

THE INTERNET UN-BUNDLED

Locating the user's voice in the debate on zero-rating

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Abstract

Zero-rated data plans, which make access to certain content on the internet cheaper (or even free), have been celebrated by some for creating more affordable access to the internet. Others contend that these plans are not creating "internet" access at all, but only making it cheaper to access certain content, thereby skewing competition in their favour. Are newer, low-income users going to get "locked-in" to a walled garden populated with only those content companies that can afford to be zero-rated? Or are zero-rated plans giving such users what they want- a chance to access popular content at more affordable rates? At the centre of these complex policy debates is the user and what s/he wants. Yet all we have to go by is broad-brush and predictive anecdotes about "new users in developing countries". There is an urgent need for country-specific research on how the target demographic is actually responding to these plans. This thesis makes a start, with a focus on India.

I use economic theory on bundling of information goods to operationalize the theme of user choice. I demonstrate why user valuation of both individual websites, and the internet as a whole, is central to determining the efficiency and welfare implications of zero-rating. I also used theory on versioning to ask whether zero-rated plans are facilitating access, what kind of access, and the extent to which the trade-off between access and competition can be given a utilitarian justification.

The empirical work of this thesis includes interviews with representatives from several telecom companies, recharge shop retailers and users themselves. Using the methodology of qualitative comparative analysis, users were categorised based on their responses to zero-rated plans. The main findings are that newer, low-income users prefer all-access plans. Critically, this preference is strong enough for most to have rejected zero-rated plans in favour of all-access plans – even when the latter are more costly or for shorter duration. The idea of the open internet, thus, moves away from being the lofty ideal that many accuse it of, to something which is of significant economic value to users. Consequently, the fear of users being locked-in to zero-rated plans may be exaggerated. The conclusions speak back to the policy debate.

Keywords: Net-neutrality, Zero-rating, Access, Competition, Openness, internet.org, WhatsApp, Facebook, Bundling, Versioning, ICT4D

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This thesis was inspired by a heated policy debate that has been taking place globally for some years now, but which erupted in India in March 2015. I had the opportunity to learn from discussions with many who were at the forefront of the net-neutrality movement in India - Raman Chima, Apar Gupta, and Nikhil Pahwa.

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Contents

I. INTRODUCTION 5
II. LITERATURE REVIEW 11
2.1 What literature on net-neutrality tells us 11
2.2 What literature on net neutrality doesn't tell us15
2.3. What economic theory calls bundling17
2.3.1 User preferences
2.3.2. Willingness to pay and welfare effects20
2.4 What economics theory calls "Versioning" or "Damaged goods" 20
2.5. The role of simplicity and predictability in pricing strategies 22
III. METHODOLOGY AND DATA25
3.1. Elite interviews - marketing executives from telecom companies 26
3.2. Recharge shop retailer interviews27
3.3. Users
3.4 Analysis30
IV. RESEARCH FINDINGS 32
4.1. Users
4.1.1. Group 1: Those who had negative responses to zero-rated plans 32
4.1.1.a Fear or suspicion about billing practices associated with zero-rating34
4.1.1.b. Limited users: the idea of the "emergency"35
4.1.1.c. Mobile internet as a source of media entertainment36
4.1.1.d Internet as a site for actual and potential "exploration" 38
4.1.2. Group 2: Those who had positive responses to zero-rated plans 39
4.1.2.a Use laptops or wifi for most purpose, and yet stay connected on the move
4.1.2.b. More risk-tolerance
4.1.2.c. No time and no interest in the internet beyond Whatsapp 40
4.2 Marketing executives41
4.2.1. Measuring the success of zero-rated plans41
4.2.2. Lack of clarity about data billing42
4.3. Retailers
4.3.1. User response to zero-rated plans
4.3.2. "Free stuff"
V. DISCUSSION44
VI. CONCLUSION49
VII. BIBLIOGRAPHY53

I. INTRODUCTION

"But the fact is that a violation of net neutrality would gladden most of the more than one billion Indians who cannot afford to pay for data and so are not connected to the Internet.

Such a violation raises the prospect of a cost-free Internet. A limited, impoverished Internet created by corporate strategy, perhaps, but a free slice of Internet that might introduce hundreds of millions to a utility that everyone now agrees is a human right."

Manu Joseph, New York Times, April 2015

The goal of public policy everywhere should be to increase access to the internet – the whole goddam internet, not some corporatecontrolled alcove – for as many people as possible.

John Naughton, The Guardian, January 2015

The violation that Joseph is referring to (and what Naughton calls the corporate controlled alcove) is in fact zero-rating – what customers in India recognize as "WhatsApp packs", "Facebook Fridays" or "internet.org". These various mobile data offerings by Indian telecom operators have one thing in common: they make it cheaper (or even free) to access selected websites or applications. The default pricing of mobile data has historically been allaccess plans, agnostic to what content the user is accessing. Pricing has been based on volume of usage – most commonly through a flat-fee price with overall volume caps. If the user is not subscribed to a plan then accessing the internet attracts charges based on bytes consumed, at a price referred to colloquially as the "base-rate". Zero-rating represents a departure from this model and comes in multiple forms that could be categorized as follows:

1. Limited packs: Access exclusively to certain online content for a fraction of the price of regular all-access plans. Accessing external content attracts notoriously high base-rate charges. For example, for WhatsApp and Facebook packs in India (priced lower than the all-access monthly plan) users get unlimited access to WhatsApp/Facebook but if they open any other website or application they are charged from their calling credit at base-rate (Indian Express, 2015). Sprint also introduced a "Facebook-only" plan in the US (Knutson, 2014).

- 2. Free walled-garden: Access to a selection of websites for no charge at all i.e. without being subscribed to a data plan. Access to content outside of this 'walled garden' incurs charges at base-rate. For example, "internet.org" (Reliance Communications, 2015) or Google's "Freezone" (Deibert, 2013)
- 3. Un-metered: Use of certain applications/websites is un-metered and does not count towards monthly volume caps- "Pay X amount for X GB of data per month, but the use of Facebook is unlimited!" For example, T-Mobile unmetered certain music streaming websites in the US (T-Mobile News, 2015).

Zero-rating has been in practice since around 2012 across the developed and the developing world, yet much of the debate is in the context of countries with low internet penetration. It is widely acknowledged that the current global gap in internet access- often referred to as the "digital divide"- will be bridged through mobile networks (The Guardian, 2014; ITU 2014; ITU 2015). Of the 2.4 billion people using mobile devices to access the internet across the globe, 1.8 billion were from developing countries (ITU, 2015). This represents a tremendous opportunity for content companies, particularly social media, to expand their networks and gain data about populations coming online for the first time.

India, in particular, has 243 million active internet users—more than the US and second only to China—but only a fifth of its population is online (Forbes, 2014). More importantly, the mobile phone is the primary mode of accessing the internet — more than 80% of Facebook users in India access it only through their mobile phones. Already, India has the world's second largest Facebook audience. More than 70 million of WhatsApp's 800 million 'monthly active users' are from India. With the highest growth rate of internet

users in the world (OGD-India, 2015), it is unsurprising that India represents tremendous opportunity for content companies and telecom operators alike. As Facebook's finance chief, Dave Wenner, puts it, "I do think that over the long term, that focusing on helping connect everyone will be a good business opportunity for us." If Facebook becomes one of the top services in these countries then over time, in his words, they will "be compensated for some of the value that we've provided" (Mirani, 2015).

Who decides what content is zero-rated? One possibility is that the content company pays the telecom operator for zero-rating their content, presumably to increase traffic to their website. The other version involves no money exchange, but is based on the strategic understanding that, if popular content is zero-rated, it will draw in new data users or cause existing ones to switch telecom companies. Strategic partnerships have thus been the norm in the developing world, as both content companies and telecom companies see a market of potentially billions of new users coming online (Knutson & Schechner 2015).

If you were confused about why something that seems to be making the internet more affordable is being referred to as a violation, you wouldn't be alone. You would, however, have to address concerns put forth by advocates of net-neutrality. Net-neutrality is the principle that the internet was created as, and should remain, an open and non-discriminatory medium that treats all content and platforms equally (AccessNow, 2015). In essence, zero-rating puts certain content on a pedestal. By making it less expensive to access, it is, potentially, more attractive to users, and arguably the market power of these content companies is strengthened to the exclusion of others. It isn't just market power that's at stake. The fact that certain voices (such as online news) could be zero-rated and made accessible to a larger number of people, puts media diversity, and freedom of speech at stake in this debate too (Van Schewick, 2015).

Zero-rated plans first started appearing in European and American markets in 2013 (Digital Fuel Monitor 2015; Pegoraro 2014). Initially, most services were

of the unmetered variety - for example, US telecom company Charmin zero-rated Facebook, and Deutsche Telekom zero-rated its own IPTV service in Germany (Pegoraro, 2014). More recently, T-Mobile un-metered online music applications like Pandora, Slacker, Spotify, and others in the US (ibid). In 2014, Virgin Mobile announced a limited Facebook-only plan in the US (ibid).

