We help ideas meet the real world

REACTION Workshop

The Regulator framework for medical devices

Medical Devices demography

- From tongue depressor to the most complicated pace maker implant

Medical Devices demography

- From disposable devices to capital equipment

Medical Devices demography

- From simple Apps to complicated software at the intensive care units

DELTA Medico Consulting

- Business focus
  - Medical device companies – Mechatronics
- Consulting
  - From ”Idea to market”
  - Supporting the development process
  - Trouble shooting specific issues
- Why DELTA
  - Many years of experience in elektronics / mechatronics
  - DELTA offers services from ”Idea to market”
  - High qualified medical device team

Electro-mechanical actuation systems allow for precise, safe, secure, and reliable power-driven adjustment and positioning of hospital beds.

Business Focus

Active Medical Devices - Mechatronics

- Medical Devices characterised by the combination of
  - Electronics
  - Hardware
  - Software
  - Mechanical Components

- Medical Devices solely based on software
  - Standalone Software / Apps

Challenges to encounter…

- Complex regulatory landscape
- The regulatory bar is constantly raised
- No “global” harmonised regulations
- Increased clinical documentation required
- Increasing demands for safer products
- Increased focus on End User Safety!
- Reimbursement under pressure

Product life cycle – 3 Main phases!

Front End Innovation	Product Development	Commercialisation
Idea	Product development	Sales
Pick the winners kill the loosers !	Executing in accordence with project plan!	Roll out !
Creativity Systematic Chaos	Focus Efficiency Capability Capacity	Full scale Manufacturing Deliver on time Deliver Quality Cost optimizing

Commercial

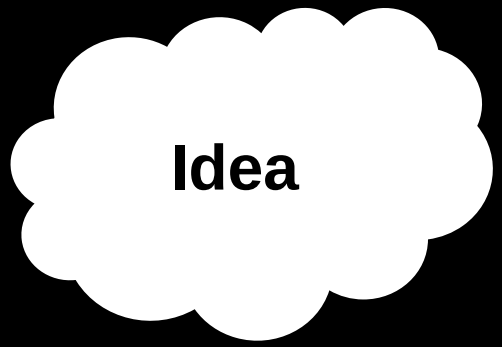
- User need
- Market potential
- Market penetration
- Business case

IPR

- Freedom to operate
- Adequate inventiveness / novelty

Product Concept

- Intended Use
- Claims
- USP



Reimbursement

- Cost in use
- Quality of life

Product

- Technology
- Materials
- Processes

Regulatory

- Regulatory Strategy
  - Product risk
  - Launch plan
  - Registration priority
- Approval process

Clinical

- Publications
- Clinical evaluation
  - Litterature study
  - Clinical trial

Risk Management – Patient & Project

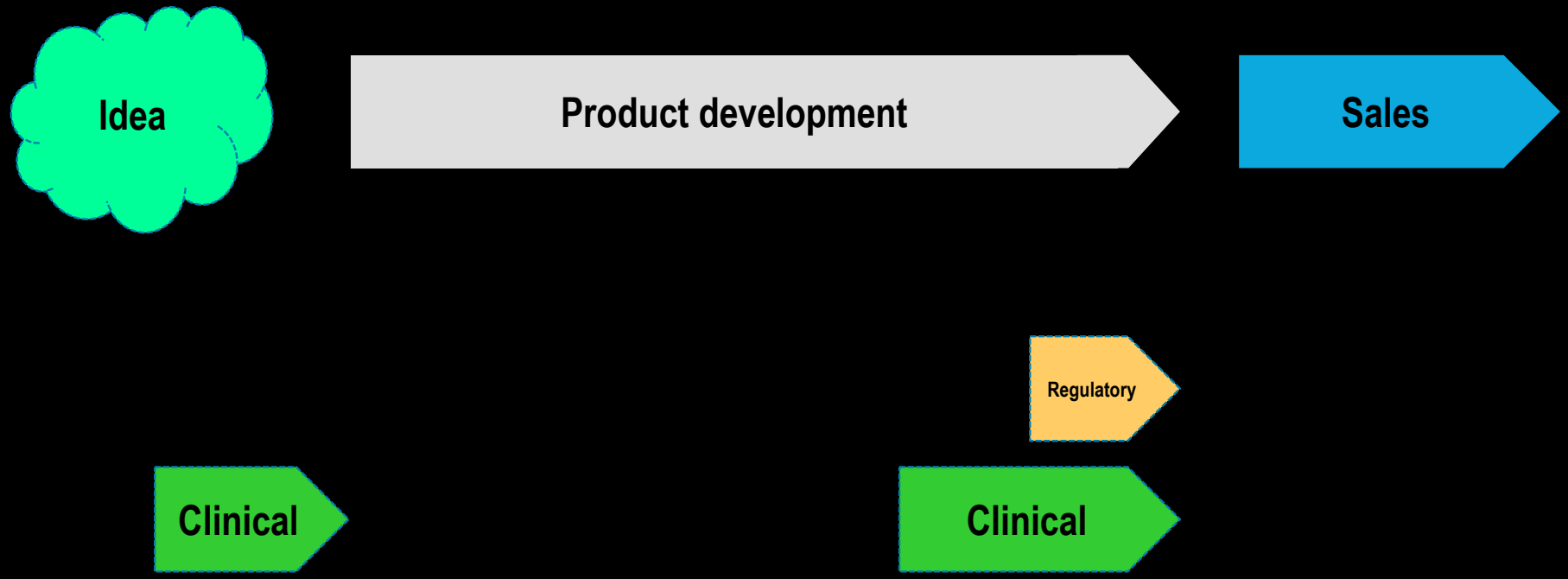
Approval stages……..

Front End Innovation | **Product Development** | **Commercialisation**

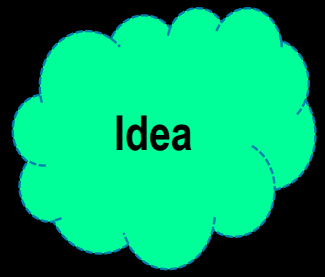
- Regulatory Strategy
- Regulatory Planning
- Clinical Documentation Plan

- Essential Requirements
- Standards
- Verification documentation
- Validation: User Need – Medical Devices
- Product registration – CE – FDA ……

