

User Generated Brands and their Contribution to the Diffusion of User Innovations

Johann Füller
University of Innsbruck
Universitaetsstrasse 15
6020 Innsbruck
AUSTRIA
E-Mail: johann.fueller@uibk.ac.at

Roland Schroll
University of Innsbruck
Universitaetsstrasse 15
6020 Innsbruck
AUSTRIA
E-Mail: roland.schroll@uibk.ac.at

Eric von Hippel
MIT Sloan School of Management
50 Memorial Drive, E52-556
Cambridge, MA
USA 02139
E-Mail: evhippel@mit.edu

Corresponding author:

Johann Füller
University of Innsbruck
Universitaetsstrasse 15
6020 Innsbruck
AUSTRIA
E-Mail: johann.fueller@uibk.ac.at
Phone: +43 (0)512 507 7193

ABSTRACT

It has been argued that users can create innovations and also diffuse them peer-to-peer independent of support or involvement by producers: that “user-only” innovation systems can exist. It is known that users can be incented to innovate via benefits from in-house use. But users’ incentives to invest in diffusion are much less clear: benefits that *others* might obtain from their innovation can be largely or entirely an externality for user innovators.

Of course, effective distribution of information products can be done near-costlessly via posting downloadable content – for example, software – on the Internet. However, potential adopters must still learn about the product and trust its qualities. In producer systems, this aspect of diffusion is heavily supported via the creation of trusted brands. It has been shown that brands help to increase awareness, to communicate a product’s benefits, and to reduce perceived risks of adoption. The development of brands by producers is traditionally seen as a very costly exercise – unlikely to be thought of as worthwhile by users who expect little or no benefits from the diffusion of their innovations to others. In this paper, we explore the creation of a strong and trusted brand by the Apache software community – and find it was created costlessly, as a side effect of normal community functioning. We think the *costless* creation of strong brands is an option that is generally available to user innovation communities. It supports, we propose, the existence of robust, user-only innovation systems by helping to solve the problem of low-cost diffusion of trusted user-developed innovations.

Keywords: *user-generated brands, product diffusion, brand value, innovation communities, user innovation*

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1. Introduction and overview

It is known that users innovate to solve their own needs, and that sometimes these user innovations later provide the basis for successful commercial products. Sports equipment such as the rodeo kayak (Baldwin et al., 2006), mountain bike (Lüthje et al., 2005), snowboard (Shah, 2000), and surfboard (Franke and Shah, 2003), medical equipment (Lettl et al., 2006), juvenile products such as the baby jogger (Shah and Tripsas, 2007), services such as computerized commercial banking services (Oliveira and von Hippel, 2011), computer games (Jeppesen and Molin, 2003), and films in the animation genre (Haefliger et al., 2010) are examples where user innovations became successful in the market.

But these examples involve *producer* commercialization and marketing of *user*-developed innovations. What about the possibility of user innovation followed by *user* innovation diffusion – e.g., a pure user innovation process with no producer required (von Hippel, 2007)? Here, a problem appears. Both users and producers have incentives to innovate, but only producers have a high inbuilt incentive to diffuse innovations they develop or acquire from users – because they profit from sales. In contrast, user innovators may gain little or no benefit from the free adoption of their innovations by others, and so may have little inclination to invest in enabling diffusion. Diffusion, in other words, can be largely an externality for users (Raasch and von Hippel, 2012).

To solve this incentive problem, what is needed is free or cheap diffusion options for users. Of course, near-free diffusion of information products and designs for physical products is possible by posting copies for free download on the Internet. But from diffusion research we know that the extent of diffusion of new products or services depends not only on the value of the innovation made available, but also on further criteria such as potential adopters' awareness of the innovation, and the perceived risks associated with adopting it (Rogers, 1976 & 2003).

In the case of producer diffusion of innovations, marketing and branding efforts are considered important to help to increase awareness, communicate a product's new benefits,

reduce perceived risks, and to raise interest. Further, in addition to the functional value of an innovation, brands offer symbolic or social value such as prestige and recognition – or getting in contact and building relationships with others. The value embedded in the perceived meaning of a brand contributes to the overall benefit provided by the innovation and thereby supports the adoption of new products. Hence, brands are significant assets for the diffusion of innovations and also a significant source of profit (Ailawadi et al., 2003; Keller, 1993 & 2008).

Marketing and branding efforts are known to be expensive as these activities are customarily done by producers – involving extensive advertising, and so forth. How then can users, expecting limited benefits from diffusion, support or be incited to support innovation diffusion to similar effect? A solution, we find, is that user communities are able to create strong brands *costlessly*, as a side effect of ordinary community activities that they engage in for other purposes and benefits. In this paper we explore how users and user communities market and brand their innovations in order to diffuse and promote them on the market. We further explore the strength of costless user-generated brands relative to the strength of producer-generated brands.

In an empirical case study on the Apache software community – a user group centered around their common interest of software development – we document the costless creation of a strong brand by users. We find that the community has created a user brand that has strong and favorable associations in the minds of both community and non-community members, and that can command considerable price premiums. We also find that the Apache brand was indeed created as a costless by-product of community member interactions.

We think these findings contribute a novel element to an important, rapidly evolving larger story: users are increasingly being empowered with respect to a number of important economic activities ranging from the creation of new product designs, to the creation and widespread diffusion of innovations (Baldwin and von Hippel, 2011; Benkler, 2006).

Our paper is structured as follows. In section 2 we review the literature on branding and marketing activities related to the diffusion of innovations and user involvement in these activities. In section 3 we describe our case study research setting and methods used. In

sections 4 and 5 we present our research findings, in section 6 we discuss the implications of brands as user-generated content.

2. Review of the literature

2.1. Diffusion of innovations and the role of branding

Innovation refers to invention and exploitation (Roberts, 2007) of useful and novel offerings (Amabile, 1997). This means inventions have to diffuse via the market and/or via peer-to-peer diffusion in order to become successful innovations. Diffusion research shows that the adoption of new products depends on factors such as adopter awareness of the innovation, its perceived value, and perceived risk (Rogers, 1976 & 2003). Marketing and branding efforts support the diffusion of innovations by providing potential adopters with information on these matters. Successful experiences by early adopters can then lead to adopter loyalty and advocacy with respect to the value of the brand and product (Barry and Howard, 1990; Vakratsas and Ambler, 1999)

Brands are especially important for early diffusion of innovations. Imperfect and asymmetric information about the new product characteristics lead to uncertainty, create risks (functional, financial, physical, psychological, and social) and costs (information-gathering and information-processing) for consumers (potential users) (Erdem and Swait, 1998). Thus, consumers need to make use of credible signals, such as brands, to reduce this uncertainty (Erdem et al., 2006). Brands help consumers to navigate through the product jungle, take the right decisions, and cope with this mental overload through the explosion of information (Solomon, 2011).

2.2. How brands evolve

The American Marketing Association (AMA), defines a brand as a “name, term, sign, symbol, or design, or a combination of them intended to identify the goods and services of one seller or group of sellers and to differentiate them from those of competition” (Kotler, 1997, p.443). In legal terms, a brand is a trademark. Technically this means that whenever a marketing manager creates a name, label, or symbol for a new product he or she creates a brand. In real-world marketing practice, however, the term brand is reserved for a name or

symbol that has created a certain amount of awareness, reputation, and prominence in the marketplace (Keller, 2008).