Meanwhile, as early as 2012, zero-rated plans had already been introduced in the developing world. Both in Turkey ("Facebook Zero", "Twitter Zero") and in India ("Facebook pack", "WhatsApp pack"), such plans were marketed as short duration promotional offerings (Internet Governance Forum, 2014). In July 2014, Mark Zuckerberg, CEO of Facebook launched internet.org in Zambia (BBC 2014). "Internet.org" wasn't merely more affordable, but allowed free access to Facebook and a selection of other websites. The service is now available in more than 10 countries, including Kenya, Colombia, Tanzania, Indonesia—and, more recently, India and Pakistan. The launch of internet.org was framed by Facebook as a philanthropic exercise — as the company's plan to "deliver on the promise of a connected world" (Facebook Connectivity Lab, 2015). This was in stark contrast to the launch of previous zero-rating plans which were silent about the social value of their endeavours, and were perceived as solely driven by economic incentives.

Perhaps for this reason, it was the much-publicized launch of internet.org in developing countries that has brought zero-rating to the forefront of a debate that pits net-neutrality against access. This is a debate with definitive policy implications and countries have already started taking a stand. Chile banned zero-rating on the grounds of it being a discriminatory practice that violated net-neutrality. Norway, the Netherlands, Iceland, Finland, Latvia, Lithuania, Malta, and Japan have all implemented similar policies (Rewheel 2014). In early 2015, the Dutch and Slovenian regulator fined telecom companies for zero-rating music and cloud-based apps (ibid).

In March this year, zero-rating in India made global headlines – "the fight for net-neutrality has come to India" one website said (Brandom 2015). When the telecom regulator in India (TRAI) published a consultation paper it was

accused of over-representing the views of network operators, and met with unprecedented public backlash (Gupta, 2015; Brustein 2015; Roy 2015). More than one million responses were received by TRAI, demanding strict net neutrality regulation (PTI, 2015). Unsurprisingly, zero-rating – which was the "hard case" in debates in the US, Brazil and Netherlands – is the center stage of this one. The public campaign has been so vociferous that e-retailer Flipkart, which was to be zero-rated, announced that it was exiting the partnership due to a commitment to net-neutrality (Balakrishnan, 2015). The next day, a popular airline booking website, Cleartrip, and a news website, Times of India, left internet.org citing similar grounds (PTIa, 2015). Equally vocal have been the supporters of zero-rating, arguing that it creates more affordable access for the next generation of internet adopters. As one commentator puts it, "Whoever wins this fight, the consequences could reach far beyond India. India is essentially ground-zero for zero-rating, globally" (Brandon, 2015; The Verge, 2015)

But are users really as "gladdened" by a "slice of the internet" as Joseph (2015) proclaims? This question has been pushed to the margins of the heated debate on zero-rating, but this thesis argues it is central, both to understanding the social implications of zero-rating and to assessing the appropriate policy stance towards such plans. Even as the Indian regulator mulls over the future of zero-rating (Mankotia, 2015), limited data plans (WhatsApp/Facebook/Twitter packs) continue to be on offer by most telecom companies in India. This therefore represents an opportunity to enquire into how the user is responding, and this thesis makes a start. Although zero-rated plans are subject to fierce debate, this debate is mostly conducted in the abstract, and in policy circles. Little is known about how users view these plans, or how they affect usage patterns. A proper understanding of these attitudes and behavioral effects is of first-order importance in assessing the broader social implications of zero-rating. To my knowledge, this is the first study to provide an assessment of these issues

This thesis enquires into user responses to such limited packs (hereinafter referred to generally as zero-rated plans). Section II outlines the relevant

academic literature on net-neutrality and zero-rating. It points out deficiencies in the existing literature, and looks to economic theory for alternative conceptual frameworks. Section III provides justifications for the methodology employed in this thesis as well as the tools of analysis used subsequently. I interviewed users, retailers and marketing executives, in order to elicit their views on zero-rating and Section IV summarizes the findings. Section V provides an analysis and speaks back to the research questions emanating from the literature. The main results are that fear of newer, poorer users being locked-in to zero-rated plans may be exaggerated, and that these users appear to be categorically rejecting limited packs. Some access may be better than none, but the trade-off they are willing to make is how much they use the internet, not necessarily how much of the internet they get to use. On the other hand, those who had alternative access to the internet through PCs suggested that the packs were tailored to their specific usage requirements. The conclusion will assess how this could affect regulatory treatment of zerorating, and further areas for research.

The question of whether Facebook is the internet or will become the internet for the next billion coming online is more than a question of semantics. The internet is now established as a powerful platform for business and speech, so whether it is politicians, startups, developers, publishers — everyone is interested in how best to communicate with this new audience. The behaviours and attitudes of these users will shape how the internet evolves.

II. LITERATURE REVIEW

2.1 What literature on net-neutrality tells us

Academic writing on zero-rating is subsumed by the literature on netneutrality. Net-neutrality is the principle that the internet was created as, and should remain, an open and non-discriminatory medium that treats all content and platforms equally. It is this architecture, proponents argue, that has allowed for content innovation and free speech of the kind that has come to characterize the internet (Schewick, 2012). Literature on net-neutrality comes largely from the fields of law and economics. Zero-rating is a relatively new practice so most academic sources pre-date it, and much of the recent literature makes only fleeting references. It is identified as a deviation from the net-neutrality principle, but still one that may require distinct analysis.

It may be useful to point out that the debate on net-neutrality has two broad facets. The first, which I call the "principled" approach deals with what the internet is, and with questions of what it ought to be. It includes discussions around whether net-neutrality is fundamental to our rights to free speech and expression, and must be afforded protection as a human right (Berners-Lee, 2014; Belli & Bergen, 2013; AccessNow, 2013) and, consequently, whether any restriction of the open, unrestricted internet is inherently inferior. Statements made by net-neutrality advocates such as "zero-rating creates a synthetic online experience that isn't the internet." (Crawford, 2015, emphasis added), or, "the cost of zero-rating is the future of the internet." (Howard 2015) exemplify how zero-rating is seen in stark contrast to the inviolable principle of the open internet. On the other hand, a utilitarian debate focuses on more pragmatic, empirically grounded issues such as whether neutrality fosters innovation or harms investment, and what the overall welfare impacts of a departure from neutrality are likely to be. While my findings potentially speak to both aspects of the debate, its main focus is utilitarian for a number of reasons. Firstly, key utilitarian concerns stem from a long theoretical tradition

¹ Much of this literature is classified under "Law and economics" – a distinct method of legal analysis that relies on economic theory to answer legal questions, such as whether and how to

regulate.

(discussed later in the literature review) that invite empirical study of the kind I am undertaking. Secondly, the main themes of the principled approach already have a strong voice in advocacy surrounding net neutrality issues. However, a balanced policy stance must weigh these issues of principle against the pragmatic benefits and costs of (in) action. It is with respect to these benefits and costs that there is a real dearth of empirical evidence, and where the real opportunity for this thesis to make a practical contribution lies.

In this section, I will outline the main conclusions from such literature as well as its limitations in addressing zero-rating. Finally, I propose alternative conceptual and analytical frameworks that may help remedy these deficiencies.

Practices that have typically been the subject of net-neutrality literature include *restrictions on use* of content (by blocking, or throttling speeds), *price-discrimination* i.e. varying charges depending on the content being accessed or *preferential treatment* (through faster speeds) for certain content. A common justification for such practices is network congestion (Yoo, 2006). Congestion in a network with finite capacity is attributed both to bandwidth-intensive applications and increasing burden due to a growing number of endusers. Making it more expensive to access bandwidth-intensive content is argued to be an efficient way to tackle congestion. This literature doesn't help us understand zero-rating. Far from forcing users to internalize the cost of congestion, it is about incentivizing use of certain content and, potentially, increasing the number of users and volume of traffic on the network.

Beyond congestion, Yoo (2012) argues that that a neutrality rule would limit product diversity and harm overall welfare. Simply put, allowing network operators to employ different standards for different kinds of web traffic allows a wider range of "products" (a recent example from India are plans to allow access to Skype only through "Skype packs"), which cater to particular preferences among consumer segments. These purported deviations from netneutrality, Yoo argues, could be "nothing more than the natural outgrowth of the underlying heterogeneity of consumer preferences." Zero-rated plans are similarly defended as a natural outgrowth of strong consumer preferences for

particular applications like Facebook or WhatsApp. Product differentiation only serves to intensify competition between network operators, the argument goes. In his economic analysis of zero-rating, Eisenach (2015) echoes this argument. He finds that zero-rating in the United States has made it possible for mobile operators to differentiate their offerings on factors other than price, thereby contributing to the competitiveness of the mobile wireless market.

The strongest justification for zero-rating in policy circles is access. Perhaps because zero-rating has come to the fore as a 'net-neutrality' issue, its access implications are yet to be analyzed by social science traditions such as development studies, specifically ICT4D literature.² At more affordable rates, policy stakeholders argue these plans could serve to bring online new users who are otherwise financially unable to subscribe to all-access data plans (Brookings, 2015; Progressive Policy Institute, 2015). Many believe that if it is at all classified as a violation of net-neutrality, it must be carved out as an exception on the basis that "some access is better than none" (Samarajiva, 2014). Access to a medium is as much a concern of free speech as plurality of content may be (Kumar, 2015). In the public discourse on zero-rating in developing countries, many advocate that internet access for the economically disadvantaged is a right. Mark Zuckerberg of Facebook responded to the backlash in India by arguing that "Arguments about net neutrality shouldn't be used to prevent the most disadvantaged people in society from gaining access or to deprive people of opportunity." (Zuckerberg, 2015).

