

Investigating end consumers' preferences for wood products

Case: Wood for outdoor deckings

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MARKET DRIVEN INNOVATION – A CHALLENGE FOR THE FOREST PRODUCTS INDUSTRY

- More customer orientation and innovation is warranted – but how should it be done?
- What are the customers' needs?
- What product attributes can meet those needs?
- How do we make products with the desired properties?
- The key properties must be easy to define and measure and possible to deliver in industrial production

WOOD FOR OUTDOOR USE



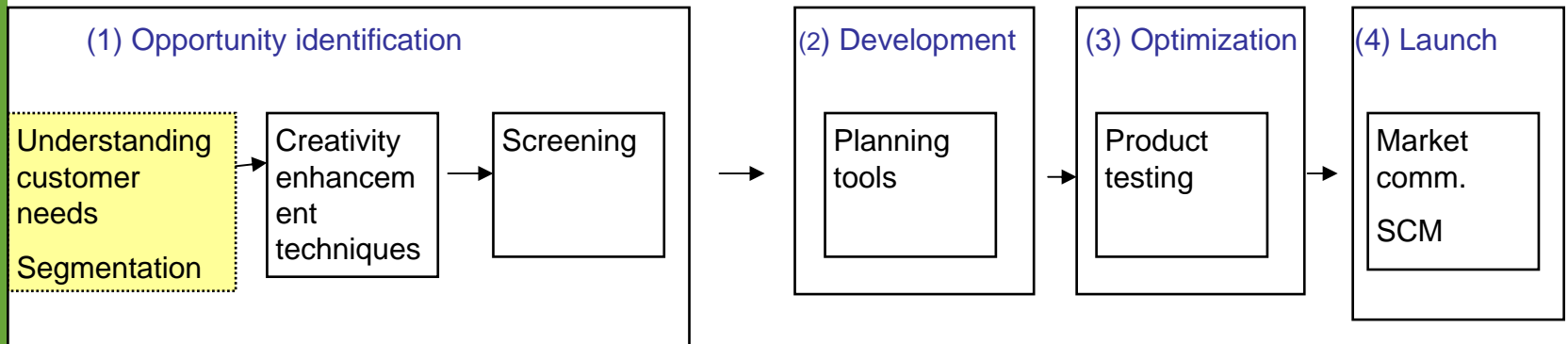
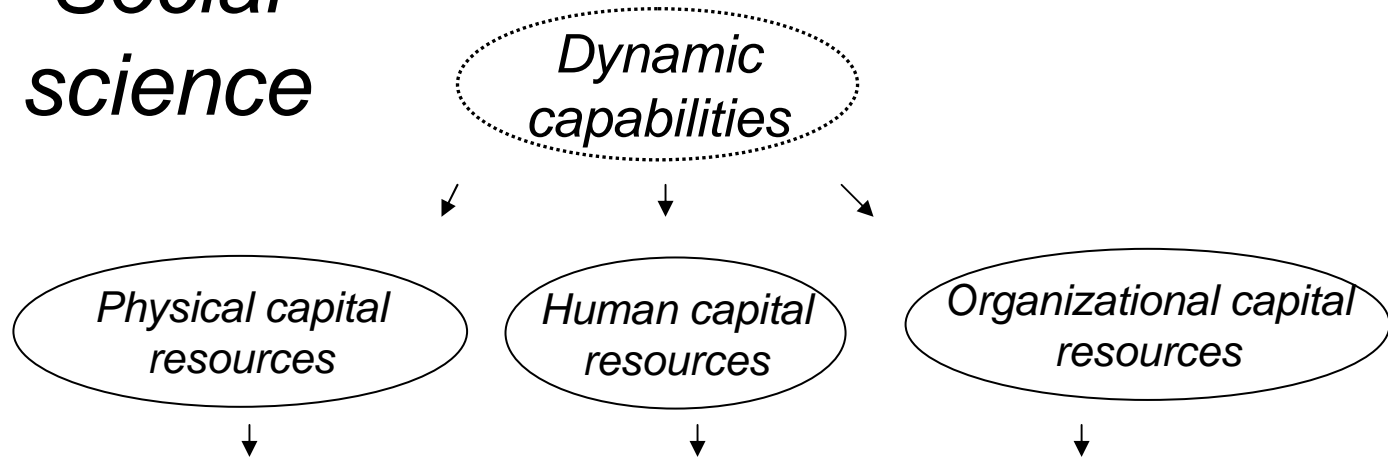
- Tree species
- Treatment
- Aesthetics
- Durability
- Environmental aspects
- Context
- etc

ENVIRONMENTAL RESTRICTIONS

- Wood for outdoor use is a growing market
- Restrictions on technologies: CCA-preserved and creosote
- Producers are looking for alternatives:
 - Naturally durable tree species, Larch, tropical wood etc.
 - Heat treatment
 - Organic preservatives
 - Modified wood
 - ...

