

Web Content Monetization Using Micropayments

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Declaration

I hereby declare and confirm that this thesis is entirely the result of my own original work. Where other sources of information have been used, they have been indicated as such and properly acknowledged. I further declare that this or similar work has not been submitted for credit elsewhere.

Hagenberg, September 25, 2018

Hebatalla Elsayed

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Preface

This work attempts a solution for monetizing written content online using micropayments, a model that gives the reader more flexibility and control within the content purchase process, without compromising publisher revenues. From the analysis of five studies, interviews with a group of readers and publishers, and evaluation of a selection of current micropayment models, recommendations for payment model design and implementation are derived. A Ruby on Rails prototype is also built as a proof of concept for a *Reader Scoring* system, which is also inspired by the previous findings.

The prototype is too limited to be tested by users for feedback gathering though. Most of the thesis efforts were focused on researching the current paywall and micropayment trends, understanding the promises and limitations of cryptocurrency-based solutions to monetize, and simulating those ideas on a WordPress blog to be tested by the thesis survey participants. The decision to switch from WordPress PHP plugins to a small Ruby on Rails prototype came later in the project timeline, after all the survey interviews were done.

Moreover, the answers to the surveys on how readers and publishers feel about the variety of available payment solutions tend to be impacted by demographic and political conditions, rather than technical features. For instance, the trust in news or openness to interact with written content online varies from a country to another, depending on the economic and political atmosphere. That is in addition to the educational and financial status of the readers, which highly influences the decision to subscribe. This explains the differences between the findings of each study, since the target groups were from different backgrounds, and had varying motives to read content online. Therefore, those external factors must be carefully considered when choosing the most fitting payment model. The thesis does not intend to take a holistic approach towards a solution as that needs very broad effort and expertise in a diversity of fields (journalism, psychology, sociology, politics, marketing etc). The focus of this work is on the User Experience (UX) and the design aspects of a payment model, the simplicity and security of its implementation, and the fairness it implies for both readers and publishers.

Abstract

After the fall of advertising and the rise of ad-blockers, newspapers and magazines are increasingly adopting paywalls with a diversity of subscription packages, in order to save their revenues. Reader reactions, however, are hard to estimate and guarantee. Some people see more value in paid content, while others are against paying for what used to be free. This work examines the recent trends for monetizing written content online, especially micropayment-based solutions. A selection of micropayment models are evaluated in terms of simplicity, security and fairness. Various reader perspectives on subscriptions are also gathered in an online survey and analyzed, together with the findings of two major studies conducted in 2017, investigating the consumption and payment for online news around the world. After looking closely from the technical and the user interaction perspectives of the case, recommendations for improving the User Experience (UX) with the micropayment interface are derived. Prototypes of these recommendations were developed using WordPress Content Management System (CMS) and Ruby on Rails.

Kurzfassung

Mit der wachsenden Kontroverse um umfassende Werbung, welche die Privatsphäre der Nutzer online angreift, begrenzen einflussreiche Publisher und Content-Hersteller ihre Abhängigkeit von werbefinanzierten Einnahmen und beginnen mit dem Aufbau von Paywalls. Ein beträchtlicher Prozentsatz der Leser zeigte jedoch einen Widerstand gegenüber den etablierten Subskriptionsmodellen. Dies warf die Frage auf, wie effektiv eine Paywall sein kann und ob es faire Alternativen gibt. Diese Arbeit untersucht die aktuellen Trends zur Monetarisierung von geschriebenen Inhalten im Internet, insbesondere Micropayment-basierte Lösungen. Eine Auswahl von Micropayment-Modellen wird hinsichtlich Einfachheit, Sicherheit und Fairness bewertet. Verschiedene Leserperspektiven zu Abonnements werden ebenfalls in einer Online-Umfrage erfasst und analysiert, zusammen mit den Ergebnissen von zwei großen Studien, die 2017 durchgeführt wurden und den Verbrauch und die Bezahlung von Online-Nachrichten auf der ganzen Welt untersuchen. Nach genauer Betrachtung sowohl der technischen als auch der Anwenderseite werden Empfehlungen zur Verbesserung der User Experience (UX) mit der Micropayment-Schnittstelle abgeleitet. Prototypen dieser Empfehlungen wurden mit WordPress CMS und Ruby on Rails entwickelt.

Chapter 1

Introduction

1.1 Motivation

Most of online content publishers rely on advertising for revenue, but as ads started to fail both content owners and readers, the former group is facing challenges maintaining profits. Invasive user tracking for ad-customization is pushing readers to install ad blockers to defend their privacy, and publishers are as well switching to various paywall models to defend their revenues. This is how the controversy of “to build or not to build a paywall” started almost seven years ago, when *The New York Times* set the first paywall to the reading audience online. Back in 2011, readers showed remarkable resistance to the idea of paying for what used to be free. Many of them also expressed concerns even beyond financial ones: Questions about political polarization, social pressure and unfairness, freedom of knowledge etc. were raised.

Nonetheless, too many changes happened in those seven years: Political polarization intensified in many parts of the world, especially with the extended use of social media and the facilitated spreading of fake news. Media producers and news agencies found themselves in a situation where they might lose the trust of their audience in a blink of an eye. On the other hand, it became much harder for readers to find reliable information, deep analysis of events, or even opinions that are based on good research. In other words, many readers are actively seeking good quality content, especially at a time when headlines are mostly no more than click-baits. Readers do the clicking, read the lines and navigate through pages, but get nothing useful in return. This made them more accepting to written content that is not financed by advertising. On one hand it keeps their privacy intact, and on the other hand, this written content would probably stand out in terms of quality.

This is what *Medium* CEO Ev Williams talked about when he decided to completely replace his ad-driven revenue model with a membership-subscription model. The intention was to let his publishers focus all their creative efforts on delivering high quality content, rather than writing whatever attracts more traffic and clicks. In his *Medium* blog post about the shift, Ev openly and boldly explained “It is clear that the broken system is ad-driven media on the Internet. It simply does not serve people. In fact, it is not designed to. The vast majority of articles, videos, and other content we all consume on a daily basis is paid for—directly or indirectly—by corporations who are funding it

in order to advance their goals” [21]

People in the media industry were skeptic about what Williams wrote, and also not all Medium writers agreed with him on the shift. In one of his blog posts right after announcing the paywall [19], a UX specialist named Jon Moore proposed some features to be added to Medium, so that it is more reasonable for readers to pay. First he suggested adding a sourcing platform for publishers to identify Medium writers who are open for hiring and exchange messages with them. Publishers pay a fee for accessing this platform and writers pay for tagging themselves in it. Another idea he had was providing the writers and publishers with analytics tools for a fee, those analytics tools help publishers get more insights about their readers and what content categories engage them more. Such suggestions not just give more incentives for users to pay, but also encourages publishers to extend their services context in a way that extends their profit margins as well. This also implies that UX tools can help find innovative solutions for online content monetization.

The current situation, however, is still not optimal for both readers and publishers. The paywall idea is still being resisted by a considerable number of readers. Some users would switch to other free content or use loopholes to access premium material instead of paying for it. Although it is challenging to find a fair solution that ensures sustainability for publishers and satisfaction for readers, there are promising innovations out there. A bunch of micropayment plugins and clients have been introduced lately to simplify the process of payment for content, so that fewer readers will be turned away by paywalls.

1.2 Thesis Research Goal

This thesis is based on the research question of “What is the optimal monetization solution, for both publishers and readers of online content, in terms of simplicity, security and fairness?”. *Simplicity* is evaluated according to the time, costs and technical attainability of implementing the model commercially. *Security* is evaluated according to the probability of finding loopholes, bypassing the payment interface, and whether user privacy will be compromised. *Fairness* ensures that little (or no) segment of readers is abandoned and more (or all) content creators are rewarded.

To take a closer look at what readers actually think, an online survey of two questionnaires was carried out. The first was filled out by 43 *Reader* participants, and the second one which was dedicated to *Content Makers* involved 10 participants. Their answers to questions about their payment preferences and concerns were collected, and then compared to the findings of two major studies conducted in 2017 by *The American Press Institute*¹ and *Reuters Institute*² on consuming digital news in the US, Austria and the rest of the world. The studies anticipated that there is a growing search for high quality content and reliable information, and that potential payers are there waiting for the right opportunity to start supporting their favorite publishers.

¹<https://www.americanpressinstitute.org/>

²<http://www.digitalnewsreport.org/survey/2017/>

1.3 Thesis Structure

The thesis work involved two semester projects, the first one is a Wordpress CMS set up with paywall plugins that mimic the subscription models adopted nowadays by newspapers like *The New York Times* and *The Economist*. This project set the base for optimization trials planned for the second project. The second semester project was a more extensive one that adopts micropayments as more promising alternative models to paywalls, especially in terms of UX. Paywall models of the first project were completely replaced by micropayment plugins from WordPress, and eventually those micropayment models were made available for survey participants to test. In a later phase of the second project, another separate blog was built with Ruby on Rails to facilitate the addition of interactive features that motivate readers to read more articles from the publisher's site, and also start to pay for them.

In the next chapter, a selection of recent micropayment plugins, clients and models are described in detail, referring to the key players in literature. In the third chapter, results of the thesis surveys with readers and content makers are exhibited and analyzed. The survey findings are then used to reflect on the models shown in the second chapter. Moreover, the models are evaluated in further detail within the same chapter, according to the thesis research question criteria explained earlier. The fourth chapter reviews the two studies by The American Press Institute and Reuters Institute, and highlights their key findings. The fifth chapter summarizes the thesis recommendations that are built upon the survey results, research question criteria and the two studies findings in the previous chapter. The sixth chapter includes the documentation of the thesis projects, the seventh chapter shows the intended future work, and finally the eighth chapter concludes the thesis.

Chapter 2

State of the Art

A micropayment is an e-commerce transaction-type with a low financial amount, typically used to purchase online products and services such as e-books, music and memberships [29]. It could be real money, cryptocurrencies or any other non-monetary resources that the user can give away. A micropayment is a simplified method of paying online as it can be done with less intervention from the user. Many of the newly proposed electronic payment methods are using the concept of simple micropayments as it is promising a better user experience. This chapter is a showcase for a number of micropayment models and implementations currently established.

2.1 Existing Micropayment Plugins in WordPress

2.1.1 LaterPay

LaterPay [18] is a plugin that lets the user pay very small amounts of money in exchange for individual articles. Users would top up their accounts from their credit cards and with one click they can buy articles. The plugin on WordPress also has other pricing options like *day-pass* and *dynamic pricing*. Day-pass makes all content available to the user for 24 hours under a reasonable price set by the publisher. As for dynamic pricing, it enables the publisher to let the price of an article change as it ages. Additionally, the normal paywall option of monthly subscription is also available in LaterPay.

2.1.2 SatoshiPay

SatoshiPay [23], a company founded 2014 in Berlin offers a micropayment plugin based on the blockchain technology. The plugin gives publishers the flexibility to set discrete prices for individual articles, photos, audio files or videos. It can also detect ad-blockers and ask the corresponding users for payment. Users would top up their account with a cryptocurrency called *Lumens* [26] (being referred to as XLM), lumens can be purchased directly from the plugin interface using credit cards or PayPal, otherwise payers can directly use their *Stellar Wallets* in case they have ones. Stellar [25] network is a platform which connects banks, people and all payment systems, and offers low cost financial services. It supports web, desktop and mobile clients which act as *wallets* with secure keys for each user to be able to send and receive money in lumens format.



Figure 2.1: LaterPay several options to visitors.

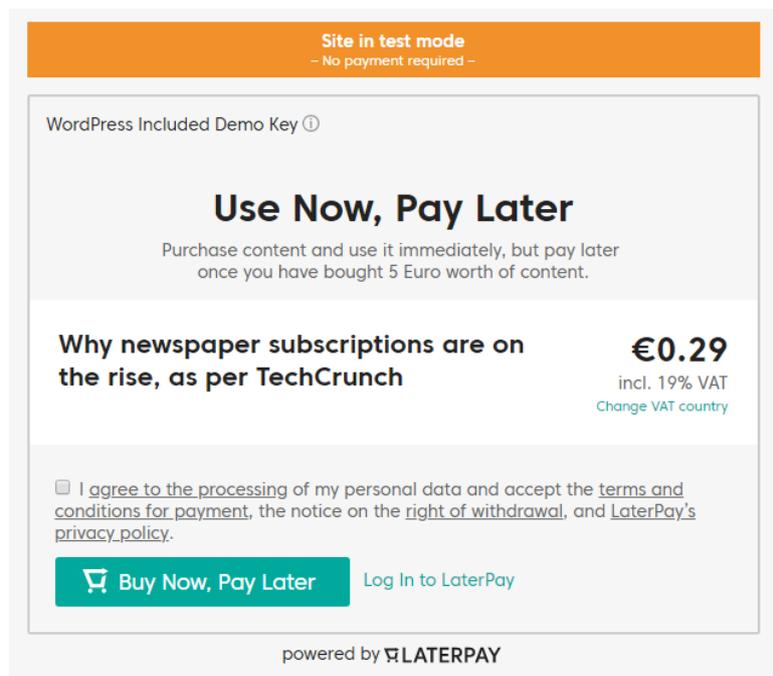


Figure 2.2: LaterPay payment interface.

2.1.3 BitMonet

BitMonet [9] has features similar to SatoshiPay but charges users in bitcoin using *BitPay* [10] accounts. Users can also pay with PayPal after reaching a threshold, or tweet the article instead of paying. BitMonet also provides timed passes similar to LaterPay ones. However, this plugin will not be evaluated in this work, as it is not maintained for four years now, despite all the promising options provided (which are partly considered in

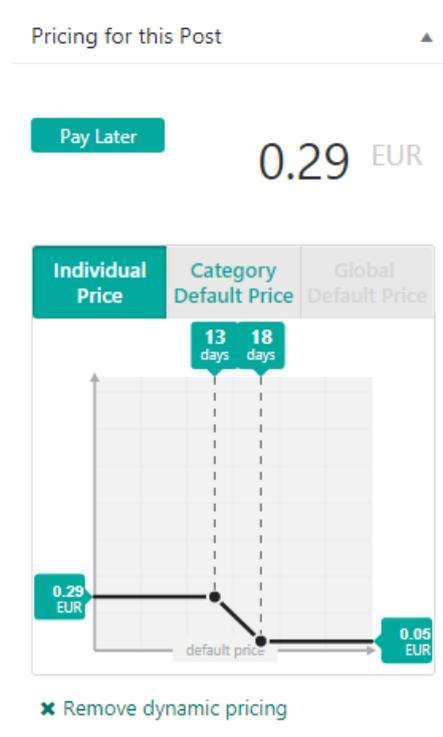


Figure 2.3: LaterPay dynamic pricing.

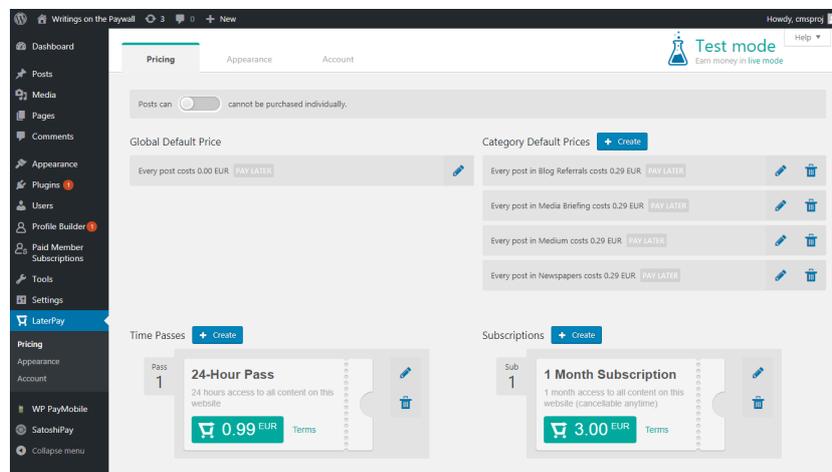


Figure 2.4: LaterPay payment options to be set by the publishers.

the future work). Also the public Github repository is empty which makes it harder investigate.

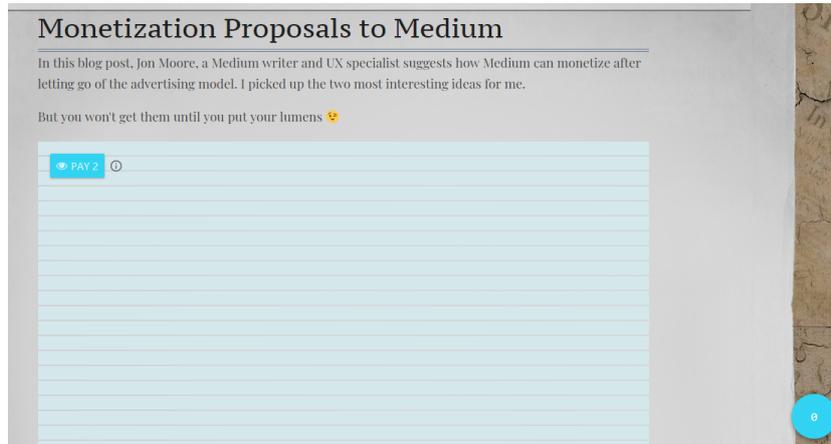


Figure 2.5: SatoshiPay banner.

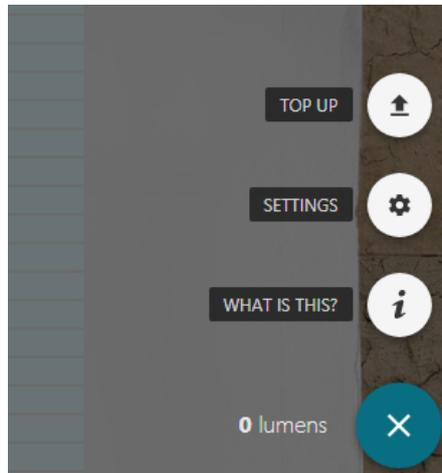


Figure 2.6: SatoshiPay lumens interface.

