Understanding the Differences in Customer Portfolio Characteristics and Insurance Consumption across Distribution Channels

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Abstract

Today's multichannel presence of insurance companies allows customers to perform research and purchase of insurance products over multiple channels. Still, compared to other industries, for insurance customers the adoption and utilization of digital channels is still lagging behind, with the lion's share of policies being sold over the traditional intermediary channels. Yet, insurers a new trend has emerged such that the customers of younger generations have adopted online channels as preferred medium for the research of insurance products, in advance to the actual purchase. Additionally to pure traditional and pure digital customers, this behaviour lead to a further customer group, the so called research-shoppers, who utilize one channel for research and a further for purchase.

In order to extend the understanding of multichannel customer behaviour in the insurance sector, we conduct an empirical study addressing the following questions: How customer characteristics (1) impact the channel choice, and (2) lead to channel-related customer typologies, and (3) Whether specific channel utilization patterns lead to differences in insurance consumption. The study is based on a dataset from one of the leading Swiss insurance companies and includes three non-life insurance products: "Household/Liability", "Motor" and "Travel".

Our results indicate that several characteristics have a significant effect, whether a customer utilized digital channels either for product research or purchase and lead to channel-specific customer typologies. Further, we found that research-shoppers have a higher insurance consumption compared to single-channel customers. Our findings are relevant to academics and practitioners alike and extend existing knowledge in the field of multichannel customer management.

Keywords: non-life insurance · insurance multichannel · research-shopper · demographic characteristics · insurance consumption · empirical analysis

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1 Introduction

Since the appearance of digital distribution channels in insurance sector, the customers' purchase behaviour has altered. In today's multichannel environment, customers communicate with companies through their preferred channels and even switch between traditional and digital channels when researching and buying products during the shopping process. According to the sigma study of SwissRe (2014), about 14% of all products in the European Union (EU) in 2012 were purchased through an online channel. With less then 5%, the ratio of insurance policies purchased digitally, was much smaller. These numbers show that for the insurance industry the adoption of new channels occurs with a smaller velocity compared to some other industry sectors. An additional support for this observation is provided in the study of InsuranceEurope (2010), which stated that the traditional sales channels still account for the lion's share (over 50%) of non-life insurance policies sold in most EU countries.

Still, the insurance industry anticipates a continuing trend towards purchasing insurance coverage through the Internet. This trend focusses especially on younger customers, as they seem more comfortable with the purchase of insurance policies online. Corresponding to the figures presented in the report by SwissRe (2014), in the US, younger customers, with less than 44 years, are more than twice as likely to utilize an online channel for purchasing insurance products, compared to older ones, i.e. those having above 65 years. Their pendants in Europe and Latin America show similar channel preferences, as stated in the studies conducted by SwissRe (2012) and SwissRe (2013). Moreover, in some markets, and in particular for specific non-life and life insurance products, the expected trend is already becoming a reality. For example, in the UK, the Internet channel accounts for over 20% of the motor insurance policies sold (InsuranceEurope, 2010). Additionally, the Internet is the most utilized channel to perform research for insurance products for European customers (SwissRe, 2012). Thereby the digital channel is an important source for gathering information in the research phase, regardless of the channel the customer is going to use for closure of the contract. With the ever present information on the Internet, new multichannel shopping patterns arise, such as research-shopping (Verhoef et al., 2007), which refers to the preference for conducting research in one channel and purchase in another. Therefore it is of high relevance for academics and practitioners to understand the behaviour of the customers in the newly established multichannel environment in order to understand customers' needs and adjust the marketing and sales strategies accordingly.

Similar to the fact that sales of insurance products over digital channels is behind other industry sectors, research over the multichannel behaviour of insurance customers also remains scarce. Previous work on customers' channel preferences is mostly focused on retailing, where empirical studies provided insights into the multichannel behaviour. For example, Punj (2011), and Bhatnagar and Ghose (2004) showed that online channel preferences of retailing customers are driven by customer characteristics and psychographics. In addition, Schoenbachler and Gordon (2002) proposed product category as a relevant factor, which could explain multichannel behaviour. This statement was further verified by empirical studies, i.a. Konus et al. (2008), showing that channel preferences indeed vary between purchased products. Yet, to the best of our knowledge, no previous work was conducted to understand what are the channel-specific characteristics of the customers, and how does the consumption differ across specific

channels and for different insurance products.

To address these issues, in this paper we answer the following questions: (1) What drives channel choice of insurance customers?, (2) How to form customer groups and segments with similar needs, including channel preferences and usage?, and (3) Do distinct channel utilization patters influence the consumption? We focus on three channel utilization patterns, adapted from the study of Elliott et al. (2012): (1) pure online, referring to customers who search and purchase over an online channel, (2) cross-channel offline, in the continuation denoted only as cross-channel, referring to those customers who search for products online but purchase them offline, and (3) pure offline, i.e. customers who search and purchase offline. We examine the differences between the customer characteristics belonging to the above mentioned channel utilization groups over three non-life insurance products: household/liability, motor, and travel, with a goal of providing product specific insights on multichannel customer behaviour in insurance sector.

This paper is organised as follows. In the Section 2 we provide an overview of the relevant literature for our research. Section 3 provides a description of the sample and details the methodology used for the empirical analysis. The results are presented in Section 4, and are further discussed in Section 5. We then explain the implications of our work for research and practice in Section 6. Finally, Section 7 contains a summary and outlines directions for future work.

2 Literature Review

Customers' channel preferences, channel utilization and consumption patterns, as well as the influence of customers' characteristics and attitudes over the multichannel behaviour have already been referenced in the marketing literature, with a focus on various demographic and psychographic measures used as factors for customer segmentation. The emphasis on understanding behavioural patterns and segmentation aspects of multichannel customers, within various industry sectors, originates from their increasing presence in companies' customer portfolios (e.g. Verhoef et al., 2007; Bhatnagar and Ghose, 2004; Schoenbachler and Gordon, 2002). As an outcome, multichannel customer management emerged as a practice involving the "... design, deployment, coordination, and evaluation of channels through which firms and customers interact, with the goal of enhancing customer value through effective customer acquisition, retention, and development." (Neslin et al., 2006) In turn, researchers have turned their attention to this topic, which is visible by the number of existing studies, outlined in details in the work of Schoenbachler and Gordon (2002), Chang et al. (2005), Neslin et al. (2006), and Neslin and Shankar (2009), where apart from providing insights into the addressed issues, the remaining open questions in the field were identified.

In order to provide evidence on customer behaviour within and across individual channels, many studies have been conducted spanning across topics from understanding if and how customers differ over individual channels and which factors drive channel selection (e.g. Elliott et al., 2012; Punj, 2011; Soopramanien and Robertson, 2007; Montoya-Weiss et al., 2003), determining the covariates leading to multichannel-shopper typologies (e.g. Konus et al., 2008; Bhatnagar and Ghose, 2004; Rohm and Swaminathan, 2004), and the consumption of customers associated with channel utilization patterns

(e.g. Ansari et al., 2008; Venkatesan et al., 2007; Kumar and Venkatesan, 2005; Hitt and Frei, 2002). In addition, researchers proposed various reference models (e.g. Schoenbachler and Gordon, 2002; Chang et al., 2005), which outline the relevant factors and dimensions across which multichannel customer behaviour could be explained. One repeating element in these frameworks is the product category, which was assumed to influence channel-specific customer behaviour. In studies using product category as a factor, either a single product category was included (e.g. Soopramanien and Robertson, 2007), or several various categories (e.g. Konus et al., 2008), in order to provide a comparison.

When looking at the distribution of studies across different industry sectors (for details see Table 1), retailing attracted the most attention. In addition, within the financial sector, banking customers have been investigated. Compared to those industries, the empirical evidence for insurance, and in particular non-life insurance products, is still scarce. Moreover, most of the findings in previous studies are based on online surveys. This approach has been criticized by some authors (e.g. Soopramanien and Robertson, 2007; Bhatnagar and Ghose, 2004; Li et al., 1999), who state that online surveys usually show a consistent higher percentage of internet buyers, which could introduce a systematic bias into the sample representativeness, leading to varying frequency distributions for the customer characteristics. In order to address the mentioned issues, we conduct our study over a sample obtained from a large Swiss insurance company, containing approximately 370 000 observations, from the years 2012 until 2014, and we look into the customer and policy characteristics which influence the channel utilization across three common non-life insurance products: household/liability, motor and travel insurance.

To provide more details and draw our hypotheses, in the following paragraphs we present recent studies with a focus on covariates influencing channel choice, shopper typologies and product consumption, for all product categories, and in particular for insurance products.

2.1 Differences in Customer Characteristics Across Channels

The differences between customers and their channel utilization patterns have been subject to many studies conducted over a great span of demographic characteristics. The observed channel utilization types involve mostly the comparison of online vs. offline buyers, whereas few studies include the cross-channel customers. In an early study over the US customers, Li et al. (1999) showed that gender, income, and education level had an effect on the online vs. offline channel choice, independent of the product category. For the case of US banking customers, Hitt and Frei (2002) found evidence that PC banking customers varied from traditional ones significantly over the age, civil status, home ownership, and income. In a comparison of how US customers utilize different retail channels (grocery, mass, drug, and club), Inman et al. (2004) provided evidence that age, income, and urbanicity correlate significantly with the channel patronage. For the Korean market, and independent of the product category, Choi and Park (2006) found significant differences for the demographic factors: age, gender, education level, and income, among the pure offline, pure online and cross-channel utilization patterns. More recent studies, e.g. Soopramanien and Robertson (2007); Ansari et al. (2008); Campbell and Frei (2010); Punj (2011), and Gensler et al. (2012), provided support for the previously observed differences in age, education level, and income level among multichannel customers, but also introduced further characteristics, such as number of

children and length of relationship. As expected, through the reference models for multichannel customer behaviour in studies which covered a range of product categories (e.g. Konus et al., 2008), the measured effects differed between individual products, as well as compared to overall findings independent of the product dimension. Thus, one might conclude that, when investigating multichannel shopping behaviour, a distinct product-specific view seems relevant.

In the domain of insurance sector, Elliott et al. (2012) conducted an analysis of drivers for varying channel utilization patterns, when researching and purchasing motor insurance coverage. Their results revealed that pure online and cross-channel customers were alike in demographics, but varied from pure offline customers in age and ethnicity, while gender, education, marital status and income were not associated with online channel utilization. The online affine customers were shown to be younger and non-White compared to the traditional ones. Further, the study of Hsieh et al. (2014) empirically tested a theoretical framework which considers asymmetric information to explain the co-existence of insurance distribution channels. Their empirical findings suggest that Taiwanese customers owning newer vehicles prefer obtaining support from an independent agent, whereas owners of older cars are more likely to purchase insurance from direct underwriters. In addition, Yang (2015) investigated the difficulties customers encounter when forming insurance decisions by using self-service technology channels, such as the Internet, for the Taiwan market. The findings of this study show that middle aged customers, with high income, are more likely to purchase insurance over self-service technology channels, indicating an impact of customer's age and income level on multichannel behaviour. The research of (Mau et al., 2015) provided further empirical evidence, that customer and policy characteristics, e.g. gender, age of vehicle insured, account for differences in multichannel customer behaviour. In their study on Swiss research-shopper purchasing non-life insurance, those varied by their characteristics in the duration they used between research at the insurer's website and purchase at the agency. Finally, the insurance related studies (e.g. Verhoef and Donkers, 2005; Christiansen et al., 2014) revealed channel-specific differences in cross- and up-selling, as well as in lapse and tariff switch behaviour.

The provided literature review implies that although the effect of demographic factors has already been addressed in several previous studies, the findings are still ambiguous, especially among product categories, with some studies showing a significant effect of certain demographic factors while other denying it. Thus, more thorough investigation would be needed to gain a deeper understanding of specific characteristics which influence the channel preferences for non-life insurance products. Building upon the previous findings and the general understanding, that channel preferences are affected by demographic characteristics and product category (e.g. Schoenbachler and Gordon, 2002; Chang et al., 2005), we propose the following hypothesis (H1):

Hypthesis 1a (H1a): *Pure online & cross-channel customers who utilize the online channels for research or purchase of non-life insurance products differ in policyholder, residence, and policy related characteristics from the pure offline customers.*

Hypthesis 1b (H1b): *Pure online customers who utilize online channels for research and purchase of non-life insurance products do not differ in policyholder, residence, and policy related characteristics from cross-channel customers.*

2.2 Channel-Specific Customer Typologies

The segmentation of multichannel customers and identification of shopper typologies has already been identified as a key challenge for research in multichannel customer management, with the assumption that "because individual differences influence channel choice, it is natural to suppose there are clearly defined channel segments." (Neslin et al., 2006) In addition, Neslin and Shankar (2009) state that customers vary in several characteristics depending on their channel usage, enabling companies to gain stronger insights on a channel-specific customer profiles. The authors conclude, that a channel-based customer segmentation may be advisable and see customer typologies based on the usage of different channels as an option under the assumption that the measurement of the channel-specific purchases is possible. Still, so far no universal segmentation scheme has been proposed, though previous studies (e.g. Konus et al., 2008; Keen et al., 2004; Rohm and Swaminathan, 2004; Bhatnagar and Ghose, 2004) revealed the existence of channel-specific customer clusters. From a managerial perspective, the definition of multichannel customer typologies provides a basis for understanding and targeting different customer groups more effectively.

As stated before, previous empirical analysis has been conducted to provide evidence on channel-specific customer typologies, but the evidence for multichannel shopper segments is not ample. In their study, Rohm and Swaminathan (2004) presented a seven-cluster customer typology solution consisting of four online and three offline grocery shopper segments. The segmentation was based upon surveyed shopping motives and utilities for each channel utilization pattern, rather than on demographics. Further, the authors applied their segments to ten other product categories including the financial services. The results showed that for financial services (and four other products), their customer typologies did not differ significantly in online purchase behaviour. The results provided by this study indicate that distinct customer clusters exist in the retailing multichannel environment, but they cannot be generalized or applied to other product categories, e.g. the insurance industry. Further, Bhatnagar and Ghose (2004) investigated the existence of e-shopper segments and presented a three clusters approach. The segmentation was built on customers' motivations to shop on online platforms, but variations between the groups were also observed for their demographic characteristics. Moreover, their findings revealed that the propensity to purchase online varied among seven observed product categories, which again indicates industry specifc nuances in multichannel customer behaviour. In turn, Keen et al. (2004) provided a segmentation of retailing shoppers resulting in four clusters, which contrary to the previously mentioned study were shown to be significant for two applied product categories. Still, the two observed products (CDs and PCs) are quite alike and do not show a strong variety as those investigated in the studies of Bhatnagar and Ghose (2004) and Rohm and Swaminathan (2004). In a further study, Konus et al. (2008) investigated the relationship between psychographic and demographic customer characteristics and their impact on segment membership for different product categories. The authors presented a solution with three multichannel customer typologies across all product categories. Applying these segments to each of the individual product categories revealed important, product-specific differences. Whereas demographics were not found to have a significant impact on segment membership in overall, a drill down into the segmentation per product category provided evidence that various characteristics (e.g. age, urbanization,

and income) have impact within the product-specific analysis.