A FRAMEWORK

Social science



Case: Wood for outdoor decking

Sources: van Kleef et al. (2005); Barney (1991); and Eisenhardt and Martin (2000)



PURPOSE

- Identify key property attributes of wood for outdoor deck materials
- Investigate customers' preferences of different types of wood for outdoor use
- This presentation: To discuss different methods for consumer research and product development in the industry.

ATTRIBUTES, NOT GOODS, GIVE UTILITY

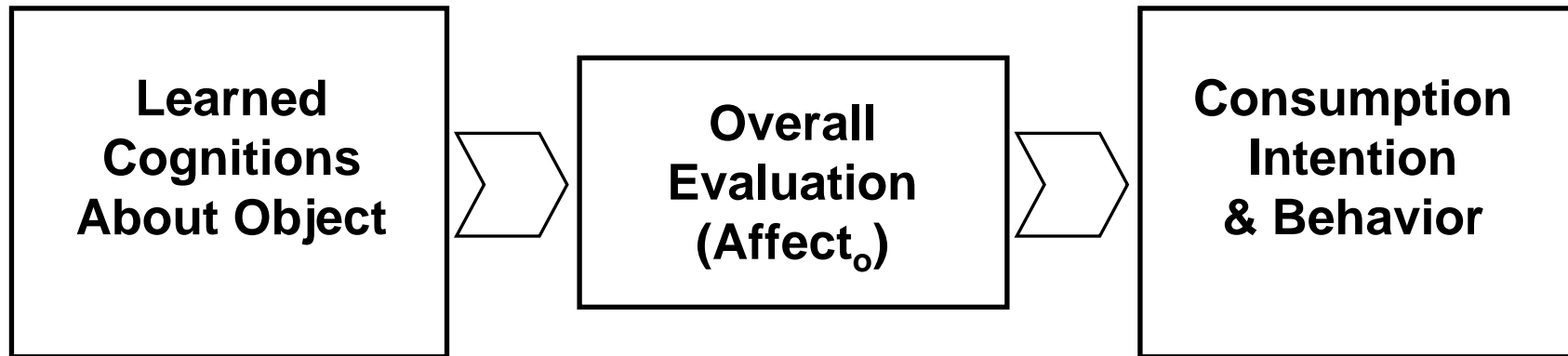
1. The good, per se, does not give utility to the consumer; it possesses characteristics, and these characteristics give rise to utility.
2. In general, a good will possess more than one characteristics, and many characteristics will be shared by more than one good.
3. Goods in combination may possess characteristics different from those pertaining to the goods separately (Lancaster 1966. A new approach to consumer theory)

THEORIES ON CONSUMER BEHAVIOUR

- Theory of Reasoned Action and Theory of Planned Behavior (Ajzen and Fishbein 1977; Ajzen and Fishbein 1980)
- Positivist cognitive models. The purpose is to predict and influence consumer behaviour (Ryan 1986).
- Non-positivist consumer research.

THEORY ON CONSUMER BEHAVIOUR

Multiattribute model (Fishbein 1963)



CONSUMER RESEARCH IN THE FOREST PRODUCTS SECTOR

- An increasing number of consumer studies on product and service attributes of wood products:
- They show promising results but...
- Most of them are focused on industrial customers
- Few studies employ well-established elicitation methods for product attributes (Brandt and Shook 2005)
- Much remains to be done, especially to support a more market oriented and innovative forest sector.
- Conclusion: Social science can contribute in marketing studies.

