Guide to the Software Engineering Body of Knowledge A Project Overview

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www.swebok.org

Corporate Support by:

Project managed by:

Presentation Goals

- Present the Guide to the Software Engineering Body of Knowledge project

- Obtain feedback from conference attendees

- Seek collaborators for the project

Presentation Plan

- ## Project background

  - Project scope, objectives and audience

  - A three-phase development approach

  - Description of current phase

  - How you can collaborate?

  - Concluding remarks

Software Engineering

- Now 30 years old!

- Millions of pages on the subject!

- Hundreds of conferences and workshops annually!

- Multiple university programs

- Millions of practitioners around the world?

Is the field really mature?

Recognized Profession?

- Starr*:

    - Knowledge and competence validated by the community of peers

    - Consensually validated knowledge rests on rational, scientific grounds

    - Judgment and advice oriented toward a set of substantive values

*   P. Starr, *The Social Transformation of American Medicine*: BasicBooks, 1982.
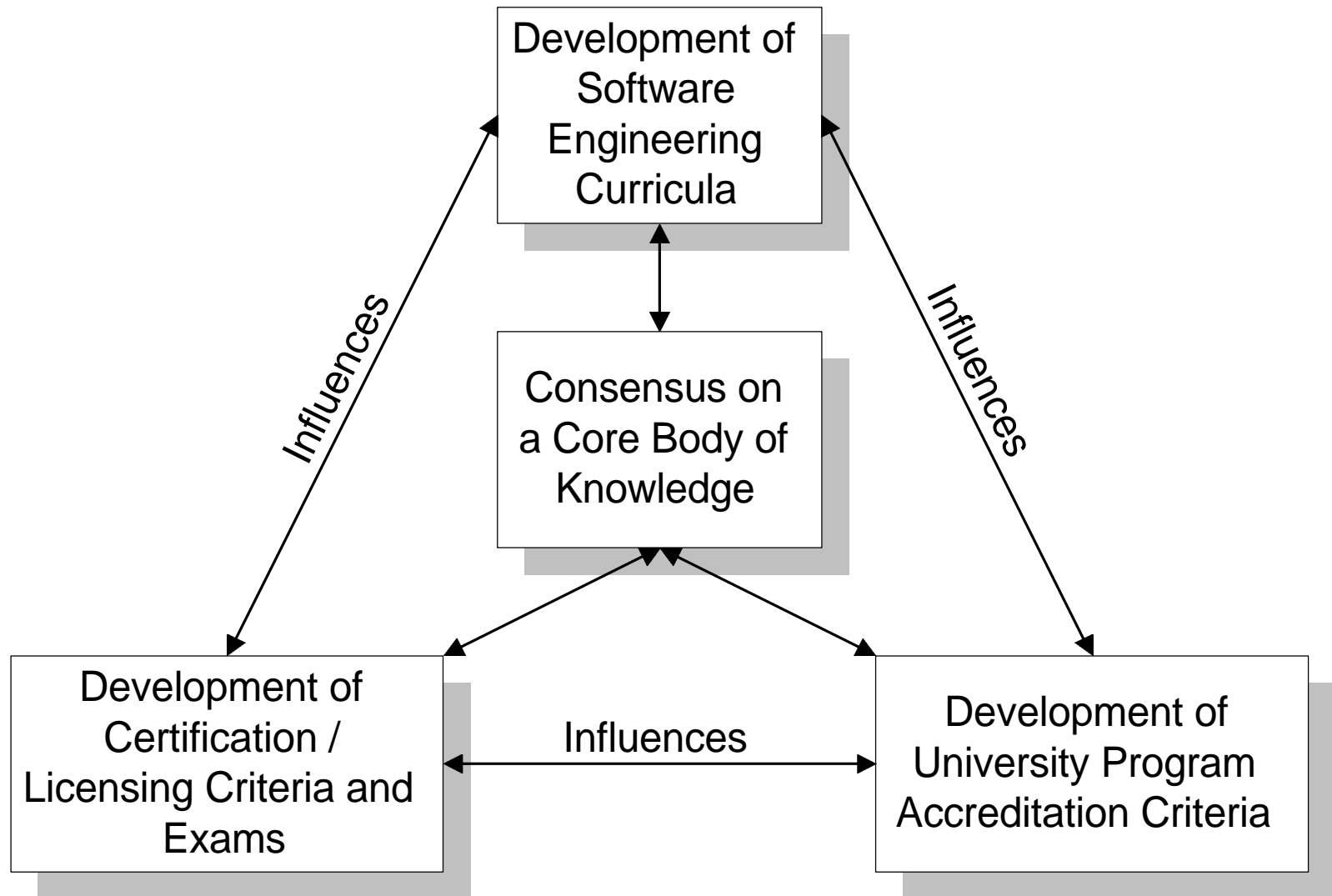
Window of Opportunity?

