‘New Issues’ in Innovation and Trade: A Study with Reference to Information Economy in India

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Introduction

‘Innovation’ is one of the most cited buzz words in academia, and is considered as one of the key characteristics of economic development in emerging economies, like India. In this study, we observe that the immediate outcome of capitalist innovation and its rapid pace of diffusion in emerging economies would generate an economic disorder within the structure of peripheral economies by favoring the growth of core economies in the world system. The neo-Marxist development perspective of the world system theory (Wallerstein, 1974) explains the factors behind the prevailing underdevelopment in poor nations, even if they have the capability and resources to grow like capitalist nations in the world, and how the rich capitalist nations in the world push developing nations into the periphery of the world economy. Modern world system theory analyses the world economy in a systemic framework of a multicultural territorial division of labor in which the production and exchange of basic goods and raw materials is necessary for the everyday life of its inhabitants. This division of labor refers to the forces and relations that lead to the emergence of two interdependent regions - core and periphery. Technologically developed capitalist nations are the core, with the less developed nations position at the periphery. Core and periphery nations are geographically and culturally different, one focusing on labor intensive production, and the other on capital intensive production (Goldfrank, 2000). Furthermore, the structure of the current world system is a power hierarchy between core and periphery in which powerful and wealthy capitalist nations dominate and exploit poor peripheral nations. Technology is a central factor in the positioning of a region in the core or the periphery. In general, capitalist economies are the major source of commercial innovations, and they have advanced market mechanisms to diffuse their innovations in emerging market economies within the vagueness of the prevailing framework of globalization.

Joseph Schumpeter, the father of innovation, pointed out that ‘the capitalist economy incessantly undergoes a mutation that revolutionizes the economic structure from within and incessantly destroying the old one for creating new ones’. As part of this creative destruction process, certain ambiguities emerge within and outside of capitalist economies, but the outcome within the boundaries of core economies would be always favorable to them. Capitalist innovations are not confined to the consumption of capitalist nations alone due to the principle of economies of scale that affect the profit maximization mode. In international trade perspectives, as part of this ‘creative destruction’ process, capitalist economies incessantly generate certain systemic chaos in emerging market economies to maximize their profit accumulation in the short-run. This system disorder would be retained in the

peripheral economies of the world system until the next cycle of their creative destruction. This causes a permanent fatal error in the innovation systems of emerging economies and imposes cyclical barriers to mutate their economies through the creative destruction process. In other words, technological innovations which originate from the core economies would also diffuse certain radical changes in the conventional structure of the peripheral economies. The present study tries to test aforementioned assumptions in the context of the emergence of social media driven governance and cultural revolutions in India within the paradigm of an information economy.

Constitution of Information Economy

India is currently undergoing a major socioeconomic transmutation in terms of information technology (IT) and its byproducts. Obviously, information technology was a capitalist innovation, which invented the core nations and spread over the periphery of the world system sidelining all socioeconomic distinctions. It was a wonderful capitalist innovation in the history of innovation, and has the capability of rapid diffusion in the world within a short span of time. The components of IT, especially the Internet, enabled a replication of real world situations in the virtual world, and reproduced the behavioral patterns of humans online. It revolutionized the lives and social concepts of the people. Capitalist internet products like Google, Facebook, Twitter, LinkedIn, YouTube, etc. have made a radical reformation in the behavioral and ideological configuration of the general public, especially the lives of people in peripheral economies like India. India is now one of the most valuable market economies for capitalist innovations. In contemporary India, internet-based social tools play a major role in the everyday activities of all factions of people in the society. Social media currently functions as a lobbying space for different interest groups and enables a digital platform for various productive and non-productive public discourses. The State also formulates various policy measures to utilize the power of social media in governance. In short, conventional offline (real world) democratic interactions have now been replaced by capitalist digital social spaces!

