Adaptation of ISO/IEC Software Engineering Standards for Very Small Enterprises

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Editor – ISO/IEC JTC 1/SC 7- Working Group 24

SEPG Latin America

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Very Small Enterprises (VSE)

- VSEs are defined has having less than **25 employees**.

- Scope includes also small project or department within a larger organization.

- Example – Greater Montréal Area.

Number of employees	Number of Enterprises	Percentage	Number of Jobs
1 to 25	540	78%	5105
25 to 100	127	18%	6221
Over 100	26	4%	6056

Source: Laporte 2005.

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VSEs and Standards

1. International standards were not written for and/or is hard to apply in small projects, small development organizations, or companies that have between 1 and 25 employees.

2. International Life Cycle Standard ISO/IEC 12207 and guide do not explicitly address the needs of VSEs.

3. Compliance with standards is difficult (if not impossible) for VSEs to achieve.

4. VSE's have no or very limited ways to be recognized as an enterprise that produces quality software systems in their domain.

   – VSEs are cut off from some economic activities.

5. Implementation of current standards requires a significant critical mass in terms of number of employees, cost and time.

6. VSEs cannot see a net benefit in establishing a software process as defined by current standards.

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IEEE User's Survey
Implementation Difficulties

- Benefits of implementation not clearly understood
- Not enough useful examples
- Cost
- Lack of templates, implementation checklists.
- Compliance determination

Source: Kathy Land, 1997

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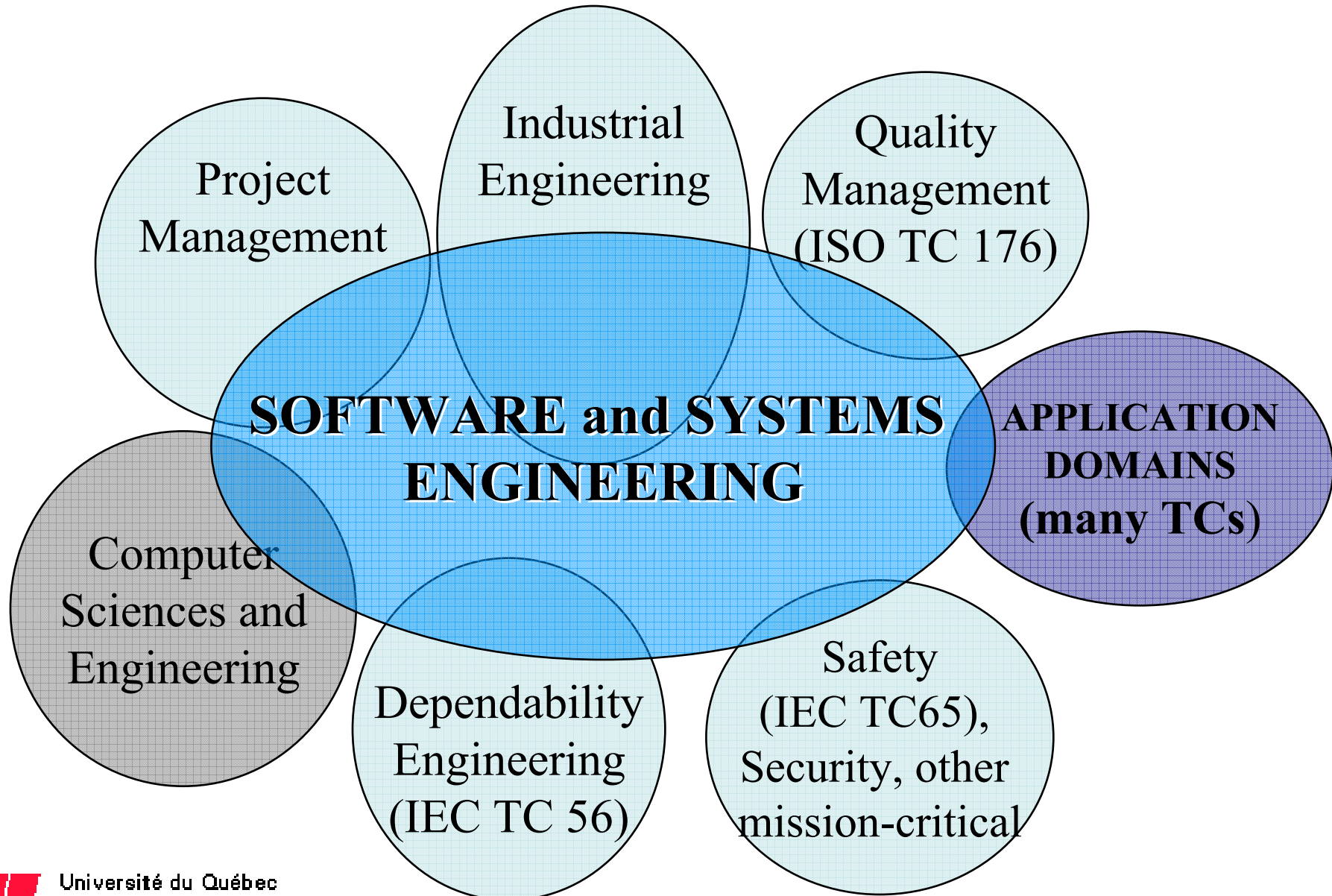
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IEEE Users' Survey
Requested Support Items

