
State of California

Department of Technology

Project Oversight Framework

Complexity Assessment – Instructions

Statewide Information Management Manual – Section 45D

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2.3.8 IT Project Complexity Assessment

In many projects, complexities and complications are discovered only as work progresses, causing missed deadlines, budget overruns, and thwarted management expectations. If a project's complexity is not assessed at the start, the later discovery of complexity results in a last minute patchwork of Band-Aid® solutions—a key cause of scope creep and poor product quality. Invariably, the project team becomes overwhelmed by problems and loses control of the project. By ascertaining the complexity of a project at its early stage, most eventualities can be preempted and surprises kept to a minimum. Additionally, knowing the complexity of any project can be of considerable assistance when faced with project planning, estimating, and staffing decisions, including the level of project oversight required for the project.

The IT Project Complexity Assessment is a self-assessment tool to be completed by the project team members.

For the purpose of assessing the complexity of a project, imagine that the project has two *dimensions*, each consisting of a series of *attributes*. The two most common dimensions of project complexity are:

- Business Complexity
- Technical Complexity

Each dimension can be characterized by a set of attributes that can vary in number depending on the project. Typical business attributes include size, geography, and financial risk. Typical technical attributes include level of technology integration, security needs, stability of hardware/software, and team experience. Technology does not necessarily mean IT; it could be any technology used to build the proposed system and/or product. The complexity introduced by each of the individual attributes can be scored on a scale ranging from Low to High, and the composite score developed for each of the two dimensions. The two composite scores, when plotted in a two-dimensional chart, depict the project's relative business and technical complexities.

The complexity diagram is divided into four primary zones (See Template):

- Zone IV: Projects in this space are highly complex – very high business and technical complexity
- Zone III: This space of the diagram depicts high business complexity projects.
- Zone II: This space of the diagram depicts high technical complexity projects.
- Zone I: Projects in this space are of low complexity – simple or routine projects

2.3.8.1 Business Complexities

When assessing the business complexity of a given project, create a *tailored* attribute list to reflect the business environment of the given project. A complexity continuum needs to be defined for each attribute. For example:

- Financial Exposure
 - Low: In case the project is not successful, the direct and indirect financial losses to the organization will be minimal (or within acceptable range).
 - High: In case the project is not successful, the direct and indirect financial losses to the organization will be high – beyond the acceptable risk range.
- Geography
 - Local: The area in which the project will be managed and implemented is limited to local offices.
 - Statewide: The area in which the project will be managed and implemented spans the entire state.

The steps to compute a project's Business Complexity are as follows:

- Assess each attribute on a scale of 0 to 4, where 0 means no complexity and rating of 4 depicts a highly complex situation. We advise the use of 0.5 increments to depict the complexity of a given attribute (e.g. 0.5, 1, 1.5, 2.0). Although we have observed the use of 0.25 increments in some cases, we believe that is too precise and difficult to accomplish in assessing the value of individual attributes.
- Add all of the assessed values.
- Divide the total assessed value by the number of non-zero attributes.

Assume that the total number of attributes rated above 0 is 16 and their total assessed value is 42. Therefore, the net business complexity is computed as:

