

Six Sigma – Motorola and City of Irving



Customers

Team Members

Continuous Improvements

Texas Technology Forum
Mark Killick, Raj Vattakunnel, Hong Sae
July 16, 2009



Agenda

- Quality Management System – Six Sigma
 - Why Quality Management System
 - Digital Six Sigma (DSS)
 - DSS Methodologies
 - Six Sigma Implementation Challenges
- Quality Management System – City of Irving IT
 - Project Management Framework (Six Sigma, PMI, ITIL)
 - Balanced Scorecard – Project Selection
 - Lean Sigma – Information Technology Service Desk
- Project Gate Review
- City of Irving Awards\Recognitions
- Executive Summary

Quality History



Quality Driven by Initiatives

Quality Governance

Vital Signs

Business Specific Initiatives

- Close the Gap
- QRB
- The Big Rules

Quality Belts

- Master Black Belts
- Black Belts
- Green Belts

Product Contract Losses

Reduce Cost of Poor Quality

Digital Six Sigma

Teaming for Excellence

- Six Sigma Tools
- FMEA
 - QFD
 - Control Plans
 - Process Maps

Design for Six Sigma

Integrate the Supply Chain

Customer Advocacy & Scorecards

Fight the Fires

Supplier Performance Mgt.

Customer Complaints

Quality IQ

Quality Playbook

Warranty Reduction

Quality Frameworks

Quality Pillars

Lean Manufacturing

Quality Survey

- Quality Systems
- ISO 9000
 - TL 9000
 - SEI CMM



Organization on Quality

Focusing on:

- Customer Requirements
- Quality Management Systems
- Quality Competency Development
- Six Sigma Methodologies

Quality Management Systems

Right Tools

Why have a Quality Management System?

- Ensures our chances of meeting customer expectations – Customers Expect it!
- Keeps our performance in control and improving

Common elements:

- An "owner's manual" for running a business
- Documentation and measurement of key business processes with closed-loop process in place and validated by quality leader

MOTOROLA

Quality IQ

Right Culture

Purpose

- Raise overall awareness and competency with quality improvement techniques
- Improve functional skills for preventing and solving quality problems
- Develop culture

MOTOROLA

DSS Methods Overview

Right Tools

Digital Six Sigma

MOTOROLA

Savings from Improved Quality Reinvested in Customer Driven Product Creation



Quality Management Systems

Why have a Quality Management System ?

- Ensures our chances of meeting customer expectations – *Customers Expect It*
- Keeps our performance in control and improving
- Moves our focus from inside out to Customer outside in

Common elements:

- An “owner’s manual” for running a business
- Documentation and measurement of key business processes with closed-loop process in place and validated by quality leader



Quality Management Systems

Why Six Sigma?



- Fact / data based and disciplined process
- Works to reduce variation in standard process
- Focuses on customer needs
- Requires critical measures / success factors
- Delivers significant positive results
- Proven tool set for driving transformational change



