Chapter 11

Feasibility Analysis and the System Proposal

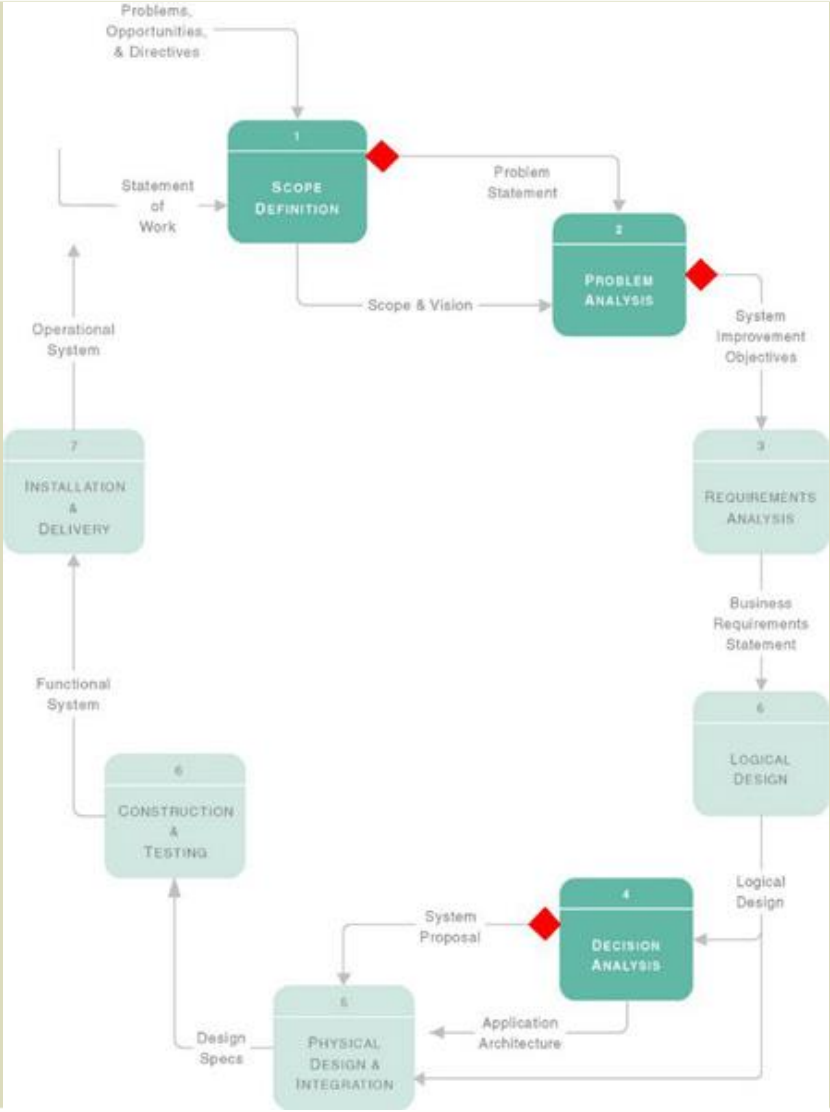
Feasibility Analysis

– **Feasibility** اندازه گیری میزان مفید بودن یا عملی بودن یک سامانه اطلاعاتی برای سازمان

– **Feasibility analysis** فرایندی که توسط آن امکان پذیری اندازه گیری می شود.

– **Creeping Commitment** فرایندی برای امکان پذیری که پیشنهاد سنجش امکان پذیری در طول چرخه حیات نرم افزار را دارد.

Feasibility Checkpoints During Systems Analysis



Six Tests For Feasibility

- **Operational feasibility** – چقدر راه حل مطابق نیازمندی ها است؟
- **Cultural (or political) feasibility** – چقدر راه حل در محیط سازمانی پذیرفته می شود؟
- **Technical feasibility** – سنجشی از عملیاتی بودن راه حل فنی و وجود منابع فنی و تخصص مورد نیاز
- **Schedule feasibility** – سنجشی از میزان منطقی بودن جدول زمانی پروژه
- **Economic feasibility** – سنجشی از میزان صرفه اقتصادی پروژه یا راه حل
- **Legal feasibility** – سنجشی از اینکه با محدودیت های قانونی/قرادادی موجود چقدر یک راه حل می تواند به خوبی پیاده سازی شود

Operational Feasibility

- سیستم پیشنهادی چقدر مشکلات را حل می کند و از فرصت های شناسایی شده در حین تعریف محدوده تحلیل مساله بهره می گیرد؟
- سیستم پیشنهادی چقدر نیازمندی های مشخص شده در فاز تحلیل نیازمندی ها را برآورده می کند؟
- آیا مساله همچنان ارزش حل کردن دارد؟

Information System Costs

- Development costs – هزینه های یکباره که بعد از تکمیل پروژه دیگر رخ نخواهند داد.
  - Personnel
  - Computer usage
  - Training
  - Computer equipment and software
- Operating costs – هزینه هایی که در کل چرخه حیات سیستم رخ می دهند.
  - Fixed costs — occur at regular intervals but at relatively fixed rates.
  - Variable costs — occur in proportion to usage.

