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VSE 101 – Who, What, When, Where, Why, How

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Introduction

Who What When Where Why

HOW

Who: VSE Community

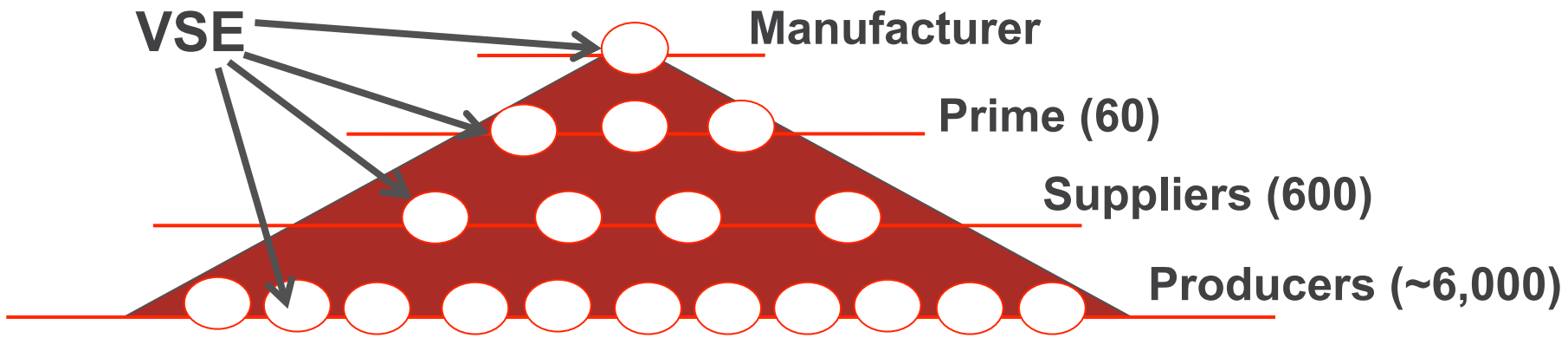
- Micro enterprises account for 70 % to 90 % of enterprises in OECD* countries (57 % in US)
- European Union
  - 99.8 % are SMEs (less than 250 employees)
  - 93 % are micro enterprises (less than 10 employees)

Number of employees	Number of Software Enterprises	Percentage
1 to 25	540	78 %
25 to 100	127	18 %
Over 100	26	4 %

Source: Montreal International, 2006

** OECD: Organisation for Economic Co-operation and Development*

Who: Users and potential users (cont.)

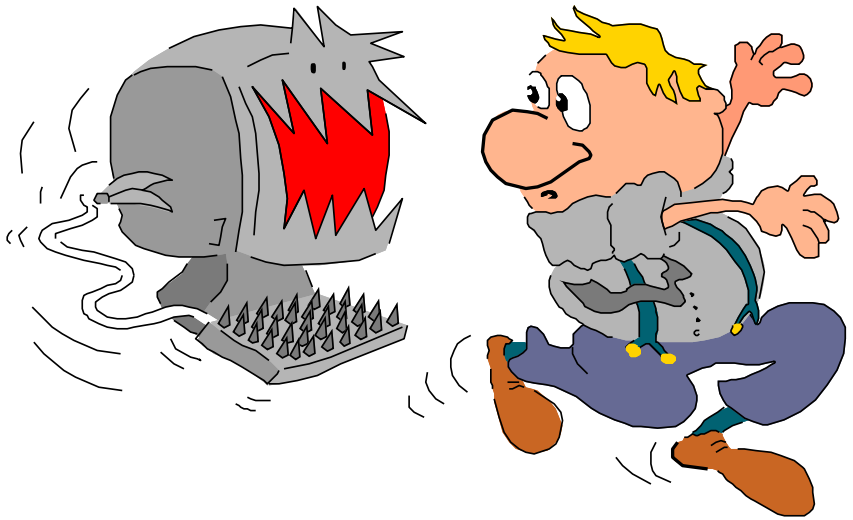


A defect from one of the producers items went into a product that resulted in a loss of over $200 million by the manufacturer