These defences become necessary in the backdrop of harsh opposition from net-neutrality advocates. Their primary argument is that zero-rating harms content innovation. Making it more expensive or slowing down access to some content, but not others, means that fewer users can afford the benefits associated with the restricted content. It also means that the developers of such content have less incentive to innovate. Market distortion is also caused when certain content is afforded better speeds. Users are likely to prefer such prioritized content which they perceive to be of superior quality, and although

² Publications are forthcoming from LIRNEAsia on zero-rating in Myanmar, as well as the Alliance for Affordable Internet (As per interviews with representatives from LIRNEAsia)

other content may not be blocked, their choice is, effectively, restricted (Schewick 2012, Schewick, 2015).

Schewick addresses zero-rating in her policy proposal to the FCC in 2015. She states that zero-rating threatens application-level innovation in the same way as speed prioritization - "As the record shows, start-ups, small businesses and low-cost speakers will often be unable to pay to be in the fast lane; they won't be able to pay for zero-rating, either." Even non-monetary, or strategic partnerships would allow network operators to favour specific content and therefore "pick winners and losers" on the internet. She proposes criteria on which to assess the legality of zero-rating – including user choice, costs on application innovation, and free speech. Choice itself is a complex idea to grapple with. It may be easy to assert that blocking certain web content restricts user choice, but when it comes to zero-rating- the argument is more subtle. Users will be "encouraged" to use only specific applications, to the exclusion of others, the argument goes.

The other predicted harm is that partnerships with content companies may incentivize network operators to exclude rival content from the network altogether. The open internet would then be potentially replaced by several proprietary "walled gardens". In fact, "walled garden" has become a catch phrase to encapsulate the anti-competitive harms associated with zero-rating in popular discourse. It implies a closed proprietary ecosystem that users seldom leave, either because they are technically prevented or because they are "locked-in" due to status quo bias. Yochai Benkler (1999), in his argument for a commons regime, protested against what he called the "enclosure movement" – calling for strict regulation of corporate walled garden strategies (Aufderheide, 2001).

This term found prominence in competition law when the AOL/Time Warner merger was being reviewed by anti-trust authorities (AOL/Time Warner, 2001). AOL's flagship internet service provider (ISP) included internet access along with access to specialized content on their portal (news, health, travel, sports, and finance information in "channels" from which users could choose).

It was found that AOL subscribers spent 85% of their time within the ISP's walled garden rather than leaving to explore the remainder of the internet. Certain content companies complained that AOL was demanding that companies purchasing space on their portal would not include links to website outside the "walled garden", or AOLs own content. Allegedly, AOL was requiring commitments that only a certain percentage of traffic within the network could be diverted outside. The merger was eventually allowed with conditions, but there were loud voices in protest, predicting that users would have to wade through AOL to get to the internet, and most would be locked in to affiliated content. Several years later, many mock the prediction, arguing that once end-users had the "ability to act as their own guides in finding content" the walled garden model would not survive (Yoo, 2014)

2.2 WHAT LITERATURE ON NET NEUTRALITY DOESN'T TELL US

Whether or not regulation of zero-rating is premature depends, in part, on the likelihood of harm to innovation and user choice. Evidence is required to take this debate forward. At the Internet Governance Forum (IGF, 2014) last year, a panelist asked:

"So what is the fear? Facebook becomes synonymous with the Internet and that is a legitimate fear. But do we know this? In the developing world, we do not. We need more evidence"

This summarizes the first deficiency in the existing literature. There is no qualitative or quantitative data on how new adopters in developing countries like India are actually responding to zero-rated plans. The likelihood of lock-in depends on the ability and awareness of users around the internet, and this is where country-specific research is urgent and necessary. And it isn't just the walled garden hypothesis – whether it's Yoo's formulation on heterogeneous consumer preferences or Schewick's nuanced idea of user choice – there is a need to understand user preferences in specific economic and cultural contexts. A broad-brush approach to user response in "developing countries" seems wholly inappropriate. This thesis starts to fill this gap in evidence, with a focus on India.

The second glaring deficiency in existing literature on net-neutrality is that it does not factor in the value of affordable access. Most existing literature originates in a western context. In countries with high internet penetration, network congestion and investment incentives, rather than access, are the primary justifications for deviating from the neutrality principle. Schewick's (2015) proposal to evaluate zero-rating, while it takes into account "low costs on application innovation and free speech", completely misses out price, which means that it does not accommodate concerns as to whether economically disadvantaged people are discriminated against by having no access. Access is not an uncomplicated argument - Crawford (2014) spells out the harm from identifying classes of users in developing countries: fragmentation of the internet into that of the rich, and that of the rest. Others argue it is creating "poor internet for poor people" and amounts to "economic racism" (Murthy, 2015). What has, or should have, more priority in our formulation of the freedom of speech? Should access to the medium be seen as protected by free speech, or would it require a higher standard of "plurality of content"? These questions have no easy answer, but if we acknowledge that access has potential social value, then it is important to accommodate it in the analysis.

The well-developed body of economic theory on bundling and versioning of information goods, on the other hand, is a powerful conceptual tool to understand the welfare and efficiency implications of zero-rated plans. Access is explicitly incorporated in its analysis of welfare effects. Four research questions will be introduced in this section, emanating from the literature on bundling and versioning of information goods. These served as points of enquiry for designing the interview questions, as well as for subsequent analysis.

2.3. WHAT ECONOMIC THEORY CALLS BUNDLING

Many stakeholders have loosely referred to zero-rated plans as "un-bundling" the internet — an al-a-carte alternative to the standard all-access plans (Crawford, 2015; Wohlsen, 2014). Bundling is the selling of several goods or services in a single package at a single price. Although the business practice is far from new, information goods have reduced (almost eliminated) the cost of distribution, such that it can allow for large-scale bundling. For example, selling access to a bundle of millions of songs would previously have required the production, storage and transportation of large volumes of physical media. Today, however, technology makes it possible for firms like Spotify to sell access to such a library of music with minimal distribution costs.

Firms can either practice pure bundling – where only the aggregated set of goods are for sale, or mixed bundling – selling both the bundle and the individual goods at the same time (Geng et al, 2005). While several studies pick up on examples of information goods being bundled *on* the internet (Bakos and Brynjolfsson, 1999), a few (Geng et al, Graber, 2005) acknowledge that flat rates for internet access are themselves a form of pure bundling: a single price which gives access to a large, ever expanding and potentially limitless set of information goods i.e. websites and applications.

Where flat rate pricing for the internet is characterized as pure bundling, the contemporaneous existence of zero-rated plans most resembles mixed bundling. A departure from flat-rate pricing to content based pricing, zero-rating essentially entails selling un-bundled popular content in its individual components while simultaneously allowing the bundle to be sold. This suggests that the theory of bundling may provide a useful lens through which to view the effects of zero-rating.

2.3.1 User preferences

The literature sheds light on when it would be most profitable for firms to employ pure bundling, and where mixed-bundling would be preferred. The first relevant factor is the availability of information about individual preferences. When the firm has limited information about user preferences for

the individual goods, pure bundling is optimal (Schmalensee, 2984; McAfee et al 1989). Intuitively, a firm could peg a consumer's average value for a single good (e.g., a single website) at a random variable. His average value for a bundle is an average across multiple random variables that will, therefore, generally have lower variance. This means that a firm can more precisely calculate a user's willingness to pay for the bundle than they can for its individual components.

But what if firms were able to more precisely calculate user preferences for individual components? Zero-rating is, in fact, often explained as the market's response to indications of a strong preference for specific web content like Facebook or WhatsApp. Policy advocate Rohan Samarajiva (2014) notes poignantly that for people in developing countries social media could be most of what they use the internet for, and zero-rating caters to this preference. "Are we going to fight this?", he asks.

Unbundling certain goods could allow users to choose the goods they find most valuable and avoid the additional costs that come with procuring the larger bundle (Sidak, 2006). In fact, McAffee et al (1989) demonstrate that, in a bundle with more than two goods, if there are positive values for two goods but *no value* for subsequent goods then bundling will not be optimal. Therefore, whether this strong preference for certain web content is to the exclusion of others is an important question. As is that of how this preference co-relates to the other information goods in the bundle. Although all economic models commonly "assume that the values for each good are separately addable, they do not necessarily assume that the values are independent". (Geng et al, 2005) In other words, to arrive at the optimal bundling strategy it is important to know how user valuation of individual components relate to each other.

Bakos and Brynjolfsson (1999) controversially concluded that "bundling very large numbers of *unrelated* information goods can be surprisingly profitable" (emphasis supplied). This was rebutted and the conclusion limited by Geng at al (2005). Bundling may be optimal for a large number of unrelated information goods but only as long as coefficient of variation is small. In other

words, when valuation among users is more or less uniform. On the other hand, when different customer segments systematically differ in their valuations, then pure bundling will cease to be optimal and a differentiated menu of prices will better respond to the heterogeneity (Sidak, 2006).