Strong brands exist when positive associations are linked to brand names or symbols within the minds of potential customers - and when many people share very similar associations. When producers “create and shape brands,” usually they are investing money to create and diffuse stimuli, such as advertisements, promotion campaigns, sponsorships, or testimonials, among potential customers that will trigger those individuals to create and shape positive and strong brand-related associations within their minds. When many potential customers are induced to generate similar and positive associations, the result is a strong, commercially exploitable brand.

Marketers apply a variety of tools to build and reinforce a powerful brand position. Besides the branded product/innovation itself, it is the communication and promotion, the history and heritage of the brand, as well as the interaction with others which contributes to the strength of a brand (Keller and Lehmann, 2003). The quality and quantity of these actions influence customers’ perception of the brand. Constant brand-building activities and investments are necessary in order to maintain an attractive and highly desirable brand. Otherwise the “brand’s revenue premium will gradually decay to the level of a private label.” Ailawadi et al. (2003, p.15).

2.3. Brand Value

Although building a strong brand requires extensive efforts and constant investments, it offers the potential of high returns. The value firms derive from building and owning a brand is known as brand equity (Aaker, 1996). Generally, brand equity is defined as market outcomes that accrue to a product with its brand name compared to outcomes that accrue if the same product did not have the brand name (Ailawadi et al., 2003; Keller, 1993 & 2008).

Brand value means different things to profit-seeking brand producers and to brand users. From a producer perspective, strong brands are those that enhance profits. The valuation of the brand as a financial asset - the price at which it can be sold or a valuation of achievable licensing fees and royalties – is termed brand equity. For example, the value of the McDonalds brand has been calculated to be 71% of that firm’s total value on the stock

market, and the value of the Coca Cola brand has been calculated as 64% of the total market value of that firm (Keller, 2008). Price, market share, revenue, and cash flow may be further indicators to determine a producer's brand equity.

From a user perspective, brand equity is the “differential effect of brand knowledge on consumer/(user) response to the marketing of the brand” (Keller 1993, p.2). Brand awareness, perceived brand quality, brand loyalty, and brand associations – broadly defined as anything which comes into a persons' mind when thinking about a brand – drive user-based brand equity (Aaker, 1991 & 1996). Based on brand associations, users decide if they are willing to pay the charged price for the brand or not. For grocery products across 20 product categories (e.g. coffee, cereals, and soft drinks), consumers for example are willing to pay a price premium of 35% compared to private label brands (Sethuraman and Cole, 1999). In the luxury segment, top brands achieve price premiums between 20-200% over normal brands in the segment (Coyler, 2005).

2.4 Sources of brand value

Two prominent non-product related and non-functional sources of value that brands can deliver are the support of personal identity formation, and support for community and a sense of belonging. With respect to personal identity formation, research indicates that brands support users in their creation of self-concept and social identity (Ahuvia, 2005; Belk, 1988; Fournier, 1998). Brands “serve as powerful repositories of meaning, purposively and differentially employed in the substantiation, creation, and (re)production of concepts of self in the marketing age” (Fournier, 1998, p.365). Hence, brands serve as powerful symbolic resources for individual identity projects. For instance, brands represent and enhance individual identities via associations with certain social positions and roles (Grubb and Hupp, 1968). Consumers tend to prefer brands that match with their own characteristics (Aaker et al., 2004). The greater the congruity between consumers' own personal characteristics and those of the brand, the greater is the preference for the brand (Aaker, 1997). Self-congruency has been found to influence important criterion variables such as brand attitude, brand choice and store loyalty (Helgeson and Supphellen, 2004; Sirgy et al., 1997).

Consumption of and preference for a certain brand can also help to form a sense of community (McAlexander et al., 2002; Muñiz and O'Guinn, 2001). Research into brand

communities shows that a shared consciousness, rituals and traditions, and a sense of moral responsibility form and hold together affectionate communities around brands (Muñiz and Schau, 2007). Cova (1997) argues that consumers value products and services less for their use value and more for their linking value - for their ability to enable and facilitate bonds between individuals. The brand thus derives value and meaning from the community and the community benefits from the brand. Brewer (1991) argues that people want their groups to be “optimally distinct.” Not so small so that they stand out as odd, but not so large that they get lost in the crowd. Brands may help users to connect with others and be the nucleus the formation of user groups and communities.

In order to serve users needs of identity formation and community affiliation and to provide social value, brands have to be perceived as authentic (Beverland, 2005; Brown et al., 2003; Holt, 2002). Previous studies have identified several attributes of authenticity, including history and tradition, relationship to place, personal investments, quality commitments, craftsmanship, downplay of commercial interests, and emphasis on intrinsic motivations (Alexander, 2009; Beverland, 2005; Holt, 2002; Leigh et al., 2006). In a postmodern and increasingly inauthentic world, users are looking for and appreciate what is perceived as “real“ and “original” (Beverland and Farrelly, 2010). For instance, hand-crafted products or a long history and tradition create authentic experiences that support users’ search for something “real“ (Berger, 1973; Leigh et al., 2006).

Users are increasingly aware of the discrepancy between a producer brand’s claim and the actual behavior of its corporate owner (Beverland and Farrelly, 2010; Holt, 2002). Hence, many producer brands are having troubles being perceived as authentic. To be perceived as authentic “brands must be disinterested; must be perceived as invented and disseminated by parties without an instrumental economic agenda, by people who are intrinsically motivated by their inherent value“ (Holt 2002, p.83). Authenticity origins from passionate individuals who are obsessed and care about the product and not from managers who try to attract a large target group and maximize profits (Beverland, 2005; Grayson and Martinec, 2004; Holt, 2002; Kozinets, 2002).

2.5 The consumer role in creating and modifying brand meaning

Consumers are now understood to have an important active role in the branding and value-creation process (Berthon et al., 2007; Muñiz and Schau, 2007; Schau et al., 2009).

Consumption communities and brand communities play important roles in the construction and modification and diffusion of a brand's meaning (Kates, 2004; Schau et al., 2009; Schouten et al., 2007; Thompson et al., 2006; Wipperfurth, 2005). Communities play this important role because they give individual consumers the possibility of collaborating with others, presenting the results of their work, and getting symbolic, social, and sometimes material reward (Cova and Dalli, 2008).

Studies exploring the impact of user-generated content on brands have focused almost exclusively on activities surrounding existing brands. Phenomena such as the adaptation or hijacking of a brand's meaning (Kates, 2004; Thompson et al., 2006; Wipperfurth, 2005), brand resistance, and antagonistic behavior towards brands (Klein, 2000; Lee et al., 2009; Lüdicke et al., 2010), increasing influence of consumers on future brand development (Edelman, 2010; Muñiz and Schau, 2007) are well documented. Important brand value creation activities within communities are also increasingly understood (Cova and Dalli, 2008; Mathwick et al., 2008; Schau et al., 2009). The case of the Apple Newton for example demonstrates the way user communities can exert extreme independence in their activities regarding commercial brands. Abandoned from Apple, the loyal Newton fan community continued the brand management against the will of Apple and engaged in the creation of new brand-related content such as logos, slogans, and ads (Muñiz and Schau, 2007).

