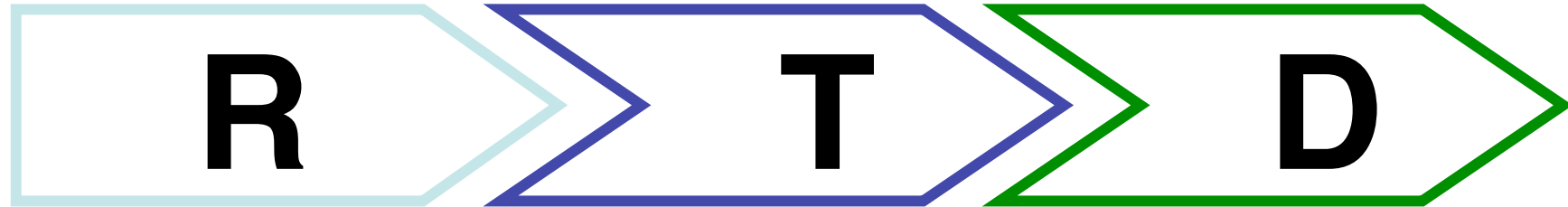# ICT Innovation – Spring 2017

MSc in Computer Science and MEng Telecom. Engineering
EIT Masters ITA, S&P,SDE

Lecture 01 – Introduction

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UNIVERSITY OF TRENTO

R → **T** → **D**

Basic Research

Technology Development

Product Development

- Discovery process
- No set timing
- Unpredictable returns
- Long term

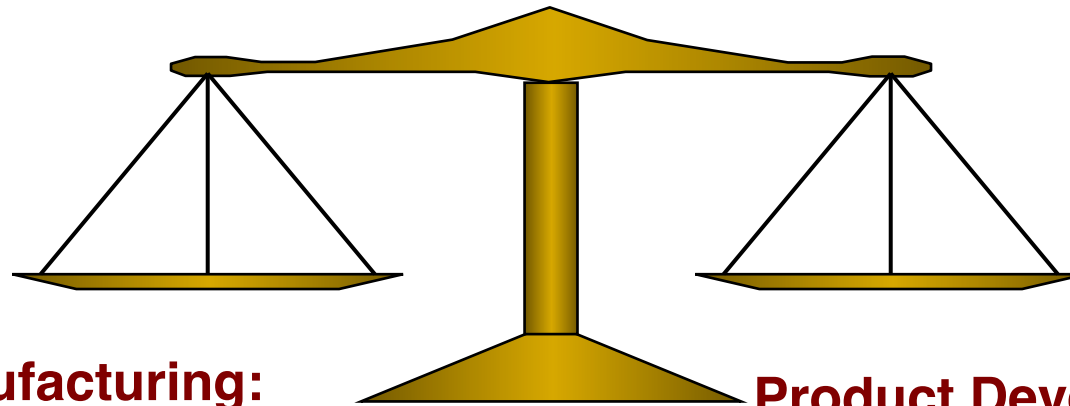- Loosely structured
- Difficult to plan
- Less predictable
- Medium term

- Structured methods
- Planned timing
- Predictable outcome
- Short term

What makes a successful product?

- **A successful product is based on several features**
  - Features and functions of design process
  - Cost and quality of manufacturing process

**Manufacturing:
Cost and Quality**

**Product Development:
Features and Function**

- **Cost and Quality can be improved leading to a "cheaper" product**
  - Eg just in time production lower cost of stockage → overall cheaper
- **Features and Functions can be improved by a good product development process that yields "better" products**

- **Seller beware! And designer even more**
  - "ogni scarrafone è bello a mamma soa" (saying from Naples)
    - Every cockroach looks a beauty to its mother (more appropriate than English "beauty is the eye of the beholder")
  - You need to balance cost/quality with features/function for <u>your</u> intended customers, not for yourself

- **What is**
  - an "acceptable cost" for a "desired functionality" might vary
    - Either minimum functionality or maximum cost might be different
  - a "better" product might be so for an "unintended" functionality bundled with the product

Example "Unintended feature"

- ## SMS intended life
  - Designed to push configuration information to GSM Phone or pull information from the Network
    - "INFO GPRS" returns the remaining network traffic
    - "SET APN ibox.mycompany.com"
  - 256 characters more than enough for this purpose
- ## SMS actual life
  - Used by phone users to send brief messages
  - A large source of revenues for the telecom operator
- ## MMS follow-up
  - Sending much richer data (photo, video, audio)
  - Why it never took over?

Why Italians were so fond of SMS?