- ⊙ Texas Board of Professional Engineers

- ⊙ Computer Science Curriculum 2001

- ⊙ Possible liability issues: Y2K, etc.

- ⊙ Increased interest in the establishment of a profession

IEEE-CS/ACM Software Engineering Coordinating Committee

- ◉ Four task forces

    - ❖ Code of ethics

    - ❖ Body of knowledge

    - ❖ Education

    - ❖ Performance norms for software engineers

Key Interrelationships for a Core Body of Knowledge

Development of Software Engineering Curricula

Influences

Influences

Consensus on a Core Body of Knowledge

Development of Certification / Licensing Criteria and Exams

Influences

Development of University Program Accreditation Criteria

What is software engineering?

- IEEE 610.12:

  - "(1) The application of a systematic, disciplined, quantifiable approach to the development, operation, and maintenance of software; that is, the application of engineering to software.

  - (2) The study of approaches as in (1)."

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Project Objectives

- Characterize the contents of the Software Engineering Body of Knowledge

- Provide a topical access to the Software Engineering Body of Knowledge

- Promote a consistent view of software engineering worldwide

Project Objectives

- Clarify the place of, and set the boundary of, software engineering with respect to other disciplines (computer science, project management, computer engineering, mathematics, etc.)

- Provide a foundation for curriculum development and individual certification and licensing material

Intended Audience

- Public and private organizations

- Practicing software engineers

- Makers of public policy

- Professional societies

- Software engineering students

- Educators and trainers

What are we not trying to accomplish?

- Not a curriculum development effort!

- Not an all-inclusive description of the sum of knowledge in the field

- Not all categories of knowledge

Categories of Knowledge in the SWEBOK

| Specialized	Generally Accepted
	Advanced and Research

Two Underlying Principles of the Project

- *Transparency*: the development process is itself published and fully documented

- *Consensus-building*: the development process is designed to build, over time, consensus in industry, among professional societies and standards-setting bodies and in academia

Presentation Plan

- Project background

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- **A three-phase development approach**

