Six Sigma Overview

KPA Ltd.

Management Consulting

- ***KPA*** is an international management consulting firm with offices in Israel and strategic partners in the US, Spain, Belgium, France and Central Europe. Formed in 1990 by Professor Ron Kenett as a partnership, the firm incorporated in 1994.
- The ***KPA*** staff consists of specialized consultants with expertise in strategic planning, market research, industrial statistics, quality and risk management, business development and human resource management. ***KPA*** is currently involved in the strategic planning of medium and large companies, in international market research and customer surveys, establishing quality systems and Six Sigma initiatives, organizational development, risk management and change management consulting.

The KPA Vision and Mission Statement

Our Mission

"To provide our customers with the expertise required to formulate strategies, concepts and breakthrough business processes that will turn their organizations into leaders in their field."

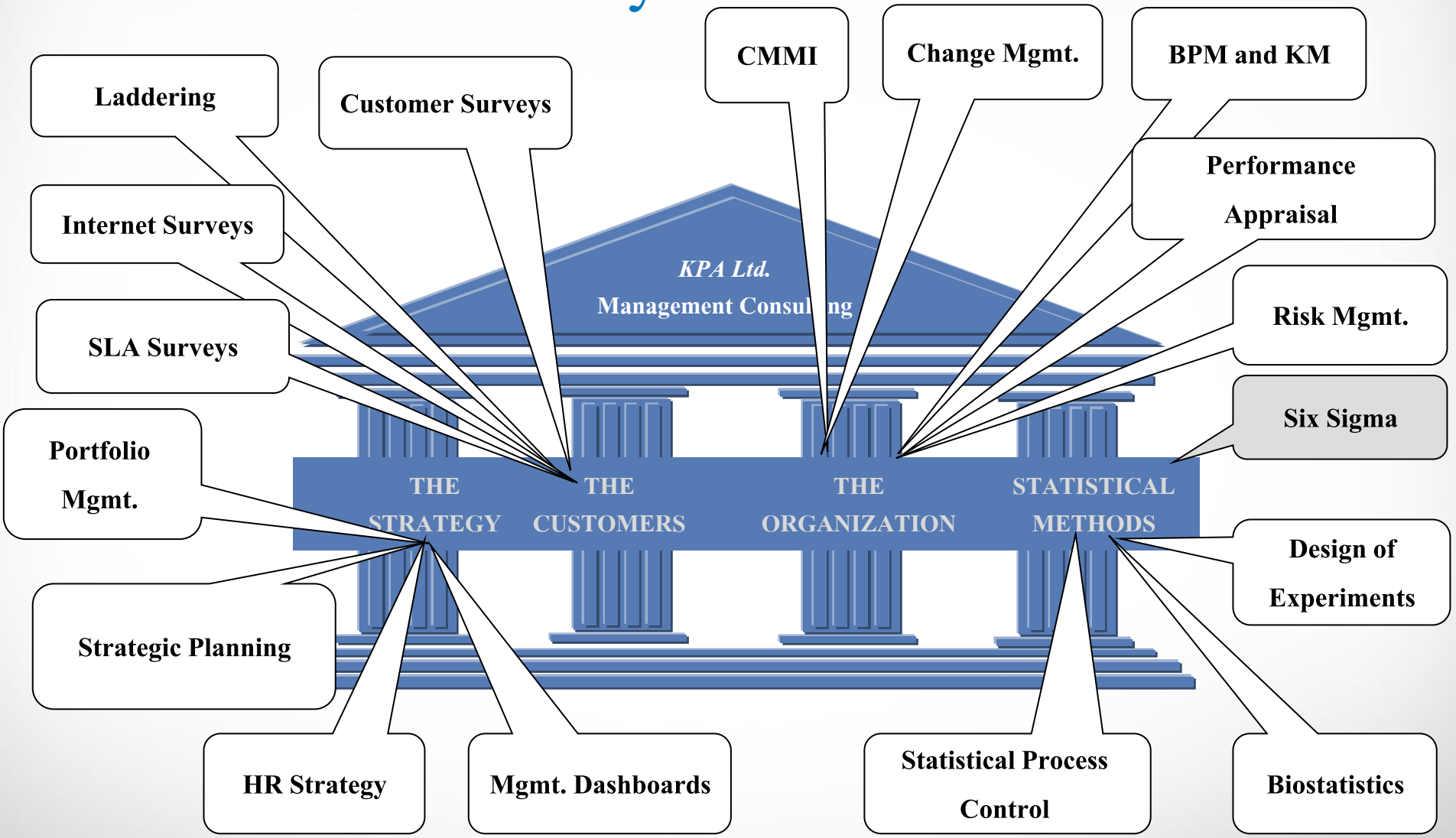
Our Vision

"To be known as a center of excellence in modern management methodologies and as a source of research and training in our field."

