

Project-Driven Process Improvement:

A Large-Scale Lean Six Sigma Deployment Across Small- and Medium-Sized Organisations



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- ◆ **The Egyptian IT landscape**
 - Key Facts
 - The Role of ITIDA – SECC

- ◆ **The Lean Six Sigma Initiative for IT and Software**
 - Objectives
 - Participating Organisations - Companies profile
 - Types of Projects
 - Deployment approach
 - Preliminary Results

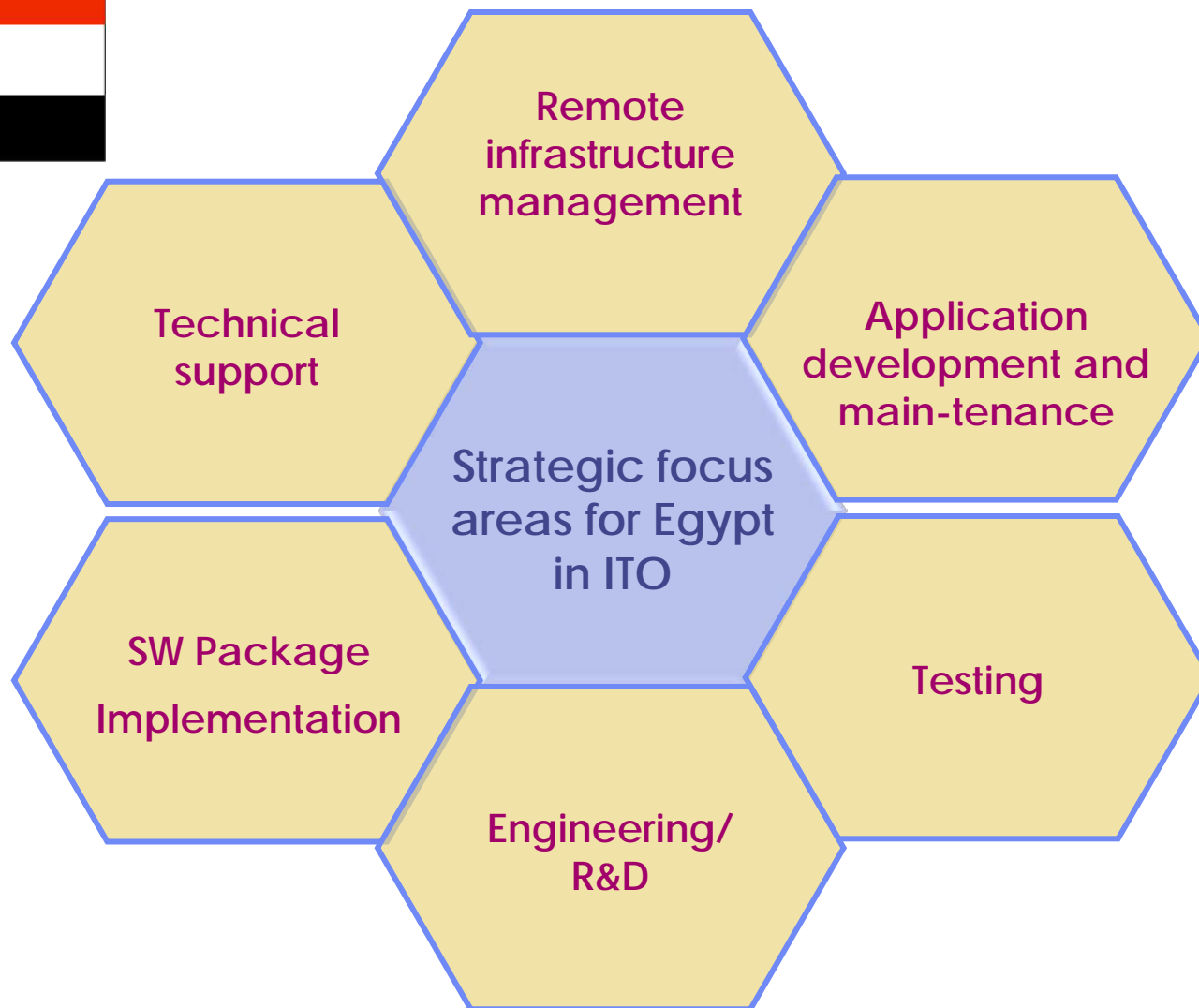
- ◆ **Challenges and Lessons Learned**

- ◆ **Q&A**

◆ Share with you the experience of Three-Party setup for deploying a Lean Six Sigma Initiative in Egypt, in terms of:

- Implementation and delivery model
- Organisations involved
- Challenges
- Commonalities and differences
- Key lessons learned



