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Marketing decision making in the forest biomass market: The case of Austria, Finland and Slovakia

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ABSTRACT

This study focuses on a qualitative assessment of marketing decisions by significant actors in the forest biomass market within the EU, particularly in Austria, Finland, and Slovakia. Based on an exploratory case study design, the forest enterprises, contractors, and heating plans from each country were purposively selected. Using qualitative content analysis and MAXQDA software, the study analyzes nine in-person interviews with actors representing the chosen companies. The results reveal that national and EU policies, logistic, or technical factors, primarily determine the marketing decisions of the actors. Although there are differences in marketing decision making framework among all companies, they are significant for forest chips producers. Their decisions varied mainly in the choice and implementation phase of the framework, associated with promotion, people, process, and physical evidence. In contrast, heating plants' decisions differ only slightly within the marketing decision making framework. Some variances in characteristics of forest chips, price range, and contract length exist in the implementation phase. Consequently, the marketing decisions of heating plants significantly influence the marketing decision making framework of forest enterprises and contractors, confirming the interaction between the 7C and 7P concepts, and derived demand of forest chips.

1. Introduction

The biomass provides the highest share of energy from organic, non-fossil materials of biological origin, and accounts for almost half (47%) of the EU-28's gross inland consumption of renewables used for energy production (EUROSTAT, 2015a). Specifically, the use of forest biomass[1] for energy production has increased within the EU due to two main reasons. First, the EU's share of the world's gas reserves decreased from 4.6% in 1980 to 1.3% in 2009. These reserves are expected to be exhausted before 2030. Second, owing to their consumption levels in the EU, estimates predict that crude oil reserves will deplete in the next 20 years (Pedraza, 2015). Thus, the EU largely depends on imported fossil energy. Moreover, according to "business as usual" scenarios, the EU's energy import dependence will rise from 50% of total EU energy consumption today to 65% by 2030 (Commission of the European Communities, 2007). Doubling the use of energy based on biomass could decrease the EU's dependence on imported fossil fuels (Kanianska et al., 2011).

Therefore, the active EU energy policy has established favorable market conditions to stimulate supply and demand for forest biomass used in energy production (Lamers et al., 2012). This trend has been driven by an adoption of several strategic documents at EU (Commission of the European Communities, 2005; Commission of the European Communities, 2006; European Commission, 2006; European Commission, 2009; European Commission, 2010) and national levels (e.g., National Renewable Energy Action Plans, National Forest Programs). Moreover, not only the legislative (e.g., guarantee of origin, guaranteed access to the grid), financial (e.g., tax adjustments, low interest loans, investment subsidies) but also marketing tools (e.g., feed-in tariff, green certificates, awareness-raising programs and training programs, biomass centers) have been proposed to support the use of forest biomass for energy production (Halaj and Ilavský, 2009). The marketing tools used can vary among EU countries (Stupak et al., 2007; Lundmark and Mansikkasalo, 2009; Kallio et al., 2011; Moiseyev et al., 2011; Mansikkasalo, 2012). Therefore, it is necessary to understand how actors make their marketing decisions concerning the use of forest biomass.

Decision making is a topic of interest to many (organizations) scientists (Sapulete et al., 2014). Despite considerable research investigating decision making at the organizational level (Bauer et al., 2013), very little has been published in marketing literature on how decisions are actually made in general (Wierenga et al., 1999) and in the forest biomass market in particular (Halaj and Brodrechtova, 2014). Most existing studies focus on decisions associated with a particular marketing tool, such as, *availability of forest biomass* (Ilavský and Oravec, 2000; van Dam et al., 2007; Panoutsou et al., 2009; Scarlat

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[1] Forest biomass is forest wood in the form of wood chips. The forest biomass, which is part of harvested raw wood, is used in the energy sector, as it is of no further use in the wood processing industry (FAO, 2015b).

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et al., 2011; Trømborg et al., 2011; Verkerk et al., 2011; Wilnhammer et al., 2012; Sacchelli et al., 2013; Lundmark et al., 2015; Lourinho and Brito, 2015), *estimation of harvesting costs* (Sikkema et al., 2014; Yemshanov et al., 2014), *assessment of forest biomass prices* (Hillring, 2006; Heinimö and Junginger, 2009; Lundmark, 2010; Schwarzbauer et al., 2013; Kristöfel et al., 2014), or *optimization of the supply chain* (Shabani et al., 2013; Windisch et al., 2013).

The aim of this study is to provide further insight into marketing decision making by analyzing not only the supplier side but also the demand side of the forest biomass market in the EU. Precisely, how producers and customers make decisions in marketing forest biomass. The analysis is guided by a marketing decision making framework (Fig. 1) built on behavioral assumptions derived from a decision making model (Simon, 1977) in combination of 7P and 7C concepts (Lauterborn, 1990; Rafiq and Ahmed, 1995; Shimizu, 2003; Moharana, 2013). Using a case study approach, the individual cases depicting situations in Austria, Finland, and Slovakia, and supported through nine expert interviews, contribute to an in-depth examination of the marketing decisions making of producers and comparing their decision accuracy to the marketing decision making of their customers.

