METHODOLOGY FRAMEWORK
FOR INFORMATION SYSTEMS DEVELOPMENT

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Agenda

1. Introduction - Methods, methodologies, techniques...
2. Methodology framework MeFIS
3. MeFISCoM – MeFIS Conceptual Model
4. Future Work
Methods, methodologies, techniques...

Elements of an Information systems development methodology

- Models of reality
- Methods and techniques
- Computer support
- System development
- Users and Development team
- Quality criteria
- Information system
- Presentation and pilot operation
- Requirements, problems, ideas, analysis
- Development
- Modification
- Evaluation
- Acceptance
- Implementation
- Analysis results
- Business rules
- Stages, steps
- Parameters, tools
- Task
- Development support
- Source: IFIP TC 8/WG 8.1/Wrycza, 1990

Methods, methodologies, techniques...

Methodology

Method

Technique

Tool
IS development methodology

Set of recommended steps, approaches, rules, processes, documents, control procedures, methods, techniques, and tools for the developers, which covers whole life cycle of an information system.

Defines **who, when, what, and why** should do during the development of the IS. Methodology covers all substantial elements of the IS:

- People,
- Organization procedures,
- Data,
- SW / HW,
- Organization influences,
- Economic aspects of IS development and operation
- Documents and control procedures for particular IS development stages

Some examples

**Governmental methodologies:**
- SSADM (Structured Systems Analysis and Design Method),
- SDM (System Development Methodology),
- MERISE,
- V-MODEL (Vorgehens modell).

**European Union:**
- Euromethod

**“Standardizing” methodologies:**
- UP (Unified Process) (OMG),

**IS/IT vendors:**
- IE (Information Engineering Methodology - J. Martin),
- RUP (Rational Unified Process) (Rational, IBM),
- SE (LBMS System Engineering),
- ORACLE CASE Method.

**Academic methodologies:**
- MMDIS (DIT PUE, 1993, 2001),
- ....................
Methods, methodologies, techniques...

**Method**

Defines what should be done in particular phase of IS development process. Method is always based on particular approach (functional, data, object-oriented). Therefore method always covers just some part(s) of the IS development process or just some points of view (data, functions, hardware...).

Some examples:
- ISAC (information analysis),
- YSM (Yourdon Structured Method),
- Jackson System Development,
- BSP (Business System Planning),
- OMT (Rumbaugh et al),
- OOSE (Jacobson),
- OOAD (Booch),
- UP a RUP (OMG, Rational), Perspective, Catalysis, Room...
- SSM (Soft Systems Methodology)
- RAD (Rapid Application Development), „Agile methods”

Methods, methodologies, techniques...

**Technique**

Defines how to act in order to reach desired result. Technique usually defines exact process of particular activities, the way of using tools, and decision options in typical situations.

In contrast to the method, the technique is more exact, but less universal.

Some examples:
- Normalization of data structures,
- Event Partitioning Approach (Yourdon) to the function structure of the system,
- Data modeling (Chen),
- Data modeling (Martin),
- Transformation of the conceptual schema to logical data structures,
- Transaction and transformation analysis,
- Canonical procedure,
Methods, methodologies, techniques...

**Tool**

Is the device supporting particular activities in the IS development process. In the same time it is the medium for expressing the result of this activity. The tool is often closely connected to the particular technique. Tools always formalize – therefore it is possible and desirable to automate them.

Some examples:

- DFD (Data Flow Diagram),
- ERD (Entity Relationships Diagram),
- STD (State Transition Diagram),
- SD (Structure Diagram (Jackson)),
- Data Dictionary (BNF),
- UML tools
  - Class Diagram, Use Case Diagram, Activity Diagram…
  - Component Diagram, Deployment Diagram…

Methods, methodologies, techniques...

**Principles of Methodology**

1. „Goal and problem“ orientation (instead of „solution“)
2. Top management support
3. Modeling and abstraction, principle of „three architectures”
4. User involvement
5. Key documents (the arm for project control)
6. Checking the correctness during the whole development process
7. Analysis and design in each stage
8. Multidimensional approach
9. Methodology customization (selection of proper activities)
10. Specific methodology for specific type of project
11. Openness for further evolution
Principle of Modeling

- Information system is a model of a real system:
  - result of analysis should be truthful (i.e., real)
  - analysis always means recognition of reality

Principle of 3 Architectures

- need to distinguish between:
  - “clear” characteristics of reality
  - used technology characteristics (technology environment)
  - implementation (realization) characteristics

Principle of Abstraction

- all substantive facts are analyzed in detail using hierarchical abstractions
  - whole – part (process - subprocess)
  - supertype - subtype (class hierarchy of objects)

Methods, methodologies, techniques...

Information System Life Cycle
Methods, methodologies, techniques...

Incremental approach

Methodology Framework MeFIS

MeFIS = Methodology Framework for Information Systems Development

Serves as a basis for:

- Definition of basic elements of an IS development methodology,
- Definition of specific features of the development of specific types of information system (Business Intelligence, ERP etc.). MeFISCom describes the common basis of all ISD methodologies – a general ISDM.
- Expression of the variability of the IS development problem (various approaches, development processes, etc.)
The heart of the Methodology Framework

The basic formal material for further development of the MeFIS

Describes basic elements of the Methodology Framework and their basic relationships

**MeFISCoM – MeFIS Conceptual Model**

- Task Pattern
- Collaboration Practice
- System Development Practice
- Project Management Practice

**Key Documents**

- General Guidance Content
- Specific Guidance Content

**Product**

- Work

**Technique**

- Work

**Tool**

- Work
MeFIS – Agenda for the future

- Completing the fulfillment of the current instance of the framework with the general methodology process (based on MMDIS) and with basic domain aspects:
  - Basic domain practices
  - Basic task patterns

- Eventual minor changes of the framework based on the discussion of the professional community in order to remove its current insufficiencies

- Start of the project based on the reference information model of ISD methodologies. The schema of the information model database will be derived from MeFISCoM.

MeFISCoP – MeFIS Community Platform

- Based on the communication principles of OpenSource communities
- Areas of interest:
  - Reference methodology base
  - Communication with other professionals
  - Introduction of new methodology / method…
  - Collaboration on the development of MeFIS
- Subject of development:
  - Reference methodology base
    - Feeding and actualization
    - Feedback – experience, insufficiencies, errors, bugs…
  - Methodology framework
    - Framework elements (patterns, practices, methods) - varying, increasing…
    - Conceptual model (the basic viewpoint) – correcting, increasing, (variating?)
- Organization
  - Competency definition – roles, persons
  - Communication and approval procedures
    - proposition – discussion – approval – team building - development
    - conferences