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ICT Innovation – Spring 2017

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

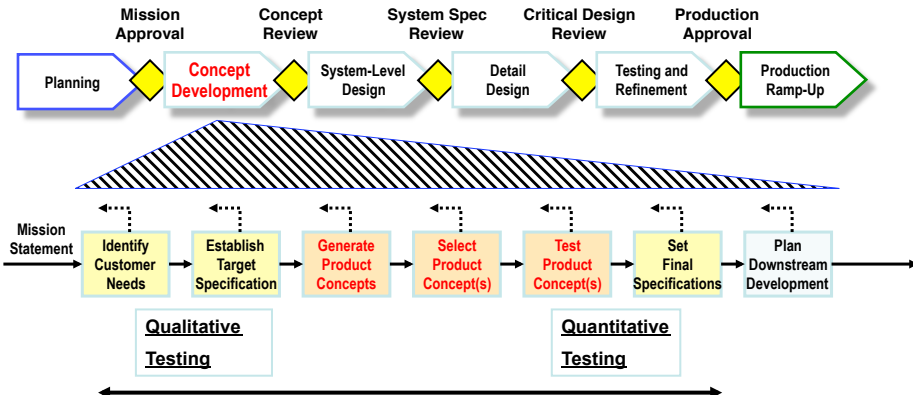
Lecture 06 – Concept Testing (Continued)

Prof. Fabio Massacci


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PD&D Process: Concept Development

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




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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








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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!)

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Interpreting the Results: Forecasting Sales


- $Q = N \times A \times P$
- 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

$= C_{def} \times F_{definitely} + C_{prob} \times F_{probably}$

↑
 “top box”

↑
 “second box”

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Forecasting Example:

<ul style="list-style-type: none"> • Campus <ul style="list-style-type: none"> – 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 <ul style="list-style-type: none"> – Total sales: 6400 units/yr – Price point: \$795 • Margins <ul style="list-style-type: none"> – 40-50% off Resellers – 25% off Distributor • “Out-of-factory” = 	<ul style="list-style-type: none"> • Factories <ul style="list-style-type: none"> – 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 <ul style="list-style-type: none"> – Total sales: 6000 units/yr – Price point: \$1500 • Margins <ul style="list-style-type: none"> – 35% Distributors • Out-of-factory =
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Are We Sure Factories Are Best?

- **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

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Repeated Sales

- **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

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Repeated Sales


- **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**

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Repeated Sales

- **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 yrs
 - Sex without Condoms (variable SXQ251): Male-Female 18-59
- **Market estimation**
 - Estimated = $(1 - \text{SXQ251}) * \text{sexfreq} * \text{US men}$


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Estimating our market

- **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

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Who do you ask? (continued)

- **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


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Recapping the numbers

- **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?**


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Sources of Forecast Error

- **“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...

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Who do we ask?

- **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.**

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Is survey reliable? Graph Theory to the rescue

- **Simulation with M=F=10 (1 sphere – 1 person)** 0

0 This man had no partner

1 → 1 This man and this woman were partners

2 → 2 These 2 women had only 1 partner

3 → 3 There are 3 women with 3 partners each

7 → 7 These 2 men had 7 partners each

15 → 15 To 15 men

1 → 1 That woman had 15 partners

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Is survey reliable? Graph must be bipartite

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


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Is survey reliable? Ooops

- Trying to complete...**


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Should you target men or women? (contd)

<ul style="list-style-type: none"> • Men's female partners over lifetime <ul style="list-style-type: none"> - 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 = <ul style="list-style-type: none"> - 61.2M * (15%+2*7.6%+...) • There are 100M relationships missing... <ul style="list-style-type: none"> - Unsurprisingly not many condoms are sold to the men boasting 7+ relationships in the surveys... 	<ul style="list-style-type: none"> • Women's male partners over lifetime <ul style="list-style-type: none"> - 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 <ul style="list-style-type: none"> - 61.9M * (22.2%+2*10.7%+...) • What's wrong? <ul style="list-style-type: none"> - Men lie or women lie or both lie - or count "partners" differently - or just don't remember and put down a "feels right" number
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Same question, different answers

- **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

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Can we exploit the bias?

- **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 m² of rubber + feel good factor vs 0.009 m² of rubber
 - How many people would buy (useless) feel good?
 - How much more people would be willing to pay?

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Can we exploit the bias? (Cont)

- **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€

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Advertising & Pricing vs Reality

- 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.

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Advertising & Pricing vs Reality

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

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

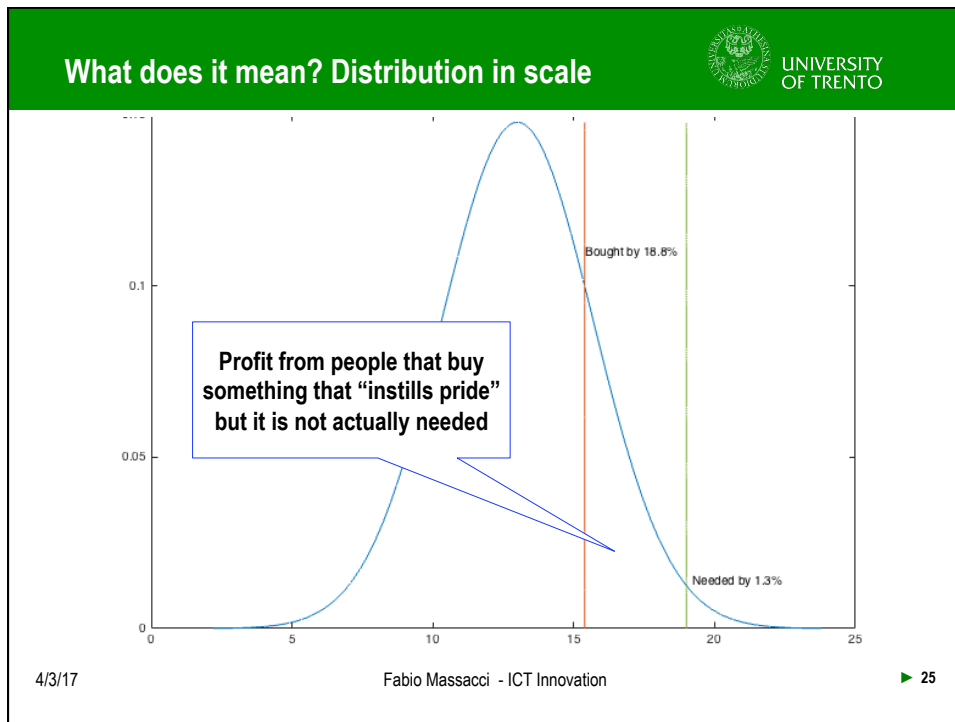




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 PA Bottomley and JR. Doyle. The interactive effects of colors and products on perceptions of brand logo appropriateness *Marketing Theory* 6:63-83, 2006.

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

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Is this cheating? Depends...

- **With Enz we sell**
 - Rubber = 36 x 300 cm²
 - Price = 11.1€
- **With Magnum we sell**
 - Rubber = 36 x 350 cm² (+15% useless for most)
 - “Pride”
 - Price = 12.8€ (+15% affordable for most)
- **The marginal value of “instilling pride” is 15%**

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Discussion

- **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 awareness/availability, repeated sales, instilling pride
- **How does early (qualitative) concept testing differ from later (quantitative) testing?**

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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



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