



# ***E-Health and Security: R&D Challenges***

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***Scientific Institute H San Raffaele***

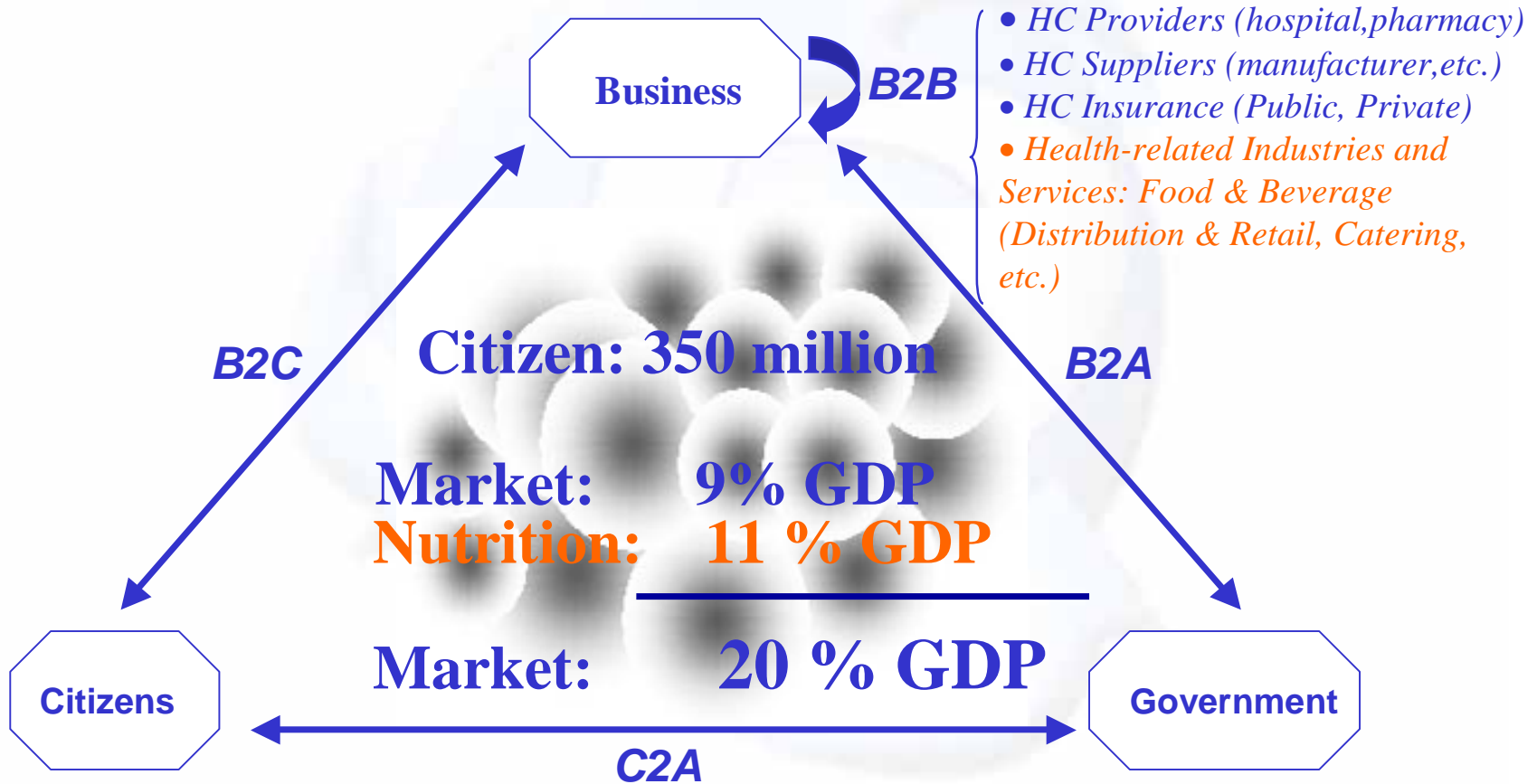
***DRIVE Program Manager***

***e-Services for Life and Health Manager***

***alberto.sanna@hsr.it***

# e-Services for Life and Health

## Health & Nutrition: Environment & Market



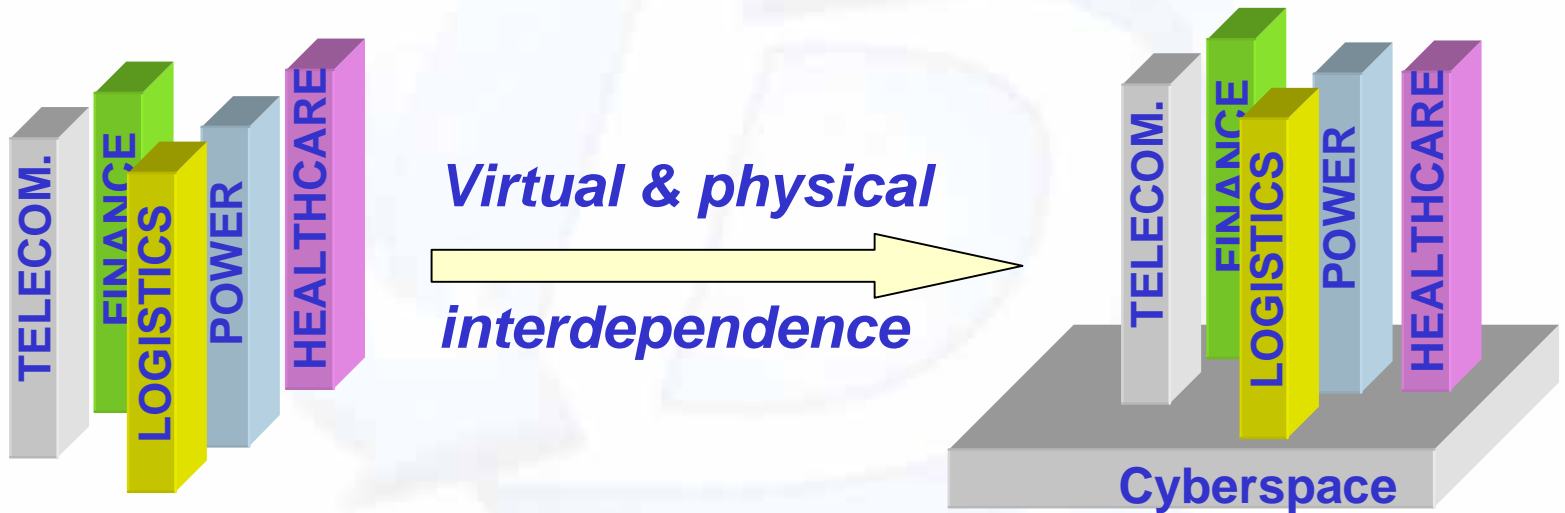
# e-Services for Life and Health

## Life and Health Value Chain



# e-Services for Life and Health

## Dependability of Critical Infrastructures: Main Issues

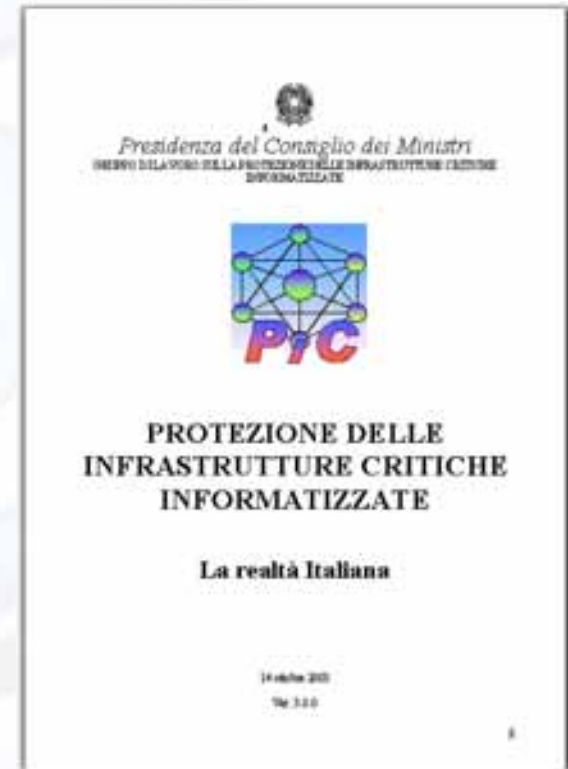


# e-Services for Life and Health

## *Dependability of Critical Infrastructures*

**Soon to be released document about:**

- ✓ **Evidence of problems in critical infrastructure**
- ✓ **Examination of some infrastructure interdependency complexities in Italy**
- ✓ **Summarizes the principal international experience**
- ✓ **Suggests proposals**



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# e-Services for Life and Health

## Life and Health Value Chain: Main Issues





# **e-Services for Life and Health**

## *Life and Health Major Challenges*

- { Knowledge management  
Human Factor
- Efficiency
- Technology Evolution
- Trust



# **e-Services for Life and Health**

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- { **Knowledge management**  
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# **e-Services for Life and Health**

## *The Patient Safety Issue*

### *To Err Is Human*

### *Building a Safer Healthcare System*

... More people die in a given year as a result of medical errors than from motor vehicle accidents (43,458), breast cancer (42,297) or AIDS (16,516).

... In terms of lives lost, patient safety is as important an issue as worker safety. Every year, over 6,000 Americans die from workplace injuries. Medication errors alone, occurring either in or out of the hospital, are estimated to account for over 7,000 deaths annually.