KPA areas of activity

- **THE STRATEGY**
- **THE CUSTOMERS**
- **THE ORGANIZATION**
- **STATISTICAL METHODS**

KPA areas of activity



KPA products and services

- Strategic Planning, Change Management, Six Sigma initiatives, joint ventures and M&A facilitation
- Market Research and Voice of the Customer Surveys
- Organizational Development, Appraisal Systems and Voice of the Workforce Surveys
- Statistical Consulting, Data Mining, Risk Management, Industrial Statistics, Biostatistics
- **Six Sigma training and consulting**

KPA clients' industrial areas

- Telecommunications
- Software
- Banking
- Plastics
- Chemicals
- Pharmaceuticals
- Food & Beverage
- Electronics
- Cellular Services
- Health Care
- Education
- Energy
- Transportation









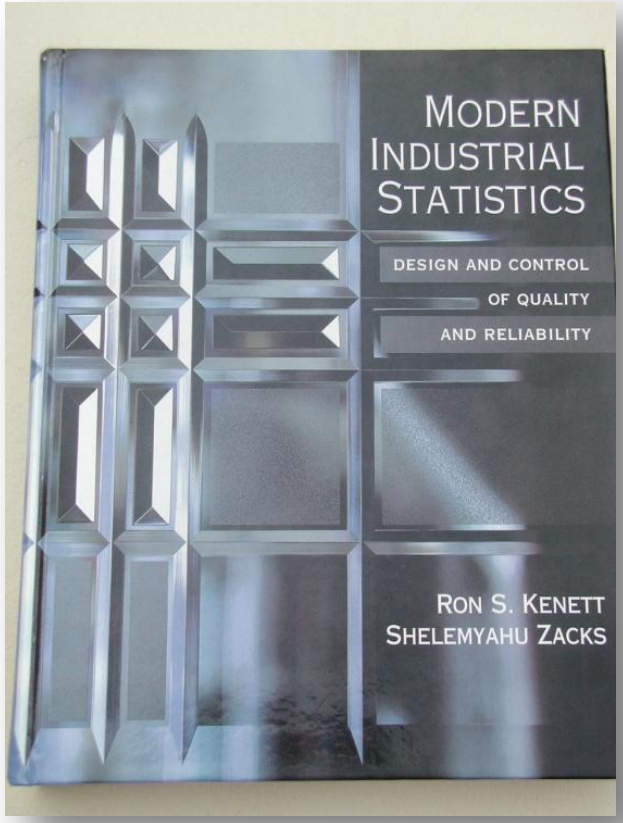
KPA partial list of clients

- The Israel Electricity Corporation, utility
- The Open University, education
- hp Indigo, the electronic printing division of hp
- Cellcom, a leading Israeli cellular service provider
- ECI, telecom supplier
- Perrigo, pharmaceuticals
- Eden Springs, home office delivery
- Cisco, network management software
- Amdocs, billing systems
- Dead Sea Bromine Group, chemicals
- Bank Leumi, financial services
- Rafael, eletronics

Why Six Sigma ?

"At Motorola we use statistical methods daily throughout all of our disciplines to synthesize an abundance of data to derive concrete actions….

How has the use of statistical methods within Motorola Six Sigma initiative, across disciplines, contributed to our growth? Over the past decade we have reduced in-process defects by over 300 fold, which has resulted in a cumulative manufacturing cost savings of over 11 billion dollars".*



Robert W. Galvin

Chairman of the Executive Committee

Motorola, Inc.

***From the forward to MODERN INDUSTRIAL STATISTICS: Design and Control of Quality and Reliability, Kenett and Zacks, Duxbury Press, 1998, Spanish edition 2000, 2nd paperback edition 2002, Chinese edition 2004.**