2. Theoretical background

2.1. Decision making

Decision making is a process of creating value for business, through planning, controlling, and evaluating (Mihăilă, 2014). Especially, in a strategic process, decision making is crucial, as it fundamentally influences the course of a firm. The multi-criterion aspect of decisions grasped via decision making models originated in Herbert Simon's work. Specifically, Simon's (1947; 1997) seminal model describes decision making as a three-phase process, which later considered cognitive limitations as part of the bounded rationality concept. This led Simon (1960; 1977) to elaborate the four phases' decision making model, consisting of intelligence, design, choice, and review phases. The intelligence phase gathers information to understand a problem that requires a decision, and makes the necessary assumptions explicit. The design phase explores various alternatives by building models and makes appropriate calculations to predict the consequences of each particular alternative. The choice phase seeks and selects the best or satisfactory decision. The review phase assesses or evaluates past choices.

2.2. Marketing decision making

2.2.1. Marketing decision making framework

Building on Simon's (1977) four decision making phases and the marketing decision process (Evans and Berman, 1990; Cravens, 1997), a marketing decision making framework using 7P and 7C concepts is proposed (Fig. 1). The 7P and 7C concepts are applied to better explain the decision making of producers and the behavior of their customers in the forest biomass market. Particularly, the marketing decisions of producers are depicted via the 7P concept (Rafiq and Ahmed, 1995), while customer behavior is explained via the 7C concept (Lauterborn, 1990; Shimizu, 2003; Moharana, 2013). The customer is defined "as the recipient and the user of products and services in a relationship with the firm" (Hämäläinen et al., 2015). Knowledge of customer behavior is crucial, as it shapes the combination of 7Ps used by the producer. In addition, as customers are an important asset of the company (Gupta et al., 2004), marketing decision making is not only product dominated, but also customer-oriented (Rust et al., 2004; Juslin and Hansen, 2011).

Therefore, the marketing decision making framework consisting of four phases is suitable for analyzing both producers and customers (Fig. 1). The first phase focuses on problem definition, gathering, and analysis of market information and goal establishment. The second phase enumerates a combination of feasible alternatives. One alternative is a combination of various marketing decisions considering the 7Ps (for producers) or 7Cs (for consumers). The third phase focuses on the selection of the most relevant alternative, characterized by the chosen combinations of 7Ps or 7Cs. Generally, the chosen set of 7Ps reflects 7Cs. As combination of 7Cs changes in time, interaction process takes a place and 7Ps are reassessed (Fig. 2). The implementation and control of the best alternative is the focus of the fourth phase. Evaluation and control of the executed decisions helps in tracking performance, and if necessary, altering decisions to maintain performance (Cravens, 1997).

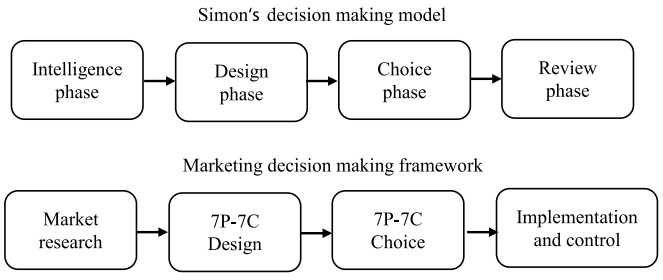

Fig. 1. The marketing decision making framework adapted after Simon (1977), Evans and Berman (1990), and Cravens (1997).

2.2.2. Characteristics of 7P and 7C concepts

The product-oriented concept known as 4P (product, price, promotion, and place) introduced by McCarthy (1960), was extended by Rafiq and Ahmed (1995) to the 7P concept (product, price, place, promotion, people, process, and physical evidence). Around the same time, Lauterborn (1990) developed a customer-oriented version of the 4P concept (customer wants and needs, costs, convenience, and communication), which was later advanced into the 7C concept (customer wants and needs, cost, convenience, communication, consideration, consistency, circumstances) by Shimizu (2003) and Moharana (2013).

Generally, the 7Cs are based on the 7Ps (Fig. 2). The "product" decisions define what goods and services the company offers to target customers (Kotler and Armstrong, 2010), while "customer wants and needs" explain you can only sell what someone wants to buy (Lauterborn, 1990). The "price" decisions are mainly concerned with the overall price level or the price range (Evans and Berman, 1990), whereas prices that include time and energy to find the right product are "costs" to the customer (Shimizu, 2003). Precisely, it is the consumers' cost to satisfy wants and needs (Lauterborn, 1990). "Place" involves all decisions about how to get the right product to the target consumer (McCarthy and Perreault, 2002). "Convenience" is recognizing customers' choices for buying in ways convenient to them (Dennis et al., 2005). The "promotion" decisions are techniques companies use to persuade customers to buy (Solomon, 2008), whereas "communication" is a two-way process involving feedback from customers to suppliers (Dennis et al., 2005). The "people" include all humans involved in service delivery, influencing the buyer's perceptions (Zeithaml et al., 2008). In contrast, the "consideration" decisions reflect the customers' requirements on the producers'