Adapted from (Shintani, Small Settings Workshop, Software Engineering Institute, 2006)

* Very Small Entities are enterprises, organizations (e.g. government, non-profit organizations), projects or departments having up to 25 people

VSEs reacting to Standards - 1

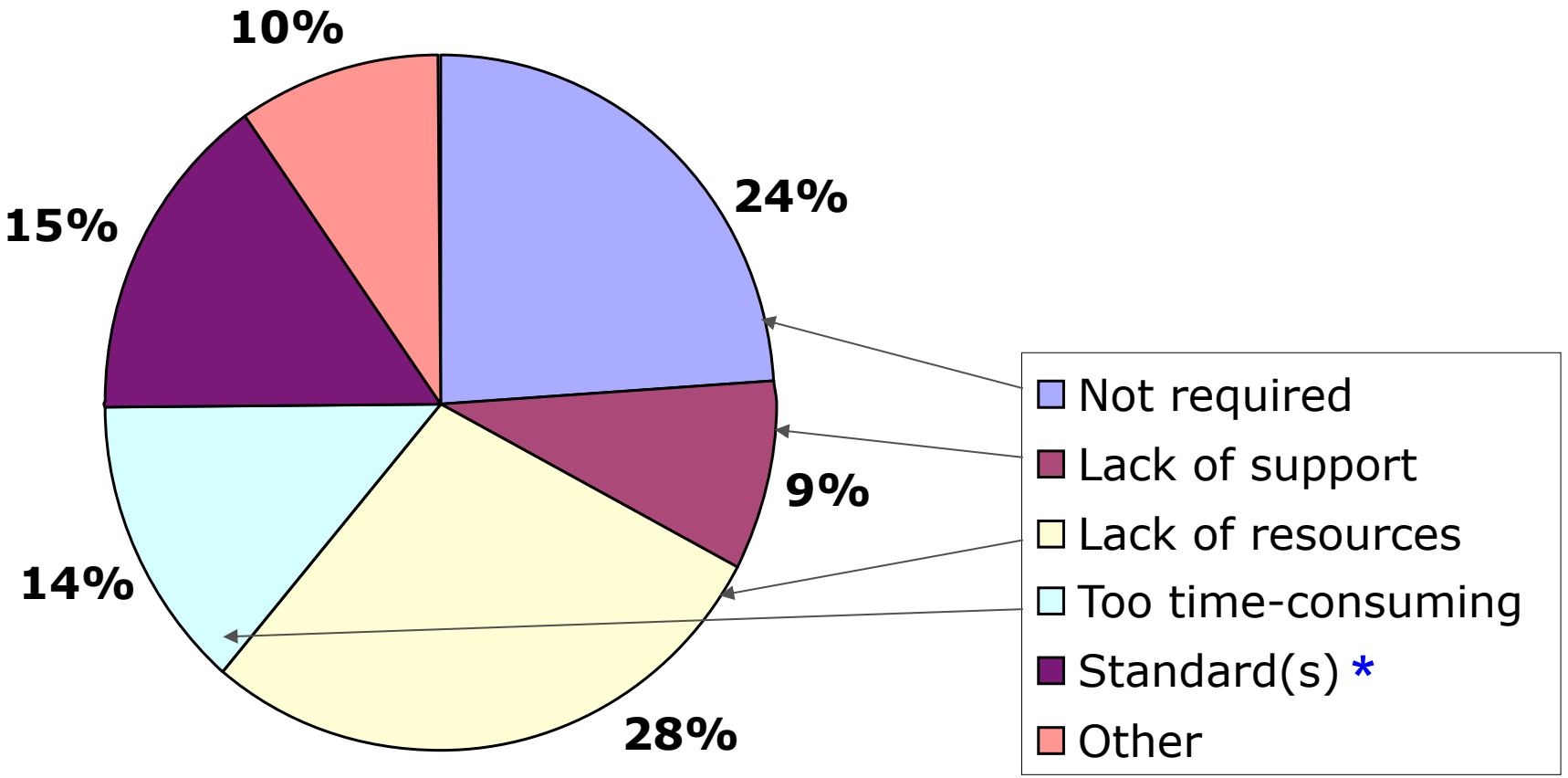


What: Makes VSEs different?

