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ICT Innovation – Spring 2018

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

Lecture 06 – Concept Testing (Continued)

Prof. Fabio Massacci

PD&D Process: Concept Development

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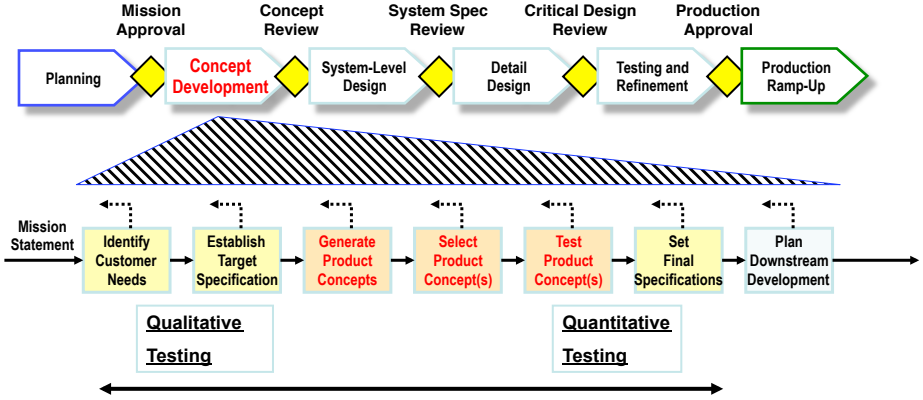
- **Eliminate**
  - Concepts that look unpromising (business-wise)
  - Concepts that are unwieldy to design



Concept Testing Process (Recap)

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- **Define the test**
  - Define the purpose of the test
    - What market to be in?
  - Choose a survey population
    - College students who live 1-3 miles from campus
    - Factory transportation
  - Choose a survey format
    - Face-to-face interviews
- **Execute test**
  - Communicate the concept
  - Measure customer response
- **Interpret the results**
  - Factory is best

Survey Format

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- **PART 1, Qualification**
  - How far do you live from campus?
    - <If not 1-3 miles, thank the customer and end interview.>
  - How do you currently get to campus from home?
  - How do you currently get around campus?
- **PART 2, Product Description**
  - <Present the concept description.>
- **PART 3/4, Purchase Intent**
  - If the product were priced according to your expectations, how likely would you be to purchase the scooter within the next year?

I would definitely not purchase the scooter.	I would probably not purchase the scooter.	I might or might not purchase the scooter.	I would probably purchase the scooter.	I would definitely purchase the scooter.
			↑ "second box"	↑ "top box"

- **PART 4, Comments**
  - What would you expect the price of the scooter to be?
    - (Price point!)

Interpreting the Results: Forecasting Sales

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- **Q = N x A x P**
- **Q = sales (annual)**
- **N = Potential number of (annual) purchases**
- **A = awareness x availability (fractions)**
- **P = probability of purchase (surveyed)**
  - C = Conversion Rate "will buy" to "actually buy"
  - F = Fraction of people who answered

= Cdef x Fdefinitely + Cprob x Fprobably

"top box" "second box"

Forecasting Example:

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- **Campus**
  - N = off-campus grad students (200,000)
  - A = 0.2 (realistic) to 0.8 (every bike shop)
  - P = 0.4 x top-box + 0.2 x second-box
- **Data**
  - Total sales: 6400 units/yr
  - Price point: $795
- **Margins**
  - 40-50% off Resellers
  - 25% off Distributor
- **"Out-of-factory" =**

- **Factories**
  - N = current bicycle and scooter sales to factories (150,000)
  - A = 0.25 (single distributor's share)
  - P = 0.4 x top-box + 0.2 x second-box
- **Data**
  - Total sales: 6000 units/yr
  - Price point: $1500
- **Margins**
  - 35% Distributors
- **Out-of-factory =**

Are We Sure Factories Are Best?

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- **Campus**
  - You have sold one scooter to a graduate student in a university
- **How many other scooters are you going to sell for the same University next year?**
  - Some students will graduate and will bring the scooter with them
  - Some of new arriving students will buy a used one, others will buy a new one
  - The used one (and resold) will be by definition crappy so if they break the students won't be surprised
- **Factories**
  - You have sold one scooter for a worker in a factory,
- **How many other scooters are you going to sell for the same factory next year?**
  - They already have one, unless they hire more workers they don't need one
  - If it breaks after one year of use this would be a crappy product and they won't buy a new one anyhow