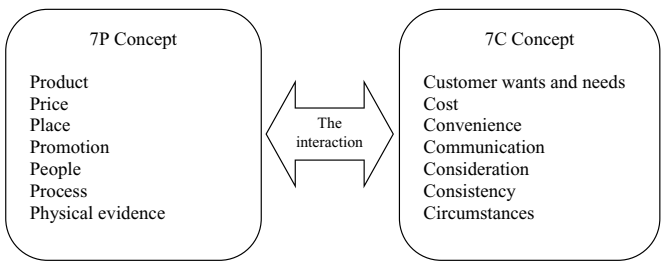

Fig. 2. The interaction between 7P and 7C concepts based on Lauterborn (1990), Rafiq and Ahmed (1995), Shimizu (2003), and Moharana (2013).

behavior (Moharana, 2013). While the "process" decisions deal with actual procedures, mechanisms, and flow of activities that operationalize and deliver the service (Bitner, 1991), "consistency" defines the level of desired services to ensure delivery of goods in changing market conditions (Shimizu, 2003). "Physical evidence" decisions deal with the environment in which the service is delivered and any tangible goods that facilitate the performance and communication of the service (Rafiq and Ahmed, 1995). In contrast, various uncontrollable external factors around the company influence the "circumstances" decisions (Shimizu, 2003).

3. Methodology

3.1. Case study approach

A qualitative analysis of marketing decision making concerning the forest biomass market is conducted using a case study approach. The case study approach combines empirical phenomena and an explanation within a theoretical framework (Lamnek, 1993). Additionally it attempts "[…] to illuminate a decision or set of decisions: why they were taken, how they were implemented, and with what result" (Yin, 2003: 12). Thus, the case study approach offers a detailed analysis of marketing decision making within real-life context. The research question is addressed in a multiple-case design to guarantee replication logic (Yin, 2003). This can help achieve complex and robust findings.

Three countries of the EU; namely, Austria, Finland, and Slovakia were selected for study. The selection considers that the desired characteristics of a forest biomass market, such as forest cover, high forest biomass potential, or the use of forest biomass for energy production are comparable among these countries (Lamnek, 1993; Yin, 2003). For instance, forest cover in Austria, Finland, and Slovakia exceeds 40% (FAO, 2010). Furthermore, the forest biomass potential in the chosen countries is currently over 10 million m^3 (IINAS, 2014). Thus, forest biomass use in the form of forest chips in district heating plants is recommended for countries located north of the 45° latitude (Austria, Finland and Slovakia) (van Swaaij et al., 2015). Here, forest chips production and its share in forest biomass potential have increased, especially in Finland and Slovakia (Fig. 3). While the European average share was 33% during the monitored period, it reached 35% in Austria, 60% in Finland, and almost 40% in Slovakia (EUROSTAT, 2015b). With intensified use of forest chips in all countries, their prices also increased, and showed similar development, starting with 10€/MWh (except Slovakia, starting with > 15€/MWh) in 2004 and reaching estimate between 21 and 23€/MWh in 2013 (Fig. 4).

Generally, Austria is among the leaders in the EU in using forest chips, at 38% energy production from renewable resources (Statistics Austria, 2015). It is also the western European country with highest investments in research and development of environmental technologies and renewable energies, at almost 3% of GDP. Finland is the Scandinavian leader in the use of wood-based fuels[2] for energy production, with 22% share of total national primary energy consumption. Generally, the share of forest biomass in its potential is at 52% (Natural Resources Institute Finland, 2013). Slovakia is the leader among the post-socialist countries of central Europe, with almost 12% share in energy consumption from renewable sources. Moreover, forest biomass has the potential to supply 28% of energy, as the following section details (Ministry of Agriculture and Rural Development of the Slovak Republic, 2015).

3.1.1. Austrian biomass market

At present, Austria meets 66% of its gross domestic energy needs via imports of oil (34%), gas (22%), and coal (10%). Fossil fuels contribute nearly 67% of total primary energy supplies (OECD/IEA, 2015). Consequently, it adopted the Austrian Energy Strategy in 2010 to reduce dependence on energy imports, strengthen supply security, and implement the EU "20-20-20" targets. The Austrian binding target for the share of renewable energy sources (RES) in gross final energy consumption is 34%, according to Directive 2009/28/EC (European Commission, 2009). The share of RES in gross final energy consumption reached 32.6% in 2013. Moreover, the share of RES in total electricity consumption reached 68.1% and the share of solid biomass[3] in electricity production from RES was 7.7% (EUROSTAT, 2015b). In 2007, the forest biomass potential was 107PJ and the National Renewable Energy Action Plan (The Austrian Federal Chancellery, 2010) estimates that it will increase to 137PJ by 2020.