*Source: To Err Is Human - Building a Safer Health System, November 1999*



# **e-Services for Life and Health**

## *The Patient Safety Issue - Counterfeit*

### *Drug Counterfeit*

*World Health Organization (WHO) estimates as much as 8% is the total amount of counterfeited drugs worldwide.*

*Source: World Health Organization*



World Health Organization



# **e-Services for Life and Health**

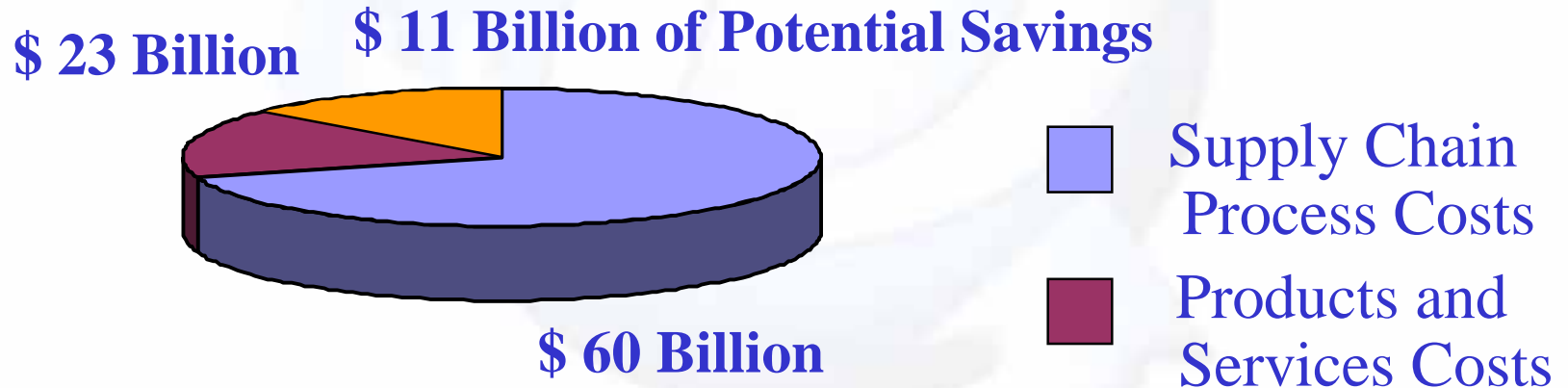
## *Life and Health Major Challenges*

- { Knowledge management  
Human Factor
- **Efficiency**
- Technology Evolution
- Trust

# e-Services for Life and Health

## *The Supply Chain Issue*

Segmentation of \$ 83 Billion Expenditures  
(related to Med/Surg, Diagnostic and Pharmaceutical)



Source: Healthcare Industry Study on Efficient Consumer Response Nov. 1996



# **e-Services for Life and Health**

## *Life and Health Major Challenges*

- { Knowledge management  
Human Factor
- Efficiency
- **Technology Evolution**
- Trust

# e-Services for Life and Health

## *The Paradox of Mobile Comm. in Hospitals*



7% of cases in the test showed interference with medical electronic devices:

- ✓ Electrocardiograms showed spikes
- ✓ One mechanical ventilator was reset in close vicinity

*Source: Mayo Clin Proc 2001;76:11-15*



# **e-Services for Life and Health**

## *Life and Health Major Challenges*

- { Knowledge management  
Human Factor
- Efficiency
- Technology Evolution
- **Trust**



# **e-Services for Life and Health**

## *The Patient Privacy Issue*

- Privacy and confidentiality protection in Europe
  - Directive 95/46/EC - Privacy Framework
  - Directive 97/66/EC - Telecommunications
  - Directive 99/93/EC - Digital Signature

- BOSTON GLOBE, July 2000 **The Boston Globe**

“... Nationwide, about 30 % of large and mid-size firms seek some form of genetic information about their employees and 7 % used that information in making hiring and promotion decision.”





