

EMPOWER YOUR ANALYTICS WITH OPERATIONAL DATA

# The PI System

Empowering People to Succeed in Analytics

*Yong The, Regional Manager - Oceania*

*10 September 2019*

# Who is Successful in Analytics?



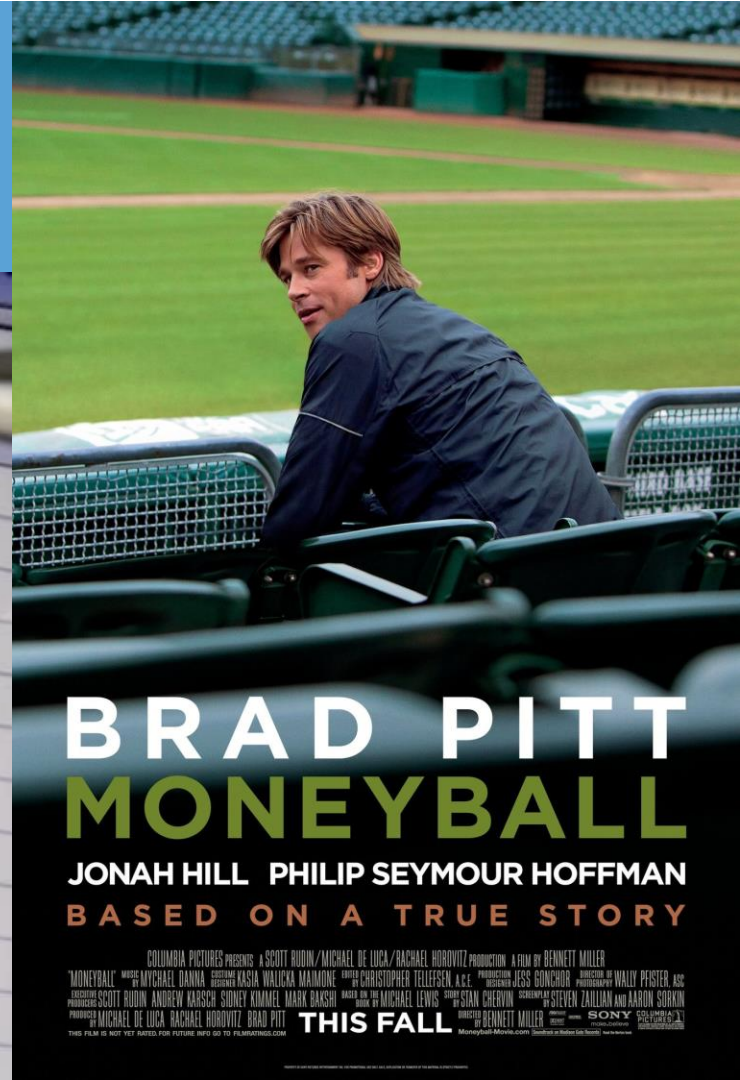
or



# Moneyball: A True Story on Data Mining in Action



	C	D	E	F
2,568.00	279.29			
,520.00	256.00	12,148		
,654.00	281.20	11,100	66.38	
568.00	12.62	12,234	60.66	
360.00	2,674.67	148	60.85	
253.00	5.62	119,940	0.81	
91.00	13.13	-167	655.41	
00.00	51.11	171	-0.91	
50.00	52.22	1,880	0.93	
10.00	1,040.22	1,930	10.27	
3.00	2.51	46,390	10.55	
5.00	52.56	-307	253.50	
0.00	2,502.22	1,945	-1.68	
0.00		112,180	10.63	





# Usama Fayyad

Chairman & CEO, Open Insights

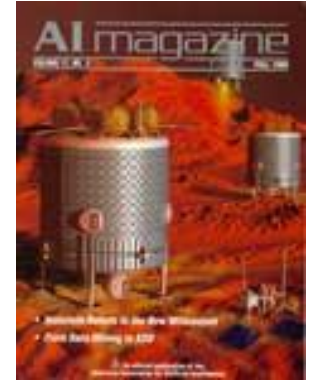
Founder, Initiative for Analytics & Data Science Standards

