# Characteristics Of Software Project Management Tools

**A-** Enterprise PM.  
**B-** Open plan.  
**C-** Microsoft project.

<table>
<thead>
<tr>
<th>The characteristics of current tools</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Project information</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Using user ID and password before using the software</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Project name</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>- Description</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>- Company name</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>- Project manager</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>- AltMgr : (Alternate Manager who has full authority for the project)</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Type : (define the type of project, e.g., development, maintenance...)</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Client Total activities:</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>(the total number of activities within the project)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Total progressed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(the total number of activities in the project with status of in progress. This value is updated only when time analysis is performed)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Total complete</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(the total number of activities within the project that are complete. This value is updated only when time analysis is performed.)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Total relationships</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(the total number of relationships within the project )</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Total resources</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(the total number of resource assignments within the project )</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Data type</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(identifies the format in which the project has been saved)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Data access mode</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(identifies the mode in which the project is open: exclusive, shared, read only)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preferences</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(display project name, description, default date format, startup view, and)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Conversion :</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(to control the way in which Open Plan converts durations into minutes from different time units: per day, per week, per month)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Default duration unit: (minutes, hours, days, months)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Minimum calculated duration:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(this field controls the minimum duration unit that Open Plan uses in calculations)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Default activity type:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>= ASAP (calculates the early dates to be as soon as possible)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>= ALAP (&quot; &quot;, &quot; &quot;, &quot; &quot;, &quot; late &quot; &quot; )</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>= Start milestone (to signify the start of project phase)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>= Finish milestone (&quot; &quot;, &quot; finish &quot; &quot; &quot;)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>= Discontinuous (Open Plan interprets the specified duration of this activity</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Appendix A
as minimum rather than as a fixed duration during time analysis."

Subproject

(this activity represents a group of activities at a lower level of the same project, and allows Open Plan to calculate its duration on durations of lower level activities.)

Hammock

(Open Plan interprets this activity as a reporting hammock for other activities.)

Effort driven

(if more than one resource is assigned to the activity, Open Plan calculates the potential duration using the effort factor of each resource.)

External subproject

(the activity represents an external sub-project. If you select this activity type Open Plan allows you to select an external project to be represented by the activity.)

Exclusive

(in this mode, you have exclusive rights to the file. You can save your data using either the save or save as command)

Shared

(in this mode, Open Plan attempts to save data whenever you choose make changes.)

Read only

(in this mode, you can read the project information and copy the project using the save as command, however you cannot modify the original project in any way).

- Files (display project name, description, pathname of the project file,)
  - Calendar file:
    (displays the name of the calendar file currently assigned to the project, if it blank, it will calculate based on a 5-day work with no holidays and an 8-hour work day.)
  - Resource definition file:
    (displays the name of the resource file assigned to the project. This file can contain any number of resources, but only one definition resource file can be assigned to a project at any one time)
  - Code file:
    (display the code file currently assigned to the project and the code fields)

2 Open & edit project

- Open with ID# and the name of the project

- Open with project name

- Status
  0 not active, being estimating
  1 not active, being planning
  2 active statuses (required that the project estimated start date be entered)
  5 on hold
  7 completed ("""""" completion date be entered)
  9 withdrawn ("""""" a date withdrawal be entered in the project completion date field)

- Status : - Planned (the project has not yet started)
  - In Progress (the project has started, but is not yet completed)
  - Complete (the project is complete.)

  = Min Total Float: (the minimum total float on the critical path)
  = Early finish: (the early finish date of the project as calculated by time analysis)
  = Late finish: (the late finish date of the project as calculated by time analysis.)
  = Scheduled finish: (the scheduled finish date of the project as calculated by resource scheduling)
  = Project start :
  = Time Now: (the current status date of the project)
  = Target start : (is used when an external subproject has a relationship in the
master project.)
= Target finish: (the finish date that you impose on the project, the target finish date affects the dates that the program calculates, when performing time analysis or resource scheduling.)

= Finish type:
  - Not Earlier Than (the earliest date on which the project can finish)
  - Not Later Than (the latest date on which the project can finish)
  - On Target (combines the effects of the No Earlier and the Not Later target dates.)

- size - EST (Estimating)
  PR (Problem report)
  MIN (Minor project)
  MAJ (Major project)
  SUP (Support project)
  INT (Intermediate project)

- Resources
  - Resource ID/Code:
  - Resource name/description:
  - Category:
  - Department code:

- Variable cost unit (this is a required field for variable costs.
Enter the type of units that the unit cost is based upon. For example, if your variable cost is "computer paper" then this description should be "boxes of paper" if that is what your cost is based upon. In the time entry system and the spreadsheet/Gantt chart, your description will appear when you are in any unit field to help you determine what units to enter.)