- Systems Engineering concepts have been adopted and adapted by most industries in various domains for development products and services
- Most VSEs cannot afford the resources, nor do they see a benefit in a system life cycle process
  - Difficulties implementing standards: employees, cost, time
  - Methodologies are not always written nor shared
  - Processes are often improvised

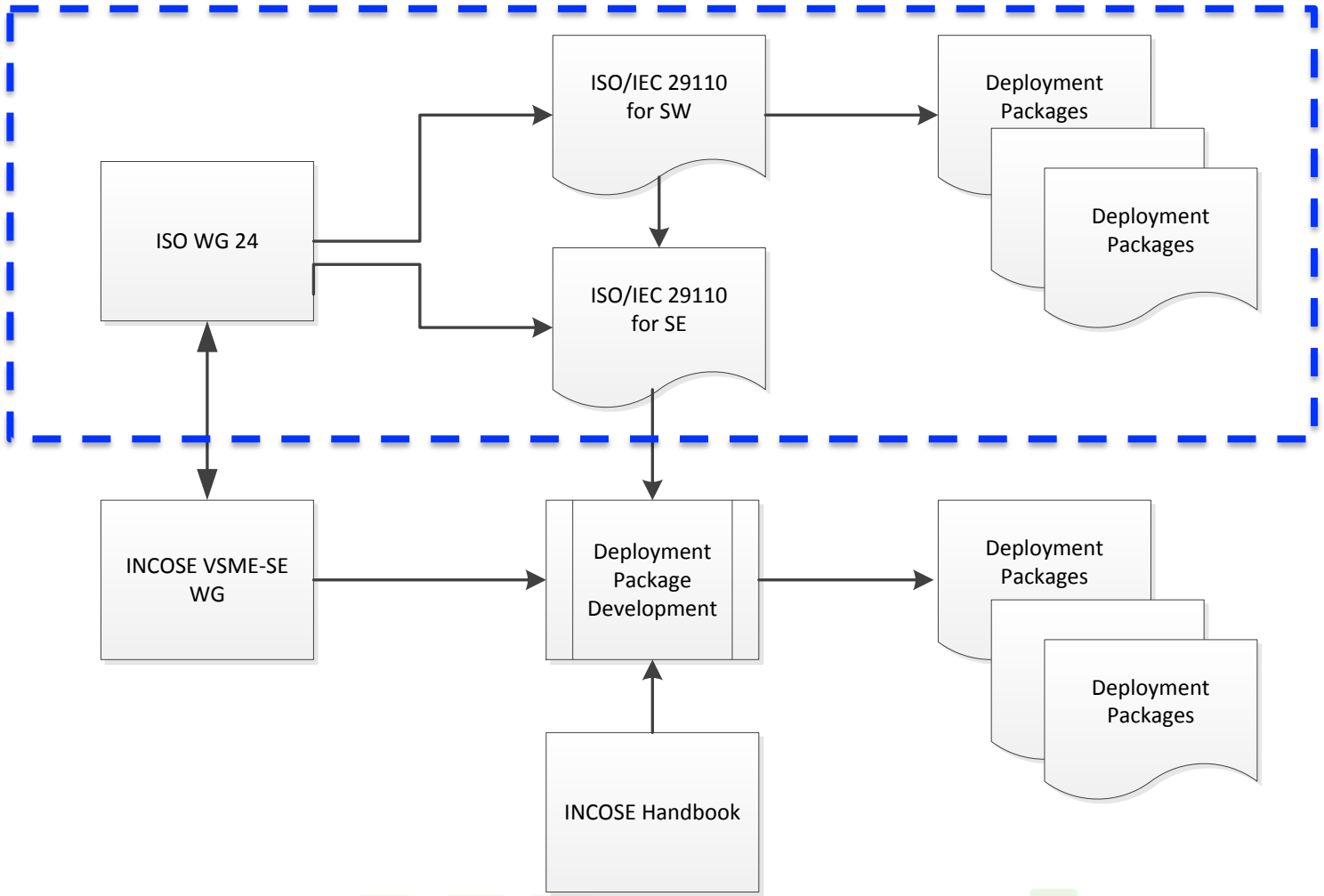
VSEs reacting to Standards - 2

Reasons VSEs don't use Standards



* Difficult, Bureaucratic, not enough guidance.