The above discussion reveals that previous studies were able to determine channel-specific customer typologies. These analyses contributed significantly to understanding of the existence of distinct multichannel customer typologies, even within channel-utilization patterns. In addition, the results of the previous work also showed that segmentation has a strong product-specific dimension, which has not been analysed in depth. Assuming that similar results can be expected for the specific context of non-life insurance customers, we propose the following hypothesis (H2):

Hypthesis 2 (H2): *Based on their characteristics and channel utilization, non-life insurance customers form heterogeneous channel-specific clusters.*

2.3 Consumption In Multichannel Settings

The value of multi- and single-channel shoppers, i.e. the relation between the channel preference and customer monetary value, is another topic of interest in the field of multichannel marketing research (Kushwaha and Shankar, 2013). For example, Stone et al. (2002) proposed that multichannel customers would provide more revenue in contrast to single channel shoppers. In line with this anticipation, the analysis of Kumar and Venkatesan (2005) and Venkatesan et al. (2007) provided empirical evidence that multichannel customers spend more compared to single channel customers. Further, the conceptional work of (Neslin et al., 2006) and Neslin and Shankar (2009) define this fact as empirically proven and derive further research questions for this topic. However, few empirical studies partially disprove this common understanding regarding the value of multichannel customers. An early empirical study for the case of internet car retailing found that multichannel customers, who were referred to a car dealer through an online purchase request, have paid significantly less than customers who directly walked into the showroom (Morton et al., 2001). A more recent study found ambivalent results regarding the relation between channel preferences and consumption behaviour (Kushwaha and Shankar, 2013). The authors showed that only for hedonic and low-risk product categories, e.g. books or toys, multichannel customers were associated with higher monetary value. In turn, single channel shoppers were found to be more valuable for purchasing utilitarian products, such as electronic equipment.

The provided literature review draws again an ambiguous picture of the relationship between channel preferences and customer monetary value. Whereas some results lead to the conclusion that multichannel customers purchase in higher volumes compared to single channel customers, other studies showed the opposite and have revealed variations between product categories. Drawing upon this observation, we conclude that when studying this aspect of multichannel customers behaviour, a product specific view is relevant. Despite the evidence of Kushwaha and Shankar (2013), and though in the literature investment products, such as insurance, are regarded as utilitarian products (Yang, 2015), we follow the broadly accepted knowledge regarding the higher value of multichannel customers, as discussed by Neslin et al. (2006) and Neslin and Shankar (2009), and we formulate our third hypothesis as following:

Hypthesis 3 (H3): *Cross-channel customers achieve higher annual premiums per non-life insurance products within a single purchase, compared to single channel customers.*

3 Research Design

3.1 Context and Dataset

To verify our hypotheses we extracted a sample of customer and policy data from the data warehouse of a large Swiss insurer. The company sells a broad range of life and non-life insurance products in all regions of Switzerland and is one of the top three non-life insurers in the Swiss market. The carrier mainly sells policies via tradional channels, such as exclusive agencies and brokers. In addition, since 2009 an online channel was established that provides possibility for purchase of non-life insurance products. The multi-channel and marketing strategy of the company is a single brand and one price approach over all distribution channels.

The dataset used for this study includes three non-life insurance products: household/liability, motor, and travel. We focus on these products since they are sold in all of the distribution channels, which are considered in this paper. Further, we restrict our sample to new policies and measure all characteristics at the policy inception date, a decision made due to the fact that the online channel supports only purchase of new policies. Therefore, within the obtained dataset two possible use cases can be observed: (1) a new customer purchasing an initial policy, or (2) an existing customer purchasing an initial policy for an additional product. The dataset spans across the time period from 2011 to 2014 and includes 371 127 records.

In order to assign the customers to multi-channel segments based on search and purchase behaviour, we build upon the channel utilization categorization (1) pure online, (2) cross-channel, and (3) pure offline, as proposed in Section 1. The pure onliners and pure offliners were identified via a channel flag in the policy data, while the cross-channel customers were detected by applying a matching algorithm over the attributes of online quotes and policies purchased via an offline channel. As an outcome, 351 163 customers were assigned to pure offliners, 14 664 to cross-channel offliners and the remaining 5 300 to pure onliners. Table 11 in the Appendix provides details about the distribution of customers over the segments within the observed time period for each of the analysed insurance products.

3.2 Used Variables

In order to determine the list of factors to be included in our models, we first generated an initial set of parameters which were available in the dataset. We then compared these parameters with those used in previous studies. We considered studies from different industry sectors, but have given the priority to those conducted within the insurance sector. Apart from the channel utilization (CHA), which represents the customer channel segment, age (AGC), gender (GEN), nationality (NAT), civil status (CIV), urbanicity (URB), local region (LOC), and income (INC) were chosen to describe the customers' characteristics. In addition, customer status (CST), and relationship length (LOR) were chosen as relevant policy-related characteristics, while annual premium, and bonus-malus were used for the operationalization of the insurance consumption. The complete list of variables, their definitions, measurement items, and relevant literature sources per industry sector are provided in Table 1.

Table 1: List of characteristics, definitions, measurement items, and literature sources per industry

Variable	Abbr.	Definition	Items	Previous Work
General				
Channel Utilization	CHA	The channel utilization of a customer for product search and purchase.	– Pure online – Cross-channel – Pure offline	Insurance: Elliott et al. (2012)
Policyholder related characteristics				
Age	AGC	The age of the policyholder in years at the inception date of the policy grouped into age classes.	– < 25 – 25 - 34 – 35 - 44 – 45 - 54 – 55 - 64 – ≥ 65	Insurance: Yang (2015), Hsieh et al. (2014), Elliott et al. (2012), Dall'Olmo Riley et al. (2009), Verhoef and Donkers (2005) Banking: Gensler et al. (2012), Hitt and Frei (2002) Motor: Ratchford et al. (2003) Retail: Ansari et al. (2008), Soopramanien and Robertson (2007), Choi and Park (2006), Gupta et al. (2004), Inman et al. (2004), Rohm and Swaminathan (2004) Other: Li et al. (1999)
Gender	GEN	The gender of the policyholder.	– Male – Female	Insurance: Hsieh et al. (2014), Elliott et al. (2012), Dall'Olmo Riley et al. (2009), Verhoef and Donkers (2005) Motor: Ratchford et al. (2003) Retail: Soopramanien and Robertson (2007), Choi and Park (2006), Gupta et al. (2004),Rohm and Swaminathan (2004) Other: Li et al. (1999)
Nationality	NAT	The nationality of the policyholder at the inception date of the policy, grouped to classes by regions in Europe.	– Swiss – Neighboring State – West Europe – East Europe – Other	Insurance: Elliott et al. (2012)
Civil Status	CIV	Civil status of the policyholder at the inception date of the policy, grouped into three classes.	– Singles – Couples – Other	Insurance: Elliott et al. (2012) Banking: Hitt and Frei (2002) Motor: Ratchford et al. (2003)
Residence related characteristics				
Urbanicity	URB	The urbanization level of the policyholder's postal code area at the inception date of the policy.	– Urban – Rural	Insurance: Verhoef and Donkers (2005) Retail: Inman et al. (2004)

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Table 1 continued from previous page

Variable	Abbr.	Definition	Items	Previous Work
Local Region	LOC	Local region in Switzerland of the policyholder's postal code area at the inception date of the policy. Equivalent to the Nomenclature of Territorial Units for Statistics Level 2 (NUTS 2) of the European Union (EU).	– Espace Mittelland – Genferseeregion – Nordwestschweiz – Ostschweiz – Tessin – Zurich – Zentralschweiz	Retail: Choi and Park (2006)
Income	INC	The average income in thousand CHF at commune level of the policyholder's postal code area at the inception date of the policy, grouped into seven classes.	– < 65 – 65 - 74 – 75 - 84 – 85 - 94 – 95 - 104 – 105 - 114 – ≥ 115	Insurance: Yang (2015), Elliott et al. (2012) Motor: Ratchford et al. (2003) Retail: Ansari et al. (2008), Soopramanien and Robertson (2007), Choi and Park (2006), Gupta et al. (2004), Inman et al. (2004), Rohm and Swaminathan (2004) Other: Li et al. (1999)
Policy related characteristics				
Customer Status	CST	The customer status at the inception date of the policy, indicating whether this customer purchases his first policy with this insurer or a new policy for a further product.	– New customer – Existing customer	
Relationship Lenght	REL	The length of relationship of the policyholder with the insurer in years at the inception date of the policy, grouped into six classes.	– < 1 – 1 - 2.4 – 2.5 - 4 – 5 - 9 – 10 - 14 – ≥ 15	Banking: Gensler et al. (2012), Hitt and Frei (2002)
Insurancer consumption related characteristics				
Annual Premium	PRE	The annual premium in CHF without discount effects at the inception date of the policy.		

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Table 1 continued from previous page

Variable	Abbr.	Definition	Items	Previous Work
Bonus-Malus	BM	The bonus or malus amount additional to the annual premium in CHF at the inception date of the policy, without discount effects. Only relevant for motor insurance policies.		

3.3 Methodology

To test our first hypothesis stating that customers differ in their characteristics across different categories of channel utilization, we first make a comparison of the independent variables, i.e. policyholder, residence and policy-related characteristics, across the three channel utilization types. In particular, we compare (1) pure online & cross-channel offline, to pure offline, to test the H1a, and (2) pure online to cross-channel offline, to address the H1b. We apply Pearson's χ^2 test to quantify the differences across the studied factors.

Further, we investigate the impact of the policyholder, residence and policy-related characteristics on channel preferences of insurance customers. In order to quantify the effect of each of the previously listed explanatory variables, we conduct multiple logistic regression, suitable for classification problems involving a dual nominal outcome and more than one independent variables (James et al., 2013; Hastie et al., 2009). The logistic regression model used in this study quantifies the probability for selection of a specific channel utilization for each customer, with:

(1) $\mathbb{P}(Y = 1|X)$ for pure online utilization and $\mathbb{P}(Y = 0|X)$ for cross-channel utilization

(2) $\mathbb{P}(Y = 1|X)$ for pure online & cross-channel utilization and $\mathbb{P}(Y = 0|X)$ for pure offline utilization

where the probability $\mathbb{P}(Y = 1|X)$ is defined as follows:

$$\mathbb{P}(Y = 1|X) = \frac{e^{\beta_0 + \vec{\beta}\vec{X} + \varepsilon}}{1 + e^{\beta_0 + \vec{\beta}\vec{X} + \varepsilon}} \tag{1}$$

In Formula 1, $\vec{X} = (X_1, ..., X_n)$ is the vector of independent variables with each element (X_{ji}) representing the effect of the i^{th} category of the independent nominal variable X_j (for $j = 1..n$), and $\vec{\beta} = (\beta_1, ..., \beta_n)$ is the vector of regression coefficients, where each coefficient β_{ni} is derived based on maximum likelihood estimation (MLE).

Finally, to understand the impact of different feature sets, i.e. policyholder, residence and policy-related, the regression model is extended stepwise in three iterations. In the first step, the model (Model1) includes only the policyholder related characteristics and is defined as follows:

$$\vec{\beta}_{M1}\vec{X}_{M1} = \sum_{i=1}^{6}\beta_{1i}AGC_i + \sum_{i=1}^{2}\beta_{2i}GEN_i + \sum_{i=1}^{5}\beta_{3i}NAT_i + \sum_{i=1}^{3}\beta_{4i}CIV_i \tag{2}$$

The model is further enhanced with residence related characteristics (Model2):

$$\begin{aligned}\vec{\beta}_{M2}\vec{X}_{M2} = &\sum_{i=1}^{6}\beta_{1i}AGC_i + \sum_{i=1}^{2}\beta_{2i}GEN_i + \sum_{i=1}^{5}\beta_{3i}NAT_i + \sum_{i=1}^{3}\beta_{4i}CIV_i \\ &+ \sum_{i=1}^{2}\beta_{5i}URB_i + \sum_{i=1}^{7}\beta_{6i}LOC_i + \sum_{i=1}^{7}\beta_{7i}INC_i\end{aligned} \tag{3}$$

Finally, in the third model (Model3), policy related characteristics are added resulting in:

$$\begin{aligned}\vec{\beta}_{M3}\vec{X}_{M3} = &\sum_{i=1}^{6}\beta_{1i}AGC_i + \sum_{i=1}^{2}\beta_{2i}GEN_i + \sum_{i=1}^{5}\beta_{3i}NAT_i + \sum_{i=1}^{3}\beta_{4i}CIV_i \\ &+ \sum_{i=1}^{2}\beta_{5i}URB_i + \sum_{i=1}^{7}\beta_{6i}LOC_i + \sum_{i=1}^{7}\beta_{7i}INC_i \\ &+ \sum_{i=1}^{2}\beta_{8i}CST_i + \sum_{i=1}^{6}\beta_{9i}LOR_i\end{aligned} \tag{4}$$

In order to compare the models against each another, after each step we calculate the Akaike information criterion (AIC) as a measure for model quality, relative to other models (Akaike, 1966).

To derive customer typologies and prove our assumption formulated on H2, we apply hierarchical clustering to the data. Clustering methods in general belong to the set of unsupervised learning methods. Unlike supervised learning techniques, which have the goal to explain or predict a dependent measure Y using X a set of k features $X_1, X_2, ..., X_k$, unsupervised methods refer to the case of "learning without a teacher" and rely solely the independent measurements $X_1, X_2, ..., X_k$ (Hastie et al., 2009; James et al., 2013). The objective of clustering is to detect subgroups or clusters within a sample and thus, they find their application for instance in marketing and marketing research, where the goals is to identitify groups of similar customers (James et al., 2013). Similar to the study of Keen et al. (2004), we applied hierachical clustering to identify multichannel customer segements, using Euklidian distance as dissimilarity measure and complete linkage as cluster method. The result interpretion in unsupervised learing is a more subjective exercise, since there is no universally accepted mechanism for validating result (James et al., 2013). Therefore (James et al., 2013) recommand to perform clustering methods with different choices of parameters as well as random subsamples to obtain robust results. Due to the large sample size in our study and computational limitations we applied the hierachical clustering to random sample restricted to $n = 20\,000$ observations.

Finally, to test our third hypothesis (H3) stating that the insurance consumption differs across channel utilization types, we compare the average annual premiums of pure online and pure offline, against

cross-channel utilization by applying Student's t-test. For the sample of motor insurance policies, we additionally test the bonus-malus variable, which is relevant for the consumption.