Quality / Digital Six Sigma Roadmap



Establish A Culture Where Quality & Continuous Improvement is Priority #1



Putting it all into Practice

D
I
G
I
T
A
L

S
I
X

S
I
G
M
A

Where the Rubber Hits the Road

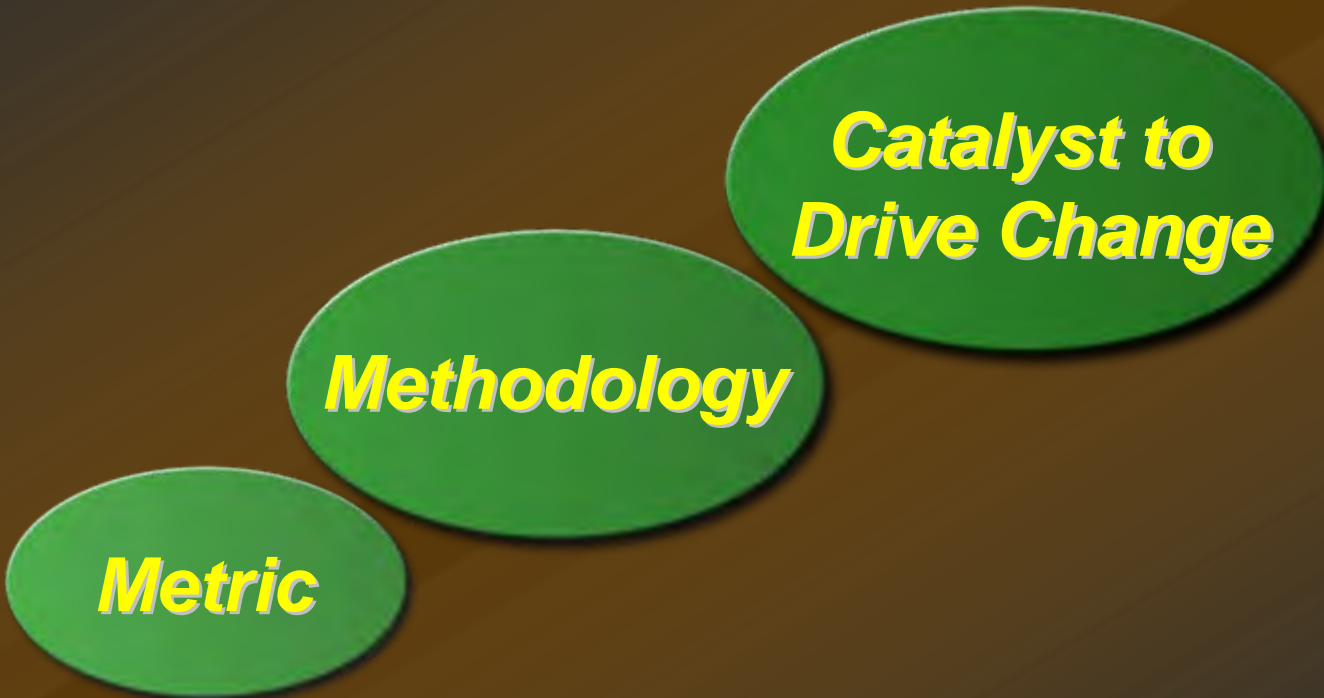
D
E
L
I
G
H
T
I
N
G

C
U
S
T
O
M
E
R
S



What is Six Sigma?

Business
Impact



Literal
Definition



Philosophical
Definition



Digital Six Sigma (DSS)



Implementing and utilizing Six Sigma methodologies can improve organizational execution And sustain results through:

1. Focusing the organization on the vital few
2. Aligning front line activities with the vital few
3. Leveraging Digitization & Six Sigma to achieve rapid and Sustainable improvements on the vital few



DSS – A Recipe For Success

❖ Six Sigma is a Near Perfect Quality Goal

❖ DSS a proven set of problem-solving tools for achieving 6σ



- Use the cooking/ recipe analogy
- Following a recipe increases the chance of making a great meal.
- Same holds true with problem solving

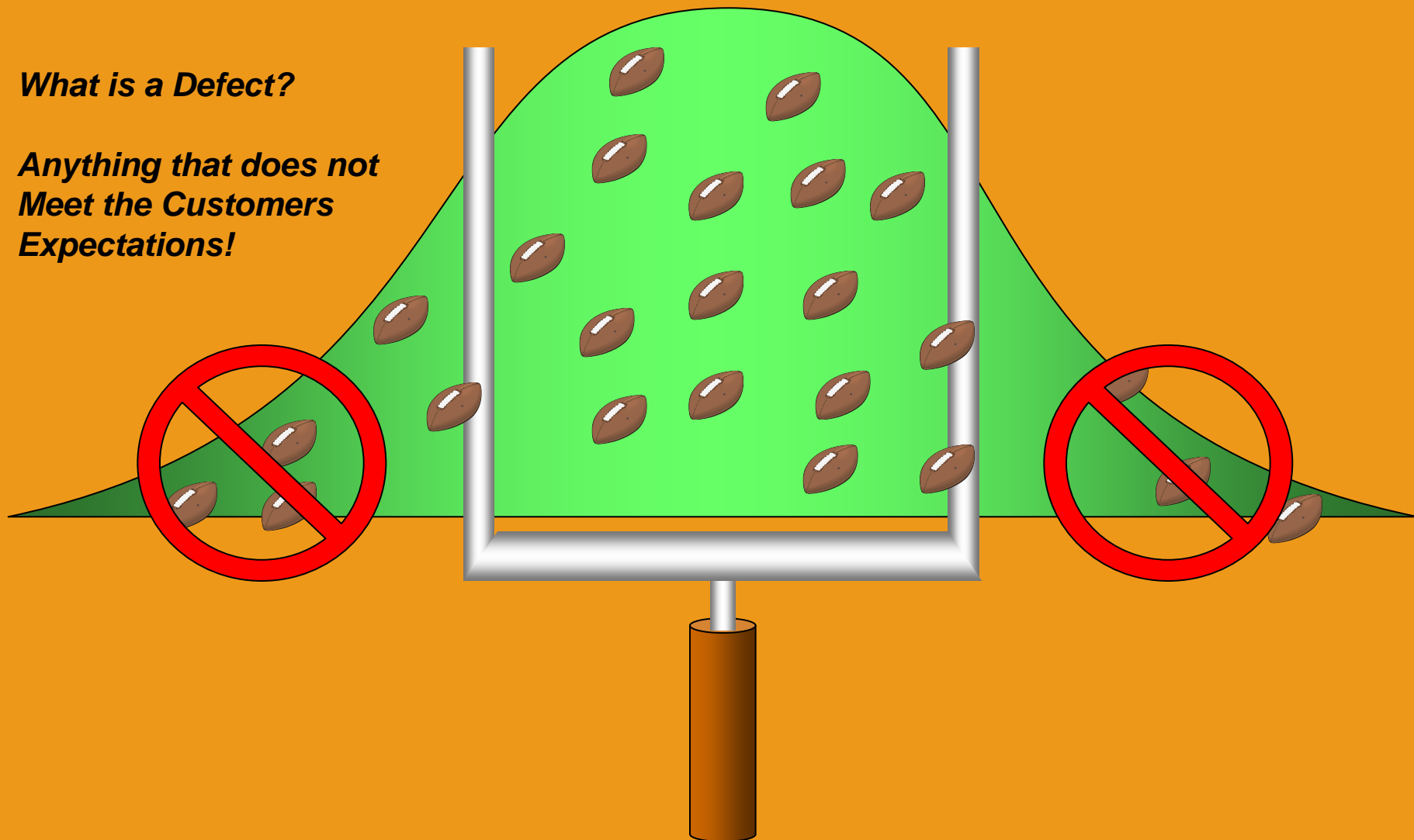
- Show the Top Tools List
- Highlight the LACK of Statistics