According to the U.S Department of Commerce, an information economy is determined by information activity. Information activity includes all resources consumed in producing, processing and distributing information about goods and services. As per their definition, information activity divided into two major sectors: one in the primary information sector where information is exchanged as a commodity, and the other in the secondary information sector where information is embedded in some other product or service and is not explicitly exchanged. In emerging economies like India, social media constitutes an information economy, which consists of the structure of primary and secondary information markets.

The information is data that have been organized and communicated. To organize data into information, one needs to superimpose the order - a system of logic, a system of thought, a

system of measurement, and a system of communication (Porat, 1977). To communicate these organized data, one requires three elements further: a communicator, a channel of communication, and a receiver. These processes reveal that the production of information is knowledge, cost, and labor intensive activity. Therefore, an information economy is also known as a knowledge-based economy, where knowledge is the key factor of production, sidelining both capital and labor (Drucker, 1993). In this definitional framework, the communicator and the receiver function as 'information workers' who produce information, and the internet technology functions as a channel of communication to connect information workers. In the case of social media, the general public around the world (users) function as information workers, and the social media platforms enable a communication medium based on the general purpose technology ICT. In this system, the knowledge and labor intensive part of the information generation is done by the users voluntarily, and such unpaid information workers are spread over the world system. It revolutionizes the conventional principles of 'factors of production' in economics.

Monopoly on Indian Information Economy

Currently, India has become a monopolistic market for the U.S based social websites and smartphone based apps like Google, Facebook, YouTube, Twitter, LinkedIn, Yahoo, Quora, Instagram, WhatsApp, etc. However, the situation is different in the case of other emerging market economies like China, Japan, Russia, South Korea, etc. as they have their own homegrown technological concepts to substitute the capitalist ideas. In India, we can observe an imbalance between human resource creation in IT sector and innovation in homegrown digital information tools. India is one of the major countries contributing IT-based talents to capitalist information companies. However, India does not have any homegrown innovative concepts like capitalistic social media products, to date.

The Indian government is a good user and promoter of capitalist social media products, yet fails to understand the economics behind this information trade, and does not insist on the need for home grown technological concepts to resist the monopolistic market power of capitalistic ideas. Why does India not have homegrown information products like Facebook, Twitter, WhatsApp, LinkedIn and Google? Why do capitalist information products have a monopolistic market power one of the world's biggest market economies, like India? In our point of view, it is because social media is not as social as its name indicates, and social websites function as money making machines for capitalist information companies by exploring the vagueness of the global trading environment of the world system. Capitalistic information tools also function as a super-government mechanism for diffusing capitalist ideologies and political moralities in the peripheral economies of the world system.

Table1. Top 5 Capitalist Internet information tools which constitute an information economy in India

Particulars	Name of Information Tool				
	Google	**YouTube**	**Facebook**	**LinkedIn**	**Twitter**
Service Description	Content Aggregation and Search	Video Sharing	Connect people	Connect professionals	Micro-blogging
Headquarters	U.S	U.S	U.S	U.S	U.S
Information Production Method	User	User	User	User	User
Traffic Rank in India	1	2	6	10	31
Average Time on Site (Minutes/visit)	9	9	15	7	7
Estimated Percent of Visits from India	7	9	4	7	6
Estimated no. of Visits from India (in millions)	2180	1890	990	70	190
Market Value (in billion USD)	567	*	387	26	12
Share Value in the NASDAQ (US$)	840	*	134	225^	17
Full-Time Employees	72053	*	17048	9,372^	3500

Note: YouTube comes under the financials of Google; statistical estimates are as of 02/15/2017
^ Data based on December 31, 2015. LinkedIn was acquired by Microsoft for US$ 26 billion in June 13, 2016 and delisted from the stock exchange.
Source: (i) publicly available data aggregated from the financial documents of the concerned companies;
(ii) Web analytical companies – Alexa.com, Similarweb.com;
(iii) Financial analytical companies – Yahoo Finance, NASDAQ.com

In the modern information economy, capitalist innovations creatively bypass the prevailing rules and regulations of the global trading system, and impose a structural anarchy in the trading principles of peripheral economies. In this process, peripheral economies like India struggle to explore the economic advantage of such capitalist innovations due to the systemic failure of their innovations. We try to exemplify such facts empirically by explaining certain economic factors behind the highly diffused five capitalist internet information products in India (Table 1).