**Key action II**

***New methods and work for electronic commerce***

***Schedule: start June 1st, 2000; duration 30 months***

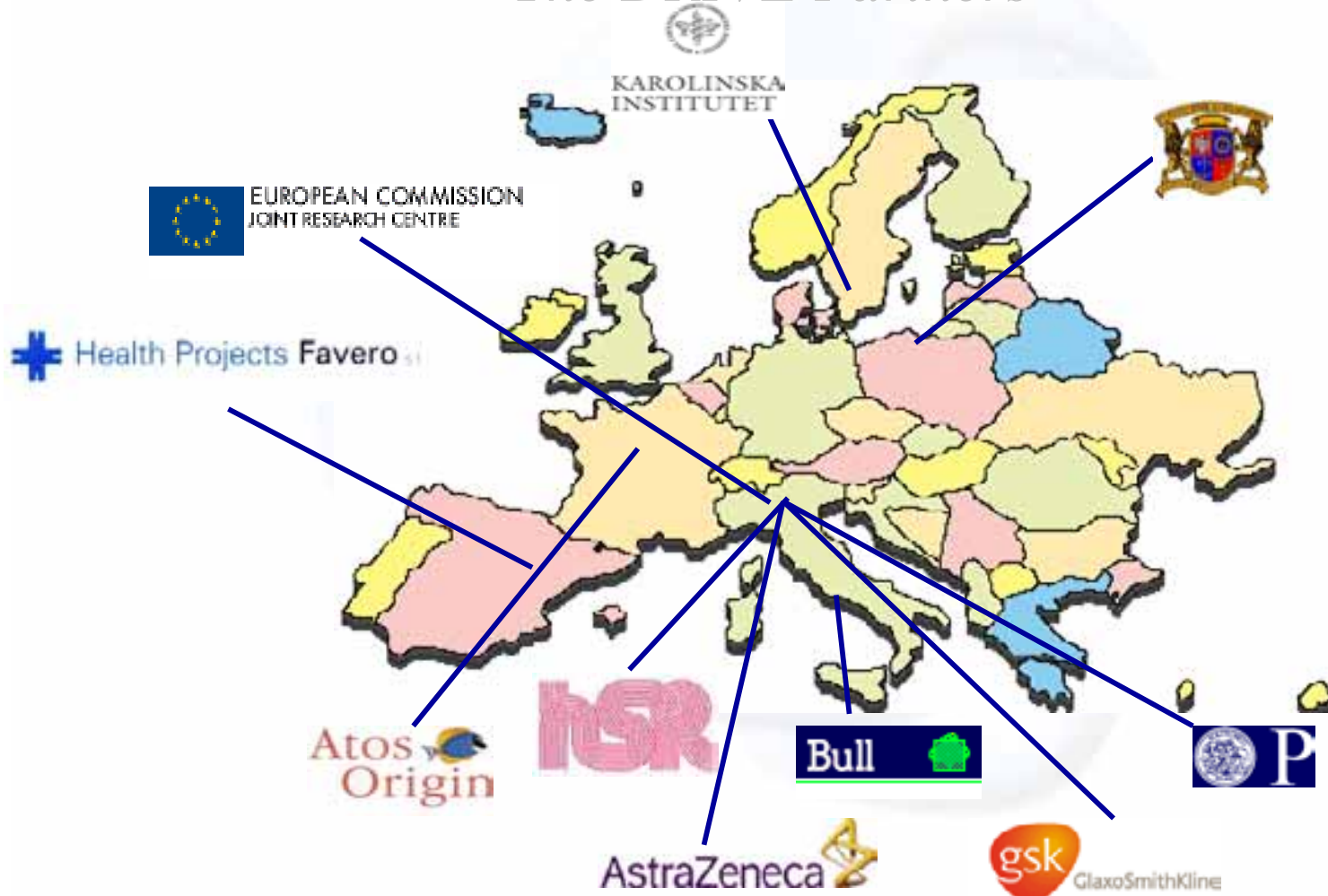
***Budget: 4,2 million EURO***

***Scientific Institute H San Raffaele (I)  
European Community Joint Research Center JRC (EU)  
Politecnico di Milano (I)  
Health Projects Favero (E)***

***Atos Origin Integration (F)  
AstraZeneca (I)  
GlaxoSmithKline (I)  
Karolinska Institute-CHT (S)  
Gdansk University of Technology (PL)***