This literature speaks directly to the possible economic justifications for zerorating. It predicts that pure bundling will be least attractive when a group of consumers share the same strong preferences for a small set of websites. Offering individual websites along with the bundle i.e. zero-rating would perhaps then be the optimal strategy for firms to address this variation among consumer segments. This research will investigate user preferences for web content, whether this is concentrated to a few websites, and whether to the exclusion of others – will thus help determine how attractive bundling is. Simultaneously, whether mixed bundling (offering zero-rated plans) would be a more attractive strategy for plans.

Research Question No. 1

How do user preferences for a handful of websites relate to how users value the internet as a whole?

This question could aid the policy process in determining whether zero-rating is a natural consequence of competition in the market for mobile data. If the conditions are satisfied for bundling to be optimal (i.e. if consumers express fairly consistent values for the internet as a whole) then it becomes much harder to justify zero-rating as a stand-alone manifestation of competitive behaviour between telecom operators. This would hint at some ulterior motive for offering zero-rated plans, such as welfare-enhancing efficiency gains or (potentially illegal) anti-competitive practices.

2.3.2. Willingness to pay and welfare effects

The preceding section studied the optimality of bundling from the firm's perspective. Here, we look at the effect of bundling on consumer welfare, which also turns on willingness to pay. Sidak (2006) refers to "marginal consumers"- who Pew Internet & Life Survey (2012) identified and classified as those users with the lowest willingness to pay for internet access due to financial incapacity. Mixed bundling could potentially allow firms to offer stand-alone goods at a price that would include marginal who would otherwise be priced out of the market (Varian 1997, Sidak 2006). When the market is expanded to include additional consumers in this way, new value is created from trade. Through a range of well-accepted metrics, economic theory shows that the result can be an increase in overall welfare. If firms are prevented from using mixed bundling, then they might decide to *only* offer the full bundle to everyone at a price that excludes those with low willingness to pay.

It isn't difficult to see that this argument feeds directly into the access argument in favour of zero-rating. Lyons' (2015) recent policy analysis on zero-rating in Turkey echoes this logic. One cannot determine how many zero-rated users would have purchased the regular all-access plan in the absence of Facebook-only plan and which would have foregone access entirely, he admits. Yet he concludes that "both groups are better served by giving them the option to purchase access to the services they most desired at a lower price than Turkcells traditional data plan".

2.4 What economics theory calls "Versioning" or "Damaged goods"

While creating access can be and has been recognized as having social value, voices in the policy debate argue zero-rating is creating a "poor internet for poor people" (Murthy, 2015) and that it creates a "synthetic online experience" inherently inferior to the non zero-rated internet internet (Crawford, 2015). This echoes the principled approach introduced earlier. This idea of zero-rated internet access being qualitatively inferior to the all-access

internet leads us to the economic literature on "versioning" or, "damaged goods". Although it pre-dates the net-neutrality debate by some margin, the versioning literature provides a lens with which to make this issue concrete and draw out the key trade-offs. For it is about who does, and does not, get to participate in consumption of some good or service, and what is the kind of good they may end up consuming. That is an issue at the very heart of the debate on zero-rating.

Versioning is said to occur when producers provide different qualities of goods at different prices. The "better" option is priced for those with higher willingness to pay, and those with lower willingness can opt for the less expensive, lower quality option. Varian (1997) points out that while "a deliberate reduction of quality seems perverse to most casual observers", it must be judged relative to the alternative – "if differential pricing were not allowed, the low end of the market might not be served at all." In the same vein, Denekere & McAfee showed the welfare effects of selling "damaged goods": when only the high-willingness-to-pay group would be able to afford the goods in the absence of such versioning, the practice is welfare improving. (Denekere & McAfee, 1996)

Echoing this argument, advocates of zero-rating argue that it will bring new users online and make them aware of the "digital life". Even if it is limited exposure, it is argued to be enough to "prime" users into seeing value in the internet. As and when their willingness to pay increases to a sufficiently high level, they will graduate to the entire internet. Here, too, there are normative objections and many find the identification of "poorer" classes of users problematic. It is fragmentation of the internet into that of the rich, and that of the rest (Crawford, 2015). Naughton (2015) goes further to say that it "effectively locks poor people into [Facebook's] walled garden where they can be monetized if and when they have anything to monetize."

This heated normative debate provides a critical point of analysis for this research: are zero-rated plans facilitating access, and to what extent can the trade-off between access and competition be given a utilitarian justification? The versioning literature tells us that it is impossible to fully answer these

questions without fine-grained knowledge of user preferences and behavior, particularly for low-income users. This thesis supplies much needed empirical evidence that speaks directly to this issue.

Research Question No. 2

Do users view zero-rated plans as "damaged goods" or "poorer versions" of all-access internet plans?

Research Question No. 3

Are low-income users more likely to be locked-in to zero-rated plans?

2.5. THE ROLE OF SIMPLICITY AND PREDICTABILITY IN PRICING STRATEGIES

The availability of information to evaluate competing pricing plans has been demonstrated to be of crucial importance (Pappandrea, 2001). In fact, literature in the field of network economics looks not only at economic theory on pricing, but also at how to realize such pricing models through efficient human-computer interaction models. (Sen et al, 2013) Recent papers on "smart data pricing" explore how departures from flat-fee pricing, for example by being charged higher for bandwidth-intensive applications, can get users to internalize the costs associated with network congestion. Zero-rating is briefly examined in this context as an application-based pricing strategy. Sen et al note a high likelihood of confusion among users since zero-rated applications could often open out to links in external content, leaving them unsure of whether such traffic would be chargeable. Smart data pricing, they argue, should instead give users control and choice over their billing- in terms of what they want to consume, how much and when they choose to do so.

The problem of consumer confusion has been articulated in the considerable body of research on flat-fee versus usage-based pricing debate. In the telecom sector, empirical evidence finds that users have to exert considerable cognitive effort to evaluate the value of different pricing options. Flat-fees are a simplification strategy. Even when an alternative pricing option offers potential savings to users, they may be willing to pay a premium for simplicity

and therefore will opt for the higher priced flat-fee option. (Pappandrea et al, 2001; Fishburn, Odlyzko & Siders, 1997) A study looked at consumer responses to both flat-fee pricing and pay-per-use for mobile phone subscribers in Australia and found three factors to be decisive in favour of the flat-fees. (Fishburn et al, 1997) First, "insurance" or protecting against the risk of sudden large bills. Second, that consumers overestimate usage routinely. And finally that a pay per-use situation involves constant calculation over each call or message – often accompanied with decline in overall usage. Odlyzko et al concluded that users respond "extremely negatively" to "fine grained pricing", and that most end up paying a premium for predictability. The literature is clear – consumers may be willing to pay a premium for a simple, more predictable plan.

Zero-rated plans are essentially a departure from the flat-fee all-access model. I was interested in whether there was a simplicity trade-off here too, and how it may affect adoption of these plans.

Research Question Nos. 4

Does clarity about data billing affect user response to zero-rating in India?

To reiterate the research questions:

- 1. How do user preferences for a handful of websites relate to how users value the internet as a whole?
- 2. Do users view zero-rated plans as "damaged goods" or "poorer versions" of all-access internet plans?
- 3. Are low-income users more likely to be locked in to zero-rated plans?
- 4. Does clarity about data billing affect user response to zerorating?

III. METHODOLOGY AND DATA

This thesis seeks to make a substantive academic contribution to the existing policy debate on zero-rating in India by introducing data on how consumers are responding to these plans. Existing work indicates that the crucial factors in determining the effects of zero-rating are end-users' preferences and behaviour. These considerations determine the informational value of zero-rating to firms, the welfare effects of unbundling, and the potential for walled garden lock-in. As users respond to these plans on the market, it is therefore vital for not only firms, but also regulators to understand what users are saying.

As explained, this thesis restricts the enquiry to zero-rating by way of "limited packs". Limited packs were on offer by all major telecom companies at the time of data collection whereas the "free walled garden" (internet.org) and "unmetered" plans had been launched only by one or two telecoms on a pilot basis. These plans are structured and priced differently, and would justifiably be the subject of distinct analysis.

In light of the importance of user behavior and attitudes, in-depth semistructured interviews and participant observation are an appropriate method for this research. As Denzin & Lincoln (2000) point out, collection of many data on a few cases rather than few data on many cases has its unique benefits. Through qualitative research, I hope to drill down into the nuances of user attitudes towards these plans. These attitudes are important for determining the likely long-term welfare effects of zero-rated plans. Given the complete lack of empirical data on zero-rating in India, or any country similarly situated in terms of internet penetration, designing a rigid data collection structure (like a survey) would perhaps be premature for several reasons. In a space rife with speculation, it would be problematic to embed a survey with multiple assumptions that may bias it towards a particular hypothesis, or leave out factors that would be crucial for a robust model. The generalisability that comes from quantitative approaches is, indeed, valuable but is often best preceded by qualitative research that can serve to highlight nuanced points of enquiry.

