Chapter 7. Moving into Design

Chapter 7 Outline

- Transition from requirements to design.
- System acquisition strategies.
  - Custom development.
  - Packaged software.
  - Outsourcing.
- Influences on the acquisition strategies.
- Selecting an acquisition strategy.

INTRODUCTION

- The **design phase** decides ***how*** the new system will operate.
- The design phase develops the ***system requirements*** that describe details for building the system.
- We also describe three alternative strategies for acquiring the system.

TRANSITION FROM REQUIREMENT TO DESIGN

- The purpose of the **analysis phase** is to figure out what the business needs. The purpose of the ***design phase*** is to decide how to build it.
- During the initial part of design, the **business requirements** are converted into ***system requirements*** that describe the technical details for building the system.
- System requirements are communicated through a collection of design documents and *physical* process and data models.

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Activities in the Design Phase	Deliverables	Chapter
✓ Determine preferred system acquisition strategy (make, buy, or outsource).	– Alternative matrix	7
✓ Design the architecture for the system.	– Architecture design	8
✓ Make hardware and software selections.	– Hardware and software specification	
✓ Design system navigation, inputs, and outputs.	– Interface design	9
✓ Convert logical process model to physical process model.	– Physical process model	10
✓ Update CASE repository with additional system details.	– Updated CASE repository	
✓ Design the programs that will perform the system processes.	– Program design specifications	
✓ Convert logical data model to physical data model.	– Physical data model	11
✓ Update CASE repository with additional system details.	– Updated CASE repository	
✓ Revise CRUD matrix.	– CRUD matrix	
✓ Design the way in which data will be stored.	– Data storage design	
✓ Compile final system specification.	– System specification: all of the above deliverables combined and presented to approval committee	7

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- At the end of the design phase, the final deliverable called ***system specification*** is created.
- System specification outline

- Recommended System Acquisition Strategy
- System Acquisition Weighted Alternative Matrix
- Architecture Design
- Hardware and Software Specification
- Interface Design
- Physical Process Model
- Program Design Specifications
- Physical Data Model
- Data Storage Design
- Updated CRUD Matrix
- Updated CASE Repository Entries

SYSTEM ACQUISITION STRATEGIES

- There are three primary ways to approach the creation of a new system:

1. Develop a custom application in-house.
2. Buy a packaged system and (possibly) customize it; and
3. Rely on an external vendor, developer, or service provider to build or provide the system.

Custom Development

- ***Custom development*** – building a new system from scratch.
- Pros of custom development:

  - It allows developers to be flexible and creative in the way they solve business problems.

  - It allows to take advantage of current technologies that can support strategic efforts.

  - It builds technical skills and functional knowledge within the organization.

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- Cons of custom development:

- It requires a dedicated effort that include long hours and hard work.
- It requires a variety of skills, but high skilled IS professionals are difficult to hire and retain.
- The risks associated with building a system from the ground up can be quite high.

Packaged Software

- Many organizations buy ***packaged software*** that has been written for common business needs.
- It can be much more efficient to buy programs that have already been created and tested, and a packaged system can be bought and installed quickly compared with a custom system.
- Packaged software can range from small single-function tools to huge all-encompassing system such as ***ERP (enterprise resource planning)*** applications.

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- One problem of packaged software is that companies utilizing packaged software must accept the functionality that is provided by the system.
- Most packaged applications allow for customization or the manipulation of system parameters to change the way certain features work.
- A custom-built add-on program that interfaces with the packaged application, called a *workaround*, can be created to handle special needs.

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- ***Systems Integration*** refers to the process of building new systems by combining packaged software, existing legacy systems, and new software written to integrate them.
- The key challenge in systems integration is finding ways to integrate the data produced by the different packages and

Outsourcing

- ***Outsourcing*** means hiring an external vendor, developer, or service provider to create or supply the system.
- Outsourcing firms called ***application service providers (ASPs)*** supply software applications and/or services over the Internet.
- ***Software as a service (SaaS)*** is an extension of the ASP model.
- Outsourcing has many advantages such as a low cost of entry and a short setup time.

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- Risks of outsourcing:
  - Compromising confidential information
  - Losing control over future development
  - Losing important skills of in-house professionals.
- You should never outsource what you do not understand.
- Carefully choose an outsourcing firm with a proven track record.

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- Three types of outsourcing contracts:
  - ***Time and arrangements***: pay for whatever time and expenses are needed to get the job done.
  - ***Fixed-price contract***
  - ***Value-added contract***: the outsourcer reaps some percentage of the completed system's benefits.

Outsourcing Guidelines

- Keep the lines of communication open between you and your outsourcer.
- Define and stabilize requirements before signing a contract.
- View the outsourcing relationship as a partnership.
- Select the vendor, developer, or service provider carefully.
- Assign a person to manage the relationship.
- Don't outsource what you don't understand.
- Emphasize flexible requirements, long-term relationships, and short-term contracts.