2.6 The consumer role in brand creation

Pitt et al. (2006) pointed out that the Open Source movement has produced a series of well-known brands such as Linux, Apache, and Mozilla Firefox. Fuller et al. (2007) documented the development of a user-generated brand in a physical consumer product setting via a qualitative study of the brand creation process in a European outdoor hiking community named OutdoorSeiten.net. In that community, they observed the brand creation process as being combined with product creation and consisting of four phases. First, community members discussed their experiences with, and their likes and dislikes regarding, commercial outdoor products they personally used in their hiking activities. Second, community members fabricated their own gear to better fit their needs. Third, community members created patches bearing a self-designed logo, and sewed it onto their own products as well as onto products

they purchased. Fourth, community members began to develop products for commercialization under their own brand.

Füller and von Hippel (2008) followed with a study investigating the attributes of the OutdoorSeiten.net (ODS) brand and its influence on product preference. They found that community members perceived their ODS brand as authentic, competent/reliable and exciting. Within the ODS community, the ODS brand was also “strong.” Thus, 34% of respondents in the study said that they would prefer to purchase a backpack labeled with the ODS logo – if such existed - rather than one of equal price and quality that carried the label of their favorite commercial backpack brand. A major limitation of this study is that it did not explore awareness of and interest in the ODS brand outside of the brand-creating community.

Cova and White (2010) describe a case in which a user community creates the “Couchsurfing” brand. They term communities that create their own brands ‘alter-brand’ communities. They note that: “Alter brands exist mainly to serve the common collective goals of community members. In this case, the community creates value by generating its own concepts, services, relationships, and so on without interactions with the company, and this value is therefore captured directly by the community. Companies gain no value directly but must face a risk of indirect competition” (Cova and White, 2010, p.265).

The literature on brands created and managed by users does not explore the costs and value of user brand development - our study is the first to do this.

3. Research methods and context

In order to examine whether and how users and user communities create brands, we applied a multi-method approach (Creswell, 2003; Tashakkori and Teddlie, 1998 & 2003). The strength of a multiple method research lies in its holistic way of exploring the research questions and allows to increase confidence in the plausibility and validity of the findings (Edmondson and McManus, 2007). We began with a qualitative study to understand the history of Apache brand development – and specifically to understand whether the development of that brand was, as we claim is possible, a ‘costless side-effect of normal community activities’. We then followed with a quantitative study based upon an online survey among community and non-

community members. Via this study we explored the nature and value of the Apache brand among community and non-community members.

Both our qualitative and quantitative studies focused on the Apache open source software community. Apache is a virtual community of software developers, which supports the incubation and development of freely available open source software. The Apache community began when University of Illinois undergraduate Rob McCool developed “web server” software for, and while working at, the National Center for Supercomputing Applications (NCSA). (Web server software is used on web server computers that host web pages and provide appropriate content as requested by Internet browsers. Such computers are a key element of the Internet-based World Wide Web infrastructure.) The source code as developed and periodically modified by McCool was posted on the web so that users at other sites could download it, use it, modify it, and develop it further. When McCool departed NCSA in mid 1994, a small group of webmasters who had adopted his web server software for their own sites decided to take on the task of continued development. A core group of eight users gathered all documentation and bug fixes and issued a consolidated patch. This “patchy” web server software evolved over time into Apache. Extensive user feedback and modification yielded Apache 1.0, web server software, released on December 1, 1995.

The Apache community grew, and in 1999 the Apache Software Foundation (ASF) was incorporated to manage potential legal exposure with respect to intellectual property and financial issues. Today, the Apache community comprises nearly 300 official ASF members, over 2,000 ‘committers’ - individuals authorized to introduce code changes into the official software code base - collaborating across six continents, as well as thousands of developers contributing code to various projects (Apache, 2012b). Apache web server software, which also figures in our study, competes with other web server software packages provided by well-known brands such as Microsoft and Google. Today, Apache is leading in terms of web server software installations, currently holding a market share of over 60% of the many millions of installations extant on the Internet (Netcraft, 2012).

4. Qualitative study

4.1. Methods

In the first phase of our qualitative research, we did extensive readings on the Apache community history and functioning. We then explained our planned study to senior Apache community members and obtained community agreement to participate. We visited ApacheCon, the community's annual conference, in March 2009 to meet key individuals face to face, to gain insight into community functioning, and to conduct interviews. Our selection of interviewees started with a list of 35 individuals provided by the Apache Foundation. All had agreed to serve as interview partners if they suited our criteria. Out of this list, we selected 12 interviewees and conducted in-depth interviews with each of them during the ApacheCon 2009 conference (Apache, 2012a)

We used two major criteria for selecting interviewees to yield us significant variation on variables likely to be important in our study. The first was the *degree* of the member's community involvement. We selected some respondents who had central roles within the community, and some who were only loosely connected to the community. Four interviewees were members of the Board of Directors, which has the social oversight over the communities' development. Other respondents held a variety of roles, ranging from documentation contributor to simple code developer. The second criterion was the *duration* of the members' community involvement. Thus four of our interviewees had been involved with Apache since the very beginning while others had experienced only a year or two of community membership. All interviewees were male and between 29 and 48 years of age. Our interviewees were from the US (6), the UK (2), Germany (1), Finland (1), the Netherlands (1), and France (1).

We used a semi-structured interview guide composed of four parts. In the first part we asked interviewees to introduce themselves and report on their commitment and current role within the Apache community. In the second part we asked for the respondents' view of the historical development of the community and the diffusion and growth of their software. In the third part we asked questions around Apache as a brand. We focused on whether interviewees perceived Apache as a brand, and what they viewed as the most important aspects of the Apache community and brand.

All 12 interviews were recorded with permission and were transcribed verbatim. Interviews took between 35 and 90 minutes each. The transcripts were content-analyzed to deepen our understanding of development and management of the Apache brand by the community, and

the meanings and value of the Apache brand to community members (Denzin and Lincoln, 1994; Maxwell, 2005). A detailed analysis of the results followed, where two independent researchers captured their interpretations and evaluations of the transcribed data in additional field notes. Through joint discussions and iterative referrals to the literature and research in related areas, we reached consensus and agreement regarding the results among the researchers (Neuendorf, 2002). By means of this process, the relevant topics regarding our research questions were identified, compared, and cross-checked.

4.2. Findings: Creation and shaping of the Apache brand

Conventional assumptions in the marketing field are that building a brand requires thoughtful planning, incorporates several steps and requires exact (typically expensive) execution. However, our interviews with long-time Apache Foundation members show that there was no intentional plan or special-purpose activities to build the Apache brand, and that the brand was in effect created and strengthened costlessly. The Apache community did not intend to create a strong brand, nor did the community engage in any advertising, marketing, or branding activities for their software in its early stages. It “simply grew” as a costless side effect of group activities, the quality of the work they were engaged in, and increasing public awareness of Apache and the quality of its work. The history of development of the Apache brand that we developed in our qualitative study, in part told in the voices of interviewees, is as follows:

At the beginning, “There was a loose grouping of people called the Apache group back in 1995 or so. And these people ... started the webserver project.” (Michael)

Historically, the Apache webserver was called the „NCSA Server”. An Open-Source software project of US universities that was discontinued due to the lack of financial resources. Without giving it much thought the group gave itself a name and a logo. The name Apache and the feather were born.