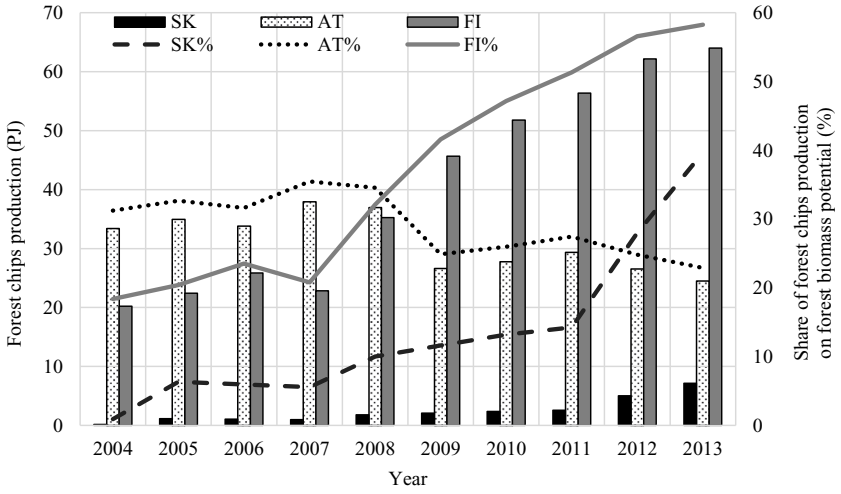

Fig. 3. Developments of forest chips production and its share on forest biomass potential in period of 2004–2013 in case countries Austria, Finland, and Slovakia. (Statistics Austria, 2015; FAO, 2015a; Holzkurier, 2015; Natural Resources Institute Finland, 2013; Statistics Finland, 2013; Ministry of Agriculture and Rural Development of the Slovak Republic, 2015).

[2] Wood-based fuels are waste liquors and other byproducts of the forest industry (tall oil and birch oil, soft soap, methanol, biosludge, and paper), wood chips, industrial chips, sawdust, bark, recycled wood, pellets, briquettes and fuel wood (FAO, 2015b)

[3] Solid biomass is used predominately for heating: small-scale residential heating and district heating. Primary forest fuel (PFF), as the most important solid biomass source, includes all biomass assortments from the forest, used to produce bioenergy (Rauch et al., 2015).

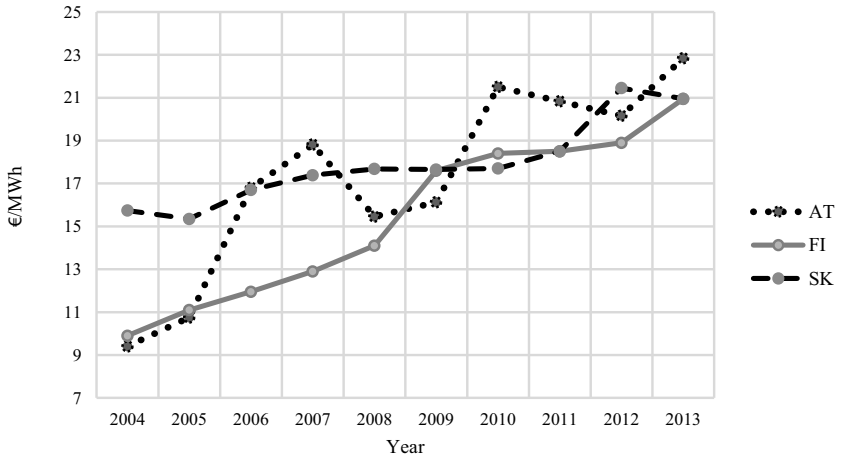

Fig. 4. Forest chip price developments of case countries Austria, Finland, and Slovakia in period of 2004–2013 (Statistics Austria, 2015; FAO, 2015a; Holzkurier, 2015; Natural Resources Institute Finland, 2013; Statistics Finland, 2013; Ministry of Agriculture and Rural Development of the Slovak Republic, 2015).

3.1.2. Finland biomass market

Finland depends upon imports of fossil fuels such as oil, gas, and coal and it will continue to do so in the long term. This poses a significant challenge in terms of energy security (OECD/IEA, 2013). Therefore, Finland has adopted several significant strategy documents in renewable energy policy in the last decade. The National Climate Strategy of 2001 (updated in 2005 and 2008) is the main strategy document followed by the National Policy on Renewable Energy, reviewed in April 2008, and approved by the Finnish Government's Report on Climate and Energy Strategy on November 6, 2008 (Halaj and Ilavský, 2009).

The Finnish binding target for the share of RES on gross final energy consumption in 2020 is 38%, according to Directive 2009/28/EC (European Commission, 2009). The National Renewable Energy Action Plan (Ministry of Economic Affairs and Employment of Finland, 2010) specifies that biomass will be a key component in reaching the 2020 target, most of which is expected to come from domestically produced forest chips (OECD/IEA, 2013). In 2013, Finland reached 36.9% share of RES in gross final energy consumption, an increase from 2005 (28.5%). Furthermore, the share of RES in total electricity consumption reached 31.1% and the share of solid biomass in electricity production from RES was 42.9% (IEA, 2009). The potential of forest biomass for energy production is 109.8 PJ per year. Owing to the country's 76% forest cover (22.9 million hectares), most industry installations of forest products are self-sufficient in terms of energy, as they can utilize woody waste and waste liquors for energy production (Natural Resources Institute Finland, 2013).

3.1.3. Slovakian biomass market

Slovakia is and will stay highly dependent on oil and gas imports in the future (OECD/IEA, 2012). Fossil fuels cover 95% of primary energy needs and > 90% of the primary energy sources are imported. About 40% of the primary energy consumption is used to generate heat with roughly half of the households served by district heating. Specifically, natural gas is currently the most significant energy source for district heating, accounting for about 30% of the country's primary energy supply. Accordingly, Slovakia adopted the Energy Policy of the Slovak Republic in 2006 and reviewed the Slovak National Renewable-Energy Policy in April 2008. Although Slovakia holds great potential for biomass use (2 million hectares of forest), the government decided to utilize it only in remote, mountainous, and rural areas-where natural gas connections are not available (Halaj and Ilavský, 2009).

