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towards eco-labelled products in Austria”

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Dorothea Sophie Bauer, Bakk.

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Univ.-Prof. Dr. Franz Wirl

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List of Abbreviations

| | |
|-----------|------------------------------------------------|
| BAU..... | Business as Usual |
| CRT | Cathode Ray Tube |
| EPD..... | Environmental Product Declaration |
| FSC | Forest Stewardship Council |
| GEN..... | Global Eco-labelling Network |
| ICT..... | Information and Communication Technology |
| ISO..... | International Organization for Standardization |
| LCD | Liquid Crystal Display |
| MSC..... | Marine Stewardship Council |
| NGO | Non-Governmental Organization |
| TWH..... | Terawatt-hour |

1. Introduction

Eco-labelling fulfils two major objectives. The first one is to provide consumers with information. This kind of information is related to a product's impact on the environment, thereby taking into account various stages of a product's life cycle. The second objective is to enforce sustainable consumption by encouraging consumers to think about their buying behaviour and to prefer less environmentally harmful goods and services.¹

This thesis is divided into two main parts, a theoretical and an empirical one. The theoretical part starting with chapter two provides a short overview to the subject including background information and explains the overall aim of Eco-labelling.

Additionally a classification of environmental labels is given to inform the reader about the different ways of providing customers with environmental information. Hereby the International Standards Organization's norms are used as a reference point. Another part of this chapter is the eco-label development process. It should be seen as a manual how eco-labels can be established theoretically.

Moreover the performance evaluation of eco-labelling is discussed as this task will become relevant in the empirical part. Thus the international literature on performance evaluation is used to explain which impacts Eco-labelling has in general on consumers, on the environment and on the industry.

The third chapter deals with the EU Energy label as the empirical study goes into detail with this kind of label. Energy efficiency labelling is defined and a short legal background is given. As the EU Energy label belongs to the category of comparison labels, energy efficiency rating is explained and arising difficulties with energy efficiency classes are introduced.

Chapter four includes an introduction of ten selected eco-labelling schemes which will later become part of the consumer study. These schemes are discussed by analysing the process of certification, the particular award criteria and their impact on the environment, if such scientific information was available.

¹ GEN - Global Eco-labelling Network (2004), p. 2

An important aim of this thesis is to gain insight into the perception of Austrian consumers towards eco-labelled products. Based on a standardized questionnaire I was able to gather data concerning eco-labelled goods and consumer attitudes towards the environment of 107 survey participants. A large part of the questions thereby referred to the European Union Energy label. The obtained information allowed for investigation of consumer knowledge regarding the eco-labelling schemes which were introduced in the theoretical part.

At the beginning of the empirical part eco-labelling perceptions of Austrian consumers are shown via some descriptive statistics. Afterwards, hypotheses are developed and tested through the analysis. Relationships are examined between different factors, such as income and consumer awareness of environmental impacts of household appliances to give one example. The hypotheses are then either verified or neglected.

2. Eco-labelling

2.1 Background

Eco-labelling was created to react to a number of circumstances. The first one was the rise in consumer environmental awareness at the beginning of the 1990s. A market study with the aim to investigate consumer behaviour in Canada found that people were willing to pay a 10 % price premium for an environmentally sound good and that people were influenced by environmentally claims. As a response a huge amount of so called ‘green’ products was put on the market. Marketers thereby relied on statements such as ‘environmentally safe’, ‘ozone-friendly’ or ‘eco-friendly’ to mention only a few, to promote their products.²

This large number of, as environmentally preferable marketed, products soon turned out to confuse consumers as these claims led to different interpretations and resulted in mistrust concerning producers’ environmental statements. To investigate this circumstance, two national surveys including 2,004 participants were carried out in the U.S. in 1992. The purpose was to explore consumer understanding of two environmental terms, namely ‘recycled’ and ‘recyclable’. People were requested to state the meaning of the word ‘recyclable’ when it appeared on different merchandises, in one case a plastic bottle, in the other case a glass pot.³

The summarized results of this study are that the majority of consumers did have severe difficulties with the comprehension of these two environmental terms. Differences in comprehension were further noticed with respect to people’s income and education, meaning that less educated people and those with a lower income had larger difficulties to understand the meaning of the terms.⁴

The fact that consumers did have difficulties with the understanding of green manufacturer claims worried policy actors and led them thinking about new opportunities to provide consumers with trustful and clear information on the environmental qualities of a product. The first policy response was the introduction of regulations for green advertising in the U.S.. These guidelines acted as information to advertisers in order to explain what the government regarded as deceptive. In Canada a private norm called ‘Guidelines on

² Harrison (2004), pp. 273-274

³ Morris, Hastak & Mazis (1995), p. 328

⁴ Morris, Hastak & Mazis (1995), p. 329

Environmental Labelling' was established in 1993. This rule made it possible not only to comply with the law, but to go a step further. The second response developed by policy makers was the creation of eco-labelling programs. The first country that managed the implementation of a national environmental labelling program was Germany, by introducing the 'Blue Angel' at the beginning of the 1980s. The next country to follow was Canada with its 'Environmental Choice Program'.⁵

2.2 Aim

According to the International Standards Organization the overall aim of Eco-labelling is, *'...through communication of verifiable and accurate information, that is not misleading, on environmental aspects of products and services, to encourage the demand for and supply of those products and services that cause less stress on the environment, thereby stimulating the potential for market-driven continuous environmental improvement'*.⁶

Eco-labelling tries to fulfil three major goals, they are

1. Protection of the environment
2. Inspiration of environmentally sound innovation and leadership
3. Creation of consumer awareness about environmental issues.⁷

An eco-label is used to deliver environmental features of goods and services to consumers and to overcome market failures like the asymmetric information problem. A next key element is to improve the ecological performance of products. Therefore incentives for companies shall be provided in order to use resources in a sustainable manner and to reduce antagonistic environmental impacts of goods and services produced. Furthermore eco-labelling is used to create awareness among consumers concerning the environmental effects of products. Finally eco-labelling tries to enhance standards and innovations

⁵ Morris, Hastak & Mazis (1995), p. 328

⁶ GEN - Global Eco-labelling Network (2004), p. 2

⁷ Sustainable Business Associates (2006), p. 7

regarding the environment. To achieve these goals producers shall be given the opportunity for a competitive advantage over other producers.⁸

Eco labelling is used as a policy tool in order to encourage customers to alter their buying behaviour and to switch to products, which are less resource consuming and less harmful to the environment. Eco labelling belongs to the so called 'Integrated Product Policy' tools, which additionally comprise mandatory standards, taxes, subsidies and arrangements on a voluntary basis. These other tools are not seen as substitutes to labelling, in fact they can be used in combination with labelling.⁹

When consumers are faced with the decision to buy an eco-labelled product, they do not only have to consider the label, but also the quality characteristics of the product, they are going to buy.¹⁰ Information is considered to be allocated asymmetrically among consumers and producers which can lead to market failure. On the one hand there is a lack of knowledge on particular features of a product among consumers. On the other hand producers gather comprehensive product information, with respect to technical, quality, or environmental aspects, of their products, whilst planning and designing them. Due to this asymmetric information allocation consumers can be discriminated in their purchasing decisions. Let me explain why by introducing 'search', 'experience' and 'credence' goods and how eco-labels can help to overcome the asymmetric information problem in this case.

Search attributes refer to the point that buyers are able to gather information prior to the purchasing act, if they are willing to do so intensively. Usually, aspects of environmental quality fall not under the category of search attributes. A product's quality can be judged in most cases after its purchase. Hence customers can only learn during product usage, if they are actually satisfied with the product. This task refers to experience attributes. Credence attributes are explained by the fact that product information is based on trust in the product's qualities. One cannot evaluate this somehow 'invisible' product features by just using the product. The majority of environmental qualities of goods belong to the category of credence attributes as consumers are not able to judge every environmental impact of a product throughout the whole production stages. Only the producer is aware of such information, which is seen as a kind of private good of the firm.¹¹

⁸ Cuts Citee (2009), p 2

⁹ Harrison (2004), p. 273

¹⁰ Harrison (2004), p. 275

¹¹ Frankl & Rubik (2005), p. 29

To solve this asymmetric information problem, consumers are supported in purchasing experience and credence goods via eco-labels. The overall aim of is to fill the information gap of ‘credence goods’ and the provision of information.¹²

2.3 Principles

In order to be able to achieve its intentions and to work efficiently eco-labelling programs have to rely on the following principles,¹³

- Voluntary participation
- Compliance to environmental and other relevant legislation
- Consideration of fitness for purpose and level of overall performance
- Based on sound scientific and engineering principles
- Criteria must distinguish leadership
- Criteria must be credible, relevant, attainable and measurable/verifiable
- Independence
- Open and accountable process
- Flexibility
- Consistency with ISO 14020 and ISO 14024 guiding principles

The first principle ‘voluntary participation’ is explained by the fact that any manufacturer, importer or further businesses can join the eco-labelling program on a voluntary basis.

An eco-labelling program has to be aware and has to respect the local or regional legislation and has to work in order to avoid any conflicts arising from the operation of the program. Furthermore it is crucial to consider quality aspects of a product. Consumers must be able to rely on an eco-labelled product which is of the same quality as an unlabelled alternative.

The next principle ‘Based on sound scientific and engineering principles’ stands for the necessity to implement a life-cycle analysis. The process of life-cycle analysis will be explained in detail in the proceeding chapter.

¹² Frankl & Rubik (2005), p. 30

¹³ Sustainable Business Associates (2006), p. 9

Established criteria must be reliable and verifiable. Every eco-label licence applicant has to be treated in the same way, when it comes to criteria evaluation. Therefore criteria have to be analysed in line with the life-cycle approach. The principle ‘Independence’ shall guarantee that eco-labelling programs are organized in a way that is self-determining and independent from commercial interests. The determination of criteria has to be made via consultation of various stakeholders, like advisory groups, interested parties, consumer and environmental organizations and the government. A further criterion of an effective program is the implementation of a quality management system, which ensures the monitoring of applications and criteria. An open process is guaranteed by public criteria assessment. A flexible program works cost-effectively and in line with market requests. It is able to adapt to technological changes. Environmental criteria are adapted to these technological changes when necessary. The last point tells us that an eco-labelling program can count on ISO’s guiding principles.¹⁴

2.4 Classification

Defining the term ‘eco-labelling’ is not an easy task, as there is no such of a formal definition established by jurisprudence.¹⁵ In the literature the term eco-labelling is often used to deal with a particular type of eco-labels, namely ISO-Type I labels. In some papers this term is also mentioned to encompass environmental claims or declarations made by individual companies. To give an example, *‘Eco-labelling aims to inform customers about the effects on the environment of the production, consumption and waste phases of products or services consumed.’*¹⁶

In the literature the terms ‘eco-labelling’ and ‘environmental certification’ are often used as synonyms. In general a certification is a kind of written provision, which is given by an independent party. This independent third party hands out a certificate, if a product, a service or a system, satisfies certain criteria.¹⁷ The US Federal Trade Commission has made an effort to clarify environmental certifications as, *‘any certification that expresses or implies that a product, package, service, practice or program is environmentally friendly, environmentally superior, preferable to other products, packages, services,*

¹⁴ Sustainable Business Associates (2006), p. 10

¹⁵ Belson (2012), p. 98

¹⁶ Galarraga Gallastegui (2002), p. 316

¹⁷ ISO 14000 – Environmental Management

practices, or programs; or expresses or implies other environmental attributes or benefits’.

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The norms carried out by the International Standards Organization can be used to classify environmental labels and to give an overview of the relevant characteristics of each label type. It is though not possible to get a certification according to an ISO standard. ISO as such is an independent and non-governmental organization, composed by national standards institutes from 164 countries. The Central Secretariat, which takes care of coordinating the system, is located in Geneva, Switzerland.¹⁹ It has developed and published more than 19,000 international standards. The development of ISO standards is done by expert groups in technical committees. These commissions, proposed by ISO’s members, are made up by industry representatives, NGOs, governments and further stakeholders. A standard is thereby defined as *‘a document which provides necessities, rules and specifications that can be used to grant that materials or products and processes are fit for their purpose.’* Having in mind this definition, ISO classified labels into three main types by using a distinct standard for every label type.²⁰

2.4.1 ISO Type I – Ecolabels

Eco-labels are basically ISO Type I labels. The principles of ISO Type I labels are publicly accessible and classify products which have a less environmental influence throughout the whole life cycle.²¹ The logo is awarded to products which are in accordance with the criteria. It can be used for a given time period, therefore it is necessary to pay application costs and fees.²² Eco-labels are included in ISO’s standard ‘ISO 14024’ and are explained as,

‘voluntary, multiple criteria-based third party programme that awards a licence authorising the use of environmental labels on products. These indicate the overall environmental preferability of a product within a

¹⁸ Belson (2012), p. 98

¹⁹ ISO 14000 – Environmental Management

²⁰ Maur & Shepherd, p.198

²¹ Stein (2009), p. 285

²² Galarraga Gallastegui (2002), p. 316

*particular product category based on life cycle considerations. These labels provide qualitative environmental performance.*²³

The following graph presents an overview of selected national ISO Type 1 programmes in various countries.

| REGION COVERED | NAME | START ^a | BODY IN CHARGE OF CRITERIA-SETTING |
|------------------|---------------------------------------------|--------------------|--------------------------------------------------------------------------|
| Austria | Eco Label | 1991 | Ministry of the Environment and the Association for Consumer Information |
| Catalonia, Spain | Distintiu de Garantia de Qualitat Ambiental | 1994 | General Directorate of Environmental Quality |
| European Union | European Flower | 1992 | European Union Eco-labelling Board |
| Germany | Blue Angel | 1978 | Jury Umweltzeichen |
| Japan | Eco-Mark | 1989 | Japan Environmental Association |
| Nordic Countries | White Swan | 1989 | Various competent bodies in the participating countries |
| Spain | AENOR Medio Ambiente | 1994 | AENOR |
| USA | Green Seal | 1991 | Green Seal Stakeholder Committee |

^a The year the label was established

Figure 1: Examples of particular programmes covering multi-product groups (ISO Type I schemes)²⁴

2.4.2 ISO Type I-like

A subdivision of ISO Type I labels are ISO Type I-like labels. While the former refers to the standards developed by ISO and meets most of the set criteria, ISO Type I like labels just contain some major elements of the ISO Type I standard and refer only to a single attribute of a product or a single sector.²⁵

²³ Rubik, Scheer & Iraldo (2008), p. 395

²⁴ adapted from Frankl & Rubik (2005), p. 54

²⁵ Frankl & Rubik (2005), p. 33

| REGION COVERED | NAME | START | BODY IN CHARGE OF CRITERIA-SETTING | NUMBER OF PRODUCT GROUPS |
|----------------|---------------------------------------------------------------------|-------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|
| International | FSC (Forest Stewardship Council) | 1991 | WWF | One (forestry) |
| Europe | Öko-tex Standard 100 | 1992 | International Union on Research and Testing in the Area of Ecological Textiles | One (textiles) |
| Austria | Österreichisches Institut für Baubiologie und -ökologie (IBO) Label | 1988 | Österreichisches Institut für Baubiologie | One (construction) |
| USA | Energy Star | 1992 | US Environmental Protection Agency (EPA) and US Department of Energy | More than 35 (energy-consuming devices, e.g. computers and printers etc.) |

Figure 2: Overview of ISO Type I-like programmes²⁶

2.4.3 ISO Type II – Environmental claims

Type II is included in ISO's international standard 'ISO 14021' defining self-declared environmental claims as, '*environmental declaration made without certification from an independent third party, on the part of manufacturers, importers, distributors, retailers or any other entity able to gain benefit from this declaration*'²⁷

In contrast to Type I labels, Type II labels are awarded by the company itself, as a consequence this standard is also known as '*self-declaration*'. Examples include statements such as '*recyclable*', '*compostable*', '*refillable*' or '*ozone safe*' or '*ozone friendly*'.²⁸ These claims take into account certain attributes of a specific product and do not consider the entire life-cycle. The fact that such claims exist without a certification from an independent third party, they provide the possibility for misuse. This has also recognised the U.S. Federal Trade Commission which established '*Guides for the Use of Environmental Marketing Claims*' to improve the credibility and to avoid consumer confusion by eventually misleading terms.²⁹

²⁶ Adapted from Frankl & Rubik (2005), p. 55

²⁷ Lavallée & Plouffe (2004), p. 352

²⁸ Stein (2009), p. 285

²⁹ Rotherham (1999), p. 4

2.4.4 ISO Type III – Environmental Product Declarations

Type III, also known as Environmental Product Declarations (EPDs), is covered by ISO's standard 'ISO 14025'. This standard describes product information as,

*'providing quantified environmental data using predetermined parameters and, where relevant, additional environmental information.'*³⁰

Environmental Product Declarations require information release and thus it is not necessary that certain criteria have to be met. EPDs do not give a statement on any environmental threat, thus the consumer has to evaluate on his own the environmental problems associated with the product.³¹ EPD's are suitable to procurement by businesses or public bodies. Individual consumers are not the main target.³²

| COUNTRY | INITIATIVE |
|---------|--------------------------------------------------------------|
| Denmark | Pilot project EPD |
| France | Experimental standard on Type III environmental declarations |
| Italy | EPD programme |
| Sweden | EPD Programme |
| UK | BRE Environmental Profiles for construction materials |
| Germany | AUB, UBA Project |
| USA | Certified Eco-Profile Programme |

Figure 3: Overview of selected EPD programmes in specific countries³³

³⁰ Rubik, Scheer & Iraldo (2008), p. 395

³¹ Rotherham (1999), p. 5

³² Allison & Carter (2000), p. 5

³³ Adapted from Bogeskär et al. (2002), p. 23

2.5 Eco-label development process

This part comprises an overview of how eco-labels are in general established. As every eco-labelling program differs in the way to deal with this practice, it should be regarded as a guideline or manual, involving the following steps, ³⁴

1. Product Selection
2. Criteria Development
3. Public review process
4. Adoption of final criteria
5. Application to Competent Body for the eco-label
6. Testing and Verification
7. Licence

Finding a product category is the overall starting point. The decision, which products to label, is made by a labelling board, keeping in mind proposals from various stakeholders, like consumers, non-governmental organizations or the industry.³⁵ These mentioned stakeholders, including non-governmental organizations, particularly try to protect the environment and are thereby allowed to give proposals to the labelling board. The consultative committee is further composed by the industry or representatives of the state. The process of consulting is essential as everyone is involved in the process of finding a product category, the formation of environmental principles and further practical product features.³⁶

The next step, ‘criteria development’, involves the setting of thresholds and the establishment of further environmental standards for the award of the label. Criteria or standards for the award of an eco-label are not settled for all products on the market, instead they are established for a specific product category like electronic equipment or paper products. Each product belonging to a particular product category has to have similar features. The ISO standard 14024 provides guidelines by using expressions such as ‘*similar product function characteristic*’ and ‘*fitness for purpose*’. The task of finding a proper product category involves environmental data gathering; conducting of market studies and detecting product suppliers and foreign manufacturers on the marketplace,

³⁴ OECD (1997), p. 11

³⁵ Kratz & Piotrowski (1999), p. 431

³⁶ Kratz & Piotrowski (1999), p. 431

which is also described in the ISO standard 14024. Every eco-label program differs in the process of weighting and setting criteria, as the ISO standard simply prescribes that any eco-labelling body has to give an explanation for a particular decision regarding the weighting and setting of the criteria.³⁷

Consumers must be able to rely on eco-labelled products, which have a lower ecological impact. Thus, in setting the criteria a valuation of the environmental performance of the products being part of the chosen product category has to be made.³⁸ The ISO standard 14024 therefore states that a 'scientific method' must be used to base the labelling criteria on. To fulfil this requirement a life cycle analysis must be conducted.³⁹

A life cycle analysis is a so called 'cradle to grave' method. The starting point of it is the finding of raw materials and energy to produce a product and it concludes at the final step when all components or materials are returned to the earth. All stages in a product's life are evaluated independently. It is thereby possible to estimate cumulative impacts, relating to the environment, which result from the various stages in a product life-cycle. The expression 'life cycle' stands for the various activities in a product's life span.⁴⁰

