

# Choose the right direction™

## Balancing between capacity & care

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1/18/2010

Lunteren 2010 – OR in healthcare



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- ➤ About quality, service & capacity
- ➤ About simulation technology
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# About Systems Navigator

Independent Dutch company specialized in delivering decision support solutions based on OR technology

- ➤ Member of the WSA
- ➤ Arena distributor West-Europe
- ➤ Manufacturer of Scenario Navigator
- ➤ Parent of Hospital Navigator



# Arena Simulation Software

Systems Navigator is a premier partner of Rockwell Automation reselling the leading discrete event simulation software Arena

*Arena*<sup>®</sup>

- ➤ More than 350,000 users worldwide
- ➤ Taught worldwide
- ➤ Fast, reliable, complete and robust!

**Rockwell  
Automation**

# Scenario Navigator Software

Decision support platform for scenario management, data management, experimentation, analysis and user interaction



- ➤ Connects to all simulation engines
- ➤ Client server architecture
- ➤ Database for data & results of scenarios

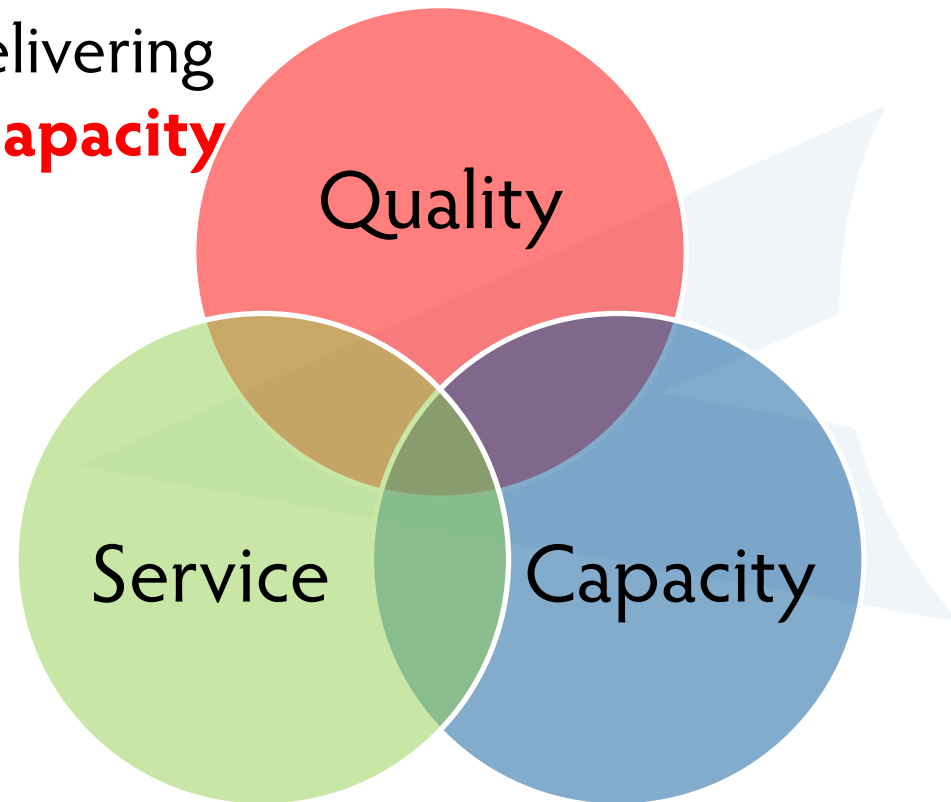
# Industries Served

- ➤ (Petro)Chemical
  - ➤ Shell, Petronas, Dow, KBR, BASF, ExxonMobil
- ➤ Food
  - ➤ Nestlé, Allied Bakeries
- ➤ Automotive
  - ➤ Daimler, Johnson Controls
- ➤ Beverage
  - ➤ Diageo, Heineken
- ➤ Metals
  - ➤ Corus, Vale
- ➤ Logistics
  - ➤ DHL, Vopak, Sandd, Samskip
- ➤ Healthcare
  - ➤ NHS BSUH, NHS DGOH



# A balancing act for healthcare organizations

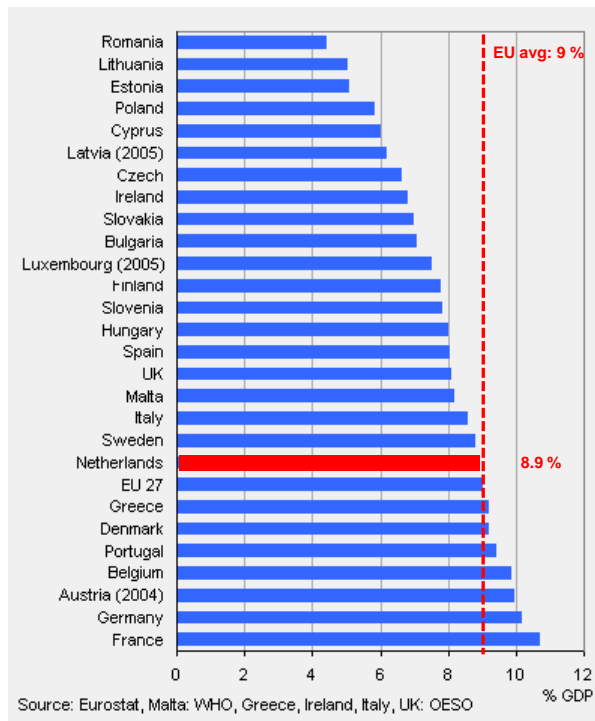
Healthcare institutions & professionals have the **joint challenge** of delivering **maximum care** with **limited capacity and funds**.