“At some point someone suggested to call it Apache. I think it was [Brian] Behlendorf, who was one of the initial 8 members. He was very interested in the history of the Apache tribe. Everyone agreed and so we kept the name.” (George)

“I think it was Randy Turbush who created the feather [Apache logo] within one or two days. It has more or less remained unchanged since 1996.” (George)

“...we did not look at it as a brand and as something to market.” (Michael)

Nevertheless a strong brand emerged. In a very authentic and organic way, the group adopted the name Apache so as to communicate the idea which stands behind their group and activity. Deep meaning was soon associated with Apache and its creators well beyond the group itself, based on the impressive work of the Apache group. While community members didn't think of Apache as a brand, Apache soon became a quality signal.

*“...and then we realized that people would say: Apache Tomcat or Apache web-server and the Apache part was very important to them because it signified a level of quality.”
(Michael)*

What we see is that the Apache brand emerged as a by-product of communal activity and not as an intentional act. The group never intended to create a strong brand nor engaged in any traditional advertising activities.

“Until today we have never done any advertising in the traditional sense. Also no marketing. The only thing we do is PR in the case of ApacheCon [the Apache annual conference]. But no marketing or advertising like companies do it.” (George)

Apache soon became well-recognized and respected within the IT area. The community realized that the name Apache carried some value. As the community activities created more and more attention and the product became well-recognized and valued, the „Apache” brand also attracted like-minded corporations as sponsors and partners.

“... when it has the Apache name attached to it a lot more people are attracted to it and more people will use it ... and also big companies, like Sun - they donated code to us because they realized that donating it to Apache is putting it into good hands.” (Michael)

Overwhelmed by its evoked interest, the community began to engage in active, purposeful brand management activities. The brand Apache, first, paid off in terms of attracting

important stakeholders, who would push further software quality and performance, before the brand attracted a greater number of users. Apache's brand development process reflects a genuine inside-out process of identity building, a strong basis for a strong brand. However, the brand also proved valuable to non-community members. More and more people outside the community were drawn towards the brand.

“First there was the `press@apache.org` address. We used it to respond to questions from journalists. Later, also due to the huge number of projects we felt the need to create press releases. Thus we created a PR committee, which consists of around 16 people.” (George)

Besides the various positive outcomes the Apache community also had to deal with some undesired side-effects of having a strong brand leading Apache to a more active and purposeful brand management.

“A lot of people used the name to take advantage out of it. And there was nothing we could do about it. So there was the need to found a foundation in order to protect the brand but also for more basic things such as signing a hosting contract for our server.” (George)

“It was the success of that project itself that made us realize that we needed to protect our committers, to protect the IP and that made us create the ASF in 1999.” (Michael)

Existing community members also began to pay more attention to the member selection process. While in the beginning no-one was ever denied membership to the community, today the acceptance rate is around 75%. As the brand becomes a more important symbol also for the identity-construction projects of members, they would look more carefully on who the new applicant was, what he has contributed so far, and who suggested him for membership.

Recently, the Apache Software Foundation increasingly professionalized its branding activities. In 2009, the Foundation appointed a Vice President of Brand Management (Apache, 2009). In addition, the Public Relations Committee (PRC) has begun to issue branding guidelines, giving clear instructions on how to use the brand name as well as the Apache logo (Apache, 2012c). The Foundation has also begun to engage in activities directed at extracting value from the brand, notably with a sponsorship program. The sponsorship program offers four levels of sponsorship, ranging from \$ 5,000 up to \$ 100,000 per year.

Benefits for sponsors are limited to placement of the logo on the Apache website. Sponsors include companies such as Google, Microsoft, and Hewlett-Packard. Whether a sponsor fits Apache is discussed openly in the community. If the fit is perceived as being too low or the community feels the risk of exploitation in a proposed link, sponsorship is denied.

“It’s not for sale. We do not do it to get money” (Michael)

5. Quantitative study

As mentioned earlier, we next conducted a study to gain quantitative insights in the meaning and value of the Apache brand as well as its influence on product preferences. We found the costlessly-developed Apache brand to be very highly-regarded both within and outside of the community membership.

5.1. Methods

An online survey was applied in order to measure the association and value of the Apache brand to both Apache community members and non-members. We recruited respondents via two independent pathways. First, we asked Apache community members to help us by inviting respondents, and by posting invitations in various IT related message boards. Data was collected during seven weeks between February and April 2010. Second, we collected data from a panel provided by Lightspeed Research. The Lightspeed panel consisted of individuals employed in the IT sector in the United States. For their participation, the panelists receive points, which they can trade for money, vouchers, and other rewards offered by Lightspeed Research. Data was collected from this panel during three weeks in June 2010. In total, 335 questionnaires were completely filled out. The majority of respondents were male (77.9%), and their average age was 40.4 years. We were only interested in respondents who were aware of Apache. In order to check for awareness, all respondents to our online questionnaire were asked at the start: “Do you know Apache?” and were simultaneously shown the Apache logo. This question served as a knockout criterion - those who answered in the negative were not asked to continue in the questionnaire.

Our analyses depend fundamentally upon the community membership status of respondents. Accordingly, respondents were asked to describe their connection to the Apache community

in terms of one of six different connection types. Respondents describing themselves as “Apache Software Foundation Members” or “Apache committers” or “Apache developers” were all coded as being Apache community members. The remaining three categories were used to describe non-community members. An “Apache software user” was any individual who consciously uses Apache software without contributing to its further development. An “Apache Fan” is an individual who has a positive attitude towards the community, but is not a community member, nor a conscious user of Apache software. (It is difficult for Internet users to *not* be a conscious or unconscious user of Apache: Apache software is an invisible component in many web sessions and transactions.) The sixth option given was “no connection” to the community. The distribution of respondents across these categories is shown in Table 1.

(insert Table 1 about here)

Apache members proved to have significant involvement with their community. For example, the average Apache community member reported working 15.37 hours a week on Apache projects. Additional salient attributes of Apache community and non-community respondents are shown in Table 2.

(insert Table 2 about here)

5.2. Measures of perceptions of Apache brand

We used a number of validated constructs to measure differences in members’ and non-members’ perception of the Apache brand. Perceived quality, expertise, authenticity, passion and self-connection with the Apache brand was measured as these dimensions constitute important drivers of a brand’s value. Three items adopted from Henderson and Hoy (1982) and Erdem and Swait (1998) were used to measure brand authenticity (for example: “Apache has a name you can trust”). Four items adopted from Ohanian (1990) served to measure brand expertise. Two items adopted from Aaker et al. (2004) served to measure self-connection, and three items developed by Pappu et al. (2005), were used to measure brand quality. Finally, three items from Carroll and Ahuvia (2006) served to measure brand love. All of items used are listed in Appendix A.1. In addition, Ailawadi et al. (2003) propose some indicators of high brand equity, including market share, preference, and price. We included these firm-level

outcomes in our analysis. We also measured users free brand associations and their perceived valence, known as further important drivers of brand value (Aaker, 1996).