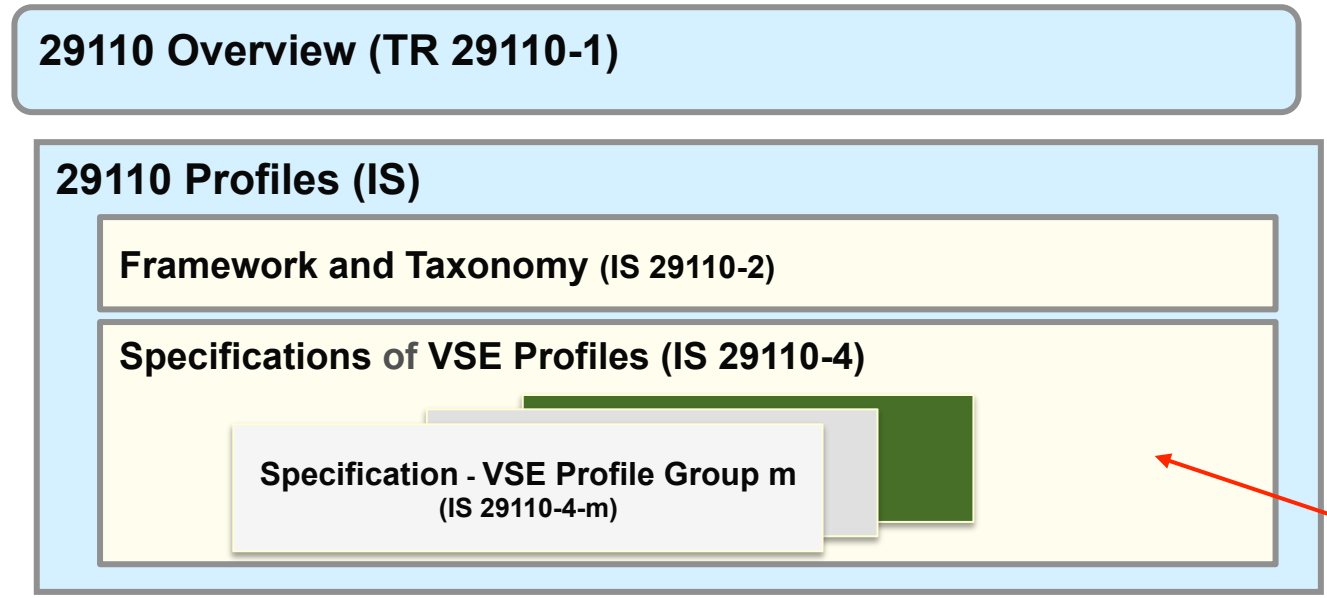
ISO WG24 – INCOSE VSE WG Collaboration



When: ISO VSE Standard History

- May 2004 ISO/IEC JTC1/SC7 Plenary
  - SWG established to address VSE
- Oct 2005 ISO/IEC JTC1/SC7 Interim - First WG24
  - Approach – profiles (ISP) based on TR 1000 and survey
- 2006 Preparation of first ISO 29110 series started
- 2011 Publication of first ISO 29110 series
  - Systems Engineering added
- 2012 Organizational Management added
- 2015 Service Delivery added

Systems, in the context of ISO 29110, are typically composed of hardware and software components (ISO 2016)



For VSEs and customers

For Standard producers, tool vendors, methodology vendors

List the Requirements i.e. '**What** to do'

For Assessors customers and VSEs

For VSEs and customers

'**How** to do'