In a qualitative study such as this one, the goal would be to "maximize the credibility and dependability of research results" (Johnson, 1997, p.183) One way to improve the evaluation of findings would be to employ triangulation. (Mathison, 1997). I sought to triangulate data from marketing executives in telecom companies, mobile credit retailers and, finally users of zero-rated plans themselves. As Gall et al (1996) remark, collecting data from diverse sets of people about the same phenomenon can establish the "project's data chain of evidence" and allow for verifying participants' perceptions in a systematic manner. I employed purposive sampling in terms of localities and the kinds of users that were relevant to my research design, as will be discussed subsequently.

I chose New Delhi as the site for my research for several reasons. First, the city has the second highest number of mobile internet users in India at 12.15 million. (IAMAI, 2014) Secondly, mobile data and telecommunication services are divided into "circles" – they represent separate service areas. Not all zero-rated plans were launched in every circle but I found that the plans I was interested in had been launched in the Delhi circle, making it appropriate for the study.

3.1. ELITE INTERVIEWS - MARKETING EXECUTIVES FROM TELECOM COMPANIES

Marketing departments in telecom companies use a mixture of sales data as well as on-the-ground market studies to determine whether a particular data plan is successful or not, and possible reasons for why. In an environment where nothing is publicly known about how consumers are responding to zero-rating, they were my first port of call. I was also interested in the metric employed by telecom companies to measure the success/failure of zero-rated plans.

I opted for interviews with marketing executives as a primary method of data collection. Sales data on particular plans and market studies are not part of public record, and are in fact regarded as commercially valuable trade secrets. I was able to interview four out of six major telecom operators that currently offer or have offered zero-rating plans in the past year. I conducted four interviews with senior marketing executives in the data department of telecom companies, and two interviews with marketing executives who worked "on the ground" collecting consumer and retailer feedback. During the course of two interviews, the senior executives would call in the individual responsible for evaluating consumer response to pricing strategies and any other service-related issues (usually network coverage problems). These executives typically spent three days of the week visiting different localities in New Delhi to collect data and then presenting short weekly reports, referred to as voice of consumer [VoC] studies. These executives were essentially engaged in a very similar data collection exercise to the one I sought to do. They verified their sales data using interviews with retailers and consumers. Below, I triangulate data from these elite interviews with voices of consumers and retailers.

Any inquiry into the internal assessment of business strategy must overcome a natural hesitancy to provide frank and accurate views. This project benefited from opportune timing because interviews with executives were conducted just before the telecom regulator of India (TRAI) released a policy brief, which discussed the potential regulation of zero-rated plans under a net-neutrality law. Whereas operators have become reticent following the publication of this report, they proved surprisingly amenable to share sales data and market insights during my interviews. All interviews were conducted on the condition of anonymous attribution — participants are attributed by their field of occupation.

3.2. RECHARGE SHOP RETAILER INTERVIEWS

"Recharge shops", as they are known in India, are the most popular means by which Indian consumers make payments under pre-paid (i.e. pay as you go) mobile phone plans. These shops usually service subscribers from most, if not all, telecom companies. A recent study indicates that only 12% of urban Indian mobile internet users have ever visited a website to recharge or pay bills, relying entirely on these neighbourhood shops (Ericsson, 2015). A user can

request an addition of any amount (starting from a very low threshold) to his/her account. Instead of paper coupons, retailers at recharge shops only need to send text messages through an electronic refill mechanism. This facility is one of many marketing strategies developed to serve the lower socio-economic demographic (Ericsson, 2015). Ubiquitous in every neighbourhood in Delhi, there are likely to be several recharge shops competing for loyalty through special discounts, or by allowing delayed payment.

Although these shops have posters from all major telecom operators detailing the pricing plans on offer, retailers most often provide advice based on the users' particular needs. A recent market study revealed that 55% of urban mobile internet users in India did not understand data plan options (Ericsson, 2015). This confusion presumably makes them more reliant on retailers. My aim was to speak to these retailers as key informants and as those who occupied a critical role in influencing the user's decision-making process.

My primary method of data collection here was in-depth interviews with 5 major retailers in lower-middle income neighbourhoods in Delhi as well as taking observational notes on their interactions with users. I define lower-middle income neighbourhoods according to National Council of Applied Economic Research (NCAER, 2014) classification as those where the annual household income is between INR 55001 and INR 88800 (GBP 556 to 900 GBP). Executives across telecom companies seemed to identify similar "target" neighbourhoods for their sales efforts — lower middle class neighbourhoods, especially those close to universities, indicating a high volume of youth users. These neighbourhoods therefore seemed appropriate for sampling users.

For the first few days, I merely observed retailers and their interactions with customers. The retailers, themselves between 18-35, knew most youth in the neighbourhood on a first-name basis and would routinely give advice on the best data plan. "We understand the priorities of young people while buying data. They trust us", one declared. Often, when users were on the fence about a particular data plan or even about getting online at all, these retailers would encourage and even demonstrate how to use applications or open browsers.

3.3. USERS

Perspectives, motivations, and opinions of users are central to my research questions. I was able to ascertain the target audience of these plans from interviews with telecom companies. A marketing executive of one telecom company informed me that zero-rated plans were marketed at student youth and migrant labour youth. Students were thought to be more likely to be interested in the internet for personal communication and entertainment and have higher levels of skill, and migrant labour because of their need to communicate with family or friends from their hometowns or villages. Advertising for zero-rated plans is also directed at young college-going youth. The focus on youth is not unusual given they are routinely identified as early-adopters of the internet in India (Halenwood & Kenny 2007, Ericsson 2015, McKinsey Insights 2015). Since I was looking at lower-middle class neighbourhoods in Delhi, participants would be classified as "urban poor" or the "urban lower-middle class".

The overall social impact of zero-rating depends on a broad range of consumer attitudes and behaviour. Importantly, this also includes the attitudes and behaviour of those who opt *not* to use zero-rated plans, and it is crucial to understand their reasons for this choice. This study therefore draws on interviews with both users and non-users of zero-rated plans

Eighteen users participated in semi-structured in-person interviews lasting between forty-five minutes and an hour. The interviews were dispersed among the five neighbourhoods I visited. Interviewees were between the ages of 18 to 35. Although studies have used focus-groups as a way to study mobile phone use among youth (Aoki & Downes, 2003), there are important reasons to prefer one-to-one interviews in this case. Firstly, I interviewed users as they left the recharge shops and this gave me the opportunity to speak to them in a natural environment. Interviews also avoid a general unwillingness to relocate or wait for other participants in a way that a focus group would require. All interviews were audio recorded and transcribed. Low levels of literacy demanded a process of oral consent, obtained after the idea of academic research pertaining to internet use (often conceptualized as a "domestic" or

"personal" issue) was explained. Seven of my participants were women, and the rest men.

Gender played a more significant role than I had expected simply due to the reluctance of men to share details of their internet use with me, a female. Some participants appeared shy to admit that pornography was a significant use of the internet but still alluded to it ("we watch different videos in the day time and the night time"). I did not probe or clarify these sections of the interview, as it was clearly an uncomfortable area for the participants. It alerted me, however, to my own subjectivity as a young female researcher interviewing young males, and how that may influence the data I was collecting (Riley et al, 2003). That said, the general guise of use for "downloading" or "entertainment" provided me adequate detail to address my research questions.

To provide an insight into attitudes across a broad spectrum of internet users, I actively sought diversity in terms of experience using the internet. This goes back to the policy debate on the effect of zero-rating on newer, financially constrained users. I interviewed both new users of the internet, defined as those who started using it within the last six months, and longer term users. This allowed me to isolate the influences of time of use on their responses. Eventually, seven users had two weeks to six months experience, four users a year of experience, and seven more than two years experience.

3.4 ANALYSIS

My data set comprised of interview transcripts and field notes based on my three sources (elite interviews, retailer interviews, user interviews). I used my research questions to derive an initial classification of two broad outcomes or codes — those that responded positively to zero-rating and those that responded negatively. My interview design allowed for this, and I was left with two mutually exhaustive categories of data.

As Cress & Snow (2000) explain, qualitative comparative analysis "is conjunctural in its logic, examining the various ways in which specified factors interact and combine with one another to yield particular outcomes." The

relevant outcomes for this thesis were positive and negative responses to zerorated plans. I performed qualitative comparative analysis on each of these
categories in turn. Through an iterative and reflexive process, I created a data
table comprising the traits of participants in each group which I found
meaningfully related to my research questions. I restricted this to four data
points: duration of use of the internet, whether the subject had alternative
means of accessing the internet, and their knowledge/familiarity with web
content and clarity about billing practices. I explain the choice of categories in
the subsequent section on research findings. These categorizations helped
revisit the transcripts in a methodologically systematic way. Finally I
triangulated these findings with those from my elite interviews and retailer
interviews.

IV. RESEARCH FINDINGS

4.1. USERS

Of the eighteen participants interviewed, a third had never heard of them. Twelve had a negative response to zero-rated plans while six had a positive response. Negative responses were those who made clear statements to the effect that they would not be interested in these plans, and gave detailed reasons why not. Positive responses of those that were current subscribers would generally imply reasons why they thought it was attractive. For the few that hadn't heard of zero-rated plans, the characteristics of the plans were explained and subjects were interviewed about their attitude to such a plan Often, at the end of the interview, they would ask if I could help them subscribe.