- Curve: (if you leave this field blank, the amount of the resource requirement is interpreted as a level-rate-per-time unit. Thus, if the activity duration changes, the amount of the resource requirement also changes. You select one of the following):
  . T-Linear (the requirement is interpreted as a total quantity allocated as evenly as possible throughout the duration.)
  . B-Beak load (most of the resource effort is allocated towards the end of the duration.)
  . D-Double Peak (most of the resource effort is allocated to two peaks one near the beginning of the duration, and one near the end.)
  . E-Early Peak (most of the resource effort is allocated near the beginning of the duration.)
  . F-Early Peak (most of the resource effort is allocated at the beginning of the duration)
  . L-Late Peak (most of the resource effort is allocated near the end of the duration)
  . N-Normal (the resource effort starts with a minimal effort, gradually increases to the middle of the duration, and then tapers off.)

- Alternate: (display resource requirements that Open Plan may use during resource scheduling if the originally requested resource is not available.)

- Offset: (the number of time unit that must elapse between the start of an activity and the time when the resource starts working. For example, if you define the offset of a requirement as 5 periods, the requirement will begin on the sixth period of the activity duration.)

- Period: (the total time for which the resource is required. It could be M-month, D-day, W-week, H-hours, T-minutes.)

- Level: (the amount of resource requirement)
<table>
<thead>
<tr>
<th>- Time for resources</th>
<th>✓</th>
<th>✓</th>
<th>✓</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Planning date (use default or specific value)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>- Hours available</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>= work week</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>= start date</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>= end date</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Non proj</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Skills</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>- Cost</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>= Total cost</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Budget :</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Actual :</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>= Activity cost</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Budget :</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Actual :</td>
<td>✓</td>
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<td></td>
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<tr>
<td>= Resource cost</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Budget :</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Actual :</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Cost
- Budget
- Original cost (budget fields are intended to be used as estimates before more detail are known, budget fields are used to calculate project backlog in management reporting)
- Revised budgeted hours and cost are used in reports to measure progress against plan
- Cumulative
- Original cost (Accumulated original plan form project tasks)
- Cumulative planned (current accumulated plan)
- ETC (Estimated Time to Complete is a resource estimate of the time required to complete each task to which he or she is assigned. When a task is entered to the system, ETC is equal to original hours and costs.)
- Actual hours and cost

3 Creating new project
- Providing ClipNote as instructions for entering data

Creating activities using:
- Activity ID :

- Activities description :

- Duration

- Activity type

- Resources selection

- Resource unit measure {cost, days, Qty, hours}

- Form update/add resource

- Def staff (Default staff is the person responsible for completing the work)

- Account codes (ex: Income, software, collecting,...)

- Comments

- Requester : (the name of the person who requested the project)

- Type (maintenance, development, problem report,...)

- Methodology link with description (is for establishing user defined help, typically used to support a company’s system development methodology.)
- Relationships
  - Activity ID:
  - Description:
  - Predecessor:
  - Successor:
  - Lag (it specifies a time delay associated with the relationship. Lags can be either positive (to indicate a delay between two events) or negative (to indicate an overlap or load time between two events). Lag is used to specify the number of periods that must elapse between events such as the finish of one activity and the start of next activity.)
  - Calendar:
  - TF: (this column displays the total float between the selected predecessor or successor and the displayed activity. Total float is the maximum number of work period by which activity can be delayed without delaying project completion or violating a target finish date.)
  - FF: (display the free float between the selected predecessor or successor and displayed activity. Free float is the maximum amount by which an activity can be beyond its early dates without delaying any successor activity beyond its early dates.)

1 = Create activities in a Barchart
- Time analysis: (to display activities bar chart, which depends on entering time now)
- Using relationship mode button to get the relationship between the activities)

2 = Create activities in a Spreadsheet
  - Activities type
  - Early start
  - Early finish
  - Total float
  - Calendar
  - Progress type
  - Progress value

3 = Creating activities in a Network
- Source scheduling (allows you to create efficient schedules that take maximum advantage of your resources)
  - Type:
    - Normal (the activity has no advanced controls for treatment of the duration during resource scheduling.)
    - Spilt (activity splitting allows the duration of an activity to be split into two or more pieces, to permit it to be scheduled earlier than would otherwise be possible due to gaps in the availability of a required resource. You can use two parameters to control the splitting of an activity during resource scheduling.
      - The minimum duration of an activity piece
      - The maximum number of pieces)
    - Stretch (activity stretching allows Open Plan to lengthen the duration of an activity during resource scheduling to reduce the peak requirements for constraining resource. To control the effects of stretching during resource scheduling, Open Plan allows you to enter a maximum duration for activity).
    - Re-profile (An activity with this attribute can be scheduled in any way consistent with available resources provided that the following criteria are met:
      - The duration of the re-profiled activity cannot be shorter than the specified duration.
      - The re-profiled requirements cannot exceed the original requirements profile.
    - Immediate (to start on its earliest feasible date, even if that means
overloading a resource. The earliest feasible date is the earliest possible date an activity can start in the absence of any resource constraints on its schedule.