A life cycle analysis takes the form of a systematic and phased method. First products and processes are defined. Then decisions on the assessment background and on the identification of boundaries are made. Afterwards an inventory analysis is conducted. Hereby energy, water and material usage and environmental discharges, like emissions to air or waste water discharges, are detected and quantified. Finally other effects, like human and ecological effects of energy, water and usage of material and environmental reliefs are evaluated. Results of the inventory analysis and the impact assessment are finally interpreted. In the outstanding graph a demonstration of the in- and outputs and the life cycle phases which are included in a life-cycle analysis is given.⁴¹

³⁷ Kratz & Piotrowski (1999), p. 431

³⁸ Kratz & Piotrowski (1999), p. 431

³⁹ Lavallée & Plouffe (2004), p. 351

⁴⁰ US EPA (2006), p. 1

⁴¹ US EPA (2006), p. 1

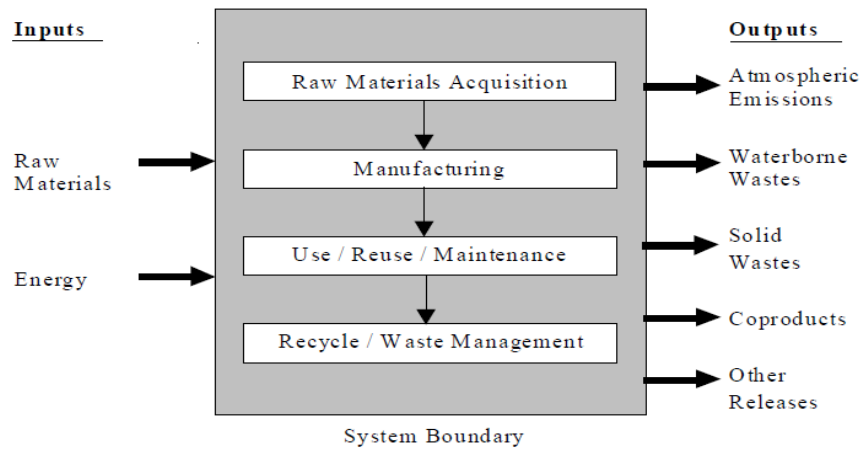


Figure 4: Life Cycle Stages⁴²

As soon as the criteria for awarding the label are settled, public reviewing takes place. Hereby various parties like the industry and environmental or consumer groups are asked to give advice or further contribution. And finally it is possible for companies to apply to a Competent Body for the eco-label. Usually the applicant has to bear all costs, such as testing and verification fees. If the label is granted to the applicant, he is allowed to use the label via a licence. The amount is therefore calculated from annual product sales. Continuous evaluation of product criteria is a requisite in order to achieve the target ‘inspiration of environmentally sound innovation and leadership’.⁴³

⁴² US EPA (2006), p. 1

⁴³ Kratz & Piotrowski (1999), p. 431

2.6 Performance evaluation of Eco-labelling

This chapter deals with an analysis of how the performance of eco-labelling schemes can be assessed. As the main goal of eco-labelling is to influence consumer behaviour and to stimulate environmentally sound production techniques, the international literature on performance evaluation of eco-labelling focuses on these elements.

2.6.1 Impact on Consumers

Most studies deal with explanations why customers consider or avoid eco-labels in their purchasing decisions. For consumers who do not consider eco-labels, it is reported that other aspects, such as product quality or the price are higher valued.⁴⁴ A general finding is that environmental conscious consumers tend to buy considerably more goods with an eco-label on and customers who care more about the price are found to buy less eco-labelled goods.⁴⁵ Additionally peer pressure, lack of time, consumer consciousness and purchasing habits are seen as further influencing factors on consumer behaviour regarding eco-labelled products.⁴⁶

A study conducted in Sweden in 2001 with the purpose to investigate the connection between demographic aspects, such as sex, education or age, and attitudes regarding eco-labelled food products, found that especially women, people with a university degree and young individuals had a positive attitude towards eco-labelled food products. Age is seen to have an inversely u-shaped connection with the purchasing of such products. It is argued that marketing campaigns are targeted mostly to those people who are classified as the 'middle age group'.⁴⁷

Another consumer study made by Torjusen, Lieblein, Wandel & Francis in Norway in 2001 investigated purchasing aspects regarding food products. They concluded that quality aspects like freshness and appearance of food were evaluated equally among consumers. However those consumers who were in favour of eco-labelled food additionally took into account environmental and health issues.⁴⁸

⁴⁴ Leire & Thidell (2004), p 1064

⁴⁵ Schumacher (2010), pp 26-29

⁴⁶ Balzarova, Delmas & Nairn-Birch (2012), pp 2-11

⁴⁷ Grankviest & Dahlstrand (2004), pp 214-215

⁴⁸ Grankviest & Dahlstrand (2004), pp 215

Another important influencing factor on consumer behaviour is consumer consciousness, which refers to the point that consumers are actually aware of the fact that a certain eco-label program exists. A main aspect for success is hereby the existence of ecological awareness combined with effective advertising campaigns. A study dealing with consumer consciousness of the EU eco-label in the Nordic countries, Denmark, Sweden, Finland and Norway, concluded that consumers had severe difficulties to remember this kind of label without any help. Consciousness however should not be confused with understanding. It is possible that consumers recognize that a particular eco-labelling program is in place but do not know its message and what type of information it wants to deliver.⁴⁹

Thøgersen found that consumer trust is another important aspect. Any certification program has to present itself in a doubtful manner, such that consumers are encouraged to buy environmental friendly products.⁵⁰ In general consumer trust is influenced by public awareness of environmental issues, clearly presented product characteristics and consideration of how individual consumers can change their behaviour due to the information provided by the eco-labelling scheme.⁵¹

Another factor that influences the purchasing behaviour of eco-labelled products is peer pressure. Research shows that an environment, where it is common that people buy environmental friendly products, or show other green behaviour in their everyday lives, could strengthen a person's wish to buy eco certified products.⁵²

Willingness to pay

Goods and services certified with an eco-label comprise additional costs, a so called 'price premium'. This additional amount has to be included in the price of the eco-label certified product, as the costs of certification have to be covered by the manufacturer. Moreover a manufacturer will have to think about the restructuring of his production facilities in order to comply with the quality standards set out by the labelling program. This restructuring leads to additional costs included in the final product. Studies dealing with price premiums have brought the cost range for organic wine certification to light, which is 15% up to

⁴⁹ Brockmann & Hemmelskamp (1995), pp. 3-5

⁵⁰ Grankviest & Dahlstrand (2004), pp 214-215

⁵¹ Roheim (2003), p. 97

⁵² Balzarova, Delmas & Nairn-Birch (2012), p 10

30%. Customers have to be aware of these additional costs and have to accept them, such that the eco-label program is able to survive in the long run.⁵³

Environmental friendly products are also referred to as ‘impure public good’, as they do not only grant a public benefit but also a private benefit to the customer. When purchasing eco-certified products, customers consider another factor besides environmental friendliness, which is quality. The quality of a product means getting a private benefit. To name a few ‘*advanced lifetime*’ or ‘*savings in energy costs*’, ‘*higher dimming ability*’ in the case of LED lightening or ‘*better taste*’ in the case of organic foods. One should not forget aspects concerning health of consumers. Organic food is often associated to taste better and to be healthier than conventional food. To sum up, if customers do not expect to get any private benefit, when purchasing eco-labelled products, they might reject to pay a price premium.⁵⁴

2.6.2 Impact on the Environment

Within the context of environmental effectiveness of eco-label programs, it is essential to ask if these programs achieve their intended goal to protect the environment. Unfortunately it is quite difficult to actually measure, if eco-labelling programs have a positive influence on the environment. As it was discussed in the previous chapters, there exist assessment techniques, like a life cycle analysis, which are used to predict measurable data with respect to the marginal environmental improvement, like emission reduction. Additionally ecological outcomes are measured with two crucial proxy indicators. These are on the one hand quantifiable data and on the other hand qualitative info.⁵⁵

The term quantifiable data comprises data from other performance indicators, like number of products covered by the eco-label, market share of the eco-labelled good or service, the number of products and companies which are awarded the certificate, or the regularity the criteria used in the eco-label program are improved or adjusted.⁵⁶

⁵³ Balzarova, Delmas & Nairn-Birch (2012), pp 2-9

⁵⁴ Balzarova, Delmas & Nairn-Birch (2012), pp 2-9

⁵⁵ UNEP The Trade and Environmental Effects of Ecolabels: Assessment and Response, p. 5

⁵⁶ UNEP The Trade and Environmental Effects of Ecolabels: Assessment and Response, p. 5

Qualitative info is used to assess the reliability of an eco-label scheme. The process of how an eco-label is established and which organizations are supporters of a labelling scheme are thereby crucial factors.⁵⁷

Until now only some studies have been carried out to investigate the effectiveness of eco labels. They comprise studies by the 'Blue Angel', the 'Nordic Swan' or the 'Good Environmental Choice'. Critics say that these studies do not rely on autonomous scientific assessments to prove that any ecological development is a result of the certification programme.⁵⁸ They further conclude that data collection and the implementation of monitoring systems to ensure environmental effectiveness remain major future challenges for eco-label programmes.⁵⁹

2.6.3 Impact on the Industry

Consumers obviously have an incentive to pay more money for 'green' products. These are products produced by environmentally sound construction or abatement technologies. A firm which has not already make use of such a production method might be interested to invest in order to obtain such a technology. As a consequence the firm is able to differentiate its products via the eco-label from those of its competitors. In addition people will get a positive view towards the firm, which is a further advantage of using 'green technologies'. A firm wishing to apply for an eco-label has to be aware of the fact that licences are granted for a short period of time and that only a small percentage of the market (5-20%) is able to obtain an eco-label. In addition criteria might be changed or improved after a few years, mostly every 3-4 years. Thus the firm has to invest money in order to keep the label, and that quality standards have to be fulfilled.⁶⁰

The international literature provides the following explanations why a company will decide to certify its products via an eco-label,

- positive impact on brand and enhanced corporate reputation
- strong corporate governance
- enhancement of regulatory relations

⁵⁷ UNEP The Trade and Environmental Effects of Ecolabels: Assessment and Response, p. 5

⁵⁸ UNEP The Trade and Environmental Effects of Ecolabels: Assessment and Response, p.4

⁵⁹ UNEP The Trade and Environmental Effects of Ecolabels: Assessment and Response, p. 12

⁶⁰ UNEP The Trade and Environmental Effects of Ecolabels: Assessment and Response, p. 11

- risk reduction and management
- competitive advantage
- new market access
- cost reductions⁶¹

The United Nations Environment Programme cites a study in support of the Rainforest Alliance which concludes that, *‘some of the benefits are quantifiable and generate immediate measurable impact on financial performance. Others are more difficult to quantify and support longer term impact on financial performance. For the most part, firms have yet to quantify the costs and benefits of certification.’*⁶²

One can distinguish between tangible and intangible benefits. Tangible benefits include increased profitability and increased predictability of future returns. Intangible ones are for instance brand equity. Regarding market penetration it is important to mention that eco-labelling criteria are established in a way that only 5-30 per cent of goods in a particular category qualify for the certification via the eco-logo. If a certain percentage of eco-labelled products exist on the market, the principles for the granting of the logo are improved or reconsidered, such that producers are encouraged to think about new possible ways to establish innovations to produce environmentally sound products.⁶³ At the moment no studies, documenting the market share of eco-labelled products in contrast to ‘not labelled’ ones belonging to a particular product group, exist.⁶⁴

The use of eco-labels might in addition have an impact on the complete product range of companies. A hypothesis is that eco-label standards can lead to minimum environmental criteria, which are then used by all products in a certain product range on the marketplace. In this case eco-labels are regarded as a benchmark by actors, who are not involved in any eco-labelling program.⁶⁵ However difficulties may arise, which will be mentioned shortly. It is reported that not every company fulfilling the criteria to be awarded an eco-label does actually have one. Thus customers might get insecure and buy a larger amount of unlabelled/dirty goods. Further consumers might expect that a company produces dirty products, simply because the products do not bear any label.⁶⁶

⁶¹ UNEP The Trade and Environmental Effects of Ecolabels: Assessment and Respose, p. 11

⁶² UNEP The Trade and Environmental Effects of Ecolabels: Assessment and Respose, p. 11

⁶³ UNEP The Trade and Environmental Effects of Ecolabels: Assessment and Respose, p. 12

⁶⁴ Rubik et.al (200.), p. 409

⁶⁵ Rubik et.al., p. 412

⁶⁶ Schumacher (2010), pp. 26-29

3 The EU Energy Label

3.1 Energy efficiency labelling defined

Energy efficiency labels are used to provide information on the energy consumption of products. They are third party certified eco-labels, which can lead to a decrease in the energy consumption of appliances on a global basis.⁶⁷ Consumers use them in their purchase choice as it is a fact that buying for example an energy consuming appliance does not only involve the cost of the device but also another indiscernible factor namely the consumption of energy. One can distinguish between two forms of energy labels, Comparison labels and Endorsement labels.⁶⁸

- **Comparison labels** display the energy efficiency of a product via a scale. It is thus possible to compare or to rate the different ‘efficiency categories’ by using this scale. Consumers are expected to easily remember this type of label as it does not imply to compare exact energy consumption values. A typical example of a comparison label is the European Union energy label.
- **Endorsement labels** highlight those products, which fulfil certain requirements. For endorsement labels a so called ‘best-in-class’ approach is used, this means that products with an endorsement label can be seen as the efficient ones in a certain product group. The logo marks those products which are consistent with a certain standard. Consumers are not able to find out, how energy efficient this kind of product is in relation to another product. While comparison labels are often mandatory, endorsement ones are almost always introduced on a voluntary basis. Examples include the Energy Star label.⁶⁹

⁶⁷ Heinzle & Wüstenhagen (2012), p. 61

⁶⁸ Harrington & Damnics (2004), p. 5

⁶⁹ Harrington & Damnics (2004), p. 5

3.2 Legal Background

The European Energy label was introduced in 1992 as a mandatory label. The purpose was to provide the public with exact, reliable and comparable information on product specific energy consumption. Further consumers were encouraged to buy energy efficient appliances. In addition the EU Energy label should stimulate the production of energy efficient appliances meaning producers to increase the energy efficiency of their goods produced.⁷⁰

At the moment, Central Directive 2010/30/EU developed by the European Commission acts as a general rule. This Directive 2010/30/EU *of the European Parliament and of the Council of 2010 on the indication by labelling and standard product information of the consumption of energy and other resources by energy-related products*, is used to give detailed insight to the aim of the program.

‘This Directive establishes a framework for the harmonisation of national measures on end-user information, particularly by means of labelling and standard product information, on the consumption of energy and where relevant of other essential resources during use, and supplementary information concerning energy-related products, thereby allowing end-users to choose more efficient products.’⁷¹

Every Member State is requested to establish a national legislation so that the program is able to work properly. Issues like submission, label accuracy, instructive actions and advertising are further left to the Member States of the EU.

‘This Directive shall apply to energy-related products which have a significant direct or indirect impact on the consumption of energy and, where relevant, on other essential resources during use. This Directive shall not apply to second-hand products; any means of transport for persons or goods; the rating plate or its equivalent affixed for safety purposes to products.’⁷²

⁷⁰ Moser (2011), p. 1

⁷¹ European Commission Directive 2010/30/EU

⁷² European Commission Directive 2010/30/EU

An energy-related product is in this case defined as,

‘any good having an impact on energy consumption during use, which is placed on the market and/or put into service in the Union, including parts intended to be incorporated into energy-related products covered by this Directive which are placed on the market/and or put into service as individual parts for end-users and of which the environmental performance can be assessed independently.’⁷³

3.3 Product groups

Currently the EU Energy label program certifies the following product groups,

- Lamp
- Household Air conditioners
- Household Television
- Household Washing Machines
- Luminaires
- Household Refrigerating Appliances
- Household Dishwashers
- Wine Storage Appliances⁷⁴.

In addition to the current product groups, a new or revised label is discussed for the below-mentioned product categories,

- Central heating boilers (<500 kW)
- Heat pumps
- Water heaters and storages
- Single-room heating appliances⁷⁵
- Household air-handling systems
- Household ovens and fume hoods
- Vacuum cleaners

⁷³ European Commission Directive 2010/30/EU

⁷⁴ WKO – EU Energielabel

⁷⁵ WKO – EU Energielabel

In Austria employees of the Federal Ministry of Economy, Family and Youth (BMWFJ) are responsible to conduct a regular market surveillance, which aims to ensure that the label is displayed in any kind of company, regardless of its size. In addition a so called ‘desktop-market surveillance’ is carried out, which monitors the appropriate labelling of online offers. Sanctions will be imposed in the event of non-compliance with the current energy labelling directive. If a company concerned has committed a violation, the relevant penalty amounts to 7.260 euros.⁷⁶

3.4 Energy Efficiency Rating

The EU Energy label belongs to the category of comparison labels. The original EU Energy label, introduced in 1992, allowed consumers to judge the energy efficiency of products by using a scale with seven categories, A to G. Category ‘A’ marked those products, with the lowest energy consumption. The label was designed, such that only the most efficient products on the market would get an ‘A-rating’. Since 2000, the EU Energy label has been regarded as a successful program, as more than 50 % of the products classified for an ‘A-rating’. After a while, the market adjusted in a way that a lot of products fulfilled the ‘A-standard’, in fact more than 90 % of products were labelled as highly energy efficient. It is hereby important to keep in mind that products existed, which could classify for a standard above ‘A’. These products were still labelled with ‘A’ but for the consumer it was invisible that these products were more efficient than the ‘A’ standard’. This situation led to a lot of criticism from consumer organizations.⁷⁷ To cope with this situation, two solutions were discussed. The first one was preferred by eco-friendly and customer organizations. It was proposed to keep the seven categories, A to G and to carry out regular revisions of criteria to guarantee that only highly efficient products were included in the ‘A’ category. A product, fulfilling the ‘A-standard’ in a certain year, would be regrouped into a lower efficiency class in the next year. This solution would mean to put the period of validity on every label.⁷⁸

The second solution was privileged by the industry. It would mean to introduce new categories further than ‘A’, like ‘A+’ and no period of validity on the label needed to be therefore necessary.⁷⁹

⁷⁶ Energyagency

⁷⁷ Moser (2011), p. 2

⁷⁸ Heinzle & Wüstenhagen (2012), p. 61

⁷⁹ Heinzle & Wüstenhagen (2012), p. 61

After taking several suggestions into account, the EU Parliament and the EU Commission came to an overall decision. It was determined to keep the seven energy classes. Three additional efficiency classes, A+++, A++ and A+ were introduced with the highest classification being now 'A+++' instead of 'A' and the least energy efficiency class 'D' instead of 'G'. The original colours of the label are left unchanged (e.g. from red to dark-green).⁸⁰

For a better understanding the adjustment of the energy efficiency classes is provided in the figure below. On the left the prior energy efficiency classes are provided, while on the right the current energy efficiency classes are depicted.



Illustration of energy efficiency classes of two label options ('A-G scale' versus 'A-plus scale')

Figure 5: Illustration of energy efficiency classes of two label options⁸¹

⁸⁰ European Commission Directive 2010/30/EU

⁸¹ Heinzle & Wüstenhagen (2012), p. 61

4. Discussion of eco-labelling schemes used in the consumer survey

The next section covers an analysis of particular examples of eco-labelling schemes, which will later become part of the consumer survey. As it is nearly impossible to discuss every single eco-labelling programme on the market, I had to decide on programmes, which could classify for the consumer survey. Note, according to the European Eco-label index, 435 eco-labels are awarded in 197 countries and 25 industry sectors at the moment.⁸²

In order to classify for the consumer survey the programmes should meet three main criteria, they are,

- ISO-Type I or ISO-Type-I-like
- Availability in Austria or the European Union
- Coverage of a wide range of products

The first criterion for me was to choose ‘ISO-Type I’ or ‘ISO-Type I-like’ eco-labelling schemes. As I have already explained, the main characteristics of ISO-Type I labels are that they are third party certified programmes, introduced mainly on a voluntary basis. That’s why I didn’t want to go into detail with social labels or environmental claims by individual companies, because they do not fulfil the ISO-Type I standard. The European Union Energy Label was picked to give an example for a mandatory label.