RECOMMENDED CONSUMER RESEARCH METHODS

<p><i>For marketing</i></p>	<ul style="list-style-type: none"> ● Focus groups ● Free elicitation ● Kelly repertory grid ● Laddering 	<ul style="list-style-type: none"> ● Emphatic design ● Zaltman methaphor elicitation technique
<p><i>For technical product development</i></p>	<ul style="list-style-type: none"> ● Category appraisal ● Conjoint analysis 	<ul style="list-style-type: none"> ● Information acceleration ● Lead user technique
	<p><i>Incremental new products</i></p>	<p><i>Really new products</i></p>
<p>Newness of product considered</p>		

WE USED THE FOLLOWING APPROACHES TO ANALYSE KEY ATTRIBUTES FOR CONSUMER PREFERENCES OF WOOD FOR OUTDOOR USE

- SENSORY ANALYSIS
- FREE ELICITATION
- SEGMENTATION
- CONJOINT ANALYSIS

SENSORY ANALYSIS



- Decking floors of wood
- Five alternatives
- Sensory measurement
 - Analytical sensory analysis by 9 trained assessors
 - Hedonic sensory analysis 92 persons/consumers
- Hedonic measurement
- Analysis and Partial Least Squares

THE SAMPLES

Tree species		Commercial name	Treatment	Orig.	Price (NOK/m ³)
<i>Tabebuia spp</i>	I	Ipé	Untreated tropical hardwood	Brazil	620
<i>Pinus silvestris</i>	II	TMF	Pressure treatment, organic biocides	Nor.	136
<i>Pinus silvestris</i>	III	Kebony	Pressure treatment and curing, Furfuryl-alcohol	Nor.	150
<i>Larix sibirica</i>	IV	Russian Larch	Untreated heartwood from larch	Rus.	208
<i>Pinus silvestris</i>	V	Wolmanit	Pressure treatment, Copper	Norw.	93



Consumer preference for wooden deckings
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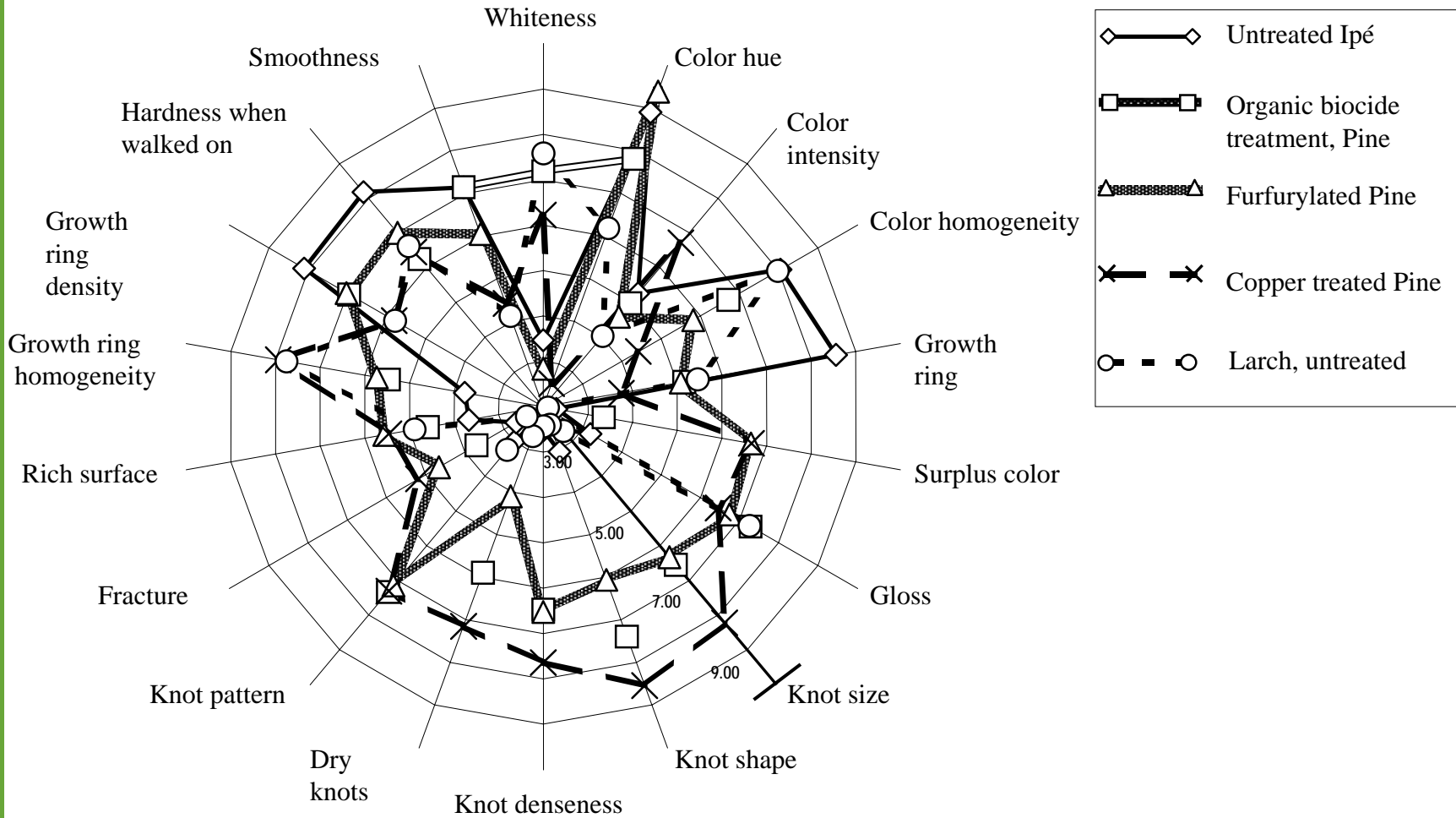