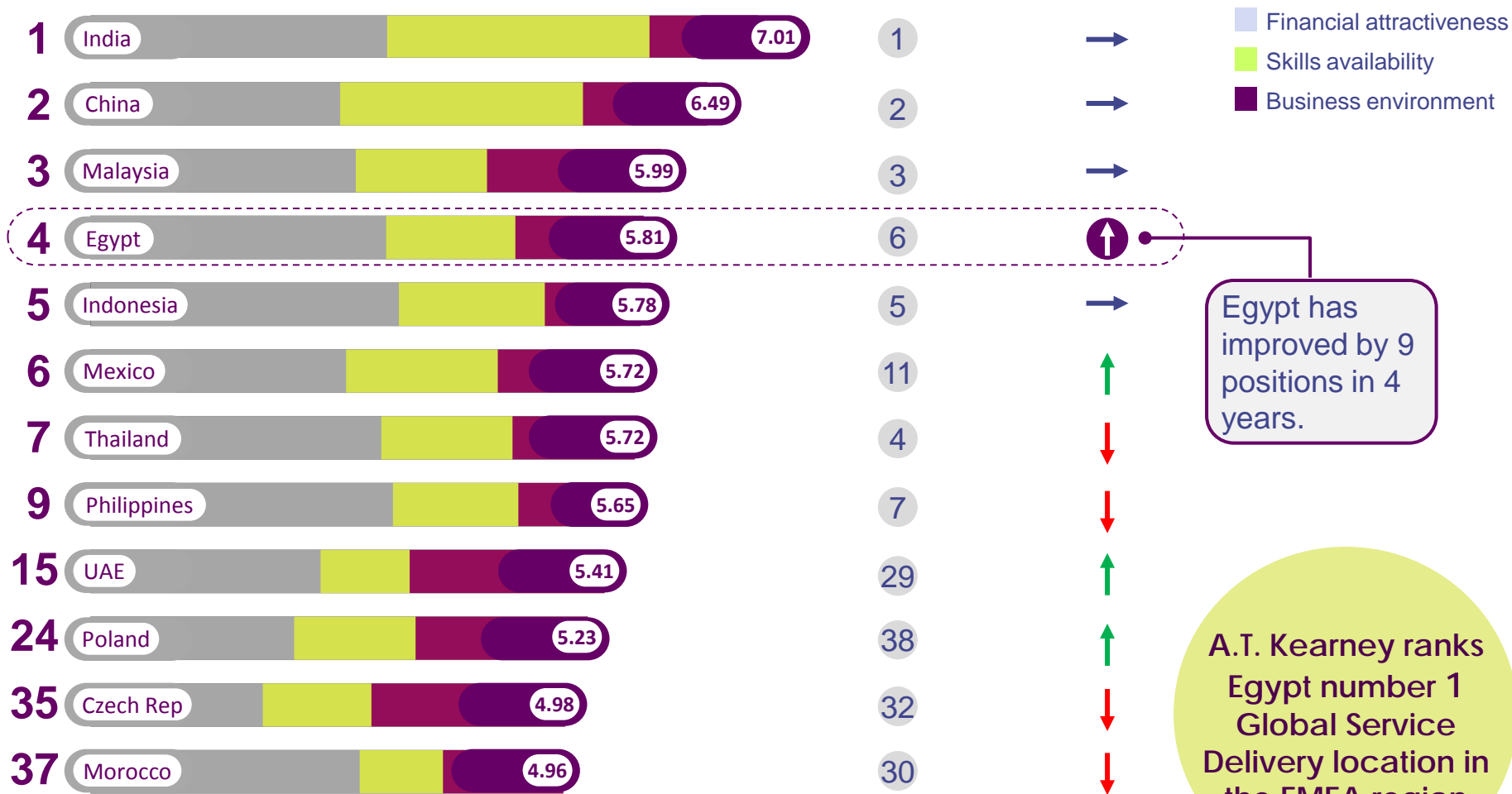


Ministry of Communication
& Information Technology



2011 Ranking

2009 Ranking 2009 vs. 2011



◆ Vision:

- To enhance the quality, efficiency and level of innovation of the ICT companies and improve their global competitiveness

◆ Mission:

- Provide services improving technical competence and internal capabilities

◆ Profile:

- Sole Certified Lead Appraisers for CMMI in the Middle East
- Sole Examination Institute/Certification Body for the ISTQB® certificates in Egypt
- Highest number of IT experts under one roof in the Middle East
- Largest Sponsor of IT technical capacity building in Egypt
- Large array of experiences with Multilanguage capabilities
- Serving more than 450 customers
- Offering a portfolio of 12 services
- More than 8 international cooperation & alliances



- ◆ **Capability Maturity Model Integration for Development (CMMI-DEV)**
- ◆ **Software Process Improvement Guide (SPIG)**
- ◆ **Personal Software Process/Team Software Process (PSP/TSP)**
- ◆ **Embedded Software**
- ◆ **Software Reuse**
- ◆ **Software Testing**
- ◆ **Information Technology Infrastructure Library (ITIL)**
- ◆ **Capability Maturity Model Integration for Services (CMMI-SVC)**
- ◆ **Certification**
- ◆ **Training**
- ◆ **Agile**
- ◆ **Lean Six Sigma for IT and Software**



Services are sponsored by ITIDA (through corporate tax revenues) and offered to Egyptian IT companies at substantially reduced cost

◆ Founded in 1999

- Headquarter in London
- Presence in Europe, US and ASIA



◆ Dedicated to Quality Engineering

- **Lean Six Sigma** and **DFSS**
- Leadership Development
- Software Process Improvement (CMMI®, ITIL, PSP...)
- Strategic Consulting
- IT and Software Risk Management
- Training and Coaching
- Hands-on Project Implementation

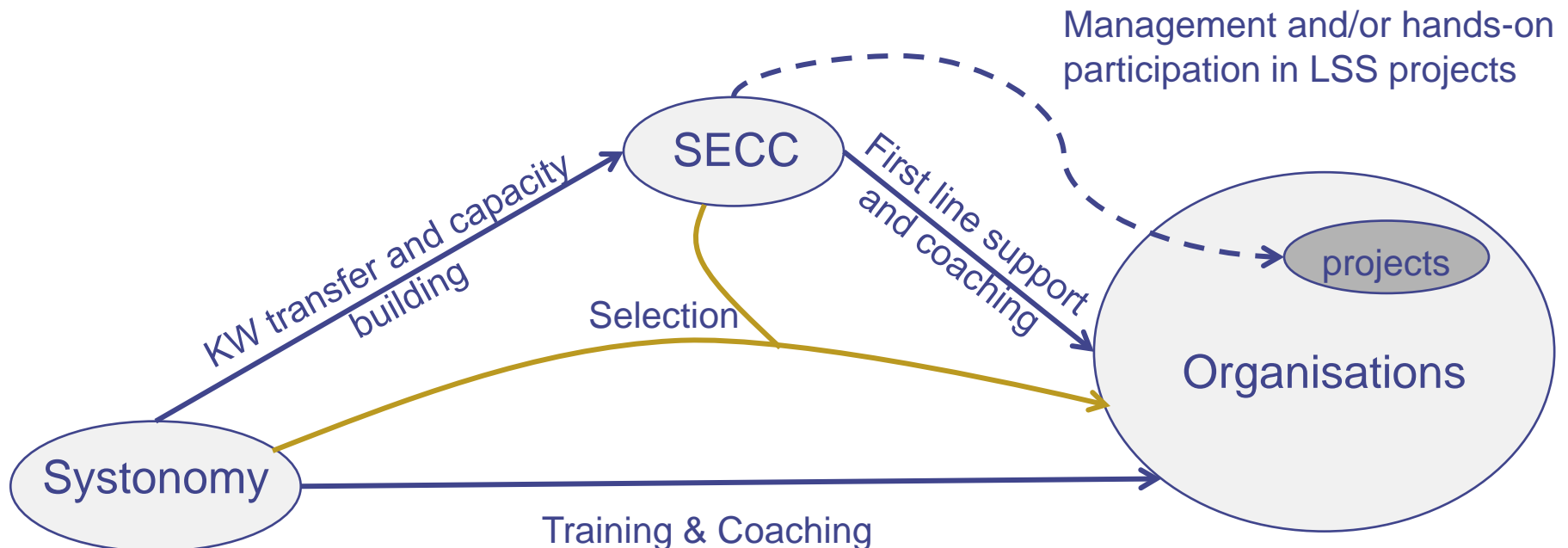
- ◆ **Our business is Software Quality Engineering and Lean Six Sigma for ICT and Software Development**
- ◆ **We work with any organisation where Software and IT is a critical part of the business**
- ◆ **We help our client to accelerate their investment in continuous improvement in:**
 - Software process performance
 - Software product quality
 - ICT services