The Marine Stewardship Council and the Forest Stewardship Council labelling programmes are included to give particular insight to ISO-Type I-like labelling programmes. Although I decided to mention the Marine Stewardship Council as an example for labelling on food, I didn’t pick any other food labels.

The second criterion to choose particular eco-labelling schemes was ‘availability in Austria or the European Union’, as Austria is certainly a part of the European Union. Products certified with one of the mentioned eco-labelling programs in the questionnaire shall be concentrated in Austria or the European Union. To my mind it makes no sense to ask Austrian consumers on their perceptions of products, certified with an eco-label program, which are not even available in Austria.

⁸² Ecolabel Index – the global directory of ecolabels

Further it was my intention to ask consumers about their awareness of several eco-labelling schemes on different product groups. So the third criterion is ‘coverage of a wide range of products’. Product groups, covered by these eco-labelling schemes, range from paper products to household appliances, detergents, to electronic equipment and sanitary products, so consumers might have bought at least one commodity belonging to these products groups once in their life, so a hypothesis is that they might be able to remember one of the chosen labels.

Having in mind the three main criteria the decision on the following eco-labels was made, with special emphasis on the European Union Energy label, which was already discussed in the previous chapter. In addition I decided to introduce the Green Dot and the Recycling symbol ‘Möbius loop’ shortly to give two examples for recycling symbols.

- EU Energy Label
- EU Energy Star
- EU Eco-label
- The Austrian Eco-label
- The Blue Angel
- The Nordic Swan (Nordic Ecolabel)
- Marine Stewardship Council
- Forest Stewardship Council
- Programme for the Endorsement of Forest Certification
- The Green Dot
- Möbius Loop

These eco-labelling programs are discussed in advance of the consumer survey. Therefore I am going to assess every scheme by mentioning its certified product groups, its market penetration and the process of certification. In addition the impact certified products may have on the environment is investigated.

4.1 European Union Energy Star

ENERGY STAR is best defined as, ‘... *integral part of the EU’s energy efficiency policy as set out in the Action Plan for Energy Efficiency. It aims to ‘pull’ the office equipment market up towards greater efficiency and thus complements the Ecodesign Directive 2009/125/EC, which acts to ‘push’ the market through mandatory or voluntary minimum efficiency requirements....*’⁸³

Background

The United States and the European Union decided on the management of a labelling program for office equipment through an Agreement, which is also called ‘the 2000 Agreement’. It was settled on December 19 in year 2000 by including the following.

Article 1 of the Agreement covers the general principles of the program. The parties, namely the US and EU agree on the use of a common logo to classify energy efficient product types. Product types that are able to be awarded with the Energy Star logo are explained later. Consumers shall be able to recognize energy efficient products through the Energy Star logo on the marketplace. The ENERGY STAR logo is a service mark, which is possessed by the U.S. EPA.⁸⁴

Article 7 determines the coordination between the two Management Units. It is foreseen that each party establishes a Technical Commission. The relevant members of the Technical Commission have to meet every year to discuss the process and management of the scheme. In advance they have to assess if the aim of the program is achieved. Representatives from other administrations are also allowed to attend these regular meetings.⁸⁵

Regarding participation it is stated in Article 6, that any manufacturer, vendor or resale agent is allowed to join the program. It is therefore necessary to register as a Participant with one of the two Management Parties, the U.S. EPA or the European Commission.

⁸³ European Commission (2011), p. 2

⁸⁴ Official Journal of the European Union (2006)

⁸⁵ Official Journal of the European Union (2006)

Certification

ENERGY STAR counts on three main certification elements. First of all, product qualifications are developed under the evaluation of both parties, the U.S. EPA and the European Commission. If one party agrees on a specification, this specification enters into force in both countries, the US and the EU, with the exact amount of strictness. Second, product qualifications have to be revised frequently in order to enable better efficiency. Third, the use of energy efficiency requirements, which are at least the same as the criteria settled in the ENERGY STAR labelling programme, are provoked.⁸⁶

The US and the European Commission differ in the way they deal with certification. US EPA for instance requires that ‘...*all products seeking certification under the programme in the US to be tested in third-party certified laboratories and to be systematically checked after their qualification.*’ US EPA decided to enforce third-party certification to ensure that the possibility for fraud is reduced. In order to be awarded the ENERGY STAR® logo a product has to be in line with the requirements set by the US EPA and the European Commission. These two bodies have the right to take actions in the case of non-compliance or misuse.

The ‘2000 Agreement’ provides product qualifications for Computers; Computer Monitors; Printers; Fax Machines; Mailing Machines; Copiers; Scanners; Multifunction Devices and Imaging Equipment.

As the particular qualifications can’t be summarized in general, I decided to use a particular example to explain the circumstances under which the Energy Star logo is awarded. Hereby the technical specifications for Computers are used as an example.

Note, a computer is in this case defined as ‘*a desktop, a tower or a mini-tower, or portable unit, including high-end desktop computers, personal computers, workstations, network computer desktops, X terminal controllers, and computer-based point-of-sale retail terminals.*’⁸⁷

For computers to be awarded with the Energy Star logo, the following standards must apply. First they have to enter into a so called ‘sleep mode’ after a phase of

⁸⁶ European Commission (2011), p. 2

⁸⁷ European Commission (2006), p. 36

inoperativeness. For a computer installed into a network, the same condition must hold true. The requested power consumption in the sleep mode is provided in the graph below.

| Maximum continuous power rating of power supply ⁽¹⁾ | Watts in sleep mode |
|----------------------------------------------------------------|----------------------------------------------|
| ≤ 200 W | ≤ 15 W |
| > 200 W ≤ 300 W | ≤ 20 W |
| > 300 W ≤ 350 W | ≤ 25 W |
| > 350 W ≤ 400 W | ≤ 30 W |
| > 400 W | 10 % of the maximum continuous output rating |

⁽¹⁾ The maximum continuous output rating of a power supply is the value defined by the power supply manufacturer in the operating instructions provided with the product.

Figure 6: Requested power consumption of Energy Star labelled computers in the sleep mode⁸⁸

The Agreement further provides guidelines for ‘Shipment Settings’, ‘Operating Systems’ and ‘Monitor Control’. Program Members shall guarantee that computers are sent with such a power control as already explained, to give an example for so called Shipment Settings. Users must be able to adapt or disable the low-power mode, when they use the monitor.

As manufacturers are requested to check their products for consistency with the criteria set out by Energy Star, they are provided with certain guiding principles. I will not go into detail with these guidelines however I will shortly explain why they are used. First, the correct power consumption has to be measured. Second other factors must not exert influence on the test outcomes. Third test outcomes must be able to get replicated. To measure the true power consumption an annual calibrated RMS-Watt Meter, has to be utilized.⁸⁹ Note RMS stands for Root Mean Square and indication of performance via Watt RMS is an internationally used method.⁹⁰ True power consumption is given by (volts)*(amps)*(power factor), which is described as Watts.

⁸⁸ European Commission (2006), p. 37

⁸⁹ European Commission (2006), p. 39

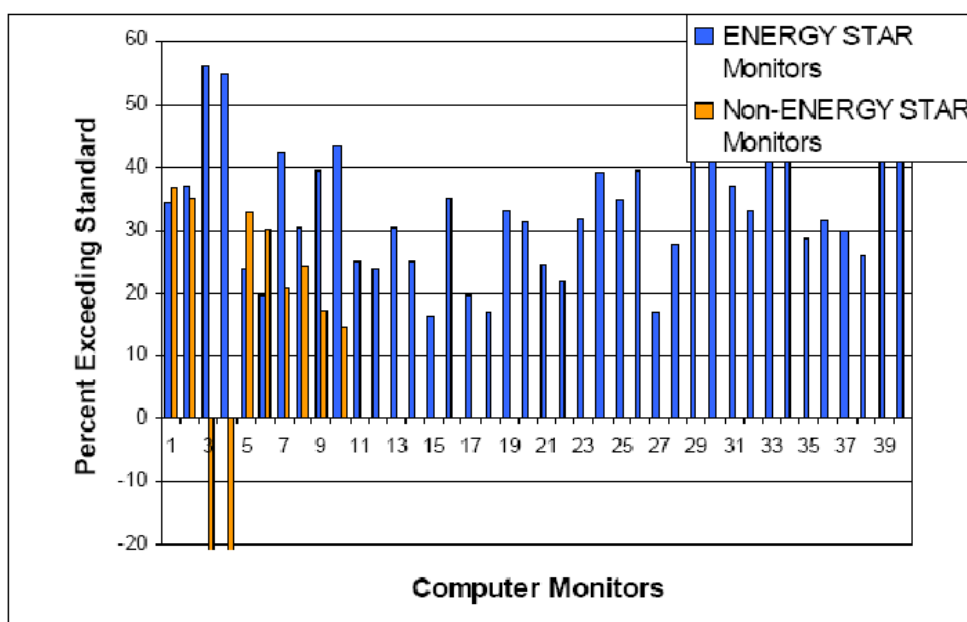
⁹⁰ Watt RMS

Compliance Monitoring

In case of non-compliance with the Standards set by the Energy Star Agreement or in case of misuse of the Energy Star mark, each Management Entity can resort to the following actions. The Program Participant has to get informed about his noncompliance with the conditions set out by the ENERGY STAR Program first. Second, through a discussion, a way has to be found, to reach compliance. If the Program Participant is not able to guarantee compliance, then his registration as a Program Participant is deleted.

To find out, if products are actually in line with product criteria, US EPA made a so called ‘product testing’, where more than 100 products were checked. The results are that 95 % tested ENERGY STAR printers and 100 % of tested ENERGY STAR monitors satisfied the standards.⁹¹

Interestingly 80 % of tested products, which no ENERGY STAR label on and 40 % non-certified ENERGY STAR products also met the regulations, set by ENERGY STAR.



Results of testing 40 computer monitors against ENERGY STAR criteria.

Figure 7: Results of testing 40 computer monitors against Energy Star criteria⁹²

⁹¹ European Commission (2011), p. 6

⁹² European Commission (2011), p. 7

This product test leads to an argumentation, namely that the general level of effectiveness adjusts or improves. ENERGY STAR will have to alter the product standards in order to be able to guarantee that it certifies the most effective products on the market. Furthermore the rate of compliance is satisfying, although only a few products were part of the sample. ENERGY STAR might repeat such tests on a regular basis to identify misuse of the agreed criteria.⁹³

Impact of Energy Star on electricity consumption

This chapter deals with the impact of the ENERGY STAR labelling program on electricity consumption. In General Office Equipment and Information and Communication Technologies are considered as one of the major electricity consumers not only in the European Union but worldwide. The amount of electricity consumed by office equipment is 17 % of electricity consumption of the tertiary sector. Information and Communication Technologies make up to 8% of electricity consumption in the European Union.

The subsequent table shows that in 2007 around 111 million computers (49,6 million desktops and 61,2 million laptops) existed in European households. In addition there were nearly 56 million monitors (42,2 million CRT and 13,7 million LCD).⁹⁴

| | Desktop | Laptop | LCD | CRT |
|----------------------------------------------|----------------|---------------|------------|------------|
| EU-27 stock (million units) | 49,6 | 61,2 | 42,2 | 13,7 |
| Annual electricity consumption/unit (kWh/yr) | 194 | 98 | 86 | 189 |
| Annual consumption (TWh/yr) | 9,62 | 6,00 | 3,63 | 2,59 |
| Total consumption (TWh/yr) | 21,85 | | | |

Figure 8: EU-27 computer stock and electricity consumption in 2007⁹⁵

The European Climate Change Programme predicted that the usage of office equipment in the EU-15 will contribute to a rise in annual greenhouse gas emissions to 29 metric tons. For an office PC the main environmental aspect to consider is its energy consumption. The usage of a typical office PC takes up to 4 times more primary energy, than the primary energy, which is needed for engineering and production of materials. Other energy costs,

⁹³ European Commission (2011), p. 7

⁹⁴ Atanasiu & Bertoldi (2009), p. 51

⁹⁵ EU Energy Star

like the costs for disposal or recycling are less relevant, because they only take up to 15 % of production energy. The average time for using an office PC is assumed with 8 hours per day, plus Standby over 260 days a year. For a home computer, assumed that it is used on average 6 years, the total energy consumption in its use phase is two times as much as the energy used to manufacture it. A laptop consumes less energy, in fact they are 50 to 80% more energy efficient than desktops. Hence the energy consumption during product usage is also predominant.⁹⁶

The subsequent graph shows the electricity consumption in the EU by 2020. The results of policy measures, which are currently applied, like the ENERGY STAR programme, are therefore included in the business as usual scenario. A Business-as-Usual scenario assumes that stability is kept through looking at the present situation, e.g. market, policy, technology.⁹⁷ Products, which are currently included in the ENERGY STAR program, will belong to the largest electricity end-users. It is further expected that the electricity usage of PCs will be constant, while the electricity usage of other tools, like servers will rise until year 2020. As a consequence US EPA and the EU Commission discuss to include further product groups, like small network tools or data storage.⁹⁸

BAU-scenario until 2020 – ICT sector total electricity use (use-phase) (EU-25)

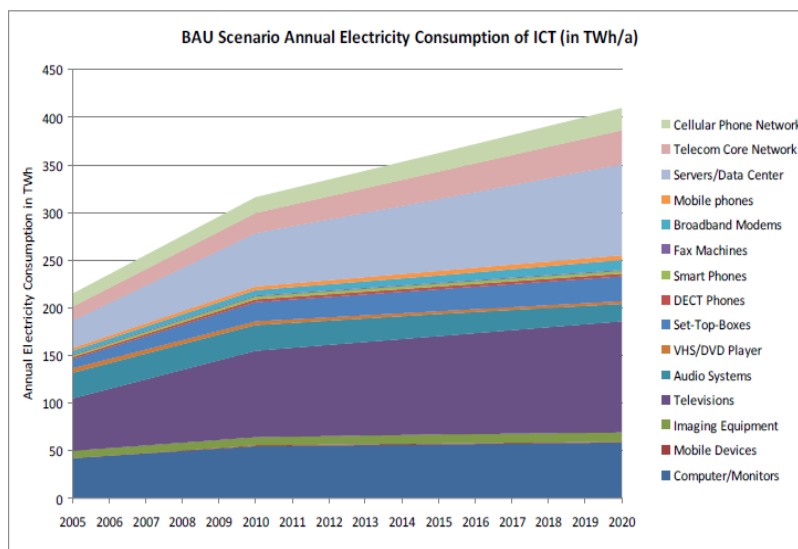


Figure 9: BAU-scenario until 2020⁹⁹

⁹⁶ EU Energy Star

⁹⁷ European Commission DG INFSO(2008), p. 6

⁹⁸ European Commission (2011), p. 3

⁹⁹ European Commission DG INFSO (2008), p. 8

So far the annual electricity consumption of information and communication technologies was discussed. Let me now point out the consequences of the introduction of the ENERGY STAR labelling program. The product testing of ENERGY STAR monitors may lead to the question, if such a programme is really able to put innovative products on the market and to distinguish itself properly from competitors, e.g. non-Energy Star products. To find out if a policy instrument, like the ENERGY STAR programme has actually an influence on the market, its impact on the future was determined by several market studies. Eurostat and the UK Market Transformation Programme made an effort to detect the amount of saving energy through the implementation of ENERGY STAR. In addition the purpose was to see how the market would look like having no such programme. The outcome is that the ENERGY STAR program is expected to contribute to a substantial reduction in energy consumption of office equipment, e.g. PCs, imaging equipment and PC monitors.¹⁰⁰

One should be aware of the fact that these market studies relied on estimations, as exact predictions were not obtainable due to further revisions of the program, which are in progress now. Calculations were thus based on agreements between 2008 and 2010. However it was concluded that having no energy labelling programme, the electricity consumption of office tools within the European Union in the past three years would have amounted to 67 Terawatt hours. The introduction of the ENERGY STAR labelling program contributed to a reduction of this number by about 16 percent. In fact, from those 67 TWh, 11 TWh (rounded) could be saved, leading to the avoidance of nearly 4 Metric tons CO₂ releases.¹⁰¹

These numbers do not take into account previous settlements. In addition no estimations of current agreements are made to be able to indicate their impact in the future. Looking also at these two factors, ENERGY STAR might be able to lead to a reduction of energy consumption within the European Union by 30 percent, which can be seen in the subsequent graph.¹⁰²

¹⁰⁰ European Commission (2011), p. 7

¹⁰¹ European Commission (2011), p. 7

¹⁰² European Commission (2011), p. 8

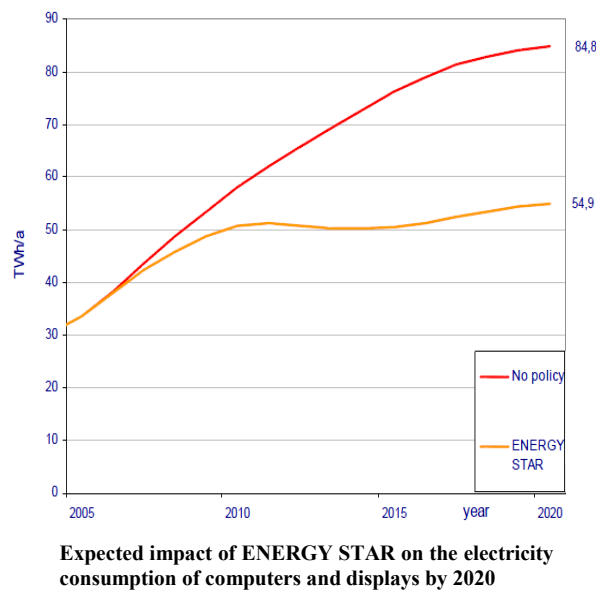


Figure 10: Expected impact of Energy Star on the electricity consumption of computers and displays by 2020

The analysis of Energy Star has shown that this voluntary labelling program can lead to a significant reduction in the electricity consumption of certified products. Being a voluntary labelling program, Energy Star is an appropriate way to deal with Information and Communication Technologies. Regular adjustments of product criteria will be necessary to ensure that the program works efficiently. In advance consistent compliance monitoring must take place in order to guarantee a certain level of credibility.¹⁰³

¹⁰³ European Commission (2011), p. 13

4.2 EU Eco-label

The major intention to develop the European Eco-Label scheme was to replace current national eco-labelling schemes in Europe. In 1992, with the adoption of Council Regulation (EEC) No 880/92, a major step for the establishment of a Community Eco-label Award Scheme was completed. The first objective of this Regulation was to promote the use of products (including the promotion design, production and marketing), which had a reduced environmental impact throughout their entire life cycle. The second objective was to inform consumers about the environmental impact of products.

This Regulation No 880/92 was revised two years later, in December 1996, in order to take into account a number of changes, thereby giving attention to the following tasks. First of all criteria were settled to establish an independent Organisation for the development of eco-label criteria. Improved harmonisation between the European Scheme and the national schemes was another major aim. Regarding small and medium sized enterprises and those applying from developing countries, a fee reduction should be granted thus settling a ceiling for the annual fee charge for label usage. Finally the consultation procedure was examined and members agreed to formalise the consultation process.¹⁰⁴

Another major revision was done in 2000 by introducing Regulation (EC) No 1980/2000 of the European Parliament and of the Council, containing amongst others the subsequent elements, establishment of the European Union Eco-labelling Board (EUEB); role and responsibility of the EUEB, competent bodies and consultative committee; role of the commission and member states in label promotion; self-financing as a goal with avoidance of further costs for member states¹⁰⁵; secure stakeholder participation; changes regarding fee structure; reinforced coordination with national eco-labelling schemes; transparency protection and inclusion of services in addition to products.¹⁰⁶

In February 2010 Council Regulation (EC) No 66/2010 was put into force, containing revisions of Council Regulation (EC) No 1980/2000 with the aim to support an eco-label for companies with lower costs and efforts for them, whilst ensuring credibility of the label with consumers and environmental groups. Concerning market penetration it shall be attained a 10% market share in product groups of the European Eco-label and the development of a wider range of new product groups for consumers bearing the label.