- **Omnitel**
  - In 1998 ha 6.1M customers
  - My birthday present on October 1999 for my wife (Beatrice) was one of them
    - and she used a lot of SMS (now whatsapp)

- **Social explanation?**
  - Now we collect them in class…

Why Italians are so fond of SMSs

- **Answers in 2017**
  - Easier Concentrate for some short period of time
  - Not real time communication doesn't require other guy to communicate
  - Doesn't attract attention
  - **Used to be cheaper**
  - Perceived as less intrusive
  - Deaf people cannot use phone call but blind people cannot send SMS
  - Can broadcast, time savings
  - Can be stored
  - Girls prefer messages than calling
  - Less affetcted by signal problems
  - Remains the proof that has been written
  - Can send a message while doing something else (cannot call when you cannot speak)
  - Can correct and weight the right word,
  - more respectuful you may not reply and not be so rude
  - More neutral from emotions
- **Only one issue about costs, rest is about psychology or convenience**

- **2016 Explanations**
  - If you can't really talk on the phone, sms is better
  - for some people to talk it is hard (psychologically)
  - takes more time, writing messages is fast
  - It was new
  - There was internet messages but there was not really internet penetration in italy
  - **It was cheaper than calling**
  - Asynchronous communication
  - If what you need to say can fit in to 256 charcthers there is no need to talk
  - When you want to meet somewhere the sms can be stored and checked later
- **Again only one answer is about costs the rest is psychological or convenience**

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- **2000 – Fabio and Beatrice have a baby**
  - The kindergarden closes at 16:00
  - Fabio tends to linger in the office longer than necessary
  - Wed 15:15 – Beatrice has an important meeting
  - Thu 19:15 – Beatrice is hungry

- **"Timing exercise" in Class**
  - 15:15 – 12 seconds
  - 19:15 – 17 seconds

- **Acceptable prices for each family conversation?**
  - 15:15 – 0.05€ (+1), 1€, 0.25€, 0.01€, 0.10€
  - 19:15 – more or less the same

What is an acceptable balance?

- **Beatrice was a young professional, let's take a more middle class role**

- **What is an acceptable "meaningful cost" of "Sorry I'm late by 1h." - "Ok, I'll pick the kid at school" for 1999's family?**
  - Italian High School Teacher with MA Degree
  - 42 working weeks out of 52 (4 days a week, 4-5 hours a day)
  - How many hours/days/weeks must work to pay phone bills?

- **Calling for 17' a day, off-peak, for the year**
  - 1999: teach for 1day, 2days, 1week, 2weeks,
  - now: teach for 1hours

- **Calling for 12' a day, normal hours, for the year**
  - 1999: teach for 2days, 3-4days, 2weeks
  - now: teach for 1-2days

- **Omnitel**
  - In 1998 ha 6.1M customers
- **Omintel Tariffs in 1999**
  - From "La Repubblica" 29/January/1999
  - Peak times (8-16): 0.51€/minute (before were 1€/minute)
  - Off peak (22-8): 0.101€/minute
  - SMS costs: 0.086€/each
  - "Scatto alla risposta" Talk 1 minute or 30 second, still pay 1 minute
- **Vodafone (who bought Omnitel) – 2015**
  - Basic: 0.125€/Minute
  - Unlimited Minutes: 34€/Month (actually 4 weeks)
- **What does it mean?**

- **Remember people must work to pay you**
  - Even the very rich must spend time of their servants, lawyers etc. to buy stuff
- **Family cost of "Sorry I'm late by 1h." - "Ok, I'll pick the kid at school" in 1999**
  - Talking: 0.5-1€ vs SMS: 0.16€
- **Starting salary of Italian High School Teacher with MArt Degree**
  - 42 working weeks out of 52 (4 days a week, 4h/day, 4-5hours/day), 20% taxes.
  - 1999: 10.253,22€
- **Calling 10' a day for <u>every</u> working day**
  - off-peak, for the year → teach for two weeks
  - normal hours, for the year → teach for **two months** just to pay phone bills, don't eat, don't pay rent, don't buy clothes, just pay the phone bills
- **Texting once a day for <u>every</u> working day**
  - off-peak, for the year → teach for 2 hours
  - normal hours, for the year → teach for 2 hours

- **Compute "Meaningful Cost" for same teacher today on using SMS vs MMS vs Whatsapp**
    - Last one provides photos or audio as well as text but requires internet connection either flat or by byte

- **High School Salary**
    - 42 working weeks out of 52 (4 days a week, 4h/day), 20% taxes
    - 2015: 20.973,22€ (plus performance bonus but ignore that)

- **Cost of doing for every (work)day**
    - Calling 10'x2 vs 2 SMS vs 2 Whatsapping it
    - 1 baby picture to Granny with MMS vs Whatsapping it

