The Influence of Green Innovation of Japanese Electronic Industries on Competitive Advantage

With particular reference to
Japanese home appliance industries

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Outline

1. Research Overview
2. Competitive Advantage
3. Green Innovation
4. Japan Electronics Industries
5. Research questions
6. Hypothesis
7. Findings
8. Field Research
9. Preliminary Conclusion

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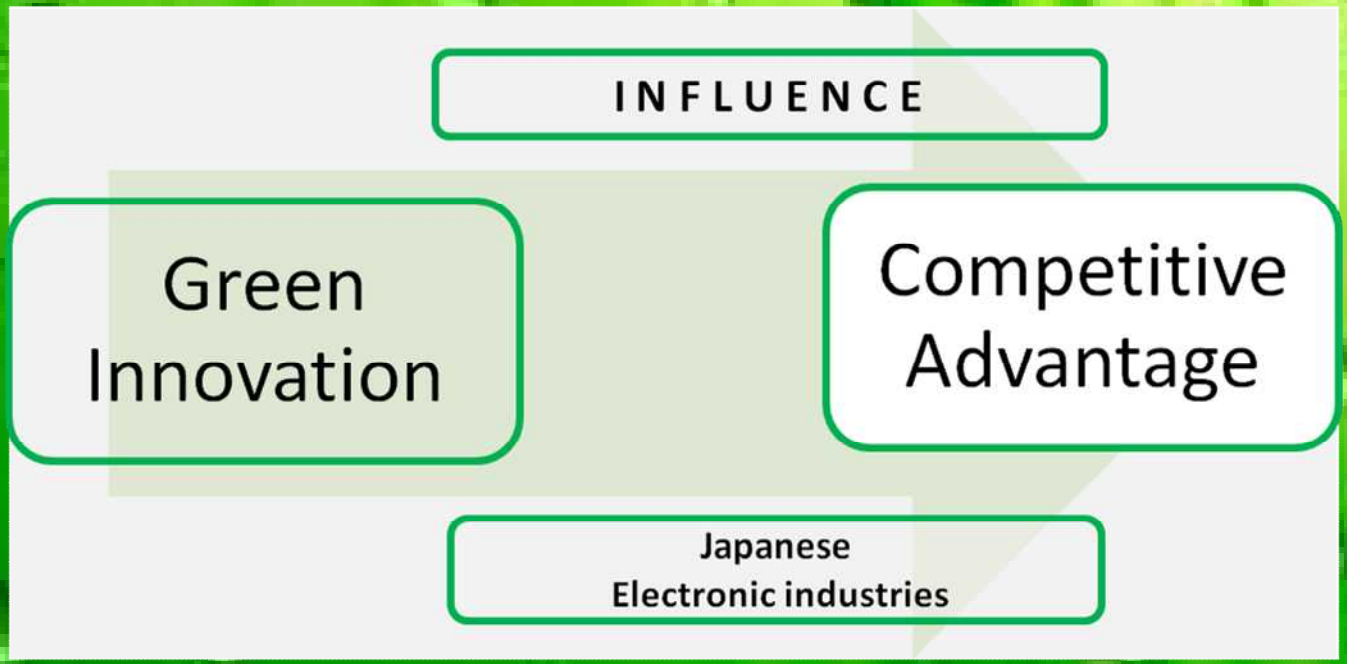
Overview



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Competitive Advantage

Porter (1985); Barney (1991); Coyne (1986)

The company occupies some positions where the competitors cannot copy its successful strategy and the company can gain sustainable benefits from the successful strategy

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Competitive Advantage

Porter, 1990

Firms create competitive advantage by perceiving or **discovering new and better ways** to compete in an industry and bringing them to market, which is ultimately an **act of innovation**.

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Competitive Advantage

- Two basic types of competitive advantage:
  - Low cost

    The ability of a firm to design, produce, and market a comparable product more efficiently than its competitors
  - Differentiation

    The ability to provide unique and superior value to the buyer in terms of product quality, special features, or after-sale service

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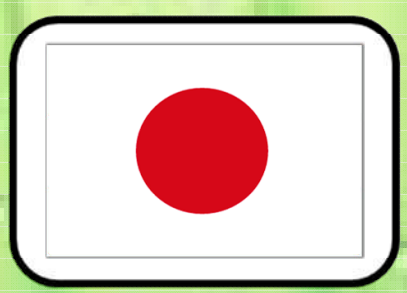
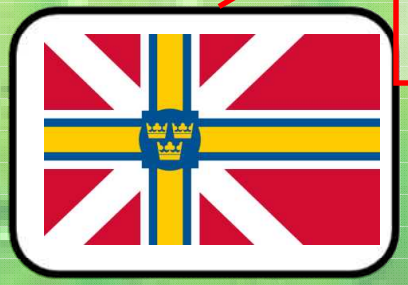
Competitive Advantage

Competitive Scope	Lower Cost	Differentiation
Broad Target	 Cost Focus	 Differentiation
Narrow Target	 Cost Leadership	 Focused differentiation

Norway; Sweden; Denmark; Finland; Iceland

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Competitive Advantage

Innovation

- New Technologies
- New or shifting buyer needs
- The emergence of a new industry segment
- Shifting input costs or availability
- Changes in government regulations

Creating Competitive Advantage

- Product changes
- Process changes
- New approach to marketing
- New format of distribution
- New conceptions and scopes

Competitive Advantage

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Competitive Advantage

Indicators of competitive advantage:

1)Low cost

2) Quality

3) R&D and Innovation

4) Managerial capability (Value system)

5) Profitability — Sales / Operating Income

6) Company growth

7) First mover

8) Corporate image

Source: Porter (1990); Chen et al. (2006)

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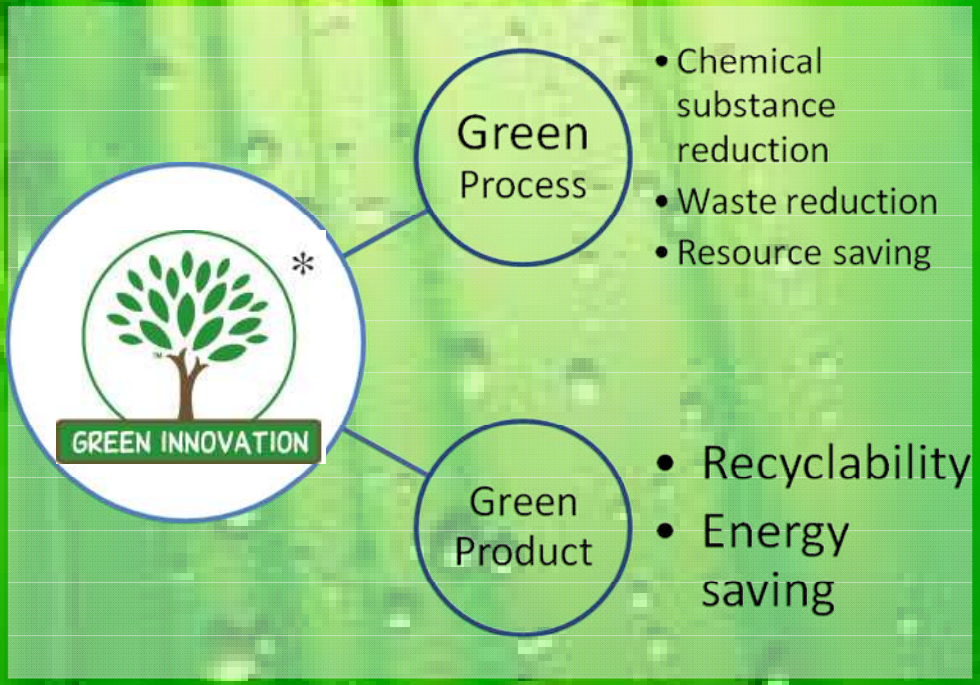
Green Innovation

Hardware or software innovation that is related to green products or processes, including the innovation in technologies that are involved in energy-saving, pollution-prevention, waste recycling, green product designs, or corporate environmental management (Chen et al., 2006)



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Why Green Innovation?

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Japanese Electronics Industries

- Innovation aimed at addressing **environmental** concerns, as a source of economic recovery & long-term growth (Capozza, 2011)
- Start from 2007, Japan adopted the **"Strategy for Sustainable Society in the 21st Century"** (Gurria, 2010, p.13).

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Japan Electronics Industries

Source: Motohashi, 2011

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Research Questions

1. Does green innovation influence Japanese electronic industries - with particular reference to Japanese home appliance industries - on their competitive advantage?
2. How strong the influence of green innovation of Japanese electronic industries - with particular reference to Japanese home appliance industries - on the competitive advantage?
3. What Japanese electronic industries - with particular reference to Japanese home appliances - should do in order to successfully market green innovation product?

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Hypothesis

Hypothesis 1: Green innovation have an influence on competitive advantage of Japanese electronic industries, with particular to home appliance industries.

- Chen, Lai & Wen, 2006;
- Porter & Linde, 1995
- Esty & Winston, 2006

Hypothesis 2: The green innovation have little influence on competitive advantage of Japanese electronic industries with particular to home appliance industries.

- Cheng, 2012
- The Economist, 2009; 2011; 2012

How to penetrate ?

Questionnaires

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Findings of hypothesis

- H1: Green innovation have an influence on competitive advantage of Japanese electronic industries, with particular to home appliance industries; however, only the initial act of green innovations that influence its competitive advantage (sales)
- H2: Green innovation actually could deliver high influence on competitive advantage (sales) but only at the early stages when companies start to inform their customers that they start to produce green innovation product