4.1.1. Group 1: Those who had negative responses to zerorated plans

Table 1 describes participants from this group based on four distinct criteria that I identified as potentially relevant to their assessment of zero-rating:

1. How long have they been using the internet on their mobile?

Since newer users were a target demographic for this thesis, this was immediately relevant, especially in order to ascertain how duration of experience may affect their assessment of zero-rating.

2. Do they have any alternative route to access the internet on a regular basis?

The importance of this factor emerged through an iterative and reflexive process. The centrality of the mobile phone as a user's only carrier for internet access was a recurring theme in several interviews.

3. What was their level of familiarity and knowledge about webcontent?

A major focus area of interviews was to understand the ways in which users derive value from the internet – and how this affected their assessment of zero-rated plans. Users in the "mature" category seemed to grasp the limitless variety of content online, were familiar with a popular web-content, and were themselves active users of several applications and websites. It is important to point out that maturity of use did not always mirror duration of experience. In fact, three first time users (with 6 months or less experience) displayed a high degree of skill and detailed knowledge about the functioning and diversity of content online. Most said this was due to learning from peers.

Limited users were either those who thought the internet was a handful of applications, or those who may have heard of a great diversity of content, but had not explored beyond one or two applications. This was either due to a lack of curiosity or purely because of skill-based issues.

4. What was their level of clarity regarding pricing of mobile data pricing?

Literature surveyed for this thesis identified the level of cognitive effort in evaluating competing plans and estimating their cost as a decisive factor in their adoption. I sought data on whether participants were familiar with mobile data pricing (I asked question to see if they understood volume caps on data plans and how they were activated).

Table 1Those who responded negatively to zero-rated plans

	Duration of Usage	Alternate mode of access	Familiarity and knowledge	Clarity on mobile data pricing
A	2 wks	No	Limited	Low
В	1 mth	No	Limited	Low
С	1 mth	No	Moderate	Low
D	6 mth	No	Mature	Moderate
E	6 mth	No	Limited	Moderate
F	6 mth	No	Mature	Moderate
G	6 mth	No	Limited	Moderate
Н	1 yr	No	Limited	High
Ι	1 yr	No	Mature	Moderate
J	1 yr	No	Mature	High
K	2 yr	No	Mature	High
L	3 yr	No	Mature	High

Group 1 can be summarized as such:

Two thirds of the negative responses came from those with less than six months experience using the internet. All of these were from participants for whom the mobile phone was the only mode of accessing the internet. About half of them were mature internet users. The other half were limited users.

In the subsequent sections, I identify four reasons why users in Group 1 have a negative view of zero-rating. Namely, fear and suspicion about billing practices; the idea of the "emergency"; the value of procuring media content; and, finally, the value associated with exploring the internet.

4.1.1.a Fear or suspicion about billing practices associated with zero-rating

Many participants in this group voiced fear and suspicion about billing under zero-rated plans. This was echoed both in participants who were familiar with the internet and had years of experience, and equally from those who had just begun using it. With the former category, it was more a fear of the unknown. Participant "A", a 27 year old home-maker, is only two weeks old to the world

of the internet. She subscribed because she wanted to be on a WhatsApp group with her siblings who live outside Delhi, "I wouldn't go for this WhatsApp only plan – I'm still new and I don't want to run into any trouble. What if I watch a video or get a photograph and then end up with my calling credit wiped out?"

For mature users, it was a suspicion that they would be falsely billed by telecom companies. Participant "I", with a year of experience and mature use of the internet gave several reasons why zero-rated plans wouldn't work for him, but among them was a suspicion of telecom billing in general: "With these mobile data plans, unlimited plans are the safest. No restrictions. The moment you have restrictions you don't know when you'll be tripped up by the telecom companies. They just want to make money." In fact, he expressed a strong preference for "unlimited" plans versus those with volume caps of any kind. In the past he said he had experiences with money being "mysteriously deducted" and being informed that he had exceeded limits without any message warning him.

Even users who were well aware of billing methods on data plans complained that it was easy to be confused: "What if I click on an ad on Facebook by mistake, or some news link? It happens. I'll end up spending more than I would have saved with this pack", said participant "K".

4.1.1.b. Limited users: the idea of the "emergency"

Participants with limited familiarity with the internet said their use of internet was restricted to WhatsApp, or Facebook. Some said this was because they had no curiosity about exploring the internet and they had subscribed to data plans only to communicate with friends via these applications, while others said it was lack of skills that prevented them from using anything else since they were still new to the internet. That the very same participants said they wouldn't opt for WhatsApp or Facebook plans that are seemingly tailored to their exact needs was surprising and counter intuitive. When probed about this apparent inconsistency, participants talked about the potential for an

emergency that would force them outside of the WhatsApp-Facebook environment. The following quote is indicative:

Participant B: "But what if there's an emergency?"

An emergency? Like what? You say you only use WhatsApp

Participant B: "Yes, mostly. But maybe once or twice a month, I need some information which only Google can give me... like the other day my sister needed to know results to her entrance exams."

Others echoed similar feelings. In fact, multiple participants used the word "emergency" in English (the use of certain English words interwoven with Hindi among native Hindi speakers is not uncommon). Most examples involved using search engines to find critical information – like addresses of institutions, examination or job results.

In fact, after initially proclaiming that they used the internet *only* for WhatsApp, when questioned about the WhatsApp plan they would volunteer instances where they had, in fact, used search engines to find crucial information. Although such occasions are rare, users appeared to value this ability especially in the context of information that you may not find elsewhere. "Today many things you can only find through Google, so it's good to have the option otherwise you will end up behind in the race". This particular quote is telling of a larger theme in the interviews – not having the internet for information seeking was linked to the potential loss of economic prospects. The idea of the "emergency" makes sense particularly in the context of these participants having no other means of accessing the internet. In fact, for some particularly financially constrained users, short duration (1 day, 3 days or a week) all-access data plans, priced as low as 5 pence seemed to cater to this need for internet access in emergencies.

4.1.1.c. Mobile internet as a source of media entertainment

Knowledge of WhatsApp and Facebook was present across participants, and all used at least one of these on a regular basis. These applications were the primary motivation behind the decision to subscribe to mobile data for the first time. WhatsApp, in particular, was referred to as a cheaper alternative to text messaging, as well as more entertaining due to group messaging and the ability to exchange photographs, videos and music files. Facebook, too, was a way to connect with friends and even make new ones through "browsing profiles".

Despite regular use of these applications, it appeared that media content was, by far, the most prominent reason why WhatAapp or Facebook plans did not appeal to mature users. Mature users found tremendous value in the internet as a source of entertainment. When I explained the WhatsApp plan, one user cheekily commented:

"Will they ever make pagalworld free? Let that happen and then we'll talk".

The website www.pagalworld.com allows users to download Bollywood songs and videos – all un-licensed content (i.e. illegal) and free. Downloading provided the ability to not only consume, but more importantly store media content. For most participants the mobile phone was their first and only media storage device. Others spoke of downloading films through torrents and even watching them on their phone:

"The mobile data speeds in my neighbourhood are usually terrible but post midnight they get much better. I usually put alarms for every two hours, through the night, to make sure the download is happening. By the morning full-length film is downloaded!"

"Night-time downloading" was a common and recurring theme in a majority of the interviews in this group. This testifies to the patience participants had in spending long hours to download media content. The idea of watching on a relatively small screen was not a factor that bothered these participants. The alternative was watching television with the family (which did not offer privacy or the chance to watch what they wanted) or go to the movie theatre (which was beyond their budget).

One participant usually subscribes to a plan for Rs.24 which has only three days of validity but no volume caps. He spends it on downloading media

content: "I'd end up spending 50 bucks going to the hall to watch a movie. Instead I can download 2-3 films at night on the 24 rupee plan and watch on the phone." This was one of several instances where participants referred to the internet as "saving" them money they would otherwise spend on leisure activities.

4.1.1.d Internet as a site for actual and potential "exploration"

Some users reacted negatively to zero-rated plans simply because they were reluctant to give up the ability to explore and discover all that the internet has to offer. One user had been using the internet for a year now. He started with the most basic plan with 3 day validity, just to make a Facebook profile. In the last year, however, his use of Facebook has become ancillary to his other interests: online-downloading and "googling". He would often see that Wikipedia was the first link when he Googled something and then one day he decided to "figure out what Wikipedia was all about". Now he's a regular.

"Why would I want to be restricted? You see something you can click it and then click on something else. It's never ending. In a year, I've found many new things"

Other users are much less confident about their own ability. A 32 year old man, just married, was gifted a data-enabled phone for his wedding. He decided he "might as well" get a data plan and see what the internet was like. He uses only WhatsApp but has heard of YouTube, and says maybe someday he'll learn

"I'm not tech savvy, quite an idiot with technology. But the other day my sister in law downloaded a song on her phone and then sent it to me on WhatsApp! And there I had it! It was a miracle—so maybe in time I'll also learn"

Other users found the internet to be characterized by unexpected finds. One participant, recently migrated from his village in rural Uttar-Pradesh, had heard that Google maps could located any place. "But my village wasn't on it. I

asked a friend and he said that you can put your village on the map but I don't know how. I will learn how to do this".

