

Scheme of Modeling and Lifecycle in the Development of Information Systems in Publishing Activity (ISPA)

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Summary: In the process of Information systems (IS) development in some of the spheres of social life, system analysts and software developers face difficulties caused by the specifics of the object sphere where a new IS has to be built or an existing one to be improved. This paper makes an attempt to:

- Systematize Lifecycle activities of Information systems in publishing activity (ISPA);
- Suggest a scheme for ISPA modeling;
- Suggest an ISPA Lifecycle model.

Key words: Publishing activity; Modeling; Lifecycle; Models.

INTRODUCTION

Most of the existing approaches of developing and building an information system (IS) rely on tools for automation of the activity during IS development (CASE). The process of IS developing splits into several subtasks depending on the used approach. The general case includes (defined by ISO/IEC 12207/1995-08-01): Gathering the information; Modeling the business, and Constructing the architecture of the future system. For the purpose we need to use a suitable scheme of modeling and relevant model of the System's Lifecycle.

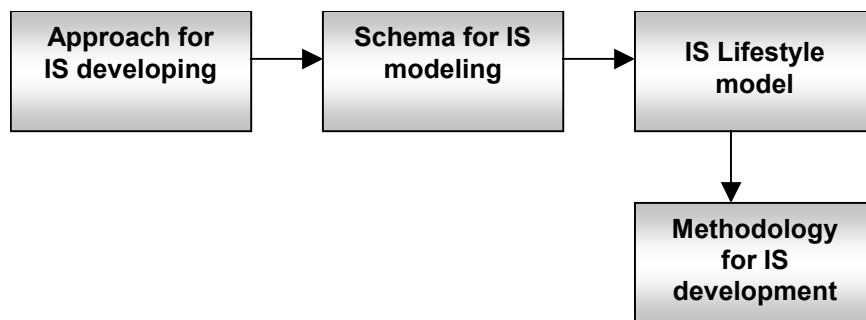
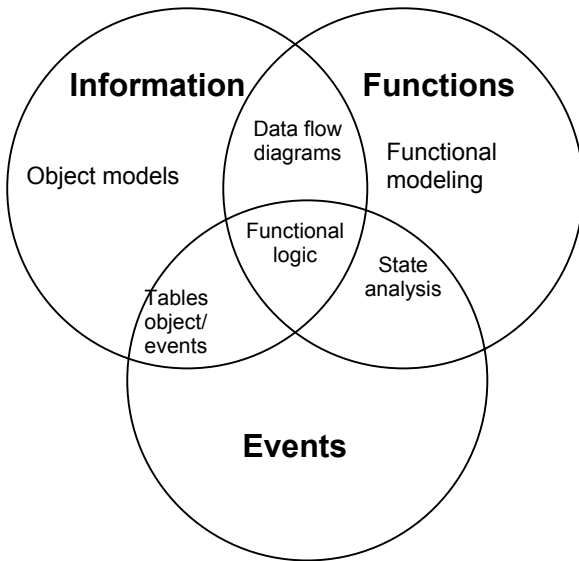


Fig.1. Inceptive stages from the process of developing of IS

GENERALIZED SCHEMES OF CORPORATE SYSTEMS REPRESENTATION

Barker's approach – When developing a business IS we must consider three aspects - **objects** that the business operates with; **the processes** performed by it, and the **events** which manage the changes in the processes. On this basis we may define three types of modeling: informational, functional and modeling of events. This approach is called "CASE*Method" [5]. The models used for defining the business needs should depend as little as possible on the existing information technologies (IT). The system must be open so that new modules can be used; for example: production, sales, management, accounts...