Due to the nature of our topic and the anonymity in our online survey, we expected no biases due to social desirability or negative affectivity (Spector, 2006). Confirmatory factor analysis was applied to check the multi-item constructs. The psychometric properties of all latent constructs, together with the wording of the items, are displayed in Appendix A.1. These indicate an appropriate structure. All indicators have good factor loadings (FL) and the respective factor reliabilities (FR) exceed the required reliability in structural equation modeling of 0.6 (Bagozzi and Yi, 1988). Equally the average variance extracted (AVE) of the constructs can be judged as satisfactory with values over 0.5. Thus convergent validity of the constructs can be seen as fulfilled (Hair et al., 2006). Discriminant validity can be estimated by calculating the Fornell-Larcker-Ratio (FLR) (Fornell and Larcker, 1981). The value reached must not exceed 1. All constructs comply with this guideline.

5.3. Findings

Our quantitative findings show that users may indeed be able to generate valuable brands, at least in the case of the Apache brand. Our study shows that Apache is able attract large market shares, accrue a significant price premium, and being perceived as high quality, authentic brand that users' desire (fall in love) and want to get connected with.

5.3.1. The value of the Apache brand

In this section we explore the value of the Apache brand via two types of tests. Our first test type involved asking respondents to imagine being Head of IT in a big company. We asked them to decide between web server software from two sources: Apache and Microsoft. To focus on the value of the brand in the consumer's mind, while controlling for differences in quality, we stated that both options were of identical quality. Using a 6-point scale, respondents were asked which web-server they would be more likely to purchase, and how much more they would be willing to pay to obtain their preferred option. A screenshot of this test is provided in Appendix B.1.

(insert Table 3 about here)

As can be seen from table 3, 74 % of community members preferred the Apache web-server, as did 66.4% of non-members. Both community members and non-members were willing to pay a price premium for their choice, and no significant difference was found with respect to this between Apache members and non-community members. Clearly, the value of the Apache brand extends beyond Apache community membership.

Next, we refined this first test of the value of the Apache brand by conducting a market simulation using a conjoint trade-off design (Johnson and Olberts, 1991; Jones, 1975; Pinnell and Olson, 1996). We now asked respondents to decide between three web-servers (Apache, Microsoft, and a no-name web server). We stated that all choices were again of equal performance, and also cost the same with respect to customization, installation, and maintenance (\$10,000). Then, for the web server software preferred by each respondent, we increased these costs, first by 10% and then by 25% compared to the initial amount, asking each time which web server software was now their first choice under these new conditions. In each simulation, we applied both a discrete choice and a stated preference approach in order to avoid potential common method bias due to acquiescence. Further, we used different item formats, different scale types as well as counterbalancing of items (Podsakoff et al., 2003). A screenshot of this test is provided in Appendix B.2.

Figure 1 shows the price-demand curves for the three web-servers resulting from the conjoint trade-off analysis: the overall results are in black, the results from Apache community members are in red, and the results from non-members are in green. At the initial costs level, 65.97 % chose Apache, 34.23 % chose Microsoft and 2.69 % chose the no-name option. These results at the initial costs level almost exactly mirror the ratio of the actual market share of Apache and Microsoft on the web-server market (Netcraft, 2012).

(insert Figure 1 about here)

Perhaps not surprisingly, community members showed a strong preference for the Apache web-server software. However, and very importantly, non-members also showed a strong preference for Apache - Apache brand strength clearly extends beyond the community. For the initial equal costs condition, 63.46 % of non-members chose the Apache web-server, compared to 34.23 % choosing Microsoft, and 2.31 % choosing the no-name option. After increasing the costs for customization, installation, and maintenance by 10 %, the majority of

all respondents (51.34%) still preferred Apache. After increasing the costs by 25 % compared to the initial amount, 33.73 % still chose Apache.

As can be seen in Figure 1, the no-name option was not of interest to many under any cost conditions. This suggests that brands do play an important role in the web-server market. It also suggests that preferences for Apache are not (or not only) due to negative feelings some respondents might have for Microsoft. If respondents only wanted to *not* choose Microsoft, instead of affirmatively choosing Apache, the no-name option should have met with more interest.

5.3.2. How Apache community and non-community members view the brand

In this section we report on what users associate with the Apache brand – the attributes that make it more – or less – valuable in their view. We also highlight perceptual differences among community members and non-members. First, we applied a free association task to explore members’ and non-members’ associations with the Apache brand. Second, we used several non-product related brand attributes to measure differences in members’ and non-members’ perception of the brand.

At the beginning of the questionnaire, respondents were shown the Apache logo and asked to name up to five associations that came to their minds. On the next page, respondents were shown their associations again and asked to rate their associations on a 7-point scale (1= extremely negative ... 7= extremely positive). Here we report all associations with more than 5 mentions. We compared associations using frequency and valence.

In terms of frequency, the three strongest associations which popped up in participants minds were “Apache web server” (32.1 %), which refers to the community’s first and most famous software project; followed by “high quality/performance”-related associations (14.4 %), such as “high quality”, “security”, “stability/reliability”, “speed”, or “scalability”; and “Open Source” (11.9 %), which refers to Apache’s philosophy of free redistribution of and access to source code. The next three associations were “other Apache projects” (10.6 %), such as Apache Tomcat (another web server) or Apache Lucene (an information retrieval software library); followed by “community-related” associations (8.1 %) such as “community”, “community-over code” (Apache’s guiding principle), or “meritocracy”; and “Internet-

related” associations (5.8 %), such as “internet”, “web”, or “network”. The next three associations were “software” (4.1 %); “Apache License” (3.2 %), which refers to the free software license issued by the Apache Software Foundation; and “Java” (3.2 %), which refers to a popular software development platform for many open source software projects. The last three associations with more than 5 mentions were “Free Software” (2.6 %); “Linux” (2.6 %), an Open Source operating system; and “Technology” (1.4 %). Table 4 shows all associations with more than 5 mentions together with their frequency and valence.

(insert Table 4 about here)

Only small differences could be observed between community members’ and non-members’ associations. Three of the four most frequently mentioned associations were identical. In both groups, the strongest association was “Apache web server” (23.8 % members; 35.9 % non-members). Next, while for non-members “high quality/performance” (12.9 %) and “other Apache projects” (12.5 %) came next, members mentioned “high quality/performance” and “community-related” associations (both 18.0 %). The fourth strongest association was “Open Source” in both groups (13.2 % members; 11.4 % non-members).

In terms of valence, overall ratings were very positive (6.0 overall; 6.4 for members and 5.8 for non-members). In both groups, “high quality/performance” associations achieved the highest rating (6.8 for members and 6.4 for non-members). Overall, there was a significant difference between members’ and non-members’ valence ratings of their associations ($F = 15.544$, $T = 4.734$, $p = .000$). On a category-level, perceptual differences were less significant.