Advisory Board Member, Data Science Institute

Adjunct Professor, Hong Kong Polytechnic University

Adjunct Professor, University of Technology, Sydney

Adjunct Professor of Computer Science, Monash University



*“Data mining is the application of specific algorithms for extracting patterns from data...the additional steps... such as data preparation, data selection, data cleaning, **incorporation of appropriate prior knowledge**, and proper **interpretation of the results** of mining, are essential to ensure that useful knowledge is derived from the data. Blind application of data-mining methods (rightly criticized as data dredging in the statistical literature) can be a dangerous activity, easily leading to the discovery of meaningless and **invalid patterns**”* – Usama Fayyad, AI Magazine, Fall 1996

# DATA PREP CONSUMES Too Much Time and Money

**53%** of data science  
time is data prep: that's  
equal to the first 194  
days a year

As a result less than  
**1%** gets used for  
decision making



Liberty, Equality, Fraternity and Waiting:  
Data analysis won't begin until  
**July 14<sup>th</sup> Bastille Day**

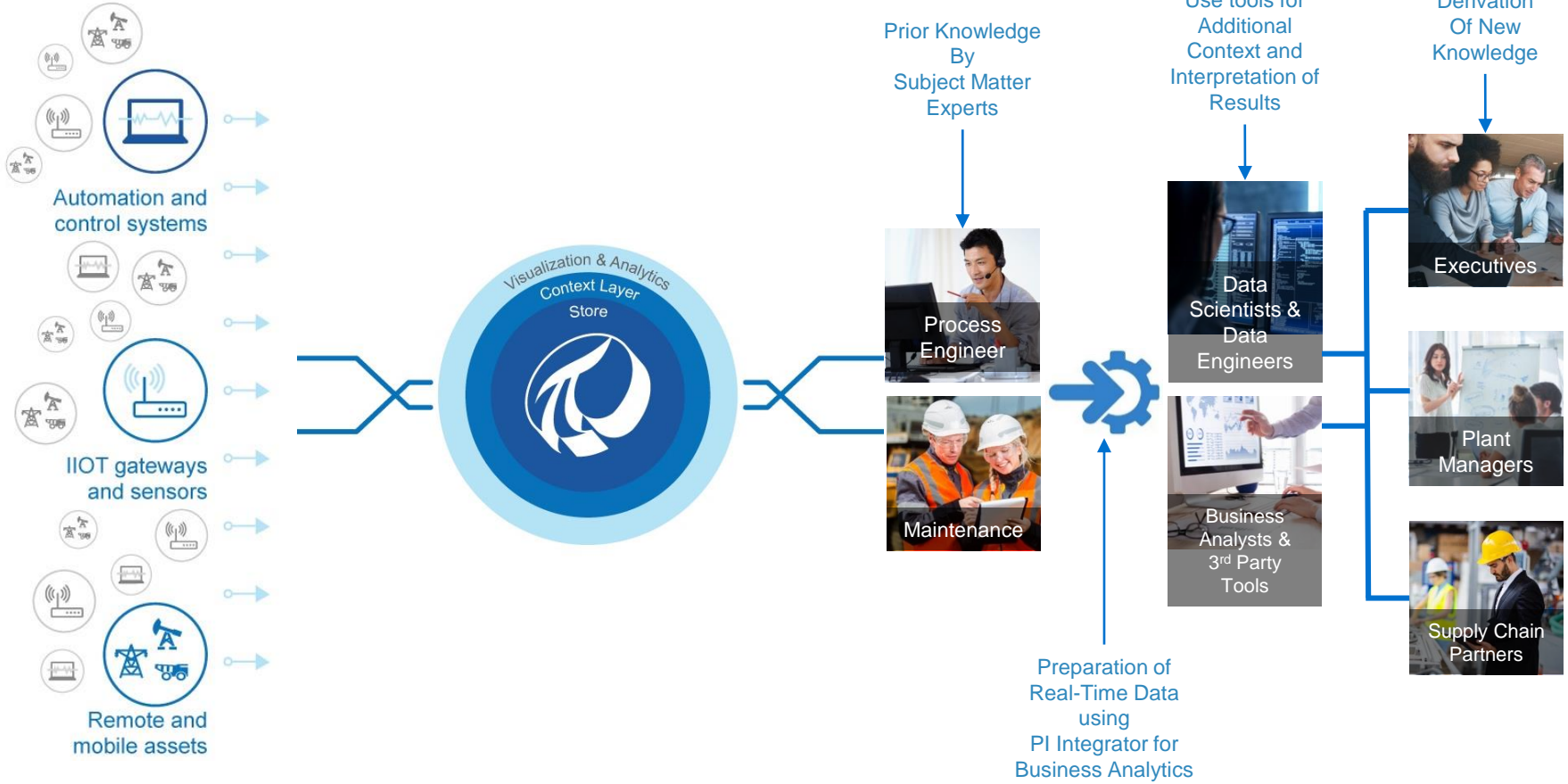
# SLASH DATA PREP

**Cemex** used to spend upwards of **816 employee-hours** to collect, clean and prepare data from 70 plants for comparative analysis.

Now it takes **less than six minutes** with the PI System and PI Integrator Technologies.

A minute with the PI System =  
**5.7 days of work**  
the old fashioned way.







*Lean Back Analysis*



# Lean Back Analysis

- Continuous Improvement Strategy
- Process de-bottlenecking
- Predictive Maintenance
- Workflow Optimization
- Production Planning



# Pushing Tin: Real-time Analytics in Action



*A Comedy about Life, Love, Airplanes and Other Bumpy Rides.*



**john CUSACK**  
**billy bob THORNTON**  
**cate BLANCHETT**  
**angelina JOLIE**



## **PUSHING TIN**



# Mica Endsley

President, SA Technologies

Past Chief Scientist, U.S. Air Force

Past President, Human Factors and Ergonomics Society

Member, HFES Executive Council (US Research Firm)

Associate Professor, MIT Dept of Aeronautical Engineering

Associate Professor, Texas Tech University



*“SA [Situational Awareness] is viewed as consisting of a person’s state of knowledge about a dynamic environment. It incorporates the perception of relevant elements, comprehension of the meaning of these elements in combination with and in relation to operator goals, and a projection of future states of the environment based on this understanding. Using this knowledge, individuals with good SA will have a greater likelihood of making appropriate decisions and performing well in dynamic systems”*