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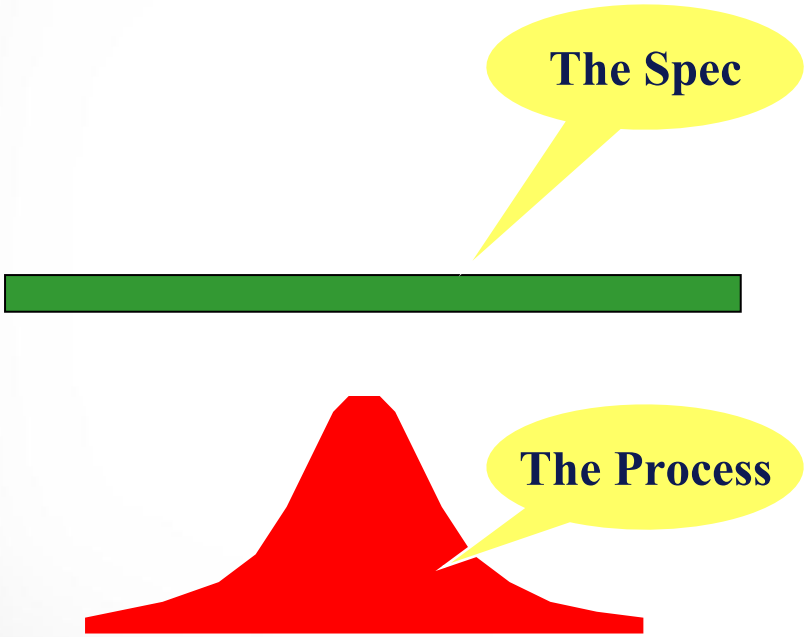
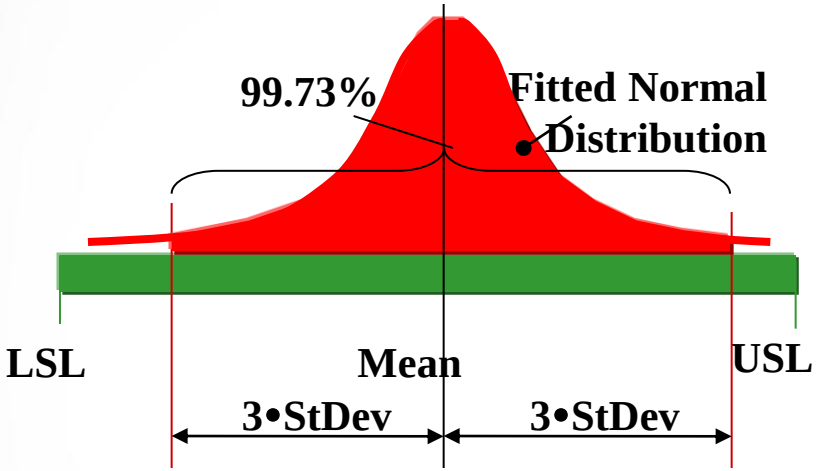
The Basketball Analogy (1/2)



How do we Perform?

The Basketball Analogy (2/2)

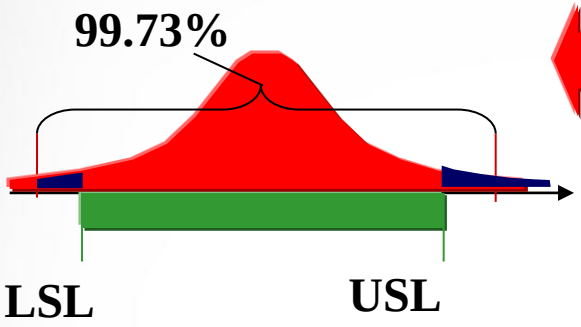


$$Cp = \frac{USL - LSL}{6 \bullet StDev}$$

$$Cpk = \frac{Min\ \{Mean - LSL,\ USL - Mean\}}{3 \bullet StDev}$$

Performance Assessment

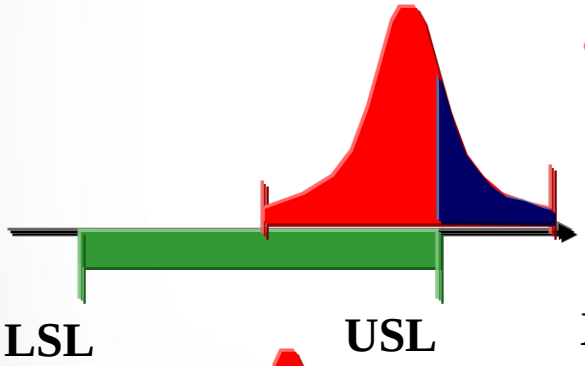
Six Sigma Indicators (1/2)