2.2 Brave

Brave [11] is a new browser that blocks user-tracking advertisements, and has a built-in micropayment wallet system called Basic Attention Token (BAT). Users can choose from a variety of cryptocurrencies (as shown in Fig. 2.8) to top up their BAT wallets and donate to the websites they specify, but those websites need to be registered in the BAT system first in order to start receiving money from their visitors.

Brave is a free browser and it is open source too, it is based on Chromium web browser and was announced by Mozilla co-founder and JavaScript creator Brendan Eich in Jan 2016. It is built with a framework called Muon¹ which leverages the power of Chromium [27] and supports message or event based microservices (extensions). The ad-blocking and tracking protection features, as well as the BAT ledger are written in

¹<https://github.com/brave/muon>

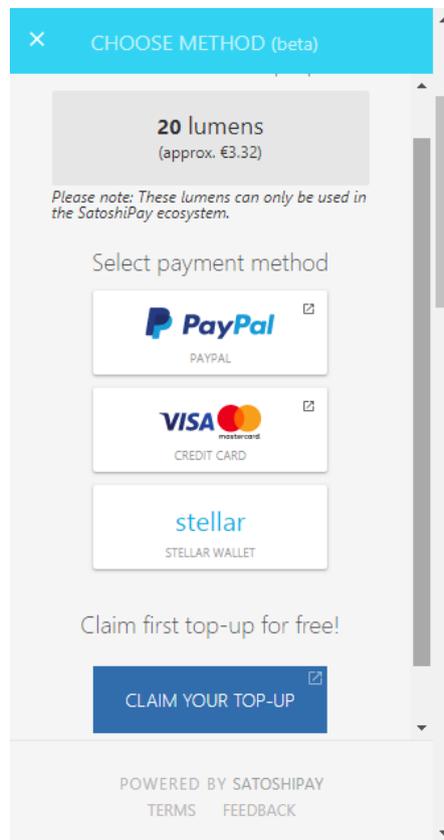


Figure 2.7: SatoshiPay top-up interface.

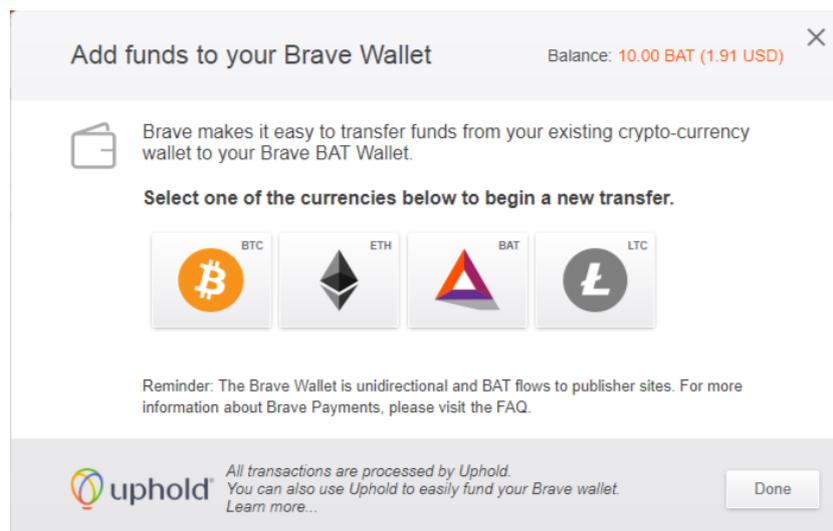


Figure 2.8: Brave BAT system.

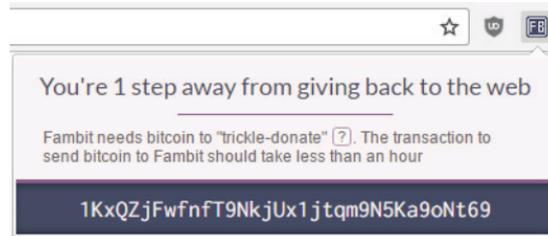


Figure 2.9: Fambit onboarding for setting a wallet.

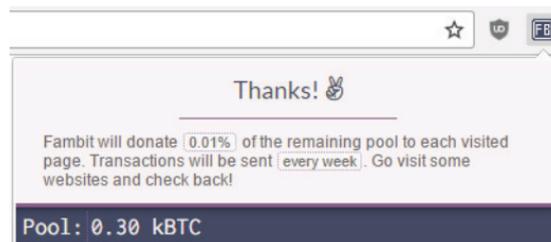


Figure 2.10: Fambit message after a donation is made.

C++. The desktop browser is available for Windows, Linux and macOS, and there are mobile browsers for Android and iOS platforms as well [12].

2.3 Fambit

Another micropayment-within-browser solution is the one presented by students from Thompson Rivers University in Canada. They call it “Fambit”, and it is a browser plugin that allows users to donate automatically to any site visited without discrimination. Users only need to charge their accounts on the plugin whenever convenient. Then with the least hassle to the user, donations are automatically deposited as bitcoin micropayments to all hosting sites browsed. Payments are calculated as percentages of the current balance—with no minimum—rather than fixed amounts [1], thus no need to charge the account very frequently.

Fambit is a WebExtension [28] written in JavaScript and targeting Chrome, Firefox and Opera web browsers on any platform (Windows/macOS/Linux). The user installs it from the browser’s add-ons store, then Fambit creates a local Bitcoin wallet for the user to insert Bitcoin amount, and then a public address is generated for transactions. Whenever the user visits a website, a percentage of the available Bitcoin amount is sent to the website wallet (Fig. 2.10). The website needs to add a meta tag *bitcoin-recipient* in order to receive money, if the tag exists, Fambit’s icon changes to include a small green circle which indicates that the current site is receiving a donation. If the tag doesn’t exist, Fambit assumes that the site does not support it. This tag is the only external Fambit interaction and it is not strictly tied to the plugin, that is why Fambit boasts a decentralized architecture.

Another aspect of the plugin’s decentralized architecture is that it has no custom



Figure 2.11: Fambit plugin displays a green mark when a supported site is visited.

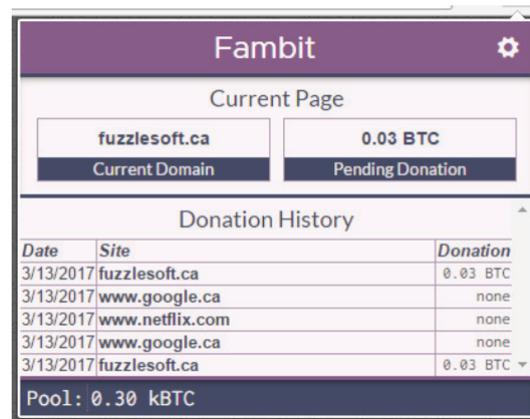


Figure 2.12: Local history of sites receiving donations by Fambit plugin.

Fambit protocol or server. All Bitcoin wallet information and site-browsing history is managed locally, and the only centralization introduced by Fambit is the propagation of donations on the Bitcoin blockchain by publishing them to the blockchain.info service's web API [11]. This is also the only information that Fambit reports to an external source, so users do not need to worry about the privacy of their data. Fambit also includes a small tool that will report errors and exceptions in the plugin to the developers, but this tool does not send identifiable information. However, users have the option to disable this error-reporting feature if they have any concerns.

Fambit also has a domain-blacklist function which allows users to add sites that are misusing if for their advantage, for example websites that separate their content into unnecessarily large number of pages, or put users into redirect loops. The Fambit-Blockchain transactions are done on a weekly basis and not immediately, so this gives the users enough time to review their transactions, and also makes the blockchain processing fees less as they are done per week and not per transaction. This as well explains why Fambit is totally free, open source and does not take any cuts of the user transactions. The transactions are costless for Fambit after all. The plugin also depends only on the existing infrastructure, owing to the standardization of the *WebExtension API*, minimal developer maintenance is required to keep Fambit operational on supported browsers. Most importantly, it is licensed under the GPL12, so even if the maintenance level is unsatisfactory, different programmers can clone Fambit to create a better-maintained and more competent version.

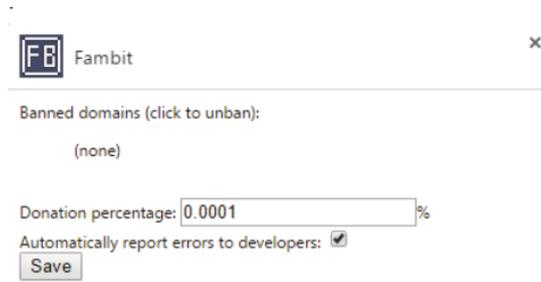


Figure 2.13: Fambit plugin configuration.

2.4 Microcomputations as Micropayments

A more evolutionary and extensive model for micropayments directed specifically towards newspapers was suggested by post-doctoral researchers from ETH Zurich [2; 3]. In this model, the micropayments are neither actual nor virtual money, they are basically microcomputations converted to monetary rewards. Readers give away part of their computational power in exchange for premium content on the newspaper website. The model does not only involve readers and newspapers, but—similar to the case with the advertising model—it also involves consumers and intermediaries. Consumer entities (denoted by \mathcal{C}) use the requested computation power in their projects (mostly charity or scientific research projects or any cause that is transparent to the readers). The intermediary entities (brokers, denoted by \mathcal{I}) validate the computations' results submitted by readers (users, denoted by \mathcal{U}), propagate them to the consumers and reward the newspapers (publishers, denoted by \mathcal{P}) with money so that the latter group no longer needs to charge users, they only lock the content until it is acknowledged that the user submitted their microcomputational tasks. Content can be split into pages or sections so that the more is accessed by the readers, the more computations are requested and carried out on their machines.

This system is inspired by, and can be integrated into currently established distributed computing frameworks like BOINC [8]. It targets non-specialized commodity web-services such as online news, Facebook etc. that might risk losing a remarkable percentage of users if they decide to charge them for money, or to give up the controversial advertising model currently adopted. However, the system can be used with the advertising model still in place. With the microcomputations as payments system, users do not even need to register to the website to read content from \mathcal{P} entity of the model, as long as they are willing to offer some of their computational power to \mathcal{C} entity. \mathcal{C} is expected to have challenging computing projects that need outsourced power from \mathcal{U} , the nature of the projects is supposed to be transparent to the users and probably have social responsibility aspects attracting their support. Aspects such as scientific research, health care projects, energy conservation etc. Moreover, governmental agencies and private industries can also play the \mathcal{C} role when needed. After all, the computations done on the users machines are with their consent and are transparent enough to clearly identify the receivers.

The suggested model does not require demanding hardware or software to be in-

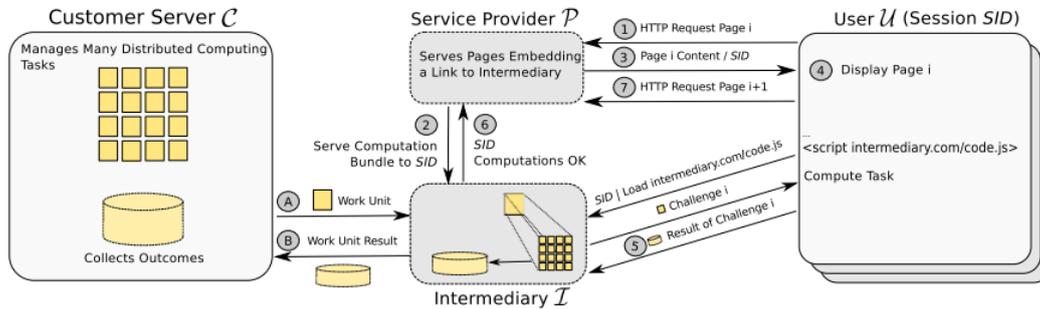


Figure 2.14: Proposed model of Micro-computations as Micropayments.

stalled on the U side, this is because a cross-browser framework is implemented using Google Web Toolkit (GWT) [15], where both the server-side and the client-side code is written in Java. With GWT, the client-side code is compiled to JavaScript in order to be interpreted directly by the web browser, without the need for further client-side support. It also handles automatically the differences in JavaScript support from different browsers, and thus no additional plugins are required on the U 's browser.

The proposed process starts with \mathcal{C} which outsources computational tasks to a distributed computing platform, \mathcal{I} fetches these work units, breaks them into smaller forms (micro-computations) and embeds ringers for integrity checks. The tasks are then propagated to U as they request to access content by \mathcal{P} . U 's browser fetches computations from a remote server and executes them using the machine's idle CPU within browsing time. \mathcal{I} (or \mathcal{P} itself) gathers the results of computations submitted by U 's machine and verifies their integrity using the ringers. Additionally, \mathcal{I} also keeps track of all previously submitted micro-computations to make sure that no micro-computations are reused several times for different payment transactions. After successful verification, the results are sent to the distributed computing partner (or \mathcal{C}) in exchange for a payment that is transferred to \mathcal{P} .

The prototype implemented by the team from Zurich ETH is a stand-alone server which distributes RC4 key-search tasks to the users' browsers in exchange for premium content. The core module was implemented in JavaScript to ensure that all browsers are able to start it without requiring additional client-side software. When the browser loads and executes an iframe tag that is provided through the JS module, the core client is initialized and checks whether the host browser supports Java or Silverlight. If Java is supported, the computations will be executed by a Java applet. If the browser does not support Java but supports Silverlight, the computations will be executed by a Silverlight applet. While in case the browser supports neither Java nor Silverlight, the computations will be performed natively in JavaScript. In fact, Java code can execute at a superior speed when compared to Silverlight code; and the Silverlight code executes faster than the relatively slow JavaScript code. The computations that need to be executed by the browser are stored in a computing FIFO queue, when the queue contains a number of microcomputation bundles that are below a given threshold, the client performs an XMLHttpRequest to \mathcal{I} in order to fetch more work units. This XMLHttpRequest contains the type of computations that the browser can support (i.e., Java, Silverlight

or JavaScript) so that the intermediary is capable of responding with the supported type of computations. When microcomputations are received from \mathcal{I} , they are stored in the FIFO queue which is continuously polled to extract new microcomputations. A new thread of computations is then started when threshold is reached.

In this implementation, the global CPU consumption is throttled to a maximum value of 50% to ensure that the user browsing experience is unaffected even if they open multiple tabs and execute a number of microcomputations in parallel. Here, for each batch of microcomputations, the core client measures the time t_c they require to execute. The core client then interpolates the required sleep time t_s (zero CPU consumption due to microcomputations) from t_c as

$$t_s = \frac{t_c(100 - C_{max})}{50} \quad (2.1)$$

assuming that computations result in 100% CPU utilization within t_c , and that C_{max} is the maximum consumption reached.

When the thread finishes executing its assigned microcomputations, the client bundles the computation results in XML format and dispatches the results back to \mathcal{I} . The client checks the status of the connection with \mathcal{I} at all times by sending periodic XHTML-based heartbeats. The \mathcal{I} in the prototype is implemented using Java servlets, and interfaces with both \mathcal{P} and \mathcal{U} browsers to support the functionality of micro-computations as micropayments. In that prototype, however, the team assumes that \mathcal{I} and \mathcal{C} are co-located on the same server and thus the communication delays between the entities are not considered. Obviously the main goal from the prototype was evaluating the impact of computation on the user's machine performance and browsing experience, but not simulating the whole model or evaluating all of its implications.

Chapter 3

Evaluating Current Work

From the previous chapter we can observe the variety of solutions available for publishers to charge for their content online using micropayments. Among them are solutions that are out of the box where users do not really have to pay money, but rather give away a portion of their computing power. Even if the payment is actual money, the idea of micropayments makes it easier and more convenient to reward the publishers for their work. For evaluating those solutions, two separate questionnaires have been distributed on Facebook, Twitter and LinkedIn to 1) readers and 2) publishers of online content. Their answers were collected and illustrated to give a preliminary idea about the value of the work exhibited in the previous chapter, from the users' point of view.

This chapter is divided into two main sections: The first section reflects on the readers and publishers answers to the questionnaires, and the second section evaluates the work exhibited in Chapter 2 according to the criteria set in the research question: *simplicity, security and fairness*.

3.1 Evaluation Based on Users Survey

3.1.1 Questionnaire for Readers

With a test WordPress site installed (more details in Chapter 6) and some blog posts written, as well as two other sections added, two WordPress plugins were installed to simulate different micropayment modules. *LaterPay* [18] was used to simulate the options to pay per article, as well as 24-hr and 7-day passes. *SatoshiPay* [23] was used to simulate payment per paragraph or image or video using Stellar XLM [26]. Users either purchase XLM using Paypal or credit cards, or top up directly from their Stellar wallets in case they have ones (only 1 participant out of 43 had a wallet but not Stellar wallet).

The participants were asked about their ages and nationalities, as well as their current paid subscriptions (if any) and whether they use ad-blockers. Among the subscribed content mentioned were *Wall Street Journal*, *Get Abstract*, *Business Insider* and *The Local Sweden*, in addition to media content like *Amazon Prime*.

The readers were also asked about what would make them consider to pay for content, as well as reasons not to pay for it even if it is from their favorite publishers. Fig. 3.5 and Fig. 3.6 show answers to these two key questions.