4 Results

Within the complete dataset, majority of the customers preferred traditional offline channels for both search and purchase (94.62%, 351 163 customers). In addition, the proportion of customers who utilized the online channel only for product search (3.95%, 14 664) is larger compared to the proportion of pure onliners (1.43%, 5 300). Moreover, the customers which exhibit different utilization patterns differ significantly in their characteristics and insurance consumption. These differences vary among the three analysed insurance products, household/liability, motor, and travel, and are presented in details in the following subsections.

4.1 Household/Liablility Insurance

Of those customers who purchased the household/liability insurance product within the observed time period (126 947 in total), only 3.3% (4 212 customers) made use of the online channel for at least one of the shopping stages, while the remaining 96.98% (122 735) used only the offline channel for both search and purchase.

The comparison of customer characteristics over individual channel utilization types revealed significant differences for most of the observed factors. In particular, when comparing pure online & cross-channel utilization against pure offline (H1a), the results of the Pearson's χ^2 test showed that customers differ significantly in terms of their age ($X = 1\,416.46$, $p < .001$), gender ($X = 39.45$, $p < .001$), nationality ($X = 323.20$, $p < .001$), civil status ($X = 333.70$, $p < .001$), urbanicity ($X = 914.16$, $p < .001$), local region ($X = 749.95$, $p < .001$), income ($X = 332.53$, $p < .001$), customer status ($X = 285.80$, $p < .001$), and relationship length ($X = 200.07$, $p < .001$).

When testing for H1b similar results were obtained. Age ($X = 32.01$, $p < .001$), nationality ($X = 36.85$, $p < .001$), civil status ($X = 21.06$, $p < .001$), urbanicity ($X = 24.45$, $p < .001$), local region ($X = 36.77$, $p < .001$), customer status ($X = 96.13$, $p < .001$), and relationship length ($X = 80.55$, $p < .001$) were found to differ significantly between pure online and cross-channel customers. In this case, significant difference was not observed only for gender and income variables. Table 2 provides the details of the obtained results.

The results of the stepwise logistic regression provided a more detailed view into the impact of each category of customer characteristics over the probability for selection of a specific channel utilization pattern. As shown in Table 3, in both cases the smallest AIC value was obtained for the model incorporating all three sets of characteristics, i.e. Model3, indicating that this model has the best explanatory power. Therefore, in the continuation only the interpretation for this model will be provided. In addition, in both cases, when looking at the combined effect of all of the independent variables, some of the previously identified significant differences were not supported.

Table 2: Customer characteristics across channel utilization types for household/liability product

		Pure Online vs. Cross-Channel		Pure Online & Cross-Channel vs. Pure Offline	
Customer Characteristics	df	X	p	X	p
Age (Classes)	5	32.01	<.001***	1 416.46	<.001***
Gender	1	-	n.s.	39.45	<.001***
Nationality	4	36.85	<.001***	323.20	<.001***
Civil Status	2	21.06	<.001***	333.70	<.001***
Urbanicity	1	24.45	<.001***	914.16	<.001***
Local Region	6	36.77	<.001***	749.95	<.001***
Income (Classes)	6	-	n.s.	332.53	<.001***
Customer Status	1	96.13	<.001***	285.80	<.001***
Relationship Length	5	80.55	<.001***	200.07	<.001***

Note: Significance levels for p-values: *** $\leq$ .001, ** $\leq$ .01, * $\leq$ .05, n.s. $>$ .05

For the model reflecting the probability for utilization of the online channel in at least one of the shopping stages (H1a), only gender was not found to be statistically significant, while all other factors were again shown to be significant. In particular, customers in the age group between 25 and 34 years are more likely to use the online channel (β =.678; $p < .001$) compared to those below 25 years (used as baseline), while those above 44 years are more likely to use the offline channels for both search and purchase (Age [45-54 years] (β = -.462, $p < .001$), Age [55-64 years] (β = -.712, $p < .001$), and Age [65+ years] (β = -1.213, $p < .001$)). Further, customers originating from neighboring states (β =.603, $p < .001$) are more likely to use online channels compared to customers with Swiss nationality (baseline), while those originating from east European (β = -.306, $p < .05$), and other countries (β = -.488, $p < .001$) are more likely to be pure offliners. New customers (β = 1.111, $p < .001$), those living in urban regions (β = .642, $p < .001$) and those with income between CHF 65 000 and CHF 95 000 are more likely to use online channels (Income [65-75] (β = .129, $p < .05$), Income [75-85] (β = .235, $p < .001$), and Income [85-95] (β = .2, $p < .05$)). No difference exists between customers living in couples (used as a baseline) and those being single, but other civil statuses are more likely to use online channels (β = .398, $p < .001$). Finally, customers living in Ostschweiz (β = -.249, $p < .001$) and Tessin (β = -1.06, $p < .001$) are more likely to use only the offline channels. The negative value of the intercept (β = -5.01, $p < .001$) indicates that in general customers tend to utilize only offline channels, with a high β-value being a result of the high ratio of pure offliners within the sample.

The model reflecting the probability for choosing the offline channels only for purchase (H1b), i.e. the probability for becoming pure onliner as opposed to becoming a cross-channel offliner, indicates that pure onliners are less likely to be female (β = -.204, $p < .01$) and over 35 years old (Age [35-44 years] (β = -.374, $p < .001$), Age [45-54 years] (β = -.859, $p < .001$), Age [55-64 years] (β = -.756, $p < .001$), and Age [65+ years] (β = -.939, $p < .001$)). Apart from neighboring states, all other nationalities are more likely to be pure onliners (Nationality [West Europe] (β = .433, $p < .05$), Nationality [East Europe] (β = .706, $p < .01$), and Nationality [Other World] (β = .63, $p < .01$)). Again, no difference was found to

exist between customers living in couples and those being single, but other civil statuses are more likely to use online channels (β = .709, $p < .001$). In addition, new customers (β = .794, $p < .001$) and those living in urban regions (β = .193, $p < .001$) were found to be more likely to use online channels. Finally, customers living in Tessin (β = -1.229, $p < .001$) are more likely to use offline channels in the purchase stage. In this case the intercept (β = -.457) was not found to be significant, which indicates that in general the probability of becoming pure onliner is similar to the one of becoming cross-channel offliner. Table 3 provides the full set of obtained coefficients for both comparisons.

Applying hierarchical clustering to our sample revealed five customer clusters (H2). Of those, cluster 1 and cluster 2 represent users which have utilized the online channel in at least one of the shopping stages, while clusters 3 to 5 contain only pure offliners. Differences in customer characteristics belonging to each cluster are provided in Table 4.

The first cluster has a share of 3.12% (610 customers) within the household/liability subsample and contains pure onliners (47.7%, 291) and cross-channel offliners (52.3%, 319) in an almost equal ratio. Within this cluster, majority of customers are singles (74.0%, 451), Swiss (84.1%, 513), male (52.5%, 320) customers, which belong to the age group from 25 to 34 years (35.7%, 218), live in urban area (60.5%, 369) in either Espace Mittelland (26.2%, 160), Zurich (23.0%, 140) or Nordwestschweiz (19.5%, 119) and earn between CHF 65 000 and CHF 85 000 per year (77.6%, 473). Moreover, most of them are new customers (85.9%, 524). As such this group represents average online affine customers. In contrast, cluster 2 shows a special subgroup of customers utilizing online channels with a minor share of 0.21% (41 customers). This segment consists mostly of pure onliners (82.9%, 34) and a small fraction of cross-channel offliners (17.1%, 7). The most noticeable difference of this cluster compared to cluster 1 is the absence of Swiss citizens (0%), and the high proportions of 25 to 34 years old (51.2%, 21), urban customers (78.1%, 32) from Zurich region (39.0%, 16). Again, most of them are new customers (92.7%, 38). In summary, this cluster represents young foreigners, which live in the metropolitan areas of Switzerland.

Of clusters representing pure offliners, cluster 3 is dominated by young, less then 25 years old (29.2%, 4 968), single (60.7%, 10 344), male (59.1%, 10 075), Swiss (92.6%, 15 779) customers, from the rural regions (63.8%, 10 866) of Espace Mitteland (37.4%, 6 366), with a greater share of low income categories up to CHF 75 000 (66.0%, 11 250). This cluster is the largest, containing 85.2% (17 036) of pure offline customers. Within this cluster the highest ratio of existing customers can be found (28.0%, 4 767).

While most characteristics follow similar distribution, cluster 4 differs from cluster 3 in incorporating those customers living in Zurich (26.2%, 312), Zentralschweiz (23.7%, 282) and Genferseeregion (23.3%, 278), and who achieve incomes of more than CHF 85 000 (100%, 1 192). Finally, cluster 5 includes only non-Swiss customers (100%, 1 121), with a great share of 25 to 44 years old (60.2%, 674) customers. Within the pure offline clusters, this segment has the highest ratio of new customers (88.8%, 995), and those living in urban areas (58.1%, 651).

Finally, significant differences were found to exist in terms of insurance consumption over different channel utilization types (H3). Cross-channel offliners achieved significantly larger annual premium (M = 337.38, SD = 189.23) compared to pure onliners (M = 300.24, SD = 133.91) (t = -7.42, $p < .001$). Similar effect was observed when comparing cross-channel and pure offliners (M = 313.57, SD = 334.99), i.e. cross-channel offliners spent significantly more (t = 5.81, $p < .001$).

Table 3: Coefficients of logistic regression model for household/liability product

Customer Characteristics	Pure Online vs Cross-Channel (N = 4 212)			Pure Online & Cross-Channel vs Pure Offline (N = 126 947)		
	Model1	Model2	Model3	Model1	Model2	Model3
Intercept	0.139	0.116	-0.457	-3.791***	-4.226***	-5.055***
Age (Classes)						
< 25	baseline					
25 - 34	-0.082	-0.113	-0.117	0.795***	0.644***	0.678***
35 - 44	-0.389***	-0.402***	-0.374***	0.147**	0.029	0.069
45 - 55	-0.860***	-0.865***	-0.859***	-0.415***	-0.506***	-0.462***
55 - 64	-0.729***	-0.745***	-0.756***	-0.648***	-0.739***	-0.712***
65 +	-0.886***	-0.914***	-0.939***	-1.11***	-1.207***	-1.213***
Gender						
Male	baseline					
Female	-0.177**	-0.182**	-0.204**	0.109***	0.061	0.037
Nationality						
Swiss	baseline					
Neighboring State	0.067	0.061	0.039	0.669***	0.623***	0.603***
West Europe	0.532**	0.438*	0.433*	0.096	-0.014	-0.044
East Europe	0.767**	0.754**	0.706**	-0.201	-0.243*	-0.306*
Other World	0.73***	0.703***	0.630**	-0.218*	-0.417***	-0.488***
Civil Status						
Couples	baseline					
Singles	-0.127	-0.168	-0.149	0.287***	0.148**	0.092
Other	0.757***	0.761***	0.709***	0.451***	0.418***	0.398***
Urbanicity						
Rural	baseline					
Urban		0.247***	0.193**		0.688***	0.642***
Local Region						
Espace Mittelland	baseline					
Genferseeregion		0.133	0.093		0.387***	0.348***
Nordwestschweiz		0.014	0.005		0.423***	0.414***
Ostschweiz		-0.227	-0.194		-0.269***	-0.249***
Tessin		-1.255**	-1.229**		-1.045***	-1.06***
Zurich		0.115	0.111		0.485***	0.467***
Zentralschweiz		-0.176	-0.178		-0.042	-0.038
Income (Classes)						
< 65	baseline					
65 - 75		-0.144	-0.171		0.146*	0.129*
75 - 85		-0.031	-0.074		0.257***	0.235***
85 - 95		-0.031	-0.055		0.217**	0.2*
95 - 105		0.026	0.007		0.193	0.179
105 - 115		-0.159	-0.232		0.208	0.183
> 115		-0.16	-0.213		0.039	0.015
Customer Status						
Existing Customer	baseline					
New Customer			0.794***			1.111***
Relationship Length						
< 1			-0.033			-0.083
1 - 2.5			0.014			1.089***
10 - 15			-0.631			0.486**
2.5 - 5			-0.106			0.927***
5 - 10			0.11			0.739***
> 15	baseline					
AIC	5 723	5 696	5 627	35 387	34 334	34 030

*Note: Significance levels for p-values: *** ≤ .001, ** ≤ .01, * ≤ .05*

Table 4: Customer profiles of channel specific customer typologies for household/liability product

Customer Characteristics	Cluster 1 n = 610 (3.1%)		Cluster 2 n = 41 (0.21%)		Cluster 3 n = 17 036 (85.2%)		Cluster 4 n = 1 192 (6.0%)		Cluster 5 n = 1 121 (5.6%)	
Age (Classes)										
< 25	188	30.8%	9	22.0%	4 968	29.2%	323	27.1%	236	21.1%
25 - 34	218	35.7%	21	51.2%	3 018	17.7%	246	20.6%	410	36.6%
35 - 44	82	13.4%	8	19.5%	2 434	14.3%	189	15.9%	264	23.6%
45 - 54	62	10.2%	2	4.9%	2 703	15.9%	175	14.7%	148	13.2%
55 - 64	31	5.1%	1	2.4%	1 876	11.0%	118	9.9%	48	4.3%
65 +	29	4.8%	0	0.0%	2 037	12.0%	141	11.8%	15	1.3%
Gender										
Male	320	52.5%	21	51.2%	10 075	59.1%	712	59.7%	710	63.3%
Female	290	47.5%	20	48.8%	6 961	40.9%	480	40.3%	411	36.7%
Nationality										
Swiss	513	84.1%	0	0.0%	15 779	92.6%	1 028	86.2%	0	0.0%
Neighboring State	86	14.1%	12	29.3%	947	5.6%	65	5.5%	106	9.5%
West Europe	11	1.8%	9	22.0%	304	1.8%	55	4.6%	196	17.5%
East Europe	0	0.0%	8	19.5%	6	0.0%	18	1.5%	320	28.6%
Other World	0	0.0%	12	29.3%	0.0	0.0%	26	2.2%	499	44.5%
Civil Status										
Singles	451	74.0%	27	65.9%	10 344	60.7%	777	65.2%	675	60.2%
Couples	110	18.0%	8	19.5%	4 856	28.5%	295	24.8%	366	32.7%
Other	49	8.0%	6	14.6%	1 836	10.8%	120	10.1%	80	7.1%
Urbanicity										
Rural	241	39.5%	9	22.0%	10 866	63.8%	621	52.1%	470	41.9%
Urban	369	60.5%	32	78.1%	6 170	36.2%	571	47.9%	651	58.1%
Local Region										
Espace Mittelland	160	26.2%	3	7.3%	6 366	37.4%	124	10.4%	268	23.9%
Genferseeregion	81	13.3%	8	19.5%	1 453	8.5%	278	23.3%	175	15.6%
Nordwestschweiz	119	19.5%	7	17.1%	2 262	13.3%	152	12.8%	136	12.1%
Ostschweiz	64	10.5%	2	4.9%	2 781	16.3%	22	1.9%	167	14.9%
Tessin	4	0.7%	2	4.9%	583	3.4%	22	1.9%	43	3.9%
Zurich	140	23.0%	16	39.0%	2 125	12.5%	312	26.2%	227	20.3%
Zentralschweiz	42	6.9%	3	7.3%	1 466	8.6%	282	23.7%	105	9.4%
Income (Classes)										
< 65	55	9.0%	4	9.8%	2 538	14.9%	0	0.0%	131	11.7%
65 - 75	247	40.5%	13	31.7%	8 712	51.1%	0	0.0%	544	48.5%
75 - 85	226	37.1%	19	46.3%	4 615	27.1%	0	0.0%	363	32.4%
85 - 95	41	6.7%	3	7.3%	986	5.8%	153	12.8%	70	6.2%
95 - 105	18	3.0%	1	2.4%	170	1%	250	21.0%	13	1.2%
105 - 115	8	1.3%	1	2.4%	15	0.1%	237	19.9%	0	0.0%
> 115	15	2.5%	0	0.0%	0	0.0%	552	46.3%	0	0.0%
Customer Status										
Existing Customer	86	14.1%	3	7.3%	4 767	28.0%	234	19.6%	126	11.2%
New Customer	524	85.9%	38	92.7%	12 269	72.0%	958	80.4%	995	88.8%
Relationship Length										
< 1	545	89.3%	41	100.0%	13 776	80.9%	1 031	86.5%	1 058	94.4%
1 - 2.5	19	3.1%	0	0.0%	444	2.6%	22	1.9%	19	1.7%
2.5 - 5	10	1.7%	0	0.0%	539	3.2%	39	3.3%	17	1.5%
5 - 10	17	2.8%	0	0.0%	545	3.2%	25	2.1%	14	1.3%
10 - 15	7	1.2%	0	0.0%	463	2.7%	24	2.0%	7	0.6%
> 15	12	2.0%	0	0.0%	1 269	7.5%	51	4.3%	6	0.5%
Channel Utilization										
Pure Online	291	47.7%	34	82.9%	0	0.0%	0	0.0%	0	0.0%
Cross-Channel Offline	319	52.3%	7	17.1%	0	0.0%	0	0.0%	0	0.0%
Pure Offline	0	0.0%	0	0.0%	17 036	100%	1 192	100%	1 121	100%