Table 1 Aspects/Stages form IS Lifestyle



Stages Aspects	<i>Business model</i>	<i>IS model</i>	<i>Application development</i>
<i>Functional modeling</i>	+	+	+
<i>State analysis</i>	-	+	-
<i>Data flow diagrams</i>	-	+	-
<i>Event modeling</i>	-	+	+
<i>Functional logic</i>	+	+	-

"+" - obligatory uses;
 "-" - not obligatory but possible uses

Fig. 2. Types of modeling

Special features:

- The offered scheme does not clearly show the sequence of activities which should be performed by the system analyst;
- The offered stages are defined generally and do not cover the peculiarities and the requirements of the ISPA developing.

Zachman’s scheme – Zachman has made an attempt to systemize and represent the different viewpoints when speaking of architecture of corporate IS. These viewpoints depend on the type of the participants in IS development [7], [1]. He creates a table that represents the IS architecture progress – “Zachman scheme” and puts a stress on the need of integration of business and IS.

The scheme is aiming at representing the strategic problems of the large systems in an intelligible and neat way and making them comprehensive not only for the people who take decisions: the scheme should also allow the IT experts to explore their sphere in details.

Table 2. Initial version of Zachman’s scheme

Aspects Stages	Data	Functions	Network	Peoples	Time	Motive
Purpose	Important data for the business	Business process	Major organization units			
Enterprise model	Business models	Processes modeling	Business location			
System model	Data model	Application function	Node functions			
Technology model	Data representation	Hardware function	System software			
Components	Field	Programs	Network architecture			
Working system	Data	Modules	Communications			

In Zahman’s scheme the complex problems of the corporate IS can be reduced to answers to the simple questions: Who (peoples), What (data), When (Time), Where (Network), Why (Events) and How (Functions).

It consists of six rows and six columns. Its initial version consisted of only three columns: Data, Functions and Network. Later on Motive, People and Time have been added.

Special features:

- The above defined lifecycle levels do not cover the special features and the requirements of the ISPA developing;
- The scheme shows the different viewpoints and not the different levels of a detailed representation.
- Each cell represents a final product (stage) but does not show how to reach to this stage.

A comparison of the two approaches:

In Barker's approach IS develops in time, in the process of the consecutive transition between the different stages of the IS lifecycle. A set of methods (obligatory or optional) is offered for each stage. Zachman does not stress on the dynamics of the development of the IS. In transition from one column to another the point from which the system is viewed changes. Zachman's scheme reflects aspects of the system roughly correspondent to some of the development types (Fig. 2 - informational, functional and other).

ISPA DEVELOPMENT SCHEME. LIFECYCLE

IS Lifecycle – a structure comprising processes, activities and tasks, which are performed during the process of development, functioning and exploitation of IS (Software products) from the stage of requirements defining to the end of the IS exploitation [3], [4]. ISO/IEC 12207/1995-08-01 is a base standard which characterizes with:

- The processes used in software products lifecycle is compatible with IS lifecycle [3]. This means that we can use the standard for the IS developing, as well as software products developing, from the draft idea to the finished Lifecycle;
- Its definition of the processes in the Lifecycle of software products and the model projects of IS is too general (where software development is a part of the general stage).

Graphic Lifecycle representation – it represents the different stages visually thus making them much more comprehensible for the analysts and developers. "Waterfall", "V", "b" and "spiral" [1], [2], [6] are some of the basic models for graphic representation. Considering that the stages of the Lifecycle are regulated generally we should analyze and set up appropriate stages (substages) in the process of ISPA development.

- Representing the activity in general;
- Functional modeling;
- Business modeling;
- Conceptual modeling;
- Application specification;
- Development integration and testing;
- Adopting/Exploitation.

An appropriate Lifecycle and ISPA model is developed in order to find the place of the stages and the steps in time (fig.3 and fig. 4).

The offered Lifecycle model takes into consideration the special features of the ISPA development. A stage of functional modeling is offered. Specific information flows from and to the general information space for publishing activity (GISPA) are considered.