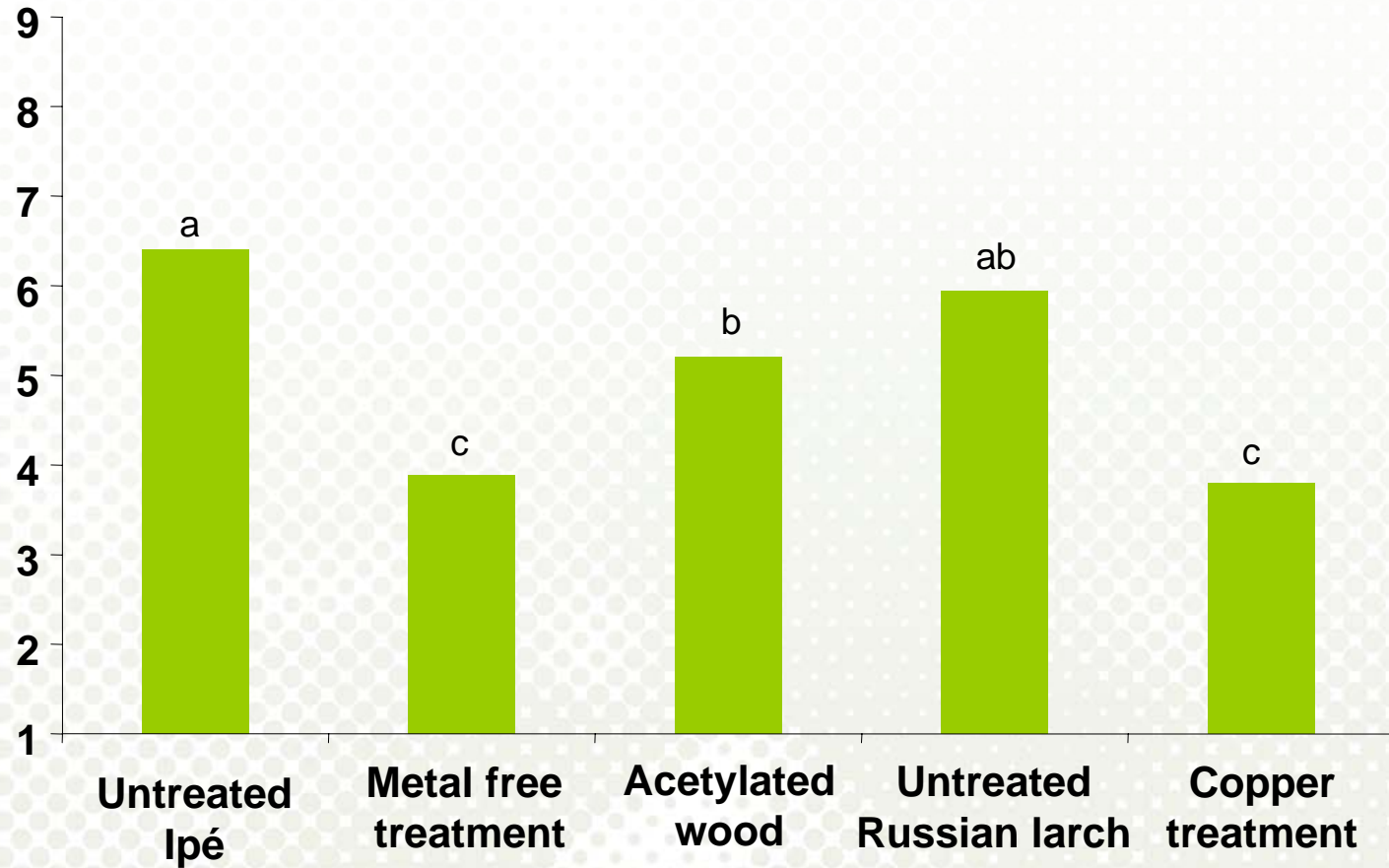
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