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Management of Outsourced Projects

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This paper is based on a presentation made to the Project Management Forum of the National Association of State Chief Information Officers (NASCIO) in July 2007.

The Enterprise Information Strategy & Policy Division (EISPD) is the office of the State Chief Information Officer (CIO), which is a division of the Oregon Department of Administrative Services. In addition to a variety of enterprise information technology (IT) programs, EISPD is responsible for oversight of all major IT projects for state agencies in the executive branch of Oregon state government.

The author of this presentation has been IT Investment Oversight Coordinator for the State of Oregon for about three years, currently reporting to the Deputy State CIO. In this role, he is the primary point of contact for lifecycle quality and risk management of major IT projects.

Before this role, the author was Project Office Manager of the Medicaid Management Information System Replacement Project — Oregon's largest IT project to date — during the Project's planning & procurement phase. Before joining the State of Oregon, he was CEO of a Hong Kong based internet B2B portal for online trading of commodities futures and metals. Prior to that, he was a program manager in the Video & Networking Division of Tektronix (now part of Thomson), responsible for worldwide applications and channels marketing for a line of video servers for broadcast television applications. In these roles, he was involved with the management of quality in software systems/applications, products, or software-enabled business processes.

In this presentation, the author will use examples from the State of Oregon to illustrate specific points. This presentation provides a useful perspective for outsourced IT projects in large enterprises and should be applicable to both the public and the private sectors unless otherwise stated in the notes of a slide.

Select Major IT Projects with Significant Outsourced Work

Projects as of May 2008	Est. Cost ($)
DHS Medicaid Management Info System (healthcare)	~$80.7 M
DHS OR-Kids (child welfare)	~$35.2 M
PERS RIMS Conversion Project (retirement accounts mgt.)	~$30.7 M
DAS Enterprise Information Security	~$14.6 M
Education – KIDS III Project (K-12 students records mgt.)	~$10 M
ODOT Transportation Operations Center – Event Mgt.	~$5.2 M
Oregon Educators Benefit Board (benefits management)	~$4.5 M
ODOT Right of Way Data Management System	~$3.6 M
OLCC Tech Modernization (licensing, enforcement, sales)	~$3.6 M
DAS Oregon Purchasing Information Network	~$3.3 M
ODOT TransInfo (state highways and related asset mgt)	~$2.5 M
DHS Electronic Birth Registration System	~$2.4 M

Note: Projects are at different points in their lifecycle. Estimated cost of all major IT projects in the statewide portfolio (including projects not listed): $210 million. [2]

This is a background slide regarding major IT projects in the State of Oregon…

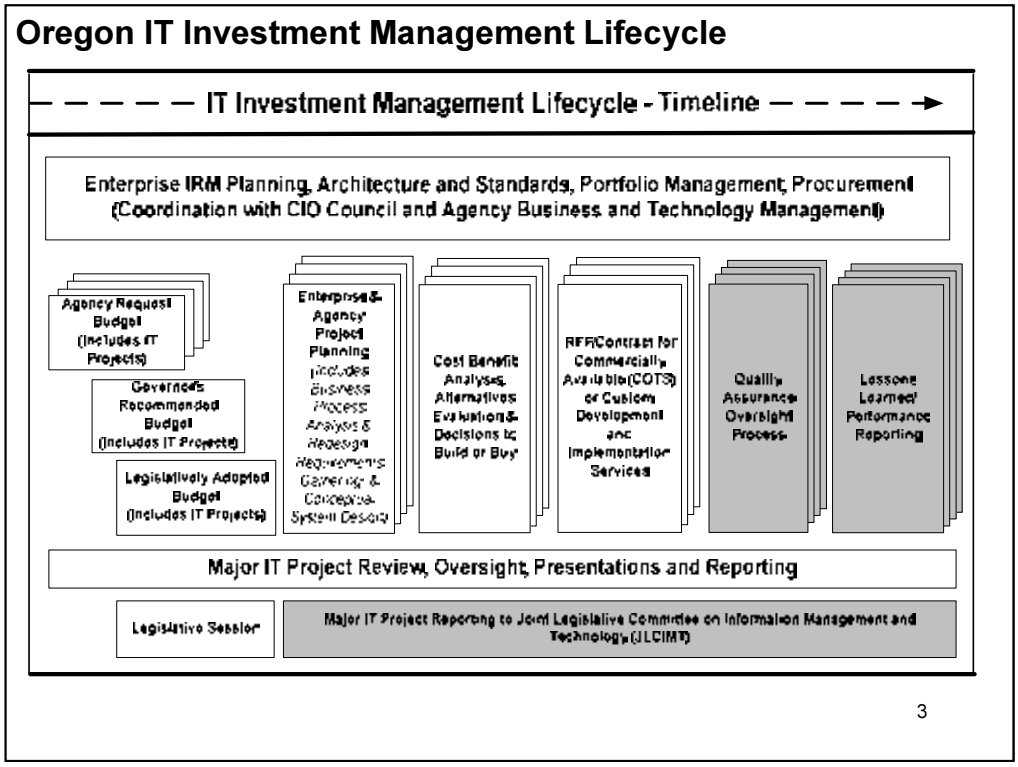
At any one time over the last three years, the State of Oregon may have between 10 to 20 major IT projects. These projects have various characteristics, including but not limited to the following:

• They have budgets above US$1 million.

• They are mission critical and/or enable major change in the state agencies where the work are undertaken, both in terms of their operations, staff, and stakeholders. These stakeholders usually consist of internal and external stakeholders; both in and out of state government and other government jurisdictions.

• They affect citizens or the public in important ways.

The State's major IT projects portfolio has a total value of about $210 million in May 2008, as seen in this chart. Most major IT projects listed are planned, designed, developed, and implemented by private contractors working closely with State personnel. As such, most technical work is outsourced to contractors.



This is another background slide on major IT projects in the State of Oregon…

The State of Oregon views major IT projects as investments with a lifecycle. This lifecycle typically begins as an agency concept that leverages IT to improve or re-engineer business process, increase capacity to meet stakeholder needs, or improve operational efficiency. Agency concepts drive the development of the budget process, which occurs once every two years. A project's budget becomes part of an agency's budget, which is then incorporated into the Governor's recommended budget and become legislatively adopted during a biennial legislative session. Off session requests are authorized by the Legislature through the Emergency Board process.

With the legislatively adopted budget in place, a state agency must prepare an Information Resource Request (IRR). The IRR is the vehicle for State CIO approval of a project and is supported by a detail business case, which analyzes the relative costs, benefits, and risk of available solution alternatives. An approved IRR is required before procurement of hardware, software, and professional services.

Because of the importance of a major IT project to a state agency and its stakeholders, quality assurance is an important aspect of every major IT project. Statewide quality processes exist to assure product quality, process quality, and management accountability. The staff of the State CIO participates in many facets of quality planning and has broad oversight authority traceable to state statutes, administrative rules, and policies. As will be discussed, the State use independent QA contractors to provide independent assessment of major IT projects. The findings of these assessments are periodically shared with decision makers in both the executive and the legislative branches of Oregon state government.

Presentation Overview

Outsourcing of major IT application development projects

- **Reasons for outsourcing**
- **Outsourcing trends**
- **Project life cycle – developer and customer agency views may be different**
- **Need for a customer-centric planning framework**

Customer-centric planning framework

Concluding remarks: key challenges

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This presentation will begin by discussing why organizations outsource major IT projects. We will put forth the perspective that the objectives of an acquiring enterprise are *not* the same as those of the developer (contractor). As such, the thinking with respect to project management and quality management are also different, in general.

This presentation describes a "customer-centric" framework to plan and execute outsourced IT project. In the context of this presentation, "customer" is defined as the enterprise acquiring the software system or application in question.

Presentation Overview - Glossary

- **"Major IT application development projects" means a potentially risky project involving significant investment (dollars, effort, etc.) in design, development, and implementation; especially in tailoring to organization or agency specific business requirements. Integration or customization of commercial off-the-shelf (COTS) products may be involved, as is custom software development.**
- **"Developer" means supplier of software application systems and related design, development, and implementation services.**
- **"Customer" means the acquirer of software application systems and related design, development, and implementation services. In this presentation, the customer is the business of a state agency or one of its operating units.**