Slovakia's binding target within the EU Directive 2009/28/EC; however, according to the National Renewable Energy Action Plan (Ministry of Economy and Construction of the Slovak Republic, 2010) is to increase the share of energy from renewable sources in final energy consumption to 14% by 2020. In 2013, the share of RES on gross final energy consumption reached 9.8%, whereas the share of RES in total electricity consumption had already reached 20.8%. Furthermore, the share of solid biomass in electricity production from RES was 11.4% (Ministry of Agriculture and Rural Development of the Slovak Republic, 2015). In 2010, the annual forest biomass potential was 26.8PJ, of which the share of forest chips was 18PJ.

3.2. Methods of data collection and analysis

Individual cases– producers (forest enterprises, contractors) and customers (heating plants) were purposively selected using a snowball system. A purposeful sample was favored over random sampling selection to guarantee that the specific desired criteria were met: i) forest enterprises ≥50 thousand tons per year of forest chips production, ii) contractors ≥50 thousand tons per year of forest chips production, and iii) heating plants ≥100 thousand tons of yearly forest chips consumption. These criteria do not ensure a statistical significant sample for a case study approach. However, they involve companies with dominant shares in the forest biomass markets of Austria, Finland, and Slovakia (Table 1).

The individual decision makers in the selected companies were identified in advance through an electronic source or telephone inquiry.

Table 1
General profile of interviewed companies.

Indicators/ Company type	Austria	Finland	Slovakia
Company establishment			
Forest enterprise	2001	1990	2000
Contractor	1958	1905	2005
Heating plant	2004	1977	2001
Ownership type			
Forest enterprise	Private	Private	State
Contractor	Private	Private	Private
Heating plant	Private	Private	State
Employees[*]*(n)*			
Forest enterprise	250 <	10–49	50–249
Contractor	250 <	250 <	10–49
Heating plant	250 <	250 <	50–249
Turnover[*]*(Mio. €)*			
Forest enterprise	11–50	11–50	3–10
Contractor	11–50	50 <	3–10
Heating plant	11–50	11–50	11–50

[*] The classification of (SMEs) according to Directive 2003/361/EC (FAO, 2015a).

Subsequently, appointment negotiations resulted in nine in-person interviews with lengths of 60–120 min. Interviews with identified decision makers were conducted during 2013 and 2014. In-person interviews were based on a structured questionnaire with open questions (Lamnek, 1993; Krott and Suda, 2001; Silverman, 2006). For instance, forest biomass producers were asked to identify which and how product, price, place, promotion, people, process and physical evidence shape their marketing decisions. Forest biomass customers were queried to see if customer wants and needs, cost, convenience, communication, consideration, consistency, and circumstances affected their behavior.

Transcribed interviews were subsequently analyzed using content analysis and MAXQDA software. In other words, the text was split by content and assigned to categories deductively derived from the proposed marketing decision making framework (Mayring, 2003). The coding system is presented in this paper's attachment.

4. Results and discussion

4.1. Austrian forest biomass market

Within the marketing decision framework (Fig.1), the forest enterprise and the contractor gather information about forest biomass sources, competitor analysis, and customer preferences, as part of market research. On the other hand, the heating plant analyzes quality, price, and guarantee of chips delivery. The marketing mix design (design phase) of forest enterprise, contractor and heating plant is mostly influenced by contract conditions, business negotiation, development of supply and demand, and length of the heating season. In the choice phase, the heating plant emphasizes high quality forest chips to maximize the quality of production by the forest enterprise, or the contractor. The implementation phase represents the outcomes of the marketing decisions made by all interviewed companies, which reflect the market's current situation and follows the theoretical framework (Fig. 2).

The EU norms define the forest chips parameters (“product”), which the heating plant uses to set up its final features with dimension < 45 mm and moisture content 40–50% (“customer wants and needs”). Additionally, the parameters also underlie the Austrian norm (ÖNORM M 7133). The forest enterprise and the contractor usually sell forest chips in €/AMM (Atro-ton with bark delivered) due to higher measuring accuracy (“price”). Nevertheless, €/MWh is the trading platform, owing to the importance of forest chips heating capacity of 8.5-12 $MJ.kg^{-1}$ (“costs”). Thereafter, the price of forest chips reaches 18–22€/MWh. Only the contractor distributes (Free Carrier - FCA) forest chips from roadside storage place locations (“place”) to the heating plant, over distances of 100–120 km. Other ways of distribution for the heating plant are irrelevant (“convenience”). The forest enterprise and the contractor provide logistic centers for optimizing deliveries. The business contracts are usually for one year. They also implement several “promotion” tools (Table 2). Contrarily, the heating plant uses only personal meetings or phone calls for closing up contracts (“communication”) and any other ways of communication are irrelevant. The forest enterprise and the contractor focus on increasing the performance of their employees (“people”) that coincides with the “consideration” of forest chips producers by the heating plant (Table 3). The heating plant mostly requires high-quality chips (“consideration”), which is why the forest enterprise and the contractor monitor the moisture quality (“process”). The forest enterprise and the contractor only partly build the “physical evidence,” according to the influential “circumstances” for the heating plant (Table 3). They focus more on a building corporate identity through company websites, or e-shops.