# DRIVE Overview

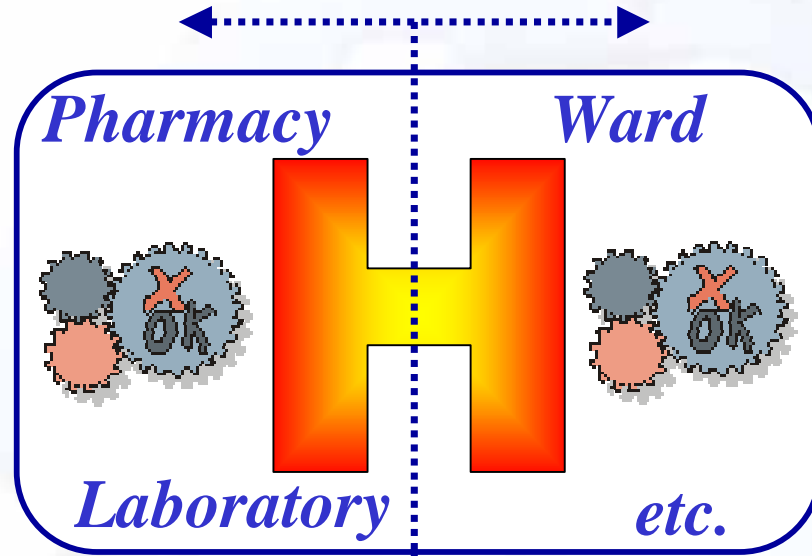
## The DRIVE Partners



# e-Services for Life and Health

## Life and Health Value Chain

*Back End*



*Front End*



*Estimated US cost-savings  
11 billion \$/year*

*Source: Healthcare Industry Study on  
Efficient Consumer Response, Nov. 1996*

- *Estim. US life costs 98,000/y \**
- *Worldwide Counterfeit: 8% \*\**

*\* Source: To Err Is Human - Dec. 2000*