¹⁰⁴ OECD 1997, p.12

¹⁰⁵ TemaNord 2008, p.152

¹⁰⁶ TemaNord 2008, p.26

The task of harmonisation was also taken into account. In the future an attempt is to harmonise the European Eco-label with other labels, on a global and national basis. Further criteria shall be established that can be used by public purchasers in an easy way. In general understanding and awareness of the EU Eco-label among consumers and companies shall be generated on a global basis. Regarding products and services where the EU Eco-label has a considerable influence, an objective until 2015 is to launch more product groups, namely 40-50, instead of currently 25. The aim to replace existing current national or regional eco-labelling schemes turned out to be difficult to achieve and after the revision in year 2000, the final regulation still permits the continuation of national labelling systems. In addition to the regional Eco labelling schemes in each member state of the European Union, the EU eco-labelling scheme is applied by 30 countries, the EU-27 and 3 non-EU countries, namely Liechtenstein, Norway and Iceland.¹⁰⁷

As Competent Bodies in every member state are responsible for administration, it is in general possible for producers, importers, service providers, traders or retailers to apply for the European Union Eco-label to the Competent Body in the EU member state, where the good or service is either produced, imported from a third country or promoted. If a product is manufactured in numerous Member States, applicants are allowed to choose a Competent Body in one of those Member States. Retailers and traders can only apply for products, which are promoted under their own brand names.¹⁰⁸

4.3 The Austrian Eco Label

Through a proposal by the Federal Ministry of Environment, the Austrian Eco Label scheme was finally launched in 1990. The Austrian artist, Friedensreich Hundertwasser, designed the logo, which is also a collective brand, at no charge to the Ministry of Environment. The logo combines the elements of water, nature, earth and air with each other.¹⁰⁹ It shall act as a trustful sign to distinguish products certified with this label from uncertified ones. In this case certified products are seen as *'more environmentally-friendly than the current offer of other products fulfilling the same function'*. Consumers shall be stimulated to choose environmental friendly products.

¹⁰⁷ TemaNord 2008

¹⁰⁸ TemaNord 2008

¹⁰⁹ BMLFUW (2013), p. 3

In addition producers are encouraged to manufacture and provide products, being less harmful to the environment. By doing so, a so called competition effect is provoked. Another major goal is to apply a trustful procedure in assessing the environmental impact of goods and services by making use of certain criteria, which are professionally evaluated. The label use is restricted to those products, which meet certain quality standards.¹¹⁰

Award criteria

In order to establish criteria for certifying product groups, the scheme applies a so called '*holistic evaluation*'. As explained in the literature part, eco-labelling schemes are subject to a 'life-cycle-analysis', which the Austrian Eco-label scheme also makes use of by giving special emphasis to the subsequent relevant parameters,

- Consumption of energy and raw materials
- Harmfulness of components
- Emissions, e.g. noise, sewage or exhaust gases
- Recycling / disposal , fitness for reuse
- Packing
- Distribution and transference
- Security, quality, ease of repair, longevity.¹¹¹

The Federal Ministry of Life and the Austrian Consumer Association are responsible for the planning and management of the guiding principles. Besides, the Austrian Federal Ministry for Education, Art and Culture manages the Eco-label for schools. As of July 2012, they established 57 guidelines for product groups or services, with 20 of them being currently applied and 37 being expected to come into force within the next few years.

¹¹⁰ BMLFUW (2013), p. 4

¹¹¹ BMLFUW (2013), p. 3

Another two groups, unlike the already explained groups, have been delegated the management of the subsequent mentioned tasks. These groups, hereafter referred to as the ‘Eco-label Advisory Board’ and the ‘Technical committee’, include representatives from environmental protection groups or other sovereign specialists.

The Eco-label advisory board takes care of the settlement of working programmes. It decides on product groups which are able to get certified and provides how to deal with the criteria by discussing and deciding drafts for the criteria. It is possible that drafts are precluded, in such a case the advisory board has to decide on the next steps. If conflicts regarding compliance with the rights and duties of the trademark agreement arise, the advisory board forms a negotiation group. The technical committee consists of a number of specialists in the field of the environment. It cooperates with the Advisory Board concerning draft guidelines. If a draft guideline is appropriate for introduction, the technical committee adopts it. Finally the Eco-Label Advisory Board ratifies the guideline and in a last step the Ministry of Life confirms it. Guidelines are only effective for 4 years, though this period might be reduced, if technological inventions take place.

Utilisation fees are charged taking into account its specific annual turnover in euros. The can thus vary from 350 to 2,200 Euros. A handling fee of 25% of the utilisation fee has to be paid, if the application takes place the first time.

The Eco-label as such can be used due a trademark contract which is settled between the company applying and the Ministry of Life. ¹¹²The process of establishing guidelines is described in detail in the following chart. ¹¹³

¹¹² BMLFUW (2013), p. 8

¹¹³ BMLFUW (2013), p. 4

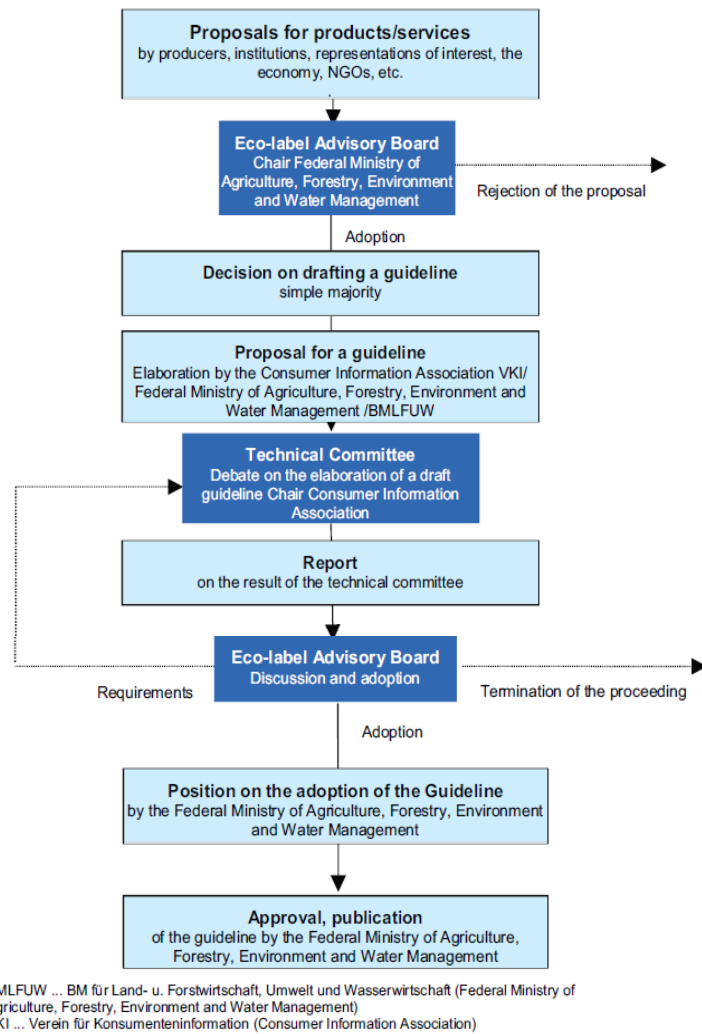


Figure 11: Process of establishing Austrian Eco-label guidelines ¹¹⁴

¹¹⁴ BMLFUW (2013), p. 5

4.4 The Blue Angel

The Blue Angel, established in 1978 through an initiative of the German Federal Minister, is the oldest environmental label which certifies products and services around the globe. It is awarded by the German Institute of Quality Assurance and Labelling (RAL) in conjunction with the German Federal Environmental Agency.

Its mission is explained as *'market-conform instrument of environmental policy designed to distinguish the positive environmental features of products and services on a voluntary basis'*. Currently 125 product groups including 11,700 products and services are labelled with the Blue Angel.¹¹⁵ Product groups include furniture, paper products, electrical devices and appliances, varnish, paint, sanitary and hygiene products, products used in the horticultural and landscape gardening, building, transportation and service sectors and last but not least interior design.¹¹⁶

Lately the scheme was confronted with a declining number of new certifications. A study carried out by the German Federal Ministry for the Environment found out that 8 out of 10 Germans know the label but only few of them actually use it to inform themselves about the environmental impact of products, when purchasing goods. In contrast to 1993, where more than 50 % of consumers used the Blue Angel as an information tool, today less than 38% count on the label to obtain information related to the environment. In addition some big companies boycott the Blue Angel. For instance companies like 'Miele' or 'Bosch-Siemens' do not offer any eco-label certified washing machines or dishwashers. According to Miele, a higher value is attached to the own brand name than to a quality seal.¹¹⁷

Studies carried out by the Institute for Ecological Economy Research (IÖW) underpin this finding. According to them, especially well-known companies are afraid that other firms might also use the Blue Angel for marketing activities, as they are also able to fulfil the criteria to be awarded with the Blue Angel's label. This would mean that unknown companies are put on the same footing as established ones, due to an environmental label like the Blue Angel.

¹¹⁵ The Blue Angel

¹¹⁶ Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (2008), p. 25

¹¹⁷ Die Zeit (2007), p. 27

As a consequence established brands prefer to offer uncertified products. In order to react to this circumstance the German Federal Office for Environment established a work plan, which comprises guidelines to certify additional product groups. Although some companies refuse certification via the Blue Angel, they adopted the certification criteria indirectly. *'The Blue Angel serves as an ecological benchmark'*, a researcher from the Institute for Ecological Economy Research concludes.¹¹⁸

4.5 The Nordic Swan

The Nordic Swan also known as the Nordic Eco-label was founded in 1989 due to an encouragement of the Nordic Council of Ministers. The Nordic countries are composed by Denmark, Iceland, Finland, Sweden and Norway. While Finland, Iceland and Norway were part of the program since the beginning, Denmark joined almost 10 years later. The Nordic Council of Ministers supports the program with an annual funding of DKK 4 million. The purpose of this eco-label was to offer a program that works within the Nordic Region. As such it became the principal multinational eco-labelling program with the goal to harmonise eco-labelling schemes in the Nordic countries three years before the start of the European eco-label. The logo used by the Nordic Council of Ministers served as the basis for the Nordic eco-label.

Administration

The Nordic Eco-labelling Board is responsible for the coordination of the agenda. It carries out decisions on product groups, which are part of the Nordic Eco-label. Further it develops requirements that have to be fulfilled in order to be awarded the label. Proposals are made by several expert groups. Issues like licence requests are left to the diverse national eco-labelling secretariats. These secretariats coordinate work side by side with the European Union Eco-label and the Nordic Eco-label. At the moment the annual turnover amounts to DKK 90 million with more than 100 people being occupied. Income is derived mostly from application and licensing fees.¹¹⁹

¹¹⁸ Die Zeit (2007), p. 27

¹¹⁹ The Nordic Swan

The selection of product groups

As the Nordic Swan's main purpose is to guarantee sustainable development, it aims to target the outstanding environmental problems. They are ¹²⁰

- | | |
|-----------------------------------------------------------|-----------------------------------------------------------------------------|
| ▪ Climate change | ▪ Oversized consumption of scarce resources and non-renewable raw materials |
| ▪ Ozone depletion | ▪ Radioactive radiation |
| ▪ Local air pollution and noise | ▪ Reduced biodiversity |
| ▪ Acidification | ▪ Dissemination of non-endemic organisms |
| ▪ Emissions of eco-toxins and heavy metals | ▪ Ground level ozone |
| ▪ Emissions and impacts of substances hazardous to health | ▪ Water pollution and eutrophication |
| ▪ Use of hazardous technology | ▪ Waste generation |
| ▪ Oversized land and water use | |

The Nordic eco-labelling program is created in a way that every environmental goal fits together with an environmental problem, like 'climate change' and the 'reduction of greenhouse gas emissions' to give an example.

The selection of product groups thereby involves three factors. First product groups are determined according to the environmental benefit that the labelling of these products might provide in the end. Environmental improvement is investigated by taking into account for example the size of the market and the presence of substitutes. The second factor is credibility. Some product groups, like cigarettes, cars or pesticides do not qualify to get eco-labelled, as they might lead to a reduction in the eco-labelling scheme's credibility. These product groups are referred to as 'Black product groups'. To put an eco-label on products, such as cars, can be problematic, as they are regarded to have a large environmental impact in the world. However the exclusion of 'black products' means having no influence on the improvement and depletion of such products. Credibility is also threatened if an eco-labelling scheme does not care about product groups with an impact on the environment in general. As a consequence consumers regard the label as untrustworthy, because it does not tackle relevant environmental problems. ¹²¹

¹²⁰ The Nordic Swan

¹²¹ The Nordic Swan

The last factor is the evaluation of the market. Thereby relevant market features, such as the amount of producers, Nordic manufacture, other policy instruments and labels, economics and consumer awareness are kept in mind.¹²²

Environmental outcomes of the Swan label

The goal of the Swan label is to enforce sustainable consumption and to encourage manufacturers to provide less environmentally harmful products. Several studies have made an attempt to go into detail with the environmental effectiveness of the Swan label. Amongst them is the study carried out by the Nordic Council of Ministers, which analyses the program's effectiveness by giving special emphasis on consumer behaviour and knowledge concerning information relating to the environment. The conclusion is that the Swan label is known by a large share of customers in the Nordic countries. Note, the Nordic Swan is assumed to have a market share of 50%. The label is seen as trustful however consumers are not aware of the intended goal of the program.¹²³

A 1995 study dealing with the environmental effectiveness regarding producers investigated how the Swan label influences production. With contribution from producers, it was determined that 1.2 million tons of fine paper products were labeled by the Swan. The label on fine paper products lead to a significant reduction of emissions when producing fine paper products. The reduction amounts to 11 % in the case of sulphur emissions, 21 % in the case of COD (cyclooctadiene) emissions and last but not least 51 % regarding AOX (absorbable organically bound halogens) emissions. For laundry detergents, it was determined that 30 000 tons were certified with the Nordic Swan and that the Swan label is responsible for a reduction in phosphates and optical whiteners. It was assumed that 4000 tons of phosphates and 40 tons of optical whiteners were saved due to the Swan. These findings are in line with a 1997 OECD study concluding that the Swan Label had an important impact for paper products, detergents or cleaning products. Therefore a detailed analysis on shampoo, sanitary facilities and laundry detergents was made. The main outcome is that the Nordic Swan program had elaborated severer requirements than the Danish legislature.¹²⁴

¹²² The Nordic Swan

¹²³ The Nordic Swan

¹²⁴ The Nordic Swan

4.6 The Marine Stewardship Council

The Marine Stewardship Council is an internationally operating non-profit organisation founded in 1997. The program's mission is to have an impact on consumer choices when purchasing seafood and to transform the market for seafood into a sustainable one. It belongs to the biggest labelling program in the context of certifying sustainable fisheries. At the beginning the programme was created in cooperation with the WWF and Unilever, as Unilever sought to purchase all of its fish from a sustainable source. More than two years were spent on characterizing the term 'sustainable source' in several meetings between various stakeholders, like environmental NGOs and industry associations. The criteria worked out in these meetings are regarded as the foundation of the MSC eco-label. MSC permitted the use of its label the first time in year 2000.¹²⁵

Today more than 300 fisheries are involved in the MSC program today, 200 of them being certified over 100 of them being in assessment. Over the world 19.500 seafood produces are labelled with the MSC-label.¹²⁶

Certification

The Marine Stewardship Council relies on donors and licencing fees to derive its budget. In 2011 MSC's annual budget amounted to 20 million US dollars. Licencing fees thereby amounted to 49.4% which is equal to 10.2 million US dollars.

Fisheries wishing to apply for the MSC logo have to bear all certification and audit costs themselves. Calculations consider hereby the size of the fishery. According to MSC the costs for certifications range between 15,000 and 120,000 US dollars.¹²⁷

¹²⁵ Ainley et.al (2013), p. 10

¹²⁶ MSC – Marine Stewardship Council

¹²⁷ Ainley et.al (2013), p. 11

MSC uses three basic principles in order to find out if a fishery is regarded as ‘sustainable’.

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- Principle 1: *‘A fishery must be conducted in a manner that does not lead to over-fishing or depletion of the exploited populations and, for those populations that are depleted, the fishery must be conducted in a manner that demonstrably leads to their recovery.’*
- Principle 2: *‘Fishing operations should allow for the maintenance of the structure, productivity, function, and diversity of the ecosystem (including habitat and associated dependent and ecologically related species) on which the fishery depends.’*
- Principle 3: *‘The fishery is subject to an effective management system that respects local, national, and international laws and standards and incorporates institutional and operational frameworks that require use of the resource to be responsible and sustainable.’*

Businesses or fisheries, which are in line with the MSC standards for sustainable fishing or seafood traceability, are able to get certified. As the program wants to ensure credibility is uses third-party certification, meaning that certificates are issued by a party unlike MSC. These certification companies evaluate if the fishery meets the standards, set out by MSC. A certified fishery is thus able to use the MSC logo via a licence from MSC’s trading company ‘MSCI’. Every MSC principle is evaluated by using so called ‘performance indicators’. A fishery that is certified has achieved a minimum of 60 points out of potential 100 points for every performance indicator. In addition it has achieved 80 points on average for each principle.¹²⁹

The major benefit that arises due to certification is a price premium for the fishing company that is certified via the MSC logo. To give an example, in 2007 the US albacore tuna fishery fulfilled certification requirements. It is reported after certification that the price fishermen were able to charge went up by 32 %.

¹²⁸ Roheim (2003), p. 97

¹²⁹ Roheim (2003), p. 97

Environmental outcomes

The environmental gains of the MSC certifications were analysed in a 2006 study that was conducted by MSC together with a fisheries research consultancy.