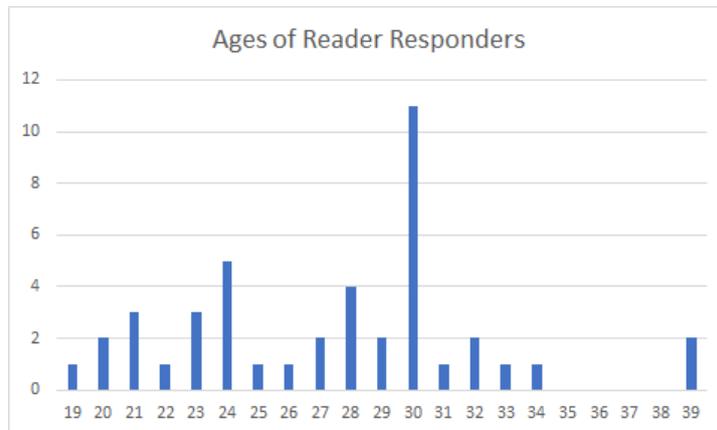


Figure 3.1: Ages of participants to the Readers Survey.

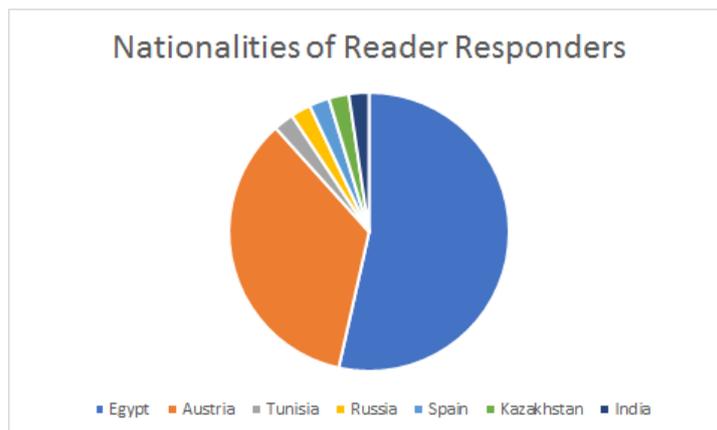


Figure 3.2: Nationalities of participants to the Readers Survey.



Figure 3.3: Percentage of Readers already having paid subscriptions.

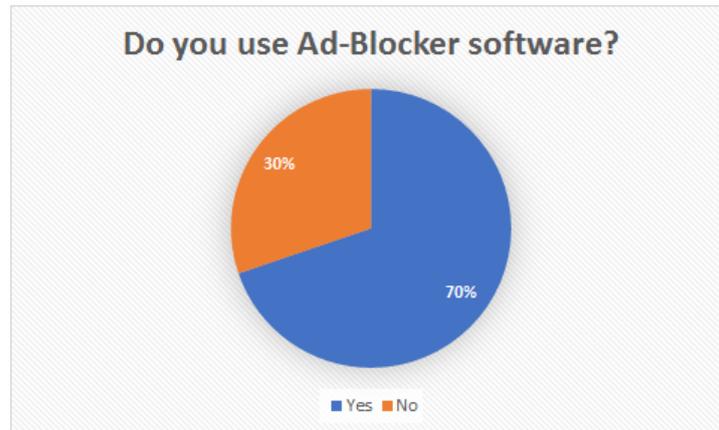


Figure 3.4: Answers to paid-content-subscription and use of ad blockers questions.

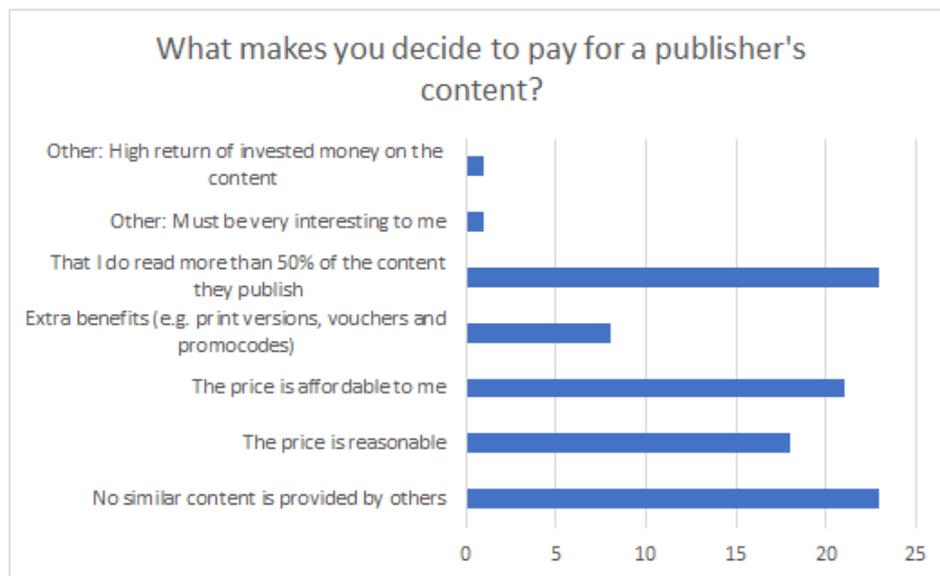


Figure 3.5: Motives to pay.

53% of the respondents think they are willing to purchase content if nothing similar is available for free. The same percentage also expressed willingness to pay if they actually read more than half of the content they are subscribed to. Regarding the price of subscription, 49% agreed it should be *affordable* and 42% were for being *reasonable* (according to the answers of the other question in Fig. 3.6, 53% said they would not pay if the price is too much even if they can afford it). 19% of participants also expressed interest in extra benefits like print versions and vouchers as motives to subscribe.

On the other hand, 63% would not pay if they find similar content for free, and 58% would not pay if they do not consume more than half of the content provided. 16% would also disregard if there are no extra benefits. While 19% are against paying for online content as a whole, 14% would wish to pay for content if they can afford to.

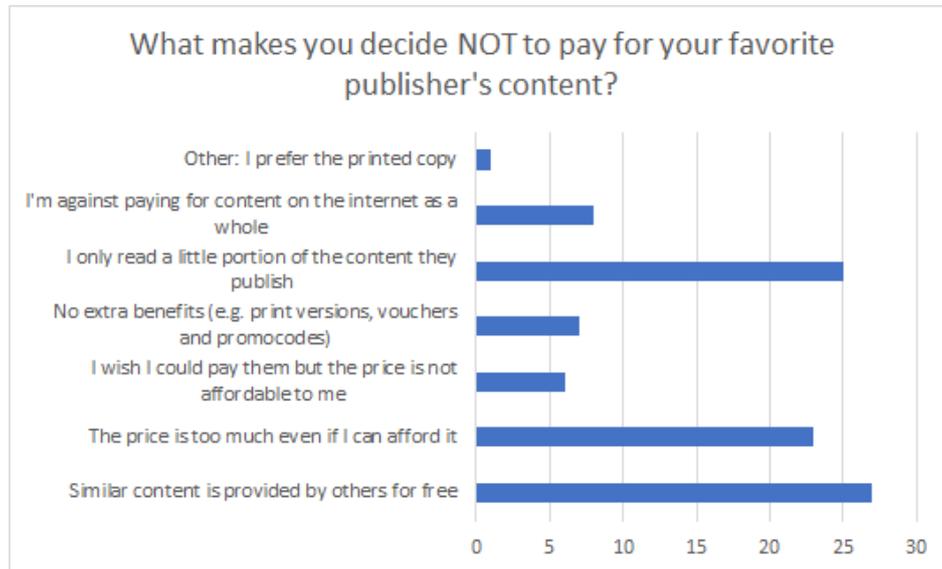


Figure 3.6: Motives not to pay.

In the second section of the survey, participants were given links to a variety of articles (both test and real articles when applicable) with a variety of payment options, and were then asked about the ones which were interesting to them, and the ones they preferred the most.

As shown in Fig. 3.8, 74% of the participants were interested in full-content monthly subscription (58% chose it as the most preferred option). Almost 42% liked the pay-per-article option (12% preferred it the most), and 23% liked the per-section monthly subscription (also 12% chose it as the most preferred). 9 participants (21%) liked the week pass option, but only one of them chose it as the most preferred. Same for the per-author subscription and per-paragraph, per-video etc, all of which got only 1 vote for being the most preferred, and 2 votes went to the 24-hr pass.

One more question the participants had to answer was about their willingness to pay with cryptocurrency, and in fact most of them were not interested. Answers are recorded in the chart in Fig. 3.10.

Looking into the answers of 43 random participants to the readers survey, we can notice the following:

1. In general, there is more interest in the—familiar—monthly subscription model.
2. However, the pay-per-article (facilitated by LaterPay plugin) seemed promising to many of them.
3. It was also clear that readers are concerned about using cryptocurrencies in general, so they almost never considered it for purchasing digital content.

3.1.2 Questionnaire for Publishers

Another questionnaire was sent to people affiliated with online content publishing, 5 of the 10 participants were freelance writers, 3 were independent bloggers, and 2 were

Paywall Options

While answering the next questions, please refer to the links provided below to see how each payment model actually looks like, urls are either from my own test WordPress blog "Writings on the Paywall" or links to real published content.

if you are curious, you can also attempt to pay without actually paying, if you are asked for your Paypal or credit card info, that means it is a real payment, DO NOT enter your info, you are supposed to be testing only.

Pay per paragraph, video, image or audio recording:

- <http://cmsproj.projekte.fh-hagenberg.at/wordpress/2018/01/27/monetization-proposals-to-medium/>
- <http://cmsproj.projekte.fh-hagenberg.at/wordpress/2018/04/14/colombia-journalism-review/>
- <https://masterinvestor.co.uk/latest/frictionless-micropayments-satoshipay/>

Pay per article: <http://cmsproj.projekte.fh-hagenberg.at/wordpress/2018/01/27/will-a-mobile-app-help/>
<http://www.spiegel.de/spiegel/gerry-adams-ueber-nordirland-und-den-brexite-a-1201738.html>

Day pass: <http://cmsproj.projekte.fh-hagenberg.at/wordpress/2018/01/27/choosing-digital-subscriptions/>

Week pass: <http://cmsproj.projekte.fh-hagenberg.at/wordpress/2018/01/27/choosing-digital-subscriptions/>
<http://www.spiegel.de/spiegel/gerry-adams-ueber-nordirland-und-den-brexite-a-1201738.html>

Per-section monthly subscription: <http://cmsproj.projekte.fh-hagenberg.at/wordpress/reports/>

Full-content monthly subscription: <http://cmsproj.projekte.fh-hagenberg.at/wordpress/2017/11/23/as-telegraph-joins-paywall-bandwagon-heres-five-leading-approaches-to-gated-access-and-user-revenues/>

Figure 3.7: Links provided within the survey.

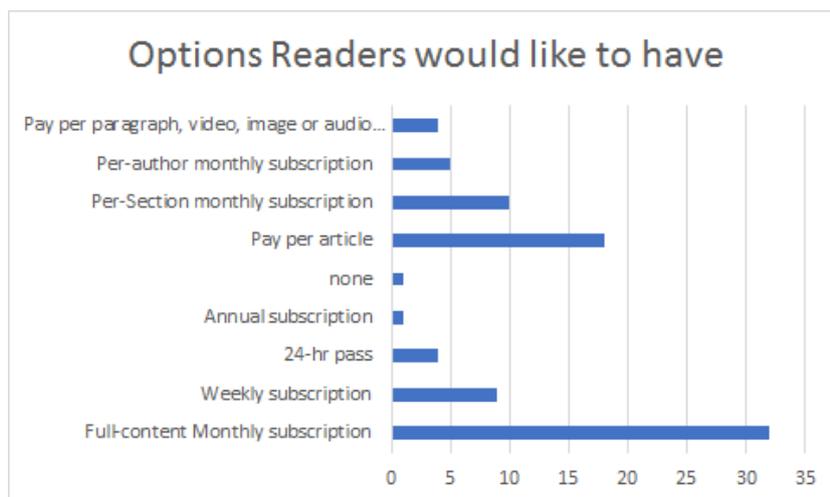


Figure 3.8: Variety of options the readers would like to have.

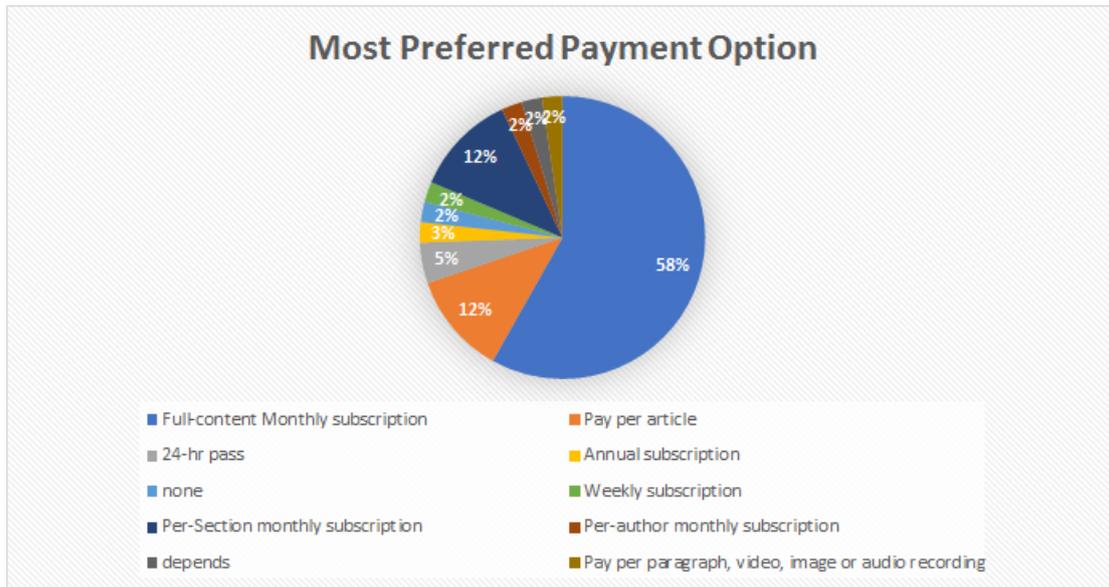


Figure 3.9: Most preferred payment options by readers.

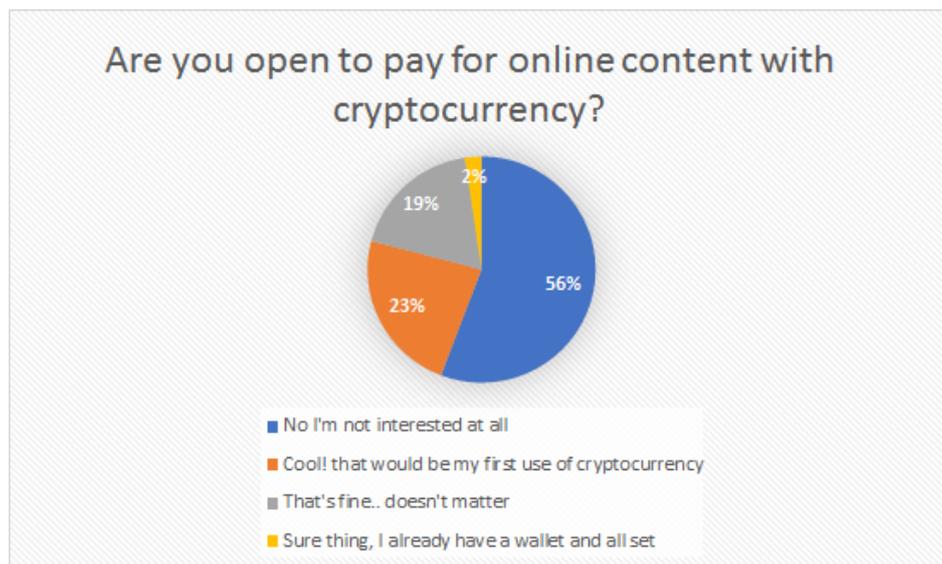


Figure 3.10: Participants readiness to pay with cryptocurrency.

content managers. 2 out of the 10 write in English only, 5 write in Arabic only and the rest write in both languages. 50% of the participants publish content completely for free. Like readers, they were directed to articles with diverse options for payment and subscription while filling the survey, and their answers to the questions are recorded in Fig. 3.11 and Fig. 3.12 below.

The ten publishers were also asked about their willingness to accept payments in cryptocurrencies and 3 of them showed interest, 3 showed curiosity and the rest were

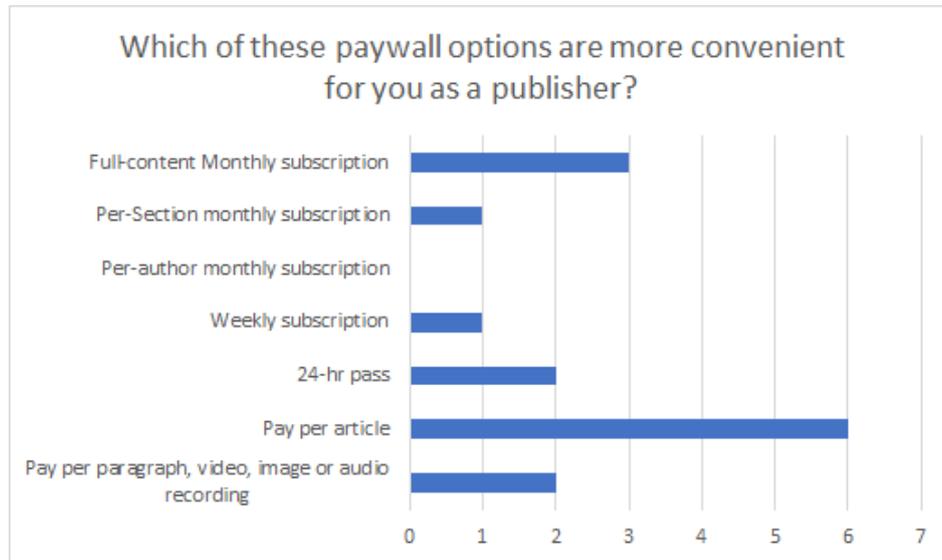


Figure 3.11: Subscription options preferred by publishers.

either indifferent or not interested at all.