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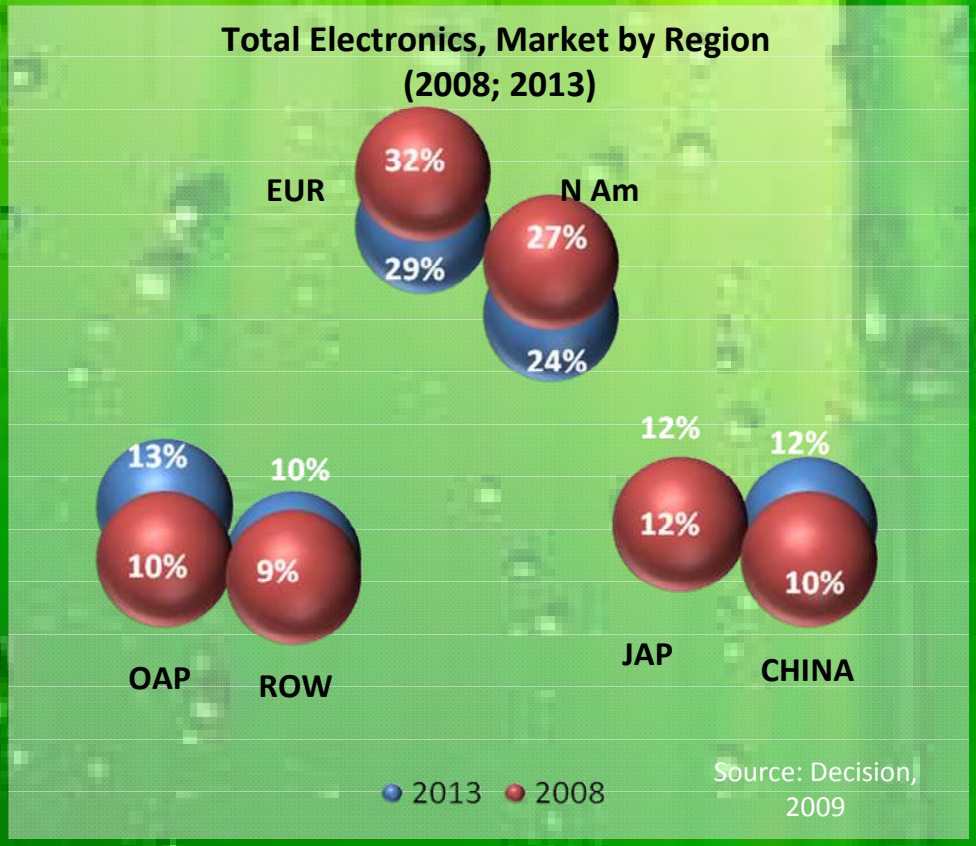
Field Research

Research Question No. 3



Source: Decision, 2009

Indonesian Electronics Association is forecasting a 20% growth in electronics sales start from 2012 to $3.2 billion USD (excluding cell phones and computer hardware). for the ASEAN region
("Global Business Guide Indonesia", 2013

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Field Research

Research Question No. 3

- Questionnaires with 15 questions
  - 5 questions towards to respondents profiles
  - 10 questions towards to respondents buy preferences
    - Likert Scale (Strongly disagree (1); Disagree (2); Neutral (3); Agree (4); Strongly agree (5)
- Indonesia
  - Jakarta : Electronic City
  - Bandung : Bandung Electronic Centre
- 120 respondents

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Questionnaires

	1	2	3
Quality	Good quality of product is important to me	One of the reason to buy a product is the quality of product	The higher the price of the product the better the quality
Brand	Brand represent quality of the product	The famous brands are usually my choices	
Environment	Environment friendly – electronic product is important for me	Environment friendly products Is part of good quality products	I prefer to buy environment friendly product although the price higher than the regular
Price	I buy good quality product nor eco-friendly product whenever it's on discount	Cheap price product is usually my choice	

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Field Research

Jakarta Electronic City

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Field Research

Bandung Electronic Centre

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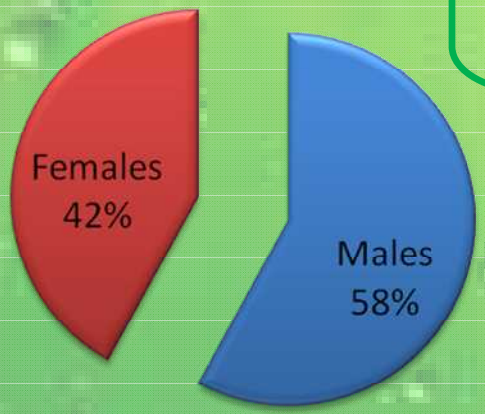
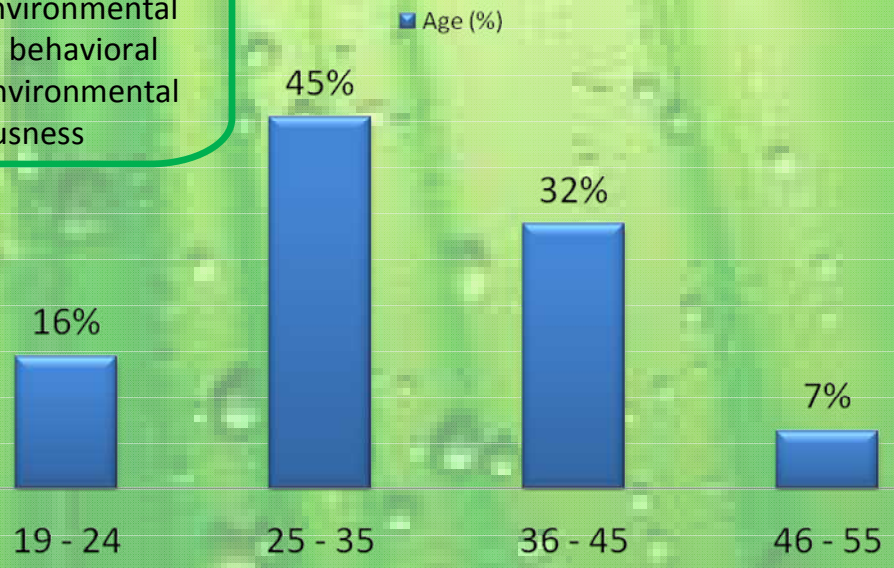
Field Research

Consumer Segments



Demographic variables associated with self-report measures of environmental commitment, behavioral indicators of environmental consciousness