Repeated Sales

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- **You don't want to make a one-off sale**
  - To make a new sale you must find a new customer!
  - If you run out of (new) customers you run out of business
- **You want to make a repeated sale**
  - Keep selling the stuff to the same customer
  - Or keep having a steady supply of new customers
- **Example:**
  - Kid Shoes
  - Computer Games

Repeated Sales

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- **Kids Shoes**
  - Can't keep the shoes for long (feet grow)
  - Got a steady supply of new customers
  - Secondary market not so good (shoes too worn out)
- **Teenagers Computer Games**
  - Can't keep games for too long (get bored)
  - Got a steady supply of new customers
  - Secondary market is good (new kid can buy old game)
- **Kid shoes is a better business but Computer Games have better margins**

Repeated Sales

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- **Selling male condoms (growing market even in crises)**
  - Survey is most frequently used method → Thousands of surveyed people → statistically significant!
- **General Social Survey**
  - US Population in the right age bracket
  - Frequency of Sex (Variable sexfreq): Women 15-44 yrss
  - Sex without Condoms (variable SXQ251): Male-Female 18-59
- **Market estimation**
  - Estimated = (1-SXQ251) * sexfreq * US men

Estimating our market

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- **Frequency of Sex (Variable sexfreq): Women 15-44 Years - Average 51 times/yr**
  - 1-2 a year: 7.8%
  - Once a month: 10.3%
  - 2-3 times month: 15.9%
  - Weekly: 17.7%
  - 2-3 per week: 21,20%
  - 4+times a week: 6.3%
- **Sex without Condoms (variable SXQ251): Males-Fem 18-59 yrs**
  - Never 27,2% ← top box
  - Less than half the times 13,4% ← second box
  - About half 6,9%
  - Not always but more than half 8.3%
  - Always 43.8%
- **Market optimist estimation: 1.3 Billions**
  - Estimated: 1.325M/year = 42% condoms x 51 times x 61.2M men

Who do you ask? (continued)

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- **General Social Survey → Now we ask women**
  - Frequency of Sex (Variable sexfreq): Avg 51 times a year
  - Frequency of Usage of Contraceptives – Women 15-44 Years
    - No Contraceptives 19,0%
    - Using Condoms 10,0%
    - Other Contraceptives 51,8%
- **Market estimation**
  - Estimate = 316M/year = 10% condoms x 51 times x 61.9 M women
  - Condom sold in 2009 according to Nielsen: 437M

Recapping the numbers

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- **General Social Survey (2006-2009)**
  - Frequency of Sex (Variable sexfreq): Women 15-44 Years
    - Average 51 times a year
  - Sex without Condoms (variable SXQ251): Males-Females 18-59 years
    - Never without or less than half 42%
    - Never without 27,2%
- **Market estimation for 2009**
  - Optimist = 1.325M/year = 42% using condoms x 51 times x 61.2M men
  - Conservative = 851M/year = 27% never without x 51 times x 61.2M men
  - Excel estimate = 1.029B/year
- **Actual Numbers**
  - Condoms sold in 2009 according to Nielsen: 437M
    - Of those city of NY alone bought 41.7M condoms to give away in some program, Washington DC bought 3.5M….
- **Where are the billions of "declared" used condoms gone?**

Sources of Forecast Error

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- **"Unsound" Surveys**
  - People may not tell true opinion
  - Statistically significant but practically insignificant
- **Network Effect**
  - Word-of-Mouth Effects may create avalanches (positive/negative)
  - Competition may change playing field
- **Quality of Concept Description**
- **Pricing**
- **Level/Type of Promotion**
  - "feel good" effect beats "actual" effect (but only for low cost item)
    - Nobody is going to spend 5.000€ for something that is nice but doesn't work
    - But between 13€ and 15€ you got a chance…

Who do we ask?

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- **Men's female partners over lifetime**
  - None 11.4%
  - One 15.0%
  - Two 7.6%
  - 3 to 6 26.5%
  - 7 to 15 18.1%
  - 15+ plus 21.4%
- **"Men are hunters" etc. etc.**
- **Most promising market?**
  - Man with several partners
    - According to a Durex survey (2° largest player)
- **Women's male partners over lifetime**
  - None 11.3%
  - One 22.2%
  - Two 10.7%
  - 3 to 6 31.6%
  - 7 to 15 16.0%
  - 15+ plus 8.3%
- **"Women prefer stable relationships" etc. etc.**