- ➤ Allocation of funds

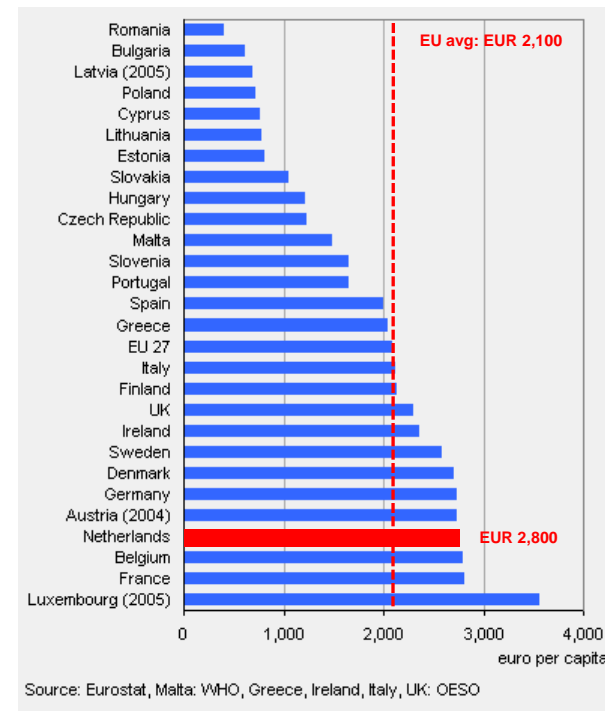
# Healthcare cost NL (1)

## • ➤ Cost (% of GDP)



Data from [www.cbs.nl](http://www.cbs.nl): 2006 figures

## • ➤ Cost (per capita)



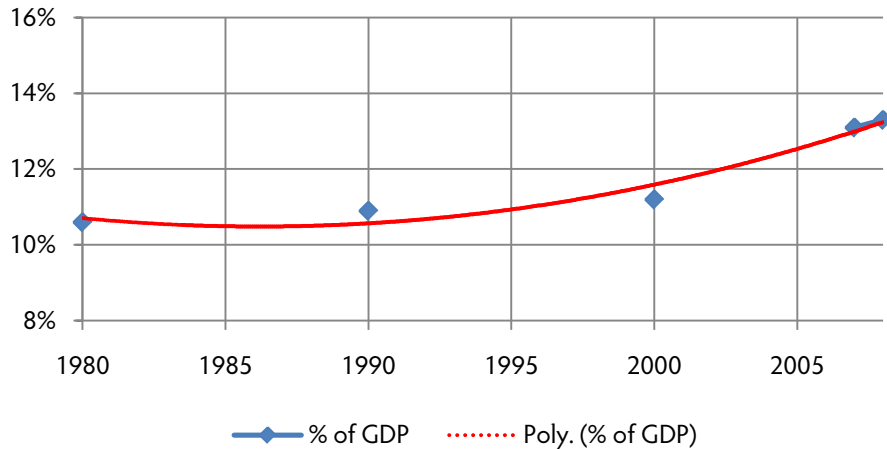
Data from [www.cbs.nl](http://www.cbs.nl): 2006 figures



# Healthcare cost NL (2)

## • ➤ CBS Statline

### Dutch healthcare cost 1980-2010

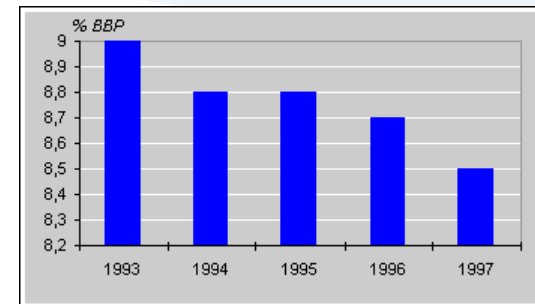
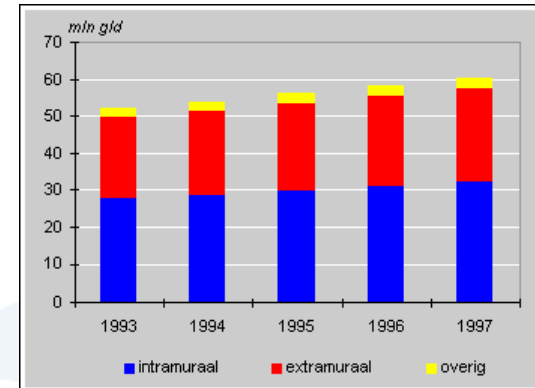