Information System Benefits

- عایدات قابل لمس موارد هستند که قابل اندازه گیری می باشند.
- عایدات غیر قابل لمس مواردی هستند که کمی سازی آنها غیر ممکن یا دشوار باشد.
  - Fewer processing errors
  - Increased throughput
  - Decreased response time
  - Elimination of job steps
  - Increased sales
  - Reduced credit losses
  - Reduced expenses

Three Popular Techniques to Assess Economic Feasibility

- Payback Analysis
- Return On Investment
- Net Present Value

Time Value of Money

- در هر سه روش استفاده می شود.
- مفهومی که نشان می دهد یک تومن امروز بیشتر از یک تومن در سال بعد ارزش دارد.
  - مثلا اگر ۱۰۰ هزارتومان با نرخ ٪۲ در یک سال سرمایه گذاری کنید، بعد از یک سال مقدار ۱۰۲ هزارتومان خواهید داشت.
  - بنابراین ۱۰۰ هزارتومان امروز و ۱۰۲ هزارتومان یک سال بعد ارزش یکسانی دارند.
  - اگر یک سیستم اطلاعاتی دو سال بعد ۲۰ میلیون تومان عایدات دارد و از سرمایه گذاری های دیگر ٪۱۰ بازگشت سرمایه وجود دارد، بنابراین سود سیستم اطلاعاتی معادل ۱۶۵۲۸۰۰۰ تومان است.

Present Value Formula

– **Present value** ارزش جاری یک تومان در هر زمان آینده که n تعداد سال ها بوده و i نرخ کاهش ارزش پول می باشد.

$$PV_n = 1/(1 + i)^n$$

– **Discount rate** یک درصد شبیه نرخ سود سرمایه گذاری

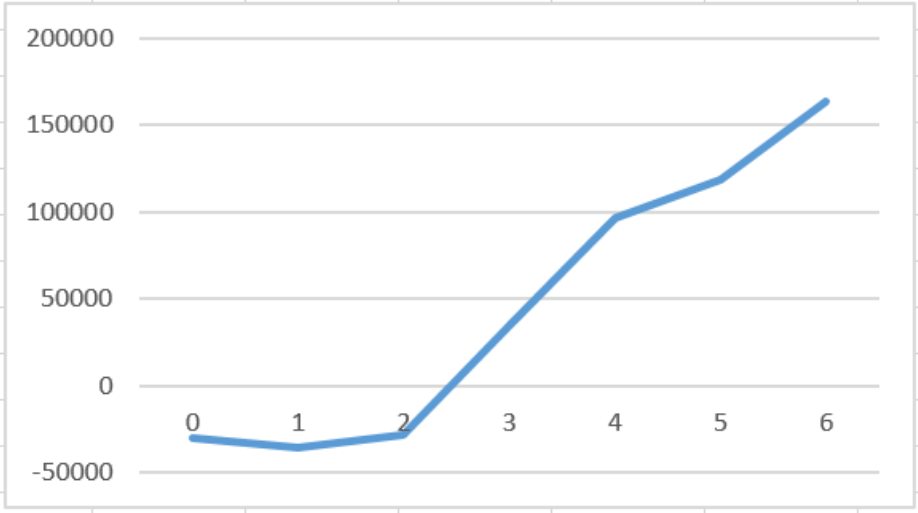
Payback Analysis

- **Payback analysis** – تکنیکی برای مشخص سازی زمانی که سیستم پول خود را پس خواهد داد

- **Payback period** – دوره زمانی قبل از اینکه عایدات سیستم از هزینه های قبلی و جاری آن بیشتر شود.