Is survey reliable? Graph Theory to the rescue

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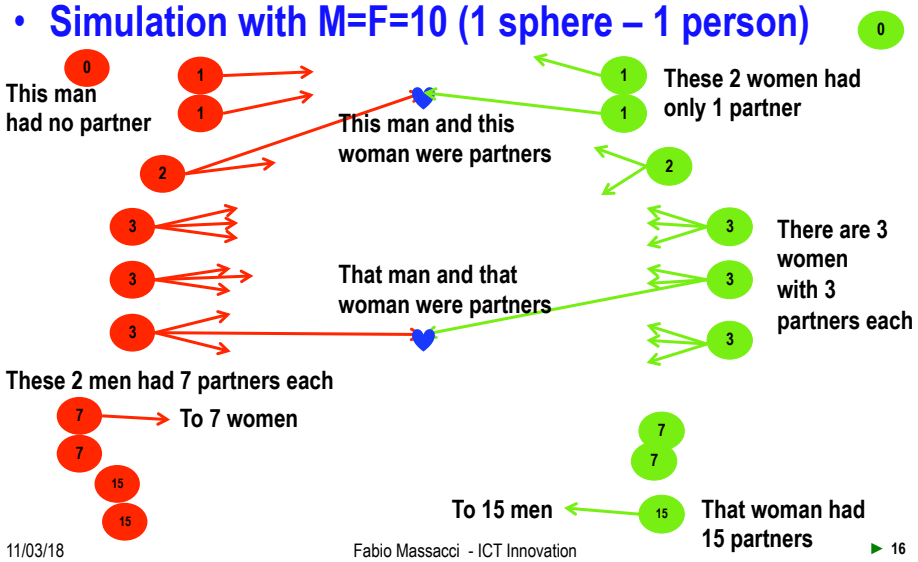
- **Simulation with M=F=10 (1 sphere – 1 person)**



Is survey reliable? Graph must be bipartite

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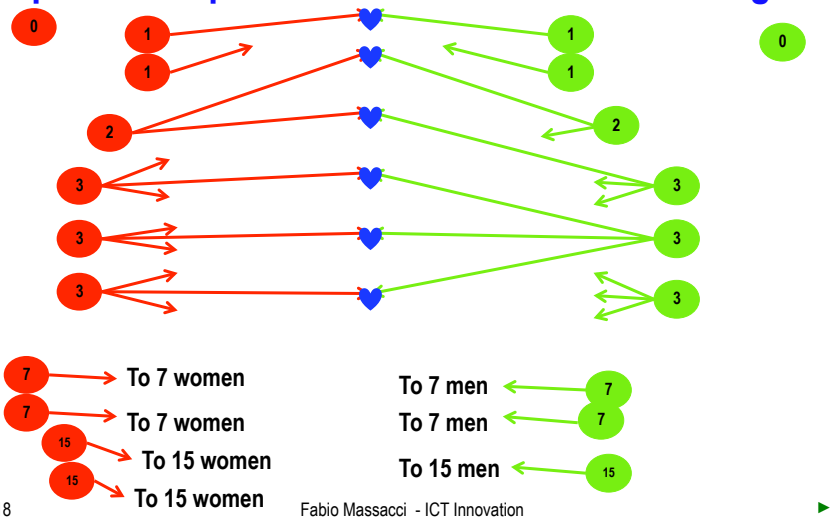
- **Bipartite Graph in words = It takes two to Tango…**



Is survey reliable? Ooops

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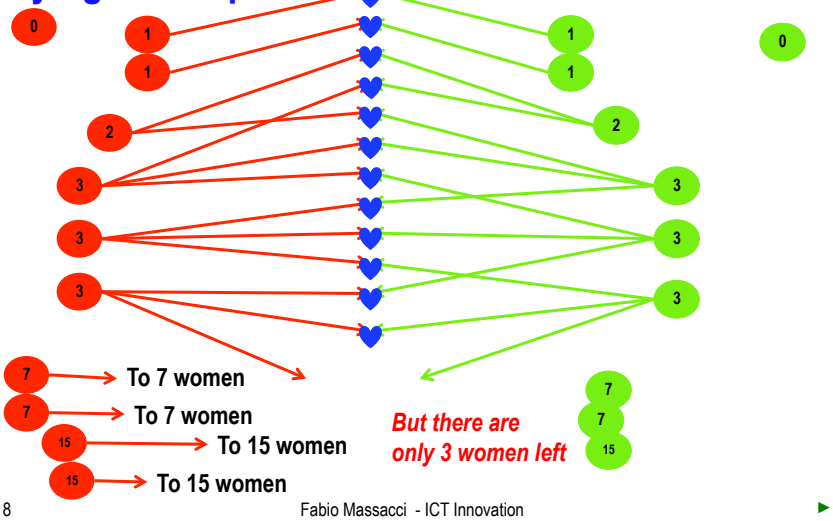
- **Trying to complete…**