- Six Sigma has many different recipes
- Six Sigma can be effective in any function

Six Sigma as a Metric

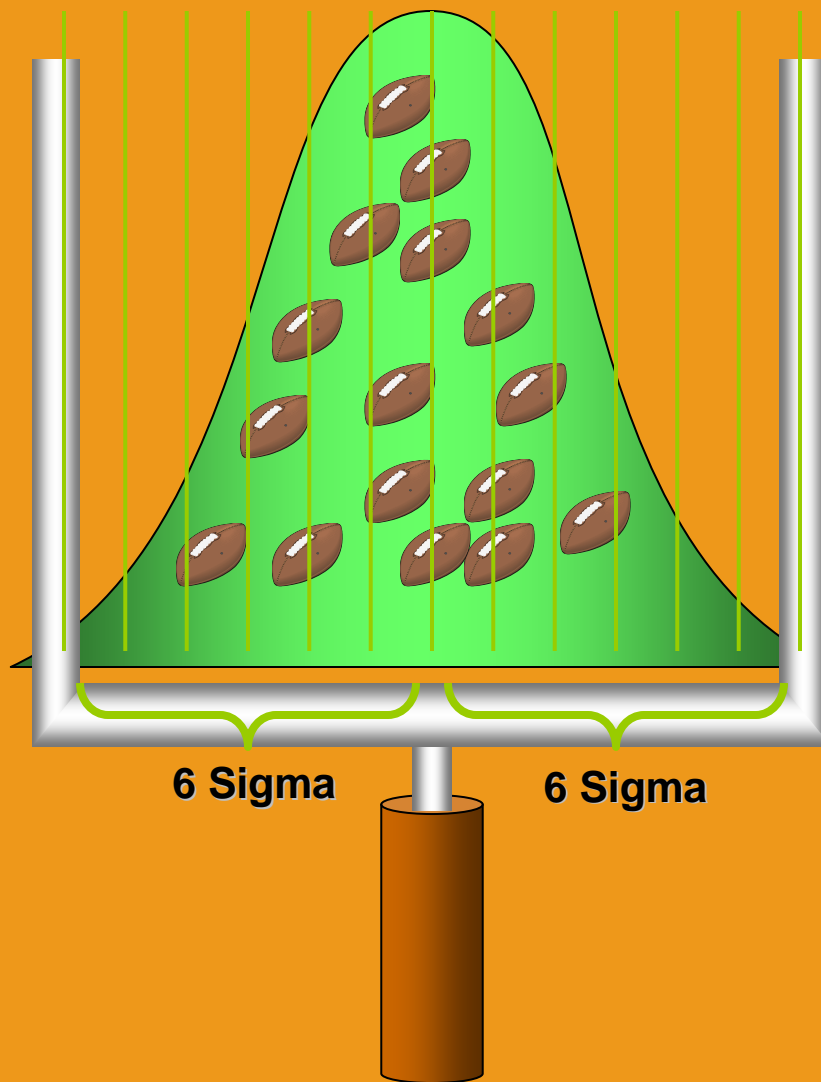
What is a Defect?

***Anything that does not
Meet the Customers
Expectations!***





Six Sigma as a Metric





What Six Sigma Looks Like...