Next, we were interested in differences between community members’ and non-members’ perception of the brand along brand attributes known as important sources of brand value. We compared Apache’s perceived quality, authenticity, self-connection, expertise, and brand love. Our comparison shows that community members’ perception of the Apache brand is similar to that of non-members but significantly differs along several dimensions (Table 5).

(insert Table 5 about here)

In general, community members show a stronger relationship to the Apache brand than do non-members. Community members rate Apache significantly higher than non-community

members with respect to brand love, self-connection, and quality. However, no significant differences between community members and non-members regarding authenticity and expertise could be found.

6. Discussion

Recall that at the start of this paper we noted that user incentives to diffuse were a weak spot with respect to the viability of “user-only” innovation and diffusion systems. While it is known that users can be incented to innovate via benefits from in-house use, benefits that *others* might obtain from their innovation can be largely or entirely an externality for user innovators (Raasch and von Hippel, 2012). Given this, it was not clear that brand development – a central element in producer innovation efforts - could or would be undertaken by users. However, we have in this paper documented that *costless* creation of strong and trusted brands is possible for user innovation communities.

In our discussion section, we first consider the likely generalizability of this finding; discuss the contribution of brands to the diffusion of user innovations; discuss the possible impact of strong user brands upon producer brands; and make brief suggestions regarding further research.

6.1 *The generalizability of brand creation by user communities*

Is costless creation of strong brands a general possibility for user innovation communities? We think the answer is ‘yes’. Consider that brands and their attributes are effective when similar brand-related elements are embedded in the minds of many consumers. Conventional assumptions are that a product producer is the entity seeking to create a brand, and must spend money to create and shape it. Thus: “Marketing programs are designed to enhance brand awareness and establish favorable, strong, and unique brand associations in memory so that consumers purchase the product or service” (Keller, 1993, p.10). For example, a producer of a cola drink for athletes may invest in ads urging consumers to ‘drink AthleticCola as you bike’. And/or the producer and its advertising agencies may invest in creating activities for consumers where brand-relevant associations are purposefully brought together (e.g., handing out free bottles of AthleticCola at a bike race).

The principle underneath these commercial tactics is the creation and shaping of “mental constructs” that are positive and include the brand. A mental construct is formed and shaped in individuals’ minds by being brought to their attention in a context and manner that creates associations within their minds (Edwards, 1990; Zajonc, 1968). If the stimulus for creating a common mental construct is expensive – as in the case of the AthleticCola example above – then the creation of brands will be expensive. If, however, the stimulus for a broadly-shared mental construct arises as a result of activities or experiences undertaken for other purposes, brand creation can be costless.

Thus, many in the Apache community are creating good software for the sake of fun, pride, interacting with like-minded others, learning, and the use-value of the product itself. In the course of participating in the creation of Apache software products, community members gain rich experiences that are associated with the Apache logo and Apache products in their minds. Interacting with other community members also helps them to serve their identity needs and form a strong sense of community. Some of these constructs will have elements in common with those being shaped by other community members. The resulting shared mental constructs can be viewed as - and, as we have seen, can function as - a brand. Similarly, as products bearing an Apache logo diffuse to non-community members and are used by them, those individuals, too, will develop mental constructs with common elements regarding Apache and its products. These too, as we have seen, can serve as a brand. In such cases, there may be little or no *intentional* investment made by individual brand users to create the mental constructs that represent and give value to a brand in their minds. Brand creation “just happens” as users engage in brand-related activities. Nevertheless, this costless created brand helps to create awareness, reduce uncertainty and risks and offers additional symbolic value.

6.2 Contribution of user brands to the diffusion of user innovations

The finding that users and user communities can costlessly create their own strong brands independently from producers seeking to create and sell commercial brands improves our understanding of how user diffusion systems – ‘no producer required’ - can compete effectively with marketplace diffusion enhanced by producer investments in branding and advertising.

In the specific case of our case study, our research found that the Apache brand enjoys high

levels of awareness, and positive attitudes such as being a signal of high quality (Keller, 2008). Our market simulation reveals that overall, 66 % of users prefer the Apache software compared to 33 % choosing Microsoft, and 3 % choosing the no-name option. More than 50 % of the users still prefer the Apache branded software even if they have to pay a price premium of 10%. The widely held positive associations regarding the Apache brand logically reduce users uncertainty, perceived risk, and information costs (Erdem and Swait, 1998), and so are likely to increase the likelihood of adoption and diffusion.

In addition, Apache users associate not only high quality software with the name Apache, but also a certain way of working and community style. Apache's "community over code" principle enthralls committers, attracts sponsors and fascinates users. The non-commercial behavior of the community members, their demonstrated expertise, commitment and obsession about Apache products, the community's shared norms, values, and actions as well as its heritage, contribute to the Apache story and to the creation of a highly authentic brand, which is highly attractive to potential adopters (Beverland, 2005; Grayson and Martinec, 2004; Holt, 2002; Kozinets, 2002).

Finally, note that the Apache community consists of a network of widely dispersed users and coders who can easily spread information about new products and reach critical mass, important conditions for the diffusion and adoption of innovations (Rogers, 1976 & 2003). Thanks to the community, Apache benefits from costless word-of-mouth activities voluntarily performed by its members (Baldwin et al., 2006). They help to create and diffuse a brand's meaning (Muniz and O'Guinn, 2001; Schau et al., 2009).

6.3 Impact of user brands on producer brands

The existence of user brands may have various implications for producer brands. User brands may become a partner, a complementor, and also a rival to producer brands (Ogawa and Piller, 2006; Raasch and von Hippel, 2012). For example, an outdoor enthusiast or an entire outdoor community may co-develop and co-brand innovative outdoor equipment together with a known producer and become a partner in value creation. Further, users may develop some products, services, or techniques complementing the offering of the producer brand and thereby supporting the offering of the producer brand (Hienerth et al., 2012; Raasch and von Hippel, 2012). And, of course, as we have discussed throughout this paper, users may also

develop and diffuse products or services under their own brand that competes with the offerings of producer brands via ‘user-only’ innovation systems (Füller et al., 2007; Füller and von Hippel, 2008).

Thanks to their price advantage resulting from low development and marketing costs, their quality, and the good understanding of user needs (Baldwin et al., 2006), user brands can be a potentially serious challenge to at least some commercial brands premiums for simple economic reasons. If we divide the price charged for a branded product into the attributes of the product, and those that are tied to the brand only, we can see that commercial products emblazoned with a “strong brand” are able to charge a price reflecting the value that the consumer puts upon both the brand and the product. If a brand of equal strength is offered by a community either at no cost or a lower cost - which they can do because the brand was created at no cost to the community - we can see that they can disrupt existing markets for commercial brands. In addition to lower cost, the Apache brand may also better serve users social and identity needs. Thus, Apache offers free webserver software labeled with a highly positive and authentic user-generated brand.