The programme set-up and roles

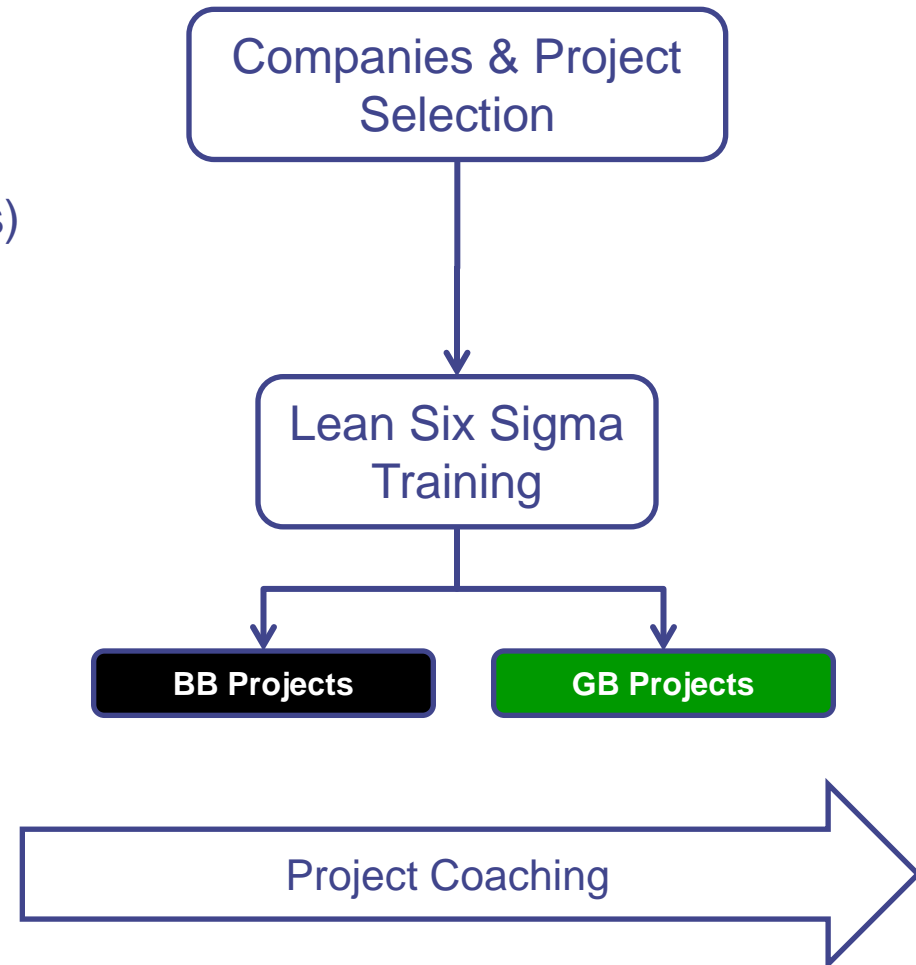
◆ Three-party setup and work dynamics

- Knowledge transfer
- Lean Six Sigma for IT and Software Training
- Project Coaching
- Companies Project implementations