*\*\* Source: World Health Organization 2002*

# e-Services for Life and Health

## *The Objectives*



The First Objective: ***SAFER***  
***Healthcare System***



The Second Objective: ***SMARTER***  
***Healthcare System***

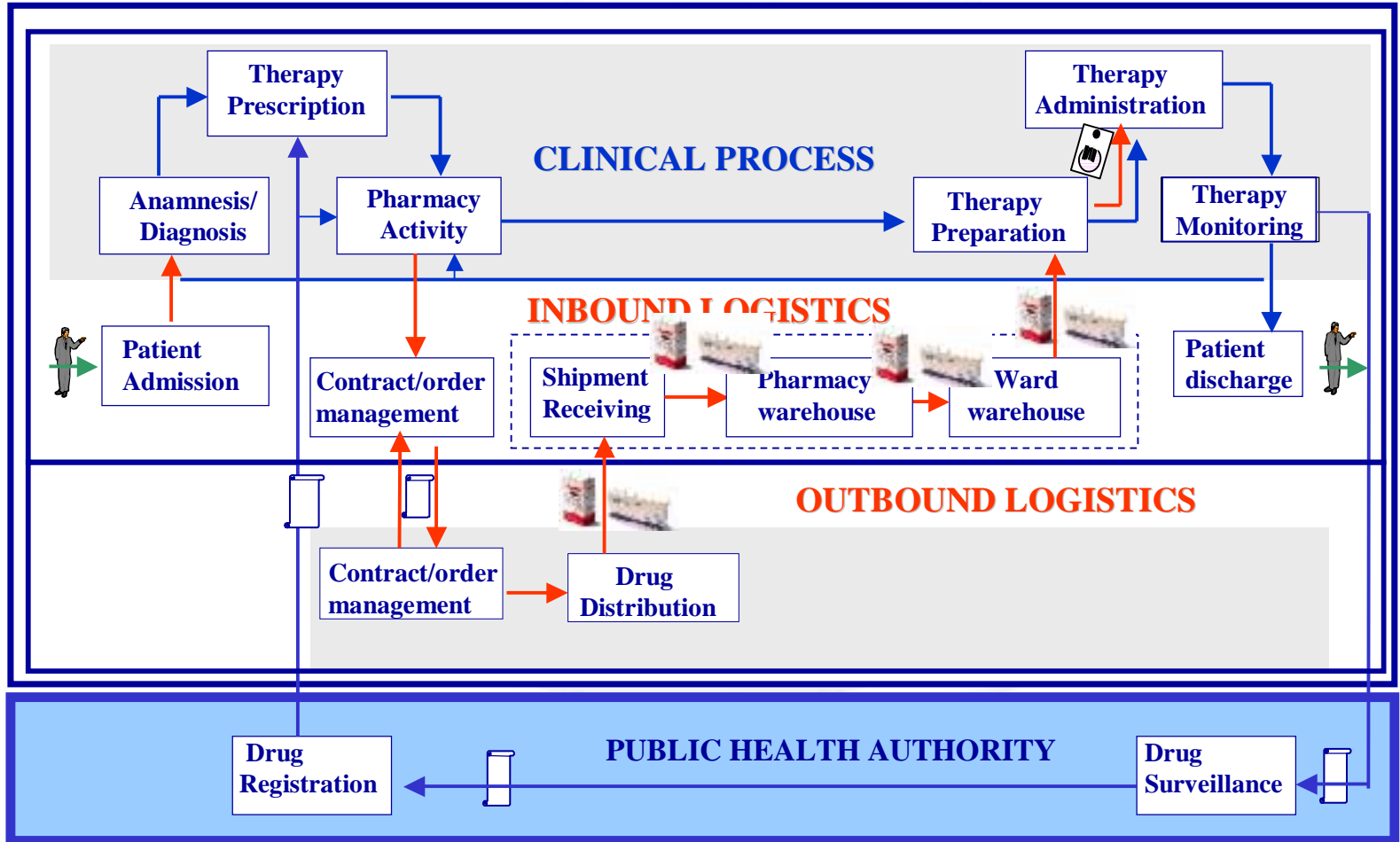


The Third Objective: ***TRUSTED***  
***Healthcare System***

# The DRIVE Approach

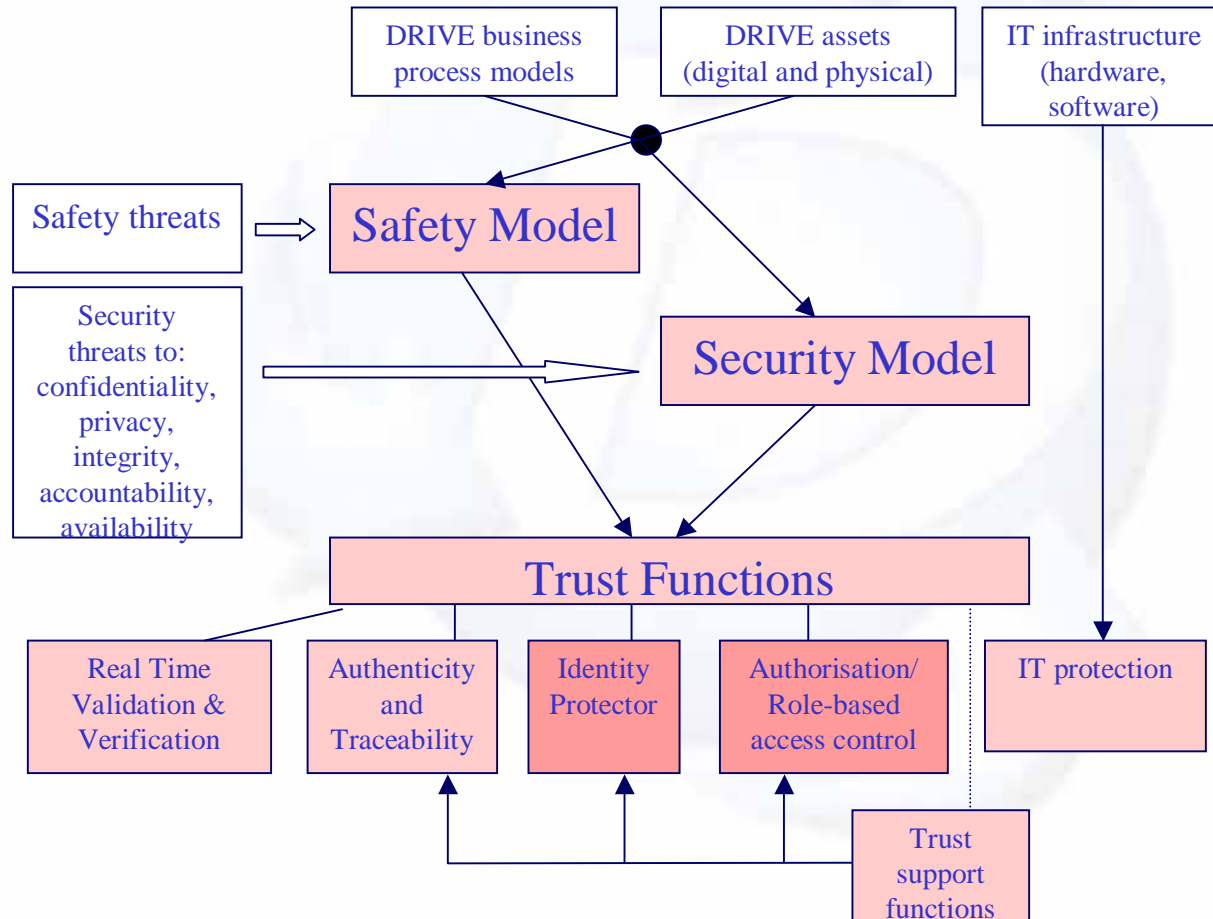
## Virtual Enterprise & Vertical Drug Process