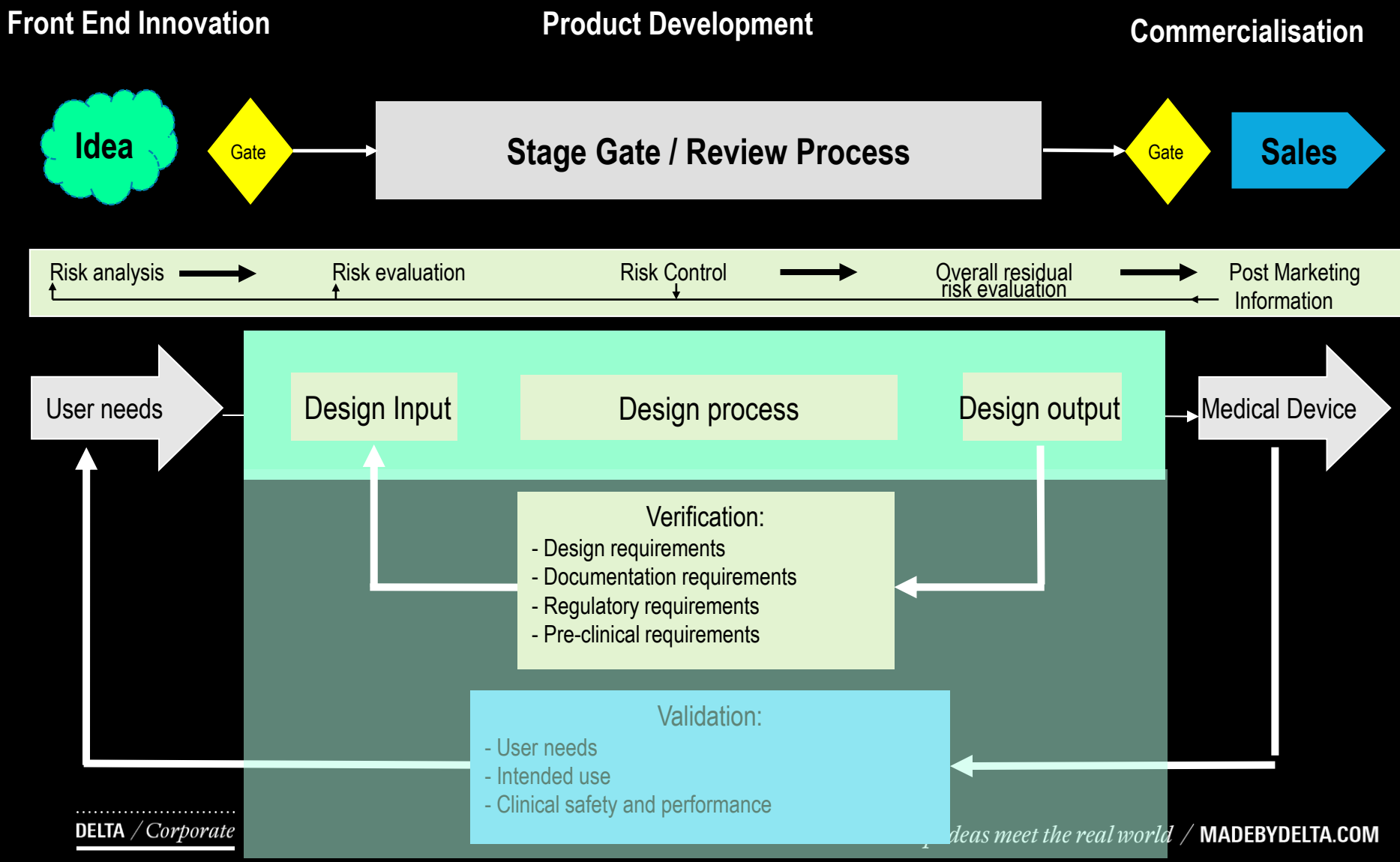
Regulatory Strategy Plan……



Regulatory Strategy Plan……



From Idea to market…..



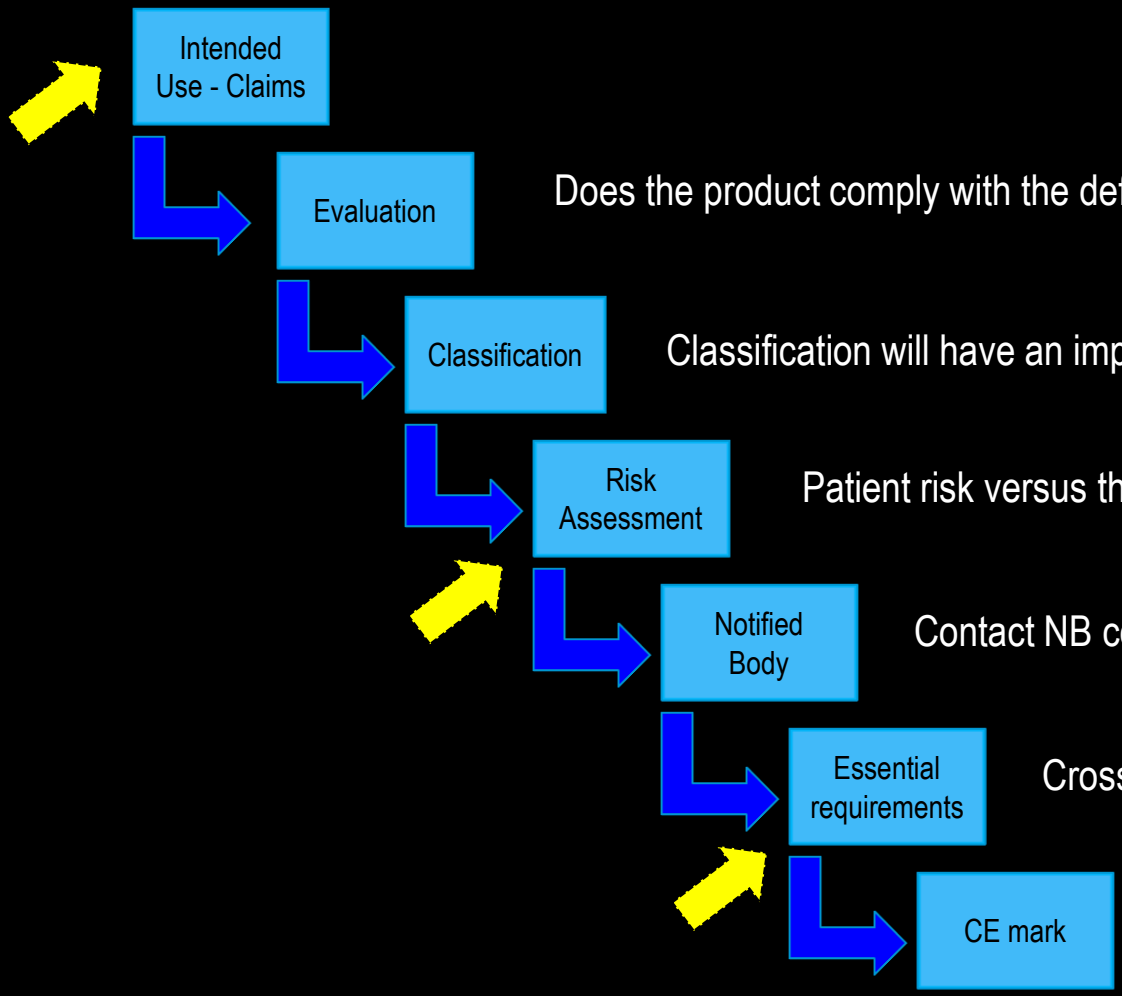
Regulatory Strategy

- Identify important regulatory elements
  - Define registration route based on market roll out plan
  - Identify potential roadblockers