= Min Duration (it controls the minimum duration of any piece of the split activity)
= Max Splits (it controls the maximum number of pieces into which the activity can be split.)
= Max Duration (when the stretch or Re-profile option is chosen, this field controls the maximum duration using any of the following duration units, M - month, W - week, H - hours, D - days T - minutes).
= Priority (it controls the priority of the activities during resource scheduling.)

<table>
<thead>
<tr>
<th>* Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Receipt (date the project request was received)</td>
</tr>
<tr>
<td>Admin</td>
</tr>
<tr>
<td>- Estimate (date the project was estimated)</td>
</tr>
<tr>
<td>- Approval (date the project was approved by management)</td>
</tr>
<tr>
<td>Original</td>
</tr>
<tr>
<td>- Start</td>
</tr>
<tr>
<td>- Complete</td>
</tr>
<tr>
<td>Sys sched</td>
</tr>
<tr>
<td>- Start</td>
</tr>
<tr>
<td>- Complete</td>
</tr>
<tr>
<td>Revised</td>
</tr>
<tr>
<td>- Start (the revised plan start date for the project)</td>
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<tr>
<td>- Complete</td>
</tr>
<tr>
<td>Actual</td>
</tr>
<tr>
<td>- Start</td>
</tr>
<tr>
<td>Percent complete at start</td>
</tr>
</tbody>
</table>

**Critical path dates** { revised or original }

<table>
<thead>
<tr>
<th>* scheduling</th>
</tr>
</thead>
<tbody>
<tr>
<td>= percent availability (maximum percentage of gross available hours that all resources can devote to a project.)</td>
</tr>
<tr>
<td>= hammock events (hammocking is an optional feature which ensures that all phases and activities completely encapsulate or hammock their subordinate events. This allows you to set relationships at the phase or activity level to which all the subordinate events will adhere. In time-oriented projects where each event generally begins when the previous event is done, hammocking is a useful feature. In a non-time oriented project, such as projects organized by department or skill, hammocking is less useful. Hammocking is useful for projects in which all tasks in each phase or activity depend logically on the completion of tasks in the preceding phase or activity.).</td>
</tr>
<tr>
<td>= priority (This value is typically used in the report writer to generate scheduling lists)</td>
</tr>
</tbody>
</table>

- Resource scheduling :(is the process of calculating schedules designed to reduce resource overloads. It produces two dates).
  - Scheduled start date:
  - Scheduled finish date:
- Types of resource scheduling:
  - Time-Limited (assumes that you cannot delay the project past its current date even if this means overloading your resources. It is sometimes called “resource leveling “ since it helps minimize resource overloads while maintaining the project schedule).
  - Resource limited (resource limited scheduling allows the project schedule to be relaxed in order to prevent resource overloads. Project is delayed so that resources are not overloaded).
- Resource type :
  = Normal (normal refers to a person who applies time to a
<table>
<thead>
<tr>
<th>Project</th>
<th>= Variable (refers to a non-person resource for which cost per unit is applied to project, e.g. machine time).</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>= Fixed (is non-person resource for which cost not time is applied to a project, e.g. a software or hardware purchase).</td>
</tr>
<tr>
<td></td>
<td>- Headcount (selecting headcount the system will consider the resource a staff member, unselect the box and system will consider the resource a nonpermanent or generic position, for example a generic programmer position)</td>
</tr>
<tr>
<td>3</td>
<td>Import/Export project</td>
</tr>
<tr>
<td></td>
<td>= save project</td>
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<tr>
<td></td>
<td>= restore project</td>
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<tr>
<td></td>
<td>= import project</td>
</tr>
<tr>
<td></td>
<td>= export project</td>
</tr>
<tr>
<td></td>
<td>Exchange and transfer project management information from other applications support MPX (Microsoft Project Exchange) format.</td>
</tr>
<tr>
<td>4</td>
<td>Dos base</td>
</tr>
<tr>
<td>5</td>
<td>View</td>
</tr>
<tr>
<td></td>
<td>= resource form</td>
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<td></td>
<td>= resource Histogram template</td>
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<td></td>
<td>= project form</td>
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<td></td>
<td>= event form</td>
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<tr>
<td></td>
<td>= Gantt chart</td>
</tr>
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<td></td>
<td>= CPM chart</td>
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<td></td>
<td>= PERT chart</td>
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<tr>
<td></td>
<td>= Resource Bar chart template</td>
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<tr>
<td></td>
<td>= Progress Bar chart</td>
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<tr>
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<td>= Activity cost speared sheet</td>
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<td></td>
<td>= Progress Network</td>
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<td></td>
<td>= Progress speared sheet</td>
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<tr>
<td></td>
<td>= Relations</td>
</tr>
<tr>
<td></td>
<td>= Multiple views for the spreadsheet at the same time.</td>
</tr>
<tr>
<td></td>
<td>= calculate and view total float time for (non-critical captivity)</td>
</tr>
<tr>
<td></td>
<td>= critical activities</td>
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<td></td>
<td>= activities calendar</td>
</tr>
<tr>
<td></td>
<td>= relationships calendar</td>
</tr>
<tr>
<td></td>
<td>= Project management directory process (PMD)</td>
</tr>
</tbody>
</table>

