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## FedEx & Information Quality

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**Executive Summary**  
We discuss strategies and efforts to improve IQ at FedEx.

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## Introduction

- *“The information about a package is as important as the delivery of the package itself.”* - Frederick W. Smith, founder, chairman, president and Chief Executive Officer (C.E.O.) of the FedEx Corporation, in 1979
- FedEx is cited as one of the success stories in Huang, Lee and Wang [8]

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## Objectives

- To illustrate the cutting edge efforts FedEx puts in the improvement of information quality as a **“reliable deliverer” of both packages and information**
- To explore **strategies and technologies** for constant improvement in information quality

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## Why improve IQ?

*As suggested by Redman's [12], improvement of information quality increases the company's competitive advantage in the dynamic global marketplace.*

- **Internally:** Quick and accurate information about the company's working process enhances efficiency and effectiveness in strategy planning  
e.g. **Data Mining** for acquisition of potential customers, competitor analysis, **forecasting** for pricing, marketing campaign, financial plan, **scheduling** of flight, allocation of couriers, etc

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## Why improve IQ? (Cont'd)

- **Externally:** Reliable and assessable information about the delivery process increases customer's satisfaction and loyalty  
e.g. Add-on services on reliable shipment tracking
- Baldrige National Quality Award Recipient (1990)
- 2001 First Quarter ACSI (American Customer Satisfaction Index) of Parcel delivery-Express mail in the transportation, communication and utilities sector: [www.theacsi.org](http://www.theacsi.org)

	2001-Q1 ACSI
Parcel delivery-Express mail	78
<b>FedEx Corporation</b>	<b>82</b>
United Parcel Service of America, Inc.	78
U.S.Postal Service-Package & Express	73

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## How to improve IQ?

The classic quality improvement philosophy of **Deming's renowned fourteen points of continuous process improvement** can be easily applied to the improvement of information quality.

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### How to improve IQ? (Cont'd)

- Extract of Deming's 14 Points - #1
  - ◆ **Recognize the importance of data and information to the enterprise's objectives and create constancy of purpose in improving them and their use**
- Extract of Deming's 14 Points - #14
  - ◆ **Create a structure in top management that recognizes the importance of data and information and their relationships to the rest of the business. Develop and implement a plan to put everyone's talents toward the transformation**

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### Enhancement in Data Collection/ Management Processes

As cited in Nobel Prize-winning physicist Penzias's [9], FedEx, "... is an *'information-work' enterprise that has combined advanced technology with a powerfully simple concept, to provide overnight package delivery service between almost any two points...*"

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### Enhancement in Data Collection/ Management Processes (cont' d)

- **Laser scanners:**
  - Each package has been scanned for at least 12 times from pickup, through the WorldHub to the customer's hand
  - Then, the packages pass through the 200-mile conveyers with electronic-blue spiral chutes, data programmed metal diverters for fast and reliable transportation of the time-critical packages

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### Extract of Deming's 14 points - #3

- Upstream approach to improvement of data quality. **Prevention of error** by building accuracy in the data collection/ management processes
- Enhancement in Data Collection/Management Processes
  - ◆ **Automation:**
    - e.g. **Laser scanners**
    - Efficient and dependable data tracking
    - Error prevention in the automation system

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### Technological Innovations

- **ASTRA** - Automated Sorting Tracking Routing Aid depends on the bar-code labels to extract precise package information, such as, destination, type of delivery service and delivery commitment time
- **DADS** - The Digitally Assisted Dispatch System, one of the largest private radio network in the United States, built in the vans transmits pick-up information via satellite
- **InSight<sup>SM</sup>** -FedEx's newly launched eBusiness tool for better information on customer's shipping activities

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### Technological Innovations – Online and Wireless Tracking

Get FedEx tracking, dropoff locator, and list rate information through:

- The company's hardware system - eBusiness tools
- The company website: [fedex.com](http://fedex.com)
- Handheld devices, such as, WAP phones, Personal Digital Assistants and pagers