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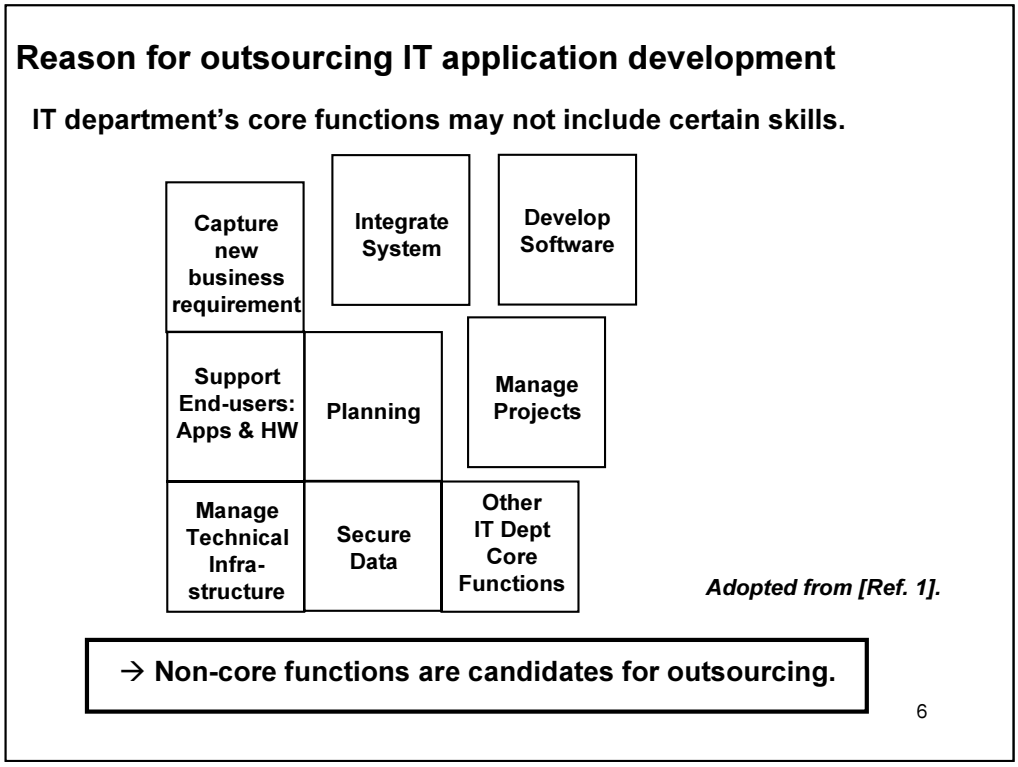
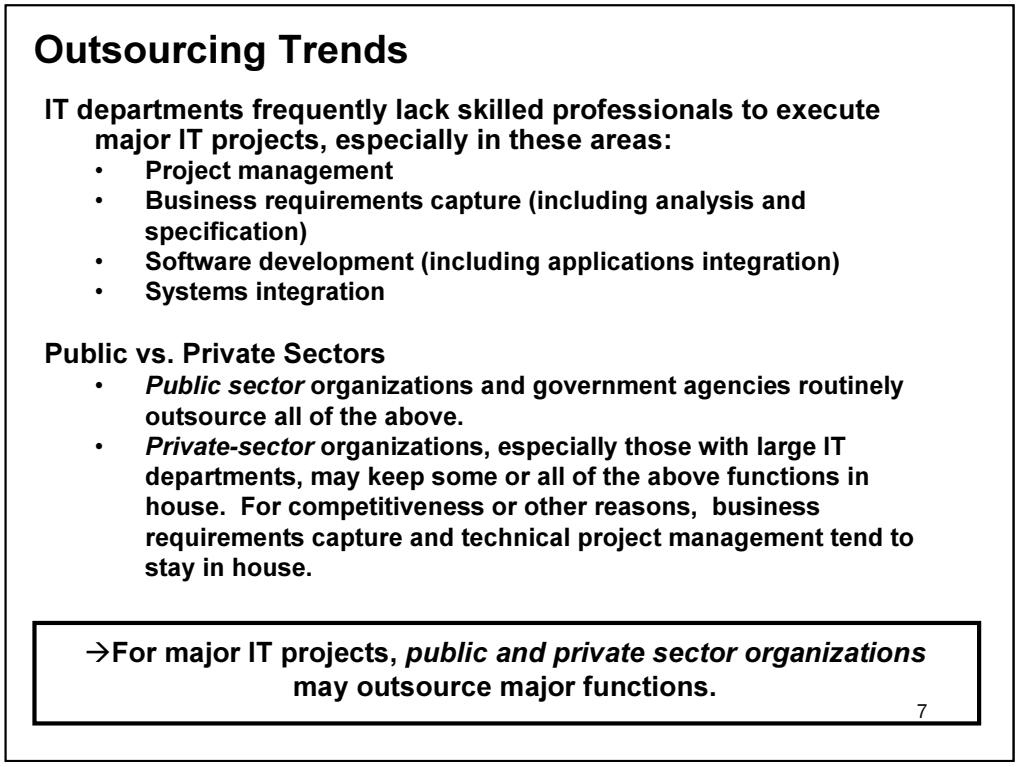
This slide defines terms that will be used throughout this presentation. In addition to the above definitions, please note the following:

1. As this presentation discusses outsourced application development projects, the term "developer," "development contractor," and "contractor" will be used interchangeably.
2. In this presentation, we use the term "customer" to refer to the enterprise acquiring the software system or application in question, which is the customer of the developer. A large enterprise may have an IT department that is primarily responsible for applications development and managing IT contractors. Such an IT department would have internal stakeholders that may be referred to as its "internal customers," or simply "customers." To avoid confusion in this presentation, we will only use the term "customer" in the sense defined in the slide above.



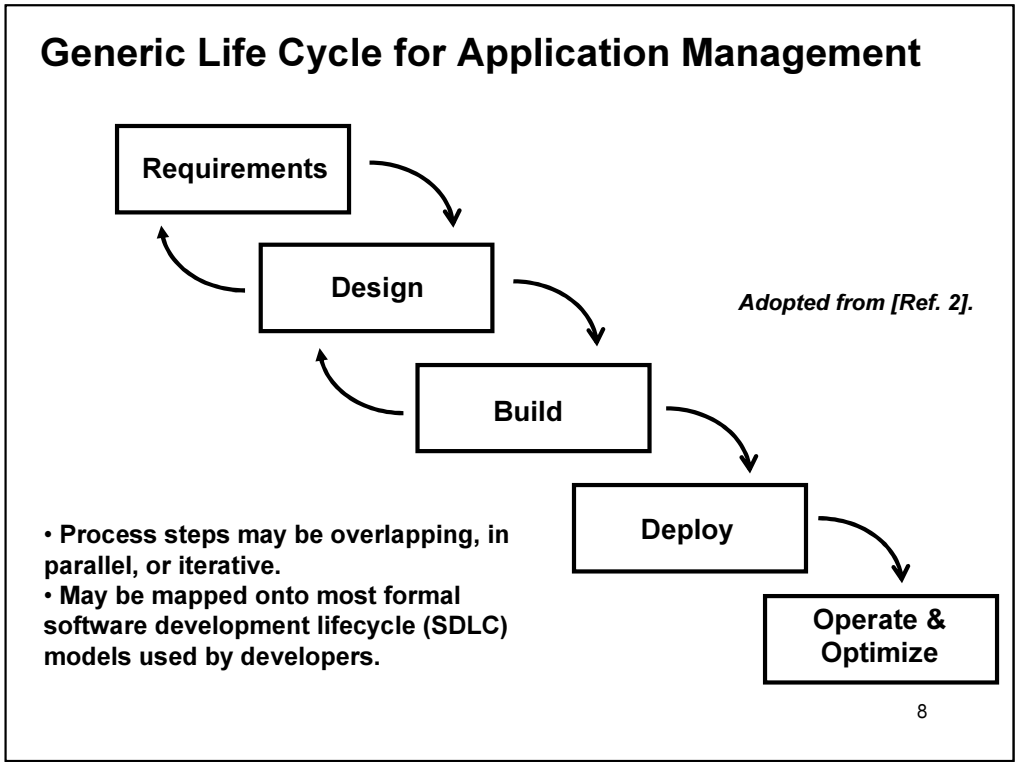
Depending on the enterprise, what is considered "core" functions or core competency may be different from enterprise to enterprise. As an example, companies such as Nike does not consider manufacturing to be core functions and use contract manufacturers extensively to fulfill its manufacturing needs.

For IT, enterprises tend to view support (for hardware, network, applications) and information security as core. Increasingly, enterprises view project management, software development, and system integration as non-core. As such, the design, development, and implementation of major IT projects are increasingly outsourced, with in-house development by internal IT staff becomes correspondingly less common.



Outsourcing of work by the IT department of an enterprise is usually driven by limitation of internal resources, the desire to focus on core business functions, and the desire to reduce cost.

The view as to whether requirements definition should be considered core function of an enterprise varies. Private enterprises usually views this (especially the definition of business functional requirements) as part of its core competency, because business requirements are closely related to an enterprise's competitive differentiation in the marketplace. Increasingly, in both private and public sector enterprises, even the capture/analysis of business requirements increasingly involves contract-based personnel. Contract-based personnel may include domain experts and facilitators in "joint application requirements" sessions or equivalent activities in iterative or Agile system development lifecycle models.

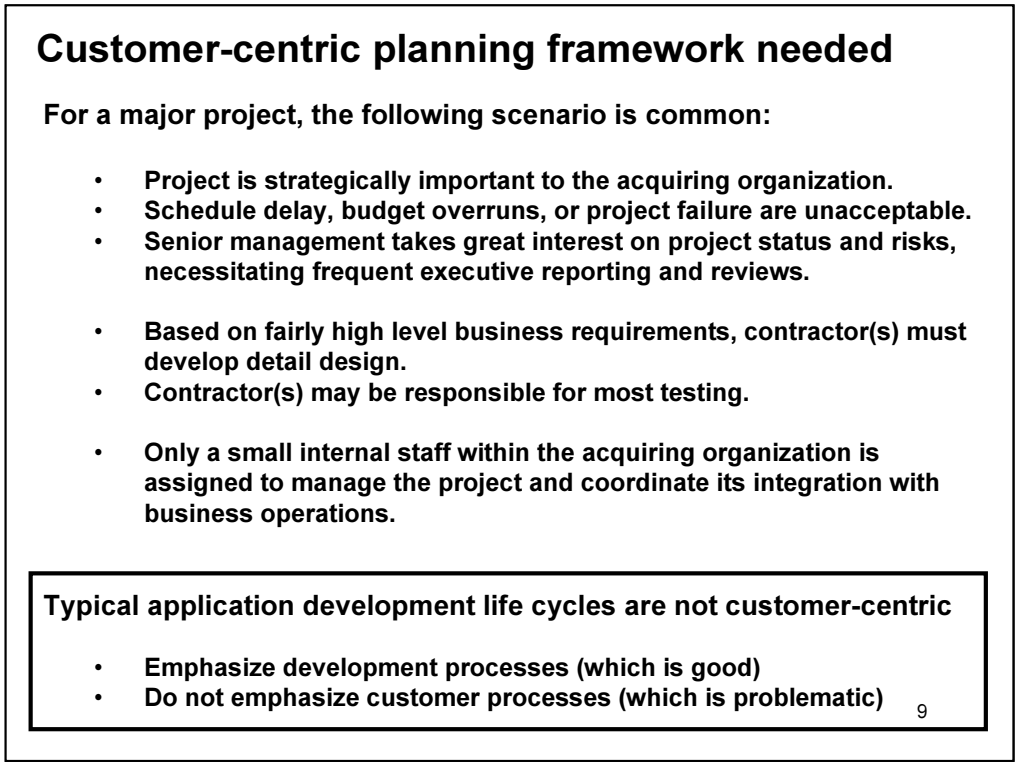


Effective ways to outsource IT projects are related to an organization's model for applications management. This generic lifecycle model is based on ITIL and can be mapped to all common SDLC models, as we will discussed later.

Especially important to the quality of an enterprise's effort to outsource major IT projects are:

• the process for capturing, communicating, or documenting requirements. (By necessity, this needs to include considerations for change control of scope, schedule, and budget.)

• the process for quality and risk management during Design, Build, and Deploy. (By necessity, this needs to include considerations for status tracking/reporting, customer reviews at major milestones, acceptance testing of iterations or subsystems, and processes for acceptance and/or payment for major releases.)



An outsourced IT project is usually tied to strategic improvements that an enterprise considers important – sometime critically important. As such, project failure is usually unacceptable, and senior management takes particular interest in the project's status, performance, and management.