Regulatory Plan

- Describe the specific steps and actions to meet the strategy
  - 1' draft of regulatory submission
  - Country specific standards to follow
  - Potential predicate devices (FDA)
  - Matrix, claims versus supporting data
  - Labelling, leaflets, Home Page ect.
  - Pre-clinical and clinical reports, literature etc.
  - Commitments from pre-submission meetings with regulatory agencies

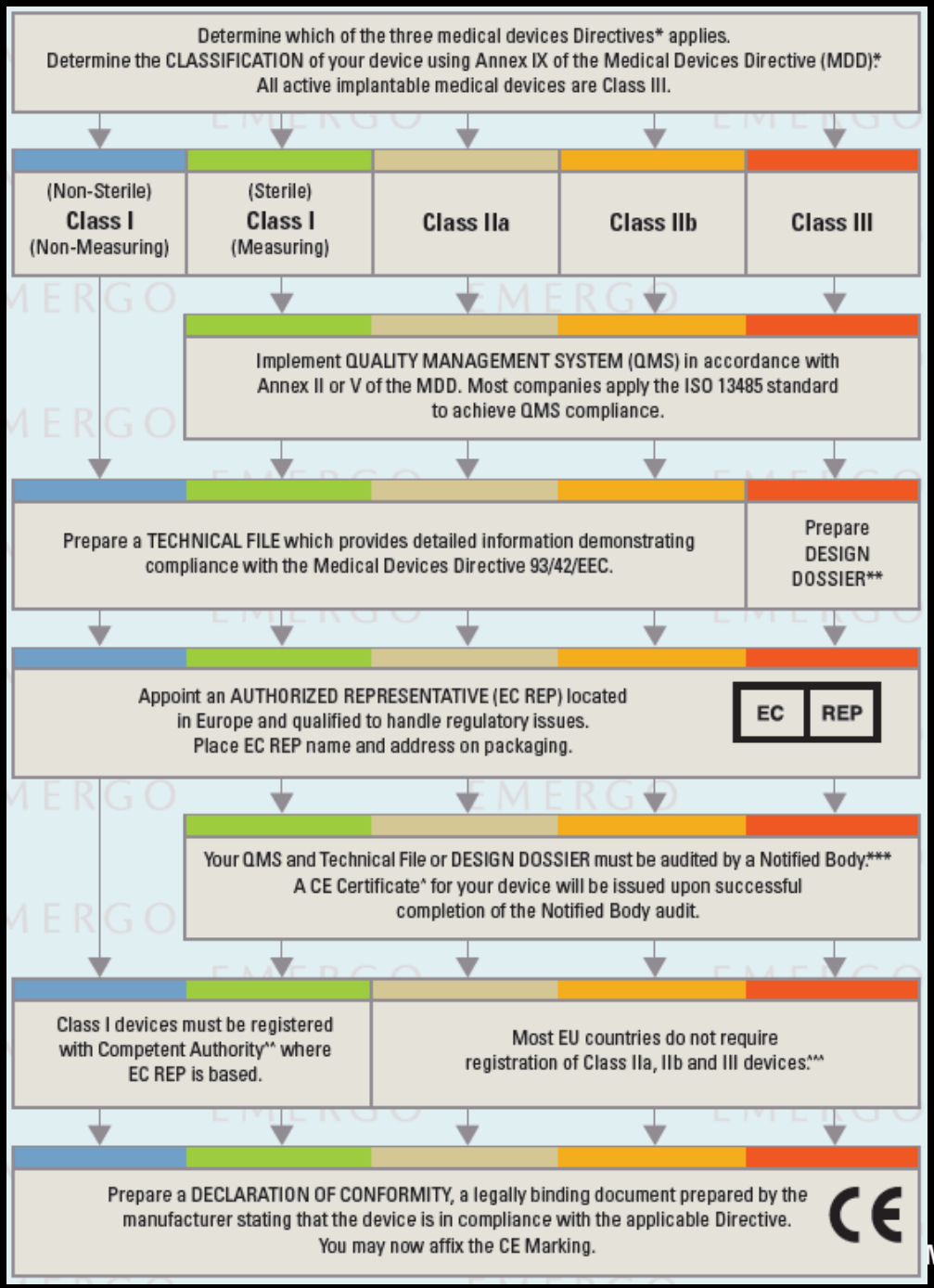
The initial Regulatory considerations



The Medical Device Directive basics…..

- Medical Device Directive MDD 42/93/EEC
  - User need
  - Intended use
  - Claims and USP
  - Classification
  - Route to CE mark
  - Essential Requirements
  - Applicable standards