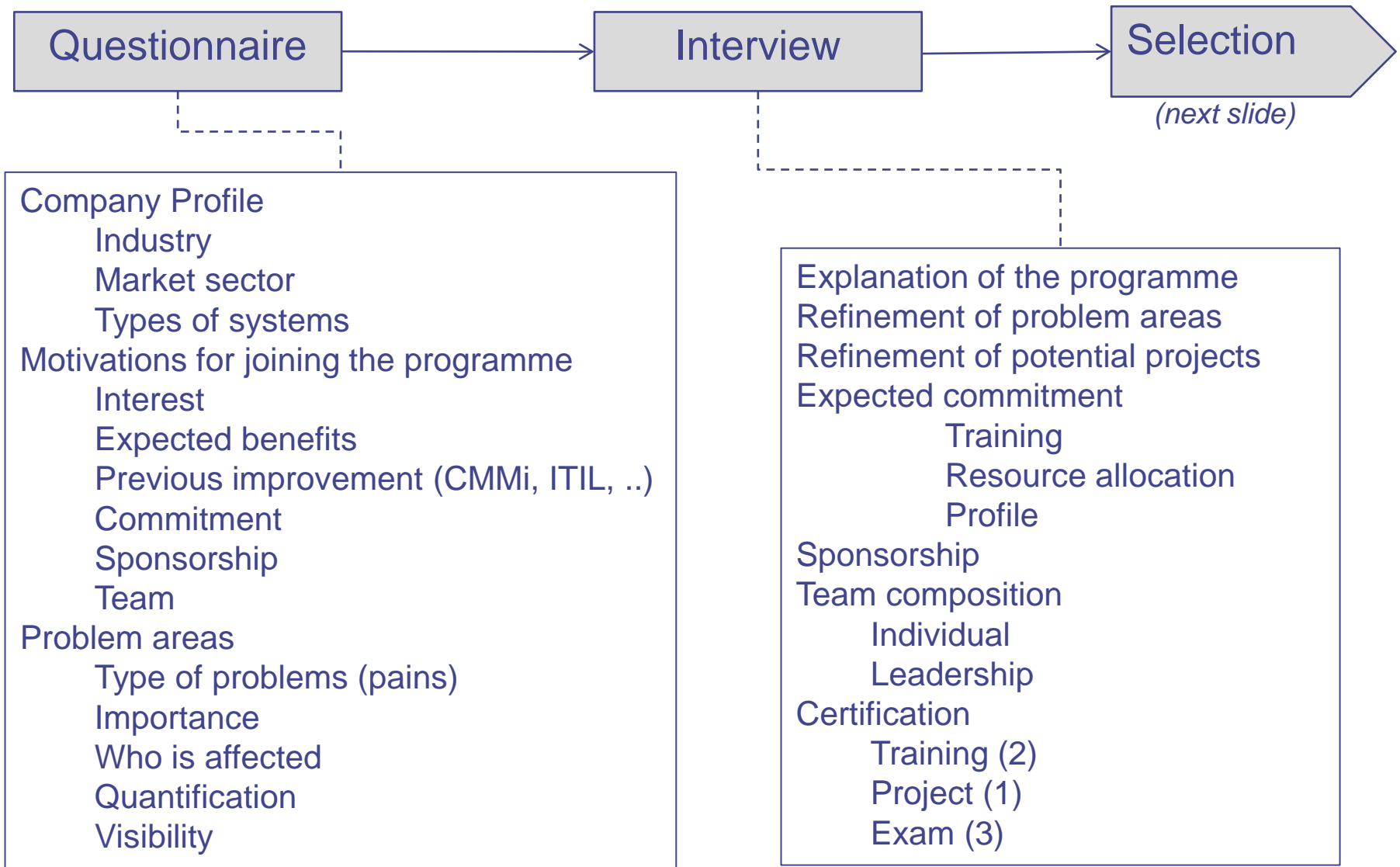


◆ **Entire initiative managed on a project by project basis:**

- Companies selection (based on proposed Lean Six Sigma projects)
- Training (aligned with projects calendar)
- Coaching (hands-on project work)
- Certification (based on project results and not only theoretical knowledge)



Organisations and Projects Selection

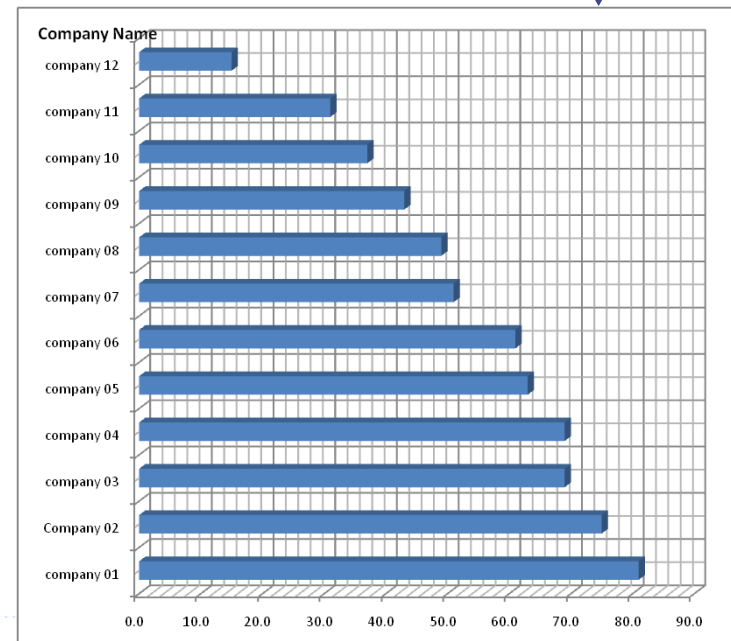


Organisations and projects selection

Company fitness Company Name

Criteria	Importance	Company Name												Total	%
		company 01	Company 02	company 03	company 04	company 05	company 06	company 07	company 08	company 09	company 10	company 11	company 12		
Problem Awareness	1.0	H	H	H	M	H	H	M	M	M	H	L	L	68.0	11
Problem: Fitness for ITIDA/Pilot	1.0	H	H	H	H	M	H	M	H	L	M	M	L	68.0	11
Individual Commitment	1.0	H	H	H	H	H	H	H	H	H	H	M	M	96.0	15
Individual Availability	1.0	H	H	H	H	H	H	H	H	H	H	H	M	102.0	16
Individual Fit (as a Team)	1.0	H	H	H	H	H	H	M	H	M	M	M	M	78.0	12
Organisational Sponsorship	1.0	H	H	H	H	H	H	H	M	H	L	H	L	86.0	13
Long Term Sustainability	1.0	H	H	M	H	M	M	M	M	M	L	L	L	48.0	07
Track record - Improvement Initiatives	1.0	H	H	M	M	M	L	M	L	M	L	L	L	38.0	06
Relationship with SECC	1.0	H	M	H	H	H	M	H	M	M	L	L	L	60.0	09
Total		81.0	75.0	69.0	69.0	63.0	61.0	51.0	49.0	43.0	37.0	31.0	15.0		
%		13	12	11	11	10	09	08	08	07	06	05	02		

Criteria	Weight
Problem Awareness	W1
Problem: Fitness with SECC/Pilot	W2
Individual Commitment	W3
Individual Availability	W4
Team Fitness	W5
Organisational Sponsorship	W6
Long Term Sustainability	W7
Track record - Improvement Initiatives	W8
Relationship with SECC	W9



◆ A broad and diverse group of organisations, reflecting the composition of the local market

- Software Development
- IT Services
- Business Process Outsourcing
- Government Organisations



Selected Companies

- ◆ **The majority of selected companies are mid-sized or SME's companies**
 - Local and international presence

- ◆ **Engaged in Projects Improvement initiatives in the past:**
 - CMMI
 - PSP/TSP
 - ITIL
 - COPC

