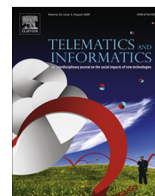


Contents lists available at [ScienceDirect](#)

Telematics and Informatics

journal homepage: www.elsevier.com/locate/tele

Video quality vs. mobile data billing plans



Andreea Molnar

Portsmouth University, Winston Churchill Avenue, Portsmouth PO1 2UP, United Kingdom

ARTICLE INFO

Article history:

Received 25 June 2015

Received in revised form 24 July 2015

Accepted 24 July 2015

Available online 26 July 2015

Keywords:

Consumer behaviour

User choices

Video quality

Mobile data

Bundle based billing

Capped billing plans

ABSTRACT

Despite extensive research regarding the user willingness to pay under different billing plans and prices it is still unclear how users choose a preferred video quality under existing mobile data plans. This is especially important as the usage of adaptive video delivery servers that make use of different video quality levels is increasing. This study presents the results of assessing user preferences for video quality under three different mobile data billing plans. The results show that the user choice of different quality of video content depends on the billing plans used. It also shows that in the case when the mobile data plan is capped but the user has the possibility to pay extra for the exceeding quantity, s/he will choose higher video quality compared to the same plan in which the bandwidth is throttled when the bandwidth is exceeded. No correlation was found between the user choices and age or gender.

© 2015 Elsevier Ltd. All rights reserved.

1. Introduction

Mobile Internet traffic is characterised by an increase in number of subscribers (Pande et al., 2013) and an exponential increase in video content (Trestian et al., 2012) through an increase of both user generated content (Trestian et al., 2011) and access to other services, such as video through mobile networks and devices (Lee et al., 2015). Video content is usually heavier than other types of content and consumes more bandwidth. In an effort to impede congestion and increase revenues, mobile network operators that initially offered unlimited data access, realised that flat rate plans are no longer feasible and decided to cap them. Reviews of mobile prices in major European countries (Molnar and Muntean, 2013), and not only (Sen et al., 2013), have shown that most mobile data plans are cap based (aka bundle based, buckle based). Although capped billing plans are mostly present in mobile networks, broadband network operators also make use of them (Higginbotham, 2013). Capping the amount of data the user can consume is likely to continue even with the deployment of more powerful networks (Pande et al., 2013; Chih-Lin et al., 2014). Investing in new network technology is seen by mobile network operators as a way to impede congestion, and increase the revenues for network operators by removing unprofitable user behaviour (i.e. consumers that use a large amount of data). In this context, capped billing plans can be seen as a means of controlling network traffic and ensure a “fair-usage” policy for Internet resources.

As another measure to avoid congestion, content providers adapt the video content to the network conditions, a process that leads to lower size data that will be delivered over the network at the expense of the video quality. For example, YouTube automatically selects a lower quality video when the request is performed from a mobile network rather than over a Wi-Fi or a wired network and Netflix allows the users to select a lower video quality in order to avoid reaching the cap limit (Newman, 2011).

E-mail address: andreea.molnar@port.ac.uk

<http://dx.doi.org/10.1016/j.tele.2015.07.009>

0736-5853/© 2015 Elsevier Ltd. All rights reserved.

Despite the increasing use of capped billing plans on mobile networks and the increased usage of video over these types of networks, our understanding of how people would choose between different video qualities under different billing plans remains poor. The goal of this research is to partially fill this void by providing further understanding on the user choices for video quality under different prices. Without knowing their users, mobile network operators cannot optimise their plans for marketing purposes (Jung and Kwon, 2015). This would also help improve video adaptation algorithms leading to a better user quality of experience, which could help retain customers. Moreover, it could maximise the resources mobile operators have. With this aim, a quasi-experimental study (Reichardt, 2009) was designed to assess how users select different video qualities under billing plan constraints. Three different billing plans are considered for the study: a flat rate billing plan and two types of capped billing plans: in one billing plan, once the user reaches the data cap, the user has to pay extra for the exceeding quantity whereas in the other billing plan, once the user consumed the data from the bundle, the user bandwidth is throttled.

The rest of this paper is organised as following. Section two introduces existing research on mobile Internet consumer behaviour. Section three presents the study set-up and the findings. Section four discusses the results and section five presents the study's conclusions.

2. Related work

Several studies (Koenigstorfer and Groeppel-Klein, 2012; Kumar et al., 2015; Jung and Kwon, 2015; Molnar & Muntean, 2015) have assessed consumers' usage of mobile data. The study presented in Koenigstorfer and Groeppel-Klein (2012) assessed how consumer personality affects the consumer acceptance of the mobile Internet, showing that innovativeness, low desire for social contact and technology optimism influence consumer acceptance. Molnar and Muntean (2015) looked at how the user risk attitude affects user's preference of video quality under monetary cost constraints, showing that risk adverse people are more willing to trade off quality for price than the risk seekers.

Kumar et al. (2005) and Jung and Kwon (2015) assess factors that affect customer satisfaction and preference with mobile network operators. Jung and Kwon (2015) have shown through a study performed in Korea that by improving the customer satisfaction, the mobile network operators could improve the loyalty of their 3G and LTE users. They have also shown that 3G subscribers are more sensitive to call services and that LTE users are more sensitive to quality of data service and pricing. Kumar et al. (2015) show that mobile network parameters and tariff schemes are affecting customer preference towards a mobile subscriber.

Other studies have looked into how consumer behaviour is characterised under different billing plans. For example, it has been shown that people are optimising their time spent on the Internet if the billing plan is not unlimited (Roto et al., 2006) and people own past experiences or highly publicised stories that report high billing plans are likely to have an effect on how people use and interact with mobile data (Isomursu et al., 2007). Marcus and Godlovitch (2013) showed that consumers use more intensively mobile data when they are connected to a Wi-Fi network and speculate that the reason may be rationing the consumption on mobile phones. Previous research has also shown that users are also uncertain about how much they consume and dislike bill shocks preferring flat rate billing plans due to their inherent predictability (Odlyzko, 2001). Molnar and Muntean (2010) have shown that some people may prefer a lower quality video under capped billing plans than what they would choose under a flat rate billing plan, however the study did not further assess how the user choices differ among existing billing plans. This study aims to address this gap by assessing how people choose between different quality levels on currently used mobile data billing plans.

3. Study

3.1. Sample and data collection

A quasi-experimental design was followed in which the participants had to select among videos of different qualities given the constraint of different billing plans. The study was advertised and the participants volunteered to participate in the study. A total of 60 people took part in the study, 75% males and 25% females. The ages varied from 20 to 57 years old, with an average age of 32 years old.

3.2. Procedure

The billing plans used in the experimental study are selected based on the results of the survey containing the most common billing plans in Europe presented in (Molnar and Muntean, 2013). Three scenarios were designed based on existing mobile data billing plans. Two capped billing plans were selected: one in which the user has to pay extra for exceeding the threshold included in the bundle and another one in which after the bundle data is exceeded the bandwidth is throttled. Although a flat rate data plan is not common on the mobile Internet, one of the scenarios included a flat rate billing plan for comparison. The following billing plans were selected:

Download English Version:

<https://daneshyari.com/en/article/465319>

Download Persian Version:

<https://daneshyari.com/article/465319>

[Daneshyari.com](https://daneshyari.com)