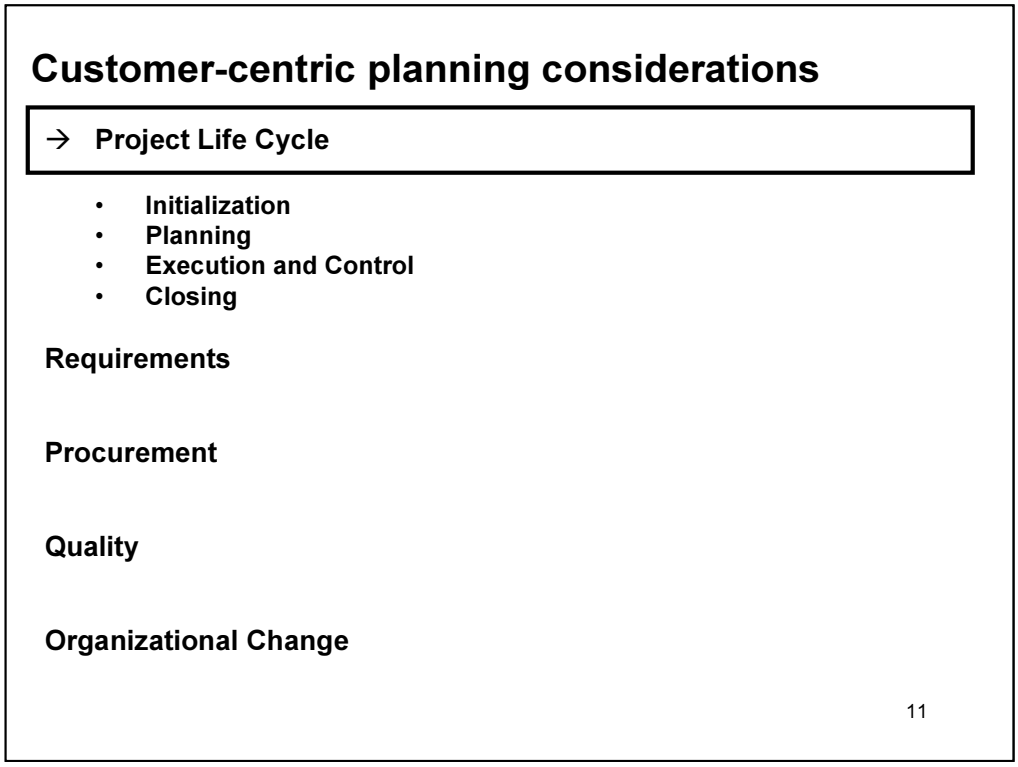
For many projects, the requirements available to the contractor at the start of the contract may be very high level or conceptual. As a result, the contractor frequently plays a significant role in defining detail requirements, in performing data conversion, and in testing.

From the perspective of the acquiring enterprise, typically a small staff is responsible for managing the project, the overall implementation of a system, work products acceptance, and integration with business operations. This situation is made more challenging by the fact that many system development lifecycle (SDLC) models emphasize development processes and do not adequately emphasize the customer's own project life cycle processes for requirements, procurement, contract administration, quality and risk, and organizational change.

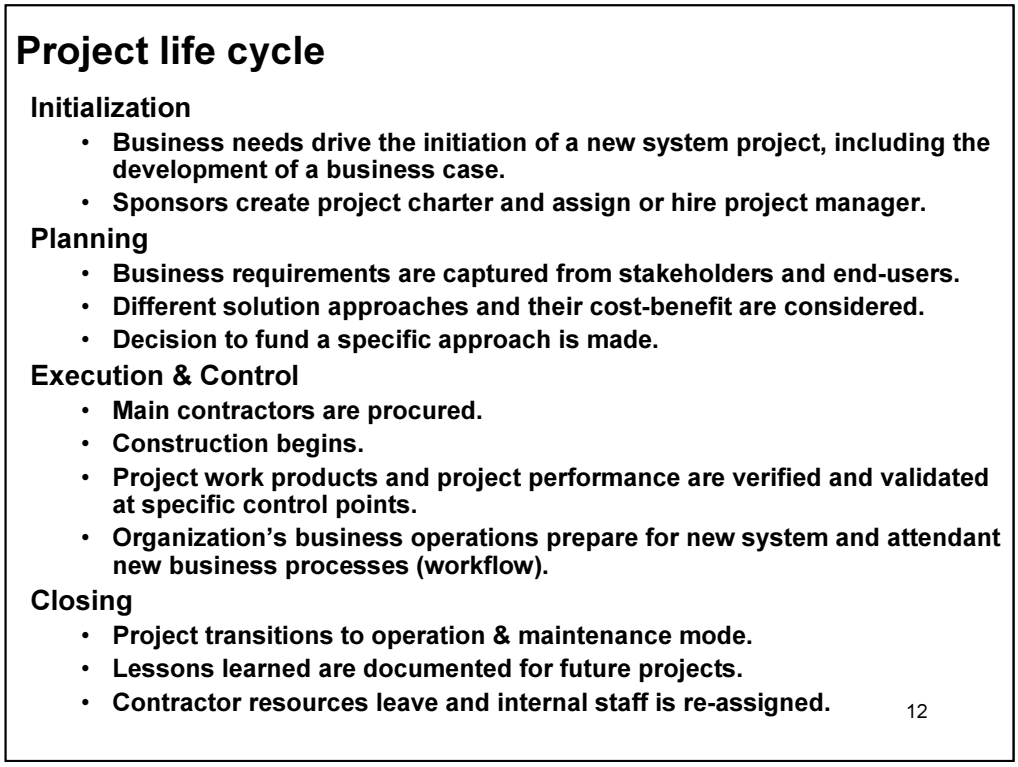
This presentation will overview a framework that emphasizes these topics from the perspective of the enterprise outsourcing major IT projects to development contractors.

The planning framework being presented here is from the point of view of the customer of the development contractor, i.e. the acquiring enterprise.

We start with reviewing aspect of a project's lifecycle, followed by the management of requirements, procurement, quality, and organizational change.



We will start with a discussion of the Project Life Cycle.



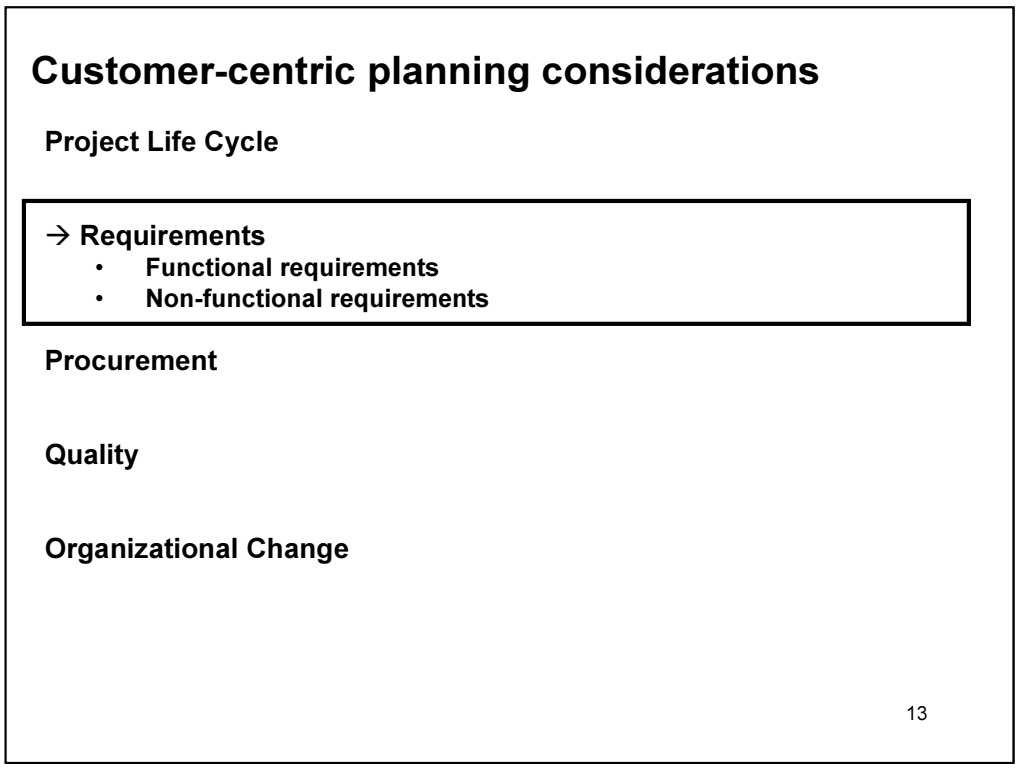
A significant degree of formality is typically required in the management of major IT projects in large enterprises. This is so for two main reasons.

First, a major IT project is typically complex, both in business and technical terms. The required resources and personnel across various functions of an enterprise must be coordinated. This is so at different points of the project; notably at times of requirements definition, user acceptance, implementation, and integration and operationalization of the production system into actual business operations. Key stakeholders from across the enterprise must also be involved in on-going project governance, requirements change control, and quality and risk management. These efforts need to be coordinated, and formal project management is a useful tool for this coordination and communication.

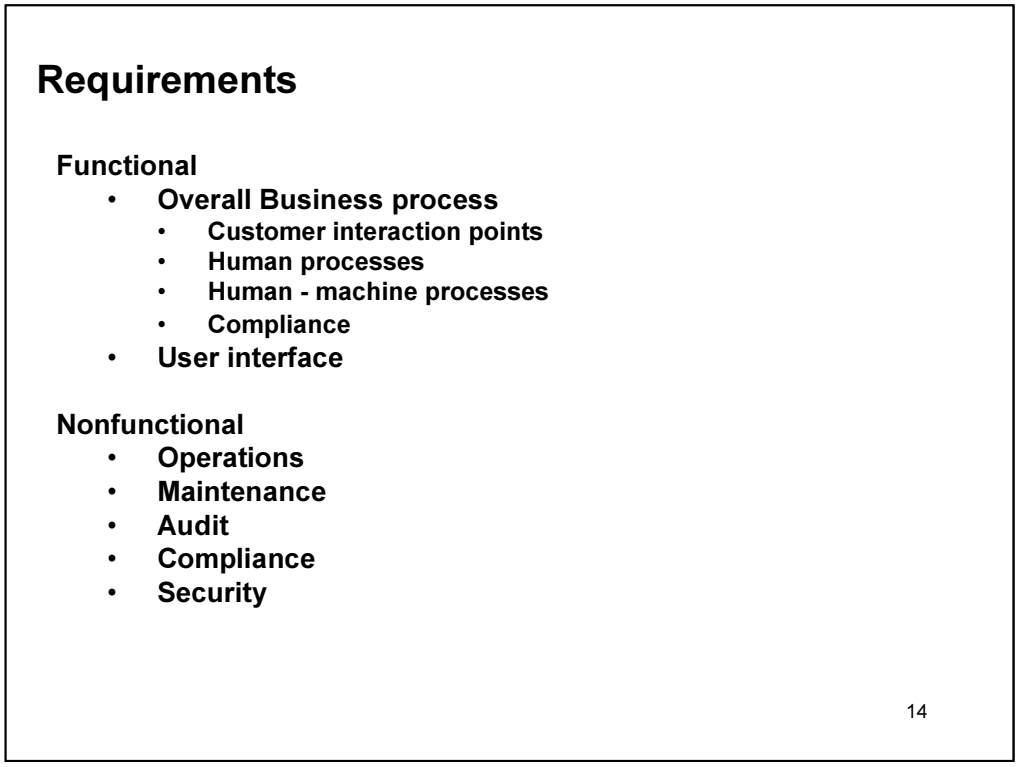
Second, a major IT project is important to the future of an enterprise. Stakeholders from both within and outside the enterprise care and need to know about the status of the project. As such, a formal approach to project management is typically the foundation for communication with diverse stakeholders (including senior management) on project status and associated project risks and issues.