- ◆ **Original Lean Six Sigma motivations**
 - Process Excellence (attraction of international clients)
 - Individual motivation (Certification)
 - Trained on “classical” Six Sigma but don't know how to apply it to IT/Software
 - Measurement...estimation...
 - A mean to achieve high maturity levels

IT and software culture and challenges

IT Organisations

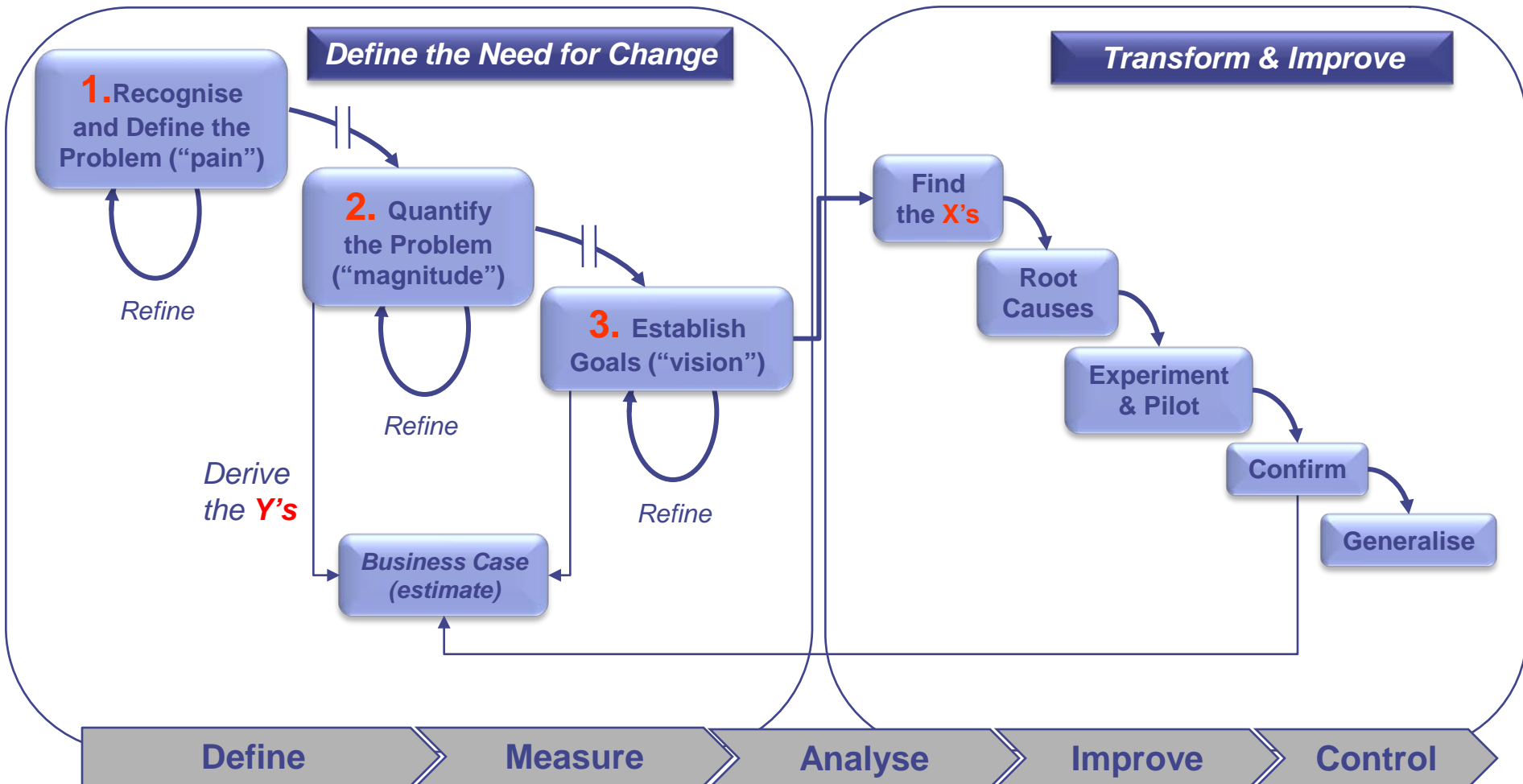
◆ Culture & Challenges

- ITIL Culture
- Closer to the customer
- More tangible benefits
- Straightforward improvement
- Have useful data or were able to generate data easily

Software Organisations

◆ Culture & Challenges

- Tend to think through compliance to a maturity model
- Struggle with problem definition
- More technical than business oriented
- More complex
- Heavily rely on project development schedule
- More invasive and disruptive
- Protective attitude
- Various levels of maturity (CMMI L1 to L5)
- Some have huge volumes of data, but rarely useful



Six Sigma Integrates Project & Change Management and rooted into Empirical and Experimental Software Engineering studies

- ◆ **Black Belt Training (4 weeks)**
 - 13 BB's from SECC and companies
- ◆ **Green Belt Training (2 weeks)**
 - 40 GB's from companies
- ◆ **Importance of Theory and Practice**
 - *No theory...No Learning (Deming)*
- ◆ **Each delegate must have a project**
 - No project... No training
- ◆ **Lean Six Sigma does not mean “Light” Six Sigma**
- ◆ **Six Sigma is NOT just about Statistics**

◆ Key comments

- Participants surprised by the importance/emphasis put on problem formulation and “soft” skills...but recognised the value later
 - ◆ “The soft stuff is the hard stuff”
 - ◆ Some people want to jump on statistics
- Some participants previously trained in “Classical” LSS realised the major differences with IT and Software
- Teaching statistics remains a difficult task
 - ◆ Use of visual exploratory tools
 - ◆ “Unlearn” some misconceptions

◆ Coaching delivered through focused and intensive sessions

- Often 2 coaches, to get different views on the problem
- Complement to training by enabling effective knowledge transfer
- Practical knowledge in Software Engineering and Lean Six Sigma methods
 - ◆ People expect the coach to help solve the problem and be familiar with IT and Software
- The coach should not do things instead of the team, but bring people to do it by themselves
 - ◆ Provocative and naive questioning

◆ Minimum of 3-5 days coaching per phase

◆ Coach SECC consultants to become coaches

- Train-actionSM (from French Formaction)