Rework

There is no Potential Capability

Cp < 1.0, Cpk < 1.0



Waste

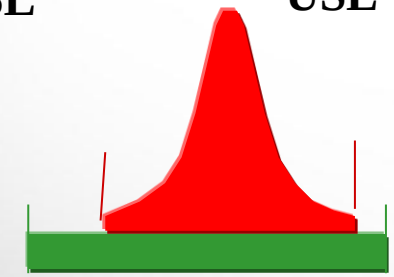
There is Potential Capability

However

There is no Actual Capability

Cp > 1.0, Cpk < 1.0

X



Performance

There is Actual Capability

Cp > 1.0, Cpk > 1.0

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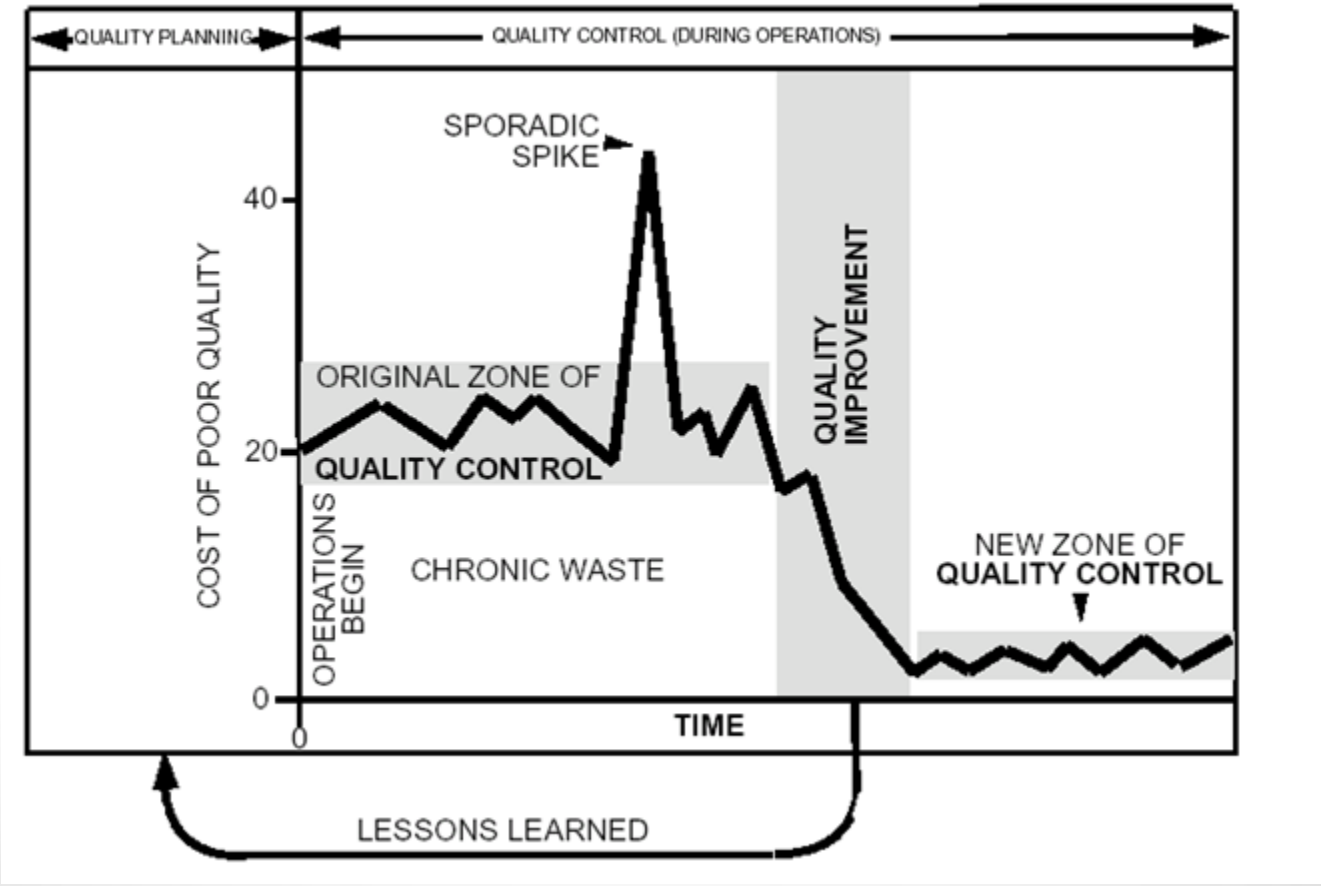
Six Sigma Indicators (2/2)

C_p, C_{pk}, Defects Per Million and Sigma Level

C_p	PPM	C_{pk}	PPM	Sigma Level
0.67	50,000	0.17	308,770	2
1	2,700	0.5	66,811	3
1.33	63	0.83	6,210	4
2	0.002	1.5	3.4	6

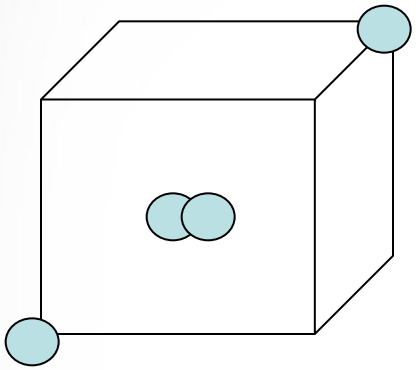
Where are your critical processes?