4.1.2. Group 2: Those who had positive responses to zerorated plans

Table 2 describes the participants in Group 2 based on the four criteria described in 4.1.1:

Table 2Those who responded positively to zero-rated plans

	How long have	Do they have an	Knowledge/	Clarity
	they used	alternative route to	familiarity	
	internet on	internet access that they	with web	
	mobile?	can regularly use?	content	
M	6 mths	No	Limited	Low
N	2 yrs	Yes	Mature	High
О	2 yrs	Yes	Mature	High
P	3 yrs	Yes	Mature	High
Q	3 yrs	Yes	Mature	High
R	4 yrs	Yes	Mature	High

Group 2 can be summarized as follows:

All but one who responded positively to zero-rated plans had two years or more of experience using the internet on their mobile phones, had alternative means of accessing the internet outside of the mobile phone, and had high levels of clarity about billing practices. They said they were using zero-rated plans on a "trial basis". Four out of six had access to a computer and internet connection at home, one had access to Wi-Fi at university and one had no alternative access at all.

The 'outlier' of this group of responses (subject M) was a participant who had 6 months experience using the internet, had never heard of zero-rated plans, and whose only use of mobile data was WhatsApp.

These participants appeared relatively more well-off than those in Group 1, possibly in the upper half of the lower-middle demographic – as evidenced by their ability to install wife and own computers. Their job descriptions included a clerk in a bank and a salesman at a premier car showroom.

4.1.2.a Use laptops or wife for most purpose, and yet stay connected on the move

These participants said their main use of mobile data was WhatsApp or Facebook, to chat or browse profiles. Occasionally they would use search engines if on the move. For all other activities, such as media downloads, games, work, writing up and sending documents, they said that using the computer was easier and quicker. One participant invested in an internet connection at home a year ago, and finds that he has gotten used to "the larger screen, and Wi-Fi is much faster than 2G speeds". It no longer makes sense for him to use the mobile for downloading media content.

On the other hand, many admitted that WhatsApp had entirely replaced text messaging. Zero-rated plans work out like "an unlimited messaging pack" and it made sense to use them for that limited purpose. These participants were confident of their usage patterns. Most claimed that during the day at work they didn't have a chance to use the internet for more than messaging anyway.

4.1.2.b. More risk-tolerance

It appeared that they understood the risk of being billed for leaving the zerorated plan. One admitted that it was easy to be confused or click on links but didn't seem to think this was reason enough not to get the plan "You make a mistake once, you wont do it again. I don't think it is such a big deal".

4.1.2.c. No time and no interest in the internet beyond WhatsApp.

One participant was a WhatsApp-only user who said he had used Google once but never again and only got the plan for the limited purpose of chatting with friends and family from his hometown. His interest in zero-rating was purely based on price—if it was cheaper than his current monthly plan, he'd be interested, he said, since he never uses anything else anyway. His reasons for not using the internet were skill-based. A junior rung police constable, he said he "didn't have time for much leisure anyway" and no interest in "jumping on the internet bandwagon".

4.2 MARKETING EXECUTIVES

4.2.1. Measuring the success of zero-rated plans

Executives across telecom companies explained the logic behind zero-rated plans as a response to strong user preferences in favour of certain applications like WhatsApp and Facebook. The plans also seemed logical due to the disproportionately high awareness about these applications even among non-users, as compared to other content. They confirmed that more than 85% of their mobile data subscribers were WhatsApp and Facebook users. I asked whether they had the technology to assess how much *time* was spent on particular applications. The telecom companies I interviewed said that they didn't currently have such capabilities even though this was potentially the "most valuable" data.

I was interested in the business strategy behind zero-rated plans, particularly how success was being measured. For stand-alone packs — the focus of my thesis — the belief seemed to be that those users who might be reluctant to pay for a monthly all-access pack may be convinced by a cheaper alternative that would give them access to these popular applications. "We hoped that retailers would convince them to 'try' the internet, starting with WhatsApp or Facebook". The hope would be that these users will eventually become regular data subscribers and migrate to all-access plans. "Even those who don't know anything about the internet have heard of WhatsApp, so it could make sense for these newer, poorer users". The other target demographic was those who may choose to use it as an "add-on" to their current data plan. In this way they could use Facebook and WhatsApp without worrying about it eating into their current data plans, and use that for other purposes.

All telecom companies admitted that the plans had met with a very poor response and subscriber numbers were limited. Most executives said it was still too early to commit to taking them off the market but one did say it was likely to be rolled back in the near future.

4.2.2. Lack of clarity about data billing

Executives said that it was too early to say, but one reason for the poor response was confusion about billing, and mentioned that they had received several complaints. They attributed this to newer users being unaware about basic features of data billing: "They don't understand that if you are in a middle of a WhatsApp session and you cross your volume limit you will be charged." Another executive responsible for VoC studies said, "You can't put technical limits in a layman's mind. He doesn't understand what is external to WhatsApp, and what isn't. To him he's clicking something on WhatsApp, and he's subscribed to a plan. Why should he be charged?" One executive explained that many users see this confusion leading to potentially unexpected charges – "Because of this fear, they may not see these packs as cheaper, but as potentially even more expensive!"

4.3. RETAILERS

4.3.1. User response to zero-rated plans

Retailers affirmed that the uptake of zero-rated plans had been very low. They are well-placed to give insight into broader user sentiment, and attributed the lack of uptake to several factors. They echoed what users said about the fear of billing and the value of media downloads. They also pointed out that most of their customers were financially constrained to the extent that a monthly plan was often too expensive. Instead, many young users would opt for the 3-day or 1-week validity all-access plans.

"The 3-day all-access recharge plan is cheaper, and makes more sense than a 1 month WhatsApp plan. All-access is the priority. Sometimes they take these small recharges several times a month, sometimes they can afford just once. Depends".

It appeared the small recharges without volume caps were the ideal for young users.

I heard from executives that those that *had* subscribed to the zero-rated plans complained of unexpected charges. One retailer claimed that sometimes billing "errors" would occur even without any fault of the user.

4.3.2. "Free stuff"

Retailers were able to provide a rich description of how younger, financially constrained users valued the internet. While WhatsApp and Facebook were undoubtedly the most popular communication platforms, internet use was far from restricted. They explained that skill-building was quick among the youth, especially when it came to "finding free stuff online". Whether it was downloading from torrents, or using online shopping applications to get free coupons, the word would spread quickly. Peers would teach each other that a certain website was optimal for downloading. Online shopping applications were the latest fad since users could gain points from referring the application to a friend, points that would translate into money they could spend. One retailer explained "Ask people who have never used the internet what it is. They'll tell you it's where you get all kinds of free things: movies, music, information!" It was clear that for the financially constrained, the internet offered tangible value.

V. DISCUSSION

RQ1: How do user preferences for a handful of websites relate to their valuation of the internet as a whole?

The first question this thesis sets out to answer is whether strong user preferences for a small selection of web content relate to their valuation of the internet as a whole. This question is important because economic theory tells us that unbundling is most likely to increase consumer surplus when users associate highly idiosyncratic value with particular components of the bundle and especially so when it is to the exclusion of other components, and the value of the bundle as a whole.

The findings reveal strong preferences — across users — for WhatsApp, followed by Facebook. In fact, these applications were the driving force behind subscribing to data plans for many, across Group 1 and Group 2. For some, WhatsApp and Facebook still dominate their experience of the internet but for many others it had become background noise. While these applications were always on, and central to what they valued about the internet— it was by no means "enough". For mature users with no alternative access to the internet, findings suggest procuring media content was a source of tangible value. This is consistent with earlier anthropological studies that document how seeking entertainment is a key tool to strategize technology use among low-income youth in India (N. Rangaswamy & Arora, 2015A; N. Rangaswamy & Arora, 2015B; N.Rangaswamy & Cutrell, 2012; Rangaswamy & Nair, 2010). Apart from the thrill of seeking entertainment online, users frequently referred to the internet as "saving" them money and effort they would otherwise spend on procuring such content.

While the communications space may be dominated by a few companies, entertainment seeking is dispersed among hundreds of websites, offering predominantly un-licensed content, and accessible through search engines. As one user put it, the possibility of zero-rating entertainment seeking of this kind seems impossible, at least in the present context. And until such time, he wasn't interested.

Loyalty to all-access plans isn't restricted to these mature users. Even where WhatsApp represented a majority or all of their use, and information-seeking on search engines was a rare occurrence, users valued this ability. Being able to use the internet in "emergency" situations made it worthwhile to have the all-access plan. Emergencies included being left out of information critical to education, job, or even marriage prospects. New users with skill constraints who had never used the internet for information seeking, still expressed hope for the ability to do so in the future.

Both entertainment and information seeking are not specific to particular web content. Search engines mean that the enquiry is no longer site specific. In effect, the internet is their oyster, and unrestricted access is valuable. This is buttressed by the recurring theme of exploration in user interviews. The recurring theme of "exploring" the internet sheds considerable light on how value for particular web content interacts with larger ideas about the internet. Many participants were enthusiastic about the limitless content available and took pride in their own ability to find unexpected content. Those who were less confident about their skills were also excited by the potential of the "unexpected". It seemed that exploring was *more* important for curious newer users than for users with years of experience who seemed to take it for granted.