Note: Hierachical clustering with complete linkage applied to a sub-sample of n = 20 000 observations. Frequencies and percentage of characteristics per cluster are reported.

4.2 Motor Insurance

For the motor insurance product, within the observed period a total of 6.0% of the customers (13 003 of 217 048) made use of the online channel for at least one of the shopping stages, which is twice the value of customers from the same group for the household/liability product. The remaining 94% (204 045 cus-

tomers) used only the offline channel. Again, the comparison of customer characteristics over individual channel utilization types revealed significant differences for most of the observed factors. The summary of the obtained results is illustrated in Table 5, while details regarding the distribution of customer characteristics across different channel utilization types are provided in Table 13 in the Appendix.

Table 5: Customer characteristics across channel utilization types for motor product

		Pure Online vs. Cross-Channel		Pure Online & Cross-Channel vs. Pure Offline	
Customer Characteristics	df	X	p	X	p
Age (Classes)	5	12.16	.033*	4 091.52	<.001***
Gender	1	28.78	<.001***	28.78	<.001***
Nationality	4	38.20	<.001***	285.35	<.001***
Civil Status	2	15.45	<.001***	2 058.58	<.001***
Urbanicity	1	40.36	<.001***	761.52	<.001***
Local Region	6	103.63	<.001***	1 170.82	<.001***
Income (Classes)	6	30.37	<.001***	425.04	<.001***
Customer Status	1	83.19	<.001***	1 325.38	<.001***
Relationship Length	5	94.85	<.001***	155.20	<.001***

Note: Significance levels for p-values: *** $\leq .001$, ** $\leq .01$, * $\leq .05$, n.s. $> .05$

When comparing pure online & cross-channel utilization against pure offline (H1a), the results of the Pearson's χ^2 test showed existence of significant differences across all customer characteristics, age ($X =$ 4 091.52, $p < .001$), gender ($X = 298.10$, $p <.001$), nationality ($X = 285.35$, $p < .001$), civil status (X = 2 058.58, $p < .001$), urbanicity ($X = 761.52$, $p < .001$), local region ($X = 1\,170.82$, $p < .001$), income ($X = 425.04$, $p < .001$), customer status ($X = 1\,325.38$, $p < .001$), and relationship length ($X = 155.20$, $p <.001$).

The comparison of pure onliners against cross-channel offliners (H1b) showed again that customers differ in their characteristics, but, similar to the case of household/liability product, differences are more moderate. This is particularly true for the variable age where only weak significant difference was found to exist ($X = 12.16$, $p =.033$). To confirm this finding we additionally conducted Student's t-test to compare the mean values for both groups. The obtained results supported the previous finding, showing no significant difference between the age of pure onliners and cross-channel offliners. The results of the statistical analysis for the remaining customer characteristics showed that both groups differ significantly across gender ($X = 28.78$, $p < .001$), nationality ($X = 38.20$, $p < .001$), civil status ($X = 15.45$, $p <$ .001), urbanicity ($X = 40.36$, $p < .001$), local region ($X = 103.63$, $p < .001$), customer status ($X =$ 83.19, $p <.001$), and relationship length ($X = 94.85$, $p < .001$).

The results of the stepwise logistic regression provided in Table 6, confirmed again that Model3, which incorporates all three sets of characteristic, has the best explanatory power, indicated by the smallest AIC value. Therefore, in the continuation only the interpretation for this model will be provided.

For the model reflecting the probability for utilization of online channels in at least one of the shopping stages (H1a), all factors were shown to be significant. Customers in the age group between 25 and 34

years do not differ significantly compared to those below 25 years (used as a baseline). For the other age groups, the older the customers are, the less likely it is that they will use an online channel (Age [35-44 years] (β = -.659, $p < .001$), Age [45-54 years] (β = -1.147, $p < .001$), Age [55-64 years] (β = -1.441, $p < .001$), and Age [65+ years] (β = -2.072, $p < .001$)). Further, females (β = .146, $p < .05$), singles (β = .194, $p < .001$), customers living in urban regions (β = .414, $p < .05$), and new customers (β = 1.77, $p < .001$) are more likely to use online channels. In terms of nationality, customers originating from neighboring states (β =.13, $p < .001$) are more likely to use online channels compared to Swiss customers, while those originating from east (β = -1.041, $p < .001$) and west European countries (β = -.441, $p < .001$), as well as those originating from other countries (β = -1.45, $p < .001$) are more likely to be pure offliners. Further, customers living in Zurich (β = -.04, $p < .001$) and Nordwestschweiz (β = .253, $p < .001$) are more likely to use online channels, while those living in Genferseeregion (β = -.202, $p < .001$), Ostschweiz (β = -.172, $p < .001$) and Tessin (β = -1.01, $p < .001$) are more likely to be pure offliners. Finally, customers with income between CHF 65 000 and CHF 115 000 are more likely to use online channels (Income [65-75] (β = .221, $p < .001$), Income [75-85] (β = .287, $p < .001$), Income [85-95] (β = .225, $p < .001$), Income [95-105] (β = .272, $p < .001$), Income [105-115] (β = .348, $p < .001$)). The intercept (β = -2.89, $p < .001$) indicates again that customers have a preference for offline channels.

For the model reflecting the probability for being pure onliner as opposed to being cross-channel offliner, income and customer status were not found to be statistically significant. Pure onliners are less likely to be female (β = -.296, $p < .001$), singles (β = -.336, $p < .001$) and over 35 years old (Age [35-44 years] (β = -.315, $p < .001$), Age [45-54 years] (β = -.282, $p < .01$), and Age [55-64 years] (β = -.295, $p < .05$)). In turn, they are more likely to live in urban regions (β = .264, $p < .001$) and originate from east European (β = .541, $p < .01$) or other world (β = .663, $p < .001$) countries. Finally, again customers living in Tessin (β = -.716, $p < .01$) are more likely to use offline channels in the purchase stage, while those living in Genferseeregion (β = .268, $p < .01$), Nordwestschweiz (β = .390, $p < .001$) and Zurich (β = .378, $p < .001$) are more likely to complete the purchase using online channels. The intercept was again found to be significant (β = -1.883, $p < .001$) indicating that for motor insurance products, customers are more likely to choose offline channels for the purchase stage. Table 6 provides the full set of obtained coefficients for both comparisons.

Applying hierarchical clustering to the motor subsample revealed five customer clusters (H2). Similar to the results obtained for household/liability subsample, cluster 1 and cluster 2 again represent users which have utilized the online channel either for search or both search and purchase, while clusters 3 to 5 contain only pure offline customers. Differences in customer profiles assigned to each of the identified clusters are provided in Table 7.

Cluster 1, the larger of two containing customers which used the online channel, represents 5.6% (1 121 customers) of the whole motor subsample and contains mostly cross-channel offliners (81.53%, 914) and a small portion of pure onliners (18.47%, 207). Within this cluster, majority of customers are singles (75.91%, 851), Swiss (86.89%, 974), male (57.81%, 648) customers, which have less than 45 years (85.73%, 961), live in rural area (58.61%, 657) in either Espace Mittelland (27.03%, 303) or Zurich (20.07%, 225) and represent lower income class with earnings below CHF 75 000 per year (57.54%, 645). Most of them are new customers (57.81%, 648). Thus, this group represents average customers with preferences for

online channels for motor insurance products.

Table 6: Coefficients of logistic regression model for motor product

Customer Characteristics	Pure Online vs Cross-Channel (n = 13 003)			Pure Online & Cross-Channel vs Pure Offline (n = 217 048)		
	Model1	Model2	Model3	Model1	Model2	Model3
Intercept	-1.205***	-1.427***	-1.883***	-2.583***	-2.874***	-2.885***
Age (Classes)						
< 25	baseline					
25 - 34	-0.083	-0.144*	-0.07	0.055*	-0.046*	0.037
35 - 44	-0.314***	-0.372***	-0.315***	-0.619***	-0.696***	-0.659***
45 - 54	-0.268**	-0.306**	-0.282**	-1.092***	-1.163***	-1.147***
55 - 64	-0.225	-0.285*	-0.295*	-1.345***	-1.429***	-1.441***
65 +	0.278	0.19	0.19	-1.917***	-2.03***	-2.072***
Gender						
Male	baseline					
Female	-0.272***	-0.268***	-0.296***	0.238***	0.218***	0.146***
Nationality						
Swiss	baseline					
Neighboring State	0.164*	0.148	0.023	0.191***	0.18***	0.13***
East Europe	0.756***	0.694***	0.541**	-0.875***	-0.904***	-1.041***
Other World	0.922***	0.788***	0.663***	-1.169***	-1.287***	-1.45***
West Europe	-0.009	-0.096	-0.218	-0.352***	-0.336***	-0.441***
Civil Status						
Couples	baseline					
Singles	-0.281***	-0.333***	-0.336***	0.265***	0.212***	0.194***
Other	0.168	0.153	0.227	-0.055	-0.072	0.059
Urbanicity						
Rural	baseline					
Urban		0.255***	0.264***		0.413***	0.414***
Local Region						
Espace Mittelland	baseline					
Genferseeregion		0.337***	0.268**		-0.137***	-0.202***
Nordwestschweiz		0.404***	0.39***		0.261***	0.253***
Ostschweiz		-0.026	-0.039		-0.161***	-0.172***
Tessin		-0.598*	-0.716**		-0.952***	-1.01***
Zurich		0.399***	0.378***		0.415***	0.4***
Zentralschweiz		-0.019	-0.028		-0.026	-0.038
Income (Classes)						
< 65	baseline					
65 - 75		0.006	0.007		0.221***	0.221***
75 - 85		0.012	0.007		0.296***	0.287***
85 - 95		-0.002	-0.028		0.244***	0.225***
95 - 105		0.222	0.205		0.282***	0.272***
105 - 115		-0.198	-0.192		0.345***	0.348***
> 115		-0.13	-0.132		0.027	0.017
Customer Status						
Existing Customer	baseline					
New Customer			0.233			1.77***
Relationship Length						
< 1			0.406**			-1.399***
1 - 2.5			0.36*			-0.306***
10 - 15			0.067			-0.097*
2.5 - 5			0.15			-0.178***
5 - 10			0.348**			-0.038
> 15	baseline					
AIC	11 785	11 679	11 593	93 324	91 620	89 322

*Note: Significance levels for p-values: *** ≤ .001, ** ≤ .01, * ≤ .05*

Table 7: Customer profiles of channel specific customer typologies for motor product