Economics of Capitalist Information Tools

As of February 15, 2017, the market value of the Facebook was US$ 387 billion, and the average stock price was US$ 134. It has a total of 17,048 employees worldwide. The market

value of Google was US$ 567 billion, and its average stock price was US$ 840. It has 72,053 employees worldwide. The market value of Twitter was US$ 12 billion and the stock price was US$ 17. Twitter has 3,500 employees globally. LinkedIn was acquired by Microsoft for US$ 26 billion in 2016, and as of December 31, 2015, the share value of LinkedIn was US$ 225, with 9,372 employees. The combined market value of all these companies is US$ 992 billion, around 47% of the Indian GDP. This indicates that the market value of the top five capitalist information companies with monopolistic market power in India is almost half of the Indian GDP!

Now, let us analyze the major businesses of these wealthy internet information products. According to stock market classification, these capitalist companies are listed under the industry category - internet information providers, meaning that the main product of the companies is 'information'. Who produces this information? In total, these multinational companies together have only 101,973 employees worldwide. Is it possible to produce such a huge volume of information using these employees? No, it is not at all possible, and they do not have internal economic resources to produce such vast amounts of information. Then who produces these information assets for these companies? The answer is the well-known fact that the raw material (information) for internet information companies is produced by the general public from all over the world. It reveals the fact that the 'general public' is the real laborer of Google, Facebook, Twitter and LinkedIn. It disrupts conventional economic theories on labor and production in the sense that all Indians who use these information tools are unpaid information workers of capitalist information companies. Therefore, we would like to conceptualize the business paradigm of these information companies as a 'capitalist mode of social entrepreneurship'.

User Fed Information Multinationals and Economic Impact

For analytical purposes, we classify the above companies under the category of 'user fed information multinationals (UFIM)' because users produce the core product 'information' for these businesses. Principally, new generation capitalist information companies do not have any internal mechanism to produce information; instead, they depend upon the content generated by the public domain. They provide only an ICT based platform to aggregate and disseminate information which is generated by the general public, business entities, and public and private institutions.

The core technology of Google provides an online platform to search and find particular keyword based information generated by third party content generators. Google neither produces nor sells its own information. In that sense, functionally Google does not have any products or services apart from its search algorithm as Google functions as a robotic agent to link information seekers and information producers. The same principle is applicable to its entire subsidiary initiatives like YouTube, Google images, Google news, Google books, etc.

The world's popular social networking tools like Facebook, LinkedIn and Twitter also work under the same principle, except there are a few differences in their content aggregation method. Search engines aggregate and index information robotically, but social websites accrue information directly from their users without any technological complexity. Therefore, technology intensity in social media is less than compared to search engines like Google. In other words, creating a Facebook-like social information tool does not involve many complex technological procedures. Furthermore, one of the economic peculiarities of the information economy is, once the information is produced, the cost of producing one more unit of the same time is minimal, almost zero. Therefore, the profit accumulation of modern digital companies progresses at a rapid pace as compared to conventional brick-and-mortar businesses.

Information generation is a knowledge and cost-intensive process. In an information economy, the major cost involves the content production level. It consists of various cost factors like time, labor, infrastructure, learning, etc. The participation cost (transaction cost) for users to take part in this content production is significantly higher in emerging economies like India. Leading UFIMs like Google, Facebook, Twitter, and LinkedIn, generate huge profits in the short-run because they do not involve information production as they get it freely from users. Here, the production cost of such information is incurred by the users themselves, and the UFIMs crowdsource huge amounts information through their information tools which work on internet protocol standards.