(For every project you can choose or add process, each process step may be one of the following types):

- OPP-View (displays an Open Plan view)
- OPP Function (perform Open Plan function)
- Document (opens a document)
- Run File (runs a file having one of these extenation EXE, BAT, or PIF)
- Reminder

PMD display the following information in each step in a process:

- Step name and the icon
- Required (indicates if the step is required for the process to be complete)
- Complete (indicates if the step is complete and ready for final publishing. A set of buttons allows you to perform the following functions:

Appendix A
- Publish (the publish command produces output for all required Open Plan view or document steps).
  - Cycle (the cycle command changes the status of all completed steps (defined as part of cycle) to incomplete. Typically you use this command at the end of a recurring process, such as monthly status report, to prepare the project management directory for next cycle).

6 Schedule

| = finite scheduler (it will schedule a project given specified start date, based on resource availability, relationships to other events, task duration, and enter constraints that you specified in the project system-scheduled start and completion dates are generated for each event). |
| = infinite scheduler (it will determine the task dates required to complete a project by the completion date.) |
| = multi project scheduler |
| = calculate average staff |
| = system calendar |
| = resource calendar |

7 Reports

| = spooler |
| - view |
| - print |
| - update |
| - delete |
| = all reports |
| = project |
| = resource |
| = All project management reports |
| = forecast |
| = cost accounting |
| = Time Estimating |
| = Time Schedule |
| = Time control |
| - Time |
| - Resources |
| - Schedule Logic |
| - Schedule analysis |
| - Information Management |
| = Quality Planning |

8 Communication

9 Using codes to summarize project data to appropriate levels for specific reporting requirements.

Appendix A
The objective of this survey is to investigate the following:

1. The types of software development problems companies are facing.
2. The types of software project management problems the companies are facing.
3. The stages of both software development & project management that have the most number of problems.
4. To evaluate the need for development tools to solve/minimize problems in the project.

The result of this survey will be used to determine the types of tools required to minimize incompleteness and delays in software projects.
Survey on software engineering project management

INSTRUCTION:

Answer by filling out the items on the questionnaire as they relate to you. For most answers, tick (✓) the box(es) most applicable to you. Where other responses are called for, special instructions are given. When completed, please return the questionnaire form in the postage paid reply envelope by 20/3/1997.

For enquiry, please contact (Mrs. Hanan Etaher D.) Tel. 7593184 / 7593195
E-mail: hanan@fsktm.um.edu.my

Please note that a web version of this questionnaire is available at:
http://www.fsktm.um.edu.my/~hanan/survey.html

Thank you for your kind cooperation and assistance.

Date: / / 1996

Interviewer’s/ Respondent’s Name: (Dr., Mr., Mrs., Ms)

Position/Occupation: ---------------------------------------------------

Telephone Number: ------------------ Extension Number: -----------

E-mail Address: ---------------------------------------------------

How many number of years experience in software development:
(Please ✓ one)

☐ 1 - 5
☐ 5 - 10
☐ 10 - 15
☐ 15 - 20
☐ 20 - 25
☐ Over 25
Company details

Please fill in your organization/institution particulars.

- 1 - Name of organization/Institution.

- 2 - Address

- 3 - Postcode

- 4 - Telephone Number

- 5 - Fax Number

- 6 - No of Years of Establishment
  (Please fill in.)

- 7 - Total IT Staff Employed
  (Please √ one)

  - 1 - 20
  - 21 - 40
  - 41 - 60
  - 61 - 80
  - 81 - 100
  - Over 100

Appendix B
COMPANY ACTIVITIES

- 8 - Industry Sector.
(Please ( √ ) in the box □ , the classification that best describes your organization's industry sector.)

□ Agriculture
□ Accounting
□ Banking
□ Building & Architecture
□ Business Services
□ Consultancy
□ Engineering
□ Library Information Services
□ Mechanical/Chemical
□ Others (please specify):

□ Education & Training
□ Medical & Health
□ Manufacturer of Computer & Communication Products
□ Software Development
□ Software Distributor
□ Government Agency
□ Manufacturing

- 9.a - Do you develop software systems in your organization?