Payback Analysis for a Project

هزار تومان	سال 0	سال 1	2	3	4	5	6
هزینه توسعه اولیه	30000						
هزینه توسعه، تغییرات و نگه داری		31200	46200	16200	9700	64200	19200
فاکتور کاهش ارزش پول	1	0.909091	0.826446	0.751315	0.683013	0.620921	0.564474
هزینه با ارزش امروز	30000	28363.64	38181.82	12171.3	6625.231	39863.15	10837.9
هزینه تجمعی	30000	58363.64	96545.45	108716.8	115342	155205.1	166043
عایدات سیستم	0	25000	55000	100000	100000	100000	100000
عایدات با ارزش امروز	0	22727.27	45454.55	75131.48	68301.35	62092.13	56447.39
عایدات تجمعی	0	22727.27	68181.82	143313.3	211614.6	273706.8	330154.2
سود تجمعی خالص سیستم	-30000	-35636.4	-28363.6	34596.54	96272.66	118501.6	164111.1



Return-on-Investment Analysis (ROI), Net Present Value (NPV)

Return-on-Investment (ROA) analysis – a technique that compares the lifetime profitability of alternative solutions.

اندازه گیری رابطه بین میزان درآمد یک سرمایه گذاری با میزان سرمایه گذاری

Lifetime ROI =
(estimated lifetime benefits – estimated lifetime costs) / estimated lifetime costs

Annual ROI = lifetime ROI / lifetime of the system

Net present value – analysis technique that compares annual discounted costs and benefits of alternative solutions

NPV=total present value of lifetime benefits-total present value of lifetime costs

Candidate Systems Matrix

	Candidate 1 Name	Candidate 2 Name	Candidate 3 Name
Stakeholders			
Knowledge			
Processes			
Communications			

Candidate Systems Matrix – a tool used to document similarities and differences between candidate systems.

- **Stakeholders** - how system will interact with people and other systems.
- **Knowledge** - how data will be implemented, how inputs will be captured, how outputs will be generated.
- **Processes** - how processes will be built and implemented.
- **Communications** - how processes and data will be distributed.

Feasibility Analysis Matrix

Feasibility Analysis Matrix – a tool used to rank candidate systems.

	Weighting	Candidate 1	Candidate 2	Candidate 3
Description				
Operational Feasibility				
Cultural Feasibility				
Technical Feasibility				
Schedule Feasibility				
Economic Feasibility				
Legal Feasibility				
Ranking				

The System Proposal

System proposal – a report or presentation of a recommended solution.

- Usually formal written report or oral presentation
- Intended for system owners and users

Appendix A: Length of the Written Report

- To Executive-level managers - one or two pages
- To Middle-level managers - three to five pages
- To Supervisory-level managers - less than 10 pages
- To clerk-level personnel - less than 50 pages.

Formats for Written Reports

- **factual format** - traditional and best suited to readers interested in facts and details as well as conclusions.
- **administrative format** - modern, result-oriented format preferred by managers and executives.

Factual Format	Administrative Format
I. Introduction	I. Introduction
II. Methods and procedures	II. Conclusions and recommendations
III. Facts and details	III. Summary and discussion of facts and details
IV. Discussion and analysis of facts and details	IV. Methods and procedures
V. Recommendations	V. Final conclusion
VI. Conclusion	VI. Appendixes with facts and details

Appendix B: Feasibility measures

Cultural (or political) feasibility

- Does management support the system?
- How do end users feel about their role in the system?
- What end users may resist or not use the system? How can this be overcome?
- How will the working environment change? Can users and management adapt to the change?

Technical feasibility

- Is the proposed technology or solution practical?
- Do we currently possess the necessary technology?
- Do we possess the necessary technical expertise?

Schedule feasibility

- Are specified deadlines mandatory or desirable?
- Are mandatory deadlines realistic for proposed solution?

Economic feasibility

- During Scope Definition
  - Do the problems or opportunities warrant the cost of a detailed study and analysis of the current system?
- During Problem Analysis
  - After a detailed study of the current system
  - Better estimates of development costs and benefits
- During Decision Analysis
  - Requirements now defined
  - Development costs can be better estimated

Legal feasibility

- Copyrights
- Union contracts
- Legal requirements for financial reporting
- National data and work laws

Appendix C: Sample Candidate Systems Matrix

Characteristics	Candidate 1	Candidate 2	Candidate 3
Portion of System Computerized Brief description of that portion of the system that would be computerized in this candidate.	COTS package Platinum Plus from Entertainment Software Solutions would be purchased and customized to satisfy Member Services required functionality.	Member Services and warehouse operations in relation to order fulfillment.	Same as candidate 2.
Benefits Brief description of the business benefits that would be realized for this candidate.	This solution can be implemented quickly because it's a purchased solution.	Fully supports user required business processes for SoundStage Inc. Plus more efficient interaction with member accounts.	Same as candidate 2.
Servers and Workstations A description of the servers and workstations needed to support this candidate.	Technically architecture dictates Pentium III, MS Windows 2000 class servers and workstations (clients).	Same as candidate 1.	Same as candidate 1.
Software Tools Needed Software tools needed to design and build the candidate (e.g., database management system, emulators, operating systems, languages, etc.). Not generally applicable if applications software packages are to be purchased.	MS Visual C++ and MS Access for customization of package to provide report writing and integration.	MS Visual Basic 5.0 System Architect 2001 Internet Explorer	MS Visual Basic 5.0 System Architect 2001 Internet Explorer

Sample Candidate Systems Matrix (cont.)