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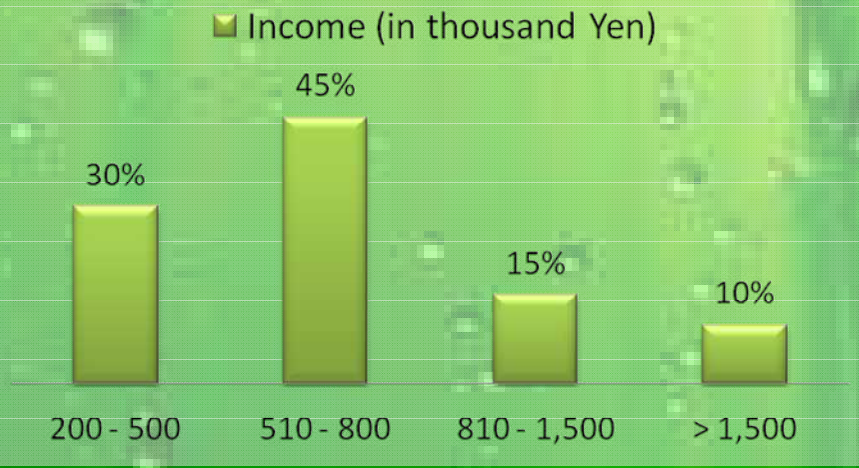
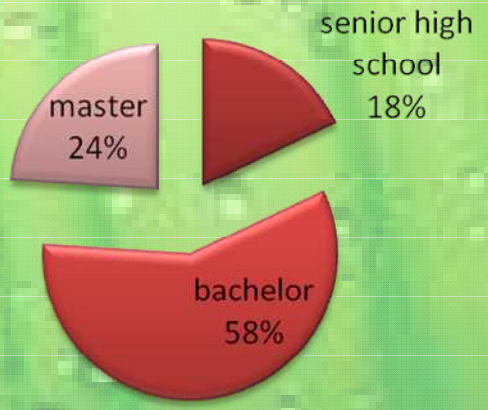
Field Research

Consumer Segments

Income



Education



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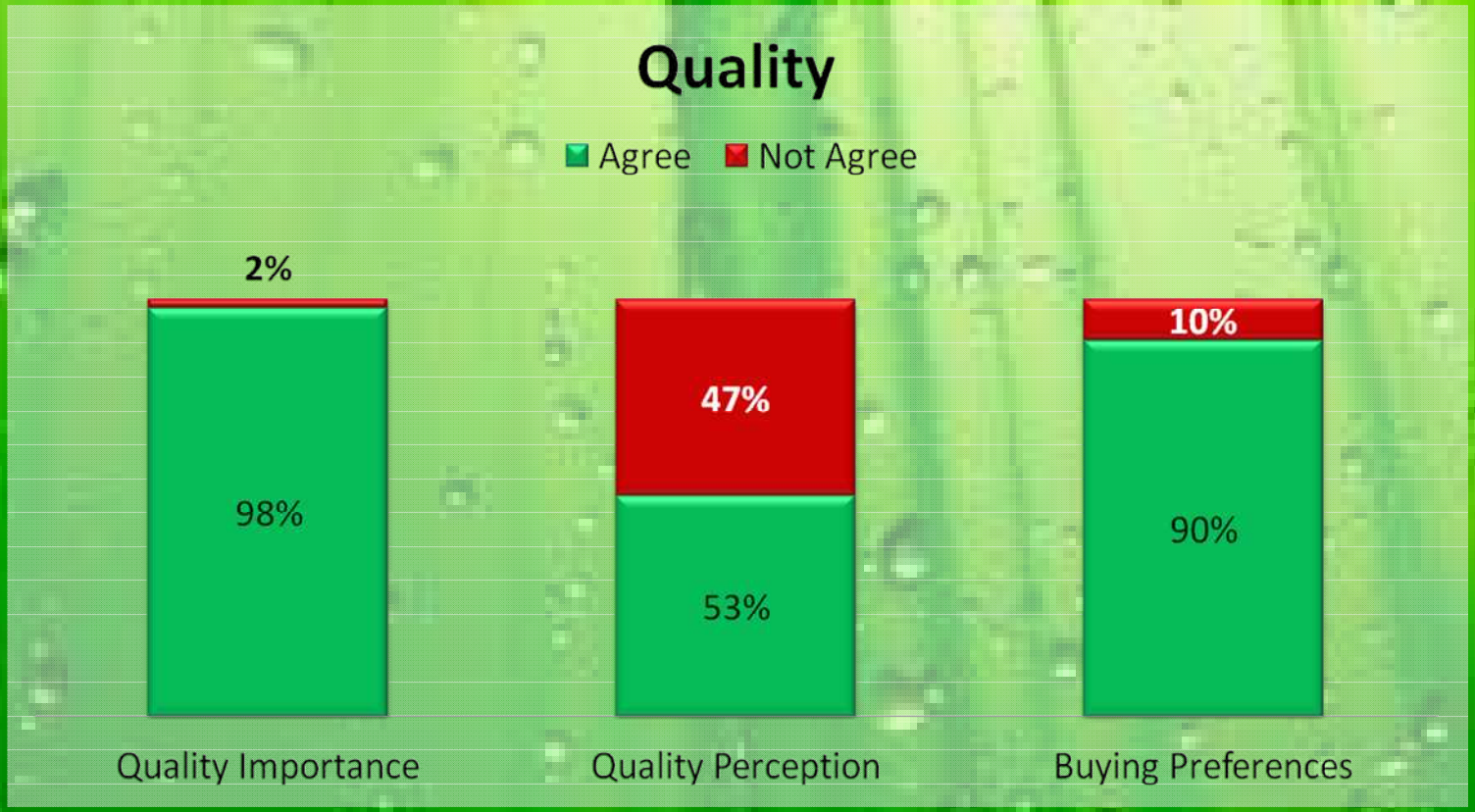
Field Research