□ Yes □ No

- 9.b - If Yes, what is/are the purpose(s) of the development?
(Please ( √ ) in the □ and/or ○ where applicable or specify otherwise.)

□ For internal/in-house applications.
□ For commercial applications.
□ Developing applications for other organizations.
□ Others (please specify):

□
- 10 - What are the languages and/or application development tools used for system development?

Fourth Generation Languages:
- CLIPPER
- VISUAL FOX PRO
- ORACLE
- VISUAL BASIC
- Others (please specify):

______________________________
______________________________
______________________________

Third Generation Languages:
- C++
- ALGOL
- BASIC
- PL/1
- APL
- COBOL
- FORTRAN
- PASCAL
- Others (please specify):

______________________________
______________________________
______________________________

Application Development Tools:
- PowerBuilder
- Authorware (Multimedia)
- CASE tools (please specify):

______________________________
______________________________
______________________________

- Others (please specify):

______________________________
______________________________
______________________________
Software Project Management

What is/are the problem(s) that you face in the following stages?  
(Please (✓) in the □ and/or ○ where applicable or specify otherwise.)

- 11 - Planning Stage

☐ Software costs and schedules are hard to prepare accurately.

☐ The methodology, standards and procedure are unclear.

☐ Losing the support of senior management due to a change in focus or change in people.

☐ Problems in strategies of the project due to:
  ☐ Incomplete/complex procedures.
  ☐ The standards are unclear.
  ☐ No methodology is used in the project.

☐ Difficult for project managers to select the methods and/or tools to use.

☐ Shortage of equipment, and manpower during implementation.

☐ Documentation such as in general plan or detail plan, is not clear and ambiguous.

☐ Supervisor, who is in-charge of control, monitoring of progress and correcting action plans, does not present reports regularly.

☐ Software project management plan is not clearly defined.

☐ Unable to determine the completeness of the software project management plan.

☐ Inadequate knowledge/training in using the plan inspection support tools.

☐ Delay in planning software project management.
- 11.a - Estimating:

☐ Difficult to estimate project size, cost, and schedule.

☐ Do not use past experience when the project is similar to those in the past.

☐ Do not decompose the project into smaller tasks to estimate individually.

What are the techniques/models that you use for cost estimation?

☐ LOC (Line Of Code)

☐ FP (Function Point) estimation.

☐ Effort estimation.

☐ COCOMO (COstructive COst MOdel)

☐ Putnam estimation model

☐ Function-Point models

☐ Automated estimation tools

☐ Others (please specify):

- 11.b - Scheduling:

Are these questions asked during software project scheduling stage? (Please tick (✓) the questions which are asked).

☐ How do we correlate chronological time with human effort?

☐ What tasks and parallelism are to be expected?

☐ What milestones can be used to show progress?

☐ How is effort being distributed throughout the software engineering
process?

☐ Are scheduling methods available?

☐ How do we physically represent a schedule and then track progress as the project progresses?

☐ The limitations/weaknesses of the available tools in this stage are:

☐ Unable to determine the accuracy of estimations (e.g. cost, & schedule)

☐ Require long training time to acquire the skill to use the inspection support tools.

☐ The planing tools are unable to integrate with other tools.

☐ Others (please specify):

_________________________________________________________________________

- 12.a - The planing tool used are not comprehensive enough to cover all the features of planning a project.

☐ Yes ☐ No

- 12.b - If Yes, what additional features do you expect?

_________________________________________________________________________

- 13 - Organizing:

☐ Difficult to select organization program model.

☐ Lack of qualified personnel in organization.
- 13.a- Which type of organization do you use in the project?
   - Functional organization structure
   - Project structure
   - Matrix Structure
   - Others (please specify) ____________________________

- 13.b- Which type of project teams do you use:
   - Egoles team
   - Hierarchical team
   - Others (please specify) ____________________________

- 14 - In your opinion what should be done to minimize problems in organizing?

- 15 - Staffing:

- Insufficient qualified people.
  - The staff turnover due to (poor working conditions, low pay, competitive job market is high).

- Assigning people late in the project (caused the following problem):

Appendix B
- Delay the project due to need for training.
- Delay in the project due to time needed to learn the system, equipment, and procedure.
- It makes the communication throughout the project more difficult.
- The staff do not know anything about the procedure or the rule planned in staffing plan.

16 - In your opinion how can the computer help/what should be done to minimize problems in this stage?