– Mica Endsley, Human Factors, 1995

**YOUR DATA  
LOOKS LIKE THIS...**



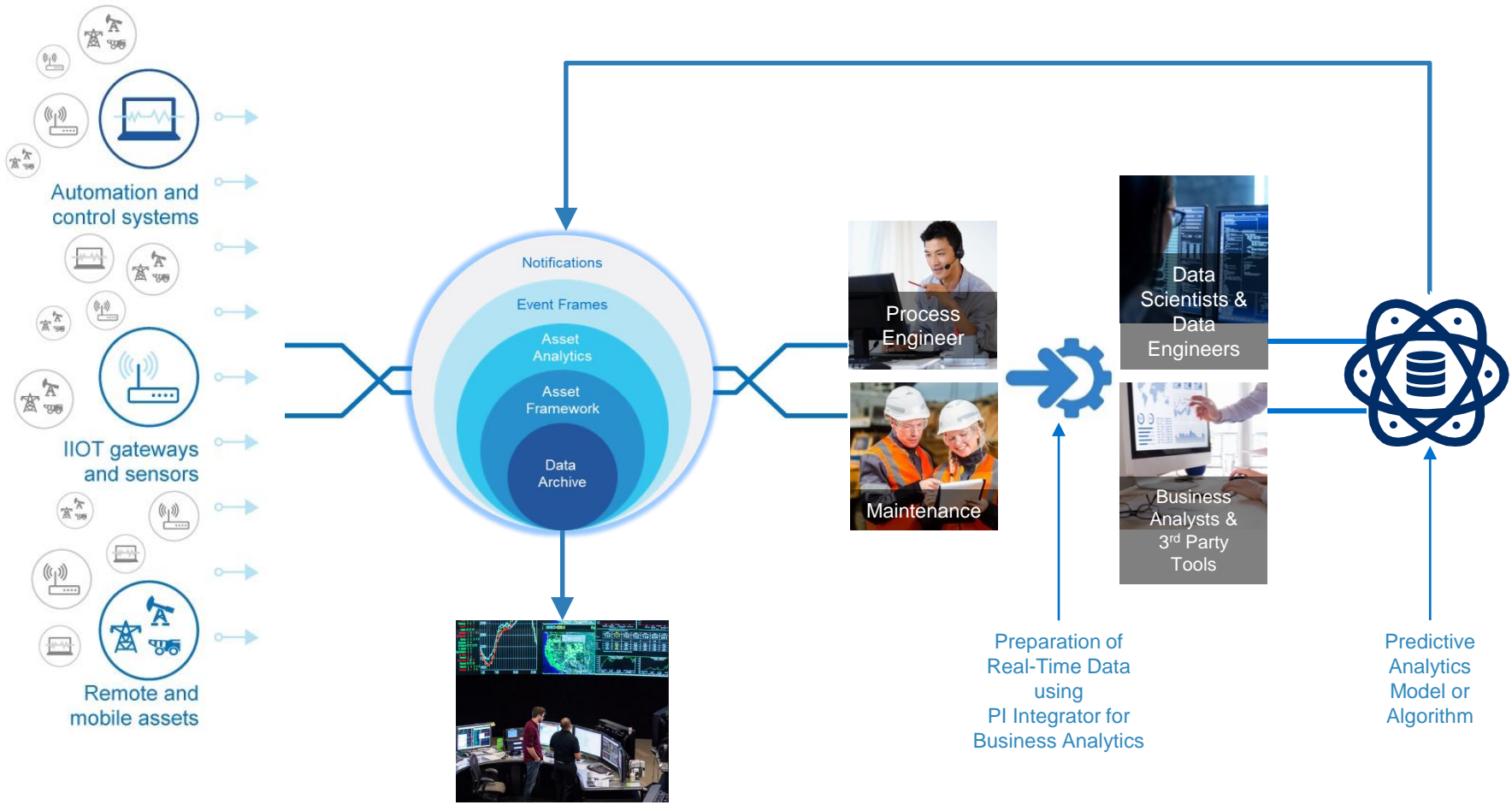
**BUT YOU  
NEED THIS...**



# THE PI SYSTEM: INSIGHT ON DEMAND

We capture, clean, and contextualize operational data so you can be aware of the situation (see the big picture)





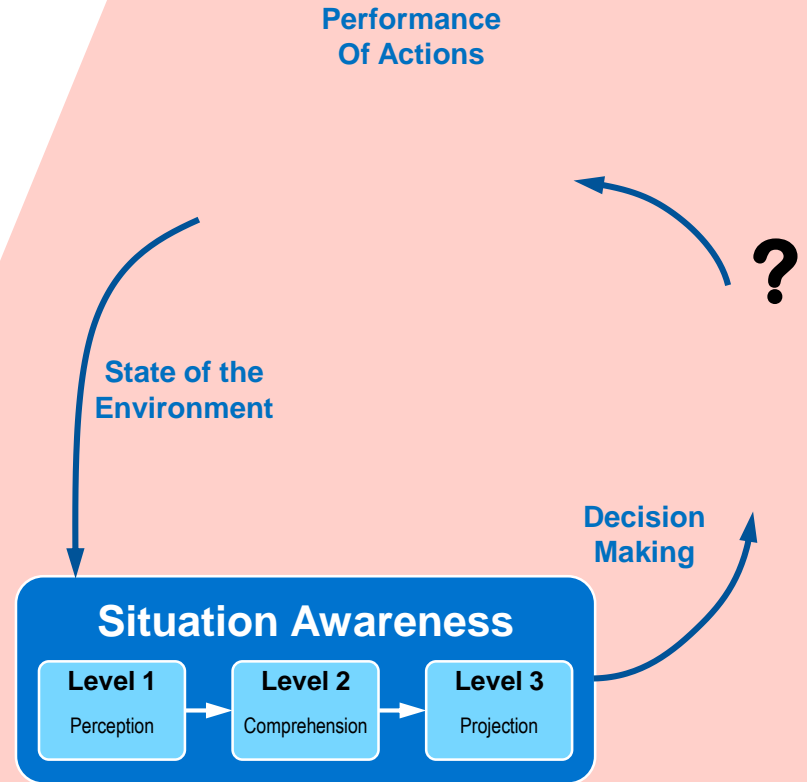


# *Lean Forward Analysis*

# Lean Forward Analysis

## Aka Real-time Situational Awareness

- State of the Environment in real time
- “Comprehend” Data into Information
- Apply Predictive Model (future tags)
- Capture Anomalous Condition
- Real time notifications
- Visualize Information
- Supports decision making