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Second Exercise

- **Winners and Losers**
  - VHS vs Betamax
  - Phonogram vs Gramophone
  - Mac vs PC (but only for for Graphic Designers)
  - Mac vs PC (but only for Small Companies)
  - iPad vs Windows Tablet (Pen Tablet)
  - Qwerty vs Dvorak
  - 2+ Buttons Mouse vs 1 Button Mouse
- **Each student will have to chose a case study and submit ONE slide per case study x Thursday evening**
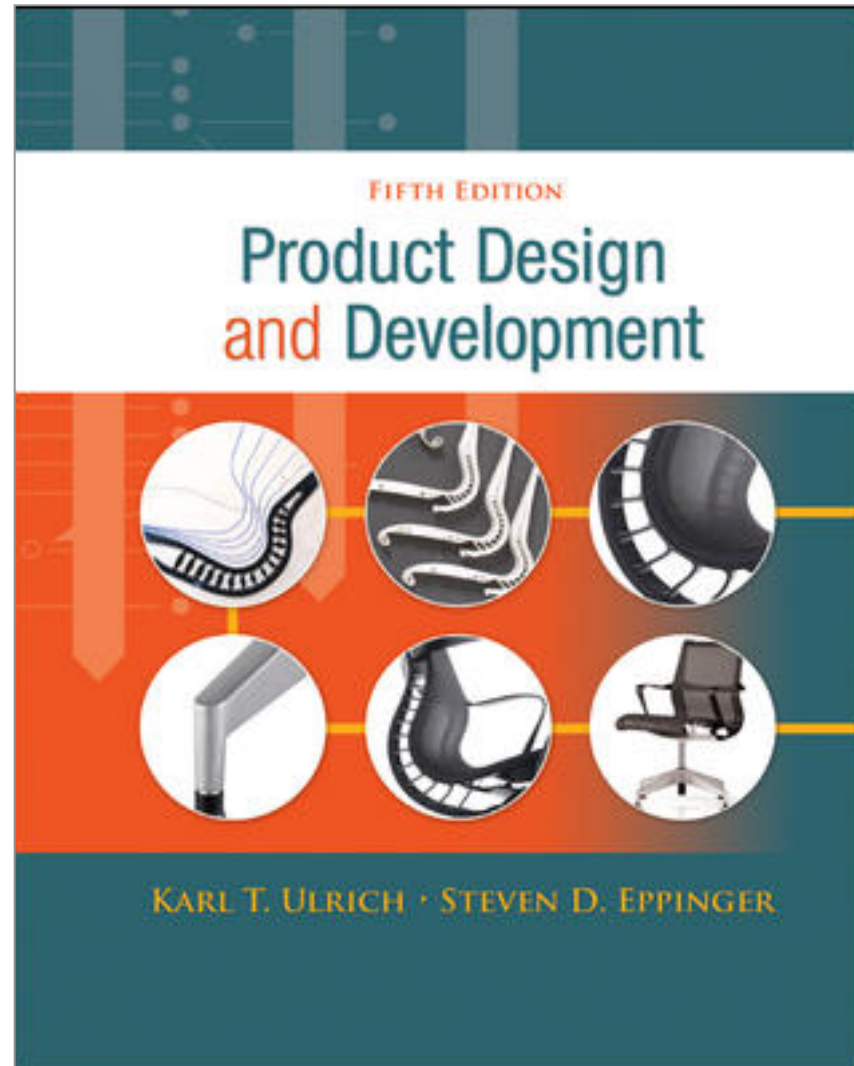- **http://doodle.com/poll/ep2mnspvwh6vqpmu**

VHS vs Betamax Slides

- **Common Characteristics**
  - If any
- **VHS Unique Characteristics**
  - Key differentiating characteristics (Business, technical, usability, whatever)
  - Bla bla
- **Betamax Unique Characteristics**
  - Key differentiating characteristics (Business, technical, usability, whatever)
  - Bla bla
- **Why VHS Won?**
  - The reasons for you
- **Evidence**
  - Some links/paper etc.

Textbook

Product Design and Development
Karl T. Ulrich and Steven D. Eppinger
5th edition, Irwin McGraw-Hill, 2012

1. **Introduction**
2. Development Processes and Organizations
3. Opportunity Identification
4. Product Planning
5. Identifying Customer Needs
6. Product Specifications
7. Concept Generation
8. Concept Selection
9. Concept Testing
10. Product Architecture
11. Industrial Design
12. Design for Environment
13. Design for Manufacturing
14. Prototyping
15. Robust Design
16. Patents and Intellectual Property
17. Product Development Economics
18. Managing Projects

FIFTH EDITION

Product Design and Development

KARL T. ULRICH · STEVEN D. EPPINGER

http://doodle.com/poll/
ep2mnspvwh6vqpmua3wsmaym/admin