Parts 4 and 5 address Systems Engineering concepts in -6-X of the series

When: INCOSE VSE History

- 2009 INCOSE IW, a joint INCOSE/AFIS (Association Francoise d'Ingénierie Système) task team developed a technical project plan (TPP) for VSE that was presented to the Technical Board leading to the VSE WG Charter
- 2011 INCOSE IW, the VSE WG reviewed the ISO 29110 series for software with ISO Project Editor Dr. Claude Laporte
  - INCOSE proposed the addition of systems engineering concepts to the ISO 29110 series
- 2013 INCOSE VSE WG started developing SE DPs

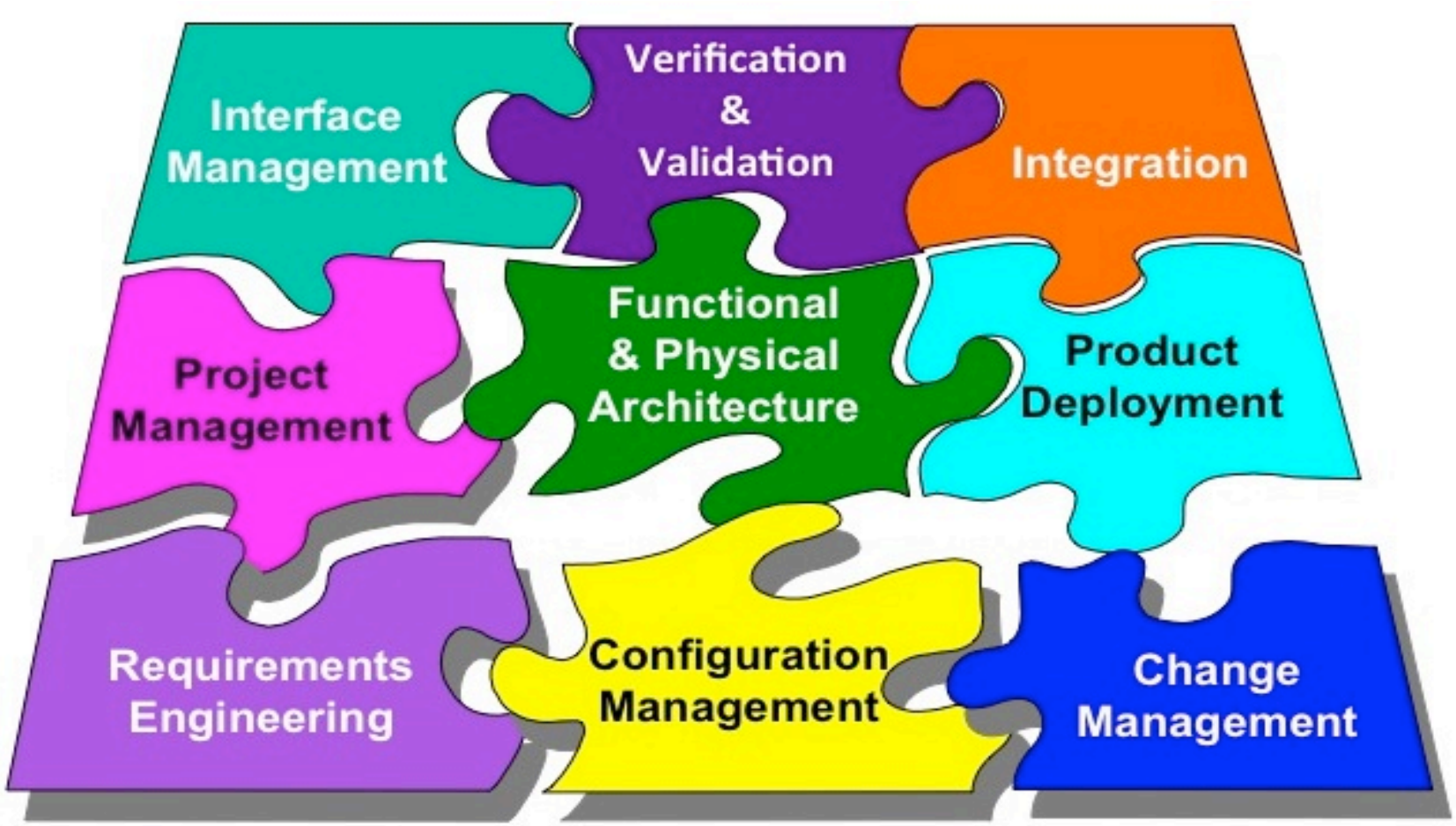
INCOSE VSE WG goals

- To **improve** and make product development by VSEs more efficient
  - Using systems engineering concepts, proven practices, and standards
- To elaborate **guidance**
  - Tailored to apply in either prime or subcontractor role
- To provide **best practices** of systems engineering techniques, methods and process
  - For betterment of the broad scope of domains around the globe
- To contribute **standardization** in the context of systems engineering
- To support the transformation of systems engineering to a **model based** discipline