In Table 3 four aspects of ISPA modeling are shown – Information modeling, Network; Functions и Events:

Table. 3 Scheme for ISPA modeling

	Events	Information modeling	Functions	Network
General representation of the activity	Not examined	Exploring the current state and the user's requirements	List of processes	List of the operating spheres of the business
Functional modeling		Informational flow defining	Pyramidal model	
Business modeling	Table events/processes	Primary data determination	Business process models	Unit location
Conceptual modeling	Events in IS	Conceptual data model	Representing the business processes in object model	Unit connection defining
Application specification	Events in application	Data dictionary. Defining a general objects	Defining the structure of the application and designing the interfaces	Choosing DBMS and communication ways
Developing integration and testing	Integration of the event table in the application	Data dictionary. Defining a general objects	Architecture modeling	Protocols
Adopting/Exploitation	Event reaction	Relational data model	Modules	DBMS adjustment
		Data		Network addresses

Note: The cells in grey are considered once while the rest are repeated according to the number and types of business processes (subsystems). The publishing activity can be defined as a social function performed by the authors, publishers, distributors and others, with it's main purpose: to satisfy the information needs of the society.

Important abbreviations:

IS – Information system; **PA** – Publishing activity; **ISPA** – Information system for publishing activity; **IT** – Information technologies; **GISPA** – General information space for publishing activity – it is represented as a part of ISPA (subsystem), contains general information resources, accessible for participants in the publishing activity. The development of the GISPA is based on the represented model of Lifecycle; Fig. 4 with A, B, C... shows the lifecycles for each subsystem.