Quality Consciousness



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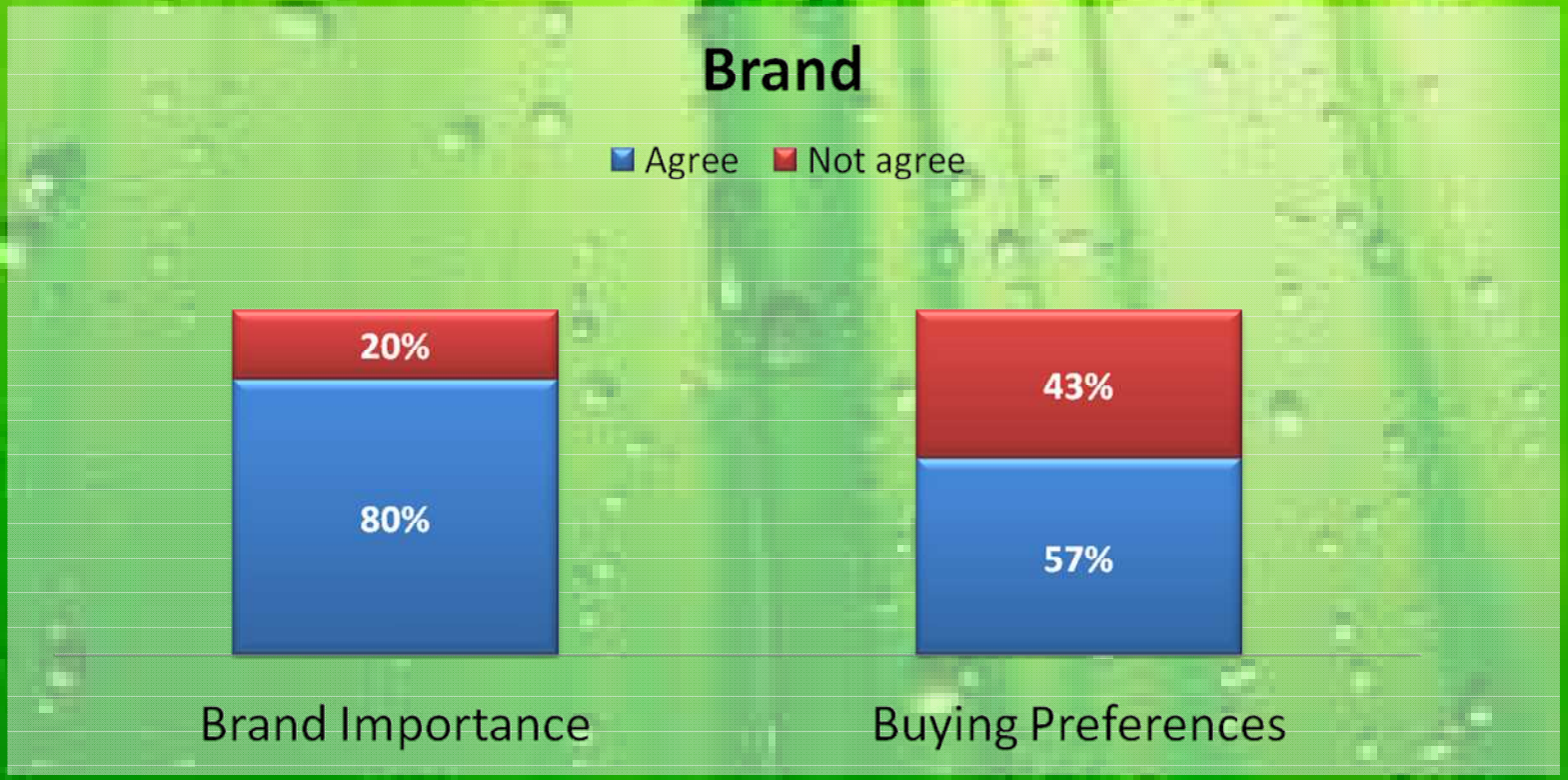
Field Research
Brand Consciousness