Looking at Figures 3.11–3.13, as well as participants’ comments, it becomes apparent that publisher participants have different payment model preferences to those of their reader counterparts:

1. 6 out of 10 picked the pay-per-article model because for them it is more measurable and fair.
2. Those who preferred monthly subscription were concerned about the “psychological pricing” implied by the other micropayment models.
3. Those who chose the micro-models like the 24-hr pass and pay-per-video etc stated that those models are more customized to their own needs, which makes it easier for them to start charging for content instead of using ads.

3.2 Evaluation Based on Thesis Research Question

Here we will go through the models exhibited in the previous chapter and evaluate them according to the thesis research question criteria: *simplicity*, *security* and *fairness*.

3.2.1 Brave

Brave [11] is in fact a complete browser solution which—in addition to its BAT system—provides ad-blocking and anti-tracking features, these features save the users privacy without forcing them to pay for the available content. It is already established commercially and is a very promising solution for rewarding all creators of all sorts of content. It is especially beneficial for uprising independent publishers who cannot risk to switch to paywall models. Brave is also open source and thus always open for improvements by external developers.

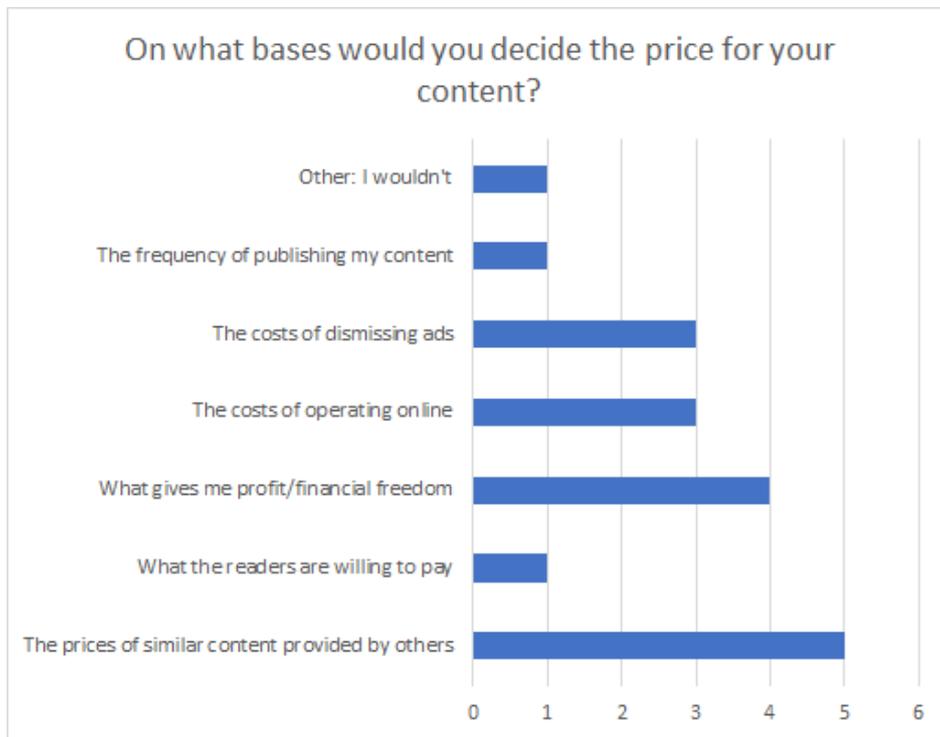


Figure 3.12: Factors affecting publishers' assumed pricing.

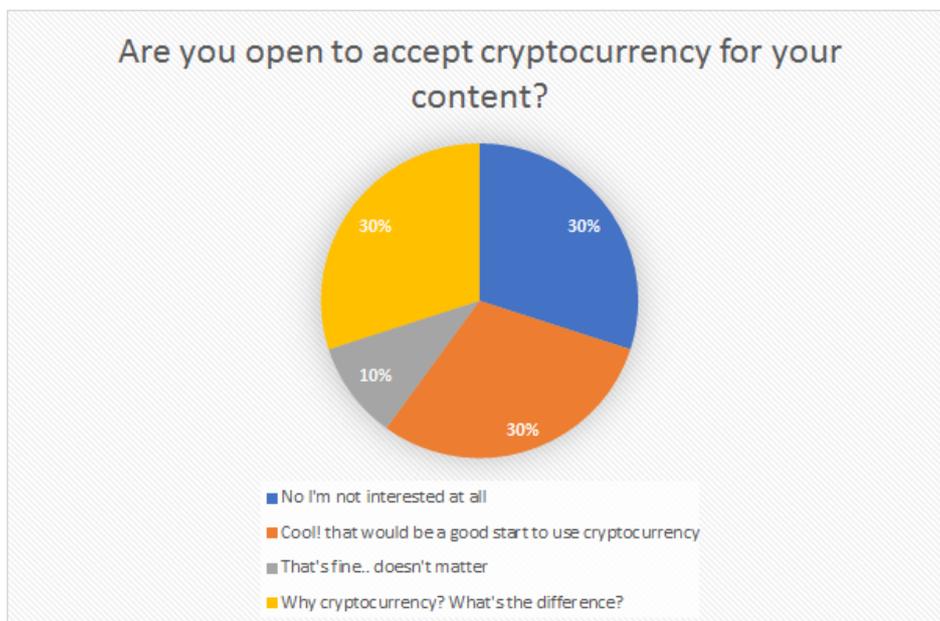


Figure 3.13: Publishers readiness to accept cryptocurrency payments.

However, it is totally centralized and cannot be used as a solution for publishers, it is completely standalone. Moreover, the publishers can only claim their BAT donations after reaching a threshold of 100\$, and a 5% cut of the donations always goes to Brave. While testing the browser myself, I also could not manage to add all the links I visited, they can only be added automatically if and only if they are recognized by Brave.

Therefore, the evaluation from the perspective of this thesis goals is as follows:

- **Simplicity:** The browser is an easy to use integrated solution for users who wish to donate to their favorite publishers.
- **Security:** It is also ideal for users looking for ads-free, safe and private browsing.
- **Fairness:** The browser does not add much to the concept of fairness as the benefit goes to only specific publishers and is only based on donations from corresponding readers.

3.2.2 Fambit

Fambit [1] is a plugin that enables users to donate to their visited websites automatically without selection, this is especially important for publishers who are not popular or specialized enough to charge for their content. It also fits with open educational and other commodity services that would not otherwise set a paywall. Contrary to Brave, it is completely decentralized, which means that it can be used by any entity. Also there is no transaction cuts as the transactions are submitted to the Blockchain every week with minimal costs. Fambit is licensed under the GNU GPL v3 license, so other developers can use existing Fambit code to make their own modified versions of the plugin [13].

The Fambit project was much useful and insightful in many ways such as:

- The idea of a decentralized plugin that rewards whatever site visited.
- The idea of very small payments, which is almost only possible with cryptocurrency.

However, Fambit cannot be a solution for saving publishers revenues, as it is controlled by the reader only and not the publisher, so it fits more with online services which are originally free and open for donations. Accordingly, from the perspective of this thesis, Fambit is:

- Very **Simple** for users and publishers to add the functionality of making and receiving bitcoin donations (*bitcoin-recipient* meta tag).
- **Secure** enough for users as no private data is required by the plugin, and the only data shared externally is the sent transactions to the blockchain. Also the error reports generated by the plugin can be disabled by the user.
- **Fair** enough for publishers who have no sensible options for monetizing their content, but still cannot be a solid means of financing a publisher.

3.2.3 Microcomputations as Micropayments

The model proposed by Ghassan O. Karame et al. [2; 3] is an out-of-the-box solution that leverages the idea of volunteer computing [8] and uses it as a form of payment. In this solution, the user is rewarded with premium content from the publisher (instead of the digital currency (GRC) [16] reward from the BOINC grid computing platform).

The model might also adopt offline micro-computations in exchange for digital currency, which in turn can be paid to the publisher. The main disadvantage as of now is that the model still needs refining and an accommodating involvement of both publishers and intermediaries to make it work effectively. It might be very complicated at the moment to implement this model for each newspaper firm. In conclusion, and relative to the thesis goals, this model:

- Does not satisfy the **simplicity** criteria as of now, and not all publishers would be willing to adopt the current model.
- Is highly **secure** for the readers as there is no access to their personal data, just the machine properties. However, the real challenge—and most of the exerted technical effort—in this model is in making it secure for publishers from loopholes and bypass tricks done by malicious users.
- Is equally **fair** for both the readers and publishers, as readers do not have to pay money, and publishers earn more than what covers their operational costs.

Nevertheless, a great deal of inspiration is owed to this distinguished work, especially that:

- Readers do not really have to pay money, they can rather exchange other resources for a good cause and still get premium reading content as a reward.
- The benefits of grid computing can be expanded for both the projects owners and the volunteer computer users.
- Browsing publishers pages is not beneficial in ad-driven models only, the concept can be extended to other revenue models as well.

3.2.4 SatoshiPay

SatoshiPay [23] blockchain micropayment system can be applied to individual articles and even individual photos, audio files or videos. This is the ultimate advantage that makes SatoshiPay stand out, leveraging the concept of micropayments using cryptocurrency. The very small payments are done in *lumens*, the cryptocurrency supported by *Stellar* network [25]. Users top up their SatoshiPay pocket either directly from their Stellar wallet or by purchasing lumens using credit cards or PayPal.

The purchased lumens can only be used in the SatoshiPay ecosystem though, and despite the fact that lumens prices are relatively more stable than other well known cryptocurrencies like *Bitcoin* and *Ethereum*, buying cryptocurrency in general is still considered a risky decision by many. Lumens prices are constantly changing as a matter of fact, Fig. 3.14 shows the change of XLM prices between Feb and Apr 2018. SatoshiPay also gets a 10% cut of all the transactions between readers and publishers, which adds one more reason for users to hesitate about adopting the model.

Accordingly, SatoshiPay is considered by this work as:

- Very **simple** to install by publishers and to top up by readers. However, it is a fundamental requirement that both sides have Stellar wallets, and this could be blocking to people who are concerned about using cryptocurrency.
- Relatively highly **secure**, as it relies on the secure keys and addresses used in the context of Stellar wallet.
- **Fair** especially for publishers and readers familiar with cryptocurrencies.



Figure 3.14: Lumens prices in Feb-Apr 2018.

3.2.5 LaterPay

LaterPay [18] is an off-the-shelf product with a plugin for WordPress that allows the user to pay very small amounts of money (not cryptocurrency) in exchange for individual articles. Moreover, the user is only asked to actually pay after a threshold of 5\$ credit is reached. Among other normal paywall plugins (on WordPress), LaterPay can be considered one of the easiest and smartest ways for publishers to improve the UX of their payment methods.

When *Der Spiegel Online* partnered with *LaterPay GmbH* in mid 2016, they started keeping some articles behind the LaterPay paywall (*Spiegel Online Plus*) to test the concept of *trust* between the newspaper and its readers, as well as trust in the value of the premium content offered.

Among at least 120 articles published daily by *Der Spiegel Online*, 2 to 4 articles were made premium. Readers were offered to either purchase the individual article or get a week pass, as in Fig. 3.16.

The results [24] reflected ultimate success, as the readers were more comfortable when given the space to explore the content they purchase before actual payment, they continued purchasing content even at times when articles publishing frequency was relatively low.

In terms of simplicity, security and fairness, this model is:

- **Simple** to embed by publishers, and very simple to set payment options as well. It is also simple to use for readers, despite the unfamiliar concept of “Buy now, Pay later”
- **Secure** as the users can pay either by credit card or Paypal, without the need to subscribe or give away data.
- **Fair** specifically for readers who have nothing against paying for content that is affordable to them. It is also ultimately fair for publishers as it still pays off as



Figure 3.15: The concept of trust in the partnership between Der Spiegel and LaterPay.

much as the normal subscription models do, despite being “micro” by nature.

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Figure 3.16: LaterPay embedded in Spiegel PLUS Online.

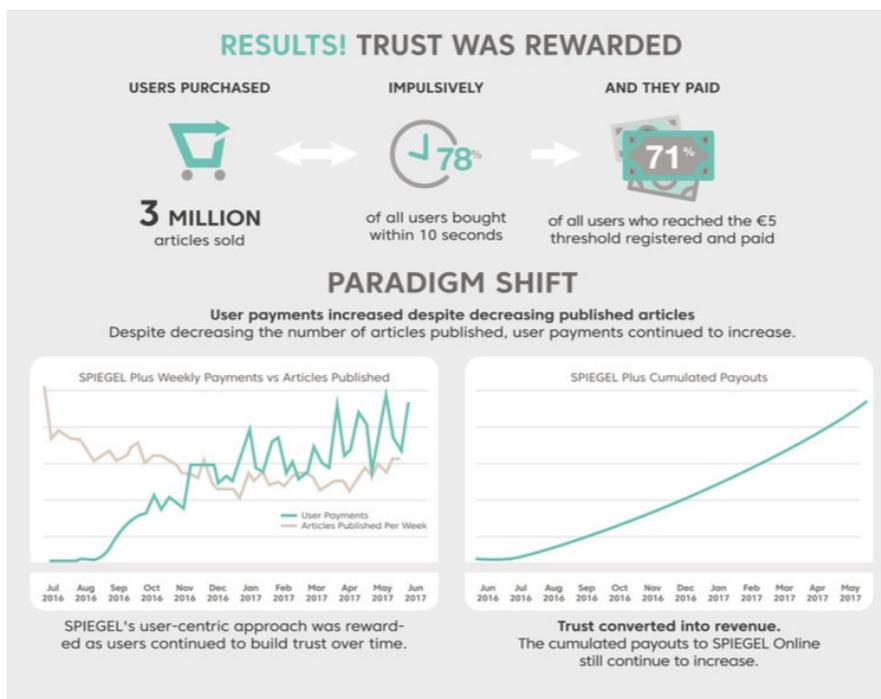


Figure 3.17: Der Spiegel and LaterPay partnership success.

Chapter 4

Reader Surveys from Literature

In this chapter, we review two major studies focusing on consumption and payment for news. The first report is the Media Insight Report by the The American Press Institute, and the second one is The Digital News Report by Reuters Institute. The reports involved surveys over huge numbers of readers in the US and Europe for the year of 2017. In the sections below, we give more focus on the reports' areas and findings that are relevant to this work's survey and goals.

4.1 Media Insight Report 2017

This report [5] (which we will refer to as “MIR” in the Figures) is an outcome of a collaboration between The American Press Institute (API) and The Associated Press-NORC Center for Public Affairs Research (AP-NORC). The report is based on interviews carried out with 2,199 news consumers in three American cities between February 16 and March 20, 2017. 1885 interviews were conducted on web and 314 on telephone. Data were collected using the AmeriSpeak Panel, which is NORC's probability-based panel designed to be representative of the U.S. household population. As of the time of the study, the panel was providing sample coverage of approximately 97% of the U.S. household population. Worthy of mentioning is that 1,194 of the participants do pay for a news subscription and 1,005 do not pay for any news. Participants were rewarded a small monetary incentive (\$3) for completing the survey.

In January 2017, hour-long interviews were conducted with eight participants in Chicago, eight in Phoenix, and six in Birmingham. The goal of those extensive interviews was exploring the participants news preferences, sources they use, and the factors that affecting the decision to pay or not to pay for news. In this qualitative research, no more than two participants were interviewed at a time. Participants were screened based on age, gender, employment status, income, education, race, ethnicity, and news consumption habits to include a variety of perspectives. The recruited participants received \$100 for completing the interview. They were also provided an additional \$10 for bringing along a friend or family member for the interview. The friend or family member also received \$100 for participating.

Who pays for news, and why do people subscribe?

53% OF ADULTS PAY FOR NEWS (NOT INCLUDING CABLE TV BUNDLES)
54% OF PAYERS SUBSCRIBE TO NEWSPAPERS
52% OF THOSE WHO DO NOT SUBSCRIBE ARE "NEWS SEEKERS"
26% WHO USE A SOURCE FOR FREE MIGHT BEGIN TO PAY FOR IT
COVERAGE OF A SPECIFIC TOPIC IS THE #1 REASON WHY PEOPLE START SUBSCRIBING
53% OF DIGITAL SUBSCRIBERS HAVE NEVER PAID FOR A PRINT VERSION OF THAT OUTLET

Figure 4.1: MIR: Highlights.