All interviewed Austrian companies use marketing mix tools to control their marketing decisions. Forest chips producers mostly assess their customer satisfaction (“people”), quality, and monitor production and market (“process”). On the other hand, the heating plant implement control by monitoring deliveries, testing the quality of chips (“consistency”) and rating the chips supplier (“consideration”). Generally, all selected companies in Austria exercise monthly or quarterly control through managers in the marketing, business, and production departments.

4.2. Finnish forest biomass market

The forest enterprise and the contractor perform market research within the decision-making framework (Fig. 1) focusing on forest biomass sources and competitor analysis. In contrast, the heating plant evaluates price and delivery guarantee. Commonly, they assess the quality of chips parameters. In the second phase, the marketing mix design by forest enterprise, contractor and heating plant underlies the following influences: contracts conditions, negotiation, supply and demand predictions, or national subsidy policy. In the choice phase, the forest enterprise and the contractor focus on distribution, owing to long delivery distances between producers and customers. Therefore, the heating plant requires consistency in deliveries from forest chips producers. Decisions made by all selected companies (Tables 2, 3) in the implementation phase illustrate the following market conditions and represent the use of individual marketing tools depicted in the theoretical framework in Fig. 2.

Despite EU norms (“product”), forest chips features underlie the specific parameters given by the heating plant as a result of its burning technology. It requires chip dimensions in the range of 30–40 mm and moisture content of 30–50% within the EU standard (“customer wants and needs”). While the “price” offer (55–60 €/t) is in €/t, the €/MWh is the trading unit due to the heating capacity content with requested range of 8.5–12 $MJ.kg^{-1}$. The market price for one MWh is 18.50–21.50 €. Additionally, forest chips producers can use government subsidies at the 10 €/m^3 or 5 €/MWh level under condition of forest land ownership of ≥1 ha. The forest enterprise fully outsources the distribution of forest chips by the contractor from the roadside storage location to the heating plant (“place”). It also uses logistic centers with optimal truck hauling distances of 60–150 km. The agreed form of delivery is only FCA according Incoterms 2010 (“convenience”). Other delivery standards are irrelevant for the heating plant. Business contracts are for a long-term period of five years. Although, the heating plant uses only personal meetings or phone calls (“communication”), the forest enterprise and the contractor implement all “promotion” tools (Table 2). The personal policy (“people”) of the forest enterprise reflects the requirements of the heating plant (“consideration”), focusing on staff professionalism (e.g. staff education or discussion with contractors, etc.). The forest enterprise and the contractor emphasize monitoring many “processes” (e.g., quality or delivery monitoring) due to the requirement of “consistent” deliveries and product quality. The “circumstances” force the heating plant to emphasize basic trading features (Table 3) that only slightly reflect in the “physical evidence” of forest chips producers. They focus more on developing a corporate identity through company websites, e-shops, or harvesting shows.

All chosen Finnish companies use marketing mix tools to control their marketing decisions. The common approaches by forest chips producers are evaluating customer satisfaction (“people”), quality, production, and market monitoring (“process”). Contrarily, the most used control by the heating plant is monitoring deliveries, testing chips quality (“consistency”), and rating the chips supplier (“consideration”). All interviewed companies exercise monthly control through selected managers in the marketing, business, and production departments.

4.3. Slovakian forest biomass market

The decision making framework (Fig. 1) of all selected companies begin with research on forest biomass sources, analysis of competitors, price, and quality of chips. Moreover, the heating plant evaluates the continuity of chips deliveries. Later, by designing the marketing mix,

Table 2
Marketing decision making of forest chips producers (7P).

Marketing tools/Country	Austria	Finland	Slovakia
Product			
Product standards	DIN EN 14961–4 ÖNORM M 7133 DIN EN 17225–4	DIN EN 14961–4 DIN EN 17225–4	DIN EN 14961–4 ÖNORM M 7133 DIN EN 17225–4
Forest chips dimension	< 45 mm	30–40 mm	< 50 mm
and moisture content	40–50%	30–50%	30–50%
Price			
Price range	55–65 €/t	55–60 €/t	55–60 €/t
Government support	No subsidies	10 €/m^3 or 5 €/MWh	No subsidies
Pricing provisions	No quantity discounts	No quantity discounts	No quantity discounts
Place			
Truck hauling distance	100–120 km	60–150 km	30–80 km
Logistic infrastructure objects	Logistic centers	Logistic centers	No logistic centers
Transport type	Truck freight	Truck/rail freight	Truck freight
Distribution process	Fully outsourced	Fully outsourced	Fully outsourced
Delivery schedule	Weekly or monthly delivery plans	Weekly or monthly delivery plans	Weekly or monthly delivery plans
Storage capacity	1/3 of total production	1/3 of total production	1/3 of total production
Type of customers	Heating plants	Heating plants	Heating plants
Promotion			
Promotion tools	Personal selling, other	Personal selling, other	Personal selling
Agreement type	Written contracts	Written contracts	Written contracts
Contract length	1 year	5 years	1 year
People			
Personal policy	Staff education	Staff education, discussions with contractors/own employees	Staff education, customer service, consulting
Process			
Quality monitoring	Monitoring product quality according to EU norms	Monitoring product quality according to EU norms	Monitoring product quality according to EU norms
Production and delivery monitoring		Harvesting and delivery plans, occupational health and safety	Monitoring of inventories
Market monitoring		Joint projects, meetings with customers	Monitoring of new trends in innovations, customer wants and needs, participation at fair trades and exhibitions
Physical evidence			
Corporate identity support	Company website, e-shop with work and company's logo	Company website, e-shop with work and company's logo, harvesting shows	Company website

Table 3
Marketing decision making of forest chips consumers (7C).