3 Sigma Quality equals

- At least 54,000 wrong drug prescriptions per year

- 27 minutes of dead air time per TV channel each week

- 5 short or long landings at O'Hare airport each day

6 Sigma Quality equals

- One wrong drug prescription in 25 years

- 2 seconds of dead air time per TV channel each week

- 1 short or long landing at all U.S. airports in ten years



DSS Methodologies

DMAIC
Variation & Defect
Reduction

Use to improve existing processes

DMADDD
Process Efficiency
& Speed

Use to drive quantum efficiency in
existing operations

DMADV
New Product &
Process

Use for developing new processes;
or radical change in process

DFSS
For Product
Development

Use to control end to end
Product Management



Six Sigma Problem Solving: DMAIC

Define Opportunities

What is the problem?

Measure Performance

How big is the problem?

Analyze Opportunity

What is causing the problem?

Improve Performance

What are the potential solutions to the problem?

Control Performance

How can we sustain the solution?

DMAIC – Six Sigma Process

DMAIC - Six Sigma Improvement Process

	Objective	Main Activities	Potential Tools and Techniques	Key Deliverables
1.0 Define Opportunities ↓ Identify	<ul style="list-style-type: none"> To identify and/or validate the improvement opportunity, develop the business processes, define critical customer requirements, and prepare themselves to be an effective project team. 	<ul style="list-style-type: none"> Validate/Identify Business Opportunity Validate/Develop Team Charter Identify and Map Processes Identify Quick Win and Refine Process Translate VOC into CCRs Develop Team Guidelines & Ground Rules 		<ul style="list-style-type: none"> Team Charter Action Plan Process Maps Quick Win Opportunities Critical Customer Requirements Prepared Team
2.0 Measure Performance ↓ Collect	<ul style="list-style-type: none"> To identify critical measures that are necessary to evaluate the success, meeting critical customer requirements and begin developing a methodology to effectively collect data to measure process performance. To understand the elements of the Six Sigma calculation and establish baseline sigma for the processes the team is analyzing. 	<ul style="list-style-type: none"> Identify Input, Process, and Output Indicators Develop Operational Definition & Measurement Plan Plot and Analyze Data Determine if Special Cause Exists Determine Sigma Performance Collect Other Baseline Performance Data 		<ul style="list-style-type: none"> Input, Process, and Output Indicators Operational Definitions Data Collection Formats and Plans Baseline Performance Productive Team Atmosphere
3.0 Analyze Opportunity ↓ Eliminate	<ul style="list-style-type: none"> To stratify and analyze the opportunity to identify a specific problem and define an easily understood problem statement. To identify and validate the root causes that assure the elimination of "real" root causes and thus the problem the team is focused on. To determine true sources of variation and potential failure modes that lead to customer dissatisfaction. 	<ul style="list-style-type: none"> Stratify Process Stratify Data & Identify Specific Problem Develop Problem Statement Identify Root Causes Design Root Cause Verification Analysis Validate Root Causes Comparative Methods Sources of Variation Studies Failure Modes & Effects Analysis Regression Analysis Process Control & Capability Design of Experiments 		<ul style="list-style-type: none"> Data Analysis Validated Root Causes Sources of Variation FMEA Problem Statement Potential Solutions
4.0 Improve Performance ↓ Reduce	<ul style="list-style-type: none"> To identify, evaluate, and select the right improvement solutions. To develop a change management approach to assist the organization in adapting to the changes introduced through solution implementation. 	<ul style="list-style-type: none"> Response Surface Methods Generate Solution Ideas Determine Solution Impacts: Benefits Evaluate and Select Solutions Develop Process Maps & High Level Plan Develop and Present Storyboard Communicate Solutions to all Stakeholders 		<ul style="list-style-type: none"> Solutions Process Maps and Documentation Implementation Milestones Improvement Impacts and Benefits Storyboard Change Maps
5.0 Control Performance ↓ Sustain	<ul style="list-style-type: none"> To understand the importance of planning and executing against the plan and determine the approach to be taken to assure achievement of the targeted results. To understand how to disseminate lessons learned, identify replication and standardization opportunities/processes, and develop related plans. 	<ul style="list-style-type: none"> Develop Pilot Plan & Pilot Solution Verify Reduction in Root Cause Sigma Improvement Resulted from Solution Identify if Additional Solutions are Necessary to Achieve Goal Identify and Develop Replication & Standardization Opportunities Integrate and Manage Solutions in Daily Work Processes Integrate Lessons Learned Identify Teams Next Steps & Plans for Remaining Opportunities 		<ul style="list-style-type: none"> Process Control Systems Standards and Procedures Training Team Evaluation Change Implementation Plans Potential Problem Analysis Pilot and Solution Results Success Stories Trained Associates Replication Opportunities Standardization Opportunities



Implementation Challenges

- Project scope – not clearly defined (size, objectives)
- Lack of direct link between project focus and impact
- Lack of management support
- Process requirements not understood
- Impact not measurable
- Impatience – going from “Define To Improve”



City of Irving Information Technology

- Six divisions – Network Services, Service Desk, Software Services, Digital Communications, Integration, and Planning
- Planning – Project Management Office (PMO)
 - Project selection and prioritization – Overall governance and strategic alignment
 - Provide coaching, mentoring, and training on project management
 - Ensure proper tracking of project data and milestones