Characteristics	Candidate 1	Candidate 2	Candidate 3
Application Software A description of the software to be purchased, built, accessed, or some combination of these techniques.	Package solution	Custom Solution	Same as candidate 2.
Method of Data Processing Generally some combination of: on-line, batch, deferred batch, remote batch, and real-time.	Client/Server	Same as candidate 1.	Same as candidate 1.
Output Devices and Implications A description of output devices that would be used, special output requirements, (e.g., network, preprinted forms, etc.), and output considerations (e.g., timing constratints)	(2) HP4MV department laser printers (2) HP5SI LAN laser printers	(2) HP4MV department laser printers. (2) HP5SI LAN laser printers (1) PRINTRONIX bar-code printer (includes software & drivers) Web pages must be designed to VGA resolution. All internal screens will be designed for SVGA resolution.	Same as candidate 2.

Sample Candidate Systems Matrix (cont.)

Characteristics	Candidate 1	Candidate 2	Candidate 3
Input devices and Implications A description of input methods to be used, input devices (e.g., keyboard, mouse, etc.), special input requirements (e.g., new or revised forms from which data would be input), and input considerations (e.g., timing of actual inputs).	Keyboard & mouse.	Apple "Quick Take" digital camera and software (15) PSC Quickscan laser bar-code scanners (1) HP Scanjet 4C Flatbed Scanner Keyboard and mouse	Same as candidate 2.
Storage Devices and Implications Brief description of what data would be stored, what data would be accessed from existing stores, what storage media would be used, how much storage capacity would be needed, and how data would be organized.	MS SQL Server DBMS with 1000GB arrayed capability.	Same as candidate 1.	Same as candidate 1.

Appendix D: Sample Feasibility Analysis Matrix

	Wt	Candidate 1	Candidate 2	Candidate 3
Description		Purchase commercial off-the-shelf package for member services.	Write new application in-house using new company standard VB.NET and SQL Server database	Rewrite current in-house application using Powerbuilder.
Operational feasibility	15%	Supports only Member Services requirements. Current business process would have to be modified to take advantage of software functionality. Also there is concern about security in the system. Score: 60	Fully supports user-required functionality. Score: 100	Fully supports user-required functionality. Score: 100
Cultural Feasibility	15%	Possible user resistance to non-standard user interface of proposed purchased package. Score: 70	No foreseeable problems. Score: 100	No foreseeable problems. Score: 100

Sample Feasibility Analysis Matrix (cont.)

	Wt	Candidate 1	Candidate 2	Candidate 3
Technical feasibility	20%	Current production release of Platinum Plus package is version 1.0 and has been on the market for only 6 weeks. Maturity of product is a risk, and company charges and additional monthly fee for technical support. Required to hire or train Java J2EE expertise to perform modifications for integration requirements. Score: 50	Solution requires writing application in VB .NET. Although current technical staff has only Powerbuilder experience, it should be relatively easy to find programmers with VB .NET experience. Score: 95	Although current technical staff is comfortable with Powerbuilder, management is concerned about acquisition of Powerbuilder by Sybase Inc. MS SQL Server is the current company standard for database, which competes with Sybase DBMS. We have no guarantee that future versions of Powerbuilder will "play well" with our current version of SQL Server. Score: 60

Sample Feasibility Analysis Matrix (cont.)

	Wt	Candidate 1	Candidate 2	Candidate 3
Economic feasibility	30%			
Cost to develop:		Approx. $350.000	Approx. $418.000	Approx. $400.000
Payback (discounted):		Approx. 4.5 years	Approx. 3.5 years	Approx. 3.3 years
Net present value:		Approx. $210,000	Approx. $307,000	Approx. $325,000
Detailed calculations:		See Attachment A	See Attachment A	See Attachment A
		Score: 60	Score: 85	Score: 90

Sample Feasibility Analysis Matrix (cont.)

	Wt	Candidate 1	Candidate 2	Candidate 3
Schedule feasibility	10%	Less than 3 months Score: 95	9-12 months Score: 80	9 months Score: 85
Legal feasibility	10%	No foreseeable problems Score: 100	No foreseeable problems Score: 100	No foreseeable problems Score: 100
Weighted score	100%	67	92.5	87.5