The Juran Trilogy: Planning, Improvement and Control*



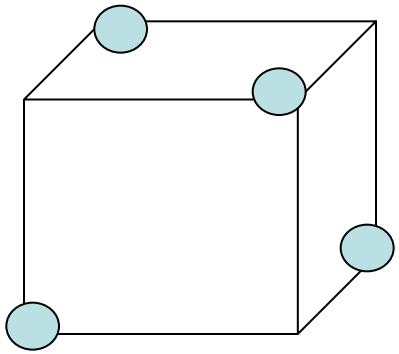
*J.M. Juran, Juran on Leadership for Quality, Free Press, 1989,

Design for Six Sigma



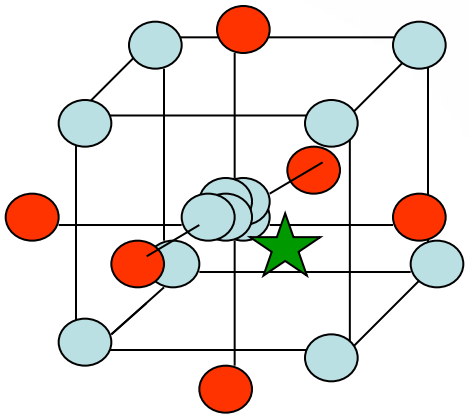
Scoping

Initial assessment