Marketing tools/Country	Austria	Finland	Slovakia
Consumer wants and needs			
Forest chips dimensions	< 45 mm	30–40 mm	< 50 mm
and moisture content	40–50%	30–50%	30–50%
Heating capacity	8.5–12 $MJ.kg^{-1}$	8.5–12 $MJ.kg^{-1}$	8.5–12 $MJ.kg^{-1}$
Costs			
Price range	18–22 €/MWh	18.50–21.50 €/MWh	21.45 €/MWh
Pricing strategy	Pricing based on the heating capacity [€/MWh]	Pricing based on the heating capacity [€/MWh]	Pricing based on the heating capacity [€/MWh]
Convenience			
Delivery conditions according Incoterms 2010	FCA (Free Carrier)	FCA (Free Carrier)	FCA (Free Carrier)
Communication			
Communication tools	Personal negotiation, e-mail, phone call	Personal negotiation, e-mail, phone call	Personal negotiation, e-mail, phone call
Agreement type	Written contracts	Written contracts	Written contracts
Contract length	1 year	5 years	1 year
Consideration			
Customers' requirements toward forest chips producers	Qualification, experience, willingness (to provide information, service, settle the claim, etc.), reliability	Qualification, experience, willingness (to provide information, service, settle the claim, etc.), reliability	Qualification, experience, willingness (to provide information, service, settle the claim, etc.), reliability
Consistency			
Customers' requirements toward forest chips distribution	Consistency and flexibility in deliveries, chips quality	Consistency and flexibility in deliveries, chips quality	Consistency and flexibility in deliveries, chips quality
Circumstances			
External factors influencing customers	Quality and price of forest chips, delivery reliability	Quality and price of forest chips, delivery reliability	Quality and price of forest chips, delivery reliability

contract conditions, business dealings, supply and demand assessment, and length of heating season, influence all the selected companies. In the choice phase, the heating plant focuses mostly on costs owing to production effectiveness. The forest enterprise and the contractor emphasize price for profit maximization. The market situations reflect the decisions of all chosen companies in the implementation phase. Simultaneously, it characterizes the use of marketing tools within the theoretical framework (Fig. 2).

The contractor indicates that in some of exports, forest chips ("product") undercuts the parameters generally given by heating plants in Austria ("customer wants and needs") within the EU Standards and the Austrian norms. Therefore, chip dimensions are up to 50 mm with moisture content of 30–50%. The "price" calculation follows heating capacity in the standard range of 8.5–12 $MJ.kg^{-1}$ while the most traded unit is €/MWh ("costs"). Only the contractor distributes ("place") forest chips from the roadside within the optimal distance of 30–80 km. The relevant delivery platform for the heating plant is only FCA, according to Incoterms 2010 ("convenience"). The business contracts are usually for one year. The forest enterprise uses only personal selling as a "promotion" tool; therefore, the heating plant prefers personal negotiation from the "communication" tools. Similarly, the forest enterprise and the contractor have personal policies ("people") according to the heating plant requirements ("consideration"). Specifically: requests of qualifications, reliability, experiences reflected in providing educational programs, consulting, and services offered by forest chips producers. Additionally, the forest enterprise and the contractor monitor various "processes" (chips quality, inventories, innovations trends, or customer perceptions) agreeing with the heating plant requests for "consistent" performance for chips quality and delivery flexibility. Although there are many "circumstances" of trading character influencing the heating plant (Table 3), the forest enterprise and the contractor care about "physical evidence," focusing on corporate identity only via websites.

All interviewed Slovakian companies control their marketing decisions using marketing mix tools. The common approaches of the forest enterprise and the contractor are evaluating customer satisfaction ("people"), quality, production, inventories and market monitoring ("process"). Contrarily, the most used control by the heating plant is monitoring deliveries, testing the quality of chips ("consistency"), and rating the chips supplier ("consideration"). All companies exercise quarterly control through managers in the marketing, logistics, production, and business departments.