- 17 - Directing:

- In each stage the leadership is lacking in knowledge and experience.
- The staff do not report consistency day by day to supervisor/manager.
- Delegating authority not to a qualified person.
- Difficulty in communications between project members and the customers.
- Incomplete/unclear documenting important decision or managing change.
- PM (Project Manager) uses unfamiliar tools and methods that they have not used before that may cause the following:
  - The software developer does not see need to change the old way/style.
  - Software developers do not want to learn new techniques.
  - Others (please specify) ________________________________

Appendix B
18. In your opinion how can the computer help/what should be done to minimize problems in directing stage?

19. Controlling:

- The staff is not qualified/has not enough experience in reporting.
- The standard of performance (to describe/define the quality of a product) is incomplete.

20. The following are types of reports and methods of monitoring (Please tick (✓) on which are used in your project.

20.a. Reporting type.

- Budget report.
- Schedule report
- Man-day by task report
- Man-hour by activity
- Others (please specify):
- Milestone due or over due report
- Activity reports
- Trends charts
- Significant change reports

20.b. Monitoring the process methods:

- Baseline management paradigm.
- Budget reviews
- Process standards

Appendix B
- 20.c - Monitoring the product methods:

- Configuration Management.
- Product standards.
- Testing (unit, integration).
- Verification & Validation.
- Walkthrough and inspection.
- Others (please specify): ________________________________

- 21. Do you think faults/defects are detected during the review/inspection process?

  - Yes
  - No

- 21.a - If Yes, at which review/inspection process are the faults detected most critical/useful for measurement?

  - Requirements review.
  - Specification review.
  - Plan inspection.
  - Design reviews.
  - Code inspections.
  - Others (please specify): ________________________________

Appendix B
22 - Which project management tools are used in your organization?
Please circle on the number of the tool, and "X" on the level you find it.

1. Microsoft Project.  
   V.Good 0 Bad

2. Open Plan.  
   V.Good 0 Bad

3. Enterprise.  
   V.Good 0 Bad

4. Project Manager Workbench. (PMW)  
   V.Good 0 Bad

5. Primavera.  
   V.Good 0 Bad

6. Others (please specify):

- 22.a- In Your opinion, what are features lacking in those tools?
- 23 - Do you use project risk management in your organization?

☐ Yes  ☐ No

- 23.a - If Yes, what is/are the step(s) you perform?

☐ Identification  ☐ Analysis  ☐ Assessment  ☐ Resolution  ☐ Control  ☐ Monitoring

- 24 - The following list describes some features of available tools
Please tick ( √ ) in the ☐ for the features you find useful and specify other not included.

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<th>The features of project management tools</th>
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Appendix B
6 - Control the project
- Tracking project progress.
- Update the schedule with actual information.
- Others (please specify):

7 - View
- Gantt chart.
- PERT chart.
- CPM chart.
- Resource form.
- Project form.
- Resource Histogram template.
- Resource Barchart template.
- Activity cost Spreadsheet.
- Progress Barchart.
- Progress Network.
- Progress spreadsheet.
- Relations.
- Activities calendar.
- Relationships calendar.
- Resources calendar.
- Multiple views for the spreadsheet at the same time.
- All the changes dates which happen during the project displayed one by one to control project execution.
- Others (please specify):

8 - Communication
- Import project.
- Export project
- Link information between projects or between a project and another application, such as Microsoft Graph or Microsoft Excel.
- Using e-mail to exchange data.
- Others (please specify):
- Reports

- Project reports.
- Cost reports.
- Time reports.
- Forecast reports.
- Resource.
- All project management reports.
  - Scope planning.
  - Quality planning.
  - Quality Assurance.
  - Risk mitigation.
- Others (please specify)

- 25- Is there anything else that has been left out or are there any other problems you face in project management?

- Yes  [ ]
- No  [ ]

- 25.a - If Yes, Please give your comments/recommendations on aspects related to software project management that have not been mentioned/surveyed here (if any).

________________________________________________________

________________________________________________________

________________________________________________________

________________________________________________________

________________________________________________________

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________________________________________________________

Appendix B

B- 17
**Software Development Stages**

What is/are the problem(s) that you face in the following stages?
(Please (✓) in the □ and/or ○ where applicable or specify otherwise.)

- **26 - Requirement Stage**

  □ Difficult to understand the problem and the requirements.
    ○ Changes in the requirements.
    ○ The customer is not knowledgeable.
    ○ Others (please specify):

    __________________________________________________________

  □ There is misunderstanding in requirement when specialists try to define
    the specification to meet that requirement.

  □ Analysis team member lack of knowledge/experience in specification
    requirements.

  □ Software requirements are difficult to write correctly and ambiguously.

  □ The tools used in this stage are not enough to detect the faults/defects.

  □ Prototyping not used in the requirement analysis.

    □ Yes  □ No

  □ If Yes, the problems are:

    ○ The customer and developer disagree that the prototype is built to serve as
      a mechanism for defining requirements.