Projects and (initial) Problem areas identification

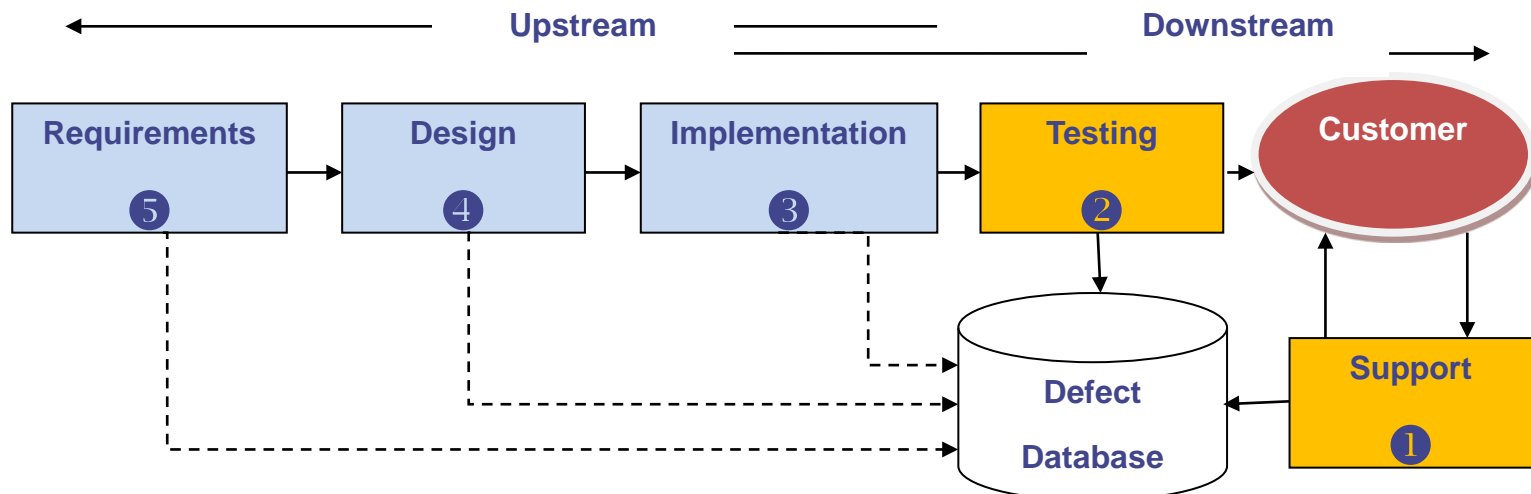
◆ Selection Criteria

- Strategic Issues
- Type of Problems
- Expected Return on Investment
- Measurability
- Organisational Issues
- Project Issues

◆ Pragmatism

- Start from the areas closer to the final customer
- Stop the bleeding first!

... Start Downstream



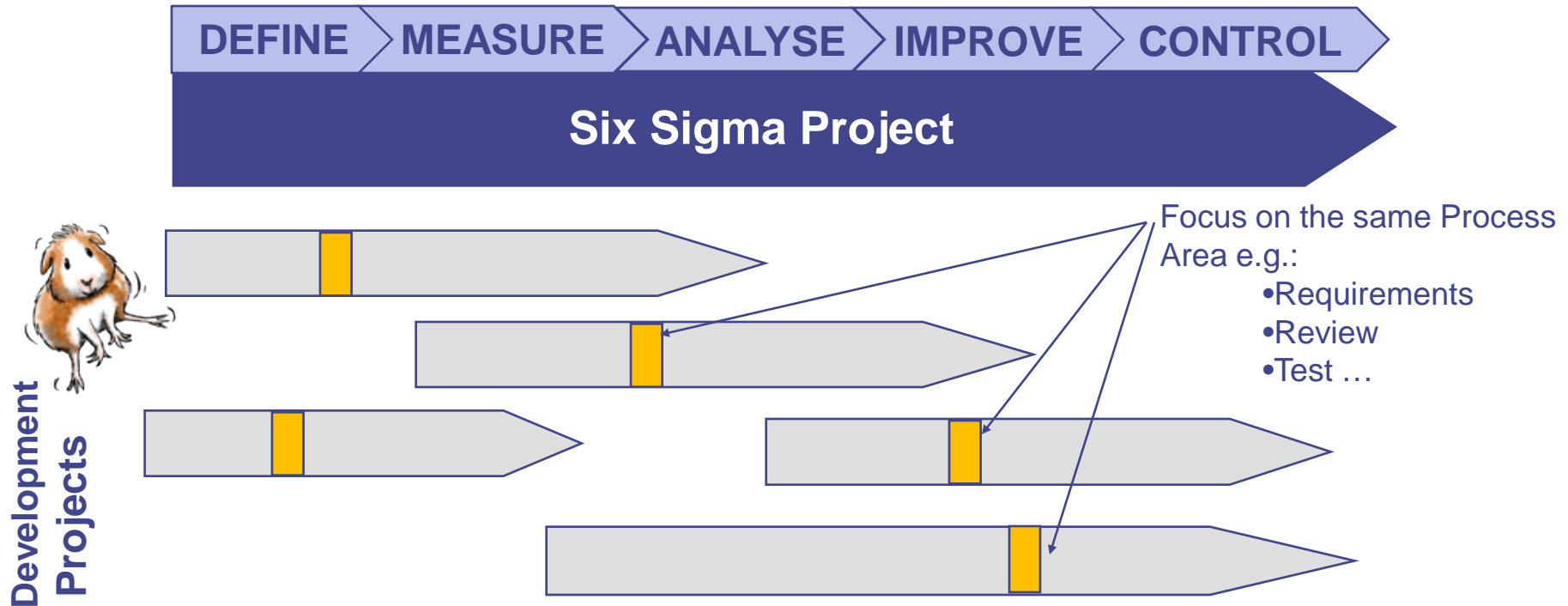
Lean Six Sigma can be applied at any level of maturity

- ◆ Projects have been selected and refined during the initial phase of the DMAIC Six Sigma roadmap

SW Companies		IT Services Companies	
Project Type	Nb	Project Type	Nb
Test Effectiveness	2	Incident Management	2
Code defects containment	5	Capacity Planning	1
UI defects reduction	1	Delivery Cycle Time	1
Regression testing -False defects	1	Service Requirements effectiveness (Requirement Defects)	1
Project management overhead	1		
Acceptance test cycle time	1		

A common problem to many companies

- ◆ Development projects are objects of studies and implementation for the Lean Six Sigma Projects.