Customer Characteristics	Cluster 1 n = 1 121 (5.6%)		Cluster 2 n = 30 (0.002%)		Cluster 3 n = 1 675 (8.4%)		Cluster 4 n = 846 (4.2%)		Cluster 5 n = 16 328 (81.6%)	
Age (Classes)										
< 25	400	35.68%	4	13.33%	254	15.16%	89	10.52%	3 533	21.64%
25 - 34	393	35.06%	16	53.33%	286	17.07%	362	42.79%	3 534	21.64%
35 - 44	168	14.99%	9	30%	307	18.33%	212	25.06%	3 024	18.52%
45 - 54	107	9.55%	1	3.33%	435	25.97%	123	14.54%	3 447	21.11%
55 - 64	37	3.3%	0	0%	233	13.91%	50	5.91%	1 793	10.98%
65 +	16	1.43%	0	0%	160	9.55%	10	1.18%	997	6.11%
Gender										
Male	648	57.81%	17	56.67%	1 139	68%	595	70.33%	10 763	65.92%
Female	473	42.19%	13	43.33%	536	32%	251	29.67%	5 565	34.08%
Nationality										
Swiss	974	86.89%	0	0%	1 475	88.06%	0	0%	14 309	87.63%
Neighboring State	124	11.06%	0	0%	144	8.6%	0	0%	1 304	7.99%
West Europe	22	1.96%	8	26.67%	55	3.28%	67	7.92%	619	3.79%
East Europe	1	0.09%	9	30%	1	0.06%	278	32.86%	96	0.59%
Other World	0	0%	13	43.33%	0	0%	501	59.22%	0	0%
Civil Status										
Singles	851	75.91%	24	80%	840	50.15%	524	61.94%	9 094	55.7%
Couples	226	20.16%	6	20%	727	43.4%	299	35.34%	5 957	36.48%
Other	44	3.93%	0	0%	108	6.45%	23	2.72%	1 277	7.82%
Urbanicity										
Rural	657	58.61%	11	36.67%	1 165	69.55%	404	47.75%	11 277	69.07%
Urban	464	41.39%	19	63.33%	510	30.45%	442	52.25%	5 051	30.93%
Local Region										
Espace Mittelland	303	27.03%	1	3.33%	236	14.09%	192	22.7%	5 125	31.39%
Genferseeregion	86	7.67%	9	30%	358	21.37%	173	20.45%	1 513	9.27%
Nordwestschweiz	181	16.15%	5	16.67%	229	13.67%	110	13%	2 084	12.76%
Ostschweiz	181	16.15%	3	10%	62	3.7%	104	12.29%	3 317	20.31%
Tessin	15	1.34%	0	0%	40	2.39%	47	5.56%	861	5.27%
Zurich	225	20.07%	12	40%	441	26.33%	124	14.66%	1 908	11.69%
Zentralschweiz	130	11.6%	0	0%	309	18.45%	96	11.35%	1 520	9.31%
Income (Classes)										
< 65	119	10.62%	0	0%	0	0%	95	11.23%	2 709	16.59%
65 - 75	526	46.92%	6	20%	0	0%	378	44.68%	8 440	51.69%
75 - 85	346	30.87%	13	43.33%	112	6.69%	233	27.54%	4 316	26.43%
85 - 95	66	5.89%	8	26.67%	375	22.39%	70	8.27%	776	4.75%
95 - 105	29	2.59%	3	10%	423	25.25%	25	2.96%	77	0.47%
105 - 115	14	1.25%	0	0%	276	16.48%	17	2.01%	10	0.06%
> 115	21	1.87%	0	0%	489	29.19%	28	3.31%	0	0%
Customer Status										
Existing customer	473	42.19%	5	16.67%	944	56.36%	282	33.33%	9 529	58.36%
New customer	648	57.81%	25	83.33%	731	43.64%	564	66.67%	6 799	41.64%
Relationship Length										
< 1	686	61.2%	25	83.33%	993	59.28%	655	77.42%	9 298	56.95%
1 - 2.5	36	3.21%	1	3.33%	78	4.66%	49	5.79%	697	4.27%
2.5 - 5	57	5.08%	2	6.67%	106	6.33%	38	4.49%	982	6.01%
5 - 10	93	8.3%	1	3.33%	119	7.1%	39	4.61%	1 189	7.28%
10 - 15	87	7.76%	0	0%	133	7.94%	36	4.26%	1 372	8.4%
> 15	162	14.45%	1	3.33%	246	14.69%	29	3.43%	2 790	17.09%
Channel Utilization										
Pure Online	207	18.47%	9	30%	0	0%	0	0%	0	0%
Cross-Channel Offline	914	81.53%	21	70%	1	0.06%	1	0.12%	0	0%
Pure Offline	0	0%	0	0%	1 674	99.94%	845	99.88%	16 328	100%

Note: Hierachicial clustering with complete linkage applied to a sub-sample of n = 20 000 observations. Frequencies and percentage of characteristics per cluster are reported.

Cluster 2 represents a special subgroup of online affine customers with only 0.002% (30 customers), where 70% (21) are cross-channel offliners and the remaining 30% (9) are pure onliners. The main difference compared to cluster 1 is the absence Swiss citizens and those originating from the neighboring states. In addition, most customers from this segment live in urban regions (63.33%, 19) of Zurich (40%, 12) and Genfenseeregion (30%, 9), are 25 to 34 years old (53.33%, 16), and belong to the middle income

class between CHF 75 000 and CHF 95 000 (70%, 21). Again, most of them are new customers (83.33%, 25). Thus again, similar to the cluster 2 in the household/liability subsample, this cluster represents young foreigners which live in the metropolitan areas of Switzerland.

Of clusters representing pure offliners, cluster 5 is the largest with 81.6% (16 328 customers) and contains only pure offliners. This cluster dominated by customers of Swiss nationality (87.63%, 14 309), who belong to lower income classes of up to CHF 85 000 (94.71%, 15 465). In addition, most of them are below the age of 55 (82.91%, 13 538), male (65.92%, 10 763), and single (55.70%, 9 094), and they live in the rural areas (69.07%, 11 277) of Espace Mittelland (31.39%, 5 125) and Ostschweiz (20.31%, 3 317). Finally, most of them are existing customers (58.36%, 9 529).

Cluster 3 resembles cluster 5 in most of the factors and contains 8.4% (1 675) customers, 99.94% of those being pure offliners. The main difference occurs in the income levels with cluster 3 having customers belonging to high income classes of more that CHF 85 000 (93.31%, 1 563) and living in Zurich (26.33%, 441), Genferseeregion (21.37%, 358) and Zentralschweiz (26.33%, 441). Most of them are again up to 55 years old (76.53%, 1 282), Swiss (88.06%, 1 475), single (50.15%, 840), males (68%, 1 139), who live in rural areas (69.55%, 1 165). Finally, most of them are again existing customers (56.36%, 944).

Finally, cluster 4 is the smallest among the three, with only 4.2% (846) of the customers and represents non-Swiss pure offliners, in particular those originating from west Europe (7.92%, 67), east Europe (32.86%, 278) and other world (59.22%, 501). Most of the customers from this cluster are again below 55 years old (92.91%, 786), male (70.33%, 595), and single (61.94%, 524). They live in urban areas (52.25%, 442) of Espace Mittelland (22.7%, 192) and Genferseeregion (20.45%, 173) and belong to the low income classes of up to CHF 85 000 (83.45%, 706). Finally, most of them represent new customers (66.67%, 564).

Similar to the results obtained for household/liability insurance products, in the case of motor insurance significant differences were found to exist in insurance consumption over different channel utilization types (H3). Cross-channel offliners achieved significantly larger annual premium (M = 1 006.77, SD = 483.61) compared to pure onliners (M = 920.43, SD = 511.49) (t = -7.30, $p < .001$). The same effect was revealed when comparing cross-channel to pure offliners (M = 950.55, SD = 605.08), i.e. cross-channel offliners spent significantly more (t = -11.65, $p < .001$).

4.3 Travel Insurance

Within the observed period, a total of 10.13% of the customers (2 749 of 27 132) made use of the online channel for at least one of the shopping stages for the travel insurance product, while the remaining 89.87% (24 383 customers) used only the offline channel. Significant differences were again found to exist between the customer characteristics over individual channel utilization types for most of the observed factors. The summary of the obtained results is illustrated in Table 8, while details are provided in Table 14 in the Appendix.

Table 8: Customer characteristics across channel utilization types for travel product

		Pure Online vs. Cross-Channel		Pure Online & Cross-Channel vs. Pure Offline	
Customer Characteristics	df	X	p	X	p
Age (Classes)	5	20.81	<.001***	232.19	<.001***
Gender	1	-	n.s.	-	n.s.
Nationality	4	25.35	<.001***	22.42	<.001***
Civil Status	2	-	n.s.	122.15	<.001***
Urbanicity	1	35.62	<.001***	73.94	<.001***
Local Region	6	49.99	<.001***	125.29	<.001***
Income (Classes)	6	27.22	<.001***	56.15	<.001***
Customer Status	1	162.28	<.001***	96.62	<.001***
Relationship Length	5	142.60	<.001***	211.61	<.001***

Note: Significance levels for p-values: *** $\leq .001$, ** $\leq .01$, * $\leq .05$, n.s. $> .05$

When comparing pure online & cross-channel utilization against pure offline (H1a), the results of the Pearson's χ^2 test showed existence of significant differences across age ($X = 232.19$, $p < .001$), nationality ($X = 22.42$, $p < .001$), civil status ($X = 122.15$, $p < .001$), urbanicity ($X = 73.94$, $p < .001$), local region ($X = 125.29$, $p < .001$), income ($X = 56.15$, $p < .001$), customer status ($X = 96.62$, $p < .001$), and relationship length ($X = 211.61$, $p <.001$). No differences were found to exist in regard to the gender and the civil status of the customers from two groups.

Similarly, the comparison of pure onliners to cross-channel offliners (H1b) revealed significant differences across age ($X = 20.81$, $p < .001$), nationality ($X = 25.35$, $p < .001$), urbanicity ($X = 35.62$, $p < .001$), local region ($X = 49.99$, $p < .001$), income ($X = 27.22$, $p <.001$), customer status ($X = 162.28$, $p <.001$), and relationship length ($X = 142.60$, $p < .001$). Again, no differences were found to exist for the variables gender and civil status.

The results of the stepwise logistic regression provided in Table 9 confirmed again that Model3 has the best explanatory power. Therefore, in the continuation only the interpretation for this model will be given. For the model reflecting the probability for utilization of online channels in at least one of the shopping stages (H1a), all but gender were found to be significant factors. Customers in the age group between 45 and 54 years do not differ significantly compared to those below 25 years (used as a baseline). For the other age groups, customers above 55 years are less likely to use an online channel (Age [55-64 years] (β = -.321, $p < .001$), Age [65+ years] (β = -.766, $p < .001$)), while those between 25 and 44 years are more likely to use an online channel (Age [25-34 years] (β = .323, $p < .001$), Age [35-44 years] (β = .307, $p < .001$)). Further, customers originating from neighboring states (β =.274, $p < .01$) are more likely to use online channels compared to Swiss customers, while those originating from east (β = -1.004, $p < .05$) and west European countries (β = -.998, $p < .001$) are more likely to be pure offliners. In regard to the civil status, no difference was found to exist between singles and couples (used as a baseline), while other types of civil statuses are more likely to use offline channels only. In addition, customers with lower income (Income [<65] (β = .165, $p < .05$), Income [65-75] (β = .273, $p < .01$)), as well as those living

Table 9: Coefficients of logistic regression model for travel product

Customer Characteristics	Pure Online vs Cross-Channel (n = 13 003)			Pure Online & Cross-Channel vs Pure Offline (n = 217 048)		
	Model1	Model2	Model3	Model1	Model2	Model3
Intercept	-0.212	-0.248	-0.578**	-2.268***	-2.469***	-2.145***
Age (Classes)						
< 25	baseline					
25 - 34	-0.334**	-0.432***	-0.233*	0.34***	0.269***	0.323***
35 - 44	-0.18	-0.324*	-0.211	0.327***	0.259***	0.307***
45 - 54	-0.388*	-0.524**	-0.496**	-0.027	-0.082	-0.104
55 - 64	-0.074	-0.218	-0.234	-0.194*	-0.254**	-0.321***
65 +	-0.659**	-0.793***	-0.972***	-0.609***	-0.705***	-0.766***
Gender						
Male	baseline					
Female	0.031	0.009	-0.006	0.001	-0.017	-0.031
Nationality						
Swiss	baseline					
Neighboring State	0.625***	0.55**	0.52**	0.237*	0.218*	0.274**
East Europe	2.138*	2.045	2.099	-0.956*	-0.977*	-1.004*
Other World	1.173	1.071	1.109	-0.948**	-0.998**	-0.998**
West Europe	0.769*	0.699*	0.567	-0.123	-0.111	-0.039
Civil Status						
Couples	baseline					
Singles	0.031	-0.086	-0.084	0.088	0.018	-0.014
Other	-0.024	-0.029	0.061	-0.454***	-0.479***	-0.424***
Urbanicity						
Rural	baseline					
Urban		0.356***	0.339***		0.208***	0.189***
Local Region						
Espace Mittelland	baseline					
Genferseeregion		0.234	0.098		-0.024	-0.044
Nordwestschweiz		0.13	0.098		-0.052	-0.064
Ostschweiz		-0.393**	-0.387**		-0.209**	-0.244***
Tessin		-1.226*	-1.349*		-0.314	-0.292
Zurich		0.215	0.162		0.313***	0.31***
Zentralschweiz		-0.03	-0.059		0.083	0.052
Income (Classes)						
< 65	baseline					
65 - 75		-0.051	-0.046		0.189*	0.165*
75 - 85		0.169	0.124		0.294***	0.273**
85 - 95		0.253	0.216		0.196	0.172
95 - 105		-0.325	-0.335		0.054	0.052
105 - 115		0.007	0.065		0.284	0.241
> 115		-0.028	-0.179		0.067	0.056
Customer Status						
Existing Customer	baseline					
New Customer			1.337***			2.642***
Relationship Length						
< 1			-0.375			-2.553***
1 - 2.5			0.02			-0.015
10 - 15			0.084			-0.099
2.5 - 5			-0.316			0.034
5 - 10			-0.058			-0.178*
> 15	baseline					
AIC	3 703	3 649	3 517	17 510	17 380	16 334

*Note: Significance levels for p-values: *** ≤ .001, ** ≤ .01, * ≤ .05*

in urban regions (β = .189, $p < .001$) and in particular in Zurich (β = .310, $p < .001$) are more likely to use online channels, while those living in Ostschweiz are more likely to be pure offliners (β = -.244, $p <$ .001). Finally, new customers are more likely to use online channels (β = 2.642, $p < .001$). The intercept (β = -2.145, $p < .001$) indicates again that customers have a preference for offline channels as already visible from Table 11.

For the model reflecting the probability for being pure onliner as opposed to being cross-channel offliner, gender, civil status and income were not found to be statistically significant. Pure onliners are more likely to be new customers (β = 1.337, $p < .001$), live in urban regions (β = .339, $p < .001$) and originate from the neighboring states (β = .520, $p < .01$). In turn, customers living in Ostschweiz (β = -.387, $p < .01$) and Tessin (β = -1.349, $p < .05$) are more likely to use offline channels in the purchase stage, same as the customers from age groups above 25 years (Age [25-34 years] (β = -.233, $p < .05$), Age [45-54] (β = -.496, $p < .01$), and Age [65+] (β = -.972, $p < .001$)). The intercept was again found to be significant (β = -.578, $p < .01$) indicating that for travel insurance products, customers are more likely to choose offline channels for the purchase stage.

The results of the hierarchical clustering over the travel subsample revealed four customer clusters (H2). Of those, cluster 2 represents users which have utilized the online channel either for search or both search and purchase, while clusters 1, 3 and 4 contain pure offline customers. Differences in customer profiles assigned to each of the identified clusters are provided in Table 10.

Cluster 1 is the largest of three containing customers which preferred offline channels with 96.7% (19 357 customers) of the whole subsample and contains mostly pure offliners (90%, 17 422) and small portions of pure onliners (4.12%, 798) and cross-channel offliners (5.87%, 1 137). Within this cluster, majority of customers are singles (56.93%, 11 020), Swiss (96.53%, 18 686), male (54.32%, 10 515) customers, which have less than 35 years (46.12%, 8 926), live in rural area (61.10%, 11 827) in either Espace Mittelland (28.58%, 5 532), Ostschweiz (20.62%, 3 991) or Zurich (17.63%, 3 413) and represent lower income class with earnings below CHF 85 000 per year (87.36%, 16 910). Most of them are existing customers (73.78%, 14 282). As such, this group can be seen as representing average customers with preferences for offline channels for travel insurance products.