$$42 \div 16 = 2.6$$

Business Complexity

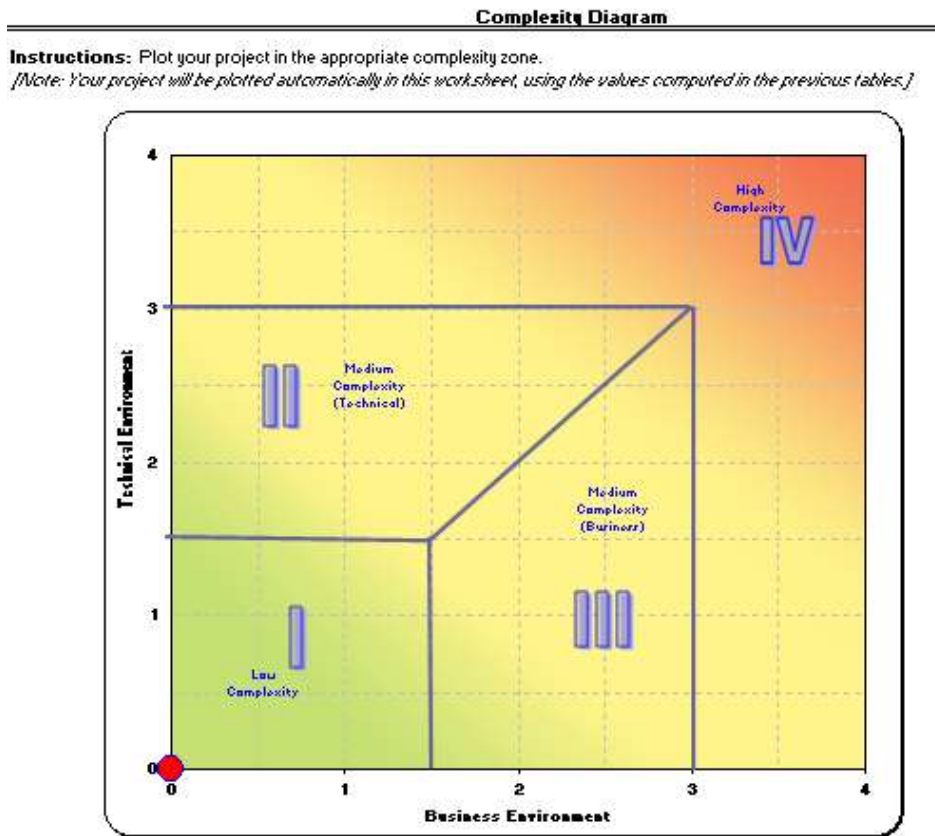
Instructions: On a scale of 0-low to 4-high, rate each applicable attribute and compute the Business Complexity by dividing the total by the number of items rated above zero. *[Notes: Business and technical complexity will be computed automatically in this worksheet, using the ratings you enter. Move your pointer over each attribute cell, marked with a red triangle, to see a definition of the attribute.]*

Low Complexity	Business Attribute				High Complexity	Rating
0	1	2	3	4		
Static	Business rules				Changing	0
Static	Current Business Systems				Changing	0
Known and Followed	Decision Making Process				Not Known	0
Low	Financial Risk to State				High	0
Local	Geography				State Wide	0
Clear and Stable	High Level Requirements				Vague	0
Few & Routine	Interaction with Other Departments and Entities				Many and New	0
None	Impact to Business Process				High	0
Few & Straight Forward	Issues				Multiple & Contentious	0
High	Level of Authority				Low	0
Clear	Objectives				Vague	0
Established	Policies				Non-existent	0
Minimal	Politics				High	0
Familiar	Target Users				Unfamiliar	0
Experienced	Project Manager's Experience				Inexperienced	0
Experienced	Team				Inexperienced	0
Loose	Time Scale				Tight	0
Low	Visibility				High	0
Total:					0	
Complexity:					0.0	

➡**Note:** The definitions for the attributes are embedded in the template

2.3.8.3 Complexity Zones

Now the project can be plotted in the complexity diagram.



A note of caution – *do not* be concerned with the *precision* of a project’s placement within the complexity diagram. The purpose is to ascertain the key complexity contributors and the zone in which the project falls, and not the precise placement of a project within the complexity chart.

Understanding the project’s complexity helps in assembling the right Sponsors, Project Manager, and the team, as well as getting the first glimpse of the risks inherent in the project. It also provides the measure for the level of project oversight required for the project (see the Project Oversight Framework, SIMM Section 45.)

Two frequently asked questions, along with responses, regarding the complexity assessment are:

Question 1: Should each attribute carry the same weight, or would it be better to assign relative weights to various attributes?

Response: Of course, assigning each attribute a relative weight and then assessing each attribute's degree of complexity would certainly result in a more accurate complexity assessment. However, assessing a large number of projects has shown that the resulting complexity values are not *significantly* different. Again, keep in mind that complexity assessment is not a precise tool; it involves a certain degree of subjectivity.

Question 2: Why divide the total assessed complexity value by the number of *non-zero* attributes?

Response: Many Project Managers tend to include a large number of insignificant complexity attributes, which they rate as 0. They then divide the sum of the values by the number of attributes. Because many of the attributes carry a 0 rating, the net complexity computes to a low figure, implying that this is a low complexity project--the results, of course, are then misleading. Use the following approach: be careful in creating the complexity attributes and include only those that have values higher than 0. At times, Project Managers want to include attributes that currently have an extremely low complexity rating (zero), but may become more complex later in the project's lifecycle. In these cases, do not count them in the total number of attributes used to compute the net complexity value. If any of the attributes rated as 0 become more complex at a later date, use the new value to recalculate the complexity.