Information Technology Mission

Deliver exceptional services using innovative, timely, efficient, accessible, and secured technologies

Project Management Framework

Six Sigma, PMI, ITIL



- Utilized based on industry wide best practices
- A standard methodology to be used on any project
- Define the activities in a formal manner, applying methods with vigor, and monitor process\results
- Wide range of tools available
 - Project charter
 - Failure Mode Effect Analysis (FMEA)
 - Quality Function Deployment (QFD)
 - Voice of the customer (VOC)



Project Management Framework

Project Management Institute (PMI)



- Not-for-profit professional association to advance project management
- Develop global standards crucial to project management profession
- PMBOK – Project Management Body of Knowledge
 - Identifies subset of project management knowledge
 - Provides and promotes a common vocabulary
 - Five process groups and forty-two processes
- Includes program management and portfolio management



Project Management Framework

Information Technology Infrastructure Library (ITIL)

- Developed by United Kingdom (UK) Office of Government Commerce in 1980s
- Systematic and professional approach to management of Information Technology services
- Benefits include but not limited to:
 - Improved services through the use of proven best practices\standards
 - Reduced costs
 - Improved productivity



Project Management Framework

Six Sigma, PMI, ITIL



Monday, November 24, 2008

Information Technology Project Management Framework

6σ	DEFINE	DEFINE, MEASURE	DESIGN, IMPROVE	ANALYZE, IMPROVE	VERIFY, CONTROL
ITIL	ITIL SERVICE STRATEGY		ITIL SERVICE DESIGN, STRATEGY, OPERATIONS	CONTINUAL SERVICE IMPROVEMENT (CSI)	ITIL SERVICE RETIREMENT
PMI	INITIATION	PLANNING	EXECUTION	MONITOR & CONTROL	CLOSEOUT
	<ol style="list-style-type: none"> 1. Preliminary Voice of the Customer (VOC) 2. Project Charter 3. Preliminary Scope Statement 4. Technology Review Committee Presentation 5. Preliminary Project Milestones & Tasks List** 6. Project Health Check** 	<ol style="list-style-type: none"> 1. Final Voice of the Customer/Requirements Document 2. Critical Success Factors and Key Performance Indicators (KPIs) 3. Final Project Scope 4. Issue RFO\IRFP* 5. Vendor Rating Matrix 6. Negotiate Contract and Statement of Work 7. Legal Review (LSR\AA\Agenda\Contract) 8. Updated Project Milestones & Tasks List 9. Risk Management Plan\FMEA 10. Quality Management Plan* 11. Communications Plan* 12. Project Health Check 13. Notice to proceed 	<ol style="list-style-type: none"> 1. Kickoff Meeting 2. Contract Amendment* 3. Managing Risk 	<ol style="list-style-type: none"> 1. Update Project Milestones & Tasks List 2. Project Status Report <ol style="list-style-type: none"> a. Weekly\Bi-weekly 3. Issues Log 4. Change Request Form 5. Update Risk Management Plan 	<ol style="list-style-type: none"> 1. Project Closure Report 2. City Manager's Report* 3. Strategic Briefing Review Presentation*

Legend
* Optional
** If approved

What is a project?

1. Level of effort must be greater than 40 person hours - Mandatory
2. Temporary endeavor with clear start and end date - Mandatory
3. Must have clear goals and objectives - Mandatory
4. Involves one or more departments within City of Irving - Optional

What is a maintenance task?

1. Level of effort is less than 40 person hours - Mandatory
2. Routine in nature or can be repetitious (ongoing activity that keeps hardware and software functioning) - Mandatory

PROJECT STATUS REPORTING											
5%	10%	15%	20%	25%	30%	50%	65%	75%	80%	100%	
INITIATION		PLANNING			EXECUTION		MONITOR AND CONTROL			CLOSEOUT	
Develop business case and feasibility	Gather initial requirements and define criteria for success	Research and further refine details/objectives	Formal project scope and budget	Develop RFP/Vendor Evaluation	Recommendation /Procurement	Implementation /Configuration	Testing	Training	Acceptance and post implementation review	Evaluation of project effectiveness	

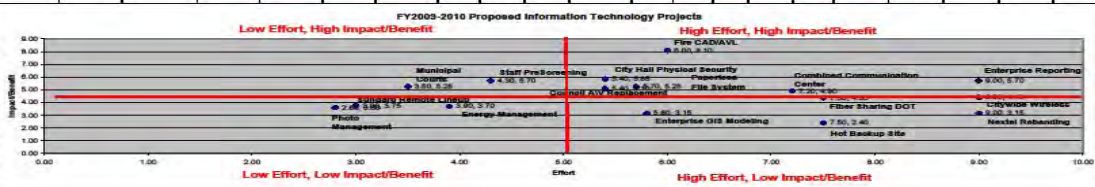
Project Management Framework

Balanced Scorecard - Project Selection



- Increased structure and shared objectives
- Align projects to strategy to add value and promote justification of projects