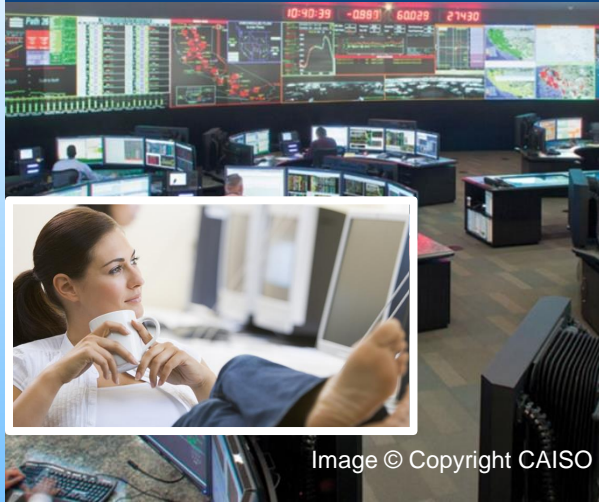


**Endsley's Model**



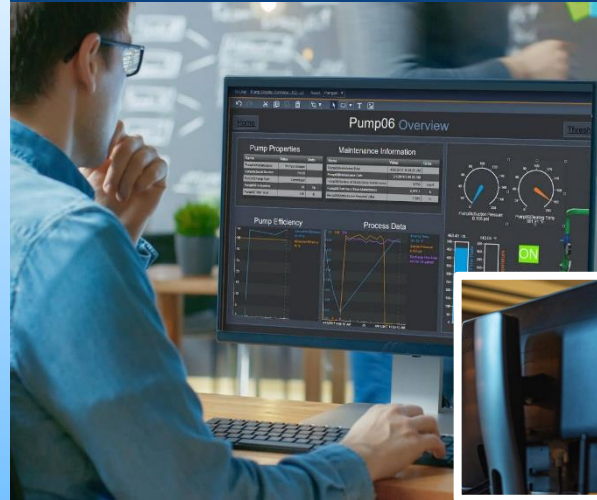
# That's Why We Created the PI System

## Situational Awareness Real-Time Dashboards



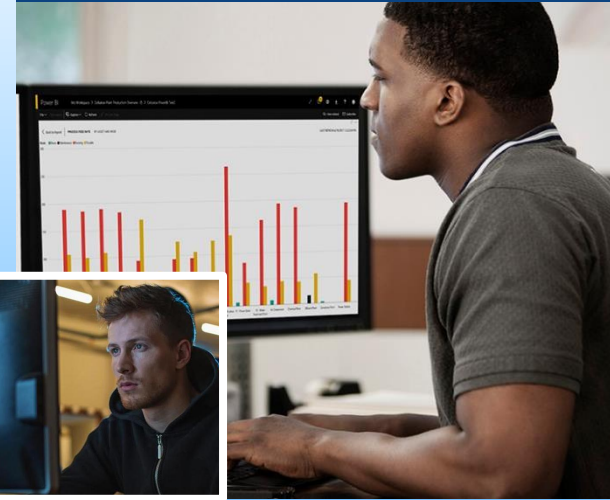
“Energy demand is decreasing, we need to begin curtailment”

## On Demand Exploration Ad-hoc analysis



“Two compressor tripped. Let's pull up a trend to see what's going on.”

## Third Party Applications Fit for purpose application



“I need to feed my Nox and process data into our air quality tracking application.”



### Challenges

- **Gold recovery rates 74.6%** (Q3 15) at Hera
- 1% = A\$1 million annually in lost revenue
- Excel hell

### Input

- **A\$1 million invested**
- Process optimization
- Real-time dashboards across organization
- Auto fault notifications
- Data Unification via Asset Framework (Digital Twin)

### Outcome

- **Recovery boosted to 88.6%**
- Reduced energy, inputs, wear rates, operator fatigue
- Output above nameplate
- AISC: A\$1,100 to A\$821
- **ROI in 12 Days**
- Data for investor relations