Should you target men or women? (contd)

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- **Men's female partners over lifetime**
  - None 11.4%
  - 1 partner 15.0%
  - 2 partners 7.6%
  - 3 to 6 26.5%
  - 7 to 15 18.1%
  - 15+ plus 21.4%
- **339M relationships =**
  - 61.2M * (15%+2*7.6%+…)
- **There are 100M relationships missing…**
  - Unsurprisingly not many condoms are sold to the men boasting 7+ relationships in the surveys…
- **Women's male partners over lifetime**
  - None 11.3%
  - 1 partner 22.2%
  - 2 partners 10.7%
  - 3 to 6 31.6%
  - 7 to 15 16.0%
  - 15+ plus 8.3%
- **233M relationships**
  - 61.9M * (22.2%+2*10.7%+…)
- **What's wrong?**
  - Men lie or women lie or both lie
  - or count "partners" differently
  - or just don't remember and put down a "feels right" number

Same question, different answers

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- **Same "data" different people and different questions**
  - 316M (women) < 437M (actual) < 851M (sex) < 1.3B (sex optimistic)
- **Why?**
  - Customers are not obliged to tell you the truth
    - Kindness to the interviewees or for shame etc. etc.
  - Surveys may have "statistical significance" → but no "practical significance"
    - Ok for a socio-rant in the NYTimes on national sexual behavior, not so good for planning to produce half billion condoms
  - Look for answers from different perspectives and "evidence" of behavior
    - Key suggestion is always to meet the customer on his/her premises and look out for clues

Can we exploit the bias?

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- **If customers have a systematic bias, can we transform this "bug" into a "feature"… to sell them things?**
  - Feature is not needed for any operational purposes but makes them feel good/cool/etc
- **In the past I used Apple products as an example but there is always at least one Apple's fan in the audience who…**
  - Cannot provide any "technical", or "operational" description of the actual difference
  - Long discussion on this or that technical feature and then always reverting to some mystical "user experience"
- **Today → Much simpler product → rubber**
  - 0.010 m^2 of rubber + feel good factor vs 0.009 m^2 of rubber
  - How many people would buy (useless) feel good?
  - How much more people would be willing to pay?

Can we exploit the bias? (Cont)

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- **Can we exploit tendency of men to boast "sexual prowess"?**
- **Trojan, condom manufacturer, already did:**
  - "Magnum" Condom (from Latin – Big) – 18.8% Market share
- **Advertising campaigns**
  - "Live Large", "Live to the gold standard"
- **Compare two product descriptions**
  - "ENZ™ is our classic trusted condom" → 12.6$/11.1€
  - "The Gold Standard™ in comfort and protection" → 14.5$/12.8€

Advertising & Pricing vs Reality

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- **Advertised Difference**
  - MAGNUM lettering is twice larger than ENZ
  - Gold Lettering over Black (princely!)
  - Just for 5cent/piece extra. 1.7€ total

JA Bellizzi and RE Hite. "Environmental color, consumer feelings, and purchase likelihood." *Psychology & marketing* 9(5): 347-363, 1992.

PA Bottomley and JR. Doyle. The interactive effects of colors and products on perceptions of brand logo appropriateness *Marketing Theory* 6:63-83, 2006.

Advertising & Pricing vs Reality

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- **Actual difference**
  - In size: +3mm
  - In length: 19cm vs 20.5cm
  - mean lenght of men: 13cm, sd. 2.7cm

R. Bresler. "Why Are So Many Men Suddenly Buying Magnum Condoms?". *The DateReport*, 26 March, 2013

K Promodu, K V Shanmughadas, S Bhat and K R Nair. Penile length and circumference. *International Journal of Impotence Research* 19:558–563, 2007

What does it mean? Distribution in scale

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Is this cheating? Depends…

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- **With Enz we sell**
  - Rubber = 36 x 300 cm^2
  - Price = 11.1€
- **With Magnum we sell**
  - Rubber = 36 x 350 cm^2 (+15% useless for most)
  - "Pride"
  - Price = 12.8€ (+15% affordable for most)
- **The marginal value of "instilling pride" is 15%**

Discussion

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- **Why do respondents typically overestimate purchase intent?**
  - Might they underestimate intent?
- **How to use price in surveys?**
- **How much does the way the concept is communicated matter?**
  - When shouldn't a prototype model be shown?
- **How do you increase sales, Q?**
  - More awarness/availability, repeated sales, instilling pride
- **How does early (qualitative) concept testing differ from later (quantitative) testing?**

Textbook

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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