- Description of current phase

- Call for collaborators

- Concluding remarks

A Three-Phase Approach for Developing the Guide to the SWEBOK

Straw Man Version

Stone Man Version

Iron Man Version

1998   **1999**   **2000**   **2001**
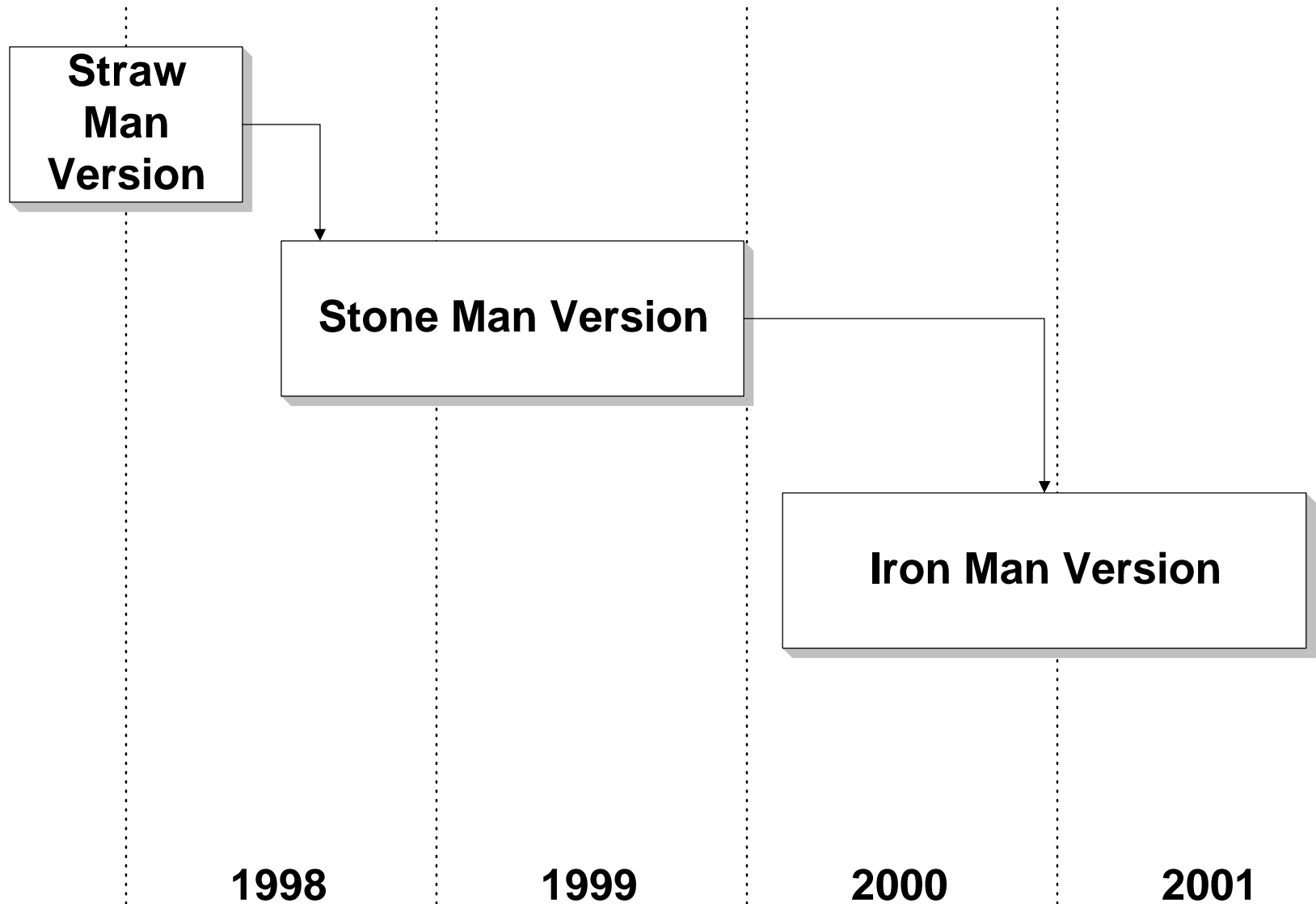
Straw Man Phase

- ⊙ Define the strategy for the project

- ⊙ Gather momentum in the profession

- ⊙ Jump-start the Stone Man phase
  - ❖ Draft list of Knowledge Areas
  - ❖ Draft list of Related Disciplines

Identification Criteria for Straw Man Phase

- Public and verifiable sources of information

- Well documented and reproducible procedure

- As few editorial decisions as possible

- As inclusive as possible

- Focus on the **generally** *accepted*

The Straw Man Version

- Published in September 1998

Report available at
www.swebok.org

Presentation Plan

- Project background

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- A three-phase development approach

- Description of current phase

- How you can collaborate?

- Concluding remarks

Description of Current Phase

- Project Team

- Stone Man Deliverables

- Development and Review Process

- Results to Date

Participants from a Broad Spectrum of Audiences

⦿ Industry

⦿ Professional societies

⦿ Standards setting bodies

⦿ Academia

⦿ Authors

⦿ International representation

Project Team

- ◉ Editorial team

- ◉ Industrial Advisory Board

- ◉ Panel of Experts

- ◉ Knowledge Area Specialists

- ◉ Reviewers/Review Captains

- ◉ Members of the software engineering community

Editorial Team

- Project "Champion":
  - ❖ Leonard Tripp, 1999 President, IEEE Computer Society
- Executive Editors:
  - ❖ Alain Abran, UQAM
  - ❖ James W. Moore, The MITRE Corp.
- Editors:
  - ❖ Pierre Bourque, UQAM
  - ❖ Robert Dupuis, UQAM

Roles of the Industrial Advisory Board

- Provide input to ensure relevance to various audiences

- Review and approve strategy and deliverables

- Oversee development process

- Assist in promoting the Guide to the Software Engineering Body of Knowledge

- Lend credibility to the project

Industrial Advisory Board

- Met in Canada in the Fall of 1998

- Conference call every six weeks

- Will meet in Canada in July 1999

- Mario R. Barbacci, Software Engineering Institute, representing the IEEE Computer Society

- Carl Chang, University of Illinois at Chicago, Editor Emeritus, IEEE Software, representing Computing Curricula 2001

Industrial Advisory Board

- François Coallier, Bell Canada, speaking as ISO/IEC JTC 1 / SC7 Chairman

- Morven Gentleman, National Research Council of Canada

- Paula Hawthorn representing the ACM

- Richard Heiman, Raytheon Systems Company

- Laure Le Bars, Saps Labs (Canada)

Industrial Advisory Board

⊙ Bryan Pflug, The Boeing Company

⊙ Dave Rayford, Comerica Inc.