Deployment Packages (DPs)

- A DP is a set of artifacts developed to facilitate the implementation of a set of proven practices
- ISO 29110 series, coupled with the INCOSE SE Handbook, provide the foundation for the DPs
- DPs are not intended to preclude or discourage the use of additional guidelines found useful
- DPs are designed so that a VSE can implement its content, without having to implement the complete framework at the same time
- By using DPs, a VSE can see concrete steps toward achieving or demonstrating coverage of ISO 29110

SE Deployment Packages



Where: Information helpful to VSEs

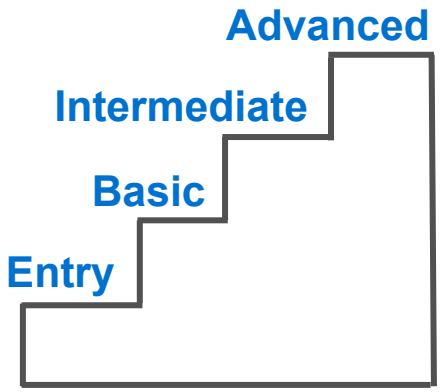
- Don’t always know what you need
- ISO 29110 series helps VSEs use systems engineering concepts and principals to support their work
- ISO 29110 supports adapting and tailoring of ISO/IEC/IEEE 12207 and ISO/IEC/IEEE 15288 to the project
- Use of INCOSE DPs helps:
  - provide a better product for the customer
  - provide a way for the VSE to become a qualified partner with larger organizations

Why: Understand why someone would use your product or service

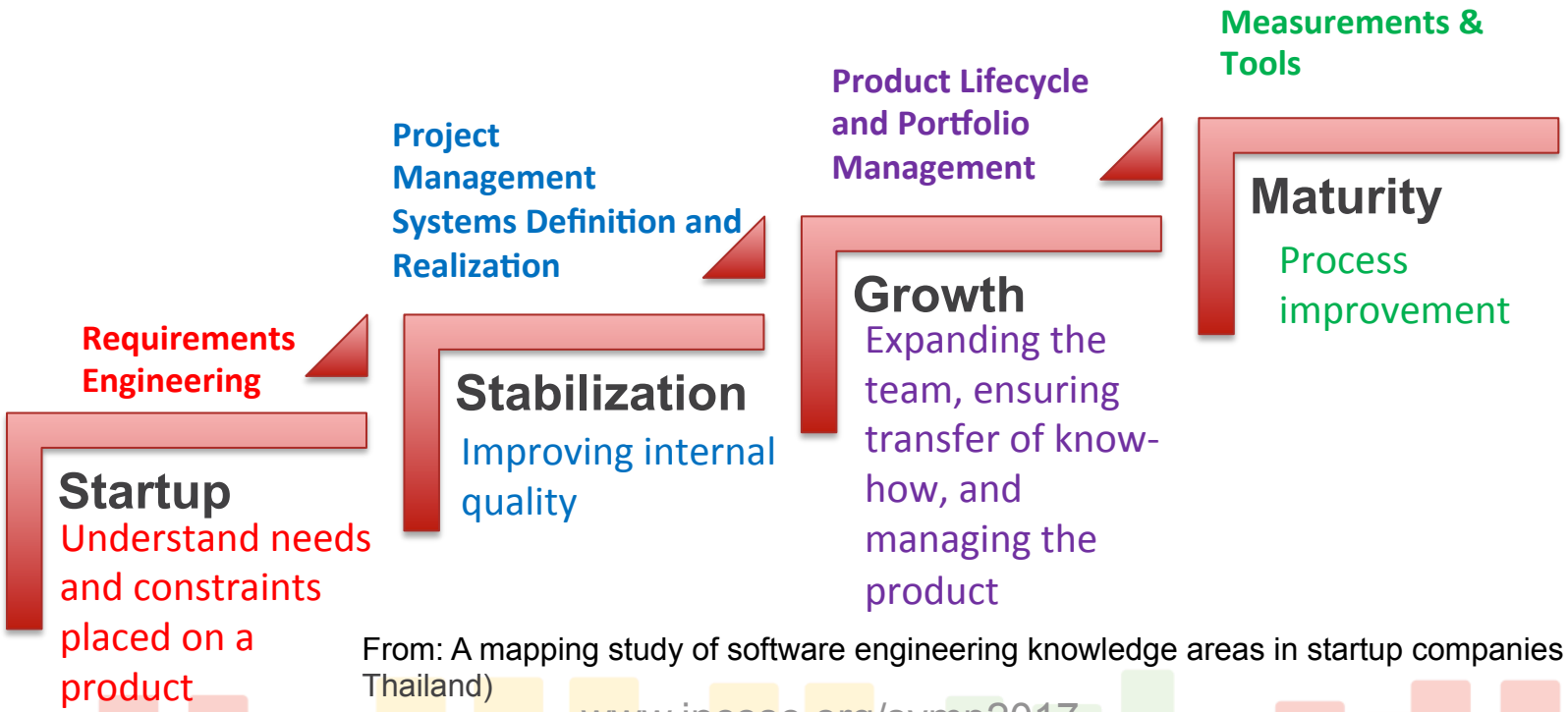
- VSEs are constrained from competing in many developmental efforts
  - Including the requirement to follow unrealistic standard requirements
- Use of ISO 29110 and DPs provide an easy way for VSEs to overcome some of the constraints