Like many large organizations, the project management approach that is the standard for the State of Oregon is the Project Management Body of Knowledge (PMBOK) Guide, third edition, as published by the Project Management Institute. In the PMBOK view, a project consists of distinct phases, as outlined in this slide.

The PMBOK approach emphasizes processes, planning, and performance measurements against baseline plans; e.g. an integrated project plan that baselines project scope (requirements), schedule, and budget, as well as supporting plans for the management of quality, risk, procurement, human resources, and communication. The PMBOK can be made consistent with iterative and Agile SDLCs, a point that we will return to later.



We now discuss Requirements.



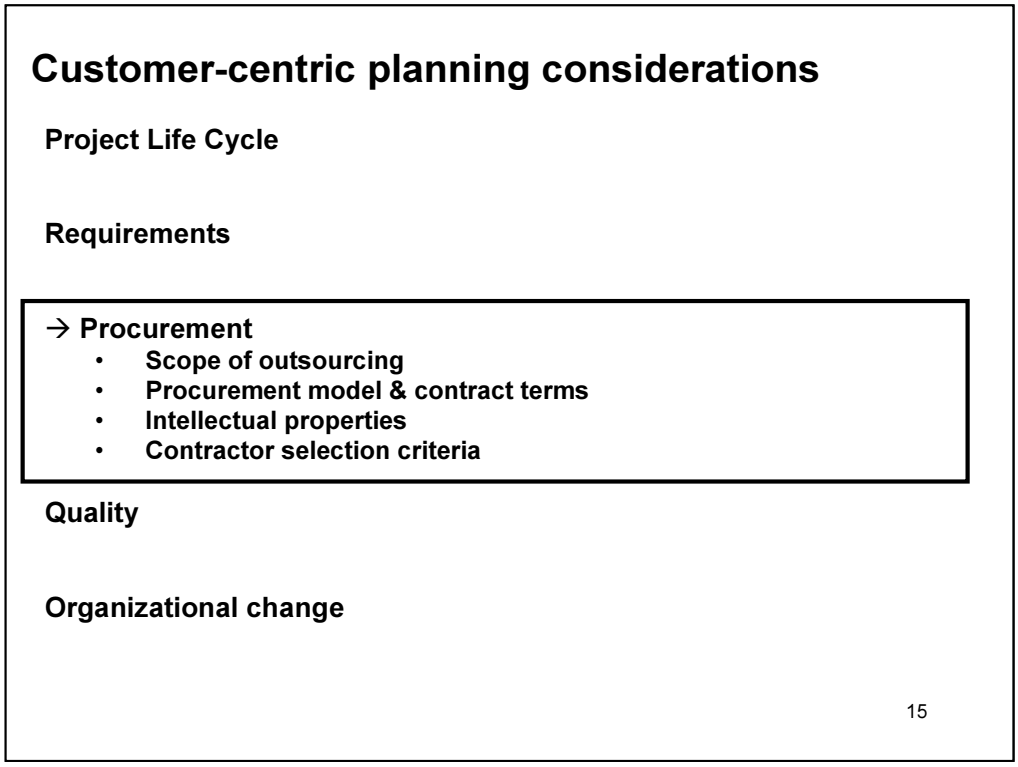
At the highest level, requirements can be described in terms of business and non-business requirements.

Business requirements are also known as functional requirements. Typically, an enterprise acquires a system to fulfill specific business functions. The management and the users of an enterprise system, especially non-technical users, typically do not care about the underlying technology.

Non-business requirements are also known as non-functional requirements, which include requirements for technology platforms and for on-going support and maintenance. (In the public sector, procurement rules may require government agencies to *not* favor specific technology platforms, especially for specific brand named products, unless there is a business need.)

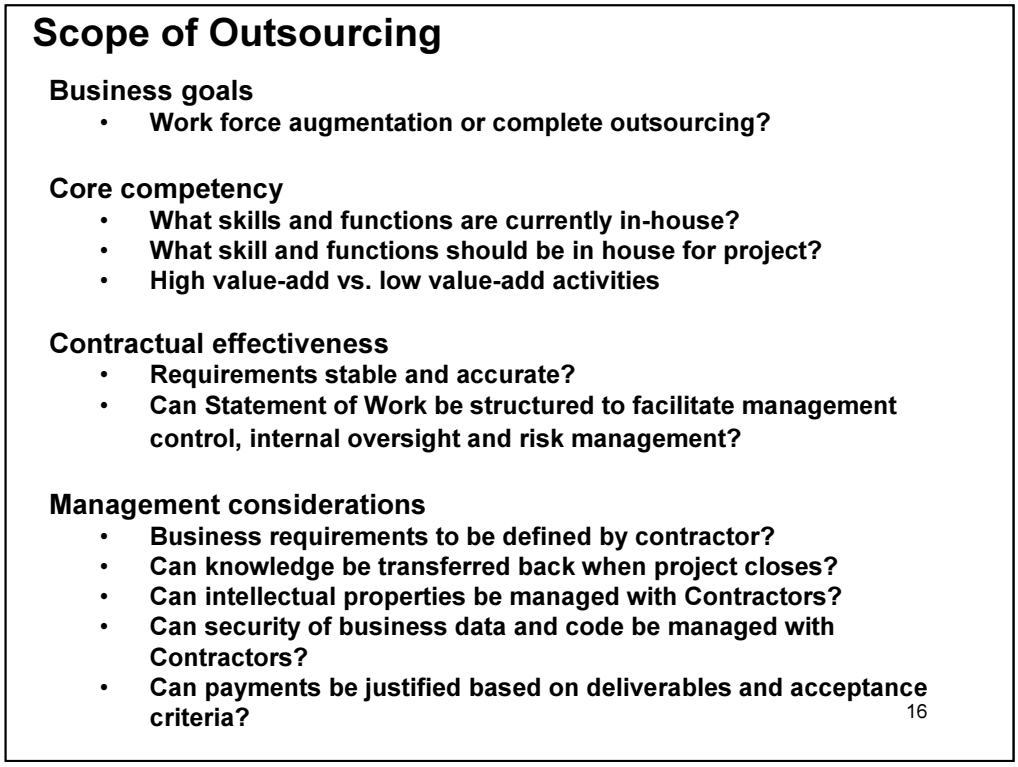
Large enterprises must increasingly pay attention to regulatory compliance. In North America, HIPAA (for the healthcare industry in both the public and private sectors) and Sarbane-Oxley (for publicly traded companies in the private sector) have focused the need of enterprises to build IT systems and associated business processes that are secured, compliant with applicable regulations, and support internal and external audits. Although depicted in this slides as non-functional requirements, many enterprises begin to view information security, regulatory compliance, and auditability as business requirements.

Managing requirements well is both a science and an art. It is central to high quality software application, but it is also an important factor for high-quality procurement and contract administration of outsourced IT projects.



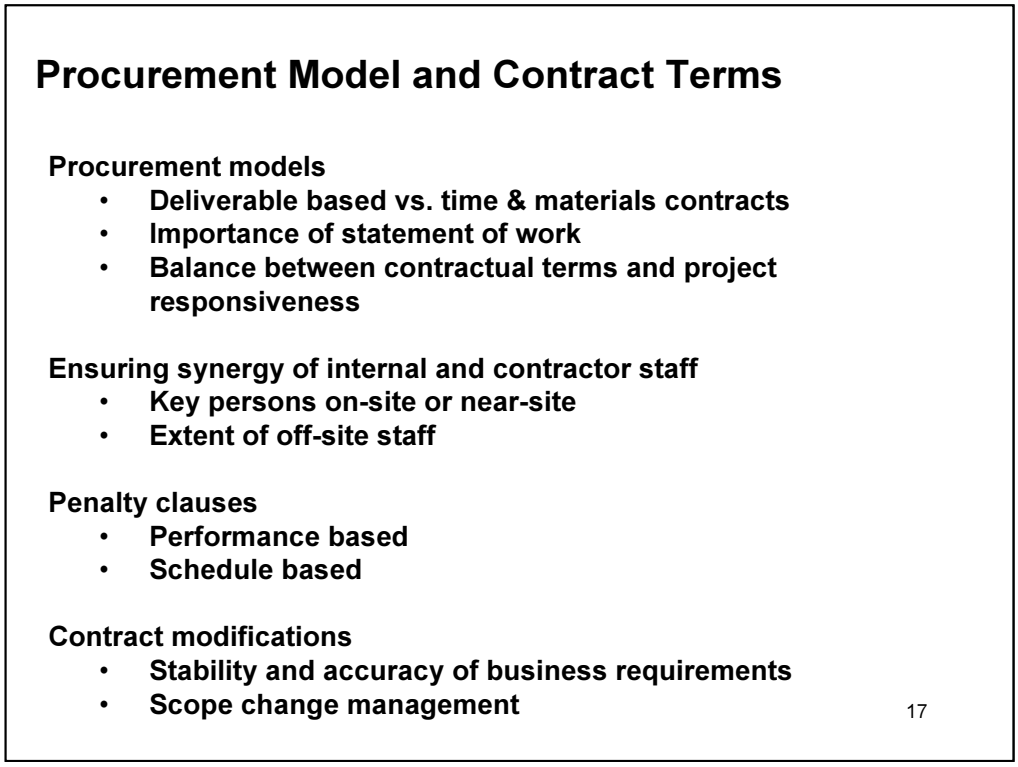
We now discuss procurement and related contract administration considerations.