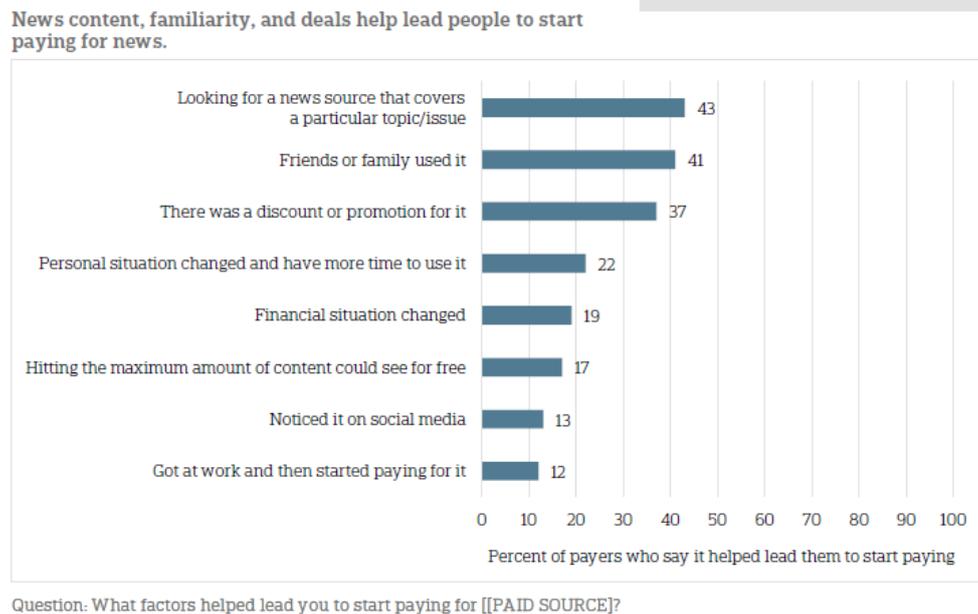
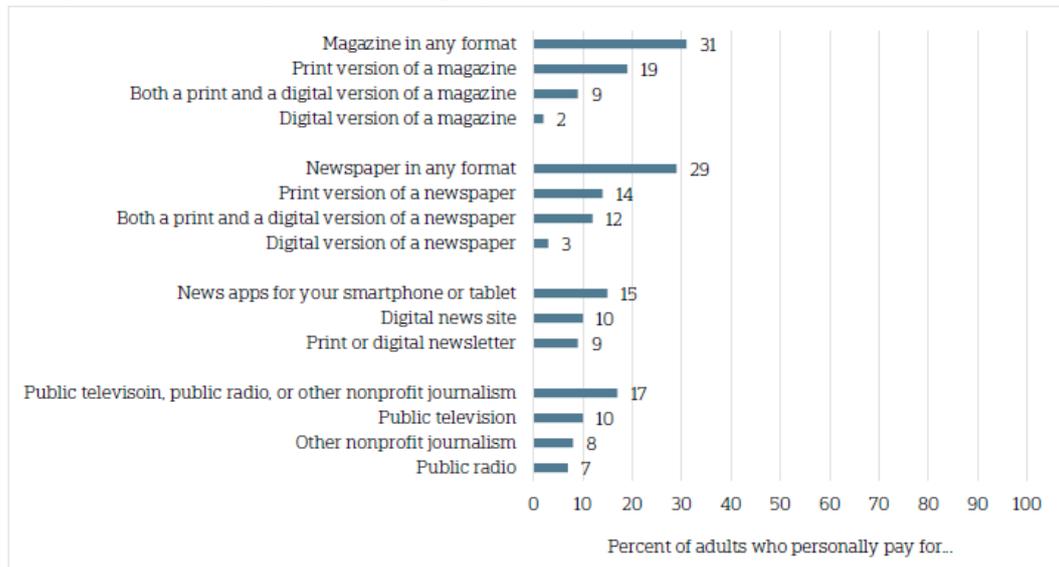


Figure 4.2: MIR: What made payers pay for news?

4.1.1 Report Outlines

- The report first indicates that 53% of American adults do pay for accessing news from any source. 54% of them are subscribed to newspapers (whether print or digital or both). More in Fig. 4.1.
- The report then looks further into the motives and preferences of those who pay for news in general, as well as their demographics. See Figures 4.2–4.5.
- The next step was comparing newspaper subscribers behaviors to the behaviors of subscribers to other news sources. The most important difference (from the perspective of the thesis goals) is that newspaper subscribers tend to be more into paying for other additional publication types. Figure 4.6 illustrates all the media options they said they pay for.
- The report then switches to those who do not pay for news, identifies their concerns and compares their behaviors with those who pay. See Figures 4.7–4.9. The answers resemble those collected in the thesis survey (see Chapter 3).

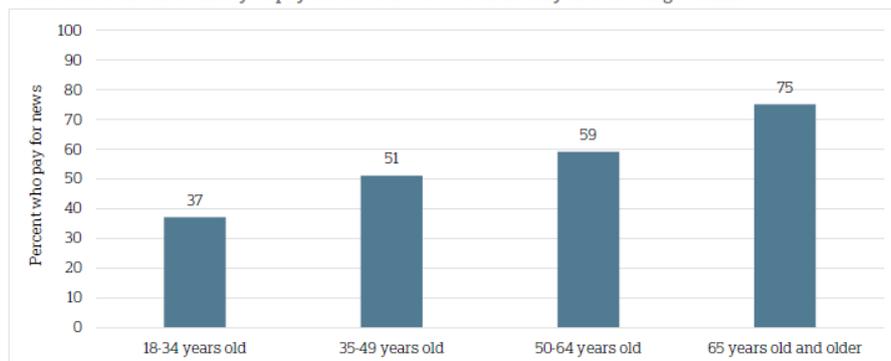
Print publications are popular sources people pay for news.



Question: Next, we are interested in whether you paid to use any media in the last year. For each of the following types of media, please indicate whether you personally have a subscription or pay for it on a regular basis, or not

Figure 4.3: MIR: Percentage of who pays for which news format, among all people interviewed.

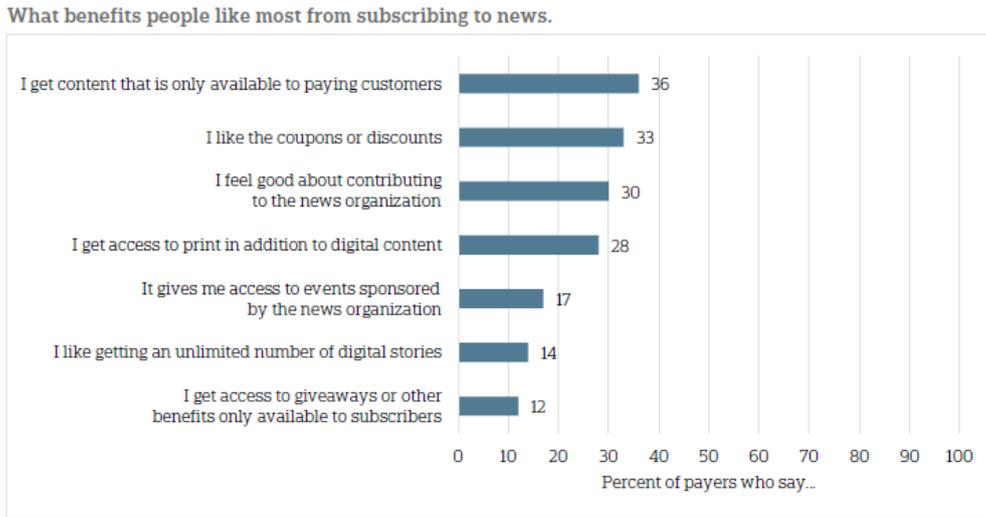
Older adults are more likely to pay for news but not as markedly as some might think.



Question: Next, we are interested in whether you paid to use any media in the last year. For each of the following types of media, please indicate whether you personally have a subscription or pay for it on a regular basis, or not

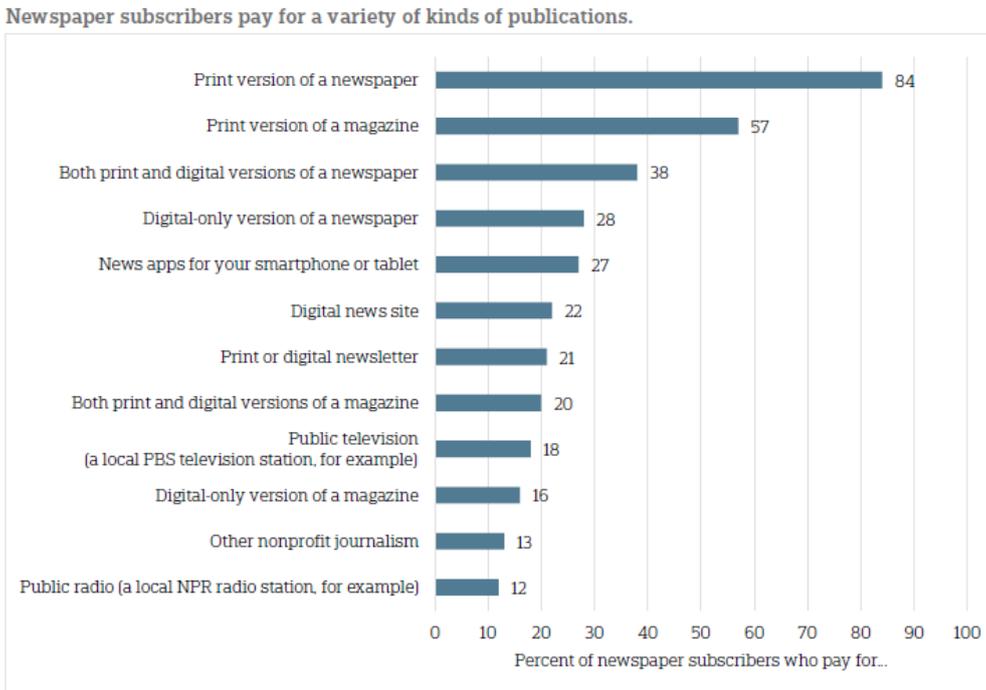
Figure 4.4: MIR: Ages of adults who pay for news.

- The report afterwards categorizes people into “News Seekers” and “Bumpers”. The former group is those who actively seek news in different media, while the latter group is the ones who bump into news by chance. This part is not of great importance for the goals of this thesis, as it is very newspapers-specific.
- In its sixth section, the report compares print subscribers (who are still a majority of 75% of newspaper subscribers and 58% of subscribers in general) and digital



Question: What benefits do you get from paying for [PAID SOURCE]? Please select all that apply.

Figure 4.5: MIR: Benefits people like most from subscribing to newspapers.



Questions: In the past year, please check whether you have donated money, someone else in your household has donated money, or you have not donated money to each of the following. Next, we are interested in whether you paid to use any media in the last year. For each of the following types of media, please indicate whether you personally have a subscription or pay for it on a regular basis, or not

Figure 4.6: MIR: What newspaper subscribers pay for.

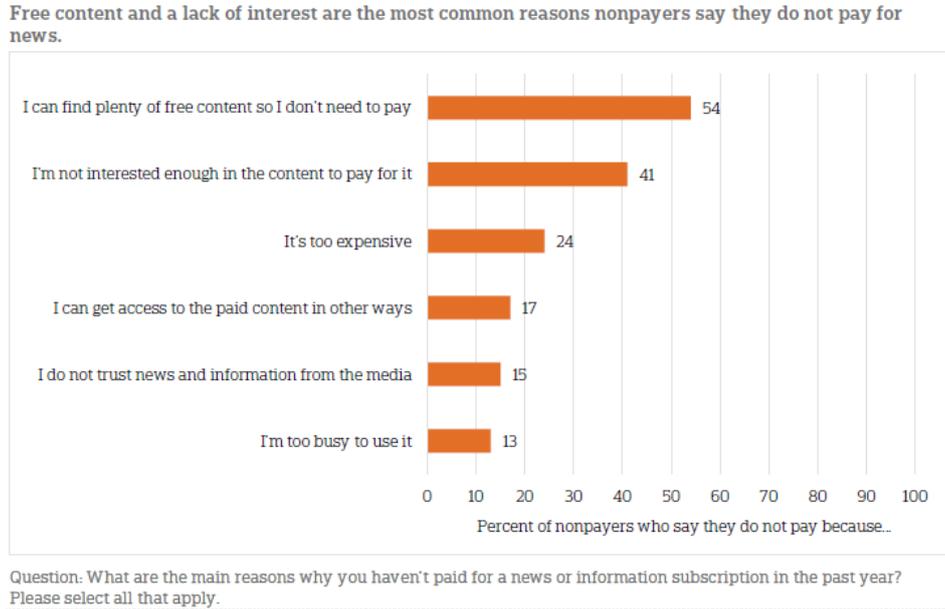


Figure 4.7: MIR: Reasons why non-payers do not pay for news.

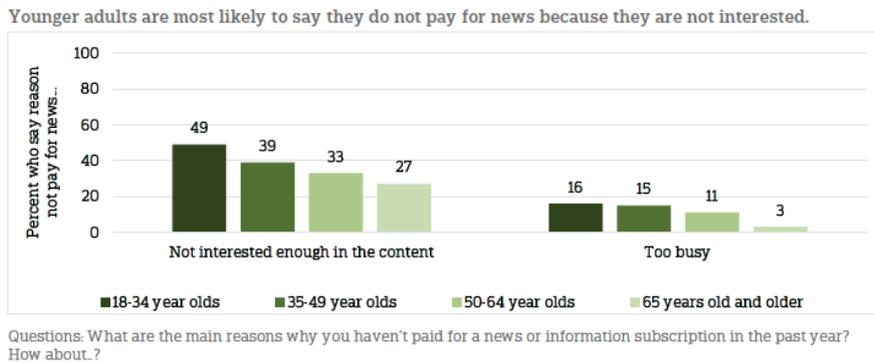


Figure 4.8: MIR: Answers of younger Non-payers.

subscribers (28% of subscribers) behaviors. Figure 4.10 shows the variations in motives to start paying for news, and Fig. 4.11 shows the difference in the way they engage with news. One key finding is that most of the recent subscribers are paying for digital news, as per Fig. 4.12. Another important observation about digital subscribers is their tendency to value the content they access more than their print counterparts do, see Fig. 4.13.

- In the same section, the report emphasizes the significance of social media use by both subscribers and non subscribers. 73% of subscribers and 76% of non subscribers do access news from social media. 24% of subscribers and 25% of non-subscribers follow their preferred news source on social media. This means that

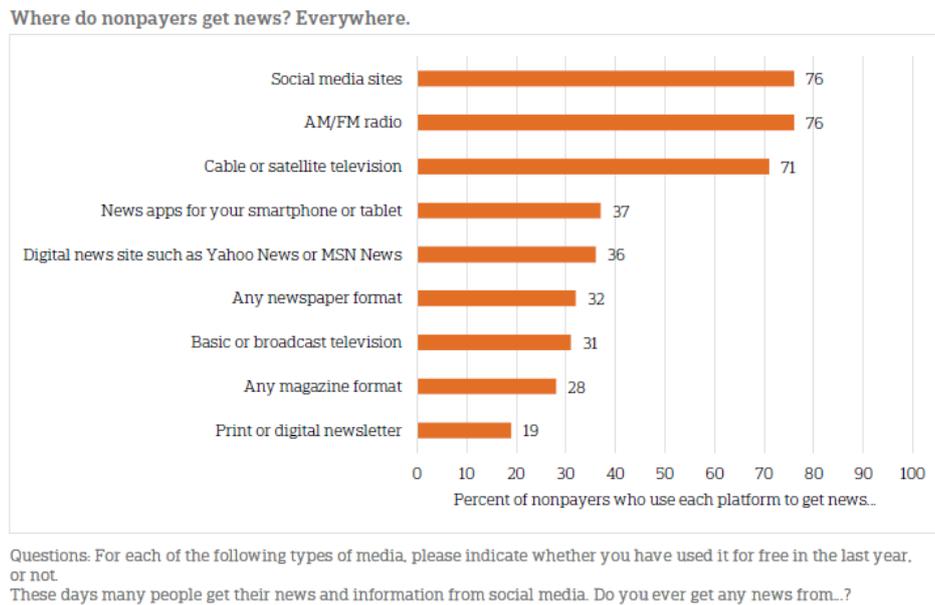


Figure 4.9: MIR: Where do you get news for free?

publishers need to invest their best efforts in engaging their loyal readers through social media, whether they are already paying or not. Fig. 4.14 shows the mostly used social media platforms for receiving news in the US.

- In the seventh section of the report, an in-depth comparison between younger and older payers is carried out. Points of comparison are how many of the payers are “Active Seekers” or “Bumpers” for each age group, as well as the most important topics followed by each, and their reasons for subscription. Another comparison between younger and older non-payers shows that the younger are less likely to start paying for news as their interest is less, also due to the abundance of free news sources online.
- The last section examines the impact of subscription perceived costs and prices. 58% of the payers say that the cost of subscription is very small to them, 32% say it is moderate, and only 7% think it is significant. As for non-payers, their answers to hypothetical questions show that nearly 1 in 5 non-payers might be willing to start paying for news. From another perspective, 29% of non-paying “Seekers” are moderately willing to pay, and only 18% of “Bumpers” do. 32% of those who pay for other resources say they would be willing to pay for a news source they are currently accessing for free. Finally, Fig. 4.15 shows answers to a question about the subscription price impact on the willingness to pay for news.

4.1.2 Recommendations

Based on the findings mentioned above, the report derives a group of recommendations such as:

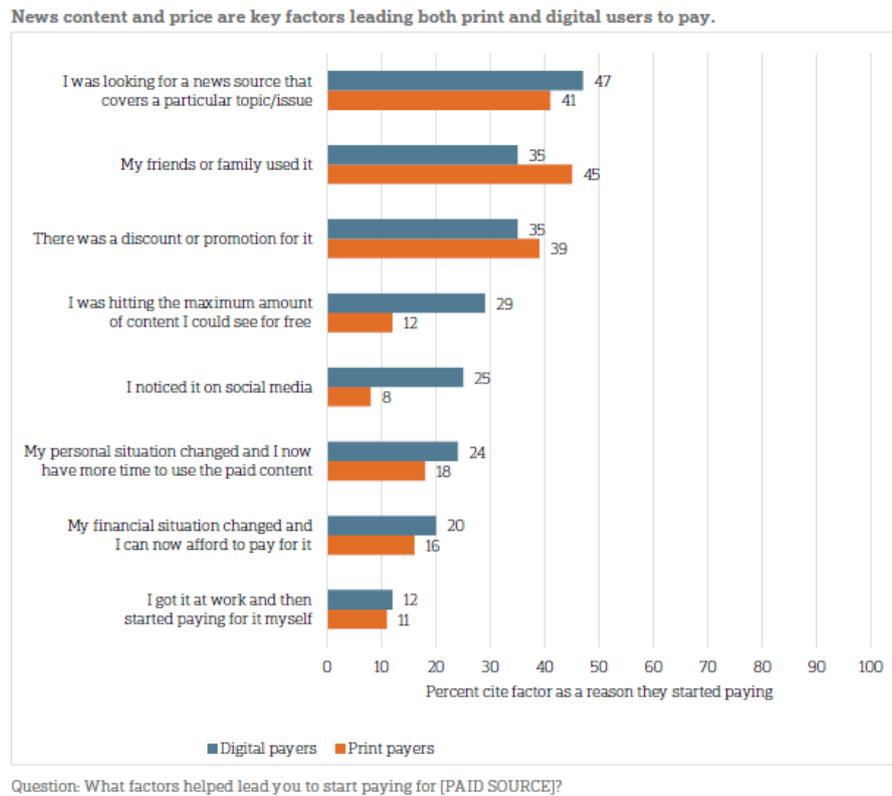


Figure 4.10: MIR: What factors helped you decide to start paying for newspaper subscriptions?