Datasource: [www.cbs.nl](http://www.cbs.nl) "CBS Statline"



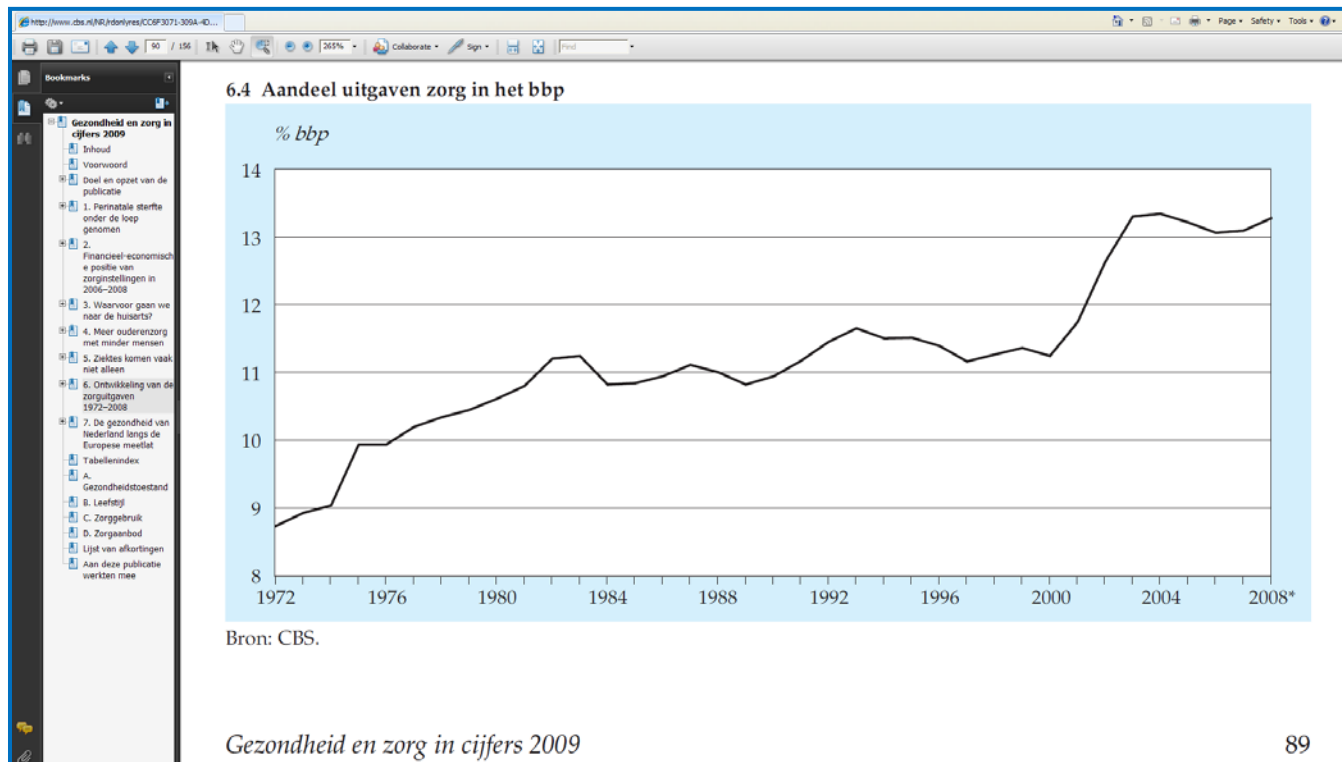
Centraal Bureau voor de Statistiek

Webmagazine, maandag 24 augustus 1998 10:00



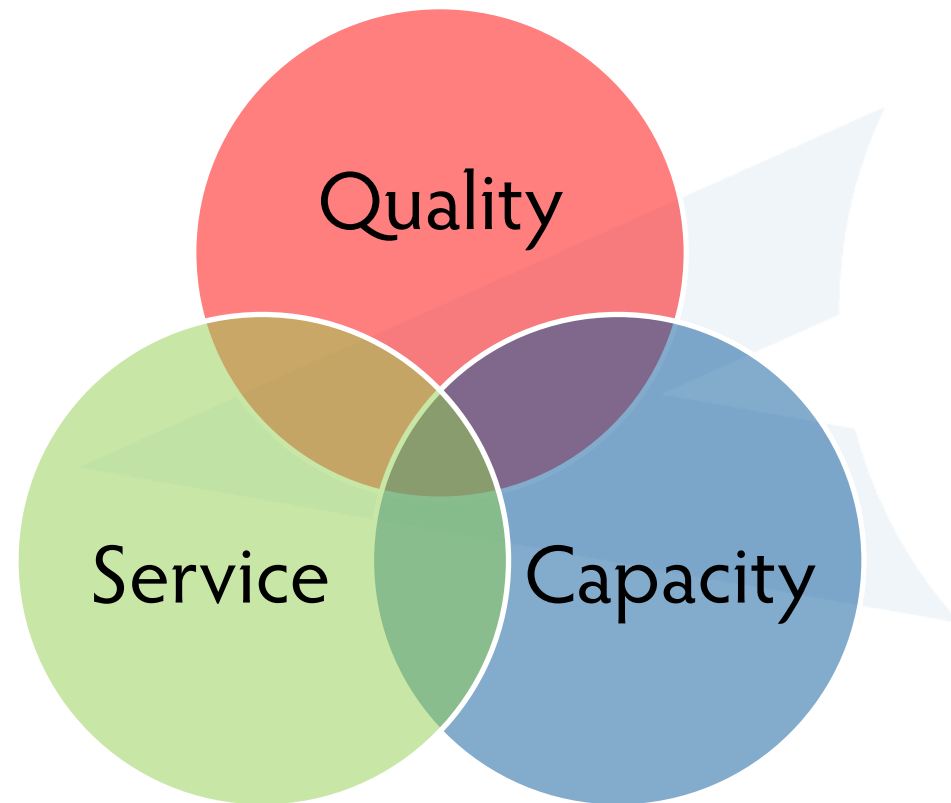
# Healthcare cost NL (3)

- CBS: "Gezondheid en zorg in cijfers 2009"



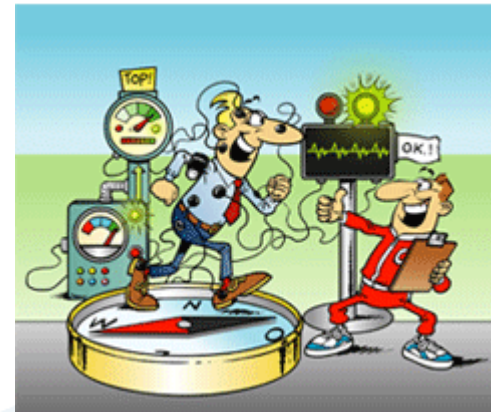
# How best to allocate funds (effort)?

- ➤ Quality