City of Irving Information Technology			IMPACT/BENEFIT								EFFORT						Last Updated: May 4, 2009			
Project Selection Criteria and Significance Ratings	Sponsoring Department	City Goal	Business Process Improvement		Citizen / Employee Satisfaction		Financial		Total Benefit	Weighted Score	Complexity of Project (Risk Increase) (0,1,2)	Single Department / Multi-Departmental (0,1,2)	Time to Implement Project (0,1,2)	Resource Availability (0,1,2)	Total Effort	Weighted Score	City Strategic Goal		Information Technology Lead	
			City Strategic Goal / IT Strategic Goal Alignment (0,1,2)	Key Business Process Improvement (0,1,2)	Key Performance Indicators Available and Measurable (0,1,2)	Citizen Satisfaction Impact (0,1,2)	Employee Satisfaction Impact (0,1,2)	Increase Revenue / Decrease Cost (0,1,2)									Return on Investment (Cost Versus Benefit) (0,1,2)	City Strategic Goal	Information Technology Lead	
1	Energy Management Audit System	IGS	18	9	9	1	1	3	3	0	25	3.70	3	3	0	9	15	3.90		City Department
2	Fire Computer Aided Dispatch (CAD) Upgrade / AVI Implementation	Fire	4	9	9	9	9	9	9	0	54	8.10	3	3	3	9	24	6.00		City Department
3	Municipal Courts Technology Operations	Courts	9	9	9	0	3	9	9	0	33	5.25	3	1	1	9	14	3.50		City Department
4	Sungard Suspect Remote Lineup	Police	4	9	3	3	9	0	0	0	27	3.75	1	1	1	9	12	3.00		City Department
5	Police Image Management Solution (Photo Management)	Police	4	9	9	0	0	9	0	0	27	3.50	1	1	0	9	11	2.80		City Department
6	City Hall Physical Security Enhancement (Video)	City Wide (IT)	4	9	9	9	9	0	0	0	45	5.85	1	9	1	9	20	5.40		City Department
7	Council Chambers / Conference Audio/Video (AV) Replacement	Council	9	9	9	9	9	9	3	0	36	5.10	1	1	0	9	20	5.40		City Department
8	Enterprise GIS Data Modeling	City Wide (IT)	9	9	9	9	9	9	3	0	41	5.15	1	9	1	9	20	5.40		City Department
9	Enterprise Reporting / Business Intelligence	City Wide (IT)	9	9	9	9	9	9	3	0	42	5.70	9	9	9	9	30	6.00		City Department
10	Citywide Communication Wireless System	City Wide (IT)	9	9	0	9	1	9	1	0	29	4.40	9	9	9	9	36	3.00		City Department
11	Combined Public Safety Communication Center/Dispatch	Police	4	9	3	3	9	9	1	0	34	4.90	9	3	9	9	30	7.20		City Department
12	Staff Pre-Screening Program	Workforce Development	9	9	3	3	1	9	9	0	34	5.70	1	9	3	3	16	4.30		City Department
13	Paperless Personnel File System Project	Workforce Development	9	9	9	9	9	3	0	0	39	5.25	3	3	9	9	24	5.70		City Department
14	Network Bandwidth	City Wide (IT)	9	9	9	3	1	9	0	0	22	3.15	9	9	9	9	36	3.00		City Department
15	File Sharing TADOL	City Wide (IT)	9	9	9	9	9	9	0	0	36	4.50	9	9	9	9	36	3.00		City Department
16	Hot Backup Site (Redundancy and High Availability)	City Wide (IT)	9	9	9	9	9	9	0	0	18	2.40	9	9	9	9	30	7.20		City Department
17	Mobile Data Terminal (MDT) Upgrade (Fire)	Fire	9	9	9	9	9	9	9	0	36	5.40	9	9	9	9	36	3.00		City Department



Lean Six Sigma (LSS)

Service Desk Realignment – Define / Measure

Priority	Number of Calls	Average Resolution Time	Standard Resolution Time
1	109	1 - 29 Hrs	Less Than 4 Hrs
2	3,323	4.91 - 180 Days	Less Than 5 Days
Total Calls Information Technology for FY 07-08 ~ 23,000			
Internal Customer Service Survey (Summer 2008) Overall Rating - ~72% (Increased Customer Complaints)			
Decentralized IT Support, Inability to Reach Service Desk, Non-Responsive (Some Priority 2 Calls ~ 180 days)			