Another item of frequent discussion is: business complexity included a total of six attributes; one was assessed at 4 and all others at 1 each. This resulted in the total complexity value of 9 and a complexity of $9 \div 6 = 1.5$. This indicates a relatively low business complexity, but the high complexity attribute (rated as 4) cannot be ignored. That is the right conclusion. To make sure that any individual attribute with a high complexity rating is not overlooked, each such item will become an input to risk assessment. By the way; the same approach applies to a technical complexity assessment. Finally, a few quick reminders regarding complexity assessment:

- A complexity analysis is useful to Project Managers in project staffing decisions, where individual skills must be carefully matched to project complexity.
- Do not be concerned with the precision of a project's placement within the complexity diagram. The purpose is to ascertain the key complexity contributors and the zone in which the project resides.
- Any attribute, business or technical issue that is given a rating higher than 3 must be treated as a potential risk to the project. Carefully consider how to manage these high complexities attributes to reduce the risk potential. A risk management plan must be developed for each attribute rated higher than 3.

The complexity assessment process is dynamic and a project's complexity should be reviewed and updated any time key changes take place (e.g., major changes in scope, resources, technology, and/or strategy).

Several project characteristics (complexity, duration, budget, and team size) are assessed to determine the suggested project manager skill set that is appropriate for the project. These qualifications are not absolute requirements; however, deviation from the guidelines must be justified. To use the tool, select the level in each category that best describes the project. The tool assigns points based on the levels selected. The Project Manager Skill Set Guideline is selected based on the total points and will appear *automatically*. A table describing all levels is on the following page.

Suggested Project Manager Skill Set Guidelines

Complexity		Duration		Budget		Resources	
<input checked="" type="radio"/>	Zone 1	<input checked="" type="radio"/>	< 6 months	<input checked="" type="radio"/>	<\$500K	<input checked="" type="radio"/>	< 5
<input type="radio"/>	Zone II, Medium Zone III, Medium	<input type="radio"/>	< 1 year	<input type="radio"/>	<\$1M	<input type="radio"/>	<10
<input type="radio"/>	Zone II, High Zone III, High	<input type="radio"/>	>1 year; < 3 years	<input type="radio"/>	>\$1M; <\$5M	<input type="radio"/>	11 – 20
<input type="radio"/>	Zone IV	<input type="radio"/>	>3 years; <10 years	<input type="radio"/>	>\$5M; <\$100M	<input type="radio"/>	21 – 40
		<input type="radio"/>	>10 years	<input type="radio"/>	>\$100M	<input type="radio"/>	40+

PM Level: Novice Experience: Minimum 1 year working as a key team member on an IT project.
 Technical experience commensurate with the proposed technology.

Professional Knowledge: Understands the CA-PMM and department's methodology.

Note: This is not a Human Resources Allocation Tool.

Score	Level	Guidelines
33-40	Novice	<i>Experience:</i> Minimum 1 year working as a key team member on an IT project. Technical experience commensurate with the proposed technology.
		<i>Professional Knowledge:</i> Understands the CA-PMM and department's methodology.
41-50	1	<i>Experience:</i> Minimum 3 years working as a key team member on an IT project or as a Project Manager on other small IT projects. Technical experience commensurate with the proposed technology.
		<i>Professional Knowledge:</i> Understands the CA-PMM and department's methodology.
51-75	2	<i>Experience:</i> 3-5 years as a key team member on a medium or large IT project or as a Project Manager on small or medium IT project. Technical experience commensurate with the proposed technology.
		<i>Professional Knowledge:</i> Strong working knowledge of the CA-PMM, department's methodology, Software Development Life Cycle. Familiar with CA Budgeting, Procurement and Contracting processes.
76-90	3	<i>Experience:</i> 3-5 years working as a Project Manager on medium or other large IT projects. Technical experience commensurate with the proposed technology.
		<i>Professional Knowledge:</i> Strong working knowledge of the CA-PMM, department's methodology, Software Development Life Cycle. Familiar with CA Budgeting, Procurement and Contracting processes.
91+	4	<i>Experience:</i> 5+ years working as Project Manager or Project Director on large IT projects. Technical experience commensurate with the proposed technology.
		<i>Professional Knowledge:</i> Strong working knowledge of the CA-PMM, department's methodology, Software Development Life Cycle. Familiar with CA Budgeting, Procurement and Contracting processes.

The Complexity Assessment is also being used to determine the level oversight required for a particular project:

For Oversight Purposes:
Zone I = Low Criticality/Risk
Zone II and III = Medium Criticality/Risk
Zone IV = High Criticality/Risk