Even experienced project managers sometime view procurement as "something for the legal department or the purchasing departments." In the author's opinion, this is incorrect.



When outsourcing, it is important for an enterprise to keep in mind the business goals and objectives. Major projects frequently require entire projects to be outsourced for two reasons. First, the internal organization simply lacks resources. Second, a single point of responsibilities may enable more effective transfer of risk (technical, schedule, and possibly even budgetary) from the acquiring enterprise to the developer.

Outsourcing usually involves some sort of contractual arrangement between the developer and its customer. Key questions that should be discussed among stakeholder of a major IT project (ideally before the start of the procurement process) are listed in this slide.



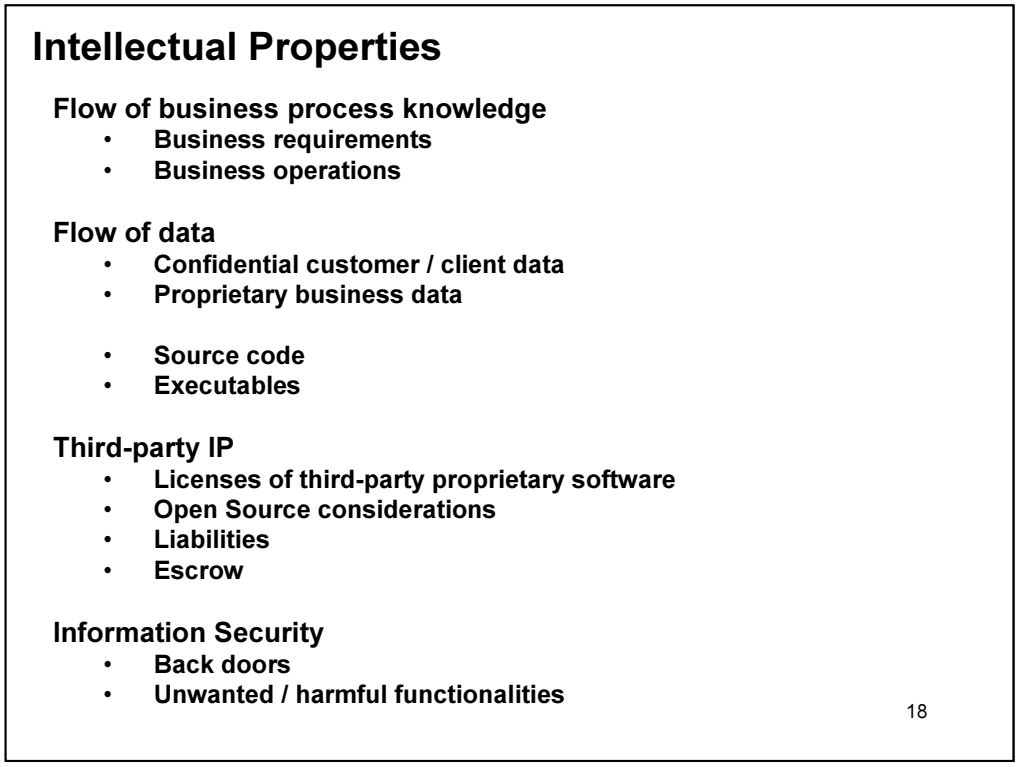
From the perspective of the acquiring enterprise, project success is at least partly tied to the effectiveness of the contract. In this respect, it is important for the acquiring enterprise to look at four things: procurement models, the roles & responsibilities of the contractor's staff vs. the customer's staff, penalty clauses, and the degree of contract modifications anticipated during the project's lifecycle.

Procurement models primarily refer to whether the contract will be deliverables based or time-and-materials based. If the requirements are well understood, stable, and can be well documented, a deliverables based contract is preferred. Many enterprises (especially private ones) may feel that time-and-materials contracts are more easily administered and requires less upfront work associated with statement of work (SOW) development. However, this is so only if the acquiring enterprise is willing to accept the risk associated with contractor non-performance and potentially flawed hours estimates.

The roles & responsibilities of the contractor staff vs. the staff of the acquiring enterprise need to well understood by the developer and its customer. Part of this understanding includes an agreement on the level of on-site staff requirements, especially contractor key personnel such as project managers and subject matter experts.

Terms and conditions in the contract that awards performance (such as early completion) could be a useful incentive for the contractor; as are clauses that delay, retain, or otherwise reduce payment due to non-performance (such as late completion).

A high quality SOW that balances specificity (of tasks and deliverables) with the need for the contractor/customer to dynamically respond to project unknowns is important. For requirements that may not be stable due to rapidly changing business conditions or the lack of thoroughly analyzed requirements, it may be necessary for the customer to budget extra funds for on-demand work by the contractor (possibly through task orders) or through contract amendments.



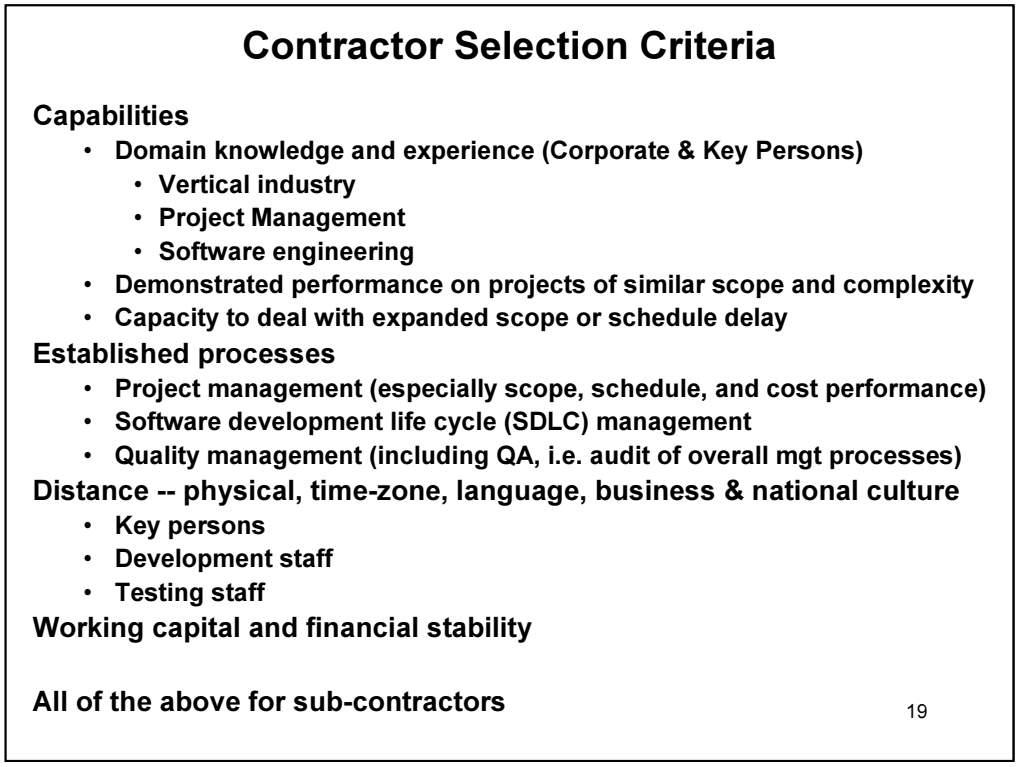
The management of intellectual properties (IP) is an especially tricky issue for offshoring (outsourcing to offshore locations), especially to countries where IP protection may be weak. However, IP in the context of outsourcing does not refer simply to unauthorized access, use, or distribution of source codes or executables.

The flow of business process knowledge is a key IP concern for the acquiring enterprise, especially when the contractor's subject matter experts (SME) are primarily responsible for defining To Be (future) business process and associated business rules and requirements. How to effectively transfer this IP from developer back to the customer is not always clear, even when the contract SOW makes provision for extensive training and/or warranty.

The potential flow of confidential or proprietary data is also a major concern. Today, confidentiality agreements are routinely expected. Many acquiring enterprises also require on-site contractor personnel to be subjected to background checks by law enforcement authorities. The security of testing or training environments is also important, not only to secure customer data but also to secure source codes and executables.

Contract language must increasingly cover reuse of third-party codes and to assure proper pass-through of proprietary software licenses. (With Open Source, the concern may be safeguards against unintentional pass-through of general licensing agreements that are not desirable from the customer's perspective.) The goal for the customer is legal protection (indemnification) against liabilities associated with third-party IP.

Large enterprises are also concerned with access to source codes in the event the contractor goes out of business. To mitigate this risk, the contract may include an escrow requirement for source codes.

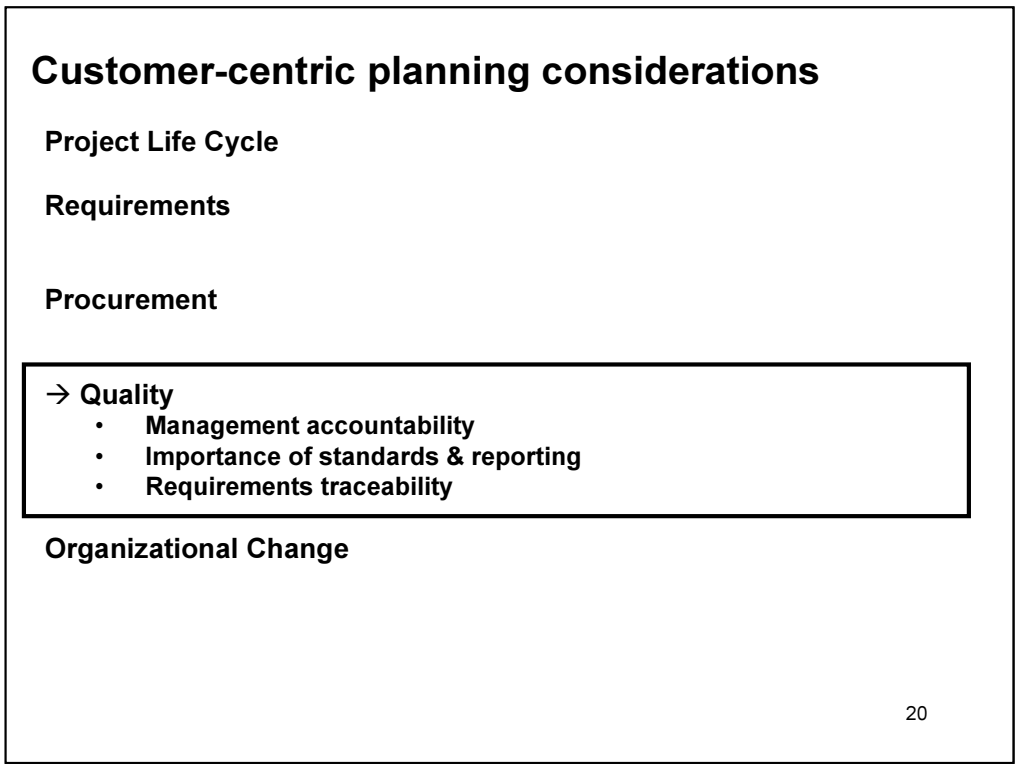


Whether a formal or informal procurement process is used, the choice of contractors ultimately comes down to considerations of the contractors' capabilities, process maturity, distance, and its financial stability; and the same for sub-contractors.