The lifecycle of user brands also offers different options. Initially, user brands are voluntarily created by users and user communities. Later on, some of those brands may be taken over by producers - the famous computer game Counter-Strike for example was initially developed by a user and then commercialized by the company Valve Software - while other user brands may become commercial as the users may decide to become entrepreneurs (Shah and Tripsas, 2007 & 2012). Cliffbar (www.cliffbar.com) – a producer of organic energy bars – is a good example where a user became an entrepreneur and successfully diffused his innovations. Other user brands may stick to their model and further diffuse their branded products for free such as Wikipedia or Apache.

6.4 Conclusions and suggestions for further research

We conclude by observing that to this point brands have generally been viewed as a scarce resource – costly to develop and sometimes very profitable once developed. It has also been assumed in the marketing literature concerned with brands that the creation of brands is a costly exercise, and that only producers would have reason to engage in it. In this paper, we have explained that the investment required to generate a brand within an individual mind can

be and is made by individual brand users. It is the case that investment by brand producers can stimulate brand creation and shaping activities within the minds of users. However, it is also the case that communities and the activities they engage in in common can stimulate those same activities within many minds - activities that can, as we have shown, result in the creation of a “strong” brand.

In the fields of innovation and design, scarcity-based views are being challenged by views based upon abundance. It is now understood that many users develop innovations for their own purposes and at low cost, and that innovations are not scarce - they are abundant and their designs are often made available to adopters at no cost (von Hippel, 2005). In the light of the no or low-cost creation of brands by communities that we have demonstrated, it is reasonable that a similar transition in thinking will be appropriate with respect to brands.

Further, it could well be that the effects of costless communications now accessible to all via the Internet will have the effect of making user-generated brands progressively still cheaper to create and diffuse, and so progressively more powerful relative to producer brands. After all, it has been the greater ability of producer brands to pay for costly advertising and promotion that has led to their present-day prominence, and to the ability of their owners to charge high brand premiums. Today, similar broad exposure can increasingly be obtained at low cost by both user-generated brands and commercial brands.

However, note that while creation of a user community brand can be costless, follow-on management of that brand may not be. As an example, consider that brands have value because they promise certain qualities in products that are linked to them: it would cloud and diminish the value of the Apache brand, for example, if poor-quality software were allowed to display the Apache logo. As a consequence, free riding on a brand may need to be controlled. Accordingly, as is the case of open source software (O’Mahony, 2003), it is useful that a community can protect its brand as a trademark, and exert ownership rights to control whether and how it is used by others. Ownership rights also mean that a community can profit from its brand monetarily if it wishes to do so.

Further study will be required to understand the generalizability and potential impacts of user brands in more detail. It may be that communities form only with respect to some product categories, or that the brands the communities create have impact only in certain areas. User

brands may be especially effective in supporting diffusion of user innovations in case of information goods such as software, Wikipedia, or magazine articles (Preston, 2012), where reproduction and diffusion is essentially free via the Internet. However examples of effective use of user brands can also be found in physical goods. Consider in that regard Premium-Cola (www.premium-cola.de), a community produced and marketed soft drink based upon a user community brand. Today, after 10 years of existence, Premium-Cola is available in 5% of all German cities, distributing around 1 million bottles per year, and growing at an annual rate of more than 50%. (Borchers, 2012; Lübbermann, 2011).

Further, even where powerful user brands do emerge, producer brands may find ways to parry their challenge. For example, they might create hybrids via cobranding when brand meanings are synergistic (Füller and von Hippel, 2008; Cova and White, 2010).

We look forward to further research on the creation and deployment of brands by user communities. This powerful feature of innovation diffusion systems has traditionally been assumed to be accessible by producers only. We now understand that user communities can also create and deploy powerful brands as a powerful tool to enhance diffusion of user innovations.

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Tables

Table 1: Survey respondents' connection to Apache

Apache community membership	Affiliation type	Number of respondents
<i>Apache community member</i>	Apache Software Foundation member	20
“	Apache code committer	25
“	Apache code developer	28
<i>Non-community member</i>	Apache software user	135
“	Apache fan	35
“	No connection to Apache	90
Total		333

Table 2: Profile of respondents to online survey

	overall	community members	non-members
N	333	73	260
Age (in years)	40.39	36.49	41.52
Gender (% male)	77.90	78.70	77.70
Apache community involvement			
How long have you been a member of the Apache community? (in years)	-	5.89	-
How many hours do you usually work on Apache projects a week? (in hours)	-	15.37	-
Programming experience ²	4.77	5.63	4.53
Brand consciousness ³	4.23	4.46	4.16

¹ 1=strongly disagree - 7=strongly agree

² measured as multi-item construct similar to Lüthje and Herstatt (2004) shown in Appendix A.1

³ measured as multi-item construct similar to Donthu and Gilliland (1996) shown in Appendix A.1

Table 3: Responder's preferences regarding webserver software, and the price premiums they are willing to pay

	Apache community members	non- community members	T-Value ⁴	P ⁵
N	73	244		
Preference 1 ¹	2.34	2.73	-1.809	n.s.
Preference 2 ²	1.29	1.39	-1.348	n.s.
Market share¹				
Apache web server	74.0%	66.4%		
Microsoft web server	26.0%	33.6%		
Price premium³				
Apache web server	61.14%	51.67%	1.116	n.s.
Microsoft web server	76.08%	48.89%	2.059	n.s.

¹ Assume that you are Head of IT in a big company, and are looking for web server software. There are two options, which offer the same level of performance. Which one would you be more likely to prefer?(1=Apache ... 6=Microsoft)

² Which web server would be the web server of your choice, given the following costs for customization, installation and maintenance etc.? (1=Apache; 2=Microsoft; 3=no-name). The no-name option was not considered when comparing the means.

³ How much more (in %) would you be willing to pay for your choice?

⁴ Two tailed T-test (lower T-values are shown)

⁵ * p < 0.05; ** p < 0.01; *** p < 0.001

Table 4: Frequency and valence of free associations

Associations	all respondents			community						Valence Difference		
	Freq.	rel. Freq.	Valence	members			non-members			F	T	p
				Freq.	rel. Freq.	Valence	Freq.	rel. Freq.	Valence			
Apache web server	210	32.1%	5.9	43	22.8%	6.2	167	35.9%	5.8	1.686	2.565	.012**
high quality/ performance	94	14.4%	6.5	34	18.0%	6.8	60	12.9%	6.4	2.141	0.940	.349
Open Source	78	11.9%	6.3	25	13.2%	6.6	53	11.4%	6.2	1.619	1.858	.068*
other Apache projects	69	10.6%	5.4	11	5.8%	5.6	58	12.5%	5.4	0.045	0.489	.632
community-related	53	8.1%	6.3	34	18.0%	6.5	19	4.1%	5.9	4.665	1.741	.088*
Internet-related	38	5.8%	5.9	8	4.2%	6.0	30	6.5%	5.9	0.260	0.261	.798
Software	27	4.1%	5.4	12	6.3%	5.9	15	3.2%	4.9	4.921	1.287	.210
Apache license	21	3.2%	5.2	6	3.2%	6.7	15	3.2%	4.7	6.439	2.642	.016**
Java	21	3.2%	5.8	6	3.2%	6.7	15	3.2%	5.5	5.012	1.546	.139
Free software	17	2.6%	6.4	3	1.6%	6.7	14	3.0%	6.4	1.435	0.722	.502
Linux	17	2.6%	6.4	3	1.6%	6.7	14	3.0%	6.3	0.712	0.922	.403
Technology	9	1.4%	5.2	4	2.1%	4.4	5	1.1%	6.0	0.368	-1.464	.188
		100.0								15.54		
SUM	654	%	6.0	189	100.0%	6.4	465	100.0%	5.8	4	4.734	.000***