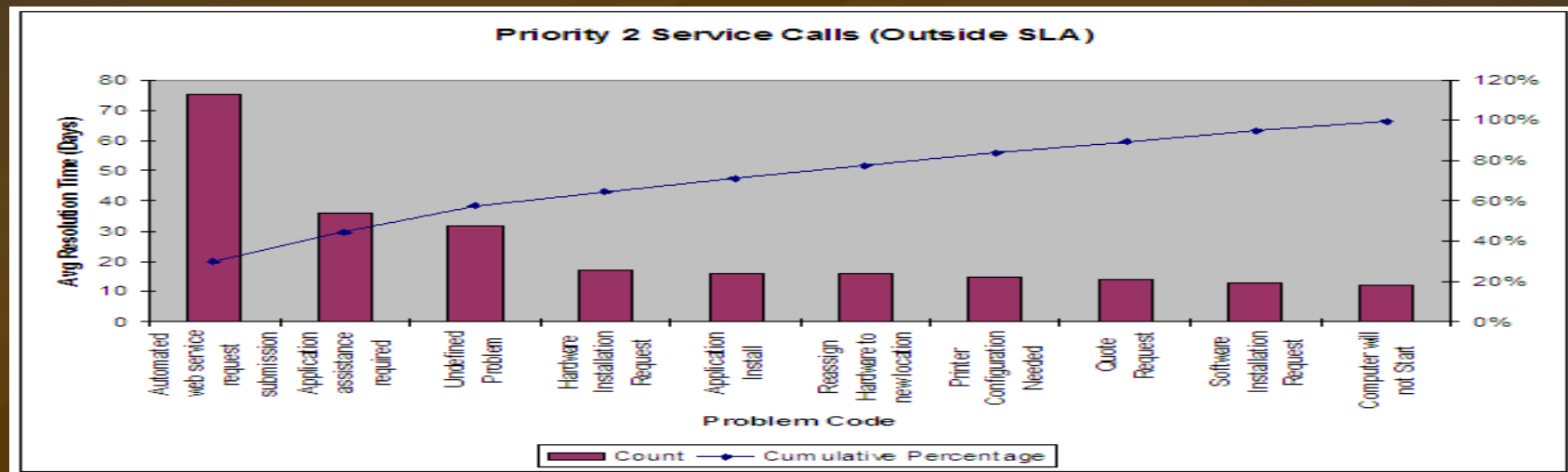
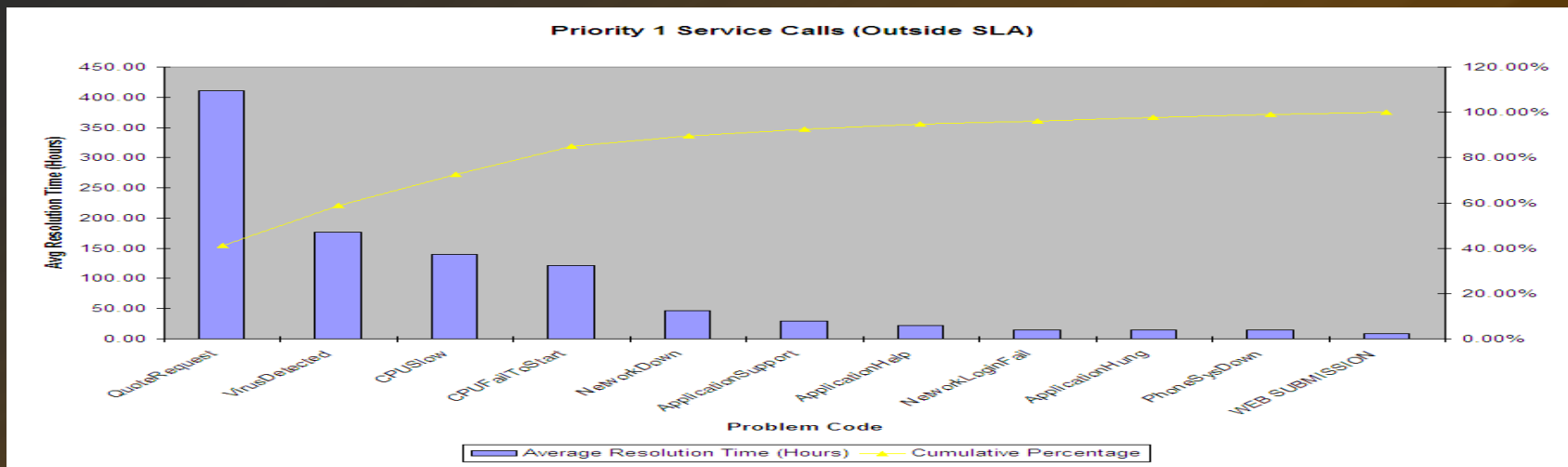
Lean Six Sigma (LSS)