    ○ Others (please specify):

    __________________________________________________________
- 27 - Are these questions asked during software requirements specification?
   (Please tick (√) the questions which are asked).

☐ Do stated goals and objectives for software remain consistent with system goals
   and objectives?

☐ Have important interfaces to all system elements been described?

☐ Is information flow and structure adequately defined for the problem domain?

☐ Are diagrams clear? Can each stand alone without supplementary text?

☐ Do major functions remain within scope and has each been adequately
   described?

☐ Is the behavior of the software consistent with the information it must process
   and the functions it must perform?

☐ Are design constraints realistic?

☐ What is the technological risk of development?

☐ Have alternative software requirements been considered?

☐ Have validation criteria been stated in detail? Are they adequate to describe a
   successful system?

☐ Do inconsistencies, omissions, or redundancy exist?

☐ Is the customer contact complete?

☐ Has the user reviewed the preliminary user's manual or prototype?

☐ How are the software project plan estimates affected?

- 28 - Design stage

☐ The preliminary program design phase is not done in the project.

☐ Using preliminary program design phase is not necessary.

☐ Difficult to use reusable software components.

☐ Data structure characteristics are not completely evaluated.
☐ Data structure represented is more complex than necessary.

☐ The hierarchical menus is not used in design.

☐ The design is incomplete.

☐ Never trace the program to see whether it meets the requirement or not.

☐ If tracing is done, how frequent is it done?
  ○ every week
  ○ every month
  ○ every two weeks
  ○ once only

☐ Design team members lack knowledge/experience in design.

☐ The tools used in this stage is not enough to detect the faults/defects.

☐ Unable to determine the completeness of the design documents.

☐ The problems faced by designers are:
  ○ Error in programming language translations.
  ○ Error in data representation.
  ○ Error in design logic
  ○ Some of the team member are busy in designing/sharing other projects.
  ○ Defect in requirement specification.
  ○ Others (please specify): ____________________________

☐ Difficult to read procedural specification to define the algorithmic details.

☐ Others (please specify): ____________________________
- 29 - Implementation (Coding)

- The design is very complex to implement.
- The documentation in design incomplete.
- The language which is used is not suitable for the project.
- The programmers need long time to learn, and train on the programming language.
- Coding the programs takes a long time.
- The implementation is not completed within the time given.
- Tools not enough to detect the errors in the programs.
- The comments are not enough/ unclear to understand the function or the procedure.
- The comments mislead the reader.
- The comments are unmaintainable.
- Data type and data declaration are not proper.
- The mouse is not used to minimize the number of input action required by the user.
- The visual characteristics of the display (e.g. Test size, color, placement) is not carried over to the input domain
- The available tools are not suitable/difficult to use.
- Others (please specify):


- 30- Testing stage.

- The documents (e.g. Test cases & data) are not clearly identified.
Incomplete erroneous testing.

Because of complexity in architectural design, very difficult to test program.

The specialist in testing lacks knowledge/experience in testing process.

Difficult to detect the errors in the program due to the following:

- Complexity of program design.
- Some modules of the program are never tested.
- The logical paths in the program are never tested.
- Others (please specify): ________________________________

Errors are detected late due to insufficient tools.

The test cases have not been identified and not listed with their expected result.

Boundary values are not tested.

Timing and performance are not tested.

Misunderstanding of what is the mainstream path.

No test done on non-mainstream path.

Time for testing is shorten due to delay in the earlier phases.

Not much time is allocated for testing.

Errors due to rushing to get the product integration into a total system

- Number of errors in requirements and design stage are not being discovered until late into testing activities.
- Coding errors are found late in the system test phase that should have been discovered in lower-level software test.
- Others (please specify):

- 31 - Is there anything else that has been left out but relevant to this survey?

  □ Yes  □ No

- 31.a - If Yes, Please give your comments/recommendations on aspects related to software development or project management that have not been mentioned/surveyed here (if any).

- 32 - In your opinion, which of the following causes the most problems/risks?

  □ software development  □ project management

- 32.a - For the one you choose, what is your opinion to solve/reduce the problem?

OPINIONS

Appendix B
- 33 - Do you think, that you need other tools to help/reduce the problem?
   □ Yes  □ No

- 33.a - If yes, in which stage do you think tools are required?
   □ Requirements review.  □ Design reviews.
   □ Coding.  □ Specification review.
   □ Plan inspection.
   □ Others (please specify):

---

**COLLABORATION LINK**

- 34 - Would you/your organization be interested to have collaboration link in this research project?
   □ Yes  □ No

- 35 - Would your organization be willing to provide information/data for our case study in future?
   □ Yes  □ No

---

**OTHERS**

- 36 - Please give your comments/recommendations on aspects related to software development that have not been mentioned/surveyed here (if any).