- User training course
- Examples of deliverables
- Deliverable templates
- CASE tool support for documentation generation
- On-line or phone support
- Software Engineering Standards newsletter
- Software Engineering Standards users group
- Educators resource/support

Source: Kathy Land, 1997.

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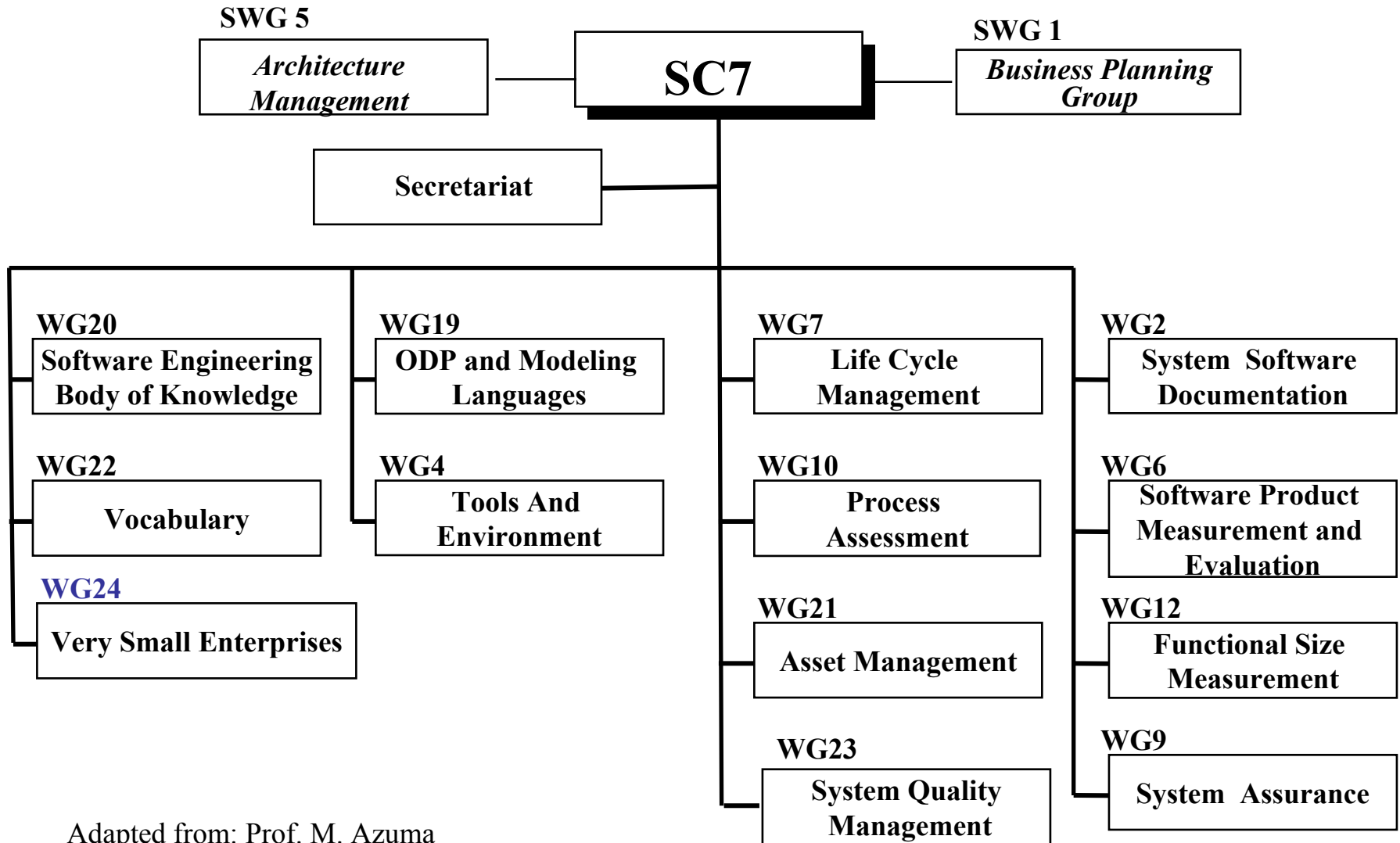**Department of Software and IT Engineering**