1. From a futuristic perspective, more attention should be given to younger readers and their motivations. 37% of younger adults (18 to 34 years) already pay for news, with an inner drive to support the news organization's mission.
2. Most of Americans (especially younger adults) find news through social media (especially Facebook), so investing on readers engagement on social media is of high importance for publishers.
3. Specialization and excellence in covering specific topics are key factors for success of a publisher. This is considered the number one reason for subscription.
4. Price is a key factor for non-payers who are willing to start paying.
5. Among the top reasons for subscription are: being a better informed citizen, and having something to share with family and friends. In other words, news is a form of social flow for subscribers, which again emphasizes the importance of engagement on social media.
6. Although most of newspaper subscribers chose print formats, the future belongs more to publishers who are also able to target younger readers who prefer digital formats, and more capable of sharing news on social media. This of course should be in parallel with maintaining relations with existing print subscribers.

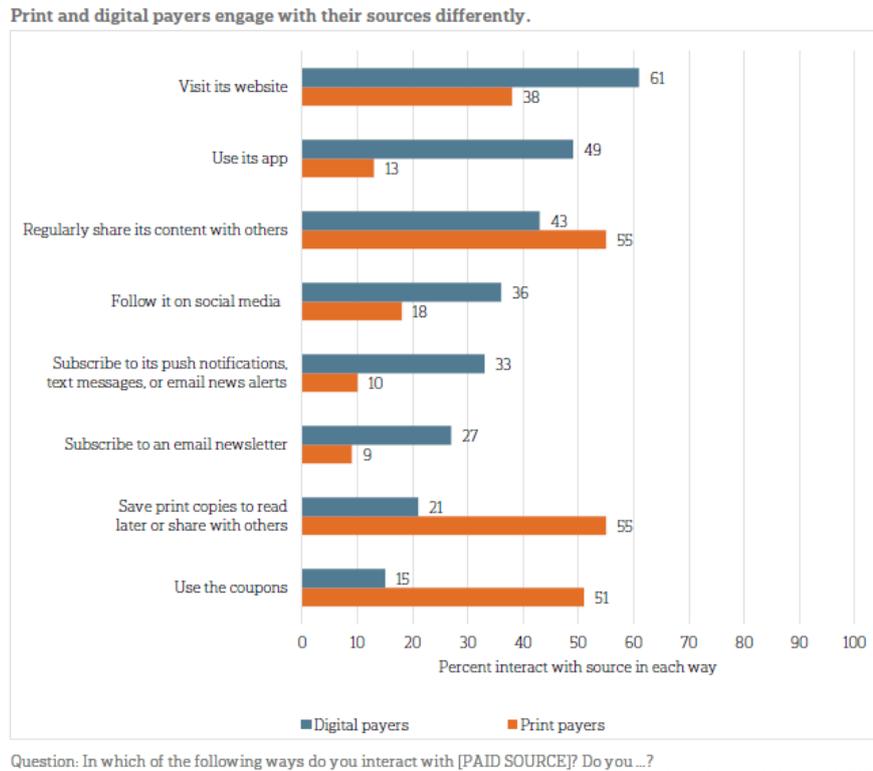


Figure 4.11: MIR: Interaction of print and digital subscribers with paid news.

7. Targeting “News Seekers” is another way for winning more subscribers. 72% of those get news through social media, with one third are at least a little likely to pay for them.
8. Coupons encourage more people to start subscribing, and the power of coupons needs to be especially leveraged in digital reading content.
9. Lifestyle changes such as starting a first job (higher income) or retiring (more free time) make people more willing to subscribe. Those are good targets for publishers.
10. Quality and exclusive content is the most important benefit from the subscribers perspective.

4.2 Digital News Report 2017 by Reuters Institute

Interesting findings are gathered from the sixth annual report [4] (which we will refer to as “DNR” in the Figures) by Reuters Institute for the Study of Journalism (RISJ). The conducted study is based on an online questionnaire at the end of January/beginning of February 2017. Answers of 70,000 people in 36 countries were collected, and the data were weighted to targets based on industry accepted data, such as age, gender, region, newspaper readership, and social grade, to represent the total population of each country. The sample therefore reflects the population having access to the internet. This

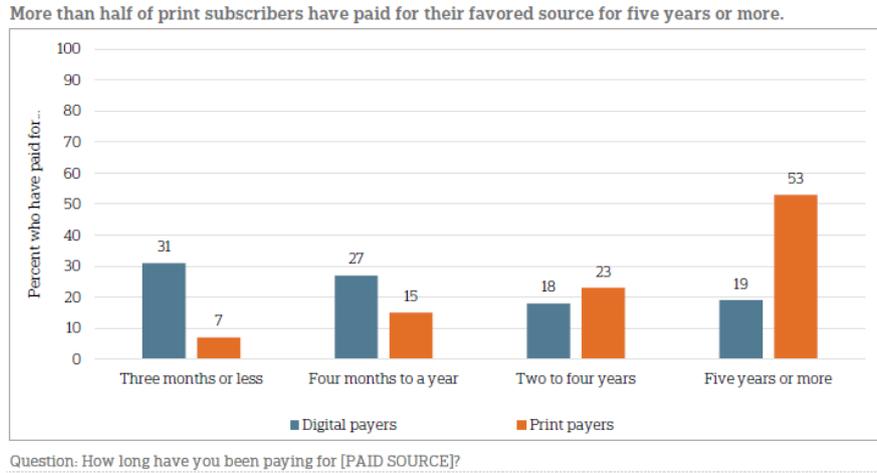


Figure 4.12: MIR: How long print and digital subscribers have been paying.

Digital payers are more likely than print payers to say their source is a very good value.

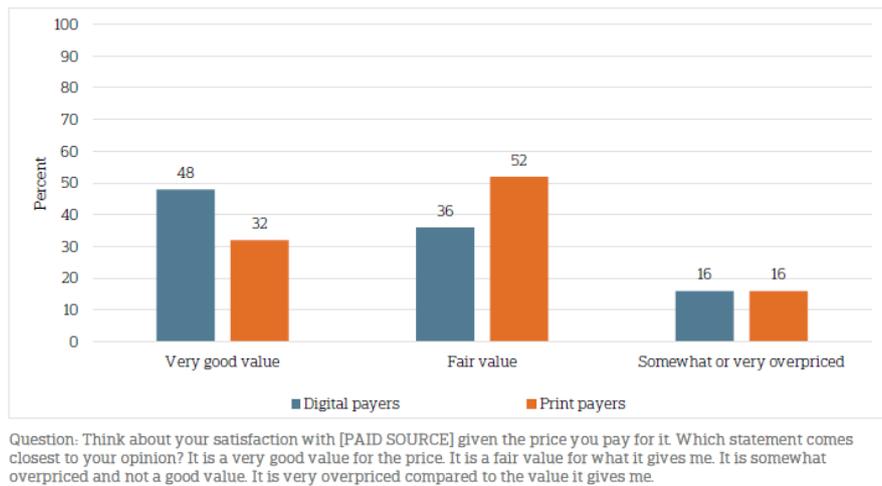


Figure 4.13: MIR: How satisfied the digital and print subscribers are with the value they pay for.

also implies that news consumers who are not online are underrepresented in this study. Moreover, anyone who said that they had not consumed any news in the preceding month was filtered out, in order to ensure that irrelevant responses didn't adversely affect data quality. A number of face-to-face focus groups were held by Kantar Media in the US, UK, Finland and Spain to explore issues relating to paying for news and digital advertising. Below are some insights derived from the study.

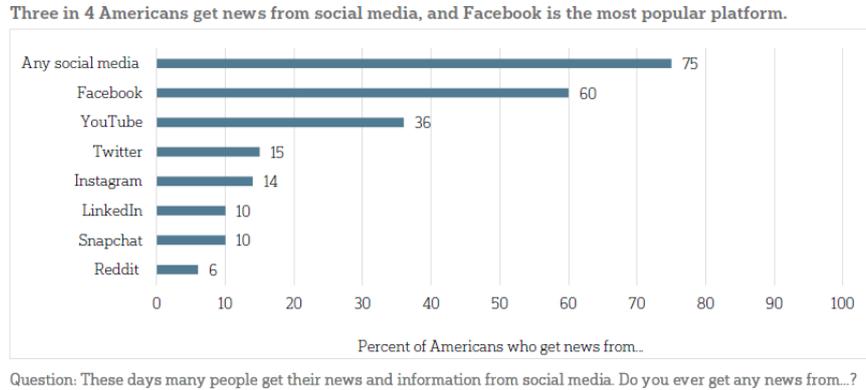


Figure 4.14: MIR: Which social media platform do you get your news from?

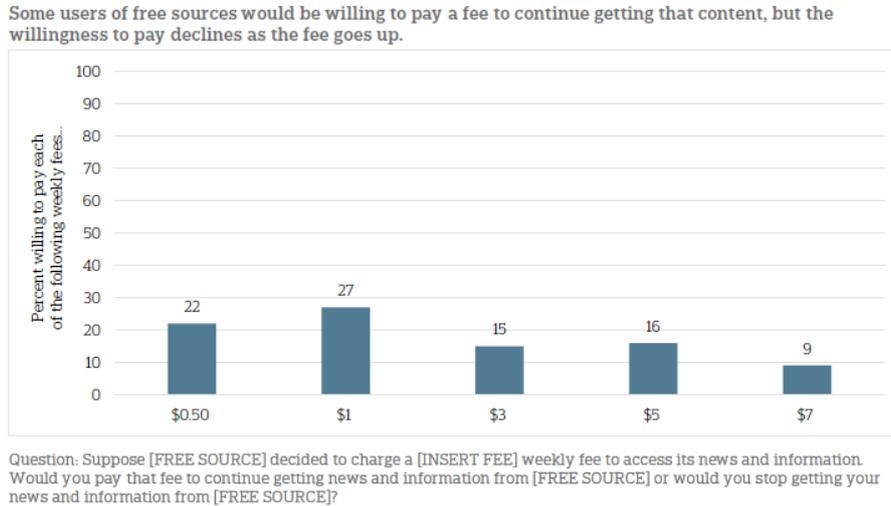


Figure 4.15: MIR: Impact of price on willingness to subscribe.

4.2.1 Report Outlines

- Across all countries, 1 in 10 pays for online news (13%).
- Nordics tend to be more willing to pay for news than people in Southern Europe and much of Asia. See Fig. 4.16.
- Most of the new payments for online news are coming from younger readers, especially in the US which witnessed a jump in subscriptions from 9% to 16%, and a tripled amount of donations as well. This is most probably due to the political situation and the resulting trust issues with the media.
- In countries like Malaysia, Brasil and Spain, the use of Whatsapp in sharing news is starting to rival Facebook. Messaging apps in general tend to be preferred over Facebook due to privacy considerations, as well as the algorithmic filtering of news items in Facebook.

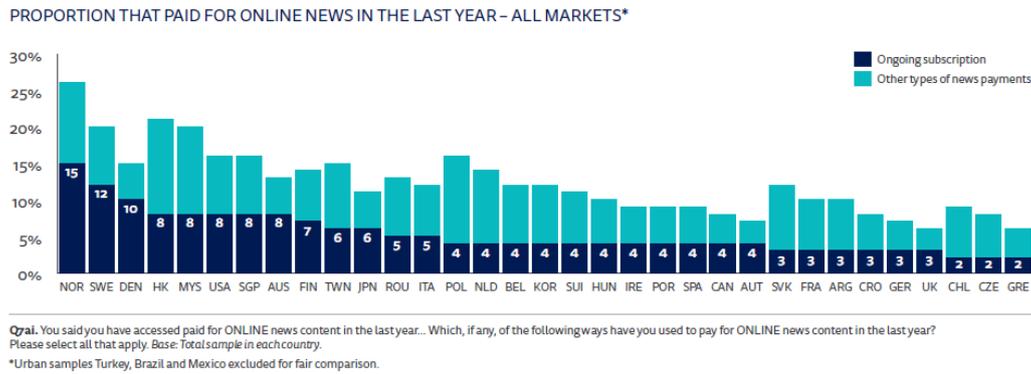


Figure 4.16: DNR: Proportion of payers across countries.

- Contrary to the Media Insights Report findings, only 24% of the participants are confident that social media gives them access to reliable news. Sometimes low quality and fake news go viral, this is more significant in countries with high levels of polarization like the US, Italy and Hungary.
- Answers to the question of why people subscribed were slightly different from those in the Media Insights Report. A possible explanation is that the question is only concerned with online news, as the top reason for payment was the convenience of accessing news from hand-held devices. What come next are the usual reasons of seeking high quality content or finding good deals. See Fig. 4.17.
- As for the question of why people do not pay for online subscription, a wider variety of answers were given as in Fig. 4.18. More than 54% are able to access news for free and thus do not need paid subscriptions. As observed in the thesis survey as well, this is the biggest reason why people do not pay for content.
- The question asked in Fig. 4.19 is closely related to the thesis concerns, as it includes other types of reading content and not just news. The answers show that reading content does not attract much audience as video, audio, software and games.
- Participants from selected countries were also asked about their interaction with news on social media, particularly sharing and commenting. Except for the US, less interaction with news is reported from the year 2015 to 2017. See Fig. 4.20.
- Participants (from all surveyed countries) who said that they do not interact with news either generally had less interest in news, or were more into discussing the news face to face than online. See Fig. 4.21.

The report then goes in depth for each country in Europe, Asia Pacific and the American continents. In this research work, we are mostly interested in Austria as a bigger portion of the survey participants were Austrians.

- According to the report, the polarized political situation in 2016 explains the increased interest in news, (67% of the country's participants expressed very high interest). Moreover, the usage of news mobile apps also jumped from 13% in 2015 to 25% in 2017. 56% said they access the news from their smartphones in general,

REASONS FOR PAYING FOR ONLINE NEWS – ALL MARKETS

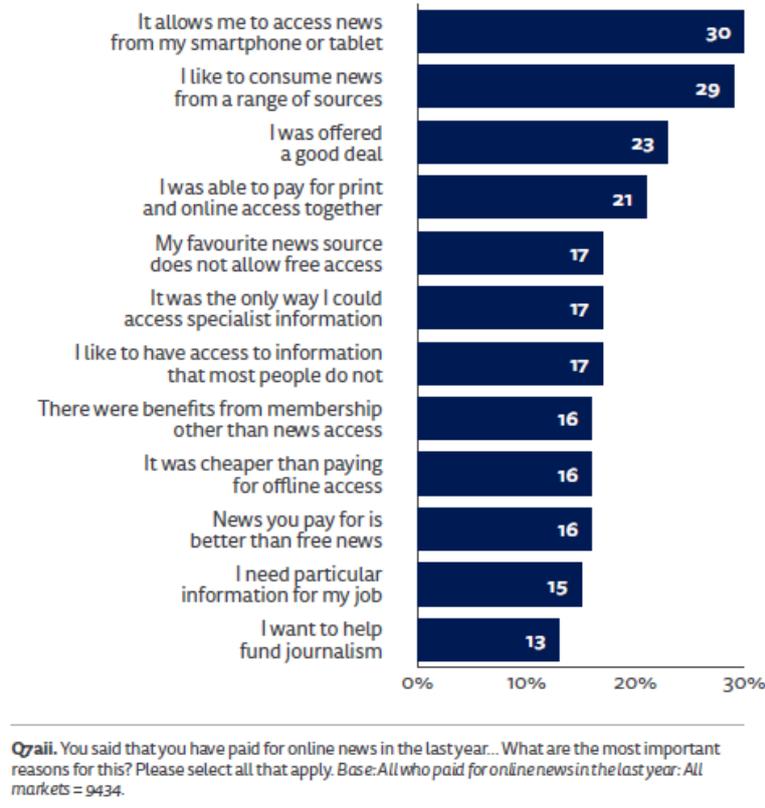


Figure 4.17: DNR: Why payers pay.

with 42% declaring them as the main devices used. See Fig. 4.22.

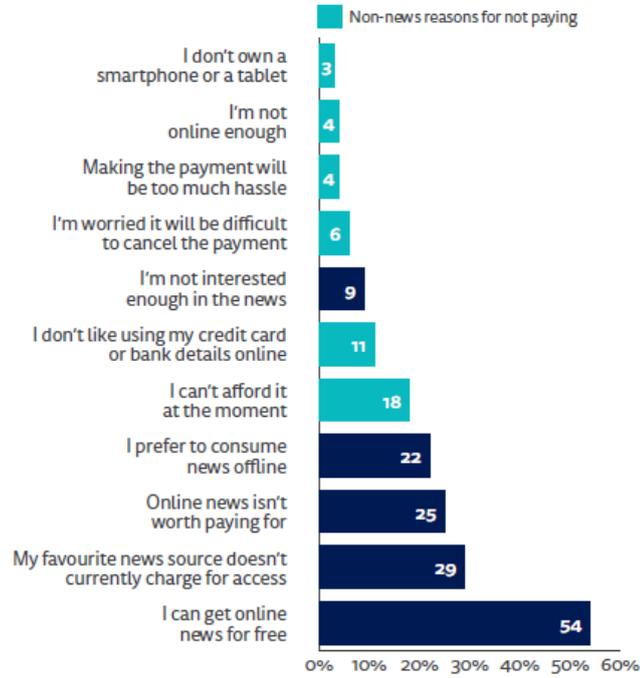
- Despite the increase in online news consumption and usage of mobile phones in the previous 3 years, print media usage still dominates. In fact, Austrians (and Swiss) are the most attached to print newspapers in comparison to all other countries involved in the study.
- Among all news brands in Austria, participants showed the most trust in ORF News and Kronen Zeitung, whether in digital form, print or TV (as illustrated in Fig. 4.23). Also they praised Der Standard Online for explaining complex issues and providing strong opinions. Moreover, and for the first time in this report, dietagespresse.com was included as the preferred amusing satirical brand.