  - ➤ Improve staff (training/hiring)
  - ➤ New equipment
  - ➤ Improve procedures
- ➤ Service
  - ➤ Lean processes
  - ➤ Reduce LOS
  - ➤ Remove waiting lists
- ➤ Capacity
  - ➤ Adequate staffing
  - ➤ Sufficient beds, wards
  - ➤ Usage of operating theatres
  - ➤ Usage of analysis equipment

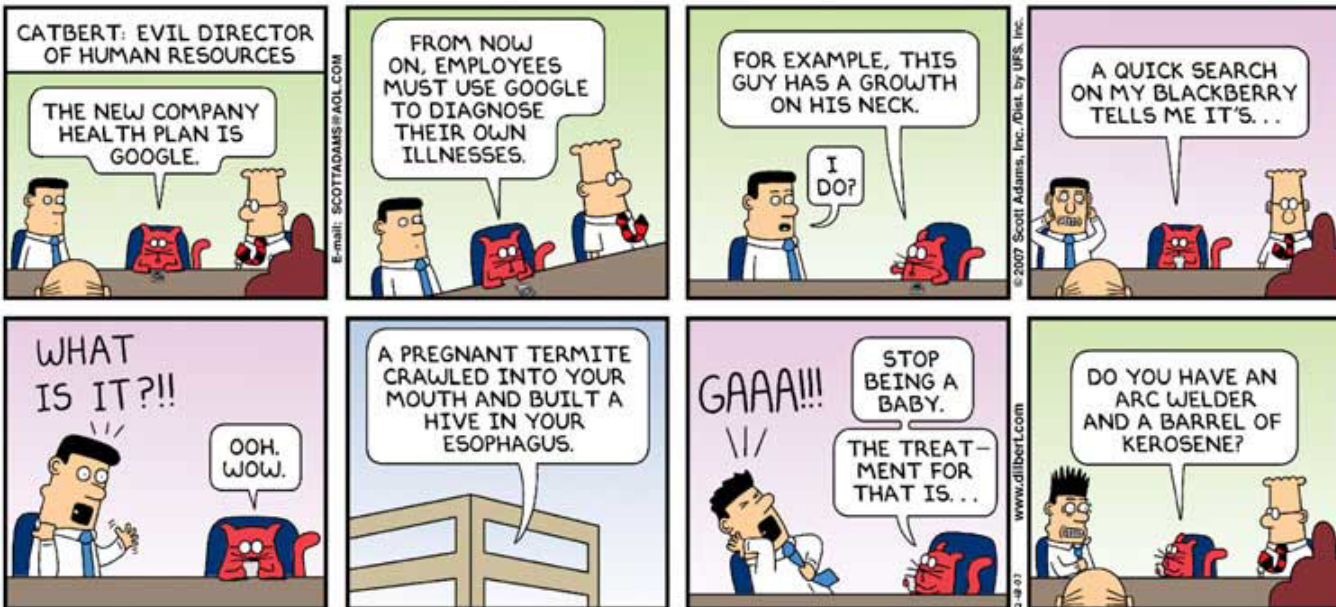


# “Measuring is knowing”

- Dutch saying: “meten is weten”