How much

- **Four Profiles within the Generic Profile Group**
  - **Entry** - Targets VSEs typically developing **6 person-month** projects or **start-ups**;
  - **Basic** - Targets VSEs developing only **one project at a time**;
  - **Intermediate** – Targets VSEs developing **multiple projects** within the organizational context;
  - **Advanced** – Targets VSEs which want to **sustain and grow** as an independent competitive system/software development business.



VSE Lifecycle: Focal Processes



From: A mapping study of software engineering knowledge areas in startup companies (Klotins et al., 2015 WG Thailand)

How you deliver matters

- Actions to improve awareness and usefulness of VSE support internationally
  - Countries have made ISO 29110 their national standard
  - Countries have increased the “share” of government contracts for small businesses
  - Countries have established agencies to stimulate small business development
- ISO 29110 implementations have been performed around the world. Unfortunately, most of us and the VSEs are not aware of these implementations
  - A European project, called the SPIRE Case Studies (http://www.cse.dcu.ie/spire/case.html), has led to the Internet publication of process improvement projects
- The development of a similar portfolio to SPIRE could help VSEs learn about successful ISO 29110 implementations around the world
  - The following issues could be discussed:
    - Identify completed ISO 29110 implementations around the world
    - Document them in English, using a template
  - Publish them
    - INCOSE
    - Internet

How you can contribute

- Join VSE WG
- Review ISO 29110
- Review DPs
- Participate in case studies
- Inform your associates about VSE efforts

Summary

- ISO and INCOSE WGs have worked together to develop a set of systems engineering management and engineering guides plus deployment packages to specifically developed help VSEs
- They are intended for VSEs who have neither the expertise, nor the budget or the time, to adapt existing standards to their needs
- They bring many benefits to VSEs, their customers, and their business partners

Contact Information

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- INCOSE VSE WG Web Page - http://www.incose.org/ChaptersGroups/WorkingGroups/Transformational/VSE
- INCOSE VSE WG Connect Site - https://connect.incose.org/WorkingGroups/VSE/Pages/Home.aspx
- Dr. Claude Laporte Web Site - http://profs.etsmtl.ca/claporte/English/VSE/

Questions?

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