4.2.2 Recommendations

Based on the above results, and additional to the recommendations already derived from the Media Insights Report, the below recommendations need to be considered while charging readers for online content:

1. The use of smartphones and apps to access reading content is especially increasing

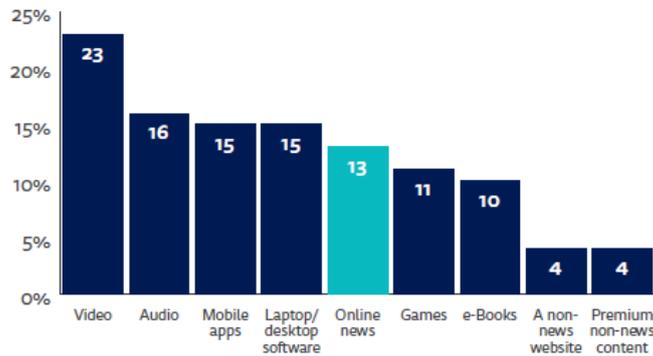
REASONS FOR NOT PAYING FOR ONLINE NEWS – ALL MARKETS



Q7a1. You said that you have not paid for online news in the last year. What are the most important reasons for this? Please select all that apply. Base: All who did not pay for online news in the last year. All markets = 60,029

Figure 4.18: DNR: Why non-payers do not pay.

PROPORTION THAT PAID FOR OTHER FORMS OF ONLINE MEDIA IN THE LAST YEAR – ALL MARKETS



Q7b_2017. Thinking more generally, which of the following types of digital media (if any) have you paid for online in the last year? Base: Total sample: All markets = 71,805.

Figure 4.19: DNR: Online content that is paid for.

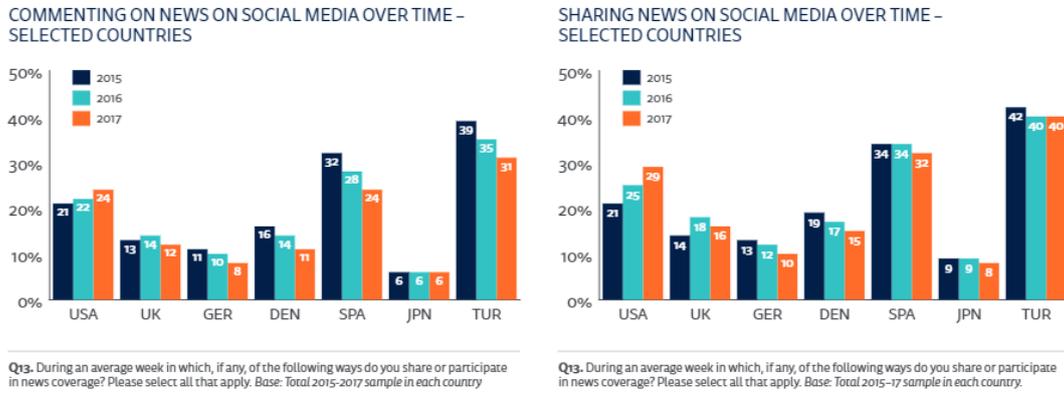
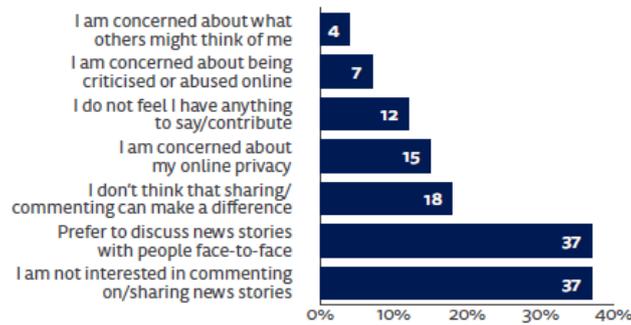


Figure 4.20: DNR: User interaction with news.

REASONS FOR NOT SHARING OR COMMENTING ON THE NEWS - ALL MARKETS



Q13ai. You said you do not share or comment on news stories... Why is that?
Base: All who do not share or comment on the news: All markets = 38,027.

Figure 4.21: DNR: Reasons for not interacting with news on social media.

CHANGING MEDIA

Readership of printed newspapers remains higher than in most other countries in our survey and is declining more slowly in the face of online competition. Smartphone usage for news has grown rapidly over the last few years.

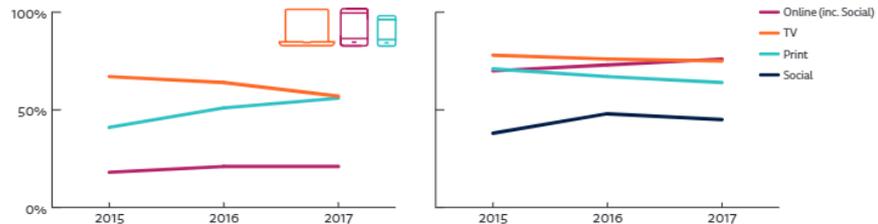


Figure 4.22: DNR: The usage of different news media in Austria.

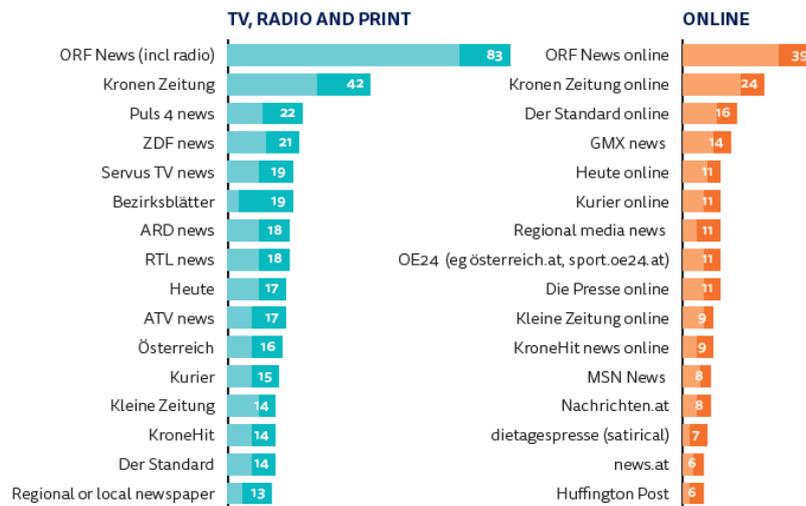


Figure 4.23: DNR: Most used news brands in Austria.

in Austria (despite being the top in consuming print media). This implies that reading content with a paywall or a micropayment should be mobile friendly. The experience on a smart phone or tablet should be as convenient and secure as the desktop experience.

2. There is a controversy over accessing news from social media (especially Facebook, with its content filtering algorithms). This, however, does not have to be the case for other types of content.
3. Sharing to instant messaging apps is also increasing remarkably, so the sharing experience on those apps should be smooth enough.

Chapter 5

Recommendations for Implementation

5.1 Decentralized Design

The less centralized a solution is, the more trustworthy it becomes, especially recently with the raised concerns about data protection. Systems that can offer subscriptions and micropayments without asking for users data—such as LaterPay [18], SatoshiPay [23], Fambit [1] and the ones proposed by Karame et al. [2; 3]— are more future-proof. Moreover, decentralization implies a much lower probability of failure.

5.2 Mobile Experience

More of the readers who recently started paying for content are accessing it from hand-held devices, which implies that the payment should be convenient and secure when done from smart phones. The plugin to be implemented should be compatible not only with as many desktop browsers as possible, but also with mobile browsers, on both iOS and Android platforms.

5.3 Monthly Subscription

According to the surveys, readers are already willing to pay monthly subscriptions if they are convinced with the articles' quality, consuming most of the publisher's content and are able to pay for it. In that case, there won't be the obvious need to pay less money for less content, which means that a micropayment plugin is not necessarily more effective than a normal paywall. Accordingly, it is a wise practice that publishers keep the monthly payment option available for their existing readers, even within the micropayment model.

5.4 Pay per Article

The Pay-per-Article model was proved to be favorable for both publishers and readers in many situations. For instance, some readers are more interested in specific categories or authors and thus are more willing to pay for specific content. As for publishers, it

could be easier to charge readers per article if writers are being paid by article too. Publishers are able to acquire a greater reader base relatively easily with this model.

5.5 Timed Passes

According to the thesis survey participants, Timed Passes such as 7-day or 24-hour passes are particularly convenient for start-ups and independent content creators. It gives the readers an opportunity to view the premium articles with limited amount of money for a limited time. Readers do not feel the pressure of having to decide a full monthly payment. On the other hand, it is also a smart option for well established publishers to attract new readers.

5.6 Social Media

Leveraging the power of social media to persuade more readers into reading content is proven to be highly effective. A payment system that rewards users for sharing content on Facebook or Twitter or even Whatsapp is considered to be relatively smart. This is already implemented in a WordPress plugin called BitMonet (see Chapter 2).

5.7 Keep Cryptocurrency as an Option

Inspite of the concerns around using cryptocurrencies in general, they do provide the highest flexibility in the amount to be paid by the users. There is almost no minimum, as the case with Fambit [1] (See Chapters 2 and 3). Therefore, the first the step to encourage more usage of cryptocurrencies could be make it an option along with other PayPal and credit card options.

5.8 Rewarding and Gamification

According to the thesis survey and the studies, readers are highly motivated by rewards and coupons that accompany their subscriptions. Digital subscriptions need to include more coupons and promocodes to attract more members. Building upon this finding, it is also suggested to add other reward-based gamification elements to the readers experience. Features that engage and motivate users to read more articles, in order to get badges or ranks reflecting their reading accomplishment. In the thesis project, a *reader score* prototype is implemented to display the concept (more on this in the next Chapter 6). Other gamification approaches such as adding leaderboards, badges, challenges etc that apply well to the reading experience are planned for future work (See Chapter 7).

Chapter 6

Thesis Projects

6.1 Payments Showcase on WordPress

The first project done in the previous semester was a WordPress CMS installed on the FH server¹. The site is used as a test blog for published content on which paywall models are implemented. WordPress was preferred over its counterparts (such as Drupal and Joomla) because of its simplicity and popularity, the very good documentation helped spending less time and effort on installing a basic component of the project.

For the second semester, the focus changed from Paywalls to Micropayment models. Two main WordPress plugins, *LaterPay* [18] and *SatoshiPay* [23] were used to simulate all Micropayment (and Paywall) features available in the market.

6.1.1 LaterPay Plugin

With LaterPay, a wide variety of payment options were possible to implement and test. Pay-per-Article, 24-hr pass, 7-days-pass and monthly subscription were applied to a selection of blog categories so as to let users experience all possibilities. The plugin was adjusted to test mode so that no real payments can be done on the site.

6.1.2 SatoshiPay Plugin

SatoshiPay is an outstanding plugin for accepting cryptocurrencies from Stellar [25] wallets. It was used to test the reader's willingness to pay very small amounts of cryptocurrencies (lumens) in exchange for paragraphs, videos or photos in a blog post. Users need to first top up their SatoshiPay wallets either by purchasing lumens (using PayPal or credit cards), or by directly connecting to their Stellar wallets. Since SatoshiPay does not have the option for test mode like LaterPay, participants to the survey (Chapter 3) were advised against entering any private payment data while testing the plugin.

¹<https://cmsproj.projekte.fh-hagenberg.at/wordpress/>

6.1.3 Removed Items

Login and Profile

The pages for member registration and login were removed for two reasons:

1. The test blog is a public site and should be GDPR-compliant (see Appendix B).
2. The two installed micropayment plugins work for all users without the need for registration.

Paywall Plugins

The two paywall plugins that were used in the first semester *Leaky Paywall* and *Paid Member Subscriptions* were removed from the second semester's project. Both were used earlier to simulate the Paywall concept for *site members only*. As the focus has changed from Paywalls to Micropayments in the second semester, users data was no longer needed. Also the *LaterPay* plugin already provides the monthly subscription option without the need for registration.

6.2 Reader Score Prototyping

The second part of the project is a prototype proposing a score system for online readers. The prototype is also a blog site with an added counter, whenever a post is clicked, the counter starts after a minimum amount of time is actively spent on the page (minimum reading time). Once the reader navigates away from the article, the counter value is added to the reader's score. This score can be used in a loyalty-rewards program set by the publisher. Alternatively, the reader can also purchase other premium content with a discount, depending on the awarded score from reading other articles. This functionality was written in JavaScript.

6.2.1 Proof of Concept on WordPress

It was quite challenging to apply the reader score concept in the same WordPress blog. As a CMS having its own API's, adding new features to a WordPress blog was not a flexible process: The plugins can only be written in PHP language, and adding Javascript to PHP was cumbersome. After a couple of attempts with PHP, a decision was made to remove the Javascript scoring code from the final WordPress deliverable and build another separate blog with Ruby on Rails.

6.2.2 Ruby on Rails Prototyping

For the sake of flexibility, Ruby on Rails [22] is used to build a separate blog with the score feature added. The blog prototype is deployed on Heroku [17], connected to a PostgreSQL database system [20].

Ruby on Rails

Being a full-stack web framework makes Ruby on Rails especially conventional for building prototypes. Ruby is a very high level language that abstracts away a lot of details

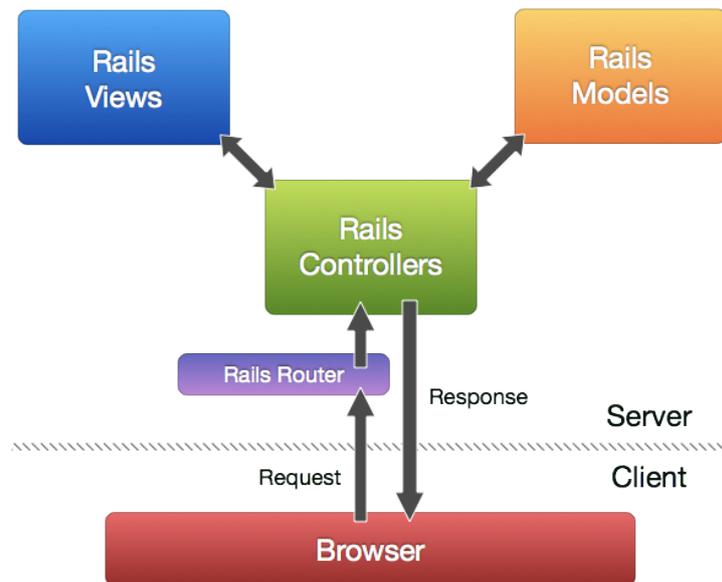


Figure 6.1: Model-View-Controller architecture in Ruby on Rails.

and makes it easier for beginners to start developing their ideas with code. Rails is the framework for Ruby that facilitates the development process through *scaffolding* and fast auto-generation of the *Model-View-Controller (MVC)* architecture (see Fig. 6.1)² for web applications. This gives the developer the freedom to focus only on the implementation design, without having to worry about configuration.

The MVC structure serves the concept of *Separation of Concerns*, so that each part deals with its own responsibility:

- **The Model** is the part that handles the relationship with the database, so that each model can represent a table in the database. Validations and associations between the different models are handled in this part of the architecture.
- **The View** is basically the UI rendered on the client side. It is the chosen format for the server response to the client's request, based on decisions by the *Controller*. This format can be HTML (styled with CSS and JS), JSON, PDF etc.
- **The Controller** is playing the "Maestro" role in this architecture, it queries the models for specific data, and makes decisions about displaying this data to the view.
- **The Router** examines the URLs requested by the browser (client) from the server and verifies if there are matching resource entries provided by the Controller. Usually the routes file contains the RESTful³ routes for each Controller.
- **Policies** are objects added to manage authorizations, that is, permitting specific users to do specific requests.

²Image Source: <http://blog.ifuturz.com/ruby-on-rails/ruby-on-rails-mvc-learn-with-fun.html>

³compliant with REST [30] architecture for creating web services, which leverages HTTP Create, Read, Update and Delete (CRUD) methods.

PostgreSQL

PostgreSQL is an open source object relational database system that leverages the SQL language to safely store and scale even complicated workloads. It is highly extensible and compatible with a lot of programming languages. What makes it especially useful with Rails (4.x and above) is that Rails supports a number of PostgreSQL features that are not in MySQL, such as PostgreSQL data types, arrays, UUID Primary Keys, full-text search, and backing Rails Active Record models with database views [7].

Heroku

Heroku is a *Platform as a Service* (PaaS) provider that handles the application installation, maintenance and monitoring. Its free tier was the most convenient option for deploying the prototype, with just a bunch of git [14] commands, the Reader Score app was made available online.

6.2.3 Current Implementation

- Models are created for *user* and *post*.
- User authentication is handled in the *pages controller*, while authorization is managed in the *post policy*, as there are admin and editor roles with different privileges.
- Reader score is calculated in the *post.js* script component then sent over to the *posts controller* to be saved as *post score* and displayed in the browser.