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ISO/IEC JTC 1/SC7- Terms of Reference

Standardization of processes, supporting tools and supporting technologies for the engineering of software products and systems.

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SC7 - An Horizontal Committee

Project Management

Industrial Engineering

Quality Management (ISO TC 176)

SOFTWARE and SYSTEMS ENGINEERING

APPLICATION DOMAINS (many TCs)

Computer Sciences and Engineering

Dependability Engineering (IEC TC 56)

Safety (IEC TC65), Security, other mission-critical

Source: F Coallier

SC7 Structure

SWG 5
Architecture Management

SC7

SWG 1
Business Planning Group

Secretariat

WG20
Software Engineering Body of Knowledge

WG22
Vocabulary

WG24
Very Small Enterprises

WG19
ODP and Modeling Languages

WG4
Tools And Environment

WG7
Life Cycle Management

WG10
Process Assessment

WG21
Asset Management

WG23
System Quality Management

WG2
System Software Documentation

WG6
Software Product Measurement and Evaluation

WG12
Functional Size Measurement

WG9
System Assurance

Adapted from: Prof. M. Azuma

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ISO JTC1 IEC
INFORMATION TECHNOLOGY STANDARDS

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Software Engineering Standards Produced and Maintained

Standards Collection

Foundation

19759	12182

Software Body of Knowledge (SWEBOK)   *Vocabulary*

Certification of Software Engineers

Systems Engineering

15288
19760

Software Engineering

12207
15271
90003

Process Implementation and Assessment

15504

Process Assessment

Product

Product packaging

9127

Documentation

15289

Product Evaluation

12119

Software Quality

9126 **14598** **14756**

Software Functional size measurement

14143 **19761** **20926** **20968** **24570**

3535 14759

SC7's legacy

6592 9294 15910 18019

Documentation

15846

Configuration Management

16085 15026

Risk & Integrity

19770

Asset Management

14764

Software maintenance

16326

Project Management

15939

Measurement

Tools, Methods

5806 – 5807 – 6593 **8631 – 8790 – 11411**

SC7 Legacy Standards

14102 **14471** **15940** **18018**

Tools and environment

10746, 13235 **14750, 14752** **14753, 14769** **14771, 15414** **15935, 19500**

Specifications

14568 **15474** **15475** **15476**

CDIF

15437 **15909** **19501** **8807**

Modeling

Adapted from SWG5

SC7 Meeting in Brisbane - 2004

- Canada raised the fact that small enterprises require standards adapted to their size and maturity,
- A meeting of interested parties was held with delegates from 5 national bodies (Australia, Canada, Czech Republic, South Africa, and Thailand),
- **Consensus**:
  - Make the current software engineering standards more accessible to VSEs;
  - Provide turn key material that require minimal tailoring and adaptation effort;
  - Provide harmonized products that integrate available standards:
    - Process standards
    - Work product and deliverables
    - Assessment and Quality.