From an economic perspective, the stock value of UFIMs is determined by their user-base and the volume of user-generated information (UGI) stock. The user-base and the UGI have a significant correlation with the market value of UFIMs. A reduction in the user base and UGI may significantly affect the stock prices of UFIMs. To avoid such market risks, various 'happenings' which stimulate the information production activities are very important for UFIMs to protect their market value. In short, 'events' which lead to mass information production are a strategy for UFIMs to increase the value of their stocks. In general, due to the lack of innovation capability and a policy framing mechanism towards the capitalistic creative destruction process, peripheral economies like India fail to recognize the economic logistics of the multilateral trade of UGI and its impact on the economy.

Now, let us look into the economic impact of UFIMs in India. Firstly, let us consider the participation cost for accessing these information tools in India. For this exposition, I consider two UFIMs - Facebook and YouTube. Both of these companies are UGI dependent and highly diffused in India. The video sharing tool YouTube is the second largest diffused social tool in India after its parent company Google. The social networking tool Facebook is positioned in the 6th rank in terms of traffic generation from India.

As of February 2016, Facebook generated 25[1] billion visits per month globally. The average visit duration on Facebook was 15 minutes. According to the official statistics of Facebook in 2016, 87% of monthly active users of Facebook are from outside the US and Canada. As per the Facebook annual report 2015, accessing Facebook on personal computers shows a declining trend due to the higher level penetration of mobile phones among users in emerging economies. In developing nations like India, Facebook is one of the most used apps on mobile phones. The increased rate of diffusion of mobile phones and the growth in Facebook users in peripheral economies like India is significantly correlated. The Facebook annual report observes that users in India, Brazil, and the United States were the key sources to record their user-base growth in terms of users. After the U.S, India is the one of the key traffic generating geographical locations for the Facebook. In India, Facebook generated an estimated average monthly visit of 1 billion in 2016. According to our data mining and estimation, an average 3 MB bandwidth of data was consumed per user for each Facebook visit. In India, the estimated cost of 1 MB bandwidth data is ₹0.2. According to statistics, estimates reveal that approximately ₹60 crores per month is spent in India for accessing Facebook. In annual terms, people spend ₹720 crores as the participation cost for accessing the Facebook platform. If we compute other cost parameters like time, infrastructure, learning, etc. the volume of spending would be significantly higher.

The UGI based video sharing tool YouTube is a subsidiary product of the search engine tool Google. Google is the most visited UFIM in India. The second position goes to YouTube. It generates on average 22 billion visits per month in 2016, and on average 9% of traffic from Indi comes from around 2 billion visits per month. YouTube as a video sharing and viewing tool consumes a high rate of data volume. Technically, YouTube broadcasts different types of resolutions of videos to improve the quality of videos and the user experience. Therefore, the rate of data consumption on YouTube is basically determined by the quality of videos users upload and watch. According to our estimates, watching a medium quality video with a resolution below 720p would consume at least 3 MB data for 1 minute duration. In India, the average time spent on YouTube is 9 minutes per visit. As per this estimates, approximately ₹1080 crores per month and ₹12960 crores per annum is spent for accessing YouTube in India.

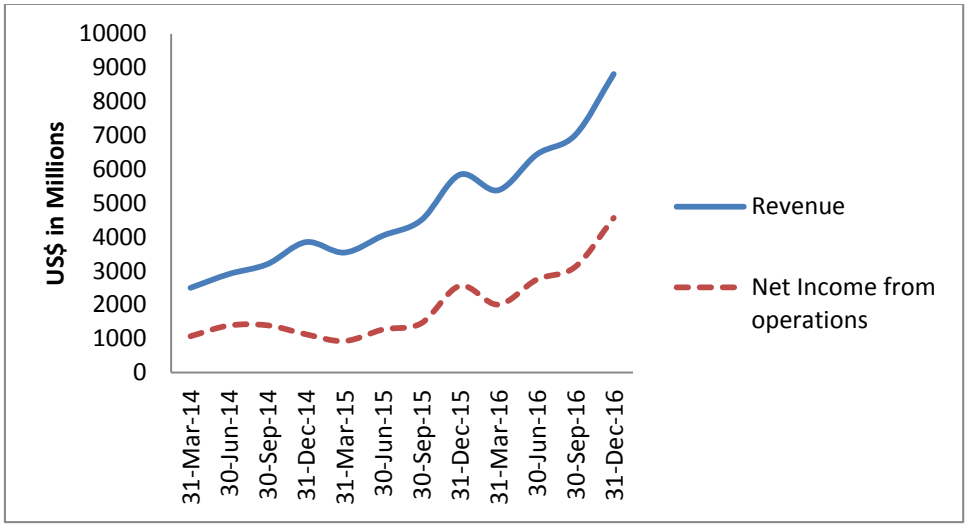
The estimated statistics of the above two UFIMs establish how much money is involved in the UGI trade and how it impacts the Indian economy. If we calculate the activities of all UFIMs in India, the emerging economic dimensions would be exceptionally complex. It reveals how the innovations of capitalist UFIMs utilize the internal socio-economic resources of peripheral economies to accumulate profits distantly by exploring the prevailing ambiguity in the innovation systems of peripheral economies and in the global trading