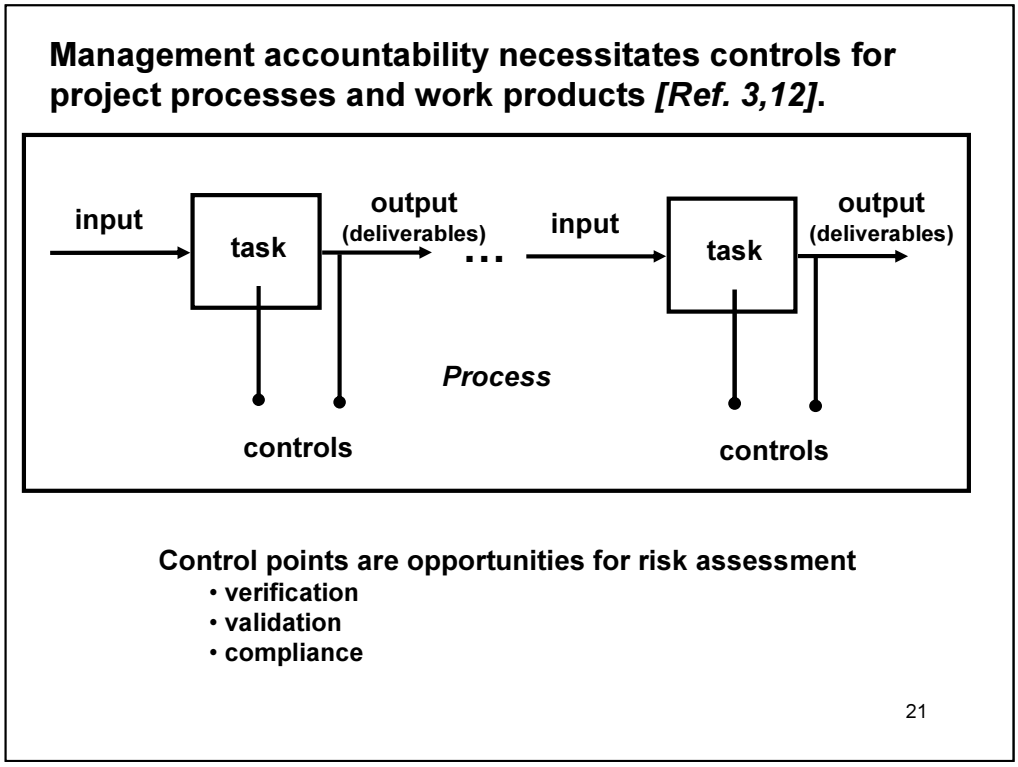
Capabilities refer to knowledge and experience in specific vertical industries (like healthcare, finance, or government), project management, and software engineering. A developer may be very experienced as a company, but the proposed team of personnel being proposed by the company may not. Corporate capacity to add staff and resources quickly (in the event of scope expansion or schedule fast-tracking) is an important consideration in the evaluation of developer capabilities.

Large projects may involve large teams of personnel. Expertise with project management, system development lifecycle methodology (such as for RUP or Agile), software engineering practices, tools for development and testing are especially important. Likewise for the skill levels and the accessibility (including physical distance) of the assigned contractor staff. In this sense, accessibility difficulty of contractor personnel may be geographic, time-zone, language, and cultural in nature.

Lastly, the financial stability of a contractor is important. No customer wants to see its developer goes out of business during a major project. The State of Oregon routinely require proposals of major IT projects to be accompanied by financial data for the contractor and may conduct searches to assure that a contractor is in good financial standing and is not currently involved in litigations or contract disputes.



We now look at quality management.

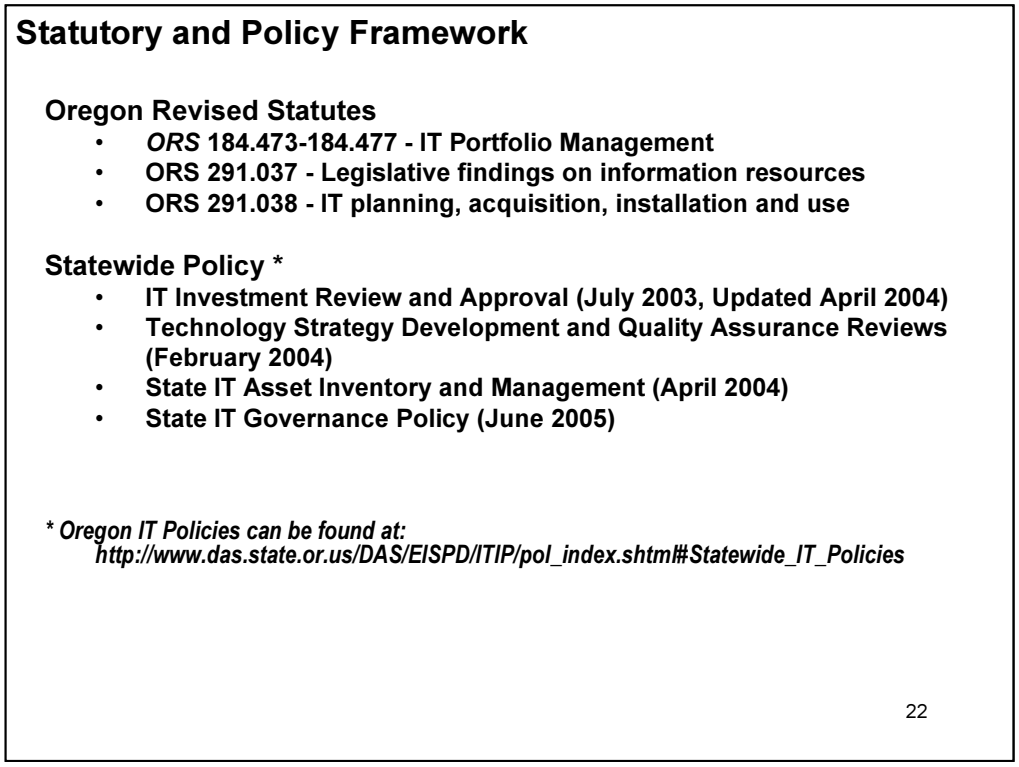


Obviously, enterprises outsourcing IT projects desire high quality contractor work. In quality management paradigm such as ISO 9000, quality usually refer to the quality of work products and the quality of processes for performing and managing work.

For major IT projects in large enterprises, a project and its management may be "under the magnifier" at all times. Stakeholders, including senior management, expect to be informed frequently about project status, quality, and risks. The fact that management accountability necessitates management oversight means that projects must be managed in a way where project performance can be transparently assessed or audited at all times, sometime by independent quality assurance personnel.

The process diagram above depicts a prototypical project plan for which a "task" may denote a specific iteration in an iterative SDLC, a phase in a spiral SDLC, or a task in a waterfall-like SLDC. Management control points can be imposed during the execution of a "task" to review work in progress or work already completed.

From a management standpoint, control points are opportunities for assessing work product quality usually by means of verification and validation (V&V); usually associated with testing, code review, and other means to establish that work products are "fit to use" and compliant with applicable regulations. These management control points are also opportunities for assessing and reporting project performance, such as percent of completion for a task and for the overall project and the actual amount of resources (time and budget) used vs. planned. In formal project management method such as PMBOK, Earned Value Analysis (EVA) is employed to measure budget and schedule variance relative to a baseline plan, both at the time of reporting and as estimated (forecasted) at project completion. In EVA, the percent completion of a task is usually tied to specific, discrete milestones having been reached.

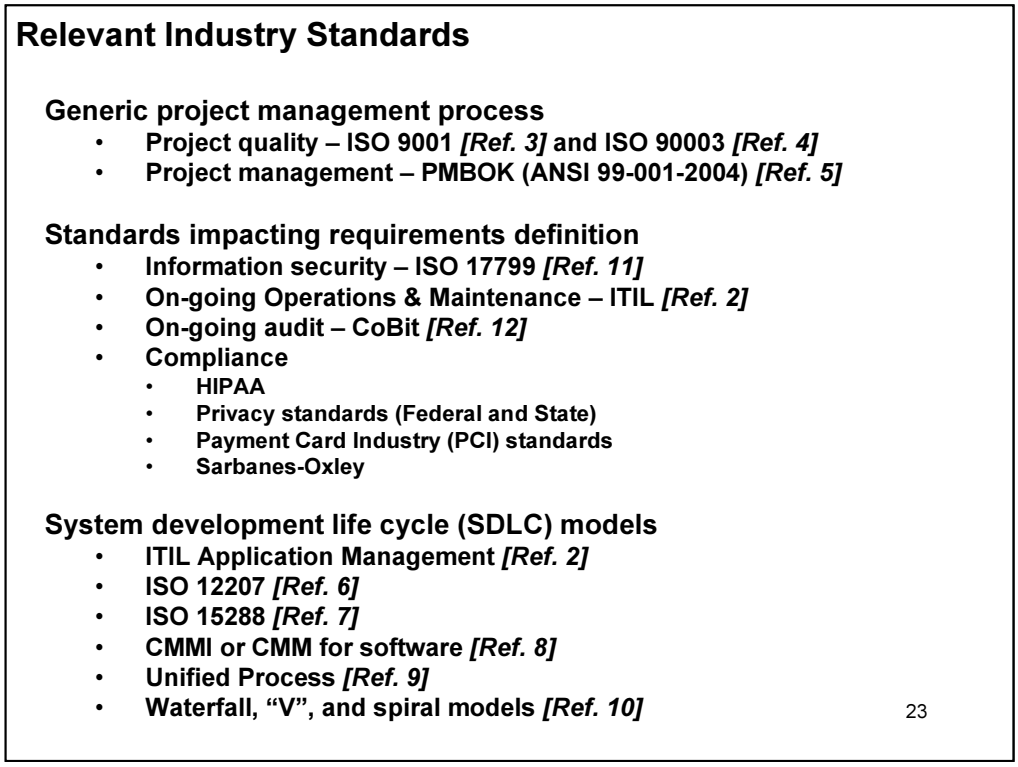


Another slide with information specific to the State of Oregon…

In Oregon state agencies, statewide policies traceable to state laws exist to govern quality of major IT projects.