* p < 0.1; ** p < 0.05; *** p < 0.001

Table 5: Differences between community members and non-members related to Apache

Differences related to Apache brand attributes¹	Apache community members	non-community members	T-Value	P
<i>Quality</i>	5.91	5.60	2.105	*
<i>Authenticity</i>	5.29	5.08	1.207	n.s.
<i>Self-connection</i>	4.94	4.14	4.903	***
<i>Expertise</i>	5.98	5.74	1.589	n.s.
<i>Brand love</i>	5.12	4.05	6.490	***

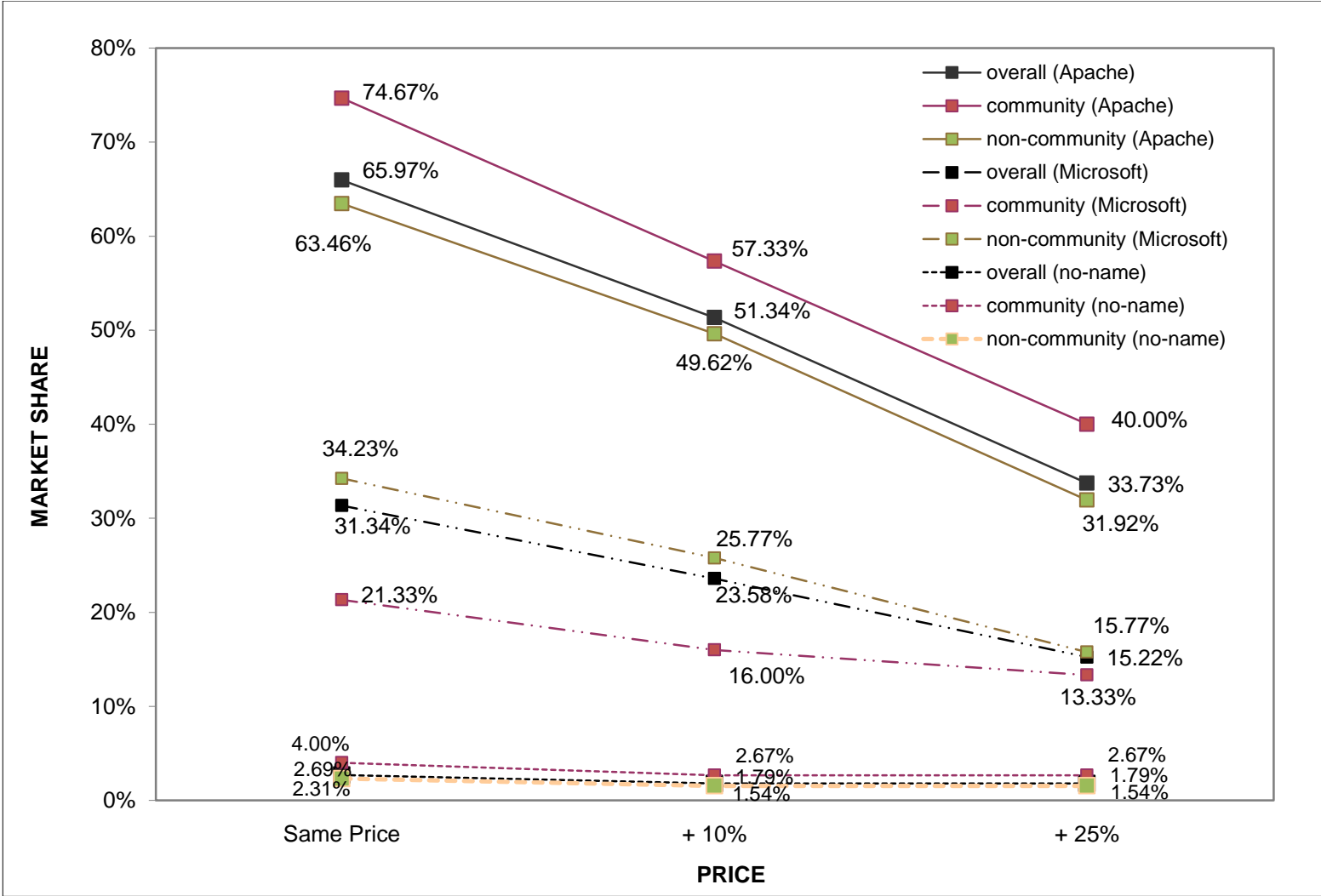
¹ 1=strongly disagree ... 7=strongly agree

Two tailed T-test (lower T-values are shown)

* p < 0.05; ** p < 0.01; *** p < 0.001

Figures


Figure 1: Price-demand curves for web-servers




Appendix A.1: Questionnaire wording and local fit measures of latent constructs in the structural model

Construct	Indicator	Factor loading	Factor reliability	AVE	Fornell-Larcker-Ratio
Authenticity	Apache has a name you can trust	0.79	.83	.62	.95
	Apache is authentic	0.83			
	Apache's beliefs and actions are consistent.	0.73			
Expertise	Imagine Apache as a person. This person is/has...		.97	.89	.59
	... knowledgeable	0.91			
	... skilled	0.93			
	... qualified	0.96			
Self-connection	... expertise	0.95	.84	.73	.94
	Apache reflects who I am	0.64			
Quality	Apache allows me to express myself	0.73	.94	.83	.79
	Apache offers a web-server of consistent quality	.90			
	Apache offers a very good quality web-server	.95			
Brand love	Apache offers a very reliable web server	.98	.90	.75	.92
	I love Apache	0.90			
	Apache is pure delight	0.87			
Programming experience	Apache is totally awesome	0.83	.89	.73	.08
	I am a skilled programmer	.91			
	I consider myself as very knowledgeable to contribute to software projects	.81			
Brand consciousness	I am very interested in programming	.84	.65	.48	.19
	All brands are about the same (r)	.60			
	Commodity goods are of poor quality	.56			


Appendix B.1: Screenshot of online survey preference design




Start
The Apache brand
Apache Web Server
Preference
Apache Community
Personal Information
End



13 Assuming you are Head of IT in a big company and looking for a web server. There are two options which offer the same level of performance. Which one would you prefer more likely?



○ ○ ○ ○ ○ ○ ○



14 How much more (In %) would you be willing to pay for your choice?

0 % 200 %

0 %

85 % next

Appendix B.2: Screenshot of online survey trade-off design (Round of 1st choice)

Start
The Apache brand
Apache Web Server
Preference
Apache Community
Personal Information
End

15 Which web server would be the web server of your choice, given the following costs for customization, installation and maintenance etc.?

Apache	Microsoft	no-name
\$ 10,000	\$ 10,000	\$ 10,000
		no-name
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

88 % next