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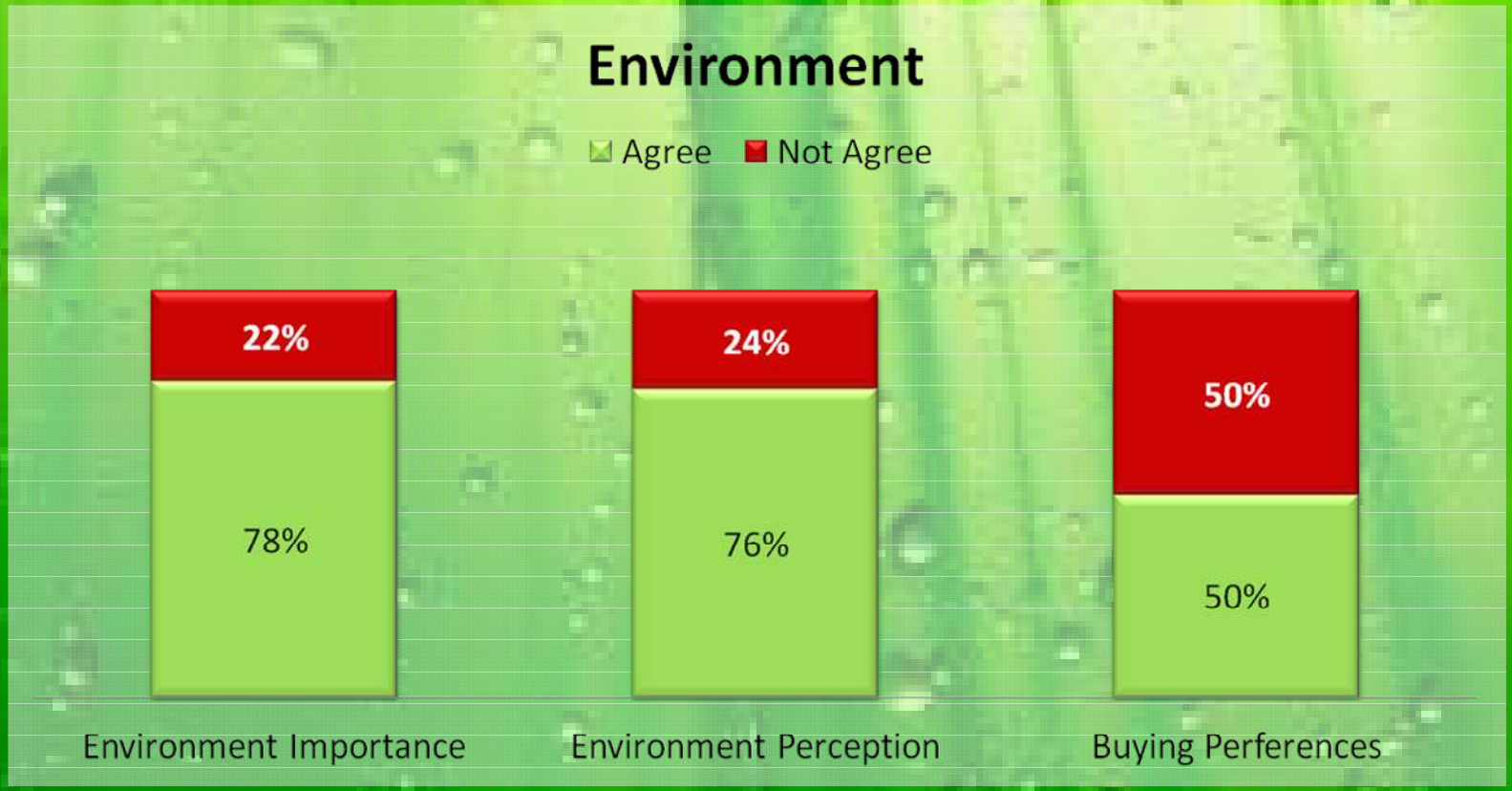
Field Research

Environment Consciousness



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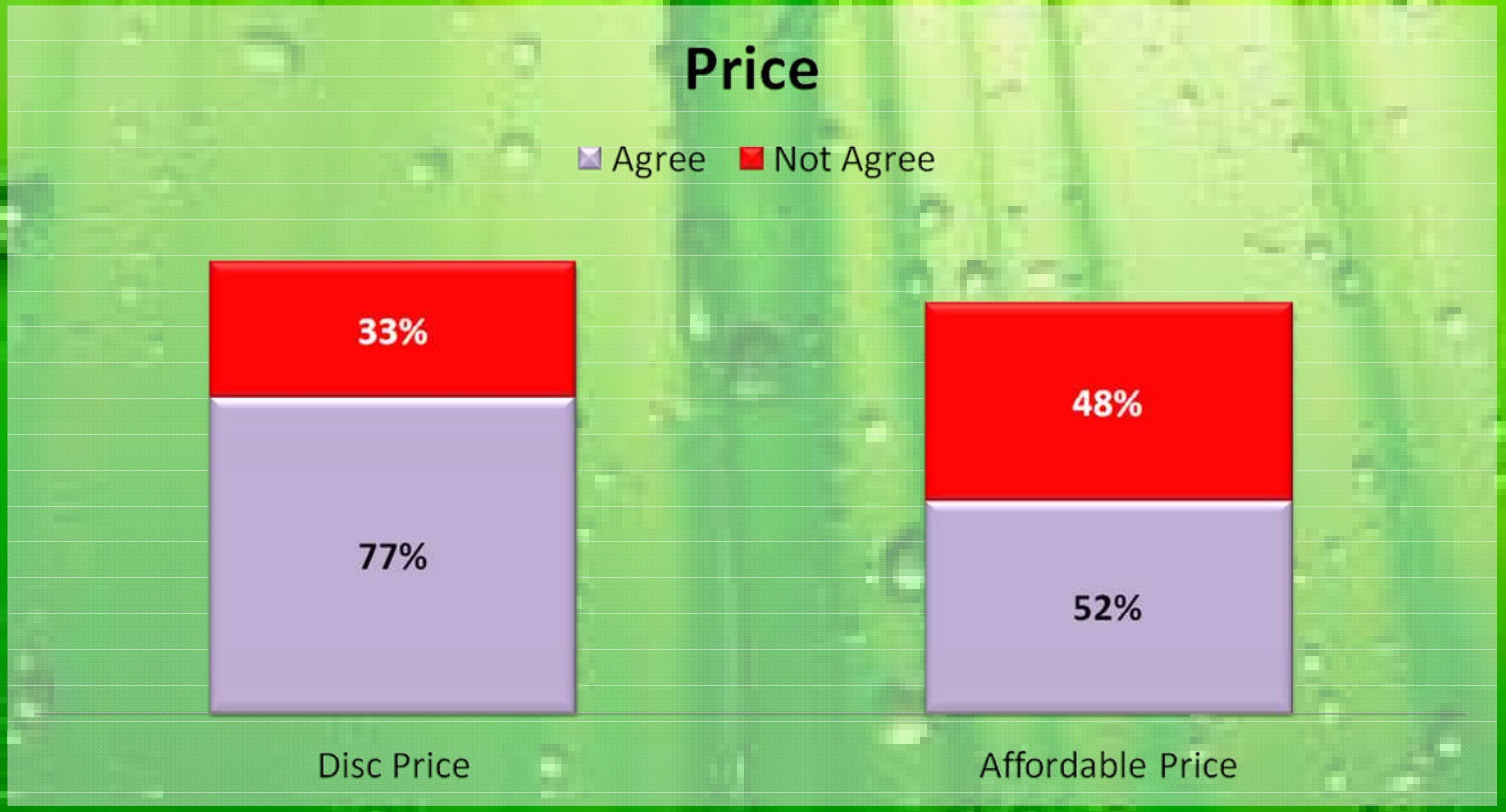
Field Research