⊙ Larry Reeker, National Institute of Standards and Technology

⊙ Dolores Wallace, National Institute of Standards and Technology

Panel of Experts

- Steve McConnell, Construx Software

- Roger Pressman, R.S. Pressman and Associates
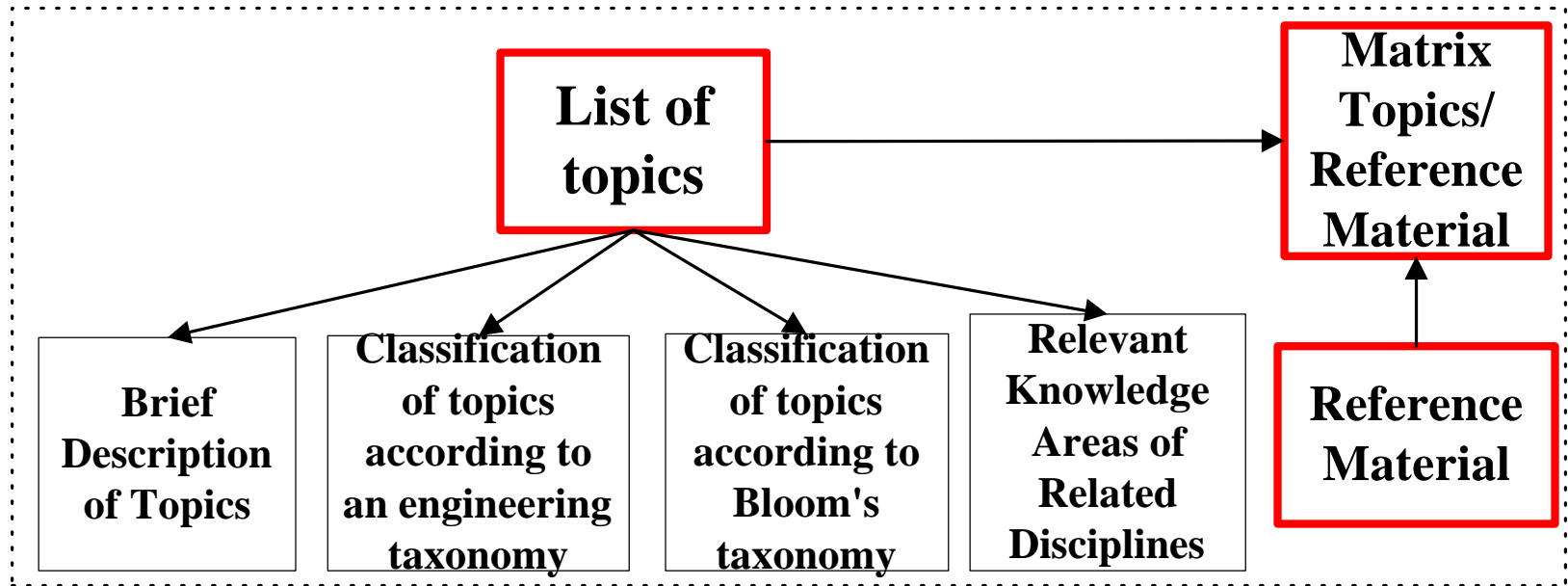
- Ian Sommerville, Lancaster University

