk</b>	Uncertain event or condition that if occurs or develops has impact on at least one objective. May have one or more causes and if materializes one or more consequences.
<b>Risk condition</b>	Related to the environment which the research project is run and risk event occurs.
<b>Risk event</b>	The occurrence of the risk.
<b>Uncertainty</b>	State characterized by absence of information related to an outcome.
<b>Risk categories</b>	Example: (a) technical, external, organization, project management. (b) high, medium, low. (c) schedule, cost, resources, scope
<b>Risk impact</b>	Show stopper, high, medium, low
<b>Risk response</b>	Action to be taken in response to the identification of the risk. Response can be performed before of after risk event.

- Example of risk plan that should be included in the application

Rank	Risk Statement	Risk code	Risk response
1	Stability of software ABC for simulation work	1	Avoid: Pull in development of software ABC 4 weeks earlier and include software regression test
2	Inability to hire PhD student researcher before Q4'13	2	Mitigate: Hire MSc student currently studying in school
3	Fluctuation in currency exchange causing RM10k above budget	3	Accept: justify need for additional fund from school

- Should include both technical and operational

# Risk Code Definition



A risk matrix with Probability on the y-axis and Impact on the x-axis. The y-axis categories are 0-24%, 25-49%, 50-74%, 75-99%, and 100%. The x-axis categories are Low, Medium, High, and Showstopper. The matrix cells contain risk codes (1-4) and are color-coded: 1 (Red), 2 (Orange), 3 (Yellow), and 4 (Green). The top row (100% probability) is labeled 'Realized' in all cells.

Probability	Low	Medium	High	Showstopper
100%	Realized	Realized	Realized	Realized
75-99%	3	2	1	1
50-74%	3	3	2	1
25-49%	4	3	3	2
0-24%	4	4	3	3



- Decent risk statement
  - If the team does not have stable software code, then the experiment work slips
- Clearer risk statement
  - If the team does not have stable XYZ software code at ABC lab 4 weeks before experiment work starts, then the experiment work slips
- Better risk statement
  - If the Unit 1 research team does not have stable XYZ software code at ABC lab 4 weeks before DEF experiment work starts, then the completion of the DEF experiment work slips 5 weeks impacting Unit 2 of the research.