INFLUENCES ON THE ACQUISTION STRATEGY

Project characteristics that influence the choice of acquisition strategy

	When to Use Custom Development	When to Use a Packaged System	When to Use Outsourcing
Business need	The business need is unique	The business need is common	The business need is not core to the business
In-house experience	In-house functional and technical experience exists	In-house functional experience exists	In-house functional or technical experience does not exist
Project skills	There is a desire to build in-house skills	The skills are not strategic	The decision to outsource is a strategic decision
Project management	The project has a highly skilled project manager and a proven methodology	The project has a project manager who can coordinate vendor's efforts	The project has a highly skilled project manager at the level of the organization that matches the scope of the outsourcing deal
Time frame	The time frame is flexible	The time frame is short	The time frame is short or flexible

Business Need

- If the business need for the system is common and the technical solutions already exist, packaged software is a solution.
- A custom solution should be explored when the business need is unique.
- Outsourcing is used in situations where the business need is not a critical element of company strategy.

In-House Experience

- If in-house experience exists for all the functional and technical needs of the system, it will be easier to build a custom application.
- A packaged system may be a better alternative for companies that do not have the technical skills to build the desired system.

Project Skills

- The skills that are applied during projects are either technical (e.g., SQL) or functional (e.g., e-commerce).
- Different design alternatives are more viable, depending on how important the skills are to the company's strategy.

Project Management

- Custom applications require excellent project management and a proven methodology.
- There are so many things that can push a project off track, such as funding obstacles, staffing, and overly demanding business users.

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- The project team should choose to develop a custom application only if it is certain that the underlying coordination and control mechanisms will be in place.
- Packaged and outsourcing alternatives also must be managed; however, they are more shielded from internal obstacles.

Time Frame

- When time is a factor, the project team should probably start looking for a system that is already built and tested.
- If a custom alternative is chosen, and the time frame is very short, consider using techniques like timeboxing to manage the problem.
- An outsourcing solution could take as long a custom development initiative.

SELECTING AN ACQUISITION STRATEGY

- To implement the strategies, additional information is needed.
  - What tools and technologies are needed for a custom development project?
  - What vendors make products that address the project needs?
  - What service providers would be able to build this application if outsourced?
- One helpful tool is the ***request for proposal (RFP),*** a document that solicits a formal proposal from a potential vendor, developer, or service provider.

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- RFPs describe in detail the system or service that is needed, and vendor respond by describing in detail how they could supply those needs.
- For smaller projects with smaller budgets, a ***request for information (RFI)*** may be sufficient, as it is shorter and less detailed.
- When a list of equipment is so complete that the vendor needs only provide a price, a ***request for quote (RFQ)*** may be used.

Developing an Alternative Matrix

- The **alternative matrix** combines several feasibility analyses into one matrix.
- It contains technical, economical and organizational feasibilities for each system candidate, pros and cons, and other information.
- The matrix is a grid with alternatives across the top and different criteria

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- Sometimes, weights and scores are added to create a weighted alternative matrix.
- The score assigned is a subjective assignment.
- To avoid a biased analysis, each analyst develops ratings independently.

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S... Alternatives Matrix Using ...

Evaluation Criteria	Relative Importance (Weight)	Alternative 1: Custom Application using VB.NET	Score (1-5)*	Weighted Score	Alternative 2: Custom Application using Java	Score (1-5)*	Weighted Score	Alternative 3: Packaged Software Product ABC	Score (1-5)*	Weighted Score
Technical Issues:										
Criterion 1	20		5	100		3	60		3	60
Criterion 2	10		3	30		3	30		5	50
Criterion 3	10		2	20		1	10		3	30
Economic Issues:										
Criterion 4	25	Supporting	3	75	Supporting	3	75	Supporting	5	125
Criterion 5	10	Information	3	30	Information	1	10	Information	5	50
Organizational Issues										
Criterion 6	10		5	50		5	50		3	30
Criterion 7	10		3	30		3	30		1	10
Criterion 8	5		3	15		1	5		1	5
TOTAL	100			350			270			360

SUMMARY

- Transitioning from requirements to design
  - The design phase develops the blueprint for the new system.
  - The main deliverable from the design phase is the system specification.
- System acquisition strategies
  - Custom application in-house.
  - Packaged system.
  - Outsourcing

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- Influences on acquisition strategy
  - Each acquisition strategy has its strengths and weaknesses.
  - Consider such issues as the uniqueness of business need, in-house experiences, and the importance of project skills.
- Selecting a acquisition strategy
  - An alternative matrix can help the design team make the decision regarding the specific acquisition strategy.
  - The request for proposal and request for quote are ways to gather accurate details regarding the