Going back to the literature on bundling, it appears that while there are strong preferences for certain individual components, it is not to the exclusion of other content. Moreover, value seems to be attributed to the bundle, as a whole, indicating that unbundling may not be attractive to users, making it also a sub-optimal strategy for firms.

RQ2 Do users view zero-rated plans as providing access to a poorer version of the internet?

Economics literature demonstrates that a necessary condition for a positive impact on consumer welfare of selling the "damaged good" – or a poorer version of a good at a lower price – is that it is able to bring in users who

would otherwise be unable to afford the goods at all. In the policy circles this is echoed in the "some access is better than none" argument.

Interview data could shed new light on this debate. Some who did not find zero-rating attractive suggested that it "missed the point" of the internet altogether. In the absence of the freedom to seek information or entertainment on demand, and explore the internet- was the character of the internet fundamentally changed, even for, and especially for newer users with no other access?

Eventually, this speaks to the normative argument made by neutrality advocates that zero-rating is substituting the internet with a synthetic experience. The relevant question, then, is whether users can tell them apart. This research suggests they could.

RQ3 Are low-income users are more likely to be locked in to zero-rated plans?

This leads us to the question of whether newer, financially constrained users are more likely to be locked-in to the walled garden of zero-rated content. Those in favour of zero-rating suggest that the utopia of the "open" internet that net-neutrality advocates defend, is perhaps not as valuable to newer users, who would be satisfied with social media, which may be most of what they understand the internet as. Yet it is this utopia that seems to draw newer users, India's urban poor, who are targeted as the next wave of internet adopters. The unrestricted internet could potentially be as indispensable as its individual parts – WhatsApp and Facebook. On the other hand, those against zero-rating suggest that these newer users are more vulnerable to being locked-in to believing the internet is a handful of websites, a cognitive bias that suits these content companies and skews innovation in the content market.

It is possible that both sides of the policy debate are missing the point. Perhaps it comes from painting users in developing countries with a broad brush. Socio-economic and cultural contexts shape what users know about the internet before coming online for the first time. Lower-middle class youth in India, targeted as the next generation of internet adopters, are far from ignorant. Instead, they are curious, quick learners and hungry to extract tangible value from the internet.

Interviews with retailers raise another important point, entirely ignored in the existing debate. They say that the most popular plans among new youth users are 1-5 day unlimited packs with prices starting as low as Rs.10 (0.09 GBP) For these financially constrained users, the likelihood of having additional "spare change" is uncertain. They prefer spending on these short validity, low price packs rather than investing in a monthly data plan. In other words, for these users "some access is better than none", but the trade-off they are willing to make is how much they use the internet, not necessarily how much of the internet they get to use

RQ4 Does clarity about data billing affect user response to zero-rating in India?

Retailers reported instances of users complaining of unexpected charges on zero-rated plans. Telecom operators confirmed receiving similar complaints and attributed it to newer users not understanding the strict separation between different websites and applications. Many users shared the experience of inadvertently clicking on advertisements or external links and being charged. Marketing executives stated this to be one explanation for the relatively low demand for these plans.

Participants with low clarity on mobile data pricing complained that zerorated plans would imply heightened risk of unexpected charges, a risk they were unwilling to take. Even mature users who had this clarity seemed suspicious of telecom companies cheating users and falsely billing them without fault. In this context, restrictions only meant more confusion.

This takes us back to literature on why users prefer flat-fee plans over being charged based on usage. Factors identified by Odlyzko et al (1997) – i.e. insurance against unexpectedly large bills – echo why users did not respond positively to zero-rating. Even as zero-rated plans may be relatively less

expensive, that people were willing to pay more for simplicity was evident from certain user interviews, echoing Pappandrea's (2001) research findings. Literature also suggests that eliminating cognitive effort through simplifying pricing plans would increase demand for such offerings and, with positive implications for welfare.

When it comes to zero-rating, users appeared confused about what they had done to attract charges. One remedy is making the boundaries clearer. In fact, retailers suggest that clear warnings would make this a less relevant factor. For some, a more rigid walled-garden is more problematic. On why zero-rating should be banned, Dharmakumar (2015) points out that, in a scenario where departures from zero-rated content are met with strong warnings, the cognitive effect over time may be significant: "By the structure, design and frequency of such and other warnings, telecom companies will be able to "nudge" users away from certain services in favour of those that are zero-rated."

VI. CONCLUSION

6.1. POLICY IMPLICATIONS

As it stands, the zero-rating debate could be summarized as balancing the benefits of providing even limited access at an affordable price with the potential harms to competition as well as the principles behind the internet as a whole. This thesis speaks directly to one side of this debate – namely, the benefits of limited access, as perceived by its users. The results are not only counter-intuitive, but could even compel re-framing the debate itself.

Newer, low-income users prefer an open, unlimited internet. This puts into question the idea that for newer users social media is all they want from the internet. Critically, this preference is strong enough for most to have rejected zero-rated plans in favour of all-access plans – even when the latter are more costly or for shorter duration. Fear and confusion associated with data billing has entrenched this rejection of zero-rated plans, confirmed by executives from telecom companies as well as recharge shop retailers themselves. Some marketing executives explicitly stated that these plans had not been as successful as predicted. In fact, I found that other existing innovations in data pricing had been more successful in responding to the needs of these financially constrained users. The short duration (1-7 days), unlimited access plans appeared to be the most popular. Whether it was the person who wanted to put his village "on the map", quite literally, or the many young students who spent nights awake downloading and watching movies on their mobile screens, or the one who "discovered" Wikipedia through exploration over a few months-I learnt that the next generation of adopters are young and curious about the ability of the internet to materially benefit their lives. Limited access curtailed this ability. The idea of open internet, thus, moves away from being the throw-away idealism that many accuse it of to something which is of significant economic value to users.

6.2. This research in context

The net neutrality debate in general, and that around zero-rating in particular, is multi-faceted and extremely complex. By necessity, this thesis focuses on an aspect of the debate that has been relatively neglected. However, there are various other aspects to this debate that were not analyzed- but which the findings may speak to. The broad themes of the debate are as follows:

- (1) Normative principles: as discussed above, society must collectively decide whether, as a matter of unassailable principle, network openness should be protected (perhaps in a different way from other media such as television or radio). Such matters must be weighed against other, more empirical arguments.
- (2) Competition & Innovation: can a dominant content firm, or a dominant telecom firm use exclusive zero-rating contracts to foreclose rivals and thereby reduce competition and consumer choice? A less competitive market could harm the vibrancy of innovation that has come to characterize the internet.
- (4) Investment: traffic volumes are increasing and, in places, the network is stretched to capacity. Opinion is divided on whether neutrality or non-neutrality provides the best environment to induce the necessary investment in capacity. Paid partnerships for zero-rating, for example, are argued to increase revenues from telecom companies, and therefore increase incentive to invest with network infrastructure.

Each of these areas are themselves complicated, and subject to active and ongoing debate and research. Good policy can only be formed if every facet of the debate is properly considered and weighed against the others. In this regard, this thesis makes a contribution by providing evidence that can inform such a delicate balancing act, where such evidence was lacking earlier.

6.3. FURTHER RESEARCH AREAS

ICT4D analysis

ICT4D literature suggests that connectivity to the internet has self-evident value, but has been slow to engage with the question of what counts towards meaningful access. Donner (2015, forthcoming) is attempting to address this gap through what he terms to be an "after-access" lens. He stresses the way in which multiple factors including devices, social and cultural settings, and affordability of data plans intervene in the way in which access becomes meaningful, but this idea has been underdeveloped elsewhere in the literature. The findings of this thesis suggests that there is room to investigate the implications of limited access (of the kind that zero-rating affords) within an ICT4D paradigm. It will compel exploration of the myriad ways in which the target demographic in developing countries derives value from the internet, a recurring theme in this thesis.

Second, many user participants explained that exploring the internet on the computer was qualitatively superior to doing so on the phone because of the larger screen since many websites were optimized for computer-viewing. Recent ICT4D scholarship critiques mobile internet access as inferior to computer based access, and its implications on development strategies (Napoli & Obar 2014, Katz & Rice, 2003) This could provide another lens to examine access arguments made in favour of zero-rating

Media Piracy

It appeared that user experience of the internet was deeply tied to their experience of the pirate media market. It was not only a large portion of what users do on the internet, but particularly for those who are most financially constrained, there are few (if any) alternatives for media consumption. Piracy research in developing countries (Karaganis, 2011) explains imperfect substitution rates between licit and pirate sales — the likelihood that a pirated

copy substitutes for a legal sale — and is a critical variable at the center of debates about the net impact of piracy. Similar analysis of substitution effects is done in neutrality and versioning literature, specifically, Lyons (2015) arguing that it was not as if people would buy all-access data plans if lower priced zero-rating was absent. It may be interesting to see how literature on piracy could enhance the debate on zero-rating, both through its focus on content but also to compare the direction of substitution effects.

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