Route to CE mark

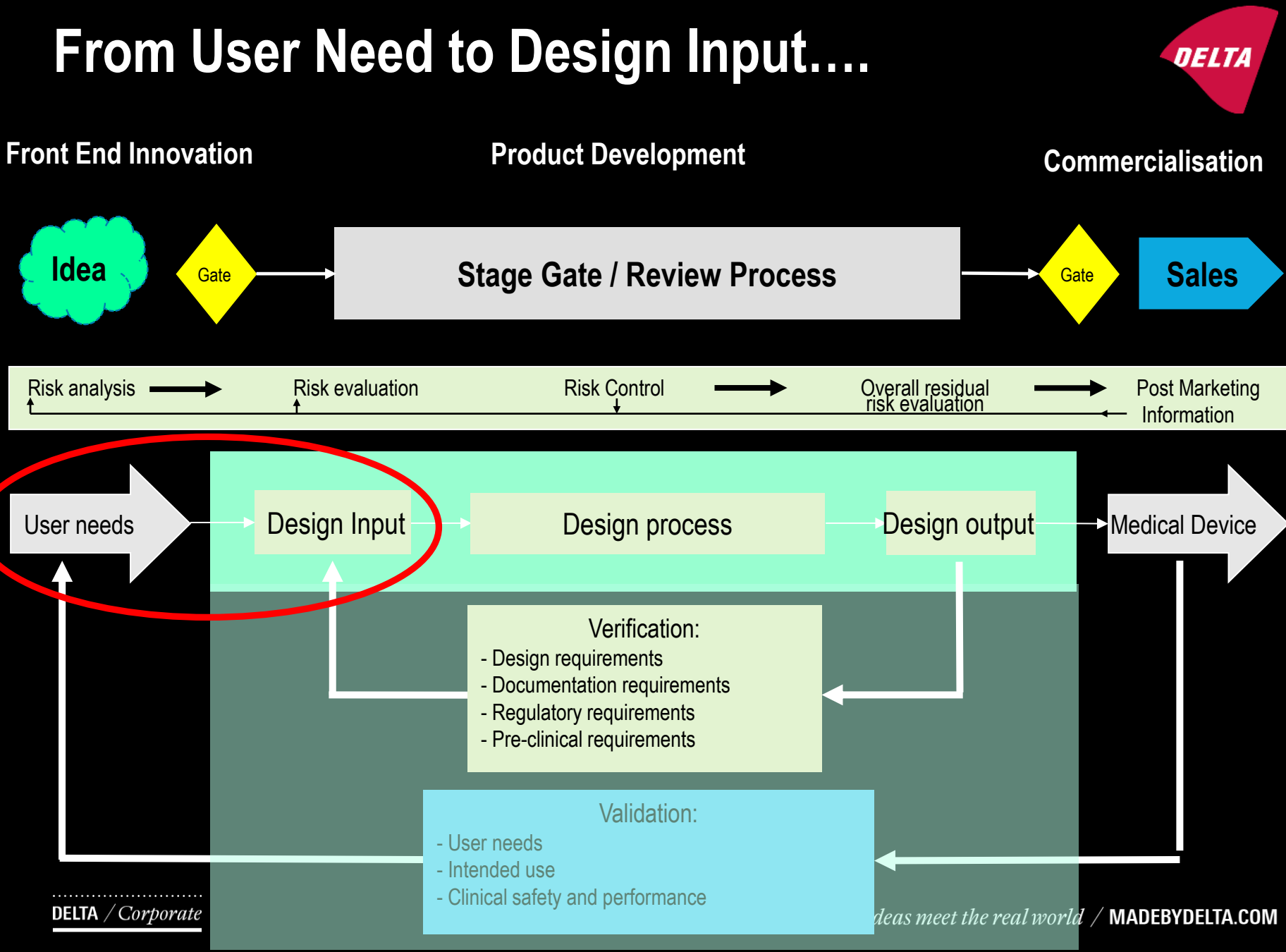


Source:
www.EmergoGroup.com/europe

DELTA / Corporate

MADEBYDELTA.COM

From User Need to Design Input….



From User Needs to Design Input

User Needs

- Identify the End User
- Define the End User Needs
- Describe Intended Use and decide on Claims
- “Freeze” the product concept
- Establish proof of concept

Design Input: The product conceptual description be elaborated, expanded, and transformed into a complete set of design input requirements, which are written to an engineering level of detail

User Need

- Identify the end user
  - Patient
  - Doctor
  - Nurse

- Make your observation in the field – not at your desk
- Study the procedure or the work in progress
- Use anthropological methods
- Collect and document information in a structured way
- Conclude the findings

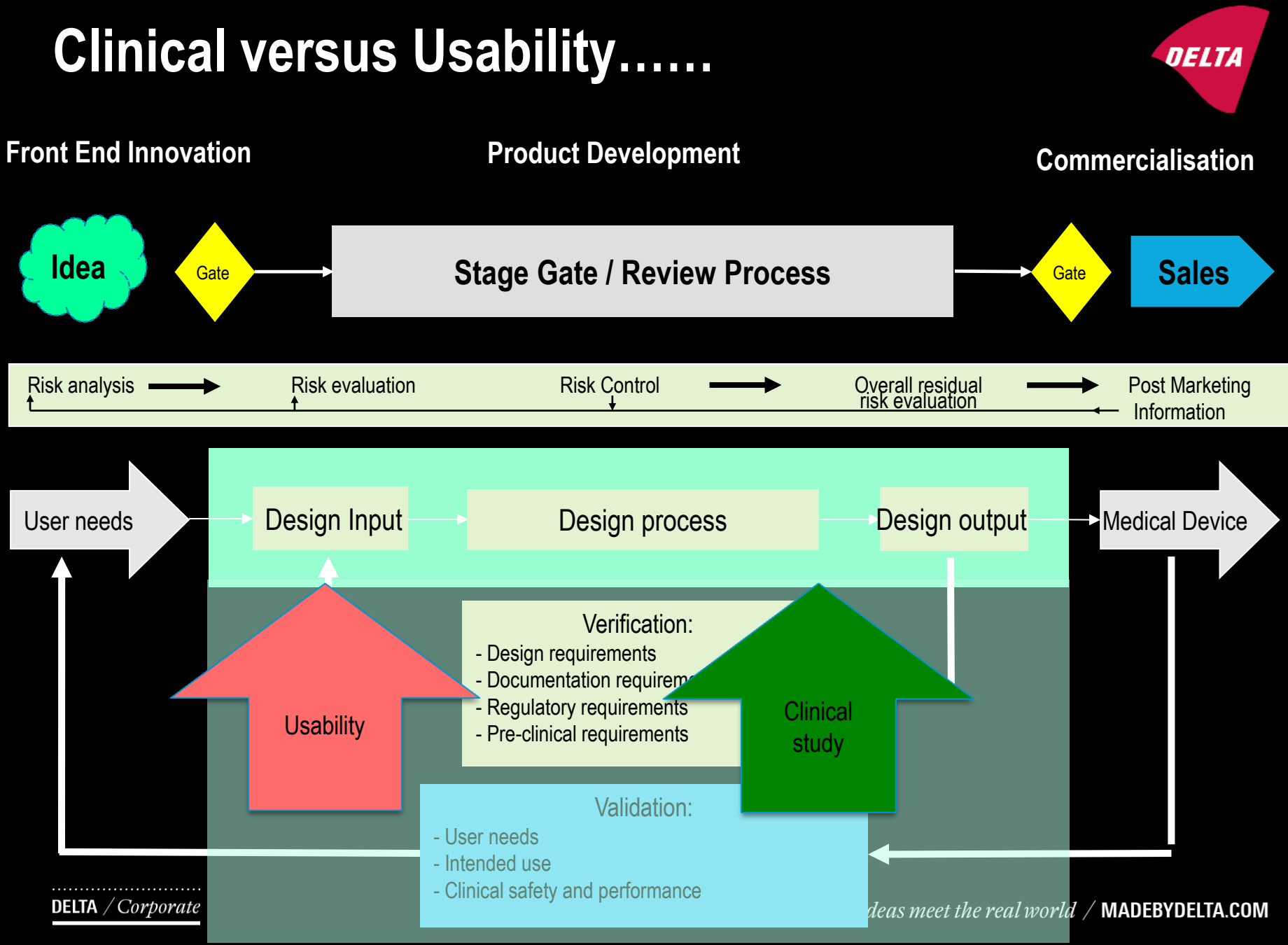
Intended Use

- Intended Use means the use for which the device is intended according to the data supplied by the manufacturer:

  - On the Labelling
  - In the Instruction for Use (IFU)
  - In the promotion material
    - Leaflets
    - Home page
    - Advertising