As already mentioned, projects with value greater than certain dollar thresholds requires a detailed business case and State CIO approval before project execution.

During execution, the use of professional project management is expected; as are project status reporting, on-going oversight by the staff of the State CIO, and the use of independent QA contractor.

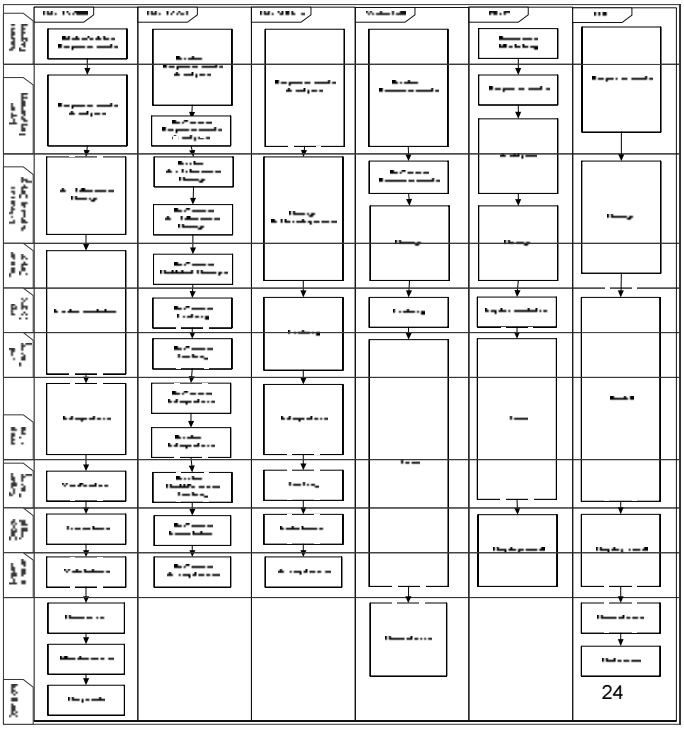


From a business perspective, the assessment of quality is tied mainly to the functional requirements. As such, functional requirements should be the main criteria for determining if work products are "fit to use" and should be accepted and paid for by the customer.

The assessment of process quality is usually not as straightforward. A variety of industry and regulatory standards are useful here. This slide depicts relevant standards or approaches that may be valuable to project management, requirements management, and system development lifecycle (SDLC) models.

Standards associated with HIPAA, PCI, and Sarbane-Oxley may prescribe work product functionalities and may be useful for assessing quality of the work products.

Different reference models for software development life cycle (SDLC)



A word on SDLC…

It is often impractical or impossible to impose requirements on a developer's choice of SDLC, but the acquiring enterprise would likely have certain preferences. An enterprises may prefer RUP or Agile when requirements are not stable or captured in detail, or when formal planning or documentation is not possible. An enterprise that understands its requirements well and where contracting approaches are very formal (as in government agencies) may prefer a waterfall like methodology with formal control points or review milestones that decouple requirements, design/development/testing, implementation, and support & maintenance.

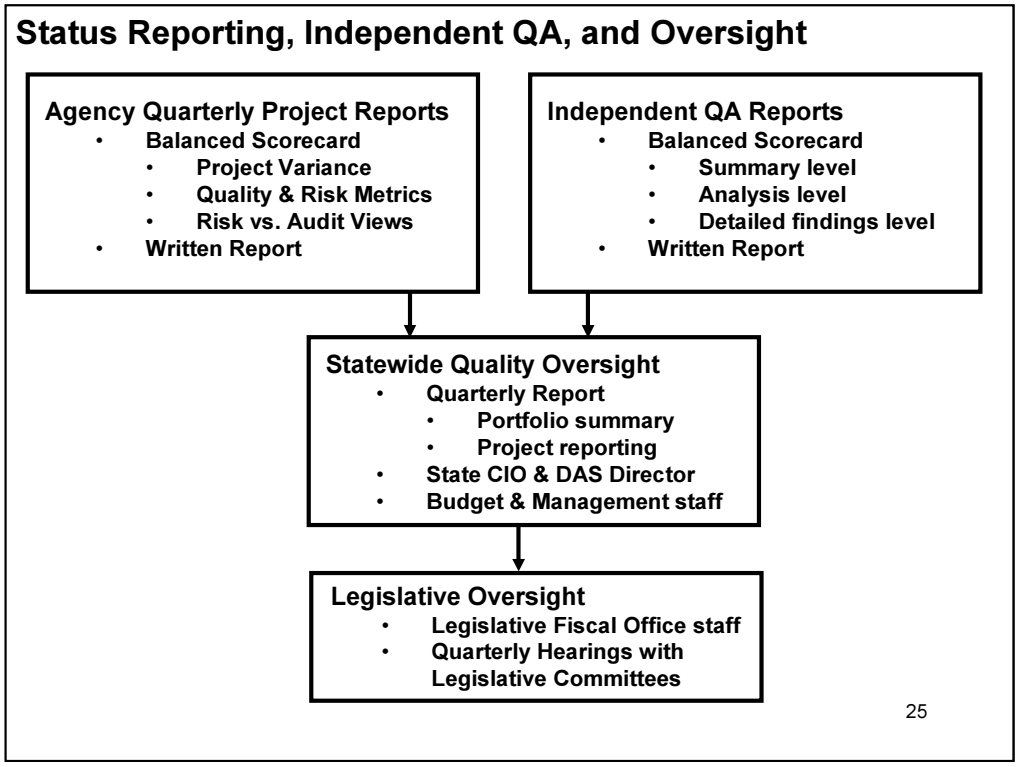
This slide maps common SDLCs (waterfall, RUP, and ITIL) to three ISO standards for software engineering:

• ISO 90003 (Software engineering -- Guidelines for the application of ISO 9001:2000 to computer software)

• ISO 12207 (Systems and software engineering -- Software life cycle processes)

• ISO 15288 (Systems and software engineering -- System life cycle processes)

The main point here is that all useable SDLCs have certain core similarities that are consistent with formal project management and quality management.



Another slide with information specific to the State of Oregon…

As mentioned, major IT projects in the State can be thought of as having multiple levels of oversight. Typically, a project is under the oversight of the following entities:

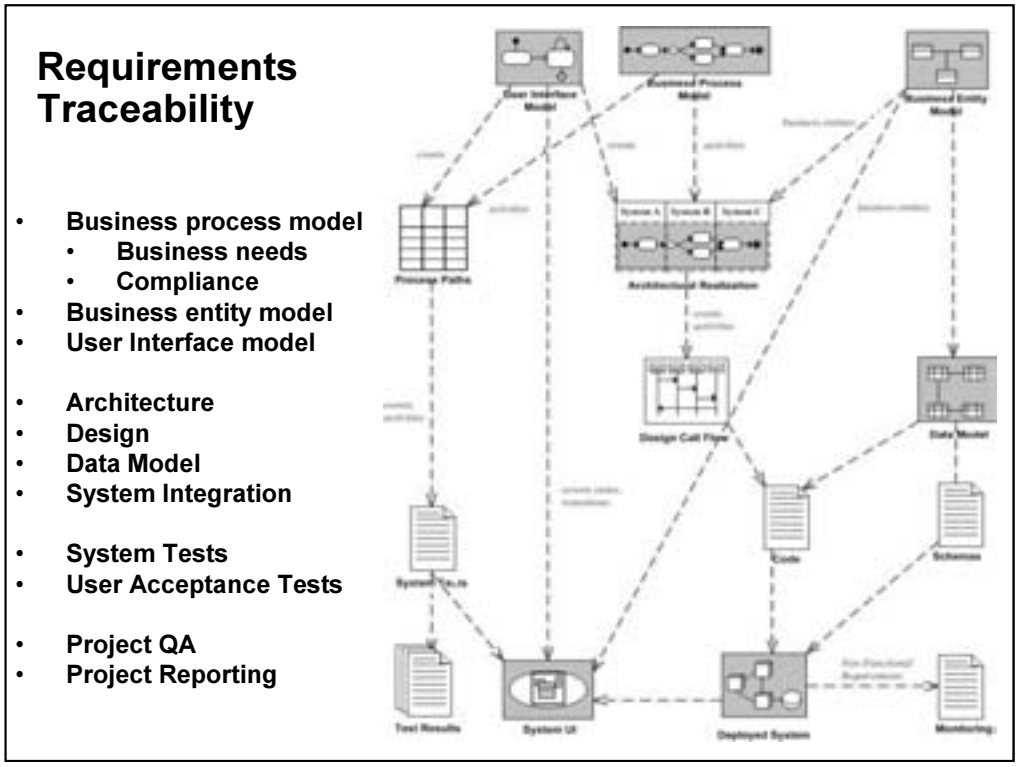
1. the management of the agency planning and executing the project;
2. independent QA contractor retained to provide independent assessment of project status, performance, and risks;
3. the staff of the State CIO;
4. legislative oversight (from a budgetary or fiscal perspective).

In addition, all projects are subject to audits by the Secretary of State, which is constitutionally independent from all executive branch agencies.

With the exception of (2), this is not too different from a large private enterprise in which a project or program may report into a director or VP of an operating division but is under the oversight of the various C-level managers, such as the CIO and the CFO. Finally, there may be external audits by an independent auditor.