MSC certification is responsible for a decrease in seabird by-catch in the *South Georgia Patagonian toothfish fishery*. A decrease in sea lion by-catch was also detected in Western Australia's rock lobster fishery. However the reduction of sea lion by-catch could not be set in relation with the MSC certification. Another outcome of MSC certification was found in a decrease of fur seal by-catch in the *New Zealand hoki fishery*.¹³⁰

A study which focused on 22 MSC certified fisheries investigated the distribution of performance scores relating to the principles of MSC. Thereby two of the central MSC certification bodies were analysed. Interestingly the principles set by MSC are interpreted contrarily in a way that one certification body gave higher points to the second MSC principle than the other certifier did. It is further argued that certifiers might have an interest to grant higher scorings, as a successful certification could result in future operations, like the monitoring which takes place once every year or subsequent re-assessment. Despite that several authors argue that it will take time to analyse the environmental outcomes resulting from the MSC program. The relationship between the MSC certification program and other actors, like the government or non-governmental parties, or the society to cope with environmental problems in the fishery area is seen as future research area.¹³¹

4.7 The Forest Stewardship Council

The environmental threat due to deforestation of tropical forests was first recognized in the 1980s. Wood as a resource is used for commercial purposes and deforestation takes place to make way for land use. The main reasons for deforestation are development of farming, growth of mining segment, building of irrigation systems, irrepressible fires and logging, to mention only a few. In 1990 more than 17 million hectares of tropical forests were

¹³⁰ MSC – Marine Stewardship Council

¹³¹ Gulbrandsen (2009), pp. 8-9

lumbered. In order to be able to protect biodiversity and to guarantee a sustainable management of forests, a solution was needed.¹³²

As a result several non-governmental organizations, traders, timber users and agents of human rights arranged a meeting in California in 1992 to discuss about a scheme that could be able to detect well managed forests, leading to responsibly manufactured wood produces. During this meeting a work plan and the name of FSC was prepared. Two years later the Earth Summit in Rio de Janeiro took place. The result is the so called ‘Agenda 21 Principles on Forests’. These principles are non-legally binding. The earth summit was further used as a platform for organizations to exchange ideas concerning an independent forest certification system operating all over the world. After several discussions the FSC Founding Assembly took place in Toronto in 1993 with over 130 contributors from 26 countries. Only one year later, the FSC legal entity was launched.¹³³

FSC’s vision is explained as follows, *‘the world’s forests meet the social, ecological, and economic rights and needs of the present generation without compromising those of future generations’*. The company’s mission is to *‘promote an environmentally appropriate, socially beneficial, and economically viable management of the world’s forests’*.¹³⁴

FSC thereby relies on 10 principles. Wood originating from bases that are in line with the FSC principles is able to be awarded the FSC logo. The logo thus guarantees that the wood results from an appropriate managed forest. A certificate is granted for five years. Certification is done by an independent organization unlike FSC. This external source is called certification body. To verify that the certification bodies apply the FSC’s rules, a process called accreditation takes place, which checks the certification organisation. In case of the Forest Stewardship Council, this process is carried out by Accreditation Services International (ASI). ASI relies on office and field audits, which take place every year. The ASI website provides documentations on previous and planned accreditation valuations.¹³⁵

FSC accredited certification bodies are allowed to issue three different FSC certificates. They are Forest Management, Chain of Custody and Controlled Wood. Each type applies to diverse stages of production and development of forest produces in the value chain. A

¹³² Perera & Vlosky (2006), pp 2-5

¹³³ Perera & Vlosky (2006), pp 2-5

¹³⁴ Forest Stewardship Council

¹³⁵ Forest Stewardship Council

forest manager applying the management practices set out in the FSC Principles is awarded the Forest Management certification. Manufacturers and traders of FSC products are treated under the Chain of Custody certification. This kind of certification confirms FSC certified material along the production chain. The last type of certification, Controlled Wood was designed to launch products, which do not only contain FSC certified material, but also timber from uncertified forests. These uncertified materials have to fulfil certain minimum requirements. The requirements are thereby regulated in the FSC Controlled Wood Standard. This Standard contains techniques how companies can prove the status of controlled wood materials. In addition the standard comprises social aspects. In general the requirements for controlled wood are, *exclusion of illegal harvested wood, exclusion of wood from regions, where traditional and basic rights are not respected, exclusion of wood, which is harvested as a result of transforming original forests into plantations, exclusion of wood originating in forests planted with genetically modified forest species.*

The following graph provides an overview of FSC certified forest areas. In 1998, 10 million hectares of forests around the globe were certified by FSC. Currently this figure amounts to 170, 471,317 hectares, with 1181 certificates issued in 80 countries. From those 1181 certificates, 161 are handed out in boreal regions, 709 in temperate regions and 311 in tropical/subtropical regions.¹³⁷

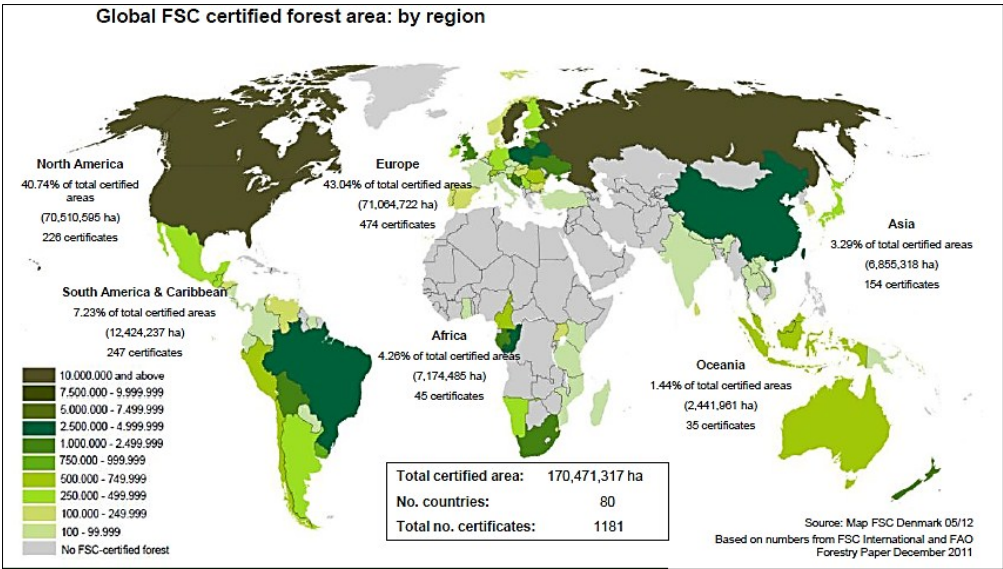


Figure 12: Global FSC certified forest area by region¹³⁸

¹³⁶ Forest Stewardship Council
¹³⁷ Forest Stewardship Council
¹³⁸ Forest Stewardship Council

4.8 Pan European Forest Certification (PEFC)

Founded in 1999 in Paris, the Pan European Forest Certification was originally created to give attention to the management of sustainable forests in Europe. At present PEFC operates on a global basis. Like FSC it is an international non-governmental and non-profit organization, relying on third party certification.¹³⁹ PEFC is organized as umbrella organization which approves national forest certification systems. This is done via multi-stakeholder processes. PEFC applies the vision of *'think globally, act locally'* and thereby necessitates that national principles are in line with PEFC's guidelines. By now PEFC counts on 30 national certification schemes and has certified 245 million hectares of forests.¹⁴⁰

4.9 The Green Dot

In the 1990s Klaus Töpfer, Germany's minister for the environment at that time had the idea to establish a system like the Green Dot. The purpose was to withdraw packaging from manufacturers or sellers and thus to avoid waste. In 1991 before a regulation tackling packaging came into force, the Green Dot label was introduced due to an effort from the retail and consumer goods industry. This industry founded an association named Dual System Germany. The Green Dot label can be printed for instance on cups or cartons or food packaging.¹⁴¹ As such it is a registered trademark in more than 170 countries. The label does not provide any information regarding the environmental characteristics of the product itself, like material composition or environmental friendly packaging. It simply informs the customer that for this kind of packaging a financial effort has been paid. This financial payment is given to a competent national packaging recovery organisation. The scheme is covered under the European Packaging and Packaging Waste Directive dated December 20, 1994.¹⁴²

¹³⁹ Pan European Forest Certification

¹⁴⁰ Pan European Forest Certification

¹⁴¹ The Green Dot

¹⁴² Pro Europe (2010)

Licensors of the Green Dot logo is PRO EUROPE, an umbrella organisation for ‘European packaging and packaging waste recovery and recycling schemes’, by ARA Altstoff Recycling (Austria), DSD Duales System Deutschland (Germany), Eco-Emballages (France) and Fost Plus (Belgium). PRO EUROPE stands for Packaging Recovery Organisation Europe and is a private limited liability company headquartered in Brussels, which establishes criteria concerning the award of the Green Dot mark to producers, suppliers and fillers of packaging or packed goods. At the moment PRO EUROPE counts on 33 compliance schemes working in over 30 countries. The Green Dot licence is handed out to 170,000 companies with 460 billion packaging items labelled every year.¹⁴³

4.10 Möbius Loop

The Recycling Symbol, also known as the ‘möbius loop’ is characterized by three chasing arrows. Each arrow stands thereby for a phase in the recycling programme, namely collection, remanufacturing and resale to the consumer. The logo is used to mark recyclable goods or goods containing recycled content. There are several versions of the logo, some indicating a percentage of recycled content. The version without any percentage simply states, that the product is recyclable. The exact guideline for the use of this kind of label is stated in the ISO guideline 14020.¹⁴⁴

¹⁴³ Pro Europe (2010)

¹⁴⁴ Recycling Symbol

5. Empirical study

The following chapter deals with the empirical study on consumer perception towards eco-labelled products in Austria. The sample comprises a total of 107 people.

The consumer survey is based on a standardised questionnaire, which is split into four main parts. The first part consists of general questions regarding consumer attitudes towards the environment. The second part deals with the topic of product certifications using the example of eco-labelling. In the third part, which is mainly used to test the hypotheses, the European Union Energy Label is presented to the survey participants. The last part comprises demographic information.

5.1 Data gathering

This study counts on two different modes of data collection,

- Personal interview
- Survey via email.

Let me start with the first survey method ‘personal interview’. Interviewing people face to face bears several advantages. Interviewer and respondent are able to interact with each other. For example, if a question regarding the survey arises, the interviewer has the possibility to explain exactly what is meant with a certain question. Furthermore additional notes or observations can be made. An example of such additional observations would be the body language of the respondent or the time taken to answer the question. Another advantage of interviewing people personally lies in the reduction of unanswered questions. In addition if a survey participant does not want to answer a particular question, the interviewer is able to ask why the participant refuses to answer it.

Conducting a personal interview is actually a very time consuming activity. One of the main challenges is to select or identify potential sample members. After having selected potential sample members, it was in fact quite difficult to find people, who were willing to spend their time on a survey without getting any reward. The majority of people on the street refused to participate as they were either busy or had serious concerns regarding data protection, although I assured that any information will be kept strictly confidential and

that personal data will not be stored or passed on to third parties or be published or made available for general access.

The second mode of data collection, survey via email, was chosen for several reasons. The first one was geographical distance. Inviting people via email to join the study allowed me to have individuals included from different regions or provinces unlike Vienna. The next reason to choose this kind of survey method was time. I was able to send a couple of emails to several persons within a very short time. A major drawback of conducting a survey via email is that the interviewer is not able to answer questions from survey respondents, like he would be able in a personal interview situation.

5.2 Overview of hypotheses

The subsequent hypotheses are made and tested through the analysis. I used SPSS to test the prepared hypotheses for significance.

Hypothesis 01_ Educated people have a better knowledge of the EU Energy label.

Hypothesis 02_ Environmental consciousness has a significant impact on the decision to buy energy efficient products.

Hypothesis 03_ A positive attitude towards eco-labelling has a significant impact on the level of information concerning environmental impacts of household appliances.

Hypothesis 04_ Environmental conscious people do inform themselves more about the environmental impacts of household appliances.

Hypothesis 05_ People with a higher monthly net income do inform themselves more about the environmental impacts of household appliances.

Hypothesis 06_ Education has a significant impact on the level of information concerning environmental impacts of household appliances.

5.3 Descriptive Statistics

5.3.1 Attitudes towards the environment

In order to be able to give insight to the environmental awareness of survey participants, they were asked to evaluate a couple of statements on a 4 point Likert Scale. Likert Scales are defined as ‘bipolar’ scaling methods. They are used to give insight to responses to a particular statement. Responses can thus be either positive or negative. I decided to use an even-point scale, where I skipped the neutral/middle option of ‘neither agree’ nor ‘disagree’. Respondents thus could rank each statement by indicating either, totally agree, somewhat agree, somewhat disagree or totally disagree. This method of using even-point scales is also referred to as ‘forced choice’ as the respondent is not able to choose the neutral option. Lower values on the 4-point Likert Scale indicate refusal, while higher values are interpreted as acceptance to the posed statement. Thus the more points the higher the acceptance.¹⁴⁵ The analysis of this question includes the answers of only 106 people as one respondent had to be excluded, as he refused to answer the question.

The highest acceptance is given to the statement ‘I try to do what is right for the environment even if those actions are time consuming and involve additional investment’. The corresponding Mean is 2.56 and Standard Deviation amounting to 0,817. Acceptance is further given to the statement ‘it is too hard for me to do much about the environment’ with corresponding Mean of 2.00 +/- 0.730. Lowest acceptance is given to the statement ‘the existent development of human activity is not in conflict with the environment’ with appropriate Mean of 1.83 and Standard Deviation of 0.810.

| Descriptive Statistics | | | | | |
|---------------------------------------------------------------------------------------------------------------------------|-----|---------|---------|------|----------------|
| | N | Minimum | Maximum | Mean | Std. Deviation |
| the existent development of human activity is not in conflict with the environment. | 106 | 1 | 4 | 1,83 | ,810 |
| it is too hard for me to do much about the environment | 106 | 1 | 4 | 2,00 | ,730 |
| i try to do what is right for the environment, even if those actions are time consuming and involve additional investment | 106 | 1 | 4 | 2,56 | ,817 |
| Valid N (listwise) | 106 | | | | |

Figure 13: Attitudes towards the environment – descriptive statistics

¹⁴⁵ Atteslander (2006), p. 222

Survey participants were further asked to evaluate selected actions, which might have an influence on reducing environmental threats. It was thereby requested to choose only 3 out of 6 aspects and to mark those aspects that have first, second, or third priority. The actions to choose were,

- Consuming less water
- Using environmental friendly transport methods
- Buying products, produced by environmental friendly production methods
- Buying energy efficient household appliances
- Reducing garbage and recycle products
- Gathering information about the environmental impacts of products.

As this thesis deals with the task of eco-labelling, I was particularly interested to find out, how people evaluate the task of buying products, produced by environmental friendly production methods. The sample comprises a total of 94 people as 13 out of 107 respondents gave inadequate answers to this particular question, so they had to be excluded.

Reducing garbage and recycling products has first priority to 34 people which is equal to 36.17 % of respondents. Another action prioritized in reducing environmental threats by consumers is consuming less water, stated by 33 people. Using environmental friendly transport methods has first priority to 10 people, which is equal to 10.64 % of respondents. Buying energy efficient household appliances is stated by eight out of 94 people. Only 8 respondents said that buying products, produced by environmental friendly production methods comes first when talking about reducing environmental threats. Gathering information about the environmental impacts of products was not stated by any respondent.

Actions that have second priority in avoiding environmental problems in the eyes of consumers were stated as follows. Reducing garbage and recycling was ranked first. The following two actions, namely buying products, produced by environmental friendly production methods and buying energy efficient household appliances are equally evaluated by respondents and come second.

When it comes to the third priority, the highest importance is given to the action ‘using environmental friendly transport methods’. However the top three answers, namely environmental friendly transport methods, buying energy efficient household appliances and buying products produced by environmental friendly production methods are nearly equally distributed as one can see in the subsequent graph.

| Aspects | 1. Priority | 2. Priority | 3. Priority |
|------------------------------------------------------------------------|--------------|--------------|--------------|
| Consuming less water | 35,1 % | 16,0 % | 14,9 % |
| Using environmental friendly transport methods | 10,6 % | 14,9 % | 21,3 % |
| Buying products, produced by environmental friendly production methods | 8,5 % | 20,2 % | 19,1 % |
| Buying energy efficient household appliances | 9,6 % | 20,2 % | 20,2 % |
| Reducing garbage and recycle products | 36,2 % | 27,7 % | 16,0 % |
| Gathering information about the environmental impacts of products | 0,0 % | 1,1 % | 8,5 % |
| Total | 100 % | 100 % | 100 % |
| N | 94 | 94 | 94 |

Figure 14: Environmental actions prioritized by consumers

5.3.2 Perception on eco-labelling

To investigate consumer knowledge and perception on eco-labelling, survey participants were asked to evaluate particular statements relating to product certification based on the example of eco-labelling. The sample comprises 103 people as respondents, who refused to answer this part of the survey, are excluded from the analysis.

A predominant part of respondents are of the opinion that eco-labels mark those products, which are more environmental friendly than conventional products. In fact 94 out of 103 people, equal to 91.26 % agreed (either stated ‘totally agree’ or ‘agree’ on the Likert Scale). Only one quarter of respondents agree that eco-labels mark those products, which do not have any impact on the environment.

Eco-labels are further regarded as contribution to a sustainable use of resources, in fact 87.38% of respondents agree. Moreover it is depicted that most survey participants associate eco-labelled products with a higher price. (90.29 % of respondents agree)

Products, certified with an eco-label are regarded as having higher quality standards introduced than unlabelled goods. Eco-labels are moreover seen as a proper way to signal a product's quality.

| Descriptive Statistics | | | | | |
|------------------------------------------------------------------------------------------------------------------------------------|-----|---------|---------|------|----------------|
| | N | Minimum | Maximum | Mean | Std. Deviation |
| eco-labels mark those products, which are more environmental friendly than conventional products (e.g. products without any label) | 103 | 1 | 4 | 3,25 | ,637 |
| eco-labels mark those products, which do not have any impact on the environment | 103 | 1 | 4 | 1,91 | ,818 |
| eco-labels promote a sustainable use of resources | 103 | 1 | 4 | 3,04 | ,609 |
| products, certified with an eco-label comply with higher quality standards than unlabelled ones | 103 | 1 | 4 | 2,77 | ,807 |
| products, certified with an eco-label are more expensive than conventional products | 103 | 2 | 4 | 3,26 | ,626 |
| eco-labels are a proper instrument to signal a product's quality | 103 | 1 | 4 | 2,65 | ,710 |
| a proper instrument to signal a product's quality is its price | 103 | 1 | 4 | 2,09 | ,961 |
| a proper instrument to signal a product's quality is its brand | 103 | 1 | 4 | 2,35 | ,848 |
| Valid N (listwise) | 103 | | | | |

Figure 15: Perception on Eco-labelling – descriptive statistics

Within the context of eco-labelling I was further interested in how consumers evaluate three different kind of impacts, a product might have on the environment. As stated in the theoretical part, eco-labelling aims to give attention to the whole life cycle of a product. That's why I decided to ask consumers to evaluate three main kinds of environmental impacts, which are,

- environmental impact of product manufacturing
- environmental impact of product use
- environmental impact of product disposal.

Analysis shows that consumers give a high priority to all three aspects, however they give less importance to the environmental impact that might occur due to product usage.

| Descriptive Statistics | | | | | |
|-----------------------------------------------|-----|---------|---------|------|----------------|
| | N | Minimum | Maximum | Mean | Std. Deviation |
| environmental impact of product manufacturing | 107 | 2 | 4 | 3,46 | ,603 |
| environmental impact of product use | 107 | 1 | 4 | 3,16 | ,767 |
| environmental impact of product disposal | 107 | 1 | 4 | 3,61 | ,611 |
| Valid N (listwise) | 107 | | | | |

Figure 16: Evaluation of different kinds of impacts a product might have on the environment

5.3.3 Consumer knowledge of eco-labelling programs

To be able to survive in the long run, an eco-labelling program has to rely on support from the consumer side. Thus an important question hereby is, if consumers are simply aware of the fact that eco-labelling programs exist? In order to be able to give insight to consumer awareness of Eco-labels, they were confronted with 10 different certification programs, which were explained in detail in the theoretical part of this thesis.

As I was quite often confronted with survey participants asking me, why I didn't show the logo of the eco-labelling scheme as this would make the answering of the question much easier, I'm going to explain why. I decided to state the name of the scheme instead of its logo for two reasons. First I wanted to avoid consumers stating to know a certain eco-labelling scheme because they are able to remember a certain logo. Second I wanted to find out, if consumers might be able to remember the name of the eco-labelling scheme without seeing its particular logo. This question allowed for multiple answers.

The green dot and the recycling symbol are the two most recognized environmental symbols among Austrian consumers. Labels, such as the Austrian eco-label, the Marine Stewardship Council and the Blue Angel are quite known as well, while most consumers are unfamiliar with the Nordic Swan and the Programme for the Endorsement of Forest Certification. The outstanding graph shows the detailed results of the analysis.

| \$eco_knowledge Frequencies | | | | |
|------------------------------|------------------------|-----------|---------|------------------|
| | | Responses | | Percent of Cases |
| | | N | Percent | |
| \$eco_knowledge ^a | eu energy star | 19 | 5,6% | 17,8% |
| | the austrian eco label | 53 | 15,7% | 49,5% |
| | blue angel | 20 | 5,9% | 18,7% |
| | the nordic swan | 2 | 0,6% | 1,9% |
| | msc | 32 | 9,5% | 29,9% |
| | pefc | 7 | 2,1% | 6,5% |
| | eu eco label | 18 | 5,3% | 16,8% |
| | the green dot | 84 | 24,9% | 78,5% |
| | recycling symbol | 82 | 24,3% | 76,6% |
| | fsc | 16 | 4,7% | 15,0% |
| | none | 4 | 1,2% | 3,7% |
| Total | | 337 | 100,0% | 315,0% |

a. Dichotomy group tabulated at value 1.

Figure 17: Consumer knowledge of selected eco-labelling schemes

5.3.4 Consumer trust in different sources of eco-label supporters

As eco-labels rely on different sources of funding, it is noteworthy to ask, whether consumers have confidence in particular sponsors. The three main groups of sponsors, namely environmental groups, government agencies and the industry were able to get evaluated on a 4 point Likert Scale.