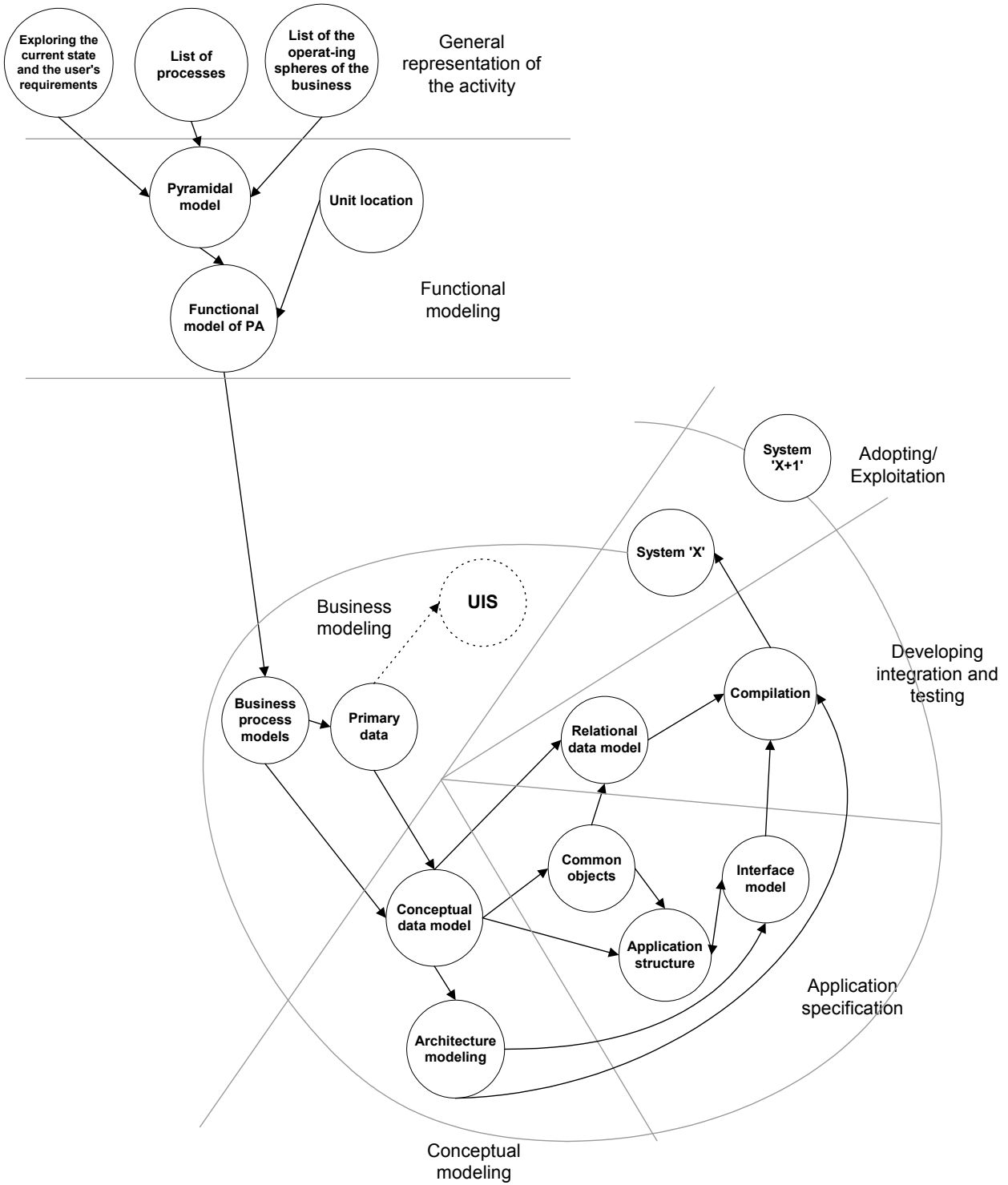


Fig. 3 Lifecycle model – excerpt for one business process

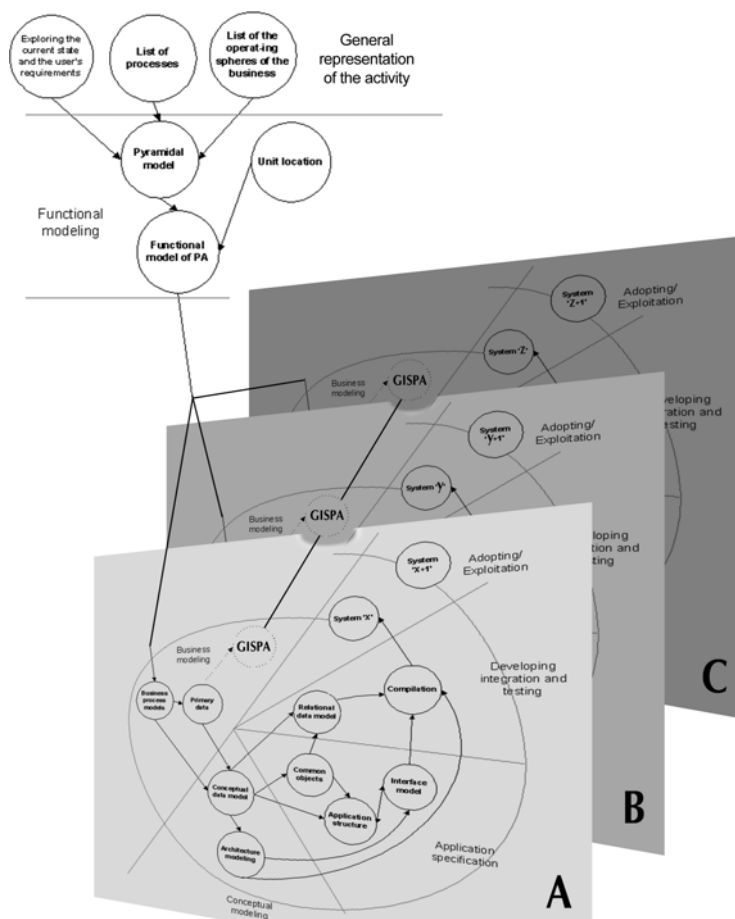


Fig. 4 Lifecycle model for ISPA

CONCLUSION

The offered scheme reflects the main stages in the development of information systems used in publishing activity. The offered lifecycle model shows the stages connected with stages of the publishing activity in general as well as the stages related to the subsystems development. A relationship between these subsystems and a General information space for publishing activity is represented.

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