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SC7 Meeting in Brisbane - 2004

- **Consensus:**
  - Generate multiple profiles from elements of standards.
  - Align, if desirable, profiles with the notions of maturity levels presented in ISO/IEC 15504.

- **Establishment of a Special Interest Group to develop**:
  - A statement of requirements ;
  - The outline of key deliverables, and the associated process to create them (e.g. how to create profiles);
  - A Terms of Reference for the work group;
  - An example of a simple profile

First Special Working Group Meeting Thailand – March 2005

- Hosted by the Thailand Industrial Standard Institute (TISI) and the Thai Software Industry Promotion Agency (SIPA),
- **Representatives**
  - Australia, Belgium, Brazil, Canada, Czechoslovakia, Finland, South Africa, South Korea, USA and Thailand.
- **Outputs**
  - Project vision and strategy;
  - Draft New Work Item (ISO SC 7, Document N3288)
    - Project Schedule;
    - Product Plan;
  - Initial requirements document;

สำนักงานส่งเสริมอุตสาหกรรมซอฟต์แวร์แห่งชาติ [องค์การมหาชน]
Software Industry Promotion Agency [Public Organization]

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Examples of Issues and Proposed Solutions by Thailand about ISO/IEC 12207

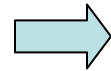SMEs are not ready to implement the whole 12207 standard.
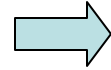
➡ Standard should be broken down in to stages or levels in order to fit all sizes of SMEs.

Not all 12207 activities are suitable for SMEs' operations.
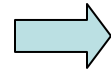
➡ Need to modify activities to suit SMEs' operation – product and project based type of business.

There is no assessment model.

➡ A set of checklist was developed for use by assessors.

Most software developers are not document-oriented.

➡ Provide packaged templates and examples for rapid documenting

Source: Thai Software Industry Promotion Agency

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Thai Quality Software (TQS) Standard

- Introduced by the Association of <u>Thai Software</u> Industry (ATSI).

- Adapted from <u>ISO/IEC 12207</u> Software Life Cycle Processes Standard to:

  - <u>Instill discipline</u> for software developers,

  - <u>Guide</u> in software engineering <u>processes</u> and assures <u>quality</u> software.

- Divided into <u>5 stages:</u>

  - Software practices (ISO/IEC 12207)

  - Organizations are <u>assessed for certification</u> at each <u>stage</u>

- Currently (March 2005)

  - <u>43</u> software organizations have been <u>certified</u> TQS <u>level 1</u>, and <u>11</u> software organizations have been certified TQS <u>level 2</u>.

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TQS Level I Mapping with ISO/IEC 12207

5. PRIMARY LIFE CYCLE PROCESS

CONTRACT VIEW

5.1 Acquisition process

5.2 Supply process

Planning

OPERATING VIEW

5.4 Operation Process

ENGINEERING VIEW

5.3 Development process

Process implementation

Software acceptance support

Software requirements analysis

Software architectural design

Software coding & testing

5.5 Maintenance Process

Process implementation

Modification implementation

6. SUPPORTING LIFE CYCLE PROCESS

6.2. Configuration management

QUALITY MANAGEMENT VIEW

6.3. Quality assurance process

7. ORGANIZATIONAL LIFE CYCLE PROCESS

MANAGEMENT VIEW

7.1. Management Process

Initiation & scope definition

7.2. Infrastructure Process

7.3. Improvement Process

7.4. Human Resource Process

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Target Market of a Future ISO/IEC Set of Technical Reports and Guides

- The collection should be based on the Software Engineering needs of the majority of the VSEs
  - Market driven.
- The collection should initially focus on lower levels of maturity
- The collection should be applicable to small teams or projects.
- The use of the collection should enable multiple VSEs to work together (teaming arrangements) or work with a customer (e.g. under contract).