Environmental groups receive the most trust, when it comes to eco-label sponsorship. The industry is regarded as least trustworthy supporter of eco-labelling programs.

| Descriptive Statistics | | | | | |
|------------------------|-----|---------|---------|------|----------------|
| | N | Minimum | Maximum | Mean | Std. Deviation |
| environmental groups | 107 | 1 | 4 | 3,31 | ,621 |
| government agencies | 107 | 1 | 4 | 2,36 | ,804 |
| industry | 107 | 1 | 4 | 2,02 | ,713 |
| Valid N (listwise) | 107 | | | | |

Figure 18: Consumer trust in different sources of eco-labelling supporters

5.4 The EU Energy Label

5.4.1 Insights from the supply side

I decided to ask an employee working in the sales department of a large corporation who wishes to remain anonymous for his opinion regarding the EU Energy label. It was my intention to get further insight to the question if the EU Energy label can be seen as successful way to inform customers about the environmental impacts of household appliances. The interview was made in German and is loosely translated into English.

In general it is noted that customers do ask what is behind the EU Energy label and sales people have to explain it. Furthermore it is found that consumers are asking increasingly frequent after certificates and labels on products as they can inspire confidence. Offline, the EU Energy label gives the dealer a unique sales argument. Regarding e-commerce, the EU energy label is displayed and consumers use landing-pages as source of information.

In addition I was further interested if consumer take into account the consumption of energy when buying household appliances. I was told that the consumption of energy appears to receive increasingly more attention by consumers. In this context the following factors were determined,

- advertising strategy
- product category
- income
- price of electricity

Increasing electricity prices and energy saving calculators play an important role for the final consumer. The way how products are advertised should also be taken into account. If business sets its focus on the price, price sensitive consumers may feel addressed. If other purchasing factors, like energy-efficiency class, noise or the consumption of water are advertised heavily, then sustainable thinking customers may feel targeted. Finally the decision to take the consumption of energy into account when buying household appliances is a matter of the product category. Buying so called ‘white goods’ means spending more money and represents a long-term investment for the final customer. Innovations take time in the white goods sector and thus price seems to play a smaller role for consumers. Further income is relevant, as many energy saving products, like A+++ or A++ labelled washing machines are too expensive for lower income groups. Despite that lower and middle income groups are the most interesting target groups when talking about washing machines.

Moreover I wanted to examine if washing machines play an important role regarding effective measures concerning the environment. I obtained the following answer, *‘...in other areas more energy could be saved, however customers think, that washing machines offer a huge energy savings potential, as these are devices, which have to prove their worth in day-to-day use’*.

Another point that was discussed is the design of the EU Energy label. I was told that it is important that any kind of label manages to deliver its intention and is not misunderstood by customers. In case of the EU Energy label, it seems that it is able to convey its message.

5.4.2 Insights from the consumer survey

Having shortly discussed one opinion from the supply side regarding the EU Energy label, I would like to investigate the consumer side in detail. Thus, the third part of the consumer survey relates to the European Union Energy Label. The EU Energy Label was picked to deliver insight into a mandatory type of label. I assumed that a mandatory label is not only known by environmental conscious people but also by the most part of consumers. As stated in the theoretical part, the EU Energy label is depicted most often on household appliances, such as washing machines, dishwashers, refrigerators, PCs, light bulbs, to mention a few.

When it comes to search of environmental information 70.90 % of consumers inform themselves about the environmental impacts before buying household appliances.

From 101 participants, less than one half, in fact 46.5 % know the EU Energy label. From those people, who are aware of the EU Energy label, more than 80 % use it to inform themselves about the energy consumption of products they buy. EU Energy label aware consumers recognize the label most often on washing machines, refrigerators and dishwashers. Only three people were unable to remember any product type they had bought with this label.

| \$awareness Frequencies | | | | |
|------------------------------------------|-----------------|-----------|---------|------------------|
| | | Responses | | Percent of Cases |
| | | N | Percent | |
| eu energy labelled products ^a | pc | 6 | 5,0% | 12,8% |
| | car | 4 | 3,3% | 8,5% |
| | light bulb | 14 | 11,6% | 29,8% |
| | tv set | 15 | 12,4% | 31,9% |
| | dishwasher | 19 | 15,7% | 40,4% |
| | washing machine | 30 | 24,8% | 63,8% |
| | refrigerator | 29 | 24,0% | 61,7% |
| | none | 3 | 2,5% | 6,4% |
| | other | 1 | 0,8% | 2,1% |
| Total | | 121 | 100,0% | 257,4% |

a. Dichotomy group tabulated at value 1.

Figure: 19: Consumer awareness of selected EU energy labelled products

To answer the question if the consumption of energy plays a major role in purchasing decisions of consumers, I chose to pick several aspects consumers can consider when buying a household appliance, in this case a washing machine. Survey participants had to pick three aspects and mark whether these aspects have first, second, or third priority to them. The question was designed to find out if the consumption of energy is prioritized in the buying decision or if other aspects, such as the price or the brand quality of the device are of higher importance for consumers. The sample includes 93 people. A total of 14 survey participants gave inadequate answers. Inadequate answers are explained as some people were unable to indicate only one aspect per priority.

The consumption of energy is most important when it comes to buying a washing machine. More than one fifth of people stated that the energy consumption is highly important to them. The price of such a device is also a key purchasing decision influencing factor. Test results published in scientific journals or the internet are ranked third by consumers regarding first priority. Other aspects, such as the consumption of water, equipment and customer service were also frequently named as ‘first priority purchasing aspects’. When consumers named their second priority, the consumption of water was ranked third. Regarding the third priority, the consumption of energy was ranked first, the price second and reliability and user-friendliness third.

| Criteria | 1. Priority | 2. Priority | 3. Priority |
|---------------------------|-------------|-------------|-------------|
| Consumption of energy | 23,7 % | 10,8 % | 18,3 % |
| Price | 21,5 % | 22,6 % | 16,1 % |
| Test results | 14,0 % | 4,3 % | 5,4 % |
| Consumption of water | 7,5 % | 11,8 % | 5,4 % |
| Equipment | 5,4 % | 5,4 % | 3,2 % |
| Customer service | 5,4 % | 4,3 % | 5,4 % |
| Design | 0,0 % | 2,2 % | 0,0 % |
| Reliability | 12,9 % | 8,6 % | 11,8 % |
| EU-energy label | 0,0 % | 7,5 % | 6,5 % |
| Consumption of detergents | 0,0 % | 1,1 % | 3,2 % |
| Brand quality | 3,2 % | 4,3 % | 1,1 % |
| Load size | 1,1 % | 3,2 % | 2,2 % |
| Noise | 1,1 % | 3,2 % | 0,0 % |
| Wash programme time | 1,1 % | 4,3 % | 1,1 % |
| User-friendliness | 2,2 % | 3,2 % | 11,8 % |
| Construction | 1,1 % | 1,1 % | 0,0 % |
| Safety | 0,0 % | 2,2 % | 8,6 % |
| Total | 100% | 100% | 100% |
| N | 93 | 93 | 93 |

Figure 20: Evaluation of selected purchasing aspects

5.5 Impact of education

The first hypothesis is related to the impact of education. Are educated people better informed when it comes to eco-labels, in this case the EU energy label?

To investigate this hypothesis, it is important to look at the highest education level of survey participants, which was originally defined as an ordinal variable having 6 attributes. They are compulsory school, apprenticeship, VET (vocational education and training) school, Matura (i.e. a general qualification for university entrance) comprising AHS (Allgemeinbildende höhere Schulen) and BHS (Berufsbildende höhere Schulen) Matura, college-related training and university.

The variable ‘education’ was regrouped later to allow for a better analysis, still being an ordinal variable, but having now only 3 attributes. The first category consists of people with highest education level from compulsory school, apprenticeship or VET school. The second category comprises those people with Matura (AHS, BHS) and the third category is composed by people with highest education level ‘university’.

The EU Energy label is known by 10 out of 22 people, which corresponds to 45.5 % of people who have accomplished compulsory school or an apprenticeship. It is further known by 22 out of 41 people (53.7%) with Austrian general qualification for university entrance (Matura). Among those people with a university degree 15 out of 38 people (39.5%) are aware of the EU Energy label.

| | | | education | | | Total |
|----------------------------------|--------------------|--------------------|------------------|----------------|------------|-------|
| | | | apprentice-compu | matura-ahs-bhs | university | |
| do you know the eu-energy label? | no | Count | 12 | 19 | 23 | 54 |
| | | % within education | 54,5% | 46,3% | 60,5% | 53,5% |
| | yes | Count | 10 | 22 | 15 | 47 |
| | | % within education | 45,5% | 53,7% | 39,5% | 46,5% |
| Total | Count | 22 | 41 | 38 | 101 | |
| | % within education | 100,0% | 100,0% | 100,0% | 100,0% | |

Figure 21: Crosstabulation – Education and EU Energy label knowledge

5.5.1 The impact of education on the awareness of the EU Energy label

The difference between these education groups is statistically not significant as p-value is equal to 0.456 and is thus greater than 0.05. There is no statistical evidence that people with a higher education level are better informed about the European Union Energy label than those people with a lower education level. Thus hypothesis 1 cannot be confirmed.

| Chi-Square Tests | | | | | | |
|---------------------|--------------------|----|-----------------------|----------------------------|-------------------------|-------------|
| | Value | df | Asymp. Sig. (2-sided) | Monte Carlo Sig. (2-sided) | | |
| | | | | Sig. | 99% Confidence Interval | |
| | | | | | Lower Bound | Upper Bound |
| Pearson Chi-Square | 1,608 ^a | 2 | ,448 | ,456 ^b | ,443 | ,468 |
| Likelihood Ratio | 1,613 | 2 | ,446 | ,456 ^b | ,443 | ,468 |
| Fisher's Exact Test | 1,613 | | | ,471 ^b | ,458 | ,484 |
| N of Valid Cases | 101 | | | | | |

a. 0 cells (0,0%) have expected count less than 5. The minimum expected count is 10,24.

b. Based on 10000 sampled tables with starting seed 221623949.

Figure 22: Chi-Square Test – Education and EU energy label knowledge

5.6 Impact of environmental consciousness

Does environmental consciousness have a significant impact on the decision to buy energy efficient products? Do people, who regard themselves as ecologically sensitive, choose an energy efficient product (including higher acquisition costs) over the more energy consuming product?

Thus survey participants were confronted with an actual example of buying two household appliances. This example comprised two virtual washing machines, which were identical in quality and equipment but varied in the following parameters, namely the price, energy consumption, energy efficiency class and water consumption.

| | X | Y |
|---------------------------------|---------------------|---------------------|
| Price: | 390 euros | 300 euros |
| Energy consumption: | 0.75 kWh/wash load | 0.95 kWh/wash load |
| Energy efficiency class: | A+++ | A++ |
| Water consumption: | 48 litres/wash load | 54 litres/wash load |

This question did not require people to carry out any calculation, they should decide spontaneously by weighting the above stated factors, namely the price, energy consumption, water consumption and energy efficiency class of the two devices against each other. The question hereby is, if people choose the cheaper washing machine by disregarding the operating costs, e.g. energy costs and water consumption, or if they keep in mind the operating expenses and thus do not mind bearing higher acquisition costs.

The results show that over 80 % of 106 people stated that they would opt for washing machine type 'X'. A possible reason for this result is that people are aware of the fact that including the energy saved during the service life of the washing machine, the higher purchase price is amortized after a few years, depending on the number of wash loads.

decision on a particular washing machine type

| | Frequency | Percent | Valid Percent | Cumulative Percent |
|--------------|-----------|---------|---------------|--------------------|
| Valid type x | 90 | 84,9 | 84,9 | 84,9 |
| type y | 16 | 15,1 | 15,1 | 100,0 |
| Total | 106 | 100,0 | 100,0 | |

Figure 23: Descriptive Results – consumer decision on a particular washing machine type

It is interesting to find out, if those people, who choose the energy saving product are further environmental conscious consumers. The variable environmental consciousness was created and has only two attributes. Those people agreeing to the statement '*I try to do what is right for the environment, even if those actions are time consuming and involve additional investment*' are defined as environmental conscious and those people who rejected the statement are defined as 'not environmental conscious' consumers.

5.6.1 The impact of environmental consciousness on the decision to buy energy efficient products

The decision to buy the energy efficient product, washing machine type X, is made by 32 out of 42 people, which is equal to 76.2% of people who don't see themselves as

ecologically sensitive. When it comes to environmental conscious consumers, type X is preferred by 58 out of 64 (90.6%).

| | | | env_consciousness | | Total |
|-----------------------------------------------|--------|----------------------------|-------------------|--------|--------|
| | | | no | yes | |
| decision on a particular washing machine type | type x | Count | 32 | 58 | 90 |
| | | % within env_consciousness | 76,2% | 90,6% | 84,9% |
| | type y | Count | 10 | 6 | 16 |
| | | % within env_consciousness | 23,8% | 9,4% | 15,1% |
| Total | | Count | 42 | 64 | 106 |
| | | % within env_consciousness | 100,0% | 100,0% | 100,0% |

Figure 24: Crosstabulation – Environmental consciousness and decision on a particular washing machine type

The difference is significant as the p-value of 0.036 is smaller than α level of 0.05 (5%), thus the null hypotheses is rejected that environmental consciousness has no impact on the decision to buy an energy efficient household appliance.

Chi-Square Tests

| | Value | df | Asymp. Sig. (2-sided) | Monte Carlo Sig. (2-sided) | | |
|---------------------|--------------------|----|-----------------------|----------------------------|-------------------------|-------------|
| | | | | Sig. | 99% Confidence Interval | |
| | | | | | Lower Bound | Upper Bound |
| Pearson Chi-Square | 5,606 ^a | 2 | ,061 | ,036 ^b | ,031 | ,040 |
| Likelihood Ratio | 5,868 | 2 | ,053 | ,036 ^b | ,031 | ,040 |
| Fisher's Exact Test | 5,418 | | | ,036 ^b | ,031 | ,040 |
| N of Valid Cases | 107 | | | | | |

a. 2 cells (33,3%) have expected count less than 5. The minimum expected count is ,40.

b. Based on 10000 sampled tables with starting seed 1556559737.

Figure 25: Chi-Square Test – Environmental consciousness and decision on a particular washing machine type

5.7 Impact of consumer attitude towards eco-labels and environmental consciousness on information level

Let me shortly explain the next analysis method, which is used in this chapter, namely the so called Two way analysis of variance. A Two way ANOVA also known as factorial ANOVA is a statistical method which extends the one way ANOVA test. The difference between One way ANOVA and Two way ANOVA lies in the fact that a two way analysis of variance can be conducted if there is more than one independent variable and when there are numerous observations for every independent variable. In addition the Two way ANOVA shows if there are correlations or significant relations between the independent variables. The usual assumptions as for other parametric statistical tests hold true in the Two way ANOVA. To give an example, a correct sampling method must be used, which means that the observations within and between data groups have to be autonomous. The Two way ANOVA counts on the following sets of null hypotheses. The first one explains that the population means of the first factor are equivalent. The second one says that the population means of the second factor are alike. The last null hypothesis states that there does not take place an interaction between the two factors.¹⁴⁶

In this Two way ANOVA, the main effects are tested and the interaction. There is a hypothesis related to the main effect of attitude towards eco-labels. Do people with a positive attitude towards eco-labelling inform themselves as much about the environmental impacts of household appliances as people with a negative attitude towards eco-labelling? There is a hypothesis related to the main effect of attitude towards the environment. Do people with a positive attitude towards the environment inform themselves as much about the environmental impacts of household appliances as people with a negative attitude towards the environment? And last but not least the interaction is tested. Does the magnitude of the difference between either people with a positive (negative) attitude towards eco-labels depend on the attitude towards the environment?

¹⁴⁶ Field (2009), Discovering statistics using SPSS, p. 353

To perform the Two way ANOVA used in the empirical study, it was first necessary to define the following variables,

1. attitude towards eco-labels (independent variable)
2. attitude towards the environment (independent variable)
3. level of information of environmental impacts before buying household appliances (dependent variable)

To gain insight to consumer perspectives on eco-labels, the following statement in part two of the questionnaire ‘eco-labels promote a sustainable use of resources’ is used. To start investigations on consumer attitudes towards the environment I used the statement in part one of the questionnaire ‘I try to do what is right for the environment, even if those actions are time consuming and involve additional investment’. Finally, to find out, if consumers inform themselves about the environmental impacts of household appliances, I included data gained from the answers in part three of the survey. The corresponding question hereby was ‘before buying household appliances, do you inform yourself about the environmental impacts?’

5.7.1 Two way ANOVA Results

SPSS Output Two way ANOVA 1.1 shows the results of Levene’s test, which is used to assess the tenability of the assumption of equal variances.¹⁴⁷ A non-significant result, as can be found in this case is indicative that the assumption of homogeneity of variance is met.

Levene's Test of Equality of Error Variances^a

Dependent Variable: information_level

| F | df1 | df2 | Sig. |
|-------|-----|-----|------|
| 2,626 | 3 | 97 | ,055 |

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + attitude_label + attitude_env + attitude_label * attitude_env

Figure 26: SPSS Output Two way ANOVA 1.1

¹⁴⁷ Field (2009), Discovering Statistics using SPSS, p. 436

Tests of Between-Subjects Effects

Dependent Variable: information_level

| Source | Type III Sum of Squares | df | Mean Square | F | Sig. | Partial Eta Squared |
|-------------------------------|-------------------------|-----|-------------|---------|------|---------------------|
| Corrected Model | 2,209 ^a | 3 | ,736 | 3,782 | ,013 | ,105 |
| Intercept | 37,859 | 1 | 37,859 | 194,504 | ,000 | ,667 |
| attitude_label | ,547 | 1 | ,547 | 2,812 | ,097 | ,028 |
| attitude_env | 1,711 | 1 | 1,711 | 8,788 | ,004 | ,083 |
| attitude_label * attitude_env | ,583 | 1 | ,583 | 2,997 | ,087 | ,030 |
| Error | 18,880 | 97 | ,195 | | | |
| Total | 71,000 | 101 | | | | |
| Corrected Total | 21,089 | 100 | | | | |

a. R Squared = ,105 (Adjusted R Squared = ,077)

Figure 27: SPSS Output Two way ANOVA 1.2

The two way ANOVA tests of between subjects effects (Figure 28), shows that there is a main effect of attitude towards the environment on the information level which is statistically significant ($p < 0.05$). More than 8 percent of the variability in information level is being accounted for by the attitude towards the environment. Thus nearly 10 percent of the variance in information level is due to consumer attitude towards the environment. Thus hypothesis 4 is confirmed. There was a non-significant main effect of consumer attitudes towards eco-labels on information level, $p = 0.097$. Thus hypothesis 3 cannot be confirmed. There was also no statistically significant main effect found for the interaction, $p = 0.087$.

The pairwise comparisons table (Figure 29) shows that the mean difference is statistically significant for those people who do not care about the environment ($0.028 < 0.05$)

Pairwise Comparisons

Dependent Variable: information_level

| | | | Mean Difference (I-J) | Std. Error | Sig. ^b | 95% Confidence Interval for Difference ^b | |
|-------------------------------|--------------------------------------|--------------------------------------|-----------------------|------------|-------------------|-----------------------------------------------------|-------------|
| attitude_environment | (I) attitude_ecolabel | (J) attitude_ecolabel | | | | Lower Bound | Upper Bound |
| do not care about environment | negative attitude towards eco-labels | positive attitude towards eco-labels | -,321 | ,144 | ,028 | -,608 | -,035 |
| | positive attitude towards eco-labels | negative attitude towards eco-labels | ,321* | ,144 | ,028 | ,035 | ,608 |
| care about environment | negative attitude towards eco-labels | positive attitude towards eco-labels | ,005 | ,121 | ,966 | -,236 | ,246 |
| | positive attitude towards eco-labels | negative attitude towards eco-labels | -,005 | ,121 | ,966 | -,246 | ,236 |

Based on estimated marginal means

*. The mean difference is significant at the ,05 level.

b. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Figure 28: SPSS Output Two way Anova 1.3

For people who do not care about the environment, the mean difference is statistically significant at the 0.05 level ($0.028 < 0.05$). Thus people, who care about the environment, do inform themselves about the environmental impacts of household appliances irrespective of their attitude towards eco-labelling, as there was found no statistical significant mean difference. For people who do not care about the environment, it was found a statistical significant difference in the means, so people who have a positive attitude towards eco-labels have a high level of information of environmental impacts, while people with a negative attitude towards the environment have a low level of information of environmental impacts.