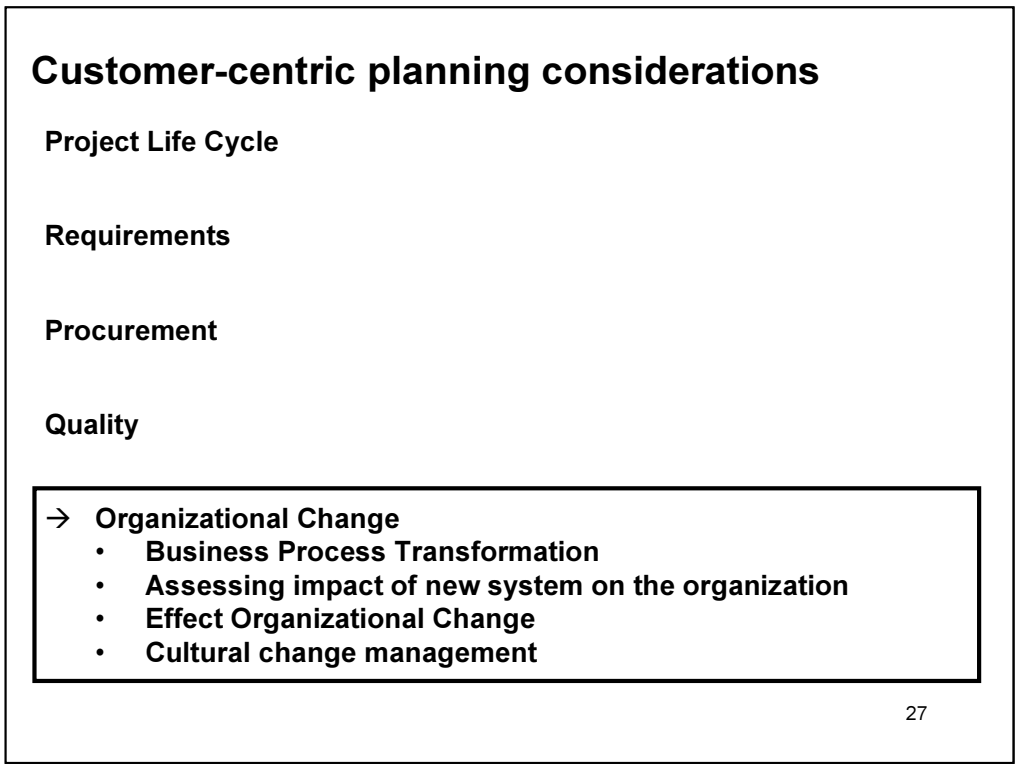
The use of independent QA contractors is expected for major IT projects greater than $1 million. The goal of independent QA is to assure the independence of assessment but also to assure project performance is measured against industry best practice with recommendations for process improvement. The staff of the State CIO recommends that 4% of the overall budget of a major IT project be reserved for independent QA, based on a standard QA statement of work.

The experience of the State of Oregon is that independent QA and external oversight can be very useful tools to assure project quality.

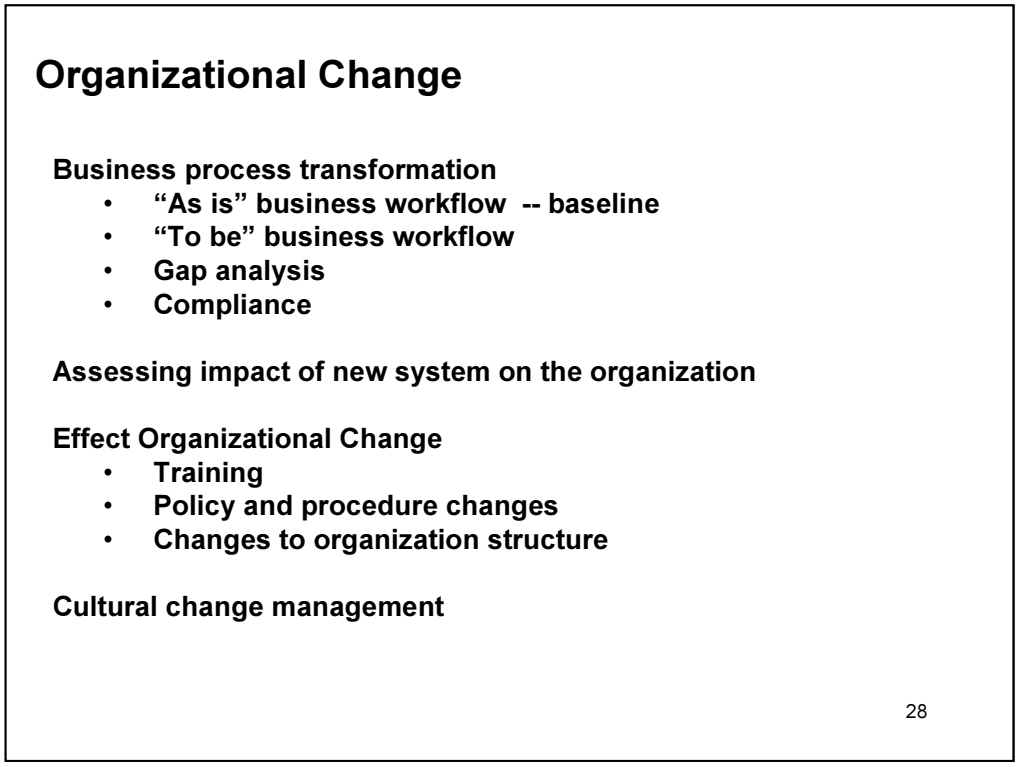


We have already discussed a fair amount about requirements management and its role in quality management of an outsourced project. This slide emphasizes the importance of business requirements as the driver for business process modeling, system architecture and design, acceptance testing, and quality monitoring and reporting.

Historically, large enterprises exhibit a chasm between its IT and business departments. Many failures of major IT projects can be attributed to the disconnect between the IT view of the enterprise vs. the business view of the enterprise. In recent years, there are wider recognition and acceptance that major IT projects need to be driven by business requirements in order to accomplish desired operational improvement and strategic objectives. This is a healthy development that helps assure overall quality.



The final topic of this presentation is Organizational Change.



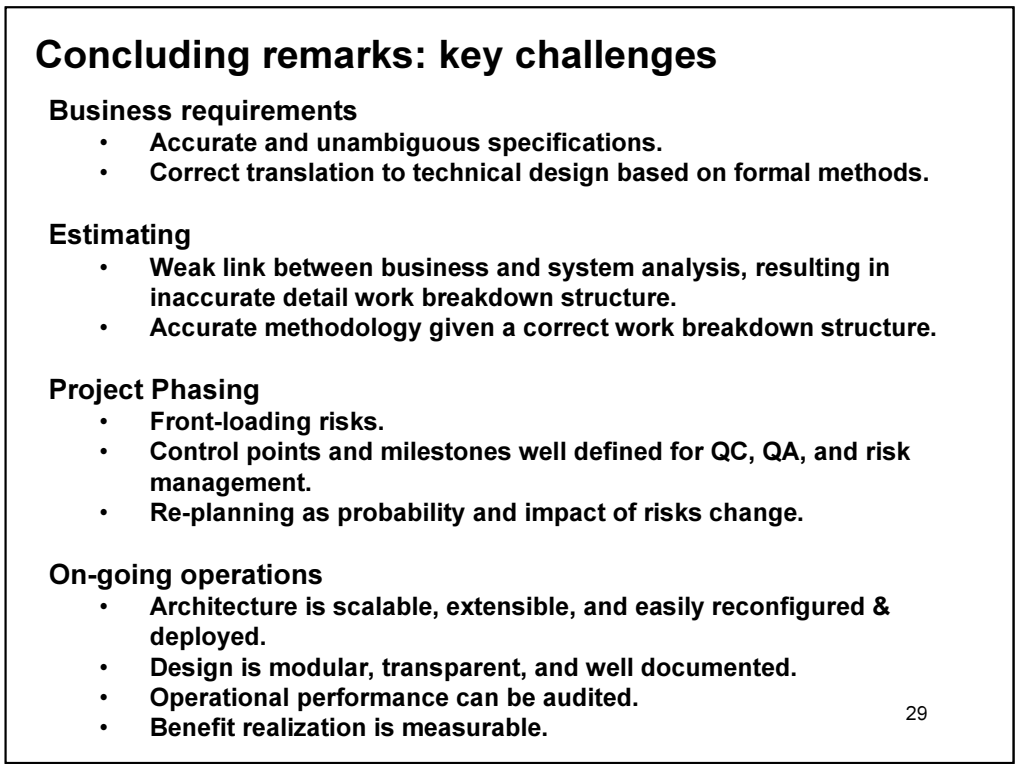
By nature, a major IT project has big impact on the operations of an enterprise. Frequently, such a projects is the enabler for major business process improvement or re-engineering and may entail significant change to staff responsibilities and even organizational structure.

Human nature is naturally resistant to change, and human and organizational factors impose challenges to all phases of a major IT project. A reasonable way to assure quality of the overall process is to emphasize business requirements and business process. In this regard, a good starting point of a major IT project is the documentation and analysis of the As Is business process. The To Be business process is then defined, ideally in a collaborative manner between contractor staff and customer staff.

The foundation of To Be business processes should be business requirements, regulatory requirements, and the capabilities (as well as constraints) of new technology. Optimization of proposed future processes should be done on the basis of balancing potential efficiency gain and return-on-investment with organizational change. Given two processes with similar effectiveness or efficiency, the process that results in smaller change, or gap, should be chosen.

Impact of the new system on the enterprise needs to be evaluated and analyzed across functional units. Training needs should be an integral part of the project plan and its budget, as should efforts required to update relevant policies and procedures. Organizational change and even cultural change may also be necessary in order to assure overall implementation quality of a major IT project.

Clearly, technical success *is necessary but not sufficient* for the overall success of a major IT project and related enterprise business process improvement initiatives.



This presentation will conclude with the author's impression of key challenges for quality management of major IT projects that are outsourced.

First, it is difficult to define good requirements. Software requirements are frequently not well understood even by the acquiring enterprise. One reason is that business conditions evolve rapidly. As such, it may be difficult to have stable, well documented requirements. A second challenge is the chasm that tends to exist between an enterprise's IT department and its operational units. As a result, there is always a risk of miscommunication during requirements definition and their subsequent management.

Second, even when requirements are stable, the method for estimating resources and time can be a challenge. Many contractors' work plans are based on estimates that may not be transparent to the customer. Frequently, there is inadequate allocation of resource and time for customer reviews, data conversion, user acceptance testing, and rework.

Third, project phases frequently delay high risk areas, instead of front-loading them (as recommended in SDLC like RUP). Projects that progresses well (or has high velocity in the sense of Agile SDLC) may slow down if high risks areas are deferred to later iterations. Management pressure to see early results sometime drives the tendency in delaying high risk portion of the project. This presentation advocates the inclusion of ample intermediate milestones to facilitate project status/performance assessment. These milestones are also potential management control points for quality and risk assessment. Project managers may consider Earned Value methodology of the PMBOK, but other ways to facilitate good communication between developer and customers are also beneficial.

Fourth, a project needs to take into account on-going support and maintenance needs of an enterprise application early, beginning with the architecture. Designs needs to be robust and supportable, with tools to support on-going monitoring of operational performance and key performance indicators, both in business and technical terms. Where possible, architecture and design need to conform to enterprise stand

"As a manager, the important thing is not what happens when you are there, but what happens when you are not there."

Ken Blanchard
One Minute Manager

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The author believes that the key to quality is process, and the management of quality is ultimately about management of process that "designs in" quality.

We end this presentation with this quote. Thank you.

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