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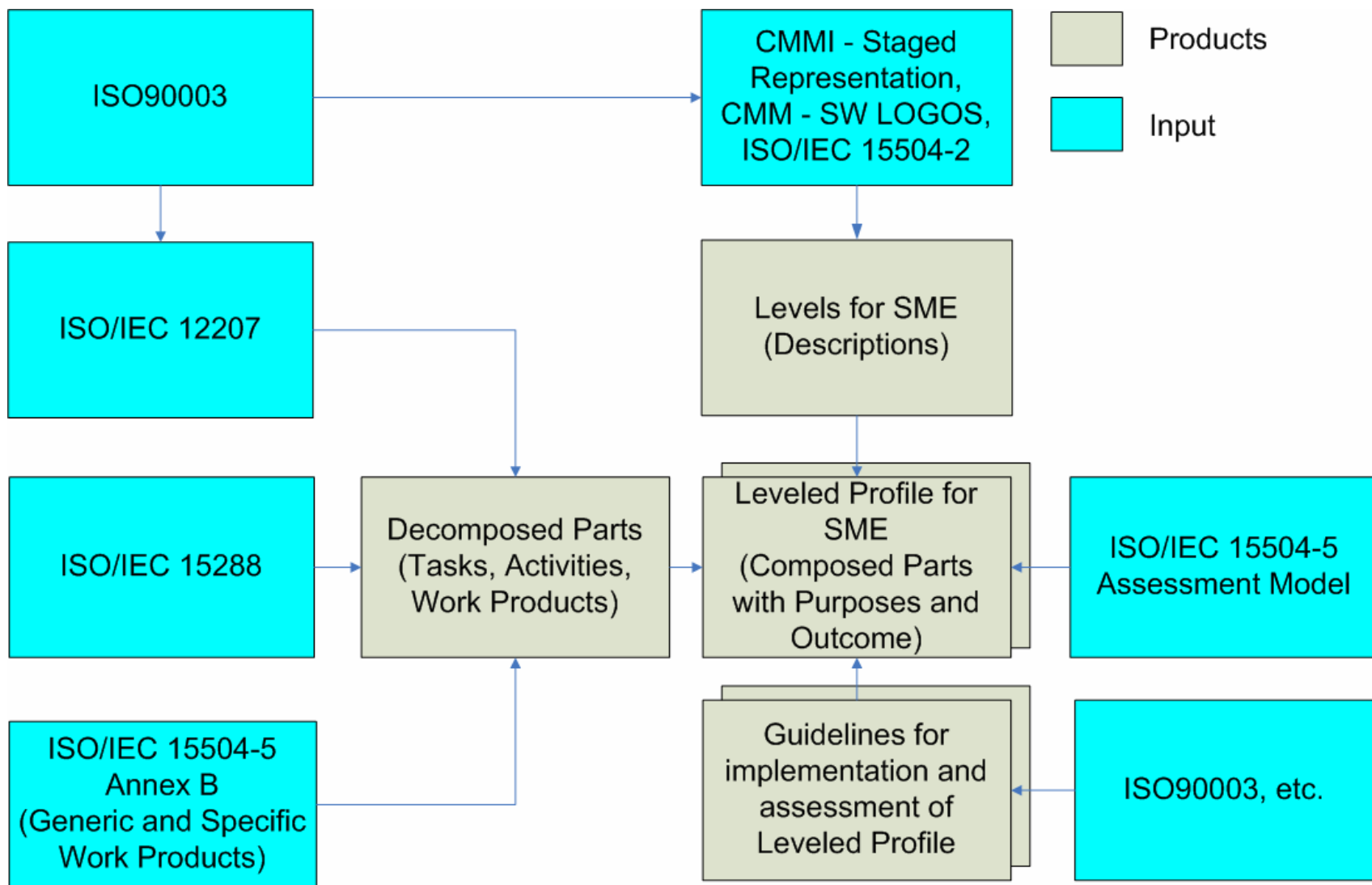Department of Software and IT Engineering