# ACROSS MULTIPLE INDUSTRIES



## **GARANT**

16% increase in productivity; ROI in two years



## **AUSTRALIAN GAS LIGHT**

Payback in 9 months; \$18.7 million saved over three years



## **KIMBERLY CLARK**

Waste reduced 15%; ROI in two years



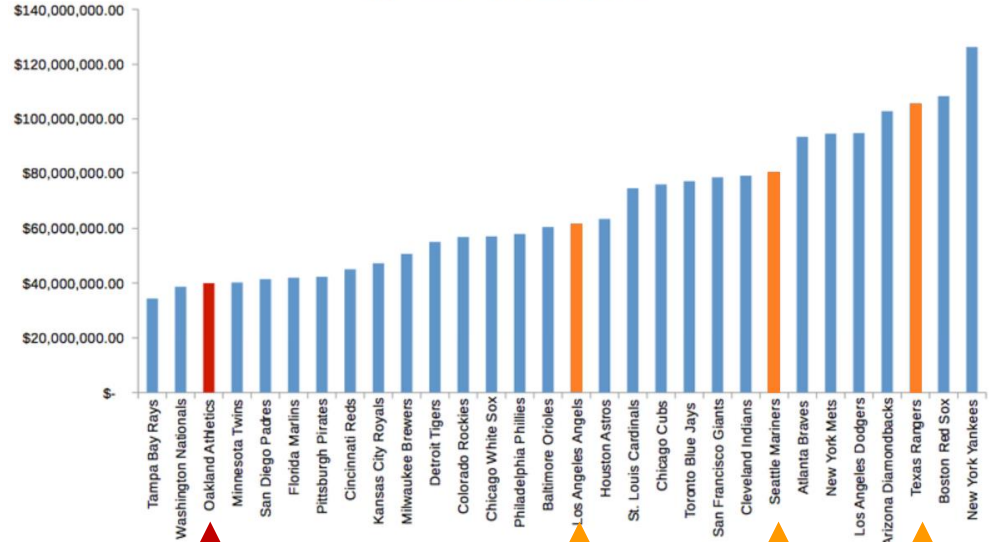
## **ARCELORMITTAL**

Increased output by \$40 million in one year through supply chain optimizations

# Turn Data to Dollars Save Money Win BIG



**Moneyball Year (2002)  
MLB Team Salaries**



**2002 MLB American League West**

Team	W	L	Pct	GB	Home	Away	L10
Athletics	103	59	.636	-	54-27	49-32	8-2
Angels	99	63	.611	4.0	54-27	45-36	4-6
Mariners	90	60	.574	10.0	48-33	45-36	5-5
Rangers	72	90	.444	31.0	42-30	30-57	3-7

The image shows two industrial workers in a control room. They are wearing high-visibility yellow and blue jackets and white hard hats. One worker is holding a tablet and pointing at it, while the other is looking at a computer monitor. The background is a blurred control room with multiple monitors and a blue color overlay.

**ISN'T IT ABOUT TIME  
YOU TOOK  
DIGITAL TRANSFORMATION  
SERIOUSLY?**

THANK YOU

謝謝

DZIĘKUJĘ CI

NGIYABONGA

TEŞEKKÜR EDERİM

DANKIE

TERIMA KASIH

GRACIES

WHAKAWHETAI KOE

DANKON

TANK

TAPADH LEAT

SALAMAT

SPASIBO

GRAZIE

MATUR NUWUN

ХВАЛА ВАМ

MUĻTUMESC

PAKMET CI3GE

고맙습니다

GRAZIE

شكرا

HVALA

FAAFETAI

GO RAIBH MAITH AGAT

ESKERRIK ASKO

БЛАГОДАРЯ

GRACIAS

MAHADSANID

HVALA

TI БЛАГОДАРАМ

TEŞEKKÜR EDERİM

TAK DANKE

DANK JE

EΥΧΑΡΙΣΤΩ

GRATIAS TIBI

MAHALO IĀ 'OE

TAKK SKALDU HA

RAHMAT

MERCI

GRAZZI

PAKKA PÉR

ДЗЯК

MERCI

HATUR NUHUN

PAHMAT CAĜA

DI OU MËSI

ĀKIJEM

CẢM ƠN BẠN

UA TSAUG RAU KOJ

TI БЛАГОДАРАМ

СИПОС

WAZVIITA

FALEMINDERIT