5.8 Impact of income and education on information level

In this Two way ANOVA, the main effects are tested and the interaction. There is a hypothesis related to the main effect of income. Do people with a higher income inform themselves as much about the environmental impacts of household appliances as people with a lower income? There is a hypothesis related to the main effect of education. Do people with a higher education level inform themselves as much about the environmental impacts of household appliances as people with a lower education level? And last but not least the interaction is tested.

To perform the Two way ANOVA I defined the following variables,

1. income (independent variable)
2. education (independent variable)
3. level of information of environmental impacts before buying household appliances (dependent variable)

The variable 'income' is treated as ordinal scaled, having 3 levels, they are people with a low income, income smaller than 1000 euros, people with a middle income 1001-2000 and people with a high monthly net income, income greater than 2000 euros. The variable education was regrouped into a dichotomous variable. I define those people with a high education level as people having passed a 'Matura' or possess a university degree. The variable 'level of information' is dichotomous. Those people stating 'don't know' when

they were asked about their monthly net income or if they search for environmental information of household appliances are excluded in the analysis.

5.8.1 Two way ANOVA Results

SPSS Output Two way ANOVA 2.1 shows the results of Levene's test. A significant result, as can be found in this case is indicative that the assumption of homogeneity of variance is not met. Thus, I decided to set the alpha level at 0.001 instead of 0.05.

Levene's Test of Equality of Error Variances^a

Dependent Variable: information_level

| F | df1 | df2 | Sig. |
|-------|-----|-----|------|
| 8,114 | 5 | 97 | ,000 |

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + educatio + income + educatio * income

Figure 29: SPSS Output Two way ANOVA 2.1

The two way ANOVA tests of between subjects effects (Figure 30), shows that there is neither a statistically significant main effect for income ($p > 0.001$) nor for education ($0.084 > 0.001$). Thus hypotheses 5 and 6 cannot be confirmed. In addition there was no significant main effect found for the interaction, $p = 0.875$. This means that neither income nor education has a significant effect on the information level.

Tests of Between-Subjects Effects

Dependent Variable: information_level

| Source | Type III Sum of Squares | df | Mean Square | F | Sig. | Partial Eta Squared |
|-------------------|-------------------------|-----|-------------|---------|------|---------------------|
| Corrected Model | 2,830 ^a | 5 | ,566 | 2,979 | ,015 | ,133 |
| Intercept | 36,392 | 1 | 36,392 | 191,521 | ,000 | ,664 |
| income | 1,114 | 2 | ,557 | 2,932 | ,058 | ,057 |
| educatio | ,581 | 1 | ,581 | 3,055 | ,084 | ,031 |
| income * educatio | ,051 | 2 | ,025 | ,133 | ,875 | ,003 |
| Error | 18,432 | 97 | ,190 | | | |
| Total | 73,000 | 103 | | | | |
| Corrected Total | 21,262 | 102 | | | | |

a. R Squared = ,133 (Adjusted R Squared = ,088)

Figure 30: SPSS Output Two way ANOVA 2.2

Pairwise Comparisons

Dependent Variable: information_level

| income | (I) education | (J) education | Mean Difference (I-J) | Std. Error | Sig. ^a | 95% Confidence Interval for Difference ^a | |
|-----------|------------------------|------------------------|-----------------------|------------|-------------------|-----------------------------------------------------|-------------|
| | | | | | | Lower Bound | Upper Bound |
| <=1000 | lower education level | higher education level | ,248 | ,183 | ,179 | -,116 | ,611 |
| | higher education level | lower education level | -,248 | ,183 | ,179 | -,611 | ,116 |
| 1001-2000 | lower education level | higher education level | ,126 | ,160 | ,431 | -,191 | ,444 |
| | higher education level | lower education level | -,126 | ,160 | ,431 | -,444 | ,191 |
| >2000 | lower education level | higher education level | ,214 | ,233 | ,360 | -,248 | ,677 |
| | higher education level | lower education level | -,214 | ,233 | ,360 | -,677 | ,248 |

Based on estimated marginal means

a. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Figure: 31: SPSS Output Two way ANOVA 2.3

The pairwise comparisons table (Figure 31) shows that the mean difference is not statistically significant for those people with a low income level ($p > 0.001$). There were also no significant results found for people with a middle income level ($0.431 > 0.001$) and people with a high income level ($0.360 > 0.001$).

The analysis shows that income has no statistically significant effect on the information level of consumers regarding environmental impacts of household appliances. There was also found no statistical difference in the means when comparing the three income levels as shown in Figure 31. There was found no statistical difference between survey participants with a lower education level and a higher education level when it comes to information search concerning environmental impacts of household appliances.

The results of this analysis are somehow surprising. I would have expected that people with a higher income level inform themselves more about the environmental impacts of household appliances than people with a lower income level as they might be able to afford the more expensive devices which might be also more energy saving and thus more environmental friendly. It is further surprising that there was no statistical main effect found for education. The results of the consumer study suggest that the attained education level has no significant relation with the decision to search for information regarding environmental impacts of household appliances.

6. Conclusion

An important question is how consumers can be made aware of environmental friendly products. As a major goal of eco-labelling is to inform customers about the environmental impacts of goods and services, the aim of this thesis was to investigate if consumers make use of this tool to gather information about the environmental attributes of products.

The international literature on eco-labelling provides ways to assess the performance of eco-labelling schemes theoretically by explaining the consequences that result for the environment, for consumers and for the industry. The most part of scientific research thereby focuses on the impacts resulting on the consumer side. An important aspect hereby is credibility. Consumers must be able to rely on the mission the eco-label wants to deliver in order for the program to survive in the long run. So called ISO Type I labels, which were introduced in this study, fulfil the ‘credibility’ requirement as the verification of criteria is done via an independent source. The discussion of these selected eco-labelling schemes has highlighted the fact that every program differs in the way it deals with the certification process, the regular monitoring of criteria and the selection of product groups, in order to be able to reduce environmental problems.

Through an empirical analysis it was possible to gain insight to the perception on eco-labelling of Austrian consumers. A special emphasis was thereby given to the European Union Energy label. The developed hypotheses suggested that income, environmental consciousness and education are major influencing factors on the awareness of the EU Energy label. It was further investigated which factors have an influence on the decision to gather information about the environmental impacts of household products.

In General eco-labels are regarded as a contribution to a sustainable use of resources and eco-labelled products are viewed as quality markers. In addition products certified via an eco-label are associated with a higher price. When it comes to consumer knowledge of selected eco-labelling schemes, which were introduced in the theoretical part, it is surprising that the majority of survey participants were unfamiliar with the EU Energy label.

However from those people who are aware of the EU Energy label, it is used as source of information. Respondents show a substantial awareness of labels such as the Marine Stewardship Council or the Austrian Eco-label.

There was no statistical evidence that people with a higher education level are better informed when it comes to the European Union Energy label. It was further surprising that factors like income or education have no influence on the information level of consumers regarding environmental impacts of household appliances. Unsurprisingly environmental consciousness can be expected to influence not only the decision to buy energy efficient appliances but also the decision to gather information regarding environmental impacts of products.

In 2014, a general revision of the EU Energy label is planned. Thereby market studies will be made, which shall investigate how consumers are able to ‘use’ the label in their purchase decision making process. Regarding the design of the EU Energy label it should be considered as well that it is not able to include any additional ‘plus-categories’. In advance further research has to be made to assess if the current decision to introduce additional plus-categories on the label, was an appropriate way to deal with the circumstance that technological process takes place and more and more products qualify for the highest standard.¹⁴⁸

Finally it can be said that eco-labelling still comprises a lot of unanswered questions. One big problem here is the measuring of environmental improvements due to the implementation of a certain labelling scheme. This circumstance makes it complicated to assess how different eco-label programs have had an advantageous outcome for the environment. For some of the discussed eco-label schemes in this thesis this kind of data is hardly available or has not been analysed or published yet. Consequently eco-labelling as a broad topic remains an important research area for the future.

¹⁴⁸ Moser (2011), p. 7

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Appendices

Appendix A: Abstract

The importance of eco-labelling as a tool to enforce sustainable consumption has gained importance over time. This thesis examines consumer perceptions on eco-labelling in Austria and if eco-labels are used to gather information about the environmental features of products. The theoretical part captures historical findings, a general classification of eco-labels and their overall meaning within the context of using resources in a sustainable manner. In addition the incentives for companies to get certified via an eco-label are explained. The theoretical part further gives insight to selected eco-labelling schemes, which play a major role in the empirical study. These schemes are discussed in detail by using certain aspects like the relevant certification criteria or product groups. A special focus is given on the monitoring of criteria and the impacts on the environment. The empirical study of this paper is based on data gained from a standardized questionnaire from 107 survey participants. Influencing factors such as income and environmental consciousness on the awareness of the EU Energy label have been in addition examined as special emphasis was given to this type of label. A significant relationship between income and information level of consumers regarding environmental features of products has not been found. However it was shown that environmental consciousness has a significant impact on the decision to buy energy efficient appliances. The analysis further allowed for investigations on consumer knowledge concerning selected eco-labelling schemes.

Appendix B: Abstract (German)

Öko-Labels als Zeichen um nachhaltigen Konsum zu forcieren, haben im Laufe der Zeit immer mehr an Bedeutung gewonnen. Diese Arbeit konzentriert sich darauf, Konsumenteneinstellungen bezüglich Öko-label zertifizierter Produkte in Österreich zu erfassen und geht darauf ein, ob Öko-labels von den Konsumenten dazu verwendet werden, sich über die Umweltauswirkungen von Produkten zu informieren. Der theoretische Teil der Arbeit gibt einen historischen Überblick und befasst sich mit der

Klassifizierung und der allgemeinen Bedeutung von Umweltzeichen im Zusammenhang mit der nachhaltigen Nutzung von Ressourcen. Es wird darauf eingegangen, welche wirtschaftlichen Anreize eine Umweltzertifizierung für Unternehmen birgt. Ein weiteres Kapitel umfasst die theoretische Erfolgsmessung von Öko-labels. Dabei wird aufgezeigt, welche Auswirkungen Öko-labels auf das Konsumentenverhalten, auf die Umwelt und auf die Unternehmen haben können. Die Arbeit gibt auch einen Einblick in ausgewählte Öko-Labels, welche in der empirischen Studie eine Rolle spielen. Diese Öko-Labels werden anhand verschiedener Aspekte, wie etwa den relevanten Zertifizierungskriterien und den unterschiedlichen Produktgruppen dargestellt. Besonderes Augenmerk wird auf die Vergaberichtlinien und die Auswirkungen auf die Umwelt gelegt. Die empirische Studie, welche sich auf Daten von 107 Probanden stützt, welche anhand eines standardisierten Fragebogens gewonnen wurden, dient der Erfassung und Auswertung von Konsumenteneinstellungen bezüglich Öko-label zertifizierter Produkte. Einflussfaktoren, wie etwa das Einkommen oder Umweltbewusstsein, auf die Kenntnis des EU Energie Labels wurden analysiert. Das EU Energie Label bildet hierbei einen Schwerpunkt. Es wurde kein signifikanter Zusammenhang zwischen Einkommen und Informierungsgrad der Konsumenten bezüglich Umweltaspekte von Produkten festgestellt. Jedoch konnte gezeigt werden, dass das Umweltbewusstsein, bei der Entscheidung energieeffiziente Produkte zu kaufen, eine Rolle spielt. Die Auswertung ermöglichte es, auf weitere Aspekte, wie etwa die Kenntnis ausgewählter Öko-labels einzugehen.

Appendix C: Questionnaire

name:

email :



universität
wien

Survey on consumer perception towards eco-labelled products in Austria

Responsibility:
Dorothea Sophie Bauer, Bakk.
Email: ds.bauer@gmx.at

Hello! May I introduce myself, my name is Dorothea Bauer. I am currently writing on my master's thesis at the University of Vienna.

A few words on data protection:

You are being asked to take part in a research study on 'eco-labelling'. The purpose of this study is to get a better understanding of consumer perception towards eco-labelled products in Austria. Thus the study is not used for any commercial purpose. I would like to ask you to indicate your contact details, like your name and your email address. You may be asked for a short feedback later.

Any information will be kept strictly confidential. In particular, personal data will not be stored or passed on to third parties or be published or made available for general access to ensure maximum confidentiality.

I. Information on the environment

| I.1. Please evaluate the following statements. | | | | |
|----------------------------------------------------------------------------------------------------------------|---------------|----------------|-------------------|------------------|
| | Totally agree | Somewhat agree | Somewhat disagree | Totally disagree |
| The existent development of human activity is not in conflict with the environment. | () | () | () | () |
| It is too hard for me to do much about the environment. | () | () | () | () |
| I try to care for the environment, even if those actions are time consuming and involve additional investment. | () | () | () | () |

| I.2. Please evaluate the following actions, which could have an influence on reducing environmental threats. Please choose only three aspects and mark, which of the following aspects, has first, second or third priority in your opinion. | | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-------------|-------------|
| (only one answer per column) | | | |
| | 1. Priority | 2. Priority | 3. Priority |
| Consuming less water. | () | () | () |
| Using environmental friendly transport methods. | () | () | () |
| Buying products, produced by environmental friendly production methods. | () | () | () |
| Buying energy efficient household appliances. | () | () | () |
| Reducing garbage and recycle products. | () | () | () |
| Gathering information about the environmental impacts of products. | () | () | () |
| (Note: Examples of environmental friendly transport methods are: Using public transport or bicycle instead of the car or use car sharing) | | | |

II. Product Certification based on the example of Eco-labels

| II.1 Please evaluate the following statements. | | | | |
|-------------------------------------------------------------------------------------------------------------------------------------|---------------|----------------|-------------------|------------------|
| | Totally agree | Somewhat agree | Somewhat disagree | Totally disagree |
| Eco-labels mark those products, which are more environmental friendly than conventional products (e.g. products without any label). | () | () | () | () |
| Eco-labels mark those products, which do not have any impact on the environment. | () | () | () | () |
| Eco-labels promote a sustainable use of resources. | () | () | () | () |
| Products, certified with an Eco-label comply with higher quality standards than unlabelled ones. | () | () | () | () |
| Products, certified with an Eco-label are more expensive than conventional products. | () | () | () | () |
| Eco-Labels are a proper instrument to signal a product's quality. | () | () | () | () |
| A proper instrument to signal a product's quality is its price. | () | () | () | () |
| A proper instrument to signal a product's quality is its brand. | () | () | () | () |

| II.2 Eco-Labels inform about the environmental impacts, a product can have on the environment. Please evaluate the following environmental impacts. | | | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----------|------------------|----------------------|
| | Very Important | Important | Not so Important | Not important at all |
| Environmental impact of product manufacturing. | () | () | () | () |
| Environmental impact of product use. | () | () | () | () |
| Environmental impact of product disposal. | () | () | () | () |

| II.3 Eco-Labels can have different sponsors. Please evaluate the following sponsors. | | | | |
|---------------------------------------------------------------------------------------------|------------------|----------------------|------------------------|--------------------|
| | Very trustworthy | Somewhat trustworthy | Somewhat untrustworthy | Very untrustworthy |
| Environmental groups | () | () | () | () |
| Government agencies | () | () | () | () |
| Industry | () | () | () | () |

| | |
|---------------------------------------------------------------------------------------|-----------------------------------------------------------|
| II.4 Do you know the following Eco-Labels? (multiple answers possible) | |
| <input type="checkbox"/> EU Energy Star | <input type="checkbox"/> EU Eco-label (EU Flower) |
| <input type="checkbox"/> The Austrian Eco-label | <input type="checkbox"/> The green dot |
| <input type="checkbox"/> Germany's blue Angel | <input type="checkbox"/> Recycling Symbol |
| <input type="checkbox"/> The Nordic Swan | <input type="checkbox"/> FSC (Forest Stewardship Council) |
| <input type="checkbox"/> MSC (Marine Stewardship Council) | <input type="checkbox"/> None |
| <input type="checkbox"/> PEFC (Programme for the Endorsement of Forest Certification) | |

III. EU – Energy Label

| |
|------------------------------------------------------------------------------------------------------------|
| III.1 Before buying household appliances, do you inform yourself about their environmental impacts? |
| <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> don't know |

| |
|----------------------------------------------------------------------------------------------------|
| III.2 Do you know the EU-Energy Label? |
| <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> don't know |

| |
|------------------------------------------------------------------------------------------------------------------------------------|
| III.2.1 If so: Do you use the EU-Energy Label, to inform yourself about the energy consumption of products you buy and use? |
| <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> don't know |

| | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|---------------------------------------|
| III.2.2 If so: Which products do you have in mind, which you have bought with this label? (Question is related to III.2) (multiple answers possible) | | |
| <input type="checkbox"/> PC | <input type="checkbox"/> TV-Set | <input type="checkbox"/> Refrigerator |
| <input type="checkbox"/> Car | <input type="checkbox"/> Dishwasher | <input type="checkbox"/> None |
| <input type="checkbox"/> Light bulb | <input type="checkbox"/> Washing machine | <input type="checkbox"/> |
| Other: _____ | | |

III.3 The following list contains a number of aspects you may consider when buying household appliances, using the example of washing machines. Please choose only 3 aspects and indicate whether these aspects have first, second or third priority to you.

(=one answer per column)

| | 1. Priority | 2. Priority | 3. Priority |
|-------------------------------------------------------------------------------------------------------------|-------------|-------------|-------------|
| Test results (published in scientific journals...) | () | () | () |
| Customer service (repair; availability of spare and wear parts; recovery of old appliances for disposal...) | () | () | () |
| Price | () | () | () |
| Design (colour; digital display; ergonomic door handle...) | () | () | () |
| Reliability (life-time...) | () | () | () |
| Consumption of water | () | () | () |
| Consumption of energy (in kWh) | () | () | () |
| EU-Energy Label | () | () | () |
| Consumption of detergents | () | () | () |
| Brand-Quality | () | () | () |
| Equipment (washing programs; dryer integrated; allergy options...) | () | () | () |
| Load Size | () | () | () |
| Noise | () | () | () |
| Wash programme time | () | () | () |
| User-friendliness | () | () | () |
| Construction (top- or frontloading; stand alone or built-in device) | () | () | () |
| Safety (integrated water protection system...) | () | () | () |

III.4 Suppose, you have to decide on a new household appliance, in this case a washing machine. You are able to choose between 2 virtual appliances, which are identical in quality and equipment. However they vary in the following terms stated below. Which one would you choose?

| <u>Washing machine „X“</u> | <u>Washing machine „Y“</u> |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| Price: 390 euros | Price: 300 euros |
| Energy consumption: 0,75 kWh/wash load | Energy consumption: 0,95 kWh/wash load |
| Energy efficiency class: A+++ | Energy efficiency class: A++ |
| Water consumption: 48 litres /wash load | Water consumption: 54 litres /wash load |
| Note: One can distinguish among the following energy efficiency classes: A+++ A++ A+ A B C D (A+++ means low energy consumption; D means high energy consumption) | |
| I would opt for.... <div style="text-align: right;"> () Type 'X' () Type 'Y' </div> | |

IV: Demographic Information

IV.1 Gender:

☐ female ☐ male

IV.2 Age:

☐ ≤ 25 ☐ 26 – 35 ☐ 36 – 45 ☐ 46 – 55 ☐ 56 – 65 ☐ > 65

IV.3 Please mark your current occupation!

☐ Manual Worker ☐ Employee ☐ Self-employed ☐ Student
☐ Freelancer ☐ Retired ☐ Other: _____

IV.4 Please indicate your highest education level!

☐ University ☐ college-related training ☐ apprenticeship
☐ Matura (AHS, BHS) ☐ VET school ☐ compulsory school

IV.5 Please indicate your monthly net Income (in euros)!