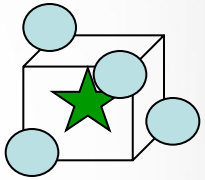
Screening

Fractional designs



Optimizing

Response surfaces



Robustness

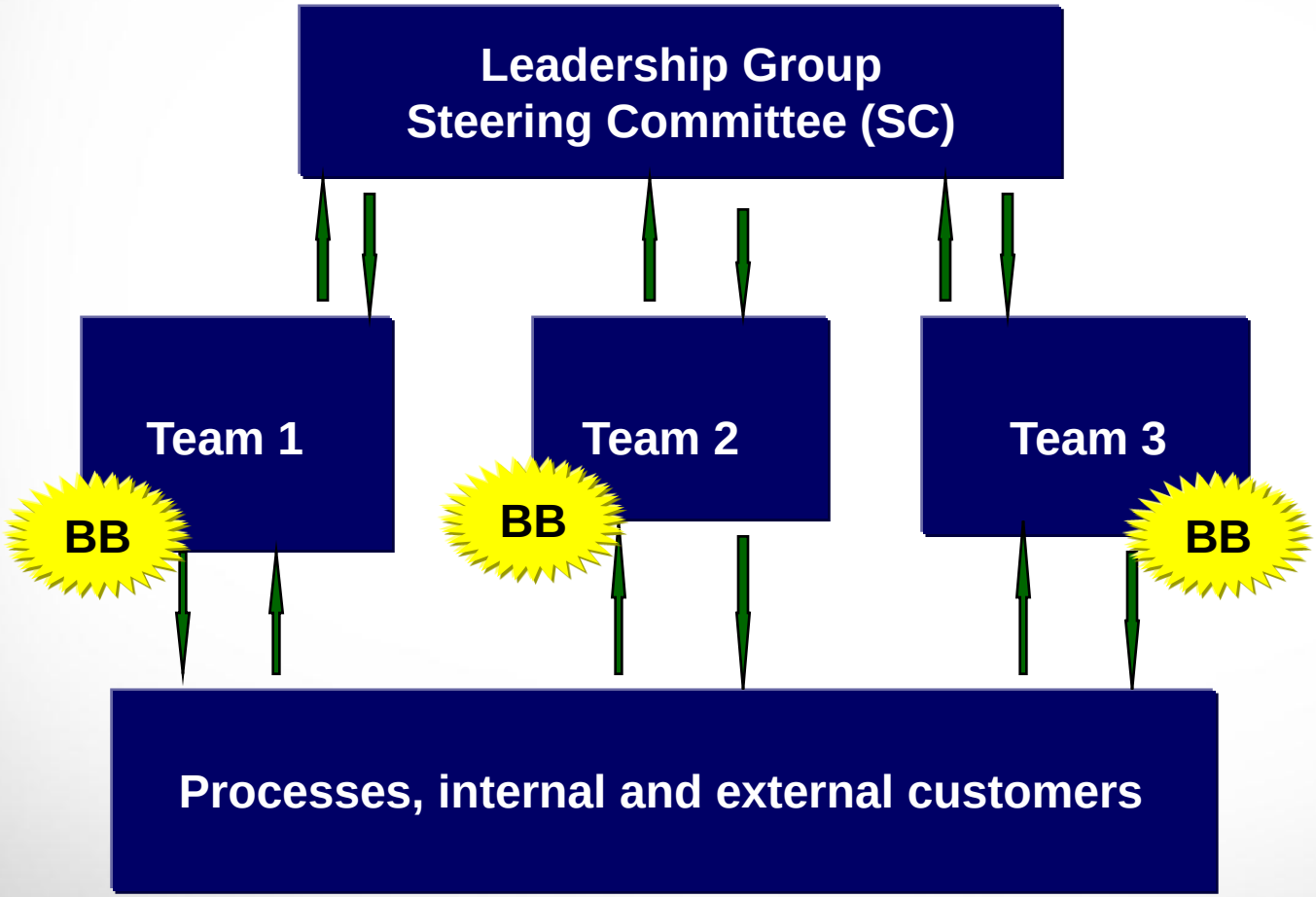
Robust designs

Process knowledge

Process Confidence

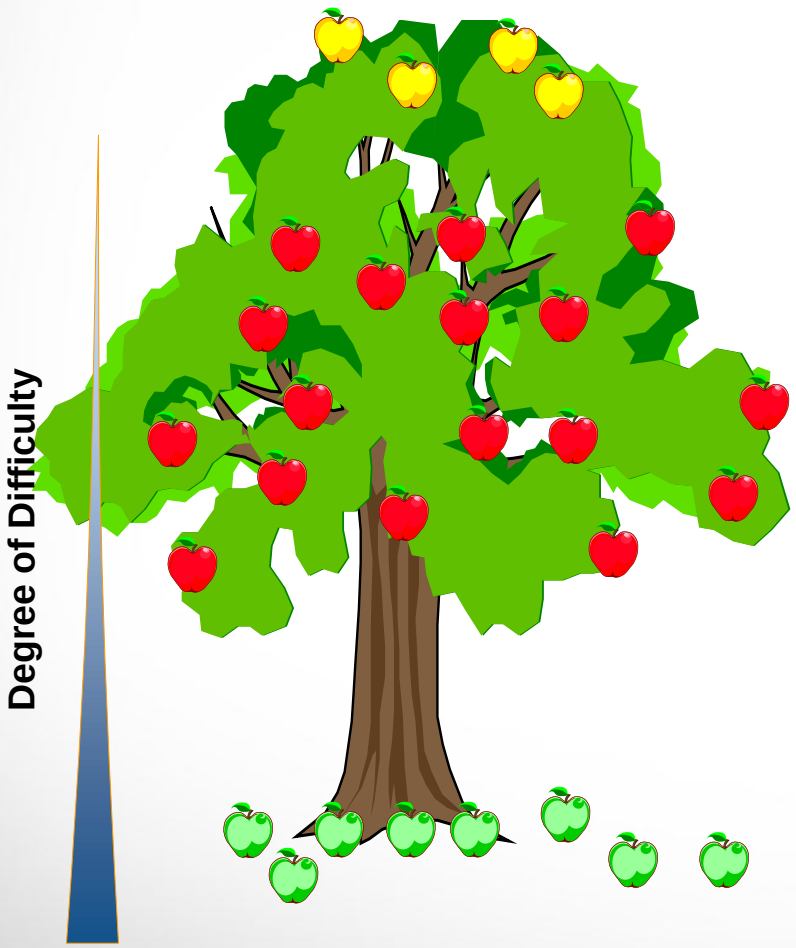
The Organizational Structure:

Supporting Six Sigma implementation



Master Black Belt

Classification of projects



Sweet Fruit — 4-6 months

DMAIC

Bulk of Fruit — 3-5 months

Low Hanging Fruit — 2-3 days

COLPI

Low Hanging Fruit — Just do it

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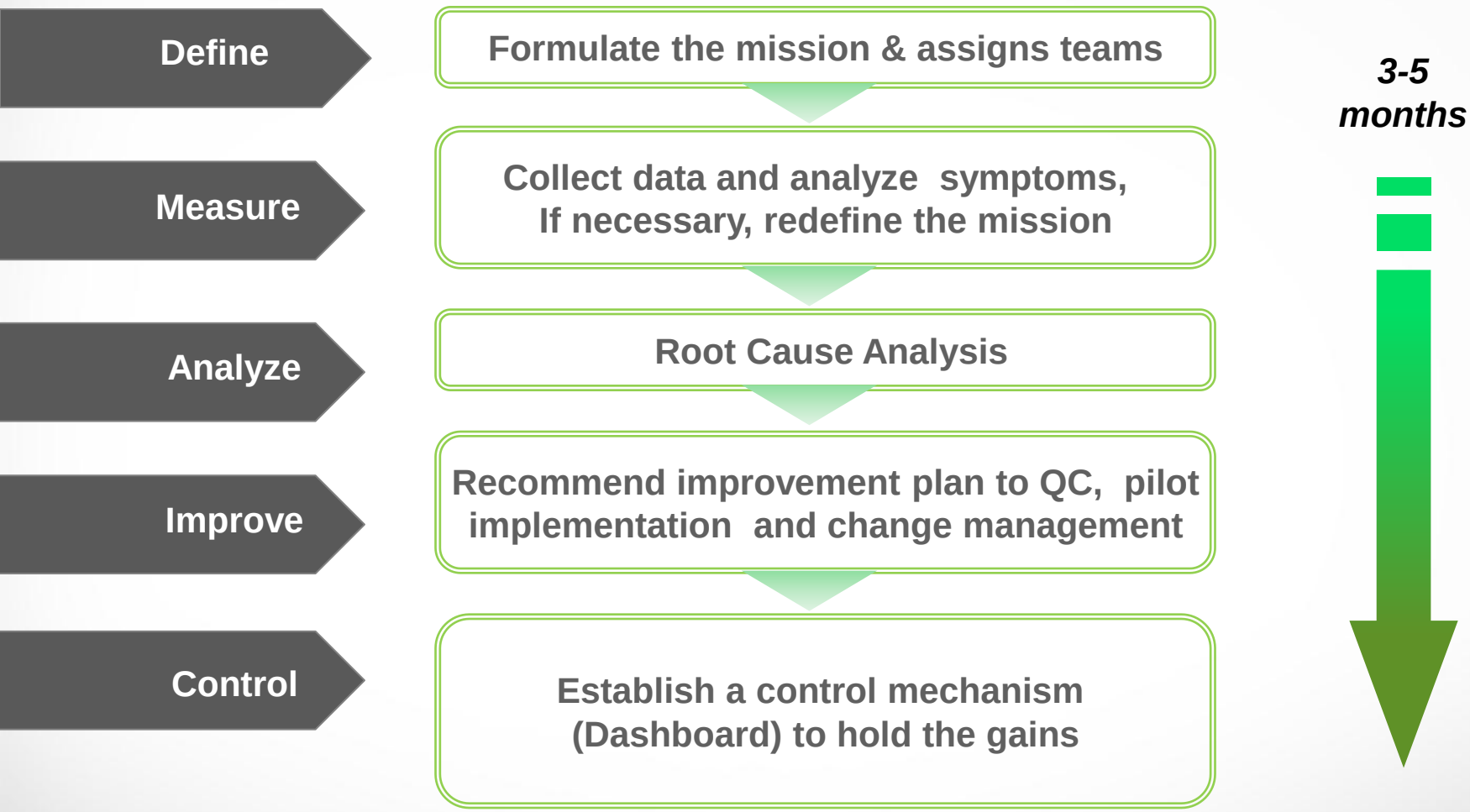
Six Sigma Methodology



DMAIC

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Marathon Methodology

Collect	Collect suggestions
Organize	Screen suggestions for Marathons, assign Sponsors
Launch	Design Marathons
Perform	Prepare Marathon Perform Marathon
Implement	Implement Marathon decisions Assess Marathon impact