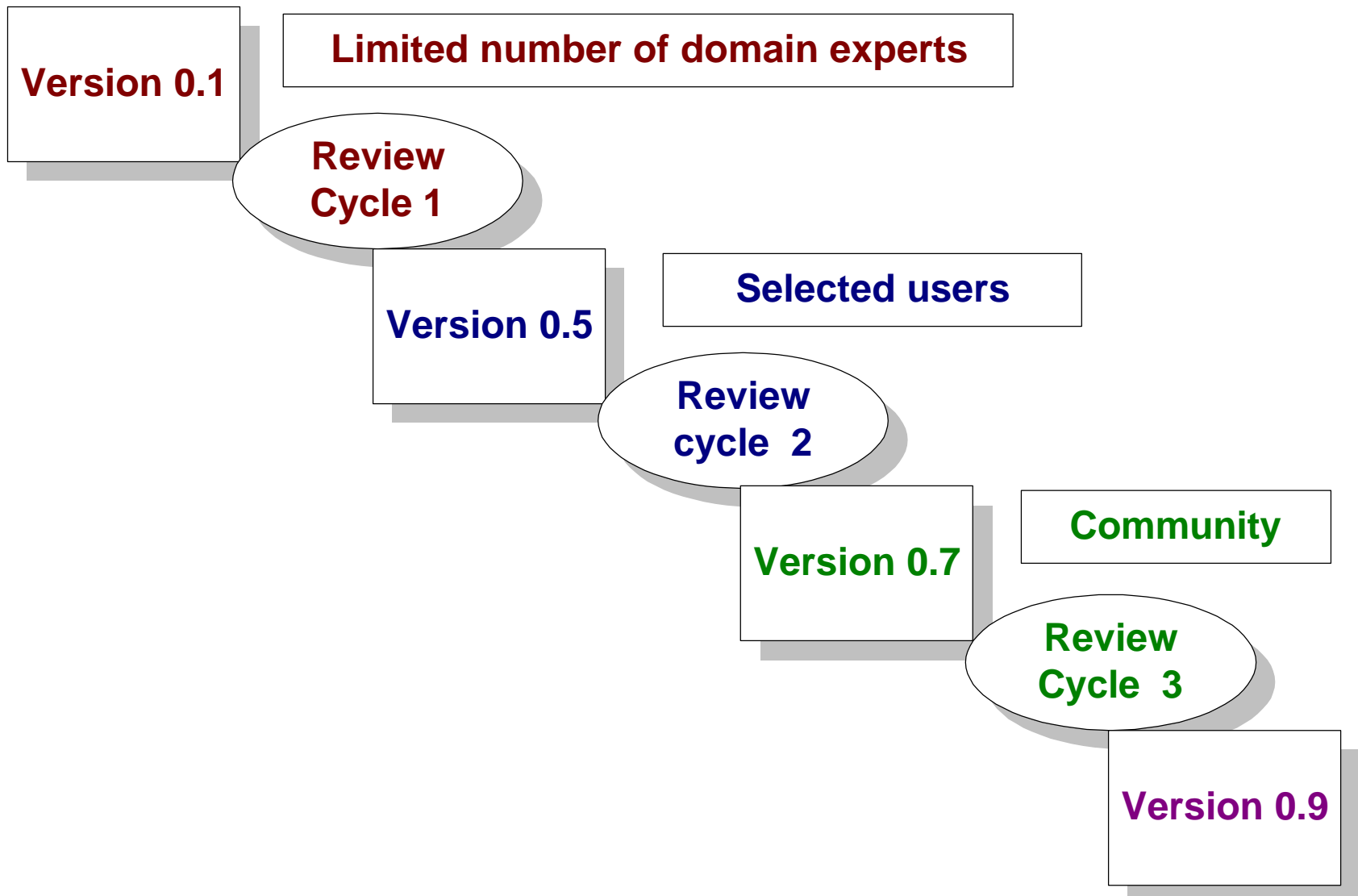# Project Funding

- Industry
- Professional societies
- UQAM

Stone Man Deliverables:

- **Consensus** on a list of Knowledge Areas

- **Consensus** on a list of **topics and relevant reference materials** for each Knowledge Area

- **Consensus** on a list of Related Disciplines

- Available free on the web

Knowledge Area Description

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List of topics	→	**Matrix Topics/ Reference Material**

List of topics arrows point to:

- **Brief Description of Topics**
- **Classification of topics according to an engineering taxonomy**
- **Classification of topics according to Bloom's taxonomy**
- **Relevant Knowledge Areas of Related Disciplines**

Reference Material → **Matrix Topics/ Reference Material**

Stone Man Review Process

Version 0.1

Limited number of domain experts

Review Cycle 1

Version 0.5

Selected users

Review cycle 2

Version 0.7

Community

Review Cycle 3

Version 0.9

Stone Man Review Process

- Transparency and consensus-building

  - All intermediate versions of documents will be published and archived on www.swebok.org

  - All comments will be made public as well as the identity of the reviewers

  - Detailed comment disposition reports will be produced for Review Cycle 2 and 3

Version 0.5 Review Strategy

	Educators and Trainers	Small Org.	...	
Req. Analysis	Five to Ten reviewers			
Design				
Construction				
. . .				