Cluster 3 represents a subgroup of offline customers with only 1% (213 customers), where 97.18% (207) are pure offliners, followed by 1.88% (4) of pure onliners and 0.94% (2) cross-channel offliners. The main difference compared to cluster 1 is the absence Swiss citizens, as well as those originating from the neighboring states and west Europe. In addition, most customers from this segment are male (58.69%, 125) and single (48.83%, 104), they live in urban regions (56.34%, 120) of Zurich (20.66%, 44) and Espace Mittelland (20.19%, 43), are 35 to 44 years old (32.39%, 69), and belong to the low income class between CHF 65 000 and CHF 75 000 (48.36%, 103). Again, most of them are existing customers (54.93%, 117). Thus this cluster represents younger foreigners which live in the central regions of Switzerland.

Cluster 4 resembles cluster 3 in most of the factors and contains 1.7% (338) customers, all of them being pure offliners. The main difference occurs in the urbanicity factor, i.e. customers from this segment live mostly in rural areas (62.72%, 212) and originate from west European countries (87.57%, 296). Again, most of them are between 35 and 44 years old (31.36%, 106), male (68.05%, 230) and single (47.34%, 160), they live in the Espace Mittelland (21.89%, 74) and Genferseeregion (24.56%, 83), they belong

Table 10: Customer profiles of channel specific customer typologies for travel product

Customer Characteristics	Cluster 1 n = 19 357 (96.7%)		Cluster 2 n = 92 (0.4%)		Cluster 3 n = 213 (1.0%)		Cluster 4 n = 338 (1.7%)	
Age (Classes)								
< 25	4 430	22.9%	7	7.6%	35	16.4%	35	10.4%
25 - 34	4 496	23.2%	34	37.0%	58	27.2%	86	25.4%
35 - 44	2 809	14.5%	33	35.9%	69	32.4%	106	31.4%
45 - 54	3 142	16.2%	14	15.2%	30	14.1%	75	22.2%
55 - 64	2 218	11.5%	4	4.4%	14	6.6%	16	4.7%
≥ 65	2 262	11.7%	0	0.0%	7	3.3%	20	5.9%
Gender								
Male	10 515	54.3%	60	65.2%	125	58.7%	230	68.1%
Female	8 842	45.7%	32	34.8%	88	41.3%	108	31.9%
Nationality								
Swiss	18 686	96.5%	0	0.0%	0	0.0%	0	0.0%
Neighboring States	671	3.5%	53	57.6%	0	0%	17	5.0%
West Europe	0	0%	33	35.9%	0	0%	296	87.6%
East Europe	0	0%	6	6.5%	70	32.9%	25	7.4%
Other World	0	0.0%	0	0.0%	143	67.1%	0	0.0%
Civil Status								
Singles	11 020	56.9%	61	66.3%	104	48.8%	160	47.4%
Couples	6 020	31.1%	27	29.4%	88	41.3%	135	39.9%
Other	2 317	12.0%	4	4.3%	21	9.9%	43	12.7%
Urbanicity								
Rural	11 827	61.1%	32	34.8%	93	43.7%	212	62.7%
Urban	7 530	38.9%	60	65.2%	120	56.3%	126	37.3%
Local Region								
Espace Mittelland	5 532	28.6%	24	26.1%	43	20.2%	74	21.9%
Genferseeregion	846	4.4%	10	10.9%	29	13.6%	83	24.6%
Nordwestschweiz	2 969	15.3%	13	14.1%	35	16.4%	37	11.0%
Ostschweiz	3 991	20.6%	16	17.4%	36	16.9%	64	18.9%
Tessin	234	1.2%	2	2.2%	5	2.4%	8	2.4%
Zurich	3 413	17.6%	16	17.4%	44	20.7%	42	12.4%
Zentralschweiz	2 372	12.3%	11	12.0%	21	9.9%	30	8.9%
Income (Classes)								
< 65	2 174	11.2%	9	9.8%	18	8.5%	45	13.3%
65 - 74	9 311	48.1%	39	42.4%	103	48.4%	153	45.3%
75 - 84	5 425	28.0%	27	29.4%	59	27.7%	76	22.5%
85 - 94	1 130	5.8%	7	7.6%	16	7.5%	20	5.9%
95 - 104	500	2.6%	6	6.5%	8	3.8%	17	5.0%
105 - 114	305	1.6%	4	4.4%	4	1.9%	13	3.9%
≥ 115	512	2.7%	0	0.0%	5	2.4%	14	4.1%
Customer Status								
Existing Customer	14 282	73.8%	71	77.2%	117	54.9%	240	71.0%
New Customer	5 075	26.2%	21	22.8%	96	45.1%	98	29.0%
Relationship Length								
< 1	9 616	49.7%	25	27.2%	148	69.5%	208	61.5%
1 - 2.4	760	3.9%	14	15.2%	13	6.1%	22	6.5%
2.5 - 4	1 147	5.9%	17	18.5%	20	9.4%	25	7.4%
5 - 9	1 839	9.5%	14	15.2%	14	6.6%	37	11.0%
10 - 14	1 640	8.5%	10	10.9%	12	5.6%	25	7.4%
≥ 15	4 355	22.5%	12	13.0%	6	2.8%	21	6.2%
Chunnel Utilization								
Pure Online	798	4.1%	38	41.3%	4	1.9%	0	0.0%
Cross-Channel Offline	1 137	5.9%	54	58.7%	2	0.9%	0	0.0%
Pure Offline	17 422	90.0%	0	0.0%	207	97.2%	338	100.0%

Note: Hierachicial clustering with complete linkage applied to a sub-sample of n = 20 000 observations. Frequencies and percentage of characteristics per cluster are reported.

to the lower income group between CHF 65 000 and CHF 75 000 (45.27%, 153), and most of them are existing customers (71.01%, 240).

Finally, cluster 2 contains only 0.4% (92 customers), of those 41.3% (38) being pure onliners and 58.7% (54) representing cross-channel offliners. Within this cluster, most customers belong to the age groups between 25 and 44 years (72.83%, 67), they are male (65.22%, 60) and single (66.30%, 61), live in urban regions (65.22%, 60) of Espace Mittelland (26.09%, 24), Ostschweiz (17.39%, 16) and Zurich (17.39%, 16), originate from neighboring states (57.61%, 53) and have low income between CHF 65 000 and 75 000 (48.36%, 103). Again, most of them are existing customers (77.17%, 71).

In regard to H3, in the case of travel insurance significant differences were found to exist in insurance consumption over different channel utilization types. Cross-channel offliners achieved significantly larger annual premium ($M = 127.12$, $SD = 45.93$) compared to pure onliners ($M = 123.48, SD = 45.69$) ($t = -2.16, p = .041$). When comparing cross-channel customers to pure offliners, the effect was not repeated, i.e. pure offliners ($M = 129.67, SD = 47.63$) spent significantly more ($t = -2.55, p = .031$).

5 Discussion

The results presented in the previous section showed that within all three subsamples the majority of the customers (94.62%) still preferred to use only traditional offline distribution channel for both shopping stages. This usage pattern was followed by a group of customers who perform information search on online channels, but still choose the traditional offline channel for the purchase itself (3.95%). Finally, pure onliners represent the smallest portion with only 1.43% of the customers. These results comply with those from previous studies (Elliott et al., 2012). In addition, the comparison of customer characteristics over individual channel utilization types revealed significant differences for most of the observed factors for each of the insurance products.

It is important to note that the observed results are not influenced by differences in products and search attributes across different channels, since, as already explained in Section 3.1, a single brand and equal price is offered across all distribution channels. Thus, this study benefits from the explained situation by reducing potential bias in the customer behaviour resulting from a varying brand recognition or premium discounts in the online channel which were observed in previous studies (Verhoef and Donkers, 2005).

5.1 Household/Liability Insurance

For the household/liability product, significant differences were found to exist over all factors between *pure offliners* and customers who utilized an online channel in at least one shopping stage. Therefore we state that hypothesis H1a is supported. In turn, when comparing pure onliners to cross-channel offliners, only gender and income were not found to be significantly different which complies with some previous studies (Elliott et al., 2012). However, all other factors, i.e. age, nationality, civil status, urbanicity, local region and customer status, were shown to play a significant role for channel selection in the purchase stage. Thus, the hypothesis H1b is not supported.

In regard to the distribution of customers over individual factors, surprisingly the age distribution of pure onliners & cross-channel offliners revealed that youngest customers are more likely to be pure offliners. In turn, the online channels were preferred by customers belonging to the age groups from 25 to 35 years, as well as those from 35 to 44 years. This result can be explained with the observation given by Ambacher et al. (2014) that very young customers are anxious about pure online purchases due to the lack of experience with the relatively complex nature of insurance products, which inhibits the online research and purchase. In turn, customers form the middle age generations have the advantage of being experienced in regard to the insurance products while still being online affine. In terms of the income, pure offliners belong to the lower income classes compared to remaining customers which complies with some of the previous studies (Choi and Park, 2006). Man prefer usage of a single channel, either online or offline, while women are more likely to be cross-channel offliners which again complies with the findings reported by Choi and Park (2006). Contrary to the findings of Ratchford et al. (2003), couples are more likely to use offline channels. However, this result was not found to be significant in the full model (Model3) of the regression analysis indicating that the effect might be dependent on, or moderated by an additional factor. Finally, the ratio of new customers is significantly higher in the pure online and cross-channel offline segments. A possible explanation for this would be that a customer looking for a new insurer would make use of the online transparency regarding insurance quotes, before making up his mind.

In summary, online channels are used in at least one of the shopping stages by young, single, urban, non-Swiss citizens, which mostly represent new customers. Moreover, being a pure onliner amplified some of the effects found between the pure offliners and online affine customers, i.e. pure onliners are even younger, and more likely to be urban, non-Swiss and new customers.

Further, the results of the cluster analysis revealed that there is a clear separation between customers who use only offline channels and those who use an online channel for at least one shopping stage, i.e. pure onliners and cross-channel offliners. Therefore we state that H2 is supported. The main difference between pure offliners and the online affine customers appears to be in the urbanicity, and customer status variable, with pure offliners living mostly in rural areas and being new customers. These results indicate that insurers are able to derive channel specific customer typologies only from the information which is already available in their customer database and to use this knowledge to refine their multichannel strategy.

Finally, in line with prior research (Neslin et al., 2006; Neslin and Shankar, 2009) and as expected, the obtained results indicate existence of significant differences in insurance consumption over different channel utilization types. In particular, cross-channel customers spent significantly larger amounts for household/liability insurance products, compared to pure onliners and pure offliners. Therefore we state that H3 is supported. An explanation for the observed difference between pure onliners and cross-channel offliners might be the occurrence of up-selling through the personal contact during the offline purchase stage. Both customer groups see an identical offer during the online research stage. Still, in the personal interaction with the sales personnel the customer might receive an advise for optimized coverage, including additional packages. Finally, the large standard deviation of the annual premium of pure offliners indicates that the range of coverages sold in this channel is very broad, thus supporting the

need for comparing the consumption between cross-channel and pure onliners.

5.2 Motor Insurance

The results of the analysis conducted over the subsample representing motor insurance customers showed that those from different channel utilization groups differ significantly. In particular, comparison between pure online & cross-channel offline customers and pure offline customers showed significant differences across all of the analysed factors, thus providing support for the hypothesis H1a. Similarly, when comparing pure onliners to cross-channel offliners, significant differences across all factors were found to exist. Therefore we conclude that hypothesis H1b is again not supported.

The distribution of customers over individual factors showed that in the case of motor insurance, age distribution of the customers complies with the results reported from previous studies for motor insurance (Elliott et al., 2012), i.e. younger customers up to 35 prefer online channels for at least one shopping stage while older customers are more likely to use the traditional channels. These results could be explained with the assumption that there is a common and greater knowledge of customers of all generations about the principles of motor insurance (third-party vehicle and comprehensive insurance), compared to the knowledge about household/liability products. Similarly to the results obtained for the household/liability insurance and in compliance with previous studies (Choi and Park, 2006), man were again found to prefer usage of a single channel, either online or offline, while women are more likely to be cross-channel offliners. In addition, customers belonging to the lowest income classes of up to CHF 75 000 were shown to be more likely to use offline channels for at least one of the shopping stages. This result complies with findings reported by Choi and Park (2006). Further, couples were found to be more likely to use a single channel while singles were more likely to use multiple channels. A possible explanation for this situation could be that singles might have more time to devote to the process and benefit from both channels. Finally, similar to the findings obtained over the Household/Liability product, the ratio of new customers was significantly higher in the pure online and cross-channel offline segments.

The results of the logistic regression for the model which distinguishes between those customers who utilized online channels for at least one of the shopping stages and pure offliners indicate that customers from the first group are more likely to be young, single and female, live in an urban area of the German speaking part of Switzerland, and obtain higher incomes. Moreover, they are more likely to be new customers, which purchase the motor insurance as their first policy with the carrier.

In addition, the clusters identified by the hierarchical clustering indicate that there is a distinct separation between the two online channel utilization pattern pure online and cross-channel, and the offline pattern pure offline. Therefore we state that H2 is supported. For motor insurance, the main difference between traditional and the online affine customers is found for the characteristics age, urbanicity and customer status, with pure offliners and cross-channel customers being new customers, younger than 35 years, and living mostly in rural areas. Whereas pure online and cross-channel customer diverge slightly in the variables urbanicity and customer status. Again for this product the results indicate that insurers are able to derive channel specific customer typologies only from the information which is already available in their customer database and to use this knowledge to refine their multichannel strategy.

For the case of motor insurance, and again in line with prior research, the obtained results indicate existence of significant differences in insurance consumption over different channel utilization types. The cross-channel customers again spent significantly larger amounts when insuring their vehicle, compared to pure onliners and pure offliners. Therefore we state that H3 is supported. Similar to the case of household/liability, the customer groups pure onliners and cross-channel offliners are presented with an identical offer during the product research, yet again the cross-channel customers achieve higher premiums. Thus again we assume that during the personal interaction with the sales personnel the customer received an advise for optimized coverage, which lead to an up-selling compared to the coverage offered on the carriers website. Finally, cross-channel customers have higher insurance consumption compared to pure offliners, but the effect is more difficult to explain. The larger standard deviation of the annual premium in the traditional channel indicates that a broader range of coverages is sold in this channel. This supports the need for including details regarding coverage and the insured vehicle when comparing the consumption between cross-channel offliners and pure onliners.

5.3 Travel Insurance

For the travel insurance product several factors were found to be significantly different over the channel utilization types of customers. When comparing pure offliners, who used only the traditional channel, against pure onliners and cross-channel customers the results reveal that they vary in the characteristics age, nationality, civil status, urbanicity, local region, customer status, and relationship length. Therefore we state that hypothesis H1a is supported. However, all these factors were shown to play a significant role for channel selection for purchase after having used the online channel for research. Thus, the hypothesis H1b is not supported.