# “Information is knowing”



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# What do we need to measure? (1)



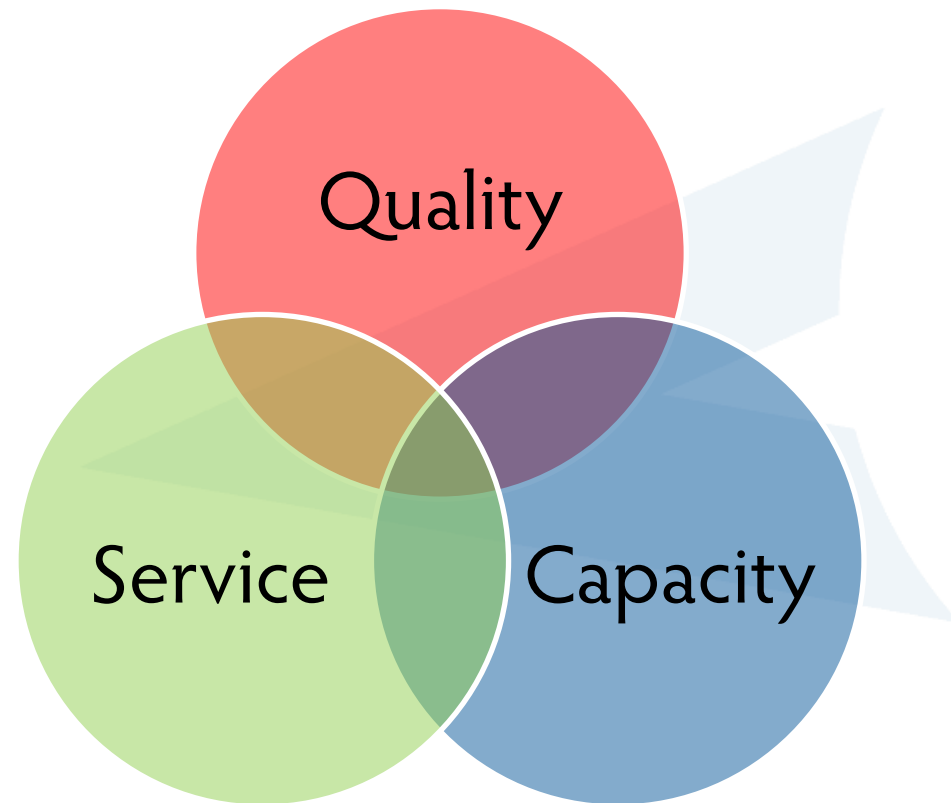
*"We have lots of information technology. We just don't have any information."*

# What do we need to measure? (2)

- ➤ Nationwide same standards
  - ➤ Comparing apples with apples
  - ➤ Allows for best practice analysis
  - ➤ Set national targets
- ➤ Annual frequency
  - ➤ Allows for trending
  - ➤ Assess improvements
- ➤ Individual records of transactions
  - ➤ OR never works by having access to averages
  - ➤ Times, decisions, percentages etc.
- ➤ Automatic
  - ➤ Not requiring additional administration tasks

# What do we need to measure? (3)

- ➤ Quality
  - ➤ Deaths by specialty
  - ➤ Throughput by specialty
  - ➤ Outliers by specialty
- ➤ Service
  - ➤ Wait times during stay
  - ➤ Cancellations
  - ➤ LOS by specialty
  - ➤ Wait time prior admission
- ➤ Capacity
  - ➤ Staffing
  - ➤ Bed usage by specialty
  - ➤ Usage of operating theatres
  - ➤ Usage of analysis equipment





# A balancing act for healthcare organizations

Hospital Navigator has developed a decision support system for bed management, theatre planning & waiting list management based on simulation technology. This system is used in the NHS, where it enables hospital management & consultants to better predict and understand the impact of new policies in regard to the use of resource, and the delivery of care. This leads towards better informed decisions regarding the delivery of maximum care, deployment of resource and funding.