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Potential Benefits for VSEs

- The use of the documents should contribute to the reduction of risk
    - Business, cost, schedule and quality
- The use of the documents should facilitate alignment of the IT strategy to the business objectives.
- The documents should help understand and appreciate the value added (short and long term).
- The documents should offer guidance on quantifying the benefits of standards implementation.
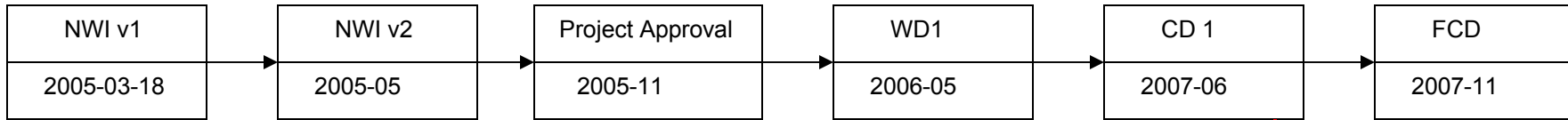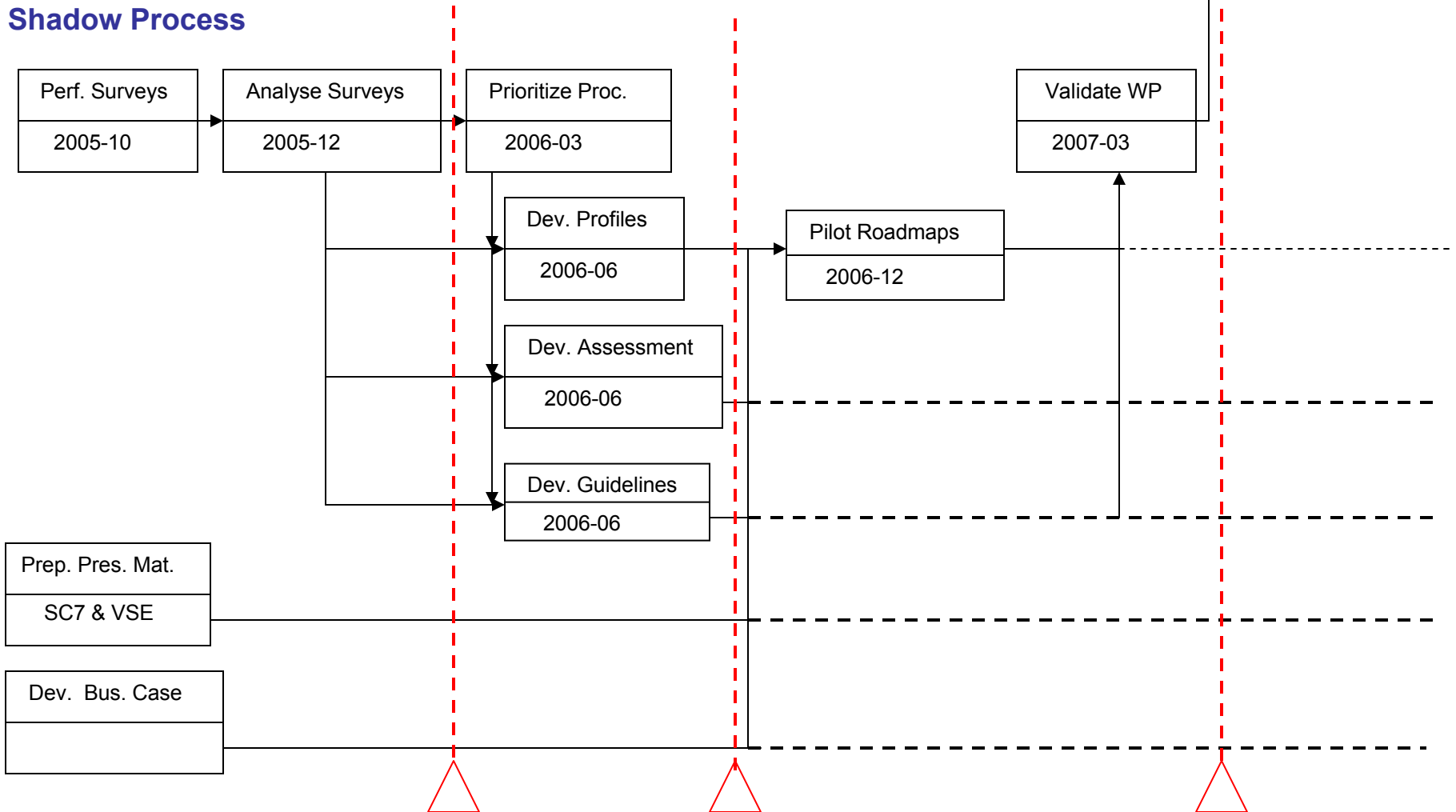   - The documents should include a measure of increased productivity and quality.