2-3 days

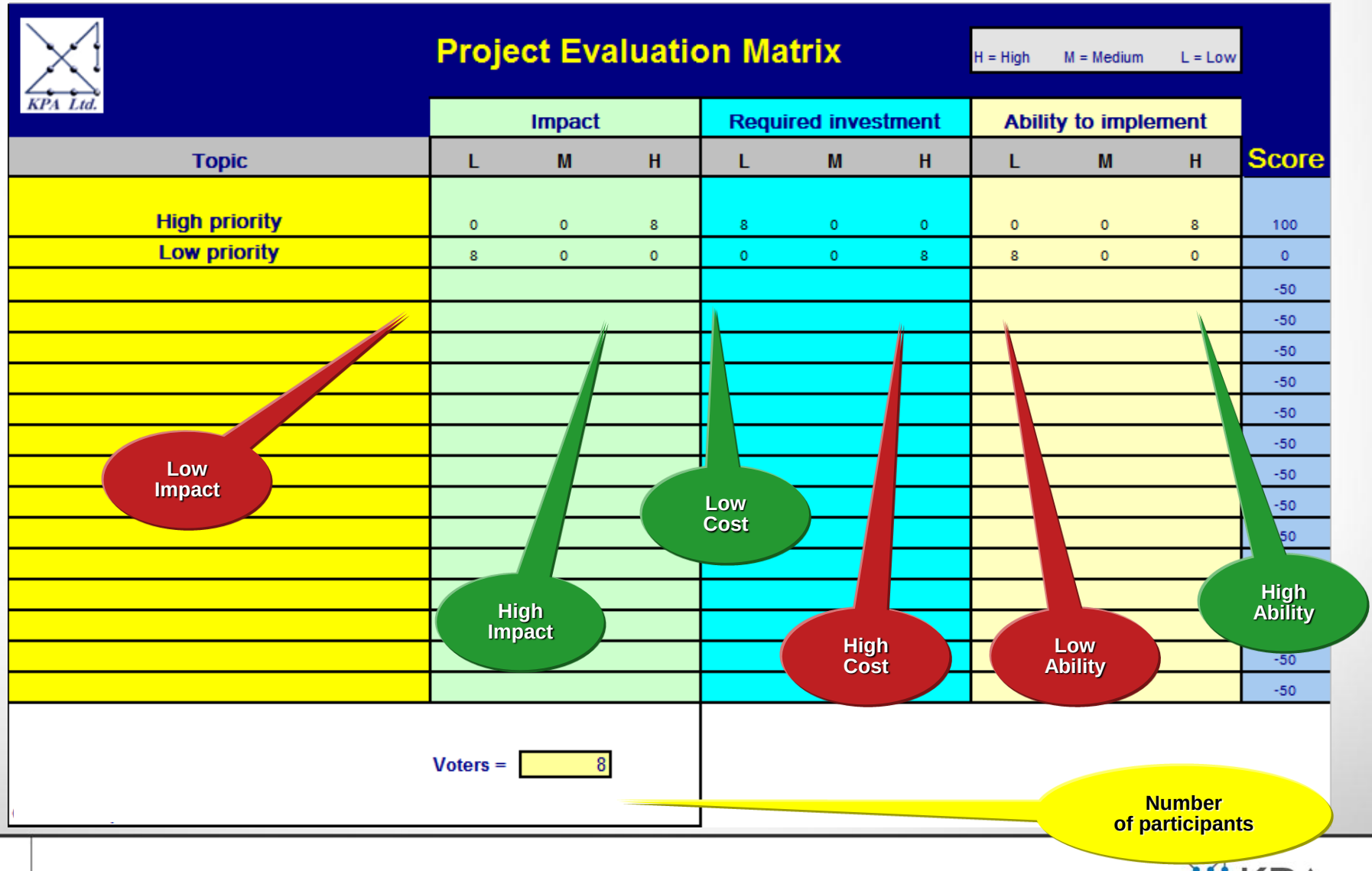
COLPI

KPA

Matrix Criteria Ranking

- **List criteria to assess projects – brainstorming, eg**
  - Impact on customer satisfaction
  - Required investment
  - Ability to implement etc.
- **Select top 3 – voting**
- **Voters place their votes for each criterion**
- **Add up votes for each project**
  - Scale by 1 (low), 2 (medium) or 3 (high)
- **Select projects**

Project Prioritization



Project Prioritization

KPA Ltd.

Project Evaluation Matrix

H = High M = Medium L = Low

Topic	Impact			Required investment			Ability to implement			Score
	L	M	H	L	M	H	L	M	H	
High priority	0	0	8	8	0	0	0	0	8	100
Low priority	8	0	0	0	0	8	8	0	0	0
										-50
										-50
										-50
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										-50
										-50
										-50
										-50

Score = (impactH*3+impactM*2+impactL*1+ investH*1+investM*2+investL*3+ abilityH*3+abilityM*2+abilityK*1 -(3*#voters))*100/(6#voters)

Voters = 8

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Black Belt Training and Six Sigma Roadmap

Tracking Tools

Part 1

- Introduction to Six Sigma
- MINITAB Part 1- The MINITAB Enviroment
- MINITAB Part 2- Graphing Dta
- Exploratory data analysis

Part 2

- Basic Statistical Inference
- MINITAB Part 4- Analyzing Data
- Gage Repeatability and Reproducibility
- Process Mapping
- Failure Modes and Effect Analysis- FMEA

Black Belt Training and Six Sigma Roadmap

Tracking Tools

Part 3

- Statistical Process Control
- MINITAB Part 5 – Assessing Quality
- Cuse and Effect Analysis
- Cost models

Part 4

- Improvement Projects Prioritization
- Design of Experiments
- MINITAB Part 6- Designing Experiments
- THE ALUMINIUM WHEELS CASE

Part 5

- Risk Management
- After Action Review (AAR)
- Working as a team
- Basics of Lean Manufacturing

Training

Thank You!