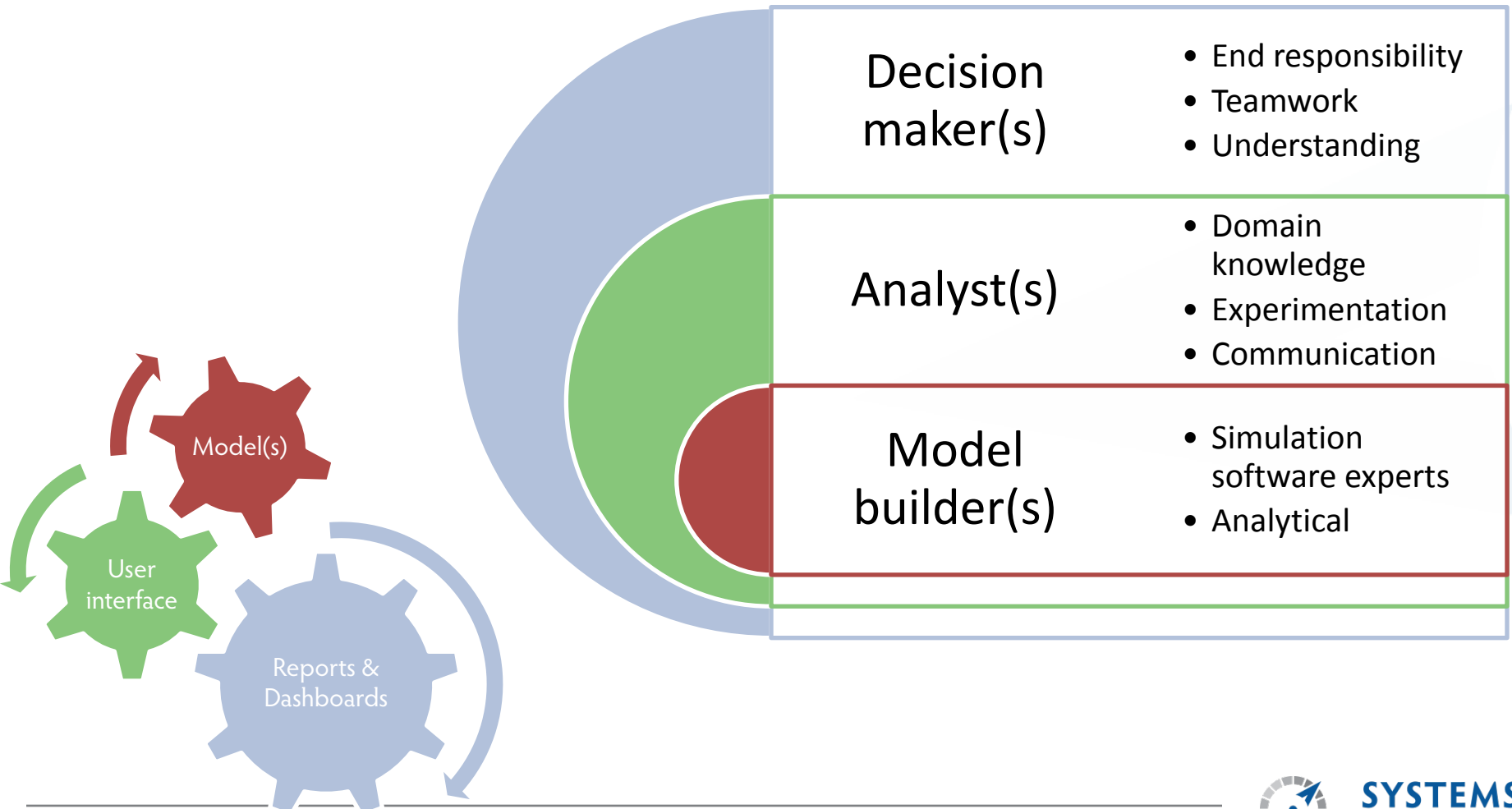
# Simulation technology (1)

- ➤ Only OR technology that takes account of variability!
  - ➤ Durations, volumes, decisions, seasonality, patterns etc.
- ➤ Virtual model of a system, used for experimentation
  - ➤ As-is model, to-be model(s)
- ➤ All system constraints taken into account
- ➤ Fast forward visibility into a future situation
- ➤ Animation for understanding & communication
- ➤ Can encapsulate all complexity of the system