• Reference: MDD 93/42/EEC, Chapter 1 page 7

Clinical versus Usability……



Clinical Documentation

- Clinical Evaluation Report
  - Objective: Safety and Efficacy documentation
- Route:
  - Literature study, evaluation of scientific publications
  - Clinical documentation
    - In Vitro
      - Bench test
      - Cadaver test
      - Pre-clinical
    - In Vivo
      - Proof of Concept
      - Evidence based clinical Study

Usability documentation

- The intension with Usability is to obtain an easy, safe and intuitive way of using a product
- Main focus on the way the End User operate the product
- The objective is to reduce patient risk based on misuse or misunderstanding of Intended Use

Usability – Why

- Reduce the patient risk
  - 1 out of 3 not intended events are caused by misuse of the medical device (source FDA)
- Authorities require safer products
- Increasing numbers of End Users
  - Hospital use
  - Community use

Case – Mobile apps

- Mobile medical apps may pose additional or different risks due to the unique characteristics of the platform.
- For example, the interpretation of radiological images on a mobile device could be adversely affected by
  - the smaller screen size,
  - lower contrast ratio,
  - and uncontrolled ambient light of the mobile platform

Usability testing

- Product mock-ups or early prototypes operating in simulated-use modes for verification. Use finalized device design and labeling for validation.
- Test participants should be representative of the intended user population(s).
- Test environment that closely simulates (or is) the actual usage environment and typical usage conditions.
  - Consider screen orientation. Consider how the user will hold the device. Is it likely to be used with one hand or two?
  - For any text entry, consider whether the users will one finger type or will be likely to double-finger or double thumb-type. Will this affect performance?
  - Are there any other environmental requirements? For example, if the device is to be used in surgery, test the use with a case/cover that meets surgical standards.
- Allow realistic device-user interactions

Usability Engineering vs. Clinical Trials

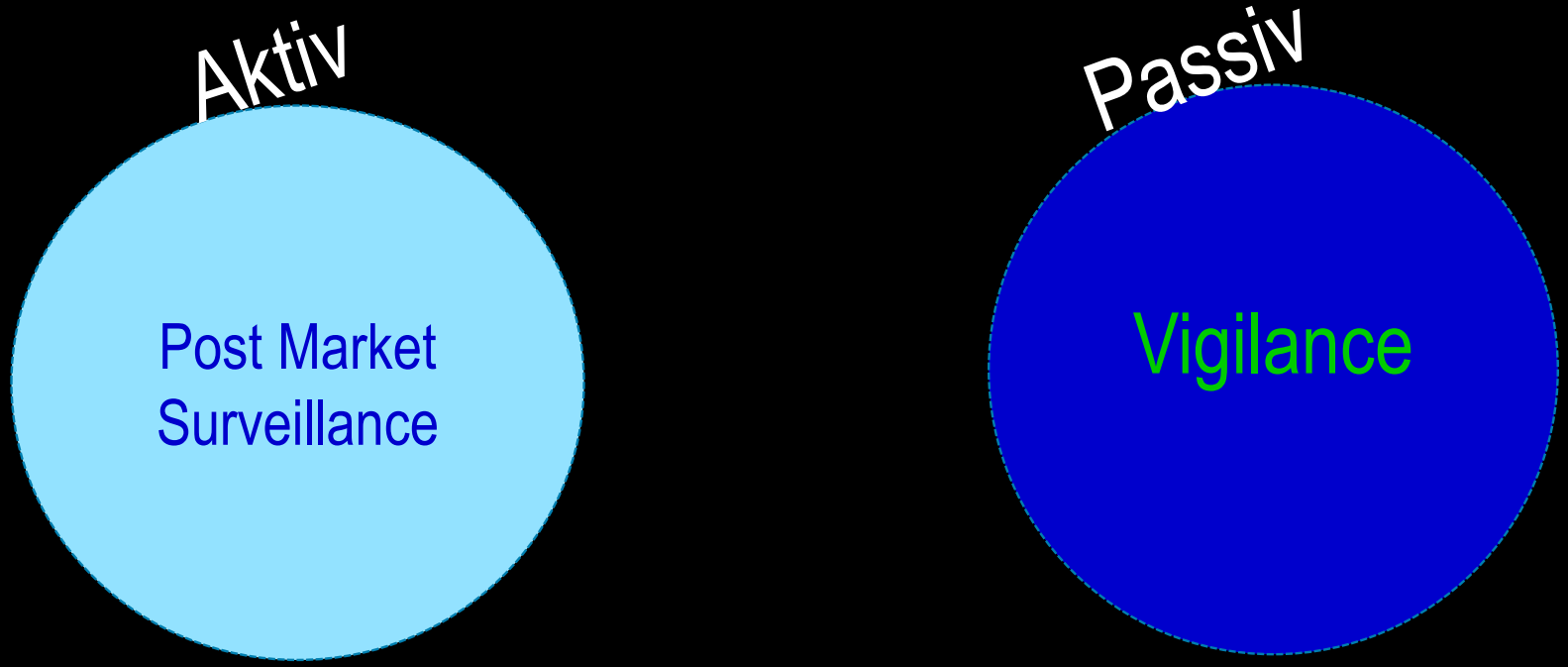
Usability Engineering

- Initiative in the early design phase
- Done with people – not on people
- Identify user failure and potential risks
- Identify strength and weakness
- Identify potential improvement of the design
- Test of Instruction For Use (IFU)
- Evaluate the product in a simulated environment
- Make a safe product to handle

Clinical Trials

- Plan in the early R&D phase
- Test of efficacy and safety In Vivo
- Evidence based documentation
- Will be conducted on real patients
- Execute the trial with product produced in the final manufacturing setup
- Approval of the Study by Authorities and Ethics Commitee before start of the study, if the product already are registered with a CE mark

Regulatorisk indflydelse på marketing!