☐ ≤ 1.000 ☐ 1.001 - 2.000 ☐ > 2.000

IV.6 Would you say you live in a ...?

☐ metropolitan zone ☐ urban centre ☐ small town
☐ rural zone

IV.7 How many individuals live altogether in your household?

☐ 1 individual ☐ 2 individuals ☐ 3-4 individuals ☐ more than 4 individuals

- Thanks for your participation! -

Appendix D: Complete Two way ANOVA Results of Chapter 5.7

Between-Subjects Factors

| | Value Label | N |
|----------------------|----------------------------------------|----|
| attitude_ecolabel | 0 negative attitude towards eco-labels | 34 |
| | 1 positive attitude towards eco-labels | 67 |
| attitude_environment | 0 do not care about environment | 42 |
| | 1 care about environment | 59 |

Descriptive Statistics

Dependent Variable: information_level

| attitude_ecolabel | attitude_environment | Mean | Std. Deviation | N |
|--------------------------------------|-------------------------------|------|----------------|-----|
| negative attitude towards eco-labels | do not care about environment | ,36 | ,497 | 14 |
| | care about environment | ,80 | ,410 | 20 |
| | Total | ,62 | ,493 | 34 |
| positive attitude towards eco-labels | do not care about environment | ,68 | ,476 | 28 |
| | care about environment | ,79 | ,409 | 39 |
| | Total | ,75 | ,438 | 67 |
| Total | do not care about environment | ,57 | ,501 | 42 |
| | care about environment | ,80 | ,406 | 59 |
| | Total | ,70 | ,459 | 101 |

Levene's Test of Equality of Error Variances^a

Dependent Variable: information_level

| F | df1 | df2 | Sig. |
|-------|-----|-----|------|
| 2,626 | 3 | 97 | ,055 |

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + attitude_label + attitude_env + attitude_label * attitude_env

Tests of Between-Subjects Effects

Dependent Variable: information_level

| Source | Type III Sum of Squares | df | Mean Square | F | Sig. | Partial Eta Squared |
|-------------------------------|-------------------------|-----|-------------|---------|------|---------------------|
| Corrected Model | 2,209 ^a | 3 | ,736 | 3,782 | ,013 | ,105 |
| Intercept | 37,859 | 1 | 37,859 | 194,504 | ,000 | ,667 |
| attitude_label | ,547 | 1 | ,547 | 2,812 | ,097 | ,028 |
| attitude_env | 1,711 | 1 | 1,711 | 8,788 | ,004 | ,083 |
| attitude_label * attitude_env | ,583 | 1 | ,583 | 2,997 | ,087 | ,030 |
| Error | 18,880 | 97 | ,195 | | | |
| Total | 71,000 | 101 | | | | |
| Corrected Total | 21,089 | 100 | | | | |

a. R Squared = ,105 (Adjusted R Squared = ,077)

Estimated Marginal Means

1. attitude_ecolabel

Estimates

Dependent Variable: information_level

| attitude_ecolabel | Mean | Std. Error | 95% Confidence Interval | |
|--------------------------------------|------|------------|-------------------------|-------------|
| | | | Lower Bound | Upper Bound |
| negative attitude towards eco-labels | ,579 | ,077 | ,426 | ,731 |
| positive attitude towards eco-labels | ,737 | ,055 | ,628 | ,845 |

Pairwise Comparisons

Dependent Variable: information_level

| (I) attitude_ecolabel | (J) attitude_ecolabel | Mean Difference (I-J) | Std. Error | Sig. ^a | 95% Confidence Interval for Difference ^a | |
|--------------------------------------|--------------------------------------|-----------------------|------------|-------------------|-----------------------------------------------------|-------------|
| | | | | | Lower Bound | Upper Bound |
| negative attitude towards eco-labels | positive attitude towards eco-labels | -,158 | ,094 | ,097 | -,345 | ,029 |
| positive attitude towards eco-labels | negative attitude towards eco-labels | ,158 | ,094 | ,097 | -,029 | ,345 |

Based on estimated marginal means

a. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Univariate Tests

Dependent Variable: information_level

| | Sum of Squares | df | Mean Square | F | Sig. | Partial Eta Squared |
|----------|----------------|----|-------------|-------|------|---------------------|
| Contrast | ,547 | 1 | ,547 | 2,812 | ,097 | ,028 |
| Error | 18,880 | 97 | ,195 | | | |

The F tests the effect of attitude_ecolabel. This test is based on the linearly independent pairwise comparisons among the estimated marginal means.

2. attitude_environment

Estimates

Dependent Variable: information_level

| attitude_environment | Mean | Std. Error | 95% Confidence Interval | |
|-------------------------------|------|------------|-------------------------|-------------|
| | | | Lower Bound | Upper Bound |
| do not care about environment | ,518 | ,072 | ,375 | ,661 |
| care about environment | ,797 | ,061 | ,677 | ,918 |

Pairwise Comparisons

Dependent Variable: information_level

| (I) attitude_environment | (J) attitude_environment | Mean Difference (I-J) | Std. Error | Sig. ^b | 95% Confidence Interval for Difference ^b | |
|-------------------------------|-------------------------------|-----------------------|------------|-------------------|-----------------------------------------------------|-------------|
| | | | | | Lower Bound | Upper Bound |
| do not care about environment | care about environment | -,280 | ,094 | ,004 | -,467 | -,092 |
| care about environment | do not care about environment | ,280 | ,094 | ,004 | ,092 | ,467 |

Based on estimated marginal means

*. The mean difference is significant at the ,05 level.

b. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Univariate Tests

Dependent Variable: information_level

| | Sum of Squares | df | Mean Square | F | Sig. | Partial Eta Squared |
|----------|----------------|----|-------------|-------|------|---------------------|
| Contrast | 1,711 | 1 | 1,711 | 8,788 | ,004 | ,083 |
| Error | 18,880 | 97 | ,195 | | | |

The F tests the effect of attitude_environment. This test is based on the linearly independent pairwise comparisons among the estimated marginal means.

3. attitude_ecolabel * attitude_environment

Dependent Variable: information_level

| attitude_ecolabel | attitude_environment | Mean | Std. Error | 95% Confidence Interval | |
|--------------------------------------|-------------------------------|------|------------|-------------------------|-------------|
| | | | | Lower Bound | Upper Bound |
| negative attitude towards eco-labels | do not care about environment | ,357 | ,118 | ,123 | ,591 |
| | care about environment | ,800 | ,099 | ,604 | ,996 |
| positive attitude towards eco-labels | do not care about environment | ,679 | ,083 | ,513 | ,844 |
| | care about environment | ,795 | ,071 | ,655 | ,935 |

Pairwise Comparisons

Dependent Variable: information_level

| attitude_environment | (I) attitude_ecolabel | (J) attitude_ecolabel | Mean Difference (I-J) | Std. Error | Sig. ^b | 95% Confidence Interval for Difference ^b | |
|-------------------------------|--------------------------------------|--------------------------------------|-----------------------|------------|-------------------|-----------------------------------------------------|-------------|
| | | | | | | Lower Bound | Upper Bound |
| do not care about environment | negative attitude towards eco-labels | positive attitude towards eco-labels | -,321 [*] | ,144 | ,028 | -,608 | -,035 |
| | positive attitude towards eco-labels | negative attitude towards eco-labels | ,321 [*] | ,144 | ,028 | ,035 | ,608 |
| care about environment | negative attitude towards eco-labels | positive attitude towards eco-labels | ,005 | ,121 | ,966 | -,236 | ,246 |
| | positive attitude towards eco-labels | negative attitude towards eco-labels | -,005 | ,121 | ,966 | -,246 | ,236 |

Based on estimated marginal means

*. The mean difference is significant at the ,05 level.

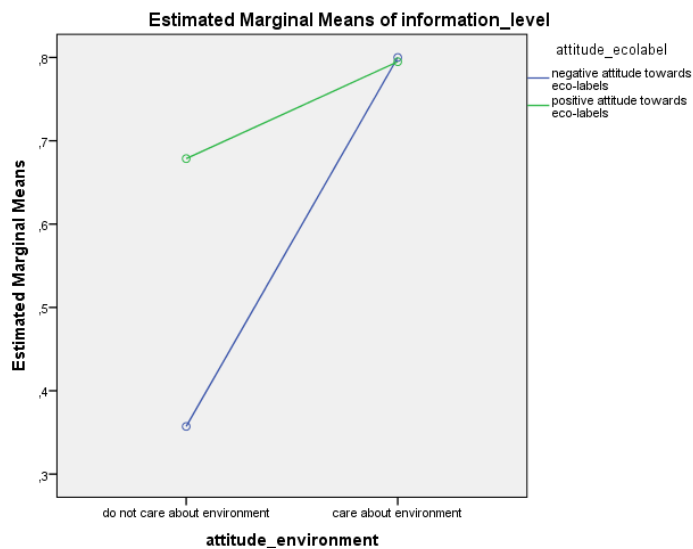
b. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Univariate Tests

Dependent Variable: information_level

| attitude_environment | | Sum of Squares | df | Mean Square | F | Sig. | Partial Eta Squared |
|-------------------------------|----------|----------------|----|-------------|-------|------|---------------------|
| do not care about environment | Contrast | ,964 | 1 | ,964 | 4,954 | ,028 | ,049 |
| | Error | 18,880 | 97 | ,195 | | | |
| care about environment | Contrast | ,000 | 1 | ,000 | ,002 | ,966 | ,000 |
| | Error | 18,880 | 97 | ,195 | | | |

Each F tests the simple effects of attitude_ecolabel within each level combination of the other effects shown. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.



Appendix E: Complete Two way ANOVA Results of Chapter 5.8

Between-Subjects Factors

| | | Value Label | N |
|-----------|---|------------------------|----|
| education | 1 | lower education level | 22 |
| | 2 | higher education level | 81 |
| income | 1 | <=1000 | 37 |
| | 2 | 1001-2000 | 34 |
| | 3 | >2000 | 32 |

Descriptive Statistics

Dependent Variable: information_level

| education | income | Mean | Std. Deviation | N |
|------------------------|-----------|------|----------------|-----|
| lower education level | <=1000 | ,71 | ,488 | 7 |
| | 1001-2000 | ,91 | ,302 | 11 |
| | >2000 | 1,00 | ,000 | 4 |
| | Total | ,86 | ,351 | 22 |
| higher education level | <=1000 | ,47 | ,507 | 30 |
| | 1001-2000 | ,78 | ,422 | 23 |
| | >2000 | ,79 | ,418 | 28 |
| | Total | ,67 | ,474 | 81 |
| Total | <=1000 | ,51 | ,507 | 37 |
| | 1001-2000 | ,82 | ,387 | 34 |
| | >2000 | ,81 | ,397 | 32 |
| | Total | ,71 | ,457 | 103 |

Levene's Test of Equality of Error Variances^a

Dependent Variable: information_level

| F | df1 | df2 | Sig. |
|-------|-----|-----|------|
| 8,114 | 5 | 97 | ,000 |

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + educatio + income + educatio * income

Tests of Between-Subjects Effects

Dependent Variable: information_level

| Source | Type III Sum of Squares | df | Mean Square | F | Sig. | Partial Eta Squared |
|-------------------|-------------------------|-----|-------------|---------|------|---------------------|
| Corrected Model | 2,830 ^a | 5 | ,566 | 2,979 | ,015 | ,133 |
| Intercept | 36,392 | 1 | 36,392 | 191,521 | ,000 | ,664 |
| educatio | ,581 | 1 | ,581 | 3,055 | ,084 | ,031 |
| income | 1,114 | 2 | ,557 | 2,932 | ,058 | ,057 |
| educatio * income | ,051 | 2 | ,025 | ,133 | ,875 | ,003 |
| Error | 18,432 | 97 | ,190 | | | |
| Total | 73,000 | 103 | | | | |
| Corrected Total | 21,262 | 102 | | | | |

a. R Squared = ,133 (Adjusted R Squared = ,088)

Estimated Marginal Means

1. education

Estimates

Dependent Variable: information_level

| education | Mean | Std. Error | 95% Confidence Interval | |
|------------------------|------|------------|-------------------------|-------------|
| | | | Lower Bound | Upper Bound |
| lower education level | ,874 | ,101 | ,674 | 1,075 |
| higher education level | ,678 | ,049 | ,582 | ,775 |

Pairwise Comparisons

Dependent Variable: information_level

| (I) education | (J) education | Mean Difference (I-J) | Std. Error | Sig. ^a | 95% Confidence Interval for Difference ^a | |
|------------------------|------------------------|-----------------------|------------|-------------------|-----------------------------------------------------|-------------|
| | | | | | Lower Bound | Upper Bound |
| lower education level | higher education level | ,196 | ,112 | ,084 | -,027 | ,419 |
| higher education level | lower education level | -,196 | ,112 | ,084 | -,419 | ,027 |

Based on estimated marginal means

a. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Univariate Tests

Dependent Variable: information_level

| | Sum of Squares | df | Mean Square | F | Sig. | Partial Eta Squared |
|----------|----------------|----|-------------|-------|------|---------------------|
| Contrast | ,581 | 1 | ,581 | 3,055 | ,084 | ,031 |
| Error | 18,432 | 97 | ,190 | | | |

The F tests the effect of education. This test is based on the linearly independent pairwise comparisons among the estimated marginal means.

2. income

Estimates

Dependent Variable: information_level

| income | Mean | Std. Error | 95% Confidence Interval | |
|-----------|------|------------|-------------------------|-------------|
| | | | Lower Bound | Upper Bound |
| <=1000 | ,590 | ,091 | ,409 | ,772 |
| 1001-2000 | ,846 | ,080 | ,687 | 1,004 |
| >2000 | ,893 | ,117 | ,662 | 1,124 |

Pairwise Comparisons

Dependent Variable: information_level

| (I) income | (J) income | Mean Difference (I-J) | Std. Error | Sig. ^b | 95% Confidence Interval for Difference ^b | |
|------------|------------|-----------------------|------------|-------------------|-----------------------------------------------------|-------------|
| | | | | | Lower Bound | Upper Bound |
| <=1000 | 1001-2000 | -,255* | ,121 | ,038 | -,496 | -,014 |
| | >2000 | -,302* | ,148 | ,044 | -,596 | -,008 |
| 1001-2000 | <=1000 | ,255* | ,121 | ,038 | ,014 | ,496 |
| | >2000 | -,047 | ,141 | ,740 | -,327 | ,233 |
| >2000 | <=1000 | ,302* | ,148 | ,044 | ,008 | ,596 |
| | 1001-2000 | ,047 | ,141 | ,740 | -,233 | ,327 |

Based on estimated marginal means

*. The mean difference is significant at the ,05 level.

b. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Univariate Tests

Dependent Variable: information_level

| | Sum of Squares | df | Mean Square | F | Sig. | Partial Eta Squared |
|----------|----------------|----|-------------|-------|------|---------------------|
| Contrast | 1,114 | 2 | ,557 | 2,932 | ,058 | ,057 |
| Error | 18,432 | 97 | ,190 | | | |

The F tests the effect of income. This test is based on the linearly independent pairwise comparisons among the estimated marginal means.

3. education * income

Dependent Variable: information_level

| education | income | Mean | Std. Error | 95% Confidence Interval | |
|------------------------|-----------|-------|------------|-------------------------|-------------|
| | | | | Lower Bound | Upper Bound |
| lower education level | <=1000 | ,714 | ,165 | ,387 | 1,041 |
| | 1001-2000 | ,909 | ,131 | ,648 | 1,170 |
| | >2000 | 1,000 | ,218 | ,567 | 1,433 |
| higher education level | <=1000 | ,467 | ,080 | ,309 | ,625 |
| | 1001-2000 | ,783 | ,091 | ,602 | ,963 |
| | >2000 | ,786 | ,082 | ,622 | ,949 |

Pairwise Comparisons

Dependent Variable: information_level

| income | (I) education | (J) education | Mean Difference (I-J) | Std. Error | Sig. ^a | 95% Confidence Interval for Difference ^a | |
|-----------|------------------------|------------------------|-----------------------|------------|-------------------|-----------------------------------------------------|-------------|
| | | | | | | Lower Bound | Upper Bound |
| <=1000 | lower education level | higher education level | ,248 | ,183 | ,179 | -,116 | ,611 |
| | higher education level | lower education level | -,248 | ,183 | ,179 | -,611 | ,116 |
| 1001-2000 | lower education level | higher education level | ,126 | ,160 | ,431 | -,191 | ,444 |
| | higher education level | lower education level | -,126 | ,160 | ,431 | -,444 | ,191 |
| >2000 | lower education level | higher education level | ,214 | ,233 | ,360 | -,248 | ,677 |
| | higher education level | lower education level | -,214 | ,233 | ,360 | -,677 | ,248 |

Based on estimated marginal means

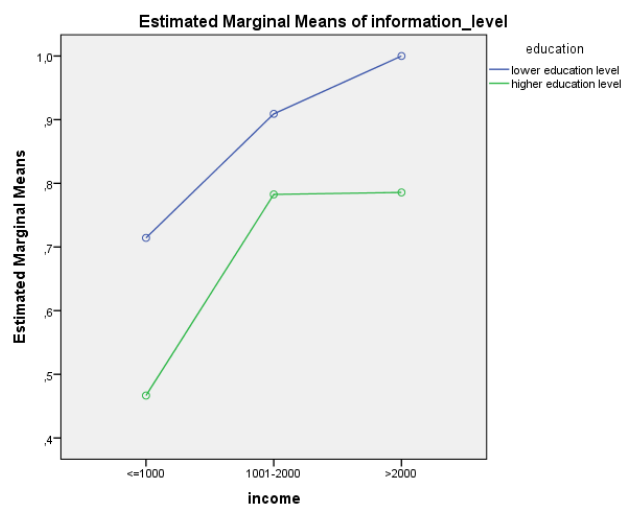
a. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Univariate Tests

Dependent Variable: information_level

| income | | Sum of Squares | df | Mean Square | F | Sig. | Partial Eta Squared |
|-----------|----------|----------------|----|-------------|-------|------|---------------------|
| <=1000 | Contrast | ,348 | 1 | ,348 | 1,831 | ,179 | ,019 |
| | Error | 18,432 | 97 | ,190 | | | |
| 1001-2000 | Contrast | ,119 | 1 | ,119 | ,626 | ,431 | ,006 |
| | Error | 18,432 | 97 | ,190 | | | |
| >2000 | Contrast | ,161 | 1 | ,161 | ,846 | ,360 | ,009 |
| | Error | 18,432 | 97 | ,190 | | | |

Each F tests the simple effects of education within each level combination of the other effects shown. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.



Appendix F: Curriculum Vitae

Dorothea Sophie Bauer, Bakk.

geboren am 15.04.1987 in Krems

Ausbildung

| | |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Seit 10/2010 | <p>Universität Wien</p> <p>Studiengang: Internationale Betriebswirtschaftslehre (Master)</p> <p>Spezialisierung: Energie- und Umweltmanagement</p> <p>Gewählte Wirtschaftskommunikation in einer Fremdsprache: Italienisch</p> <p><u>Masterarbeit:</u></p> <ul style="list-style-type: none">- An empirical analysis on consumer perception towards eco-labelled products in Austria |
| 10/2006 – 09/2010 | <p>Universität Wien</p> <p>Studiengang: Betriebswirtschaftslehre (Bakkalaureat)</p> <p>Vertiefung: International Business</p> <p>Gewählte Wirtschaftskommunikation in einer Fremdsprache: Französisch</p> <p><u>Bakkalaureatsarbeiten:</u></p> <ul style="list-style-type: none">- Incentives for Industrial Companies to head to Central and Eastern Europe- Qualifizierungsmaßnahmen im Gesundheitsbereich |
| 09/2001 – 06/2006 | <p>Handelsakademie Fasangasse Wien</p> <p>Ausbildungsschwerpunkt: Wirtschaftsinformatik und betriebliche Organisation</p> <p>Abschluss: Reife- und Diplomprüfung mit ausgezeichnetem Erfolg</p> |
| 09/1997 – 06/2001 | <p>Bundesgymnasium Schwechat</p> <p>Sprachlicher Zweig: Französisch ab der 3. Klasse</p> |