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VSE Proposed Model

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Estimated Schedule of Activities

ISO JTC1 Process

NWI v1	NWI v2	Project Approval	WD1	CD 1	FCD
2005-03-18	2005-05	2005-11	2006-05	2007-06	2007-11

Shadow Process

Perf. Surveys	Analyse Surveys	Prioritize Proc.		Validate WP
2005-10	2005-12	2006-03		2007-03

Dev. Profiles	Pilot Roadmaps
2006-06	2006-12

Dev. Assessment
2006-06

Dev. Guidelines
2006-06

Prep. Pres. Mat.
SC7 & VSE

Dev. Bus. Case

SC7 Meeting in Finland – May 2005

- Proposal developed in Thailand was reviewed
  - Recommendation: To establish a new Working Group
- Resolution was approved to ballot the New Work Item Proposal
  - *Software Life Cycle Profiles and Guidelines for use in Very Small Enterprises (VSE)*
- Many countries voted in favour of the NWI Proposal
- Working Group 24
  - Mr. Tanin Uthayanaka (Thailand) was appointed Convener.
  - Mr. Jean Bérubé (Canada) was appointed Secretary.
  - Mr. Claude Y. Laporte (IEEE CS) was appointed Project Editor

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Second Special Working Group Meeting Thailand – September 2005

- Hosted by the Thailand Industrial Standard Institute and the Thai Software Industry Promotion Agency

- **Representatives**
  - Australia, Belgium, Canada, Finland, Japan, Luxembourg, South Africa, USA and Thailand.

- **Outputs**
  - Proposition to use International Standardised Profiles (ISPs) as a framework to develop documents (e.g. guides)
  - Proposed survey on VSEs exposure and needs for software development lifecycles;
  - Proposed business models to help classify VSEs

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First SC7 Working Group 24 Meeting
Italy – October 2005

- **Countries committed to participate to Working Group 24**
  - Belgium, Canada, Czech Republic, Ireland, Italy, Japan, Korea, Luxemburg, South Africa, Thailand, UK, USA
- **Outputs**
  - New Work Item – comments received during balloting,
  - Project Requirements,
  - Business Models,
    - Custom on contract, Custom in-house, Commercial products, Mass-market software, Firmware.
  - Strategy to create profiles.
  - Users' Survey,
  - Strategic Plan,
  - Web site for public review of documents produced.
- **Next Step**
  - Perform Users' Survey.
- Next WG 24 Meeting - May 2006, Thailand.

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- **Working Group 24 Public site – (Under construction)**
  - **http://www.jtc1-sc7.org/**

Resources

- ISO/IEC TR 19559, Software Engineering Body of Knowledge (SWEBOK) (Free copy of TR)
    - http://isotc.iso.org/livelink/livelink/fetch/2000/2489/Ittf_Home/Publicly AvailableStandards.htm

- National Computing Centre – Toward Software Excellence
    - http://www.software-excellence.org/

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