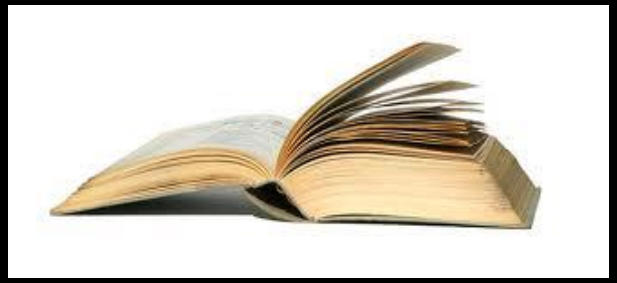


Definition: Post Market Surveillance

- En ***aktiv, fabrikantdrevet*** proces til at finde og opfange produkt-relateret viden angående sikkerhed og ydeevne fra markedet og kunderne

Målet er:

- at der udføres en fokuseret aktiv indsats for at indsamle viden om hvordan produktet fungerer i praksis



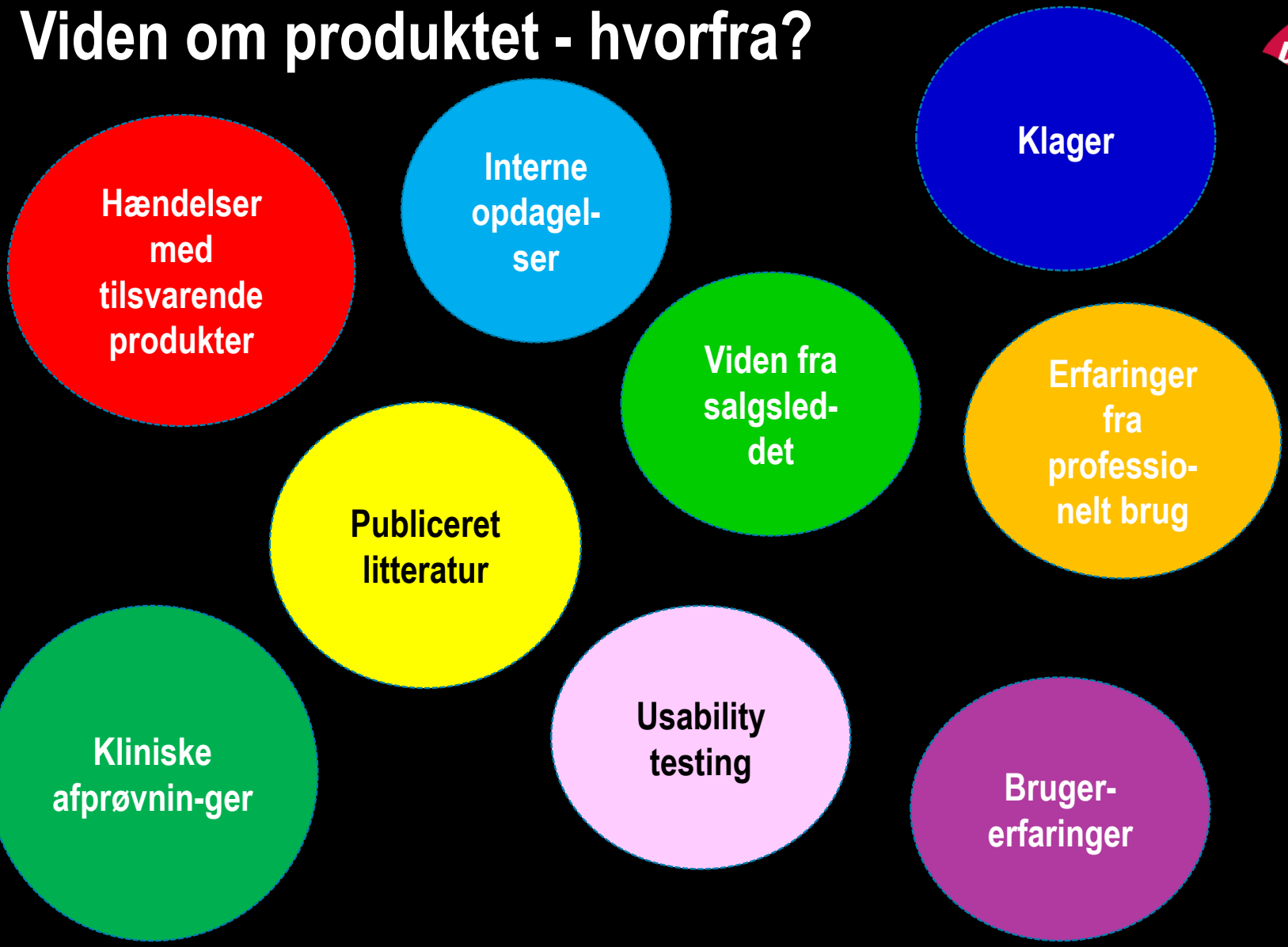
Definitioner: Vigilance

- En “ikke-opsøgende” struktureret proces til opsamling og behandling af indkomne klager og produkt-relaterede hændelser.
  - Indeholder bla. periodevis (gerne flere gange om året) trending og vurdering af indkommen viden, som en del af fabrikantens kvalitetsstyringssystem. Denne viden skal vurderes af ledelsen.

Målet er :

- at øge sikkerheden for patienter og brugere ved at nedsætte sandsynligheden for at en alvorlig hændelse opstår - eller opstår flere gange.

Viden om produktet - hvorfra?



Post Market Surveillance Plan…….

- Beskrivelse af formålet med planen - Hvad skal der undersøges for at underbygge sikkerhed og ydeevne - Patient followup?
- Endpoints der skal måles på for at besvare udeståender, f.eks. kliniske parameter eller andre mål
- Hvordan man har tænkt sig at gøre i praksis
- Sample size rationale og/eller antal produkter involveret
- Benyttede datakilder, f.eks. journaler eller spørgeskemaer mv.
- Procedurer for at sikre fremdrift i aktiviteterne, planer for dataindsamling
- Forventet start på aktiviteter og afrapportering, samt timelines

Post Market Surveillance – hvordan indhentes viden?

- Litteratursøgning
- Spørgeskemaer
- Hændelsesdatabaser FDA (MAUDE/PRIMO), MHRA, TGA etc.
- Fokusgrupper
- Trending
- Målrettede kliniske afprøvninger

Summary

- Regulatory strategy
- Regulatory Plan – route to compliance

- Clinical Documentation Plan
- Usability

- Vigilance
- Post Market Surveillance

We help ideas meet the real world

Case: ePatch® Regulatory Challenges

Lars Seier-Petersen

Health monitoring need……

With an ageing population and ever-increasing occurence of chronic diseases more people need to be monitored.

Continous monitoring of vital physiological signs provide valuable information about a person's state of health.

Longer and easier monitoring periods at home or in hospitals add crucial information.

ePatch®

ePatch® continuously records, stores and wirelessly transmits the following physiological data:

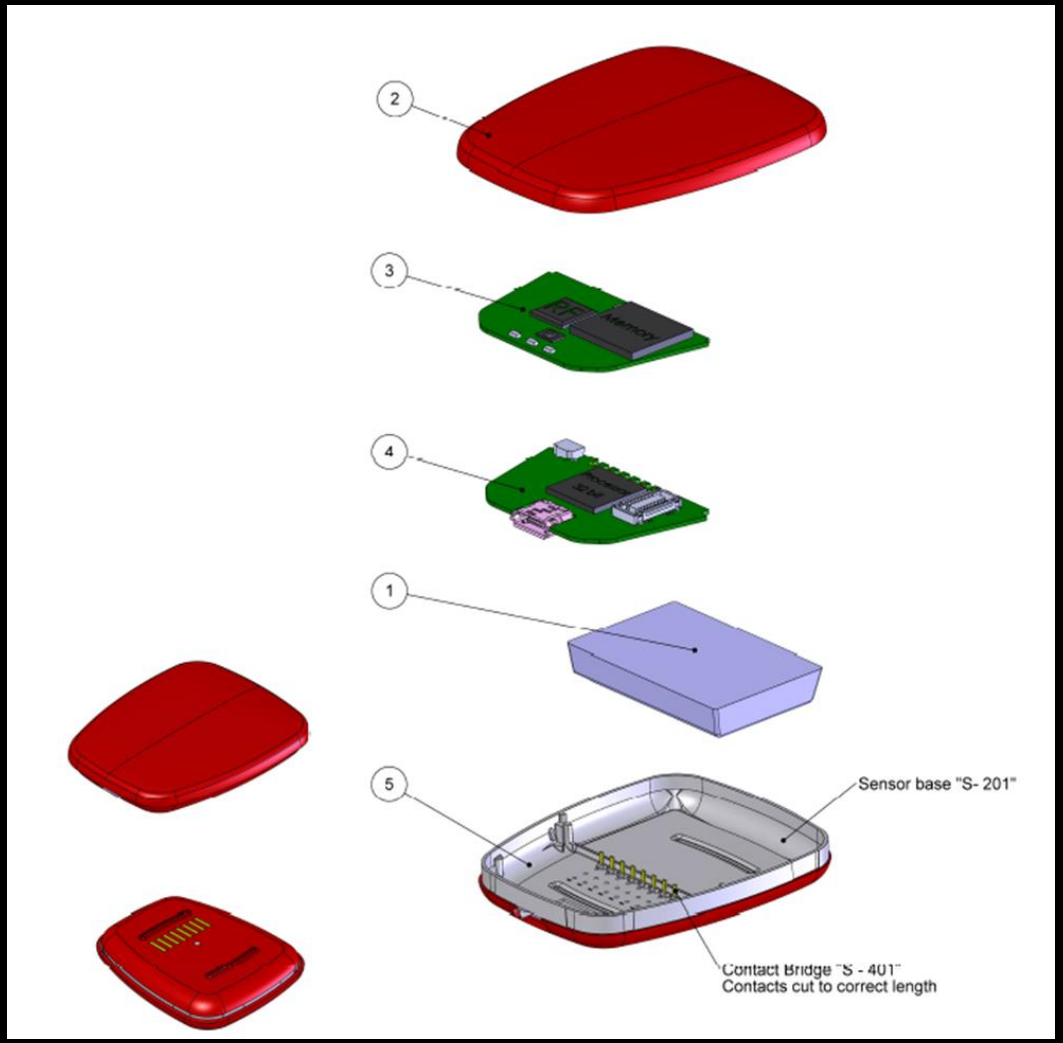
- ECG
- Heart rate
- Activity and motion

ePatch® allows individuals to remain active and independent while their heart and general health are monitored. ePatch® is a small, discreet body-worn patch sensor that adheres to the skin.

ePatch – ECG Electrode

ePatch – ECG Recorder

ePatch – ECG Recorder



(1) Battery
(2) Mechanics Top
(3) PCB Top
(4) PCB Bottom
(5) Mechanics Bottom

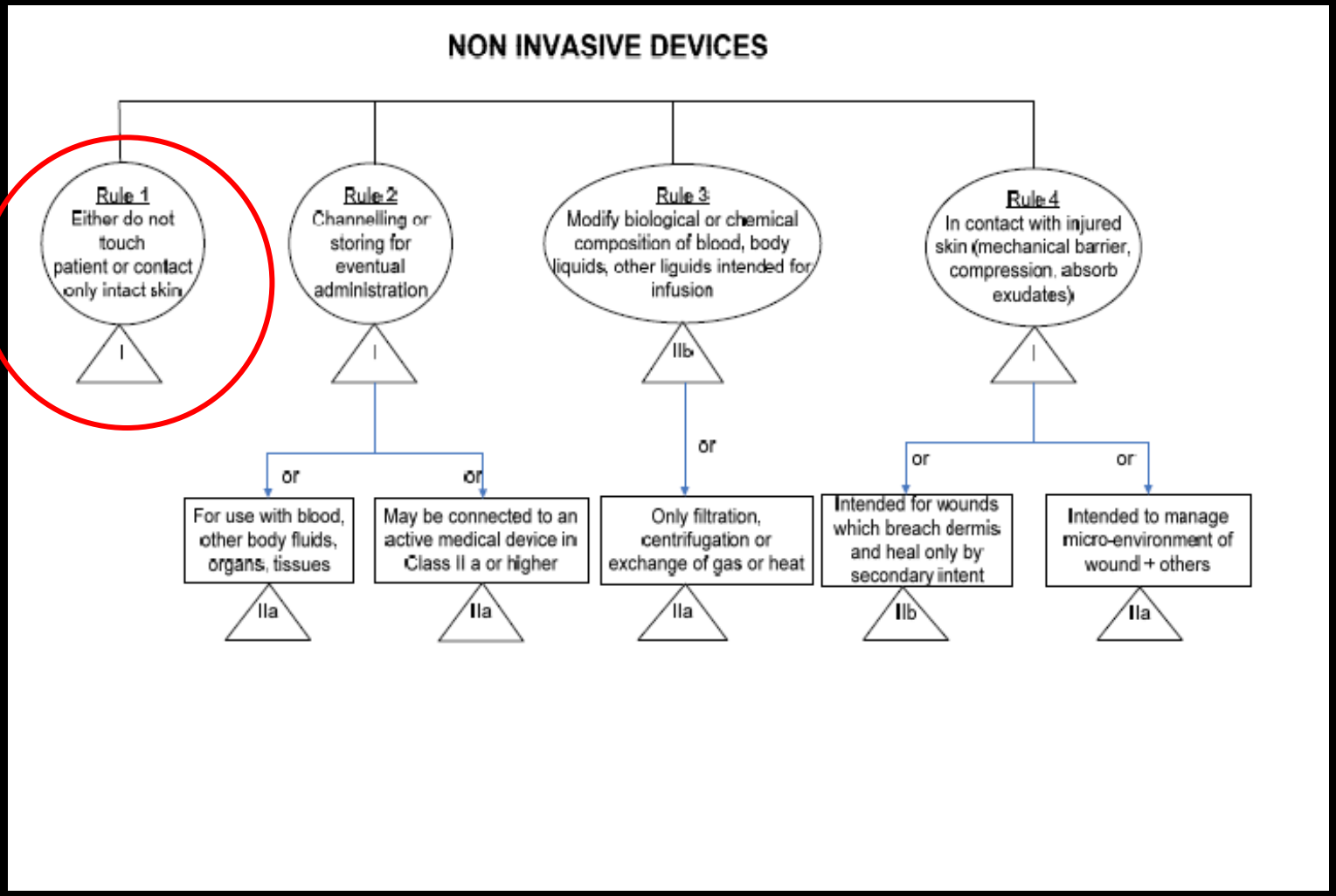
Regulatory strategy……..