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# DRIVE

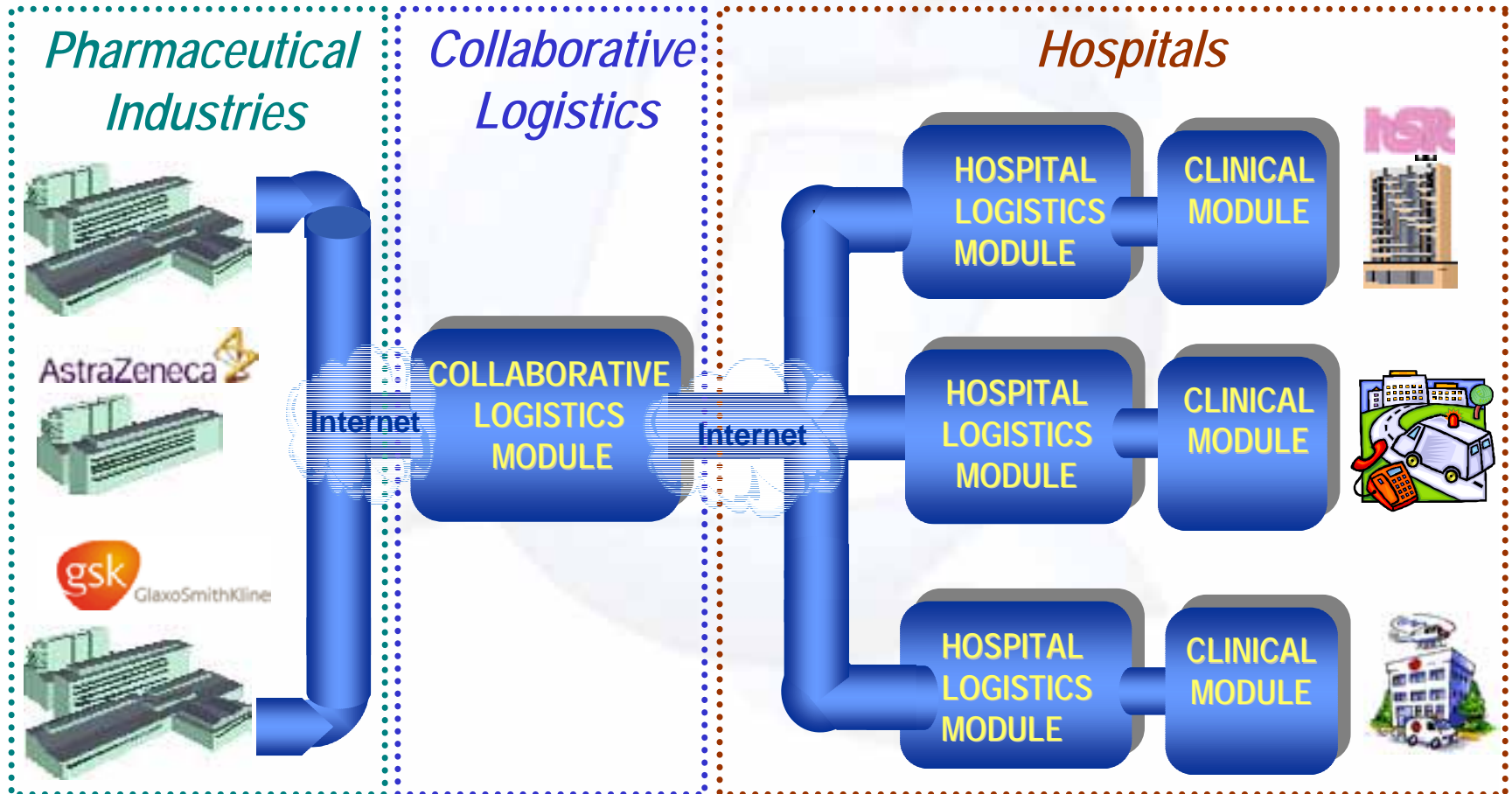
## The Trust Model





# DRIVE Approach

*Supplier + Hospital = Safety + Efficiency*



# DRIVE Pilot

## The Results



**Digital Wristband** - 91,3 % patients approval.

Significant improvement in Patient Safety

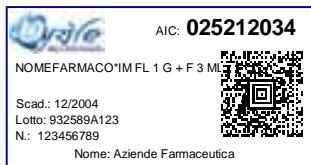
**Trust Infrastructure** (digital signature and RBAC)

Significant improvements in:

- Patient Privacy,
- Healthcare Operator Accountability,
- Business to Business Confidentiality.



**Digital Label** - Complete real time traceability of drug life-cycle in the production, logistics and clinical phases. Significant improvements in fraud prevention.