Service Desk Realignment – Define / Measure

- Communicate estimate of time of service (*# of Days*)
- Faster response (*Respond within 1 Day*)
- Courteous, professional, and knowledgeable staff
- Commitment to finding resolution (*within 1st call*)
- Better follow-up with customer (*service*)
- Streamlining of process for escalation (*automated*)
- Increase accountability (*ownership of problem*)

Lean Six Sigma (LSS)

Service Desk Realignment – Analyze



Lean Six Sigma (LSS)

Service Desk Realignment - Improve



- Standup meeting every day (discuss top 5 issues)
- Defined prioritization criteria
- Service tickets escalated\transferred as needed
- Creation of standardized operating procedures (SOP)
- Implementation of new service management system
- Identify new performance and operational metrics
- Increased communication\follow-up with customers

Lean Six Sigma (LSS)

Service Desk Realignment - Control



- Automatic escalation of service tickets
- Monitor operational and key performance indicators
- Automated customer service surveys
- Maintain standard operating procedures and training
- Improved customer service interface and self-service capabilities

Lean Six Sigma (LSS)

Service Desk Realignment - Results



	April 2008	Today	Improvement
Survey	72%	97%	↑ 34%
Number of Calls Open	~ 90	~ 40	↓ 55%
Priority 1 Res. Time	1 – 29 Hrs	1 Hour	100%
Priority 2 Res. Time	4.9 – 180 Days	1 – 5 Days	100%
Call Center Locations	City Hall	Redundant	100%
SOP	None	10	100%

City of Irving Information Technology *Strategic Initiative Results*



Animal Services

	Results
PetPoint	<ul style="list-style-type: none">✓ Estimated 1,462 hours (.7 FTE) saved with software changes✓ Increased reporting capabilities
Phone System	<ul style="list-style-type: none">✓ Reduce number of unanswered calls by hundred (100) percent✓ Decreased load for dispatchers by sixty (60) percent
Smartphones / PDAs – Supervisors	<ul style="list-style-type: none">✓ Improved customer response time<ul style="list-style-type: none">- Hundred (100) percent access to voicemail and E-mail

City of Irving Information Technology

Strategic Initiative Results



Code Enforcement

	Results
TrakIt Upgrade	<ul style="list-style-type: none">✓ Individual dashboard to help manage\track✓ Foundation for ETrakIT and MobileTrak
ETrakIt	<ul style="list-style-type: none">✓ 24 X 7 access to payments and scheduling✓ Reduce daily cash report preparation time by fifteen (15) percent
MobileTrak	<ul style="list-style-type: none">✓ Data entry time per inspection reduced to five (5) from seven (7) minutes

City of Irving Information Technology *Strategic Initiative Results*



Police	Results
Sallyport Workstation	<ul style="list-style-type: none">✓ Reduced prisoner booking time by forty five (45) minutes✓ Increased officer safety
Recruiting Website	<ul style="list-style-type: none">✓ 24 X 7 online access to employment information✓ Part of enhanced marketing strategies✓ 100% of positions filled due to technology and business process changes
Online Crime Reporting	<ul style="list-style-type: none">✓ 24 X 7 access to file police reports✓ 288 reports generated and at a minimum 288 hours person hours saved in three months

City of Irving Information Technology *Strategic Initiative Results*



Citywide

Results

Communication
Billing Charges

- ✓ Overbilling and unnecessary taxes
- ✓ Estimated savings of \$24,000 per year

Agenda
Management
Process / System

- ✓ Agenda creation and submission process review and re-engineering
- ✓ Estimated savings of \$24,000 per year (labor, paper)

Service Desk

- ✓ Fifteen (15) percent of personnel located offsite
- ✓ Extensive drive time and delay in response
- ✓ Estimated savings of \$9,000 per year



City of Irving Awards\Recognitions

- **2009 Government Customer Support Excellence Award Winner – Service Desk**
 - Selected among fifty-six (56) other local, state, and federal organizations
- **City of Irving “On The Spot” Award – Service Desk**
 - Service desk recognized by City Manager for outstanding service
- **City of Irving – 2009 Texas Award For Performance Excellence (TAPE) – Achievement Level**
- **2008 Digital Cities – Ranked 6th in nation**



Executive Summary

- Define the problem clearly
- Myriad of methodologies and toolsets available
- Evaluate organization culture, maturity, and resource availability
- Senior management support crucial for success
- Performance Measurement / Key Performance Indicators
- Gate review, broadcast successes, blend IT process with key business strategies
- Technology related efficiency savings \$4,994,710 for 2007-2008

Structurally Balanced Budget



Question & Answers

Hong Sae
Information Technology
Director
City of Irving
hsae@cityofirving.org



Mark Killick
Quality & Customer Advocacy
Director
Motorola, Inc.
mark.killick@motorola.com

Raj Vattakunnel
Information Technology
Planning Manager
City of Irving
rvattakunnel@cityofirving.org