Lean Six Sigma projects must be synchronised with development projects

◆ Initial problems often expressed as “Non compliance” or absence of process

- “CMMI excuse”

Why is this problem?
BTW: processes always exist...
Who tells you that if you follow that process you will perform better?



◆ Shift the thinking towards “Pain” related to:

- Effectiveness first → Defects
 - ◆ Late phases first and go up the process
- Efficiency second → High Effort, Waste
 - ◆ Again the CMMI excuse, CMMi asks for lot of overhead activities and/or documentation (some companies have over 35% management overhead)

Very difficult to admit for CMMI L2 and L3, that we have quality problems

◆ Shift the thinking about Cost of Poor Quality

- Pain means cost

Business Case

Management:
... Now we are talking!

Define phase ranged from 6 to 15 weeks: paradigm shift from compliance oriented improvement to performance oriented improvement... Shock therapy

◆ Most existing measures are not useful...

- Again “CMMI excuse”
- *KPImania* syndrome
 - ◆ *KPI's are collected like Pokémons*
- 3rd order measure vs 1st order
 - ◆ *Complicated is Beautiful*
- Time reporting system
 - ◆ *One of the most unreliable and distorted source of data*

“So how this is related to our problem?”
 “Anyway, what can I do (or get) from these measures?”
 “Why do you collect them?”

◆ “We do not have measures”

- You often have (or can easily get) more measures than you think!

◆ Focus on First Order Measures → Defects

- Defect Categorisation
- Cost of defect

*It is not about collecting measures for compliance, but finding the key factors (X's) that influence our problem (Ys).
 MEASURE PHASE ranged from 8 to 15 weeks.*

- ◆ 9 Six Sigma projects analysed between 590 to 1070 defects (Code defect Containment, Testing, Regression test)
 - Analysis conducted as a workshop gathering people from multiple perspectives

- ◆ To the surprise of all it only took max 2 hours to analyse 100 defects → 2-3 days to analyse a large enough sample of defects!

- ◆ People do have a memory for defects!

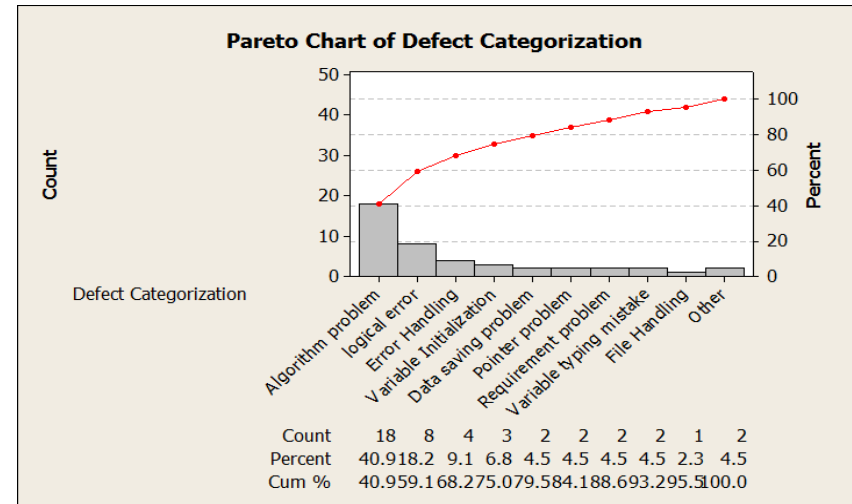
- ◆ Defects analysed on multiple dimensions
 - Type of defects
 - Complexity - T-shirt sizing (XL, L, H, XH)
 - Effort to fix

- Reliability and agreement on the defect assessment by design
- First Stage: Operational definitions provided
 - “Calibration” of the team
 - Adaptation and refinement of Operational definition
- Second stage: more reliable and quicker

**Defects Characterisation
Provides the basis for the
organisation measurement system**

◆ Typology of defects help refining the problem, will drive the projects and the solution

◆ Root cause Analysis depends on the type of defects



Looking for the Pareto effects

◆ Analyse is not only about statistics

- People tend to jump on the statistical analysis tools
- System and structural tools are as much important as the statistical tools → provides context to the data

ANALYSE PHASE ranged from 4 to 8 weeks.

Six Sigma SW Projects **Example of experimentation**

ANALYSE

DEFINE

MEASURE

ANALYSE

IMPROVE

CONTROL

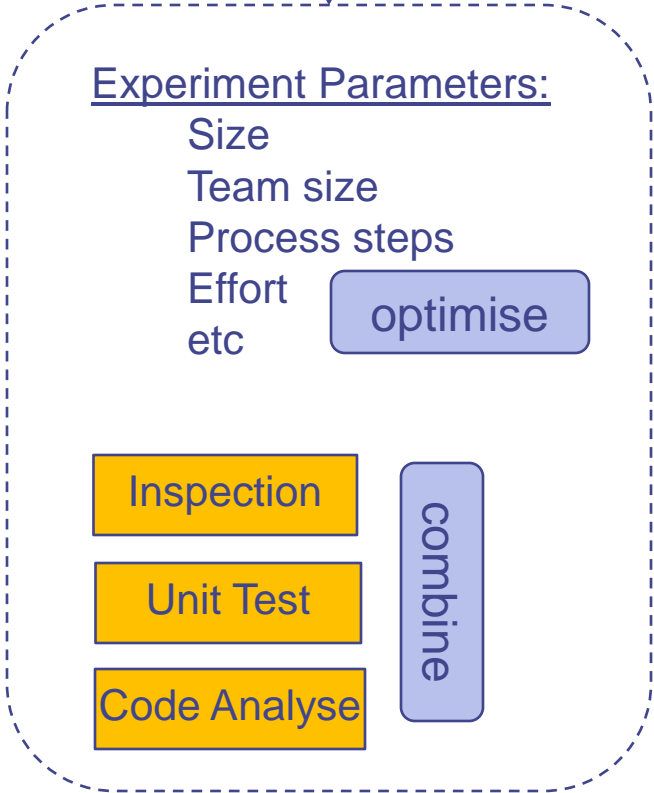
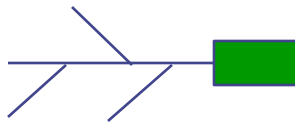
Review

data

X's:

- Size
- Team size
- Process steps
- Effort/Time per step

Min 50 points
Pull planning rather than push
 (e.g. Inspection every 2 weeks per project)



- ◆ **Pilot projects**
 - Code Inspections
 - UI Defect Containment
 - Testing Cycles

- ◆ **Software Projects showing slower paced improvement**
 - More complex
 - Cultural barriers
 - **Economic slowdown due to recent events**

- ◆ **...but the initial analysis of the implemented improvements data shows potential for remarkable increases in Defect containment**

- ◆ **Financial Benefits so far: 2.5:1 to 10:1**

- ◆ **Cultural resistance is the key challenge, but cultural change is always possible (and the Egyptians know this very well...)**

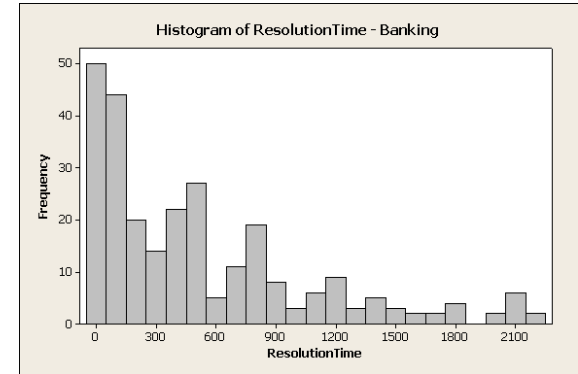
- ◆ **Problem Space more straightforward**
 - Delays and Cycle time (Lean focus)

- ◆ **Highly visible to the Customer (“louder” VOC)**
 - *Shift from service denial to true a service provider*

- ◆ **Performance measures already available**
 - SLA adherence, response times, Non value added time
 - Tangible COPQ (rework, duplication, penalties..)

- ◆ **Process more directly observable**

- ◆ **“Continuous” flow of data (incidents)**



Compared to Software organisations, IT services company already have a culture of process excellence, commitment to customer and measurement

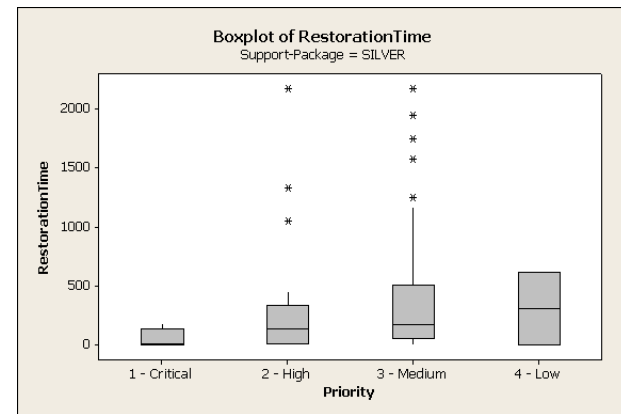
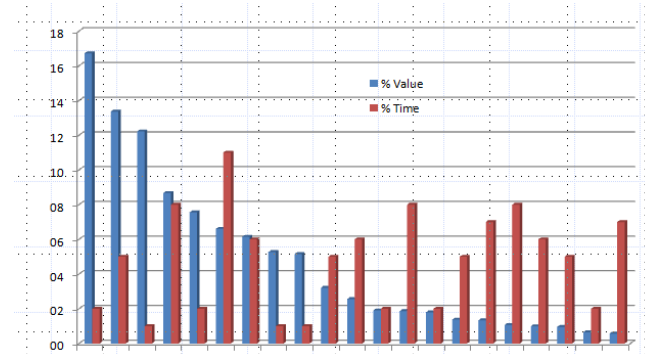
◆ Process Value Analysis (Lean)

◆ Root Causes

- Incorrect incident classification / prioritisation
- Non value added time
- Capacity Planning

◆ Importance of Process and Data view

- Huge volumes of data, require context and interpretation



◆ Pilot projects

- Incident Management
- Capacity and resources planning
- Delivery and procurement cycles

◆ IT projects showing significant reductions in terms of cycle time, improved capacity planning and process governance

- Lean process improvement
- Six Sigma for establishing ongoing monitoring and controls
- Process harmonisation
- Customer involvement, focus on delivering value

◆ Straightforward improvement with quicker tangible benefits

◆ Huge Financial Benefits so far ROI: 7.4:1 to 17:1

Change is possible...

From	To
(Managers) decisions are rarely questioned	Everything can and will be questioned openly
Decisions are based on experience, influence, power relations and gut-feelings	Decisions are based on in-depth knowledge of <u>structural and quantitative</u> characteristics of the system
Quality is viewed as compliance, controls, checklists and extra processes	Quality is seen as a business enabler and a way of working
Buzzwords and <i>tecchie jargon</i> are used extensively to justify improvement efforts	Clarity and Operational Definitions are used to build consensus and drive change initiatives
Solutions are often quick fixes	Problems are tackled at the level of the root causes
Improvement (if any) is “by the book”	Improvement is “by experiment “



tahrirsquare



Lessons Learned

- ◆ **Large scale deployments can accelerate the investment in capacity building**

- ◆ **They do however present specific challenges**
 - Managing multiple projects in the same process area, but with different organisations
 - Synergies across projects, knowledge sharing across organisations

- ◆ **Cultural change and resistance**
 - Use projects to drive change (tangible results)
 - The exploratory part and problem definition play a major role in raising awareness and getting the “*questioning habit*”

- ◆ **Data is A-political... Data makes a difference**
 - **But I don't believe your data... I might believe my own data!**
 - First order Measurement come first (keep it simple)



Thank You!