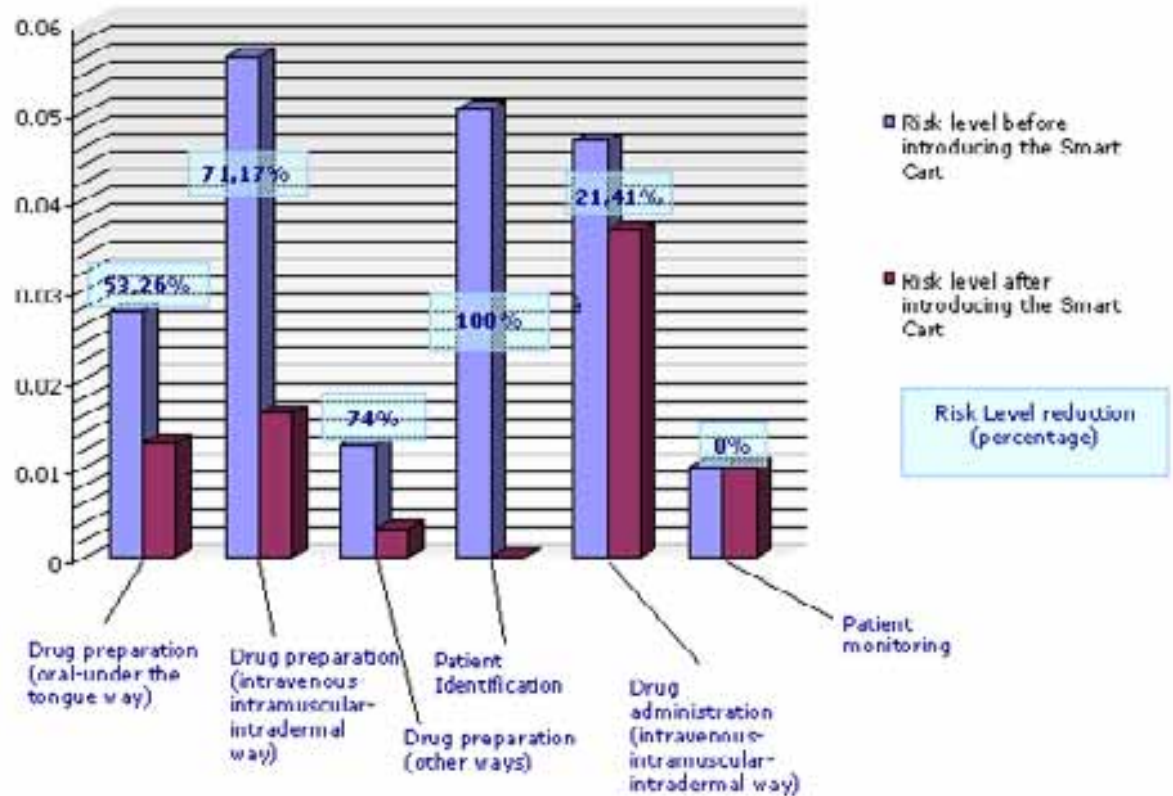


**Logistics** - Drug supply chain efficiency improvement (- 30 % operative costs)



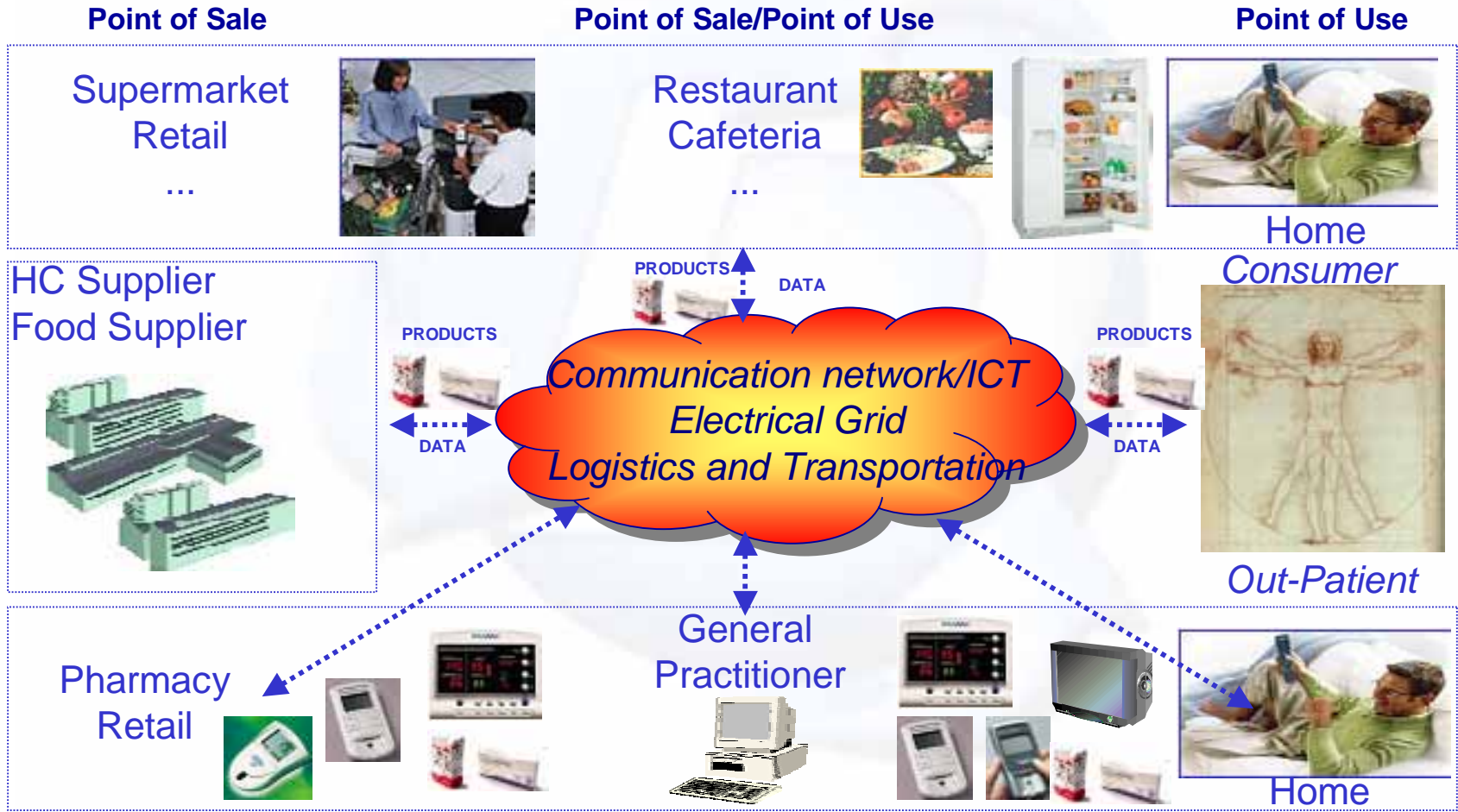
# Integrated Patient Bedside Care

## Preliminary Pilot Results: Smart Cart for Patient Safety



# The Next Step

## Personalized Care and Consumer Life-Style





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