Price Perception



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Pearson Correlation

Correlations

		quality1	quality2	quality3	brand1	brand2	environment1	environment2	environment3	price1	price2
quality1	Pearson Correlation	1	.506**	-.020	.088	-.057	.180	.051	.232*	-.081	-.257**
	Sig. (2-tailed)		.000	.846	.384	.571	.073	.615	.020	.421	.010
	N	100	100	100	100	100	100	100	100	100	100
quality2	Pearson Correlation	.506**	1	.018	.074	-.029	.142	.104	.159	-.071	-.279**
	Sig. (2-tailed)	.000		.860	.463	.772	.158	.303	.114	.480	.005
	N	100	100	100	100	100	100	100	100	100	100
quality3	Pearson Correlation	-.020	.018	1	.399**	.566**	.021	.073	.333**	.380**	.222*
	Sig. (2-tailed)	.846	.860		.000	.000	.837	.472	.001	.000	.026
	N	100	100	100	100	100	100	100	100	100	100

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Pearson Correlation

Correlations

		quality1	quality2	quality3	brand1	brand2	environment 1	environment2	environment 3	price1	price2
brand1	Pearson Correlation	.088	.074	**.399****	1	.528**	-.031	.019	.171	**.316****	**.359****
	Sig. (2-tailed)	.384	.463	**.000**		.000	.759	.848	.088	**.001**	**.000**
	N	100	100	100	100	100	100	100	100	100	100
brand2	Pearson Correlation	-.057	-.029	**.566****	**.528****	1	.036	.145	**.305****	.183	**.238***
	Sig. (2-tailed)	.571	.772	**.000**	**.000**		.724	.151	**.002**	.068	**.017**
	N	100	100	100	100	100	100	100	100	100	100

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Pearson Correlation

Correlations

		quality1	quality2	quality3	brand1	brand2	environment1	environment2	environment3	price1	price2
environment1	Pearson Correlation	.180	.142	.021	-.031	.036	1	.526**	.447**	-.076	-.156
	Sig. (2-tailed)	.073	.158	.837	.759	.724		.000	.000	.453	.122
	N	100	100	100	100	100	100	100	100	100	100
environment2	Pearson Correlation	.051	.104	.073	.019	.145	.526**	1	.244*	-.058	-.181
	Sig. (2-tailed)	.615	.303	.472	.848	.151	.000		.015	.564	.071
	N	100	100	100	100	100	100	100	100	100	100
environment3	Pearson Correlation	.232*	.159	.333**	.171	.305**	.447**	.244*	1	.231*	-.045
	Sig. (2-tailed)	.020	.114	.001	.088	.002	.000	.015		.021	.655
	N	100	100	100	100	100	100	100	100	100	100

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Pearson Correlation

Correlations

		quality1	quality2	quality3	brand1	brand2	environment1	environment2	environment3	price1	price2
price1	Pearson Correlation	-.081	-.071	.380**	.316**	.183	-.076	-.058	.231*	1	.358**
	Sig. (2-tailed)	.421	.480	**.000**	**.001**	.068	.453	.564	**.021**		.000
	N	100	100	100	100	100	100	100	100	100	100
price2	Pearson Correlation	-.257**	-.279**	.222*	.359**	.238*	-.156	-.181	-.045	.358**	1
	Sig. (2-tailed)	**.010**	**.005**	**.026**	**.000**	**.017**	.122	.071	.655	**.000**	
	N	100	100	100	100	100	100	100	100	100	100

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Findings from Questionnaires (Q3)

Preliminary Conclusion
Companies' perspective

Product	Environmental Issues	Innovative Solutions	Innovation offsets
• Refrigerators 	• Chlorofluorocarbons (CFCs) used as refrigerants	• Propane-isobutane mix (alternative refrigerants)	• 10% better **energy efficiency** at same cost • 5% to 10% initial **price premium** for "green" refrigerator

Resource Productivity → **Better product quality** → **Social benefits** → **Enhance global competitive**

Source: Esty & Winston (2006)