[1] The real time traffic statistics is aggregated from the web analytical tools Alexa.com and Similarweb.com, and the annual reports of Facebook.com and Google.com. Date: 15/02/2017

system. However, we cannot disregard the fact that, in terms of participation costs, Indian internet service providers and ICT hardware sellers also benefit partly, but it is insignificant if we consider the overall economic impact on the economy.

To understand the volume of revenue accumulation of UFIMs from India, we exclude YouTube from the present analysis due to discrepancies in the data available from Google's annual reports separately for YouTube. According to Facebook official statistics, the total revenue generated in 2016 was US$ 27,638 million, and the net income after the total costs and expenses was US$ 12,427 million. The chunk of its revenue is generated from its globally broadcasted advertisements, and it constitutes around 97% of the total income generated in 2016. The quarterly records of total revenue and net operating income after all costs and expenditure show an upward trend since 2014, and the gap between total revenue and net income narrowed due to cost efficiency (Figure 1).

Figure 1. Total Revenue and Net Income from the Operations of Facebook

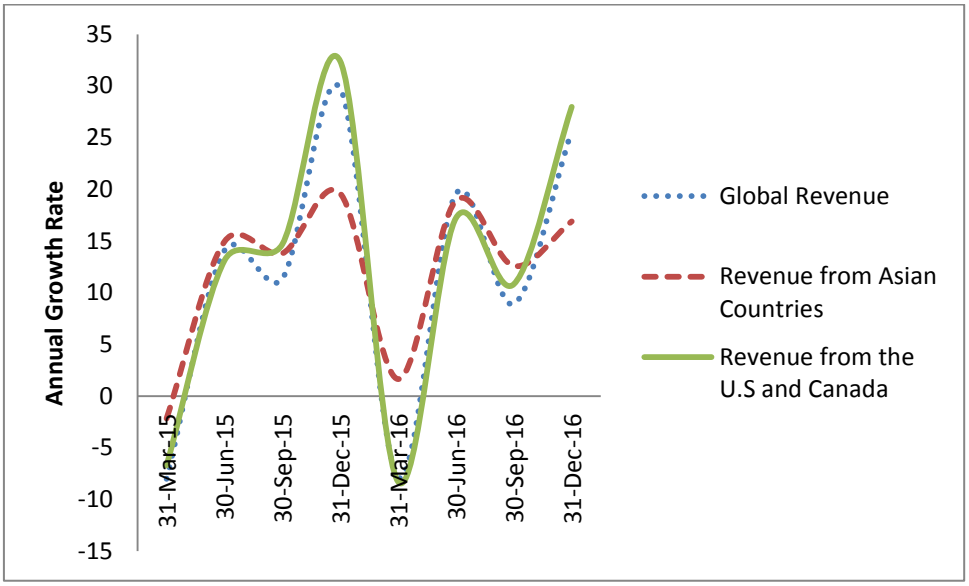


Source: Annual Financial Reports of Facebook

The average annual growth rate of Facebook revenue since the last quarter of 2014 is 13% globally and 12% in Asian countries. However, the trend in the growth rate is highly volatile. This is mainly due to the immediate fall and rise in user engagements on the Facebook platform in tune with various events which accelerate and decelerate UGI production and its distribution. In other words, time sensitive events and happenings may fire up the productions of UGI that would accelerate income generation through a large volume of advertisement distribution worldwide. For example, a controversial statement of the American president Donald Trump on his