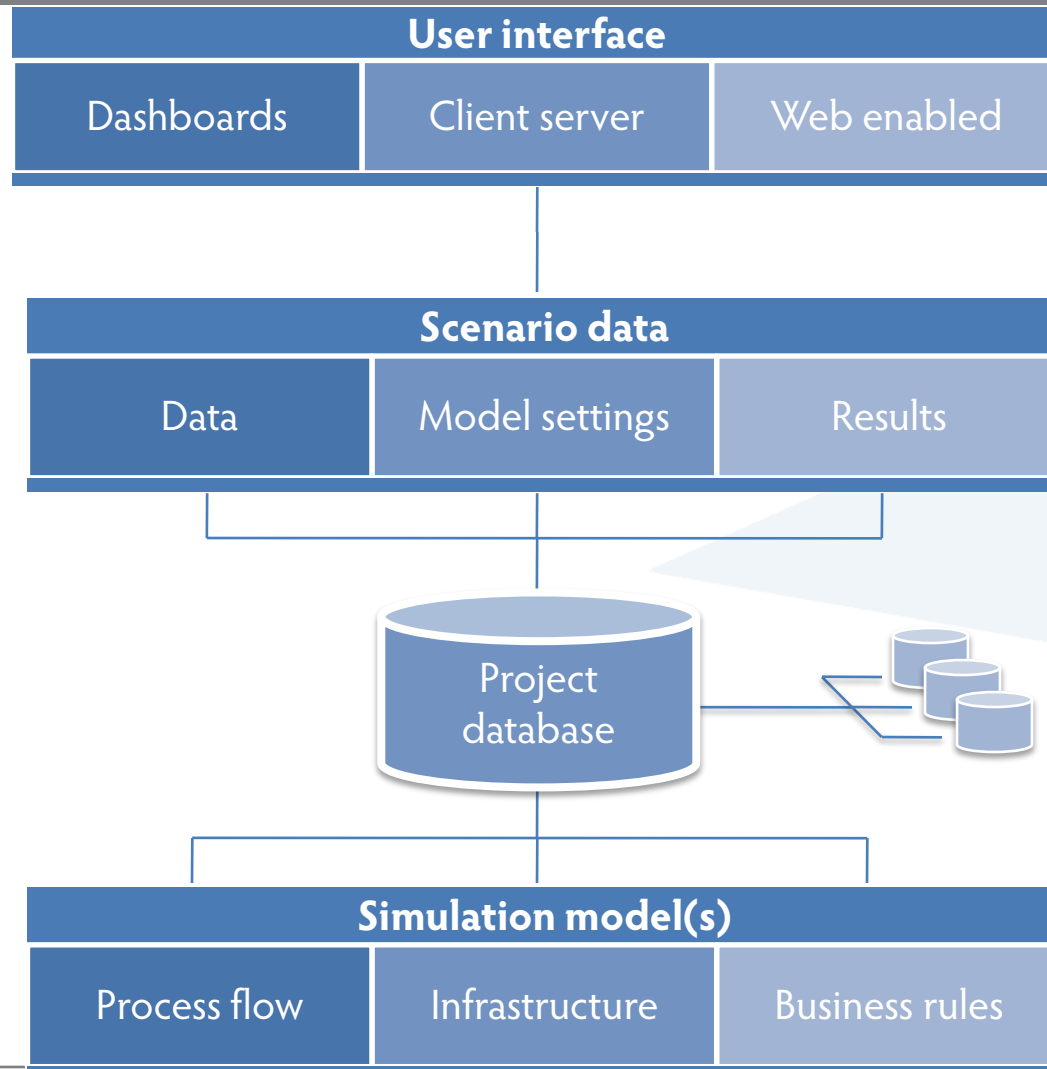
# Simulation technology (2)

- ➤ Widely used as a(n):
  - ➤ Insurance policy
    - ➤ for large capital investment projects
    - ➤ predicting realistic KPI's of future system
  - ➤ Testing facility
    - ➤ when testing in real world is too time consuming
    - ➤ when testing in real world is not possible (Non-existing infrastructure)
    - ➤ when testing in real world is too dangerous
  - ➤ Decision facilitator
    - ➤ when decision makers need an unbiased model to show the impact of decisions
    - ➤ when gut-feel is not enough to understand full complexity
    - ➤ when nobody has the expertise covering all aspects of the system
    - ➤ when the impact of decisions need to be communicated to multiple parties

# Simulation user community



# Solution architecture



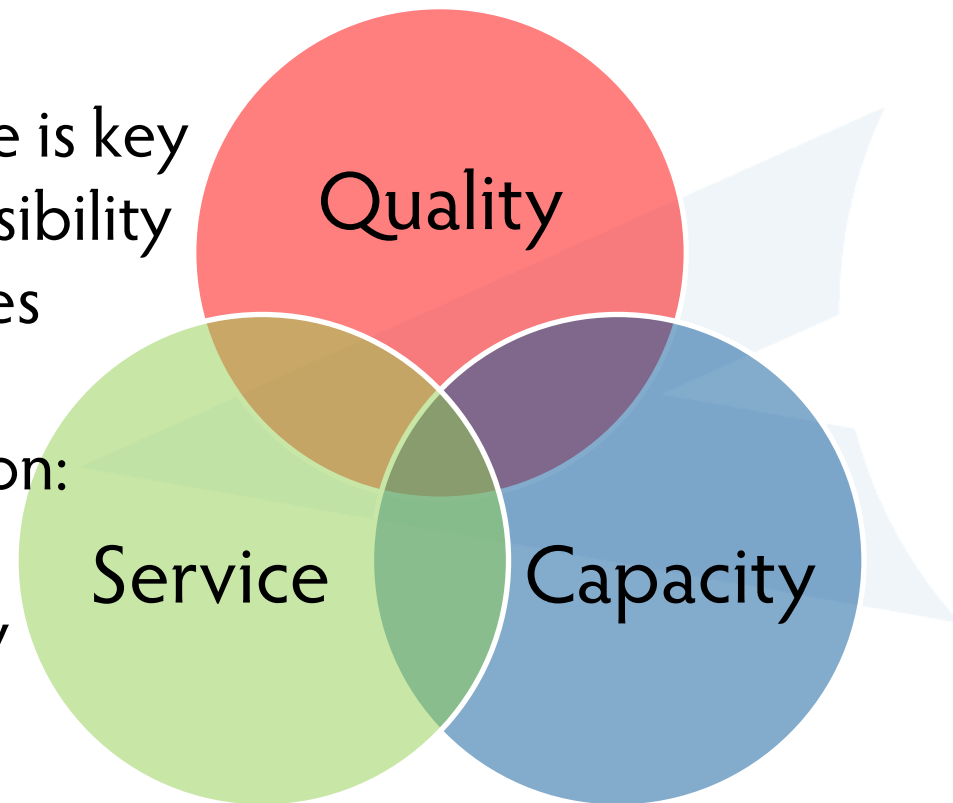
# How we can help to make decisions?