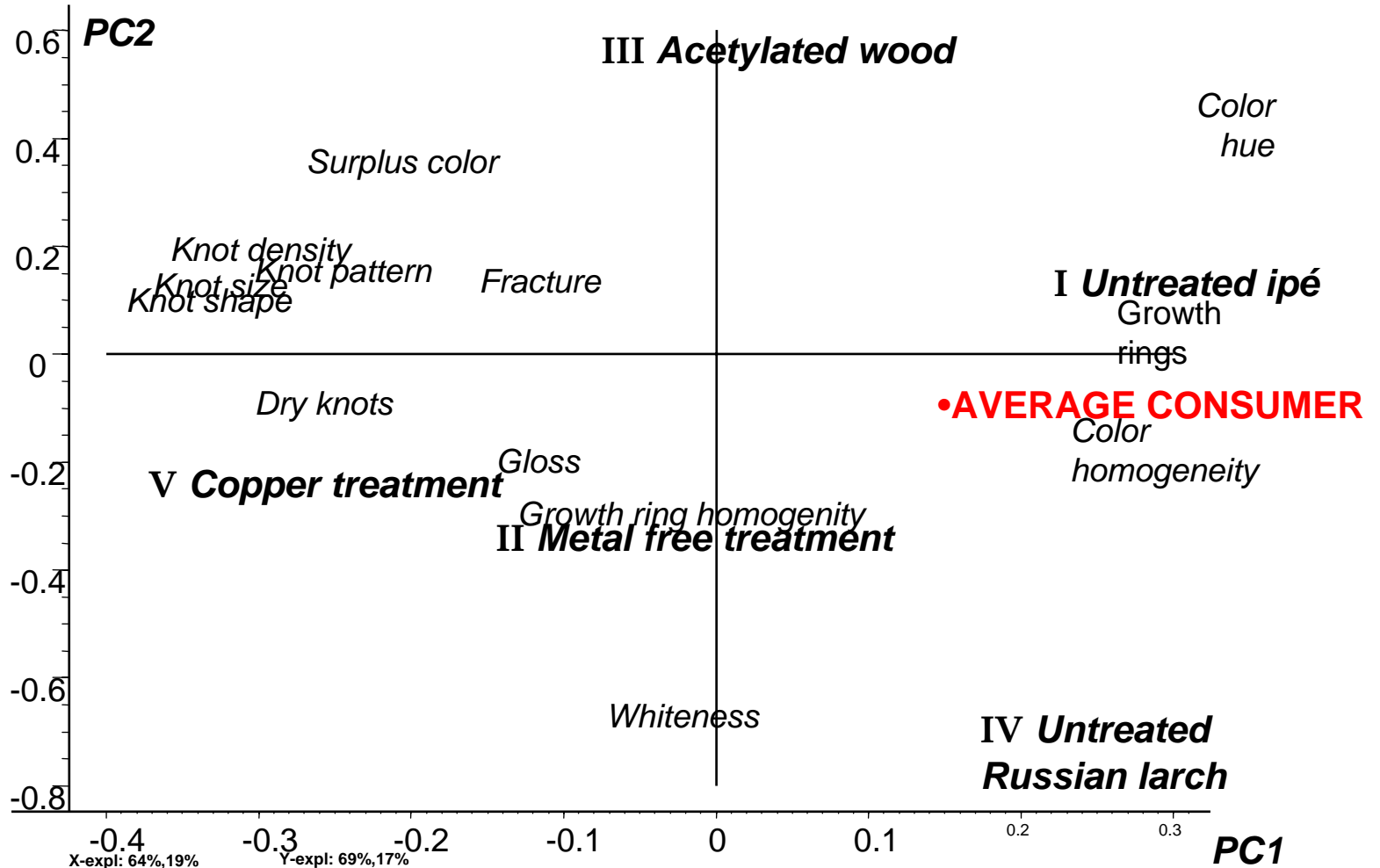
ANALYTICAL SENSORY PROPERTIES