Similar to household/liability product, the distribution of customers over the age variable showed the highest ratio of online affine customers in the category from 25 to 34 years. Similarly to the previous products, in this case the observation could again be explained by referring to the greater experience of these customers, compared to the age group of customers younger than 25 years, which would encourage online channel utilization. Further, having a Swiss nationality increased the probability of being a pure offline customer, whereas coming from a neighboring state of Switzerland had a positive impact on utilizing the online channel for at least one stage of the purchase. The effect of nationality underpins the difference in ethnicity between offline and online affine customers found in the study of Elliott et al. (2012). In contrast to the findings of Hitt and Frei (2002) for banking customers, singles were more likely to be pure onliners and cross-channel offliners, however this observation was not supported by the model coefficients due to a probable moderation by a further factor. Moreover, the effect of online affine customers who have their residence in urban areas is repeatedly visible for all three products analysed in this study. In regard to the income, pure onliners have a higher ratio of middle class income and lower ratio of lower class income, which is consistent with the results of Choi and Park (2006). Concluding from the values of the model coefficients, being a new customer had the strongest effect on the channel choice, resulting from a strongly increased ratio of new pure online customers. Interestingly, for this criteria the pure onliners and cross-channel offliners differ strongly, which might result from the fact that travel

insurance is a product that is more likely to be sold by an agent to existing customers in follow up sales and is not initially desired by the customers. This explanation could be supported by the fact that over 51% of the pure offline customers purchasing travel insurance have relationship shorter than one year, but only 25% of the customers are new customers. Still, those customers that appear as cross-channel offliners utilize Internet for a market scan before settling the deal with the sales agent. In turn, pure onliners specifically have a need for the product and purchase it directly over the online channel.

Summarizing the results, the online channel is the preferred channel for at least one of the shopping stages for young, single, urban, and middle income customers. Further, pure onliners are much more likely to be new customers, whereas cross-channel and pure offline customers show a similar behaviour.

In addition, the distinction in customer characteristics along the channel utilization patterns resulted in four customer typologies purchasing travel insurance. Therefore we state that H2 is supported. The clusters separating strongly between online affine and traditional customers have the greatest differences in the measures urbanicity, nationality, and age, with pure onliners and cross-channel offliners living mostly in urban areas, being immigrants from Europe and having between 25 and 44 years. The results again indicate that insurers are able to derive channel specific customer typologies only from the information which is already available in their customer database and to use this knowledge to refine their multichannel strategy.

Likewise previous two products, the insurance consumption varied significantly among the channel utilization patterns, but in this case H3 is only partially supported. While cross-channel customers achieve a higher average premium than pure onliners, they are topped by the consumption of the pure offliners. We again explain the difference in premiums between both online affine customer groups with the potential up-selling through the sales personnel for the case of cross-channel customers, as both are provided with an equal search result on the website. Whereas the superior average premium of pure offliners could result from the broader offer of coverages in this channel. Overall the differences are more marginal compared to the other two products, which results from the lower complexity and higher standardization of this product.

6 Implications for research and practice

The results presented in this paper have implications for both researchers and practitioners. For researchers, the results reveal that non-life insurance customers differ significantly in their channel utilization and consumption. As such, our findings verify and enhance the knowledge of previous empirical studies covering insurance or other product categories, such as retailing. A major implication of the analysis is that characteristics of insurance customers provide an explanation of their channel preferences and furthermore lead to channel specific customer typologies. As long as the utilization of online channels for purchasing of insurance products has not penetrated through all customer generations, as mentioned in Section 1, differences in customer demographics could stay observable. The results of our channel-specific customer typologies provide a reference on how to approach the clustering of insurance customers regarding their channel preferences. Furthermore, since insurance products have a high complexity compared to other product categories, for online affine customers it might be too difficult to evaluate and thus

conclude the shopping within the offline channel. Yet, the example of a motor insurance market in UK (Elliott et al., 2012) provides a valuable instance showing that customers purchase preferences can change quickly. Therefore researches should further investigate detailed product categories, to better understand the multichannel insurance customers. Regarding the question if a firm should encourage customers to be multichannel customers, posed by Neslin and Shankar (2009), the results of our study indicate a positive answer. For all three observed non-life insurance products, we observed a significant higher annual premium of cross-channel customers compared to pure onliners and for the case of household/liability and motor products, this value was even higher than the one of pure offliners. This indicates that a low channel lock-in of insurers website which was shown to be among the main factors influencing the multichannel behaviour (Verhoef et al., 2007), could direct the customers to perform the purchase at the agency, which would further be translated into a higher consumption.

For the marketing practitioners within insurance companies our results reveal new insights by indicating that the usage of their own customer databases could provide a valuable asset to explain their customers' multichannel behaviour and adapt their multichannel and marketing strategies accordingly. Moreover, the contractual setting established between insurances and their customers (Fader and Hardie, 2009), could enable usage of the detailed information that customers provide when negotiating contracts, for the process of customer-base analysis. This in turn might put insurers in the position to include even pricing relevant characteristics to explain their customers' multichannel behaviour and go beyond the approach of this study. With such detailed information, carriers could tackle challenges in multichannel marketing, such as customer segmentation, usage of channels in a customer life-cycle analysis, and encouraging multichannel utilization, with a goal of directing their customers to the channel which would result in greatest profit (Neslin and Shankar, 2009). In particular, our findings of increased insurance consumption for multichannel customers should have an impact on how insurers guide their potential customers through the product research on their website. In case the website is designed to have a high channel lock-in, the company would attract a large fraction of pure online customers and could thus loose potential revenue, which could have been generated through the up-selling taking place during the direct contact to an insurance agent. In contrary, if the channel lock-in is small, the customer might get lost in the shopping course from website to an agency and sign with another carrier, in which case the insurer might loose the complete revenue. This indicates that to find the optimal solution more research would be needed in this direction.

7 Summary and Future Work

In this paper we addressed the channel utilization patterns of non-life insurance customers. We studied the effect of customer characteristics on channel choice and how this translates into channel-specific customer typologies. Furthermore, we investigated the effect of multichannel utilization patterns on the insurance consumption. Our results show that several customer characteristics influence the channel utilization patterns and that customers can be clustered based on these characteristics. Moreover, our findings indicate that multichannel customers have higher insurance consumption compared to those who utilize only a single channel.

This study is limited in some dimensions and thus provides streams for future research. First, the choice of products is limited to three non-life insurance products. Further studies could focus also on life insurance and pensions, as well as on public and private health insurance products, which could reveal additional product-specific patterns of customer behaviour in the multichannel environment. Second, our study includes only general customer and policy characteristics. In order to verify and extend our results, future analysis might include product specific and pricing relevant measures as additional influencing factors. Moreover, future studies could include customer's life cycle stage, originated from the life cycle concept in marketing research (Wells and Gubar, 1966), as an additional explanatory variable. Third, our hypotheses were tested on a sample from a single company. In order to generalize our findings, future studies should include additional customer samples. Finally, as already mentioned in the previous section, future studies could focus on providing evidence on how insurers find the optimal balance for the channel lock-in, so that a high ratio of customers turns into multichannel shopper, leading to an increase in the premiums, at the same time avoiding the potential customer loss in his course of shopping from the web to the agency.

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A Appendix

Table 11: Overview of sample sizes and data capturing period per insurance product and channel utilization segment

Product	Period	Pure onliners		Cross-channel offliners		Pure offliners			Total
Household/ Liability	2012 2nd half-year	140	0.36%	119	0.31%	38 537	99.33%	38 796	100%
	2013 1st half-year	593	2.06%	676	2.35%	27 523	95.59%	28 792	100%
	2013 2nd half-year	646	1.97%	818	2.49%	31 346	95.54%	32 810	100%
	2014 1st half-year	579	2.18%	641	2.41%	25 329	95.40%	26 549	100%
	Total	1 958	1.54%	2 254	1.78%	122 735	96.68%	126 947	100%
Motor	2011 2nd half-year	435	1.45%	1 536	5.13%	27 984	93.42%	29 955	100%
	2012 1st half-year	462	1.19%	2 125	5.46%	36 313	93.35%	38 900	100%
	2012 2nd half-year	377	0.93%	2 053	5.04%	38 310	94.04%	40 740	100%
	2013 1st half-year	378	0.99%	2 035	5.34%	35 675	93.66%	38 088	100%
	2013 2nd half-year	252	0.7%	1 581	4.41%	34 044	94.89%	35 877	100%
	2014 1st half-year	307	0.92%	1 462	4.37%	31 719	94.72%	33 488	100%
	Total	2 211	1.02%	10 792	4.97%	204 045	94.01%	217 048	100%
Travel	2012 2nd half-year	225	3.77%	129	2.16%	5 616	94.07%	5 970	100%
	2013 1st half-year	361	4.81%	596	7.94%	6 552	87.26%	7 509	100%
	2013 2nd half-year	231	3.77%	379	6.19%	5 516	90.04%	6 126	100%
	2014 1st half-year	314	4.17%	514	6.83%	6 699	89.00%	7 527	100%
	Total	1 131	4.17%	1 618	5.96%	24 383	89.87%	27 132	100%
All products	Total	5 300	1.43%	14 664	3.95%	351 163	94.62%	371 127	100%

Table 12: Customer characteristics and insurance consumption across channel utilization types for Household/Liability product

Customer Characteristics	Pure online n = 1 958 (1.5%)		Cross-Channel n = 2 254 (1.8%)		delta	p-value	Pure online & Cross-Channel n = 4 212 (3.3%)		Pure offline n = 122 735 (96.7%)		delta	p-value
Age (Classes)						<.001***						<.001***
< 25	562	(28.7%)	584	(25.9%)	+2.8%		1 146	(27.2%)	35 330	(28.8%)	-1.6%	
25 - 34	811	(41.4%)	852	(37.8%)	+3.6%		1 663	(39.5%)	22 771	(18.6%)	+20.9%	
35 - 44	314	(16%)	362	(16.1%)	-0.1%		676	(16.0%)	18 492	(15.1%)	+0.9%	
45 - 55	145	(7.4%)	247	(11.0%)	-3.6%		392	(9.3%)	19 196	(15.6%)	-6.3%	
55 - 64	79	(4.0%)	121	(5.4%)	-1.4%		200	(4.7%)	13 086	(10.7%)	-6.0%	
65 +	47	(2.4%)	88	(3.9%)	-1.5%		135	(3.2%)	13 860	(11.3%)	-8.1%	
Gender						.261						<.001***
Male	1 085	(55.4%)	1 209	(53.6%)	+1.8%		2 294	(54.5%)	72 799	(59.3%)	-4.8%	
Female	873	(44.6%)	1 045	(46.4%)	-1.8%		1 918	(45.5%)	49 936	(40.7%)	+4.8%	
Nationality						<.001***						<.001***
Swiss	1 503	(76.8%)	1 835	(81.4%)	-4.6%		3 338	(79.2%)	10 6109	(86.5%)	-7.3%	
Neighboring State	253	(12.9%)	297	(13.2%)	-0.3%		550	(13.1%)	7 651	(6.2%)	+6.9%	
West Europe	82	(4.2%)	57	(2.5%)	+1.7%		139	(3.3%)	3 353	(2.7%)	+0.6%	
East Europe	47	(2.4%)	24	(1.1%)	+1.3%		71	(1.7%)	2 116	(1.7%)	± 0.0%	
Other World	73	(3.7%)	41	(1.8%)	+1.9%		114	(2.7%)	3 506	(2.9%)	-0.2%	
Civil Status						<.001***						<.001***
Singles	1 434	(73.2%)	1 689	(74.9%)	-1.7%		3 123	(74.1%)	74 537	(60.7%)	+13.4%	
Couples	301	(15.4%)	397	(17.6%)	-2.2%		698	(16.6%)	34 931	(28.5%)	-11.9%	
Other	223	(11.4%)	168	(7.5%)	+3.9%		391	(9.3%)	13 267	(10.8%)	-1.5%	
Urbanicity						<.001***						<.001***
Rural	682	(34.8%)	954	(42.3%)	-7.5%		1 636	(38.8%)	76 027	(61.9%)	-23.1%	
Urban	1 276	(65.2%)	1 300	(57.7%)	+7.5%		2 576	(61.2%)	46 708	(38.1%)	+23.1%	
Local Region						<.001***						<.001***
Espace Mittelland	493	(25.2%)	588	(26.1%)	-0.9%		1 081	(25.7%)	42 383	(34.5%)	-8.8%	
Genferseeregion	284	(14.5%)	270	(12.0%)	+2.5%		554	(13.2%)	12 288	(10.0%)	+3.2%	
Nordwestschweiz	337	(17.2%)	390	(17.3%)	-0.1%		727	(17.3%)	15 692	(12.8%)	+4.5%	
Ostschweiz	167	(8.5%)	255	(11.3%)	-2.8%		422	(10.0%)	19 634	(16.0%)	-6.0%	
Tessin	8	(0.4%)	34	(1.5%)	-1.1%		42	(1.0%)	4 024	(3.3%)	-2.3%	
Zurich	545	(27.8%)	537	(23.8%)	+4%		1 082	(25.7%)	17 320	(14.1%)	+11.6%	
Zentralschweiz	124	(6.3%)	180	(8.0%)	-1.7%		304	(7.2%)	11 394	(9.3%)	-2.1%	
Income (Classes)						.094						<.001***
< 65	169	(8.6%)	188	(8.3%)	+0.3%		357	(8.5%)	17 193	(14%)	-5.5%	
65 - 75	766	(39.1%)	978	(43.4%)	-4.3%		1 744	(41.4%)	58 715	(47.8%)	-6.4%	
75 - 85	759	(38.8%)	783	(34.7%)	+4.1%		1 542	(36.6%)	31 089	(25.3%)	+11.3%	
85 - 95	145	(7.4%)	154	(6.8%)	+0.6%		299	(7.1%)	7 672	(6.3%)	+0.8%	
95 - 105	49	(2.5%)	57	(2.5%)	± 0.0%		106	(2.5%)	2 981	(2.4%)	+0.1%	
105 - 115	26	(1.3%)	34	(1.5%)	-0.2%		60	(1.4%)	1 834	(1.5%)	-0.1%	
> 115	44	(2.2%)	60	(2.7%)	-0.5%		104	(2.5%)	3 251	(2.6%)	-0.1%	
Customer Status						<.001***						<.001***
Existing Customer	178	(9.1%)	449	(19.9%)	-10.8%		627	(14.9%)	32 575	(26.5%)	-11.6%	
New Customer	1 780	(90.9%)	1'805	(80.1%)	+10.8%		3'585	(85.1%)	90 160	(73.5%)	+11.6%	
Relationship Length						<.001***						<.001***
< 1	1 818	(92.8%)	1 895	(84.1%)	+8.7%		3 713	(88.2%)	100 579	(81.9%)	+6.3%	
1 - 2.5	39	(2.0%)	85	(3.8%)	-1.8%		124	(2.9%)	2 946	(2.4%)	+0.5%	
2.5 - 5	35	(1.8%)	91	(4.0%)	-2.2%		126	(3.0%)	3 721	(3.0%)	± 0.0%	
5 - 10	33	(1.7%)	76	(3.4%)	-1.7%		109	(2.6%)	3 909	(3.2%)	-0.6%	
10 - 15	11	(0.6%)	50	(2.2%)	-1.6%		61	(1.4%)	3 172	(2.6%)	-1.2%	
> 15	22	(1.1%)	57	(2.5%)	-1.4%		79	(1.9%)	8 408	(6.9%)	-5.0%	

Insurance consumption	Pure online		Cross-Channel				Cross-Channel		Pure offline			
Annual Premium	300.24	(133.91)	337.18	(198.23)	-37.14	<.001***	337.18	(198.23)	313.57	(334.90)	+23.80	<.001***

Note: For the customer characteristics the frequency, ratio (in %), delta (in %), and p-values of Pearson Chi-Square test and for insurance consumption the mean, standard deviation, delta and p-values of Student's t-test are reported (significance levels for p-values: *** ≤ .001, ** ≤ .01, * ≤ .05, n.s. > .05).