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### Extract of Deming's 14 points - #6

- Institute **job training**. Help **individuals and organizations** understand how their actions impact data and others downstream
- Enhancement in Data Collection/Management Processes (Cont'd)
  - Human Involvement in the System:**
    - Checkers/ Sorters* -Last-minute verification of destination addresses of the special sized packages
    - Controllers from the monitoring video cameras* - Monitoring Video Cameras Controllers Decision making in the management of the flow of packages
    - Couriers, frontline employees*

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### Extract of Deming's 14 points - #5

- Constantly **improve the systems** by which data and information are produced and used to create value for customers, the enterprise, and its stakeholders
- Current Concern
  - Current Concern:** Missing/ erroneous data
  - Concern** = Room for data quality improvement
    - Improvement for both external customers and internal users

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### Effect of Poor IQ

- Wan [13] illustrated varying degrees of poor information quality effects on time series prediction of future production needs
- It can be used for teaching examples to motivate all personnel about the **importance of preventing errors**

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### Scenario 1: Percentage of Erroneous data = $1/48 \approx 2\%$

The original output value in October 1988 is 134.3.

- Neglecting the decimal: 1343
- Flipping the numbers: 314.3
- Different position of the decimal (1/10): 13.43
- Different position of the decimal (1/100): 1.343

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### Scenario 2: Percentage of Erroneous data = $2/48 \approx 4\%$

The original output value in October 1988 is 134.3 and in October 1989 is 143.6.

- Neglecting the decimal: 1343 and 1436
- Flipping the numbers: 314.3 and 413.6
- Different position of the decimal (1/10): 13.43 and 14.36
- Different position of the decimal (1/100): 1.343 and 1.436

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### Scenario 3: Percentage of Erroneous data = $3/48 \approx 6\%$

The original output value in October 1988 is 134.3, October 1989 is 143.6, and October 1987 is 120.0.

- Neglecting the decimal: 1343, 1436, and 1200
- Flipping the numbers: 314.3, 413.6, and 210.0
- Different position of the decimal (1/10): 13.43, 14.36, and 12.00
- Different position of the decimal (1/100): 1.343, 1.436, and 1.20

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### Effect of Poor IQ (cont'd)

- **Preventing:**
  - ◆ "Minor" typos of decimal points being misplaced, e.g. 134.3 versus 1343
  - ◆ Numbers being transposed, e.g. 134.3 versus 314.3 can have huge effects on improving data quality. Employees are more motivated to prevent such problems when they see simple, yet powerful examples
- **Strategy for Improvement:**
  - ◆ **Identify** the missing/ erroneous values
  - ◆ **Recognize** and **prioritize** the reason for the problem
  - ◆ **Improve** and **implement** the corresponding data management system

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### Suggestion for Improvement (1)

- **P-charts for missing values**

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### Suggestion for Improvement (2)

- **Cause and Effect Chart**

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### Suggestions for Improvement (3)

- **Pareto Chart** for Organizational Causes of Data Problems
- Pareto chart for Causes of Data Entry Problems

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### Iterations in IQ Improvement

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### Who is responsible for data quality?



- At FedEx, the culture is for **everyone** to be responsible for data quality
- Extract of Deming's 14 Points - #9
  - ◆ **Break down barriers between organizations** and welcome inputs to ensure the **free flow of high-quality data** and information across organizational boundaries

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## Second-Generation Data Quality Systems



Those with the highest quality data focus on the most important:

- Business issues/opportunities
- Customers and customer needs
- Data Improvements

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## Conclusion

FedEx's on-going effort in information quality improvement promotes a seamless delivery of not only packages but also information that is critical to customers.

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*Acknowledgements: We thank David McGinnis for his tremendous help with formatting some of the slides. The work of Dr. Guess was supported by the University of Tennessee College of Business Administration's Scholarly Research Grant Program during the Summer, 2002. Also, we deeply appreciate the constructive comments of reviewers of these slides.*