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*Thank you for your participation.*
To:
Project Management Survey
Faculty of Computer Science & Information Technology
University of Malaya
50603 Kuala Lumpur
Malaysia

Fold Here
SoftProMT Prototype Tool Evaluation and Validation Questionnaire

University of Malaya / Faculty of Computer & IT
Software Engineering Laboratory

1. Optional Data

Date: __________________________ / __________ / 1998

Respondent’s Name: (Dr., Mr., Mrs., Ms)

Position/Occupation: __________________________________________

Organization: __________________________________________

2. Introduction

Project management is a system of procedures, practices, technologies, and know-how that provides the planning, organizing, staffing, directing, and controlling necessary to successfully manage an engineering project. Project management software is a tool to help scheduling, resources leveling, analyzing and reporting. Management principles, functions, and fundamental activities can be applied to manage any organization or activity. However, software engineering project management is similar in some aspects to other engineering projects but it is different in other aspects. Therefore, available software project management tools do not cover all software project problems sufficiently and thereby software projects are often late, exceeds budget and behind schedule.

SoftProMT is a prototype tool to help the project manager perform their responsibility to manage the project successfully and meet the target with low cost and high quality products. The prototype has been developed using the JAVA language and tested in the software-engineering laboratory at the Faculty of Computer Science & IT / University of Malaya as part of the master’s degree project. The current work is to validate and evaluate the SoftProMT prototype for research purposes.
3. The Objectives of SoftProMT

1. To analyse, compare, and evaluate the problems in past projects to prevent or avoid areas where problems arise, and for accurate resources estimation.
2. To reduce problems and difficulties caused by unqualified and unknowledgeable personnel.
3. To provide information for assigning personnel based on their work experience, qualification, and knowledge in specific area.
4. To provide an example on integrated system for better management support.
5. To reduce complexity in software development processes by tracking the chosen methodology.
6. To minimize the acquisition time for the suitable hardware or software component by providing up to date information on each product.
7. To facilitate the process of assigning the right person at the right time base on their availability.
8. To keep track of changes in the project requirements.
9. To produce valuable reports such as reports on critical problems, similarity between projects and others.

The prototype tool has been designed and developed to handle the above objectives. It will be very much appreciated if you would help to validate this prototype. If you do not have a ready validation mechanism, the following evaluation questionnaire could help you in the validation task.

4. Validation Questionnaire

4.1 The tool attempts to minimize the acquisition time for the suitable hardware or software component by providing up to date information on each product. Do you think that it is useful for managing and developing software project?

☐ Useful  ☐ Not useful

If there are any comments please specify.

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Appendix C
4.2 Do you think that displaying and tracking the chosen software methodology can reduce the complexity of software development?

☐ Yes ☐ No

If you have any comment(s) or suggestion(s), please specify

4.3 The provided information about assigning personnel and the way people have been assigned. Are these two features clear, sufficient, and easy to understand?

☐ Yes ☐ No

If you have any comment(s), please specify. If No, what is a better way of representing this feature?

4.4 Is the way the system analyses, compares, and evaluates the problems in past projects clear and sufficient?

☐ Yes ☐ No

If you have any comment(s) please specify. If No, please specify the limitation.

4.5 The system provides information about each problem. Do you think this information is enough?

☐ Yes ☐ No

Appendix C
If there are any other information, please specify.

4.6 Is the information about changing in requirements for specific project enough?

☐ Yes  ☐ No

If there are any comments please specify. If No, what kind of information do you expect it to be useful?

4.7 Do you think displaying risk level and the number of times the requirements have been changed are useful for monitoring and tracking the project?

[ ] Not useful at all  [ ] 0  [ ] Very useful

4.8 In the availability of any personnel, is the provided information clear enough?

☐ Yes  ☐ No

If there are any comments, please specify If No, what is/are the limitation(s)?

Appendix C
4.9 SoftProMT provides examples on integrated system for better management support. Is that useful?

☐ Yes  ☐ No

If there are any comments, please specify.

4.10 Is the SoftProMT friendly/understandable enough in terms of its button, tables, lists, captures, menus, graphic, and colors?

| Completely unfriendly | 0 | Completely friendly |

4.11 What about the help and messages support?

| Not enough | 0 | Very enough |

4.12 Is it easy to move around the system?

| Very difficult | 0 | Very easy |

4.13 Is there any unnecessary data, fields, or screens which gets in the user’s way?

☐ Yes  ☐ No

If Yes, please specify.
4.14 Was it easy to learn how to use SoftProMT?

[Rating scale from Very difficult to Very easy]

4.15 Does the system meet the need of a project manager in the context of managing the resources?

☐ Yes  ☐ No

If No, please specify.

4.16 What are the good features of this tool?


Thank you for your participation.