HEDONIC SENSORY ANALYSIS - RATINGS



PREFERENCE MAP



FREE ELICITATION RESULTS

Sample	Reasons to Prefer*	Reasons not to prefer**
Ipe	Suits the color of my house, Nice color, Solid impression, Looks exclusive, Trendy color Nice dark color, Tough color, resistant Doesn't need treatment, Would be nice in my garden, Few knots, Seems resistant Will last over years	Too dark, Deforestation?, Rainforest species? I don't like dark, Uneven colors, Ser kjedelig ut
TMF	Looks real,color, Light and nice, Inviting, Light and pleasant	Pink color?, Reddish colour – seems unnatural Too light red – unpractical, doesn't fit anywhere
Kebony	Nice color, Conforms to the color of my house, OK color, Dark and even color Gives a solid impression, Like a roof of a cabin	Too dark!, This type of color is not trendy, Looks dirty
Untreated heartwood from larch	Light, pleasant color Aesthetically appealing wood, Looks natural Neutral and nice color, Looks like good, quality wood	Gets easily stained, Needs regular treatment, Too much patterns, Too light
Wolmanit	Nice color, Green is a known color for preserved wood	Don't like the color!, Associated with pressure treatment, Too green Looks poisonous, Low quality wood!, Uneven color



CLUSTER ANALYSIS RESULTS

CLUSTER No	N	LIKES	DISLIKES	COMMENT
1	15	Kebony Larch	Wolmanit	Young (Women)
2	13	Ipe	TMF	
3	18	TMF Larch	Kebony Wolmanit	
4	22	Kebony (Wolmanit)		(Young)
5	5	Ipe	TMF Kebony Wolmanit	

CONJOINT ANALYSIS

Factor	Levels	No of levels
Photo and product	<ul style="list-style-type: none">•TMF•Kebony•Wolmanit	3
Price	P1, P2 P3	3
Environmentally certified	Yes, No	3
Service	Yes, No	2
Ready to assemble box	Yes, No	2

CONJOINT ANALYSI: DATA COLLECTION

- House and garden fair outside Oslo
- Rating of samples
- Fractional factorial design
- 12 stimuli and 5 holdouts
- 294 answers



		Envir.		Aesthetic		Price	
No. responses		90		40		75	
Picture an product information	Copper	-0.10	14	-1.76	52	-0.20	10
	Metal free	0.36		0.31		-0.09	
	Acetylated	-0.26		1.45		0.30	
Price	90 kr/m2	0.14	8	-0.22	8	1.49	54
	140 kr/m2	0.06		-0.03		-0.33	
	190 kr/m2	-0.21		0.25		-1.16	
Certified	Ja	1.57	71	0.84	27	0.88	22
	Nei	-1.57		-0.84		-0.88	
Service	Nei	0.07	3	-0.37	12	-0.01	0
	Ja	-0.07		0.37		0.01	
Module system	Ja	0.08	4	0.03	1	-0.35	14
	Nei	-0.08		-0.03		0.35	
Share women				68			
Share experience						77	
Share plans						83	

DISCUSSION

- Analytical sensory analysis can distinguish a large number of sensory attributes on wood products
- For our sample of outdoor decking, the two main components were surface texture and color
- People prefer natural looking deckings with even coloring to an uneven and artificially colored surface.
- In a choice situation consumers seem to be most influenced by the attributes treatment, price, and (surprisingly) environmental certification
- Service level or augmented products (“deck-in-a-box-type”) doesn’t seem to excite Norwegian customers

METHODOLOGICAL CONCLUSIONS

- Sensory analysis and preference mapping can be used for a more consumer focused product development, especially for products with an aesthetic focus (deckings, floors, interior products)
- Free elicitation can provide further information on how preferences are formed
- Cluster analysis/segmentation can also be productive approaches. However, they need more socioeconomic background data
- Conjoint analysis may be a powerful tool in product development (e.g. screening)
- Main conclusion. Economic science and social and behavioral sciences can contribute to the development of the forest products sector

NEEDED RESOURCES FOR THE INDUSTRY

- *Physical capital resources*
 - *Laboratories, expert sensory panels, prototype production*
- *Human capital resources*
 - *Consumer research competences, psychologists, designers*
- *Organizational capital resources*
 - *An organization that can channel information into production, cross-functionality, a sound scepticism*
- *Dynamic capabilities*
 - *Ability to adapt resources to the information needs on consumer tastes, alliance-formation*



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