Table 13: Customer characteristics and insurance consumption across channel utilization types for motor product

Customer Characteristics	Pure online n = 2 211 (1.0%)		Cross-Channel n = 10 792 (5.0%)		delta	p-value	Pure online & Cross-Channel n = 13 003 (6.0%)		Pure offline n = 204 045 (94.0%)		delta	p-value
Age (Classes)						.033*						< .001***
< 25	762	(34.5%)	3 725	(34.5%)	± 0.0%		4 487	(34.5%)	42 190	(20.7%)	+13.8%	
25 - 34	811	(36.7%)	3 913	(36.3%)	+0.4%		4 724	(36.3%)	45 744	(22.4%)	+13.9%	
35 - 44	303	(13.7%)	1 612	(14.9%)	-1.2%		1 915	(14.7%)	39 627	(19.4%)	-4.7%	
45 - 55	207	(9.4%)	1 025	(9.5%)	-0.1%		1 232	(9.5%)	42 085	(20.6%)	-11.1%	
55 - 64	86	(3.9%)	400	(3.7%)	+0.2%		486	(3.7%)	21 771	(10.7%)	-7.0%	
65 +	42	(1.9%)	117	(1.1%)	+0.8%		159	(1.2%)	12 628	(6.2%)	-5.0%	
Gender						< .001***						< .001***
Male	1 414	(64.0%)	6 234	(57.8%)	+6.2%		7 648	(58.8%)	135 139	(66.2%)	-7.4%	
Female	797	(36.0%)	4 558	(42.2%)	-6.2%		5 355	(41.2%)	68 906	(33.8%)	+7.4%	
Nationality						< .001***						< .001***
Swiss	1 848	(83.6%)	9 322	(86.4%)	-2.8%		11 170	(85.9%)	170 988	(83.8%)	+2.1%	
Neighboring State	227	(10.3%)	995	(9.2%)	+1.1%		1 222	(9.4%)	15 888	(7.8%)	+1.6%	
West Europe	61	(2.8%)	308	(2.9%)	-0.1%		369	(2.8%)	7 846	(3.8%)	-1.0%	
East Europe	34	(1.5%)	84	(0.8%)	+0.7%		118	(0.9%)	3 838	(1.9%)	-1.0%	
Other World	41	(1.9%)	83	(0.8%)	+1.1%		124	(1.0%)	5 485	(2.7%)	-1.7%	
Civil Status						< .001***						< .001***
Singles	1 614	(73%)	8 291	(76.8%)	-3.8%		9 905	(76.2%)	114 041	(55.9%)	+20.3%	
Couples	503	(22.7%)	2 138	(19.8%)	+2.9%		2 641	(20.3%)	74 872	(36.7%)	-16.4%	
Other	94	(4.3%)	363	(3.4%)	+0.9%		457	(3.5%)	15 132	(7.4%)	-3.9%	
Urbanicity						< .001***						< .001***
Rural	1 118	(50.6%)	6 253	(57.9%)	-7.3%		7 371	(56.7%)	139 497	(68.4%)	-11.7%	
Urban	1 093	(49.4%)	4 539	(42.1%)	+7.3%		5 632	(43.3%)	64 548	(31.6%)	+11.7%	
Local Region						< .001***						< .001***
Espace Mittelland	511	(23.1%)	3 039	(28.2%)	-5.1%		3 550	(27.3%)	60 053	(29.4%)	-2.1%	
Genferseeregion	217	(9.8%)	896	(8.3%)	+1.5%		1 113	(8.6%)	22 048	(10.8%)	-2.2%	
Nordwestschweiz	429	(19.4%)	1 692	(15.7%)	+3.7%		2 121	(16.3%)	26 416	(12.9%)	+3.4%	
Ostschweiz	289	(13.1%)	1 763	(16.3%)	-3.2%		2 052	(15.8%)	39 132	(19.2%)	-3.4%	
Tessin	19	(0.9%)	206	(1.9%)	-1.0%		225	(1.7%)	9 931	(4.9%)	-3.2%	
Zurich	578	(26.1%)	2 153	(19.9%)	+6.2%		2 731	(21.0%)	25 803	(12.6%)	+8.4%	
Zentralschweiz	168	(7.6%)	1 043	(9.7%)	-2.1%		1 211	(9.3%)	20 662	(10.1%)	-0.8%	
Income (Classes)						< .001***						< .001***
< 65	196	(8.9%)	1 145	(10.6%)	-1.7%		1 341	(10.3%)	31 128	(15.3%)	-5.0%	
65 - 75	941	(42.6%)	5 009	(46.4%)	-3.8%		5 950	(45.8%)	95 754	(46.9%)	-1.1%	
75 - 85	765	(34.6%)	3 240	(30.0%)	+4.6%		4 005	(30.8%)	49 592	(24.3%)	+6.5%	
85 - 95	148	(6.7%)	687	(6.4%)	+0.3%		835	(6.4%)	13 247	(6.5%)	-0.1%	
95 - 105	81	(3.7%)	292	(2.7%)	+1.0%		373	(2.9%)	5 605	(2.7%)	+0.2%	
105 - 115	34	(1.5%)	179	(1.7%)	-0.2%		213	(1.6%)	3 194	(1.6%)	± 0.0%	
> 115	46	(2.1%)	240	(2.2%)	-0.1%		286	(2.2%)	5 525	(2.7%)	-0.5%	
Customer Status						< .001***						< .001***
Existing Customer	712	(32.2%)	4 608	(42.7%)	-10.5%		5 320	(40.9%)	116 819	(57.3%)	-16.4%	
New Customer	1 499	(67.8%)	6 184	(57.3%)	+10.5%		7 683	(59.1%)	87 226	(42.7%)	+16.4%	
Relationship Length						< .001***						< .001***
< 1	1 576	(71.3%)	6 578	(61.0%)	+10.3%		8 154	(62.7%)	118 812	(58.2%)	+4.5%	
1 - 2.5	71	(3.2%)	373	(3.5%)	-0.3%		444	(3.4%)	8 748	(4.3%)	-0.9%	
2.5 - 5	94	(4.3%)	618	(5.7%)	-1.4%		712	(5.5%)	12 011	(5.9%)	-0.4%	
5 - 10	158	(7.1%)	856	(7.9%)	-0.8%		1 014	(7.8%)	14 966	(7.3%)	+0.5%	
10 - 15	117	(5.3%)	864	(8.0%)	-2.7%		981	(7.5%)	16 141	(7.9%)	-0.4%	
> 15	195	(8.8%)	1 503	(13.9%)	-5.1%		1 698	(13.1%)	33 367	(16.4%)	-3.3%	

Insurance consumption	Pure online		Cross-Channel				Cross-Channel		Pure offline			
Annual Premium	920.43	(511.49)	1006.77	(481.63)	-86.34	<.001***	1006.77	(481.63)	950.52	(605.74)	+56.25	<.001***

Note: For the customer characteristics the frequency, ratio (in %), delta (in %), and p-values of Pearson Chi-Square test and for insurance consumption the mean, standard deviation, delta and p-values of Student's t-test are reported (significance levels for p-values: *** $\leq$ .001, ** $\leq$ .01, * $\leq$ .05, n.s. $>$ .05).

Table 14: Customer characteristics and insurance consumption across channel utilization types for Travel product

Customer Characteristics	Pure online n = 1 131 (4.2%)		Cross-Channel n = 1 618 (6.0%)		delta	p-value	Pure online & Cross-Channel n = 2 749 (10.2%)		Pure offline n = 24 383 (89.8%)		delta	p-value
Age (Classes)						< .01**						< .001***
< 25	287	(25.4%)	330	(20.4%)	+5.0%		617	(22.4%)	5 475	(22.5%)	-0.1%	
25 - 34	338	(29.9%)	526	(32.5%)	-2.6%		864	(31.4%)	5 544	(22.7%)	+8.7%	
35 - 44	220	(19.5%)	289	(17.9%)	+1.6%		509	(18.5%)	3 581	(14.7%)	+3.8%	
45 - 55	143	(12.6%)	243	(15.0%)	-2.4%		386	(14.0%)	4 044	(16.6%)	-2.6%	
55 - 64	98	(8.7%)	125	(7.7%)	+1.0%		223	(8.1%)	2 809	(11.5%)	-3.4%	
65 +	45	(4.0%)	105	(6.5%)	-2.5%		150	(5.5%)	2 930	(12.0%)	-6.5%	
Gender						.339						.924
Male	606	(53.6%)	898	(55.5%)	-1.9%		1 504	(54.7%)	13 312	(54.6%)	+0.1%	
Female	525	(46.4%)	720	(44.5%)	+1.9%		1 245	(45.3%)	11 071	(45.4%)	-0.1%	
Nationality						< .001***						< .001***
Swiss	1 019	(90.1%)	1 534	(94.8%)	-4.7%		2 553	(92.9%)	22 764	(93.4%)	-0.5%	
Neighboring State	75	(6.6%)	62	(3.8%)	+2.8%		137	(5.0%)	896	(3.7%)	+1.3%	
West Europe	25	(2.2%)	18	(1.1%)	+1.1%		43	(1.6%)	397	(1.6%)	± 0.0%	
East Europe	6	(0.5%)	1	(0.1%)	+0.4%		7	(0.3%)	140	(0.6%)	-0.3%	
Other World	6	(0.5%)	3	(0.2%)	+0.3%		9	(0.3%)	186	(0.8%)	-0.5%	
Civil Status						.19						< .001***
Singles	764	(67.6%)	1 040	(64.3%)	+3.3%		1 804	(65.6%)	13 699	(56.2%)	+9.4%	
Couples	301	(26.6%)	468	(28.9%)	-2.3%		769	(28%)	7 681	(31.5%)	-3.5%	
Other	66	(5.8%)	110	(6.8%)	-1.0%		176	(6.4%)	3 003	(12.3%)	-5.9%	
Urbanicity						< .001***						< .001***
Rural	523	(46.2%)	935	(57.8%)	-11.6%		1 458	(53.0%)	14 993	(61.5%)	-8.5%	
Urban	608	(53.8%)	683	(42.2%)	+11.6%		1 291	(47.0%)	9 390	(38.5%)	+8.5%	
Local Region						< .001***						< .001***
Espace Mittelland	289	(25.6%)	445	(27.5%)	-1.9%		734	(26.7%)	6 907	(28.3%)	-1.6%	
Genferseeregion	58	(5.1%)	64	(4.0%)	+1.1%		122	(4.4%)	1 193	(4.9%)	-0.5%	
Nordwestschweiz	180	(15.9%)	229	(14.2%)	+1.7%		409	(14.9%)	3 812	(15.6%)	-0.7%	
Ostschweiz	135	(11.9%)	310	(19.2%)	-7.3%		445	(16.2%)	5 146	(21.1%)	-4.9%	
Tessin	4	(0.4%)	19	(1.2%)	-0.8%		23	(0.8%)	302	(1.2%)	-0.4%	
Zurich	333	(29.4%)	344	(21.3%)	+8.1%		677	(24.6%)	4 073	(16.7%)	+7.9%	
Zentralschweiz	132	(11.7%)	207	(12.8%)	-1.1%		339	(12.3%)	2 950	(12.1%)	+0.2%	
Income (Classes)						< .001***						< .001***
< 65	87	(7.7%)	148	(9.1%)	-1.4%		235	(8.5%)	2 820	(11.6%)	-3.1%	
65 - 75	464	(41.0%)	784	(48.5%)	-7.5%		1 248	(45.4%)	11 736	(48.1%)	-2.7%	
75 - 85	435	(38.5%)	487	(30.1%)	+8.4%		922	(33.5%)	6 717	(27.5%)	+6.0%	
85 - 95	74	(6.5%)	85	(5.3%)	+1.2%		159	(5.8%)	1 402	(5.7%)	+0.1%	
95 - 105	22	(1.9%)	44	(2.7%)	-0.8%		66	(2.4%)	657	(2.7%)	-0.3%	
105 - 115	19	(1.7%)	28	(1.7%)			47	(1.7%)	409	(1.7%)	± 0.0%	
> 115	30	(2.7%)	42	(2.6%)	+0.1%		72	(2.6%)	642	(2.6%)	± 0.0%	
Customer Status						< .001***						< .001***
Existing Customer	587	(51.9%)	1 219	(75.3%)	-23.4%		1 806	(65.7%)	18 146	(74.4%)	-8.7%	
New Customer	544	(48.1%)	399	(24.7%)	+23.4%		943	(34.3%)	6 237	(25.6%)	+8.7%	
Relationship Length						< .001***						< .001***
< 1	566	(50.0%)	451	(27.9%)	+22.1%		1 017	(37.0%)	12 530	(51.4%)	-14.4%	
1 - 2.5	54	(4.8%)	97	(6.0%)	-1.2%		151	(5.5%)	961	(3.9%)	+1.6%	
2.5 - 5	69	(6.1%)	166	(10.3%)	-4.2%		235	(8.5%)	1 411	(5.8%)	+2.7%	
5 - 10	107	(9.5%)	209	(12.9%)	-3.4%		316	(11.5%)	2 309	(9.5%)	+2.0%	
10 - 15	98	(8.7%)	190	(11.7%)	-3.0%		288	(10.5%)	1 983	(8.1%)	+2.4%	
> 15	237	(21.0%)	505	(31.2%)	-10.2%		742	(27.0%)	5 189	(21.3%)	+5.7%	

Insurance consumption	Pure online		Cross-Channel				Cross-Channel		Pure offline			
Annual Premium	123.48	(45.69)	127.12	(45.93)	-3.61	.041*	127.12	(45.93)	129.67	(47.63)	-2.55	.031*

Note: For the customer characteristics the frequency, ratio (in %), delta (in %), and p-values of Pearson Chi-Square test and for insurance consumption the mean, standard deviation, delta and p-values of Student's t-test are reported (significance levels for p-values: *** ≤ .001, ** ≤ .01, * ≤ .05, n.s. > .05).