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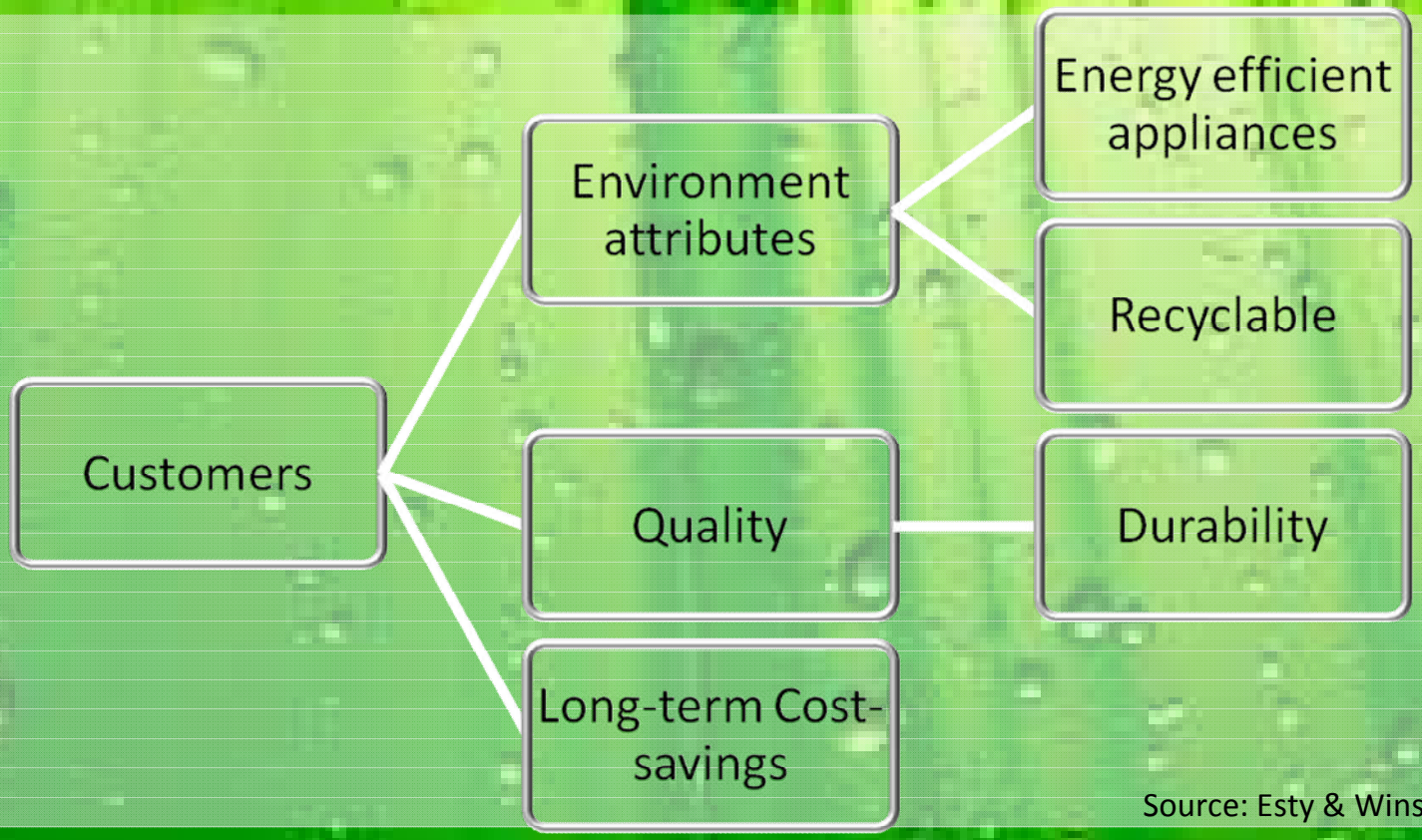
Preliminary Conclusion
Customers' perspective



Source: Esty & Winston (2006)

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Research Limitation

- Time restraint
  - Green innovation, environmental investment suppose to have different effect in a longer view
- Limited to home appliance industries
  - Every product have different customer segments that could have different effect as well. For example: cell-phone industries or computers industries, where they have customers that still rely on the quality function of the products, will suppose to have different effect.
- Only apply to large home appliance industries
  - This research only apply to large electronic firms, while there is possibility that small firms that conduct green innovation have different effect on their competitive advantage

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Reference

- Chen, Y. S., Lai, S. B., & Wen, C. T. (2006). The influence of greening the suppliers and green innovation on environmental performance and competitive advantage in Taiwan. *Transportation Research Part E*, *67*(4), 331 - 339.
- Cheng, R. (2012, November 9). The era of Japanese consumer electronics giants is dead. *CNET News*, Retrieved from http://www.cnet.com
- Esty, D. C., & Winston, A. (2006). *Green to gold*. (1st ed.). United States: Library of congress cataloging-in-publication data.
- Japanese electronics firm, the mighty, fallen. (2011, March 03).*The Economist*, Retrieved: Jan 2, 2014 from http://www.economist.com/node/18285828
- Japanese manufacturing, from summit to plummet. (2012, February 18). *The Economist*, Retrieved: Jan 2, 2014 from http://www.economist.com/node/21547815
- Motohashi, K. (2011). Innovation policy challenges for Japan, an open and global strategy. *IFRI Center for Asian Studies*, 1 - 25. Retrieved: Jan 2, 2014 from www.ifri.org
- Porter, M. E., & Linde, C. V. D. (1995). Green and competitive. *Harvard Business Review*, 120-133.
- Porter, M. E. (1990). *The competitive advantage of nations*. (p. 855 pages). New York: Free Press

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