Results to Date

- Approved by the Industrial Advisory Board:
    - Stone Man Development Plan
    - Baseline List of Knowledge Areas
    - Baseline List of Related Disciplines
    - Nomination of Knowledge Area Specialists
    - Knowledge Area Description Specifications

Baseline List of Knowledge Areas

- Software Requirements Analysis

- Software Design

- Software Construction

- Software Testing

- Software Evolution and Maintenance

Baseline List of Knowledge Areas

- ⊙ Software Configuration Management

- ⊙ Software Quality Analysis

- ⊙ Software Engineering Infrastructure

- ⊙ Software Engineering Process

- ⊙ Software Engineering Management

Knowledge Area Specialists

- Antonia Bertolino, Istituto di Elaborazione della Informazione, CNR, Italy

- Terry Bollinger, The MITRE Corporation, USA

- Dave Carrington, Queensland University, Australia

- Khaled El Emam, National Research Council, Canada

- Stephen MacDonell, University of Otago, New-Zealand

- Pete Sawyer and Gerald Kotonya, Lancaster University, UK

- John Scott, The Lawrence Livermore National Laboratory, USA

- Guy Tremblay, UQAM, Canada

- Chris Verhoef, University of Amsterdam, Netherlands

- Dolores Wallace and Larry Reeker, NIST, USA

Baseline List of Related Disciplines

- Computer Science (CC2001)

- Mathematics (CC2001)

- Project Management (PMBOK)

- Computer Engineering

- Cognitive Sciences and Human Factors

- Systems Engineering

- Management and Management Science

Knowledge Area Jumpstart Documents

- Topic breakdown based on the analysis of the four most widely-sold generic software engineering textbooks (amazon.com)

- Proof of concept for Knowledge Area Descriptions

- Method for documenting a form of existing consensus

- Viewed as an enabler not a constraint for Knowledge Area Specialists

- Produced by collaborators in Canada, USA and New Zealand

- Completed in January 1999

Version 0.1 of Knowledge Area Descriptions

- ⊙ First version by Knowledge Area Specialists of topic breakdown for each Knowledge Area

- ⊙ Must satisfy criteria specified in Knowledge Area Description Specifications

- ⊙ Completed in April 1999

- ⊙ Reviewed by a limited number of domain experts for reasonableness and major omissions

Version 0.5 of Knowledge Area Descriptions

- First complete version of Knowledge Area Descriptions

  - ❖ Breakdown of topics

  - ❖ Selected Reference Material

  - ❖ Accompanying texts and specified appendices

Version 0.5 of Knowledge Area Descriptions

- Currently being submitted to the Editorial Team

- Will be reviewed for completeness and depth of coverage

- Reviewed by selected users for completeness and depth of coverage in May, June and July 1999

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- Description of current phase

- How you can collaborate?

- Concluding remarks

Reviewers

- Reviewers are responsible for
  - ❖ Reading the Knowledge Area Description and consulting the selected reference material
  - ❖ Providing comments from one specified viewpoint

- Schedule
  - ❖ Review Cycle 2: May, June and July 1999
  - ❖ Review Cycle 3: October 1999

Reviewers

- Çriteria for reviewers are
  - ❖ Knowledge in the Area
  - ❖ Availability
  - ❖ Ability to give articulate, constructive comments
  - ❖ Representative of: software engineering practitioners, trainers an educators, standards developers, small industry, students, etc.

Review Captains

- Responsible for compiling comments of a group of 5-10 reviewers for a specific Knowledge Area and Review Viewpoint

- Schedule:
  - ❖ June and July 1999 timeframe

Institutional Collaboration

- Membership on Industrial Advisory Board

- Participation in review process and uptake of results by national professional societies

- Endorsement of results by national professional societies

Presentation Plan

⊙ Project background

⊙ Project scope,objectives and audience

⊙ A three-phase development approach

⊙ Interim results of current phase

⊙ Description of current phase

⊙ **Concluding remarks**

Concluding Remarks

⦿ Consensus on the core body of knowledge is key in all disciplines and pivotal for the evolution of SE toward a professional status

Concluding Remarks

- Involvement of all parties is key for relevancy, credibility and quick uptake:

  - ❖ Industry

  - ❖ Professional societies

  - ❖ Standards setting bodies

  - ❖ Academia

- Seeking many collaborators!

www.swebok.org

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