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.







- 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.

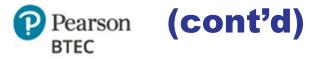




TRANSITION FROM REQUIREMENT TO DESIGN

- 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.





| 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 |





- 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.







- 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 singlefunction tools to huge all-encompassing system such as *ERP* (enterprise resource planning) applications.





- 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.





- 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 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.







- 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.





- 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 |







- 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.







- The skills that are applied during projects are either technical (e.g., SQL) or functional (e.g., ecommerce).
- 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.





- 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.







- 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.





- 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

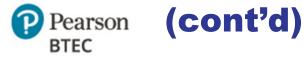
across the ton and different criteria





- 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.





| <u></u> | | N 14 | | 41 | R 4 | 4 1 | | | | |
|------------------------|------------------------------------|---|--------|-------------------|---|-----------------|-------------------|---|-----------------|-------------------|
| Evaluation Criteria | Relative Importance (Weight) | Alternative 1: Custom Application using VB.NET | (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: | | 4 | | | † | | | † | | |
| Criterion 1 | 20 | | 5 | 100 | | 3 | 60 | | 3 | 60 |
| Criterion 2 | 2 10 | | 3 | 30 | | 3 | 30 | | 5 | 50 |
| Criterion 3 | 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 |
| Organization Issues | nal | | | | | | | | | |
| Criterion 6 | 3 10 | | 5 | 50 | | 5 | 50 | | 3 | 30 |
| Criterion 7 | 7 10 | | 3 | 30 | | 3 | 30 | | 1 | 10 |
| Criterion 8 | 5 | | 3 | 15 | | 1 | 5 | | 1 | 5 |
| TOTAL | 100 | + | | 350 | + | | 270 | + | | 360 |





- 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.





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