Typical healthcare organizations:

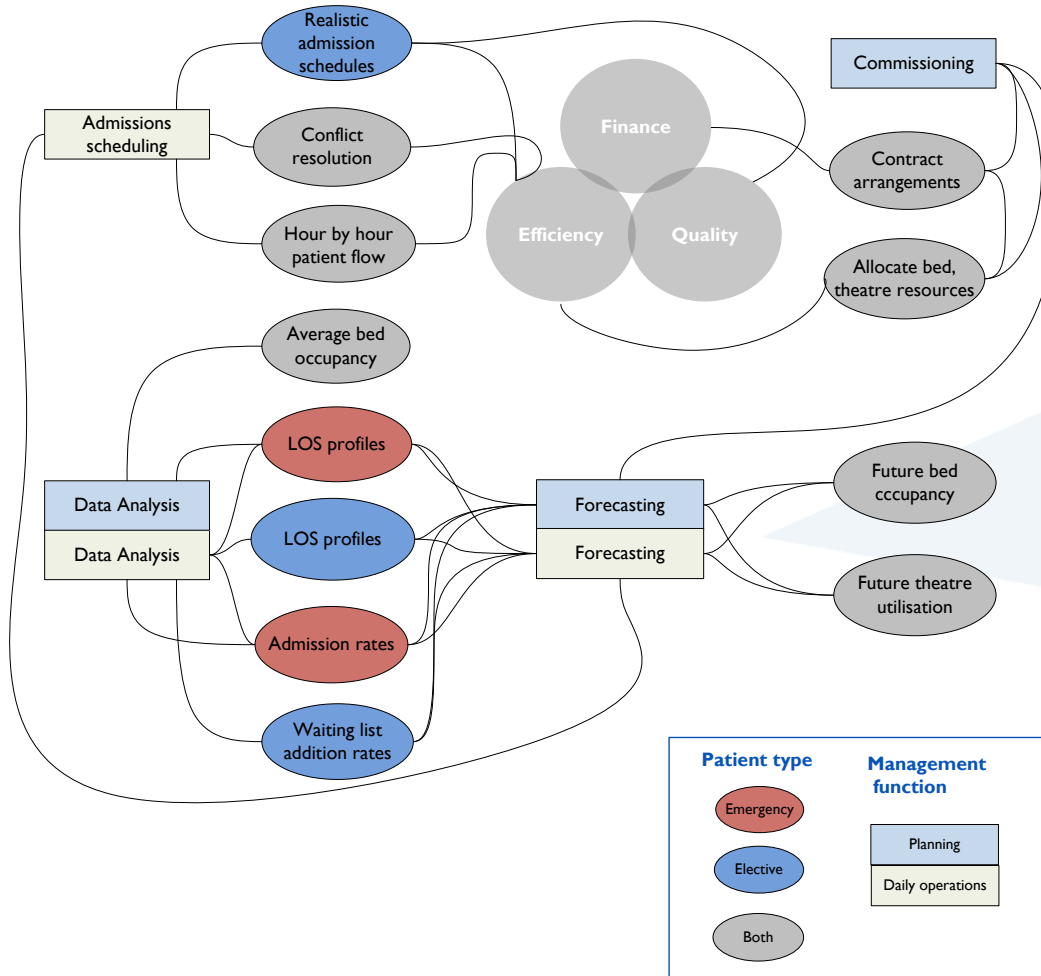
- ➤ Integrated logistics
- ➤ Quality of health outcome is key
- ➤ Health cost lacks direct visibility
- ➤ Limited logistic capabilities

OR solution based on simulation:

- ➤ Integrated DES model
- ➤ What if analysis capability
- ➤ Web based service
- ➤ Customized GUI



# How we can help to make decisions?



# Software demonstration?

## Hospital Navigator software

- ➤ Arena simulation library
- ➤ Hospital model
- ➤ Scenario Navigator GUI

*Arena*<sup>®</sup>



**HOSPITAL**<sup>®</sup>  
**NAVIGATOR**



# Thank you for your attention!

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