Due to time and resources limitations, the current implementation⁴ has limited functionality:

- Reader Score can only be displayed to the user on top of the page, while using it for discounts is a separate functionality that is not implemented.
- For testing purposes, the score counter starts after only 20 seconds of opening an article page. Ideally it should be at least 2 minutes (minimum reading time for a short article).

⁴<https://redalytics.herokuapp.com>

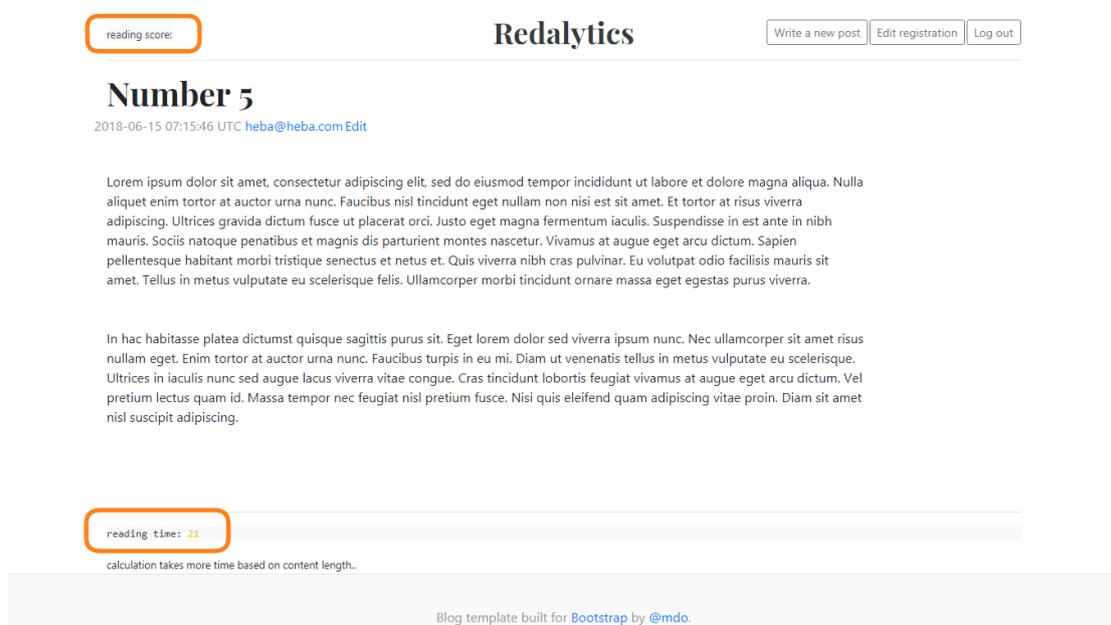


Figure 6.2: On reading the first article, no score is recorded yet.

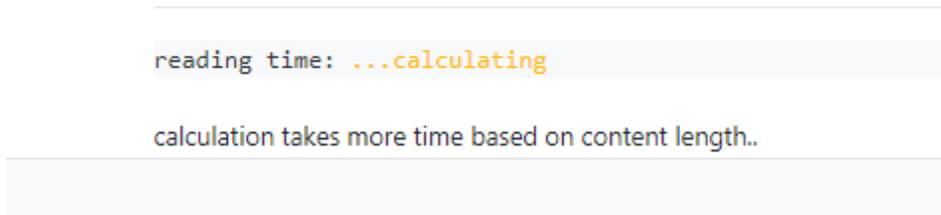


Figure 6.3: Waiting for minimum reading time before recording a score.



Figure 6.4: Accumulated score after reading an article and switching to the next.

Chapter 7

Future Work

In addition to the quality of content, increased focus on user experience (UX) should help publishers keep their readers engaged and willing to pay for content. In this chapter, further enhancements that can be added to the implementation—described in the previous Chapter 6—are discussed. These enhancements are based on the insights from the thesis survey with readers and publishers in Chapter 3, as well as the reports reviewed in Chapter 4.

7.1 Enhancing the Incomplete Reader Scoring Prototype

7.1.1 Score Calculation

The estimated reading time for each article should be displayed on top of the article, and this reading time value t_r is recorded in the back-end so that the score counter only starts adding score to the reader after a minimum of $t_r - 1$ minutes (assuming a user reading time that is a bit faster than estimated). Needless to say, the score should be counted in minutes instead of seconds.

7.1.2 Score Usage

The score counted and recorded in the user profile can be exchanged anytime for premium content. This score can either be translated into a percentage discount while purchasing a subscription, or can be used in a loyalty-rewards program set by the publisher in cooperation with other business partners.

7.2 Purchase Articles with GridCoin

GridCoin (GRC) [16] is a cryptocurrency earned when users volunteer with their computational power to scientific projects on the BOINC Grid Computing System [8]. The micropayment solution suggested by Karame et al. [2; 3] directly uses the computational power in exchange for premium content. A simpler solution is to use the monetary rewards from the already established BOINC to pay for articles, without having to involve the publishers in the volunteer computing part.

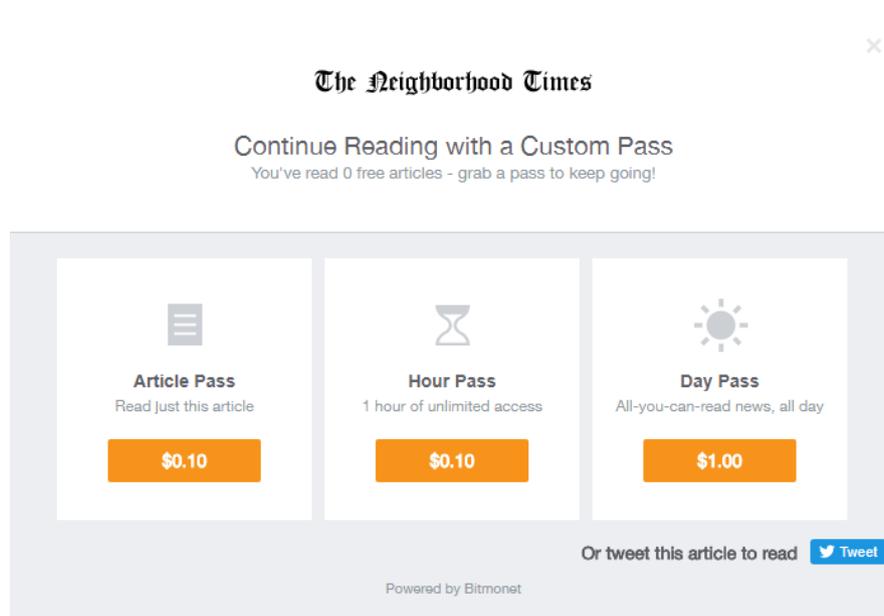


Figure 7.1: Bitmonet article purchase options

The GRC wallet, however, was in maintenance mode from 10th of February till 25th of May 2018, so it could not be tested further for implementation.

7.3 One Premium Article for One Shared Article

In one of the WordPress plugins, Bitmonet, there was the option of accessing a premium article without paying, only if the user shared it on Twitter (see Fig. 7.1). A suggested future enhancement for this feature is recording the number of shared articles by the user on Twitter (also Facebook and other social media can be considered), and giving access to an equal number of Premium articles. This makes the sharing feature more effective and will ensure more reader engagement, as readers are more willing to share articles they have already read and believe that they are worth sharing.

Bitmonet plugin was not used in the project because it has not been updated for five years. Also the code is not available on their GitHub account. On the other hand, a simple sharing feature was removed from the current thesis implementation due to GDPR considerations—users have to connect their social media accounts in order to share—which requires more time and development resources. See Appendix B for more details on GDPR article related to this.

7.4 Adding More Gamification Elements

7.4.1 Instructions and Feedback

It should be clear for the reader how to earn points and what are the expected rewards. The scoring system should be challenging enough to engage the readers, and at the same

time not so demanding that new readers cannot stick around. Also clear and frequent feedback should be given to let the readers know why (or why not) and when they get scores.

7.4.2 Badges

Badges can be awarded to the readers when they reach a certain score or consume a specific number of articles. Badges can also be specific to each reading section if the publisher is providing a variety of articles and not specialized in one subject.

7.4.3 Leaderboard

A leaderboard showing the number of read articles per reader can also be added to motivate readers to access more articles.

Chapter 8

Conclusion

The micropayment solutions discussed in this work do not ultimately answer the question of “to build or not to build a paywall”, since the problem at hand is not purely technical. Content quality, pricing and mutual trust are other major factors affecting the subscription trends.

Moving from paywalls to micropayments simplifies the payer’s decision, but only supports the publishers revenues over a longer period. If a model is not *simple* enough to implement, it will not fix the problem of high costs and low revenues for publishers. *Security* is the reason behind the fall of the advertising model, so if users cannot trust that their data is protected while interacting with a payment interface, they will stop using it. *Fairness* should always be a standard to meet, especially when it comes to accessing information and news. UX improvements and Gamification elements only do their magic when they are designed to benefit both publishers and readers. A good design should help readers recognize the value and meaning behind what they are asked to pay for, once they find that value, they will invest both their time and money. In return, this also helps publishers acquire, engage and maintain a wider readers base.

The thesis goal is to recommend optimizations of the currently used models, based on input from readers and publishers. Their concerns were gathered in a survey questionnaire distributed on social media, along with insights collected from two major studies conducted in 2017 about paying for digital news. On top of the suggested improvements, is a reader score calculation interace that checks the time spent reading articles online. This scoring is prototyped using Ruby on Rails as a proof of concept, but the development of further functionalities and UX enhancements are planned for future work.

Appendix A

Thesis Survey Questionnaires

A.1 Questionnaire for Readers

This is a short survey to assess readers perception of paid online content, the first 8 questions are general and the last 2 come after some explanation for more specific answers. Thanks in advance for your time taken to answer all.

1. How old are you?
2. Where are you from?
3. Are you subscribed to paid online content?
 - Yes, a lot of them
 - Yes but only a few of them
 - No I only read free stuff
4. If your previous answer is yes, could you name those publishers you are subscribed to? Examples: Medium, The Economist, Financial Times, The Next Web, Wired etc
5. Do you use Ad-Blocker software?
 - Yes
 - No
6. What makes you decide to pay for a publisher's content?
 - No similar content is provided by others
 - The price is reasonable
 - The price is affordable to me
 - Extra benefits (e.g. print versions, vouchers and promocodes)
 - That I do read more than 50% of the content they publish
 - Other
7. What makes you decide not to pay for your favorite publisher's content?
 - Similar content is provided by others for free
 - The price is too much even if I can afford it
 - I wish I could pay them but the price is not affordable to me

- No extra benefits (e.g. print versions, vouchers and promocodes)
 - I only read a little portion of the content they publish
 - I'm against paying for content on the internet as a whole
 - Other
8. Are you open to pay for online content with cryptocurrency?
- No I'm not interested at all
 - That's fine.. doesn't matter
 - Ok but I'm interested in Bitcoin only
 - Cool! that would be my first use of cryptocurrency
 - Sure thing, I already have a wallet and all set
 - Other

A.1.1 Paywall Options

While answering the next questions, please refer to the links provided below to see how each payment model actually looks like, urls are either from my own test WordPress blog "Writings on the Paywall" or links to real published content.

If you are curious, you can also attempt to pay without actually paying, if you are asked for your Paypal or credit card info, that means it is a real payment, DO NOT enter your info, you are supposed to be testing only.

- Pay per paragraph, video, image or audio recording: <https://goo.gl/ZJC2GQ> <https://goo.gl/FrWCAA> <https://goo.gl/FGdN6H>
- Pay per article: <https://goo.gl/dzVFco> <https://goo.gl/cXKA9j>
- Day pass: <https://goo.gl/mgf33u>
- Week pass: <https://goo.gl/ZQ27y5> <https://goo.gl/5GgFjf>
- Per-section monthly subscription: <https://goo.gl/2QXTjj>
- Full-content monthly subscription: <https://goo.gl/LyTMqL>

1. What options do you like to have for purchasing content?
- Pay per paragraph, video, image or audio recording
 - Pay per article
 - 24-hr pass
 - Weekly subscription
 - Per-author monthly subscription
 - Per-Section monthly subscription
 - Full-content Monthly subscription
 - Other
2. From the previous, which is the one option you prefer the most?
- Pay per paragraph, video, image or audio recording
 - Pay per article
 - 24-hr pass
 - Weekly subscription

- Per-author monthly subscription
 - Per-Section monthly subscription
 - Full-content Monthly subscription
 - Other
3. Your email (optional)

A.2 Questionnaire for Publishers

This is a short survey to assess publishers perception of payment models for their online content, the first 8 questions are general and the last 2 come after some explanation for more specific answers. Thanks in advance for your time taken to answer all.

1. You are a(n)
 - Affiliated journalist
 - Independent journalist
 - Freelance writer
 - Content Manager
 - Blogger
 - Other
2. How old are you?
3. What is the main language(s) of your content?
4. If you don't mind, please name the publishers you are working for
5. Is your online content paid?
 - Yes, most of it is paid
 - Only a little of it is paid
 - All for free
6. Do you rely on ads in the free pages of your content?
 - Yes
 - No
7. On what bases would you decide the price for your content?
 - The prices of similar content provided by others
 - What the readers are willing to pay
 - What gives me profit/financial freedom
 - The costs of operating online
 - The costs of dismissing ads
 - The frequency of publishing my content
 - Other
8. Are you open to accept cryptocurrency for your content?
 - No I'm not interested at all
 - Why cryptocurrency? What's the difference?

- That's fine.. doesn't matter
- Ok but I'm interested in Bitcoin only
- Cool! that would be a good start to use cryptocurrency
- Sure thing, I already have a wallet so I'm all set

A.2.1 Paywall Options

While answering the next questions, please refer to the links provided below to see how each payment model actually looks like, urls are either from my own test WordPress blog "Writings on the Paywall" or links to real published content.

If you are curious, you can also attempt to pay without actually paying, if you are asked for your Paypal or credit card info, that means it is a real payment, DO NOT enter your info, you are supposed to be testing only.

- Pay per paragraph, video, image or audio recording: <https://goo.gl/MPxYJc> <https://goo.gl/mNLmcM> <https://goo.gl/PvByMj>
- Pay per article: <https://goo.gl/MeJJ5R> <https://goo.gl/eNbhp7>
- Day pass: <https://goo.gl/fVLe6A>
- Week pass: <https://goo.gl/9Hdnyq> <https://goo.gl/VP97Jb>
- Per-section monthly subscription: <https://goo.gl/dWUwJp>
- Full-content monthly subscription: <https://goo.gl/18rsgL>

1. Which of these paywall options are more convenient for you as a publisher?
 - Pay per paragraph, video, image or audio recording
 - Pay per article
 - 24-hr pass
 - Weekly subscription
 - Per-author monthly subscription
 - Per-Section monthly subscription
 - Full-content Monthly subscription
 - Other
2. Can you take a minute to explain why you chose those models in the previous question?
3. If you have more comments in general Your email (Optional)

Appendix B

Art. 7 GDPR: Conditions for Consent

1. Where processing is based on consent, the controller shall be able to demonstrate that the data subject has consented to processing of his or her personal data.
2. If the data subject's consent is given in the context of a written declaration which also concerns other matters, the request for consent shall be presented in a manner which is clearly distinguishable from the other matters, in an intelligible and easily accessible form, using clear and plain language. Any part of such a declaration which constitutes an infringement of this Regulation shall not be binding.
3. The data subject shall have the right to withdraw his or her consent at any time. The withdrawal of consent shall not affect the lawfulness of processing based on consent before its withdrawal. Prior to giving consent, the data subject shall be informed thereof. It shall be as easy to withdraw as to give consent.
4. When assessing whether consent is freely given, utmost account shall be taken of whether, inter alia, the performance of a contract, including the provision of a service, is conditional on consent to the processing of personal data that is not necessary for the performance of that contract.

Suitable Recitals

(32) Conditions for consent¹, (33) Consent to certain areas of scientific research², (42) Burden of proof and requirements for consent³, (43) Freely given consent⁴
All GDPR articles can be found in the info site [6].

¹Recital.32: Conditions for Consent <https://gdpr-info.eu/recitals/no-32/>

²Recital.33: Consent to certain areas of scientific research <https://gdpr-info.eu/recitals/no-33/>

³Recital.42: Burden of proof and requirements for consent <https://gdpr-info.eu/recitals/no-42/>

⁴Recital.43: Freely given consent <https://gdpr-info.eu/recitals/no-43/>

Appendix C

CD-ROM/DVD Contents

1. Electronic version of the written Master's Thesis.
2. Latex source code of the written Master's Thesis.
3. WordPress folder on the FH server.
4. Source code for the Ruby on Rails project
5. NEX folder containing screenshots from the blog sites.

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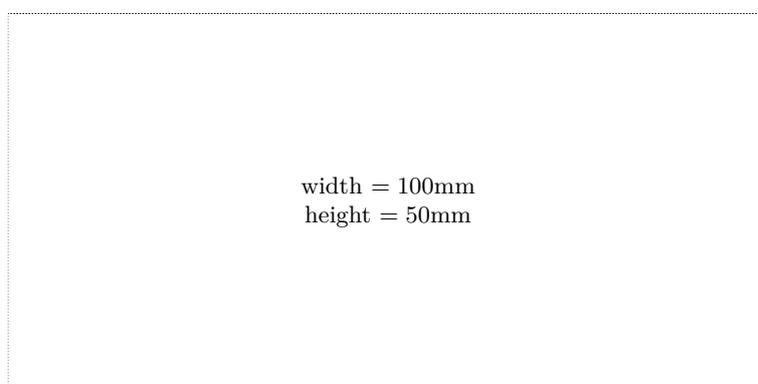
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