- Prepare for product registration in EU
- Prepare for product registration in US

- Choose products concept:
  - ECG Recorder
  - ECG Electrode

- Product Classification!

Classification (EU) – ECG Electrode



Class I

Class I (EU) devices are low risk.

Routes to compliance:

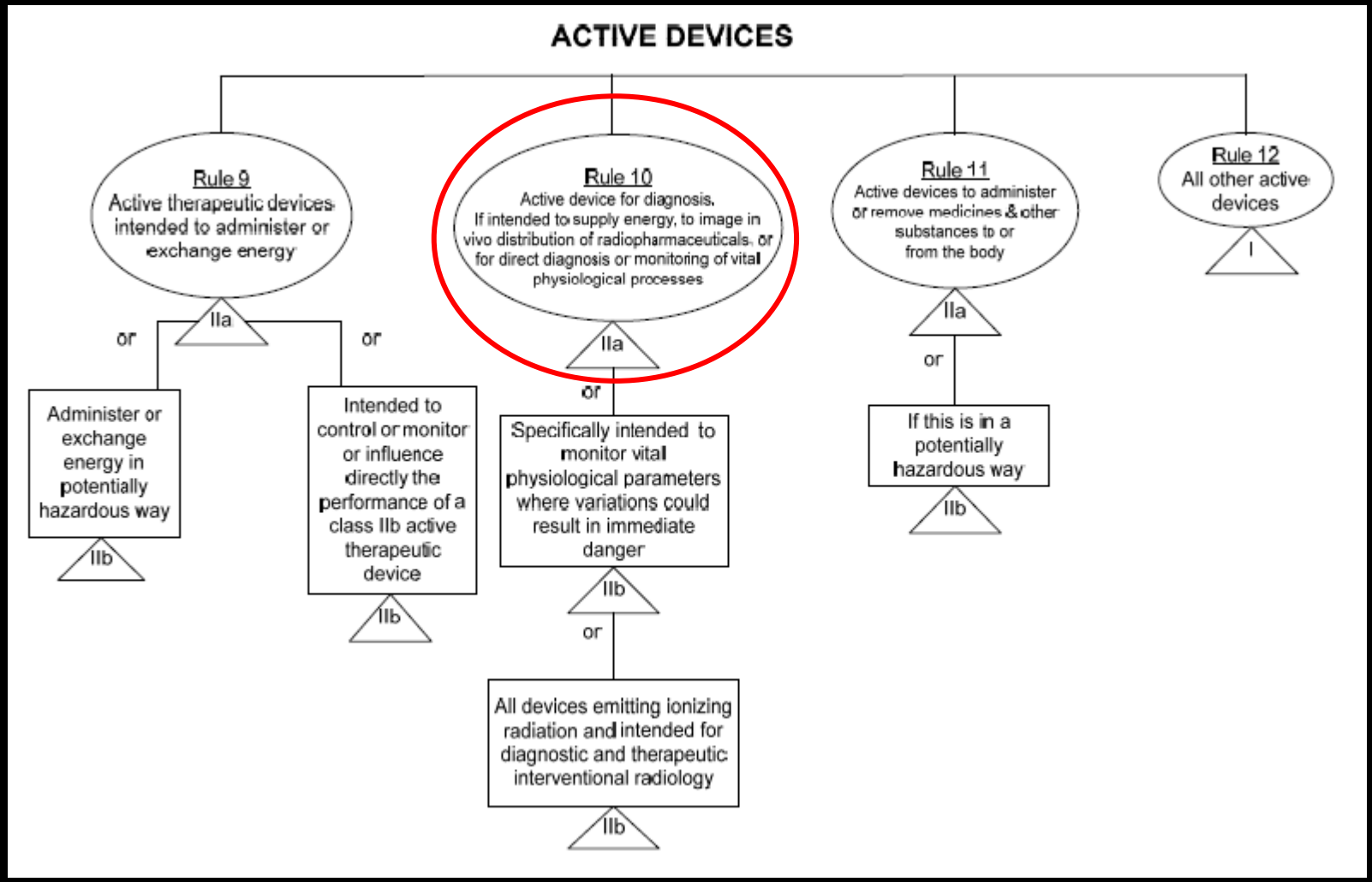
- The manufacturer has to produce a technical file, including product test results to relevant EN standards
- Register company and product at “Sundhedsstyrelsen”

Class I (US) devices are low risk.

Routes to compliance:

- The manufacturer has to produce a technical file, including product test results to relevant US standards
- Register as Class I Exempt from 510(k)

Classification (EU) – ECG Recorder

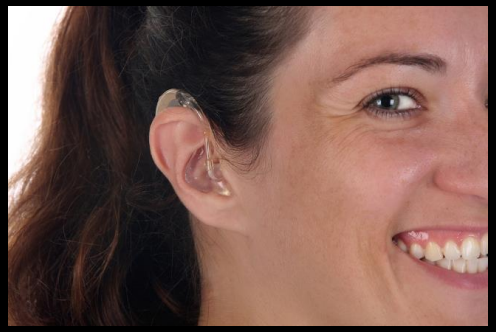


Source MEDDEV 2.4/1 Rev. 9

Class IIa Devices (EU)

Class IIa are low-medium risk devices

- Examples such as hearing aids, electrocardiographs, ultrasonic diagnostic equipment. As for Class I, the manufacturer produces a technical file, but in addition a conformity assessment must be carried out by a Notified Body, one of the following routes (at the manufacturer's choice):



Class IIa Devices (EU)

Routes to compliance:

- Examination and testing of each product or homogenous batch of products
- Audit of the full quality assurance system – EN 13485
- Audit of the production quality assurance system – EN 13485 excl. the part covering R&D
- Audit of final inspection and testing

Class II Devices (US)

Class II are low-medium risk devices

- Comply with FDA 21 CFR 820 Quality Management System

Routes to compliance:

- Submit a 510(k) application to FDA
- Please note that FDA does not perform 510(k) pre-clearance facility inspections. The submitter may market the device immediately after 510(k) clearance is granted. The manufacturer should be prepared for an FDA quality system (21 CFR 820) inspection at any time after 510(k) clearance.

Claims

- ePatch® enables fast-track development of an ECG patch for a leadless, unobtrusive, continuous ECG recording and arrhythmia detection.

- Wear and forget – ePatch® is
  - easy to use
  - can be worn 24/7
  - has no wires or cable
  - is easy to apply.

DELTA learnings……..

- Formulate the Regulatory Strategy in the early stage
- Prepare and update the Regulatory Plan

- Frontload the project
  - Resources
  - Manpower
  - Timing of the right skills

It’s easy to present –

Hard to execute!

Thank you!

Lars Seier-Petersen, DELTA