4.4. Cross-case comparison

4.4.1. Cross-case similarities

In the first phase of the marketing-decision framework (Fig. 1), all chosen companies focus on the same issues of market research, due to the use of standard marketing approaches and methods. In the design phase, the equal factors influence all interviewed companies in designing the marketing mix tools, mostly business contract conditions, and business dealings. In the choice phase, despite different preferred marketing tools in each case, there is a common shared value in the consistency of deliveries. This is to maintain the heat or electricity production from forest chips. In the implementation phase, the results of marketing decisions by all selected companies are mostly similar (Table 2, 3). The reasons for this are as follows: same material in form of wood fuel,[4] logging residues (thin or large branch-wood), or pulpwood to produce forest chips at the global level (van Swaaij et al., 2015). Except for EU norms, the quality requirements for forest chips consist of using equivalent burning facilities. Additionally, the moisture content and occurrence of dirt (e.g., soil, ice, snow, plastics, metal) in forest chips influence their heating capacity and energy value, and can damage conveyers and combustion boilers afterwards (Otepka et al., 2013). Therefore, all selected companies test their samples in laboratories. The trading unit for forest chips is in MWh. The high costs associated with harvesting, skidding, transporting, or storing chips generally burden their production (Shabani et al., 2013; Yemshanov et al., 2014). Consequently, forest enterprises perform but mainly try to outsource these processes to contractors to decrease overheads and depreciation. The price range is similar across all cases as a result of common burning technologies used, EU norms, and production costs (Lundmark et al., 2015). Forest enterprises and contractors prepare weekly or monthly plans for delivering forest chips to the heating plants for optimization. All interviewed companies use personal selling as a promotion or communication tool in consequence of the character of forest chips as a commodity product (Sinclair, 1992; FAO, 2011). For the same reason, written contracts negotiated in-person with usually long-term customers dominate the market. As the heating plants generally consider managerial and soft skills, along with expertise, competence, and experience forest chips producers must educate their employees in current legal and technical norms. For common EU norms and burning technology, forest enterprises and contractors monitor product quality.

All selected companies control marketing decisions through suitable marketing tools within the theoretical framework (Fig. 2). Therefore, they use tools that contain elements of control. Generally, forest enterprises and contractors use tools such as "people" and "process." In parallel, heating plants mainly use "consideration" and "consistency."

4.4.2. Cross-case differences

In the first phase of the marketing decision making framework (Fig. 1), the heating plants differ from forest chips producers in their focus on evaluating the continuity and guarantee of chips delivery. This is to maintain the continuous heat production. In the design phase, the various geographical latitudes (between the North and Central Europe) and different national energy policies create some dissimilarity in the scale of factors influencing the design of the marketing mix (Halaj and Ilavský, 2009). In the choice phase, the selected companies prefer different marketing tools. This is due to their diverse marketing goals. Precisely, the demand of heating plants determines the preferred marketing tools of forest enterprises and contractors. There are more differences in marketing decision making among forest enterprises and contractors than heating plants, in the implementation phase. Mostly, Slovakian forest enterprise, and contractor differ from their counterparts in the other two countries. They provide distribution without logistic centers with justifying of using short truck-hauling distances (Ilavský and Oravec, 2000). Further, they use only personal selling for promotion and only company websites to develop corporate identities. Their personal conviction, less competition, and unwillingness to invest further into promotion or into optimizing the distribution are the reasons for these decisions. The Austrian forest enterprise and contractor differ only slightly from the others, mostly in limited personal policy and monitoring fewer managerial processes. However, the reasons behind their decisions are long-term experiences and requirements of heating plants in the domestic forest biomass market. The Finnish forest enterprise and contractor differ somewhat from the others. First, they enter the longest business contracts with heating plants to ensure a smooth production program for both forest chips producers and consumers, and guarantee future sales. Further, the number of heating plants for forest chips combustion and long heating seasons are increasing (Heinimö and Junginger, 2009; Panoutsou et al., 2009; Kallio et al., 2011). Second, as the Finnish government actively supports green energy production to ensure its effectiveness and profitability (Caputo, 2009; Leban et al., 2016), Finnish producers use government subsidies for forest chips production.

The control process of marketing decisions among all interviewed

[4] Wood fuels are all types of biofuels originating directly or indirectly from woody biomass. Woody biomass is biomass from trees, bushes, and shrubs (FAO, 2004).

companies differs slightly in its regularity and departments responsible. This is mainly due to different managerial criteria and the periodic absence of the marketing department in Slovakian companies, which generally substitute it with the logistics or business department.

5. Conclusion

Most research in this field attempts "to help firms make decisions about marketing resource allocation, customer segmentation, and customer selection" (Bauer et al., 2013). Therefore, it is necessary to understand how actors make marketing decisions to use forest biomass. The results show that marketing tools are widely used. However, despite similar characteristics of forest biomass in Austria, Finland, and Slovakia, there are differences in marketing decision frameworks among all interviewed companies, more so for forest chips producers. These variations are associated mainly with product, price, and place tools in the choice phase, and promotion, people, process or physical evidence tools in the implementation phase of the decision framework. On the other hand, heating plants only slightly differ in marketing decision frameworks. The choice phase shows some difference in importance of marketing tools among the selected countries. Certain variances in forest chips features, price range, and contract length also exist in the implementation phase. Generally, the same factors influence both companies in the design phase of the decision framework. Equally, all interviewed companies use the same research approaches and methods within the market research phase.

In summary, as a commodity product, forest chips have derived demand (also see Cooper, 1990; Knauf, 2015). Therefore, the decision making of heating plants significantly influence the final decisions of forest enterprises and contractors. From the interviews, we can state that decisions on the 7C concept influence decisions on the 7P concept, mostly in the choice and implementation phase of the marketing decision framework as there is interaction between these two concepts.

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Appendix A. Supplementary data

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