immigration policy may stimulate user interaction and UGI production on Facebook all over the world, and its externality would positively reflect on the ad revenues of Facebook. The highest level of volatility in the growth rate of Facebook revenue would not be an indicator of the uncertainty in its business; instead, it

indicates the UGI production capability of various events in the world and its relation to revenue generation. Events and happenings are the major stimulating factors which determine the business of UFIMs. Figure 2 clearly shows the fact that as compared to global and U.S revenues, the revenue growth instability is relatively lower in the Asian region. In Asia, India is the major traffic generating geographical location for the Facebook.

Figure 2. Quarterly Growth Rate of Facebook Revenue



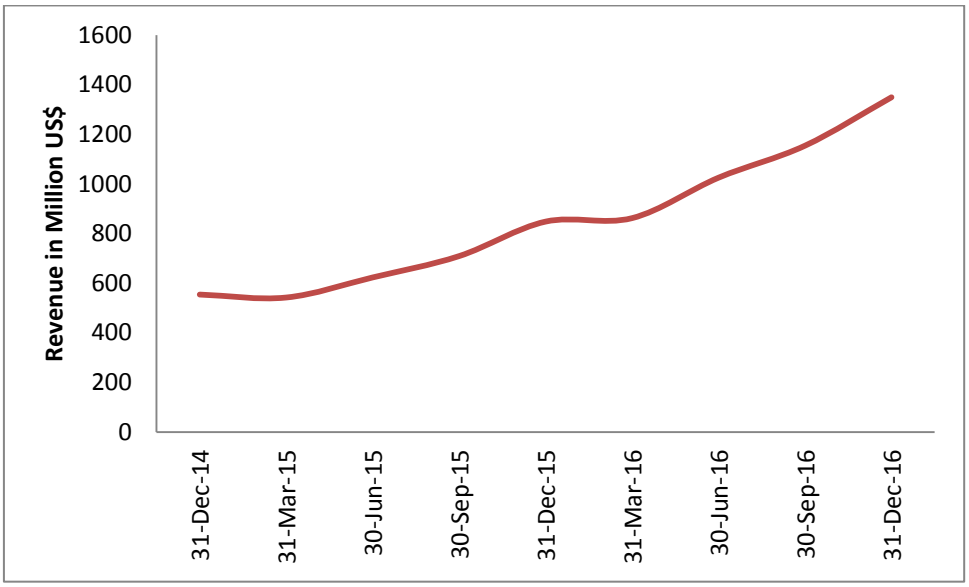
Source: Annual Financial Reports of Facebook

According to Facebook official statistics, 16% of the total revenue was contributed by Asian countries in 2016, and the average revenue per user was US$ 2. Facebook has earned US$ 4390 million from the Asian region in 2016. In the Asian region, India was the most income generating market geographies for Facebook, and India had 195 million active users in 2016[2]. According to these statistics, Facebook generated an estimated amount of US$ 390 million from the Indian market in 2016. In Indian currency, that comes in around ₹2574 crores[3]. It is interesting to observe how capitalist ideas accumulate profits from the social and economic resources of peripheral economies by creating technological ambiguity. In this case, the world's largest democracy, India, has spent ₹720 crores in participation costs to generate ₹2574 crores in profit for Facebook in 2016!

[2] According to publically available data from the online statistical company Statista.com – Accessed on 15-02-2017

[3] Calculation is based on the exchange rate: US$ 1 = ₹ 66

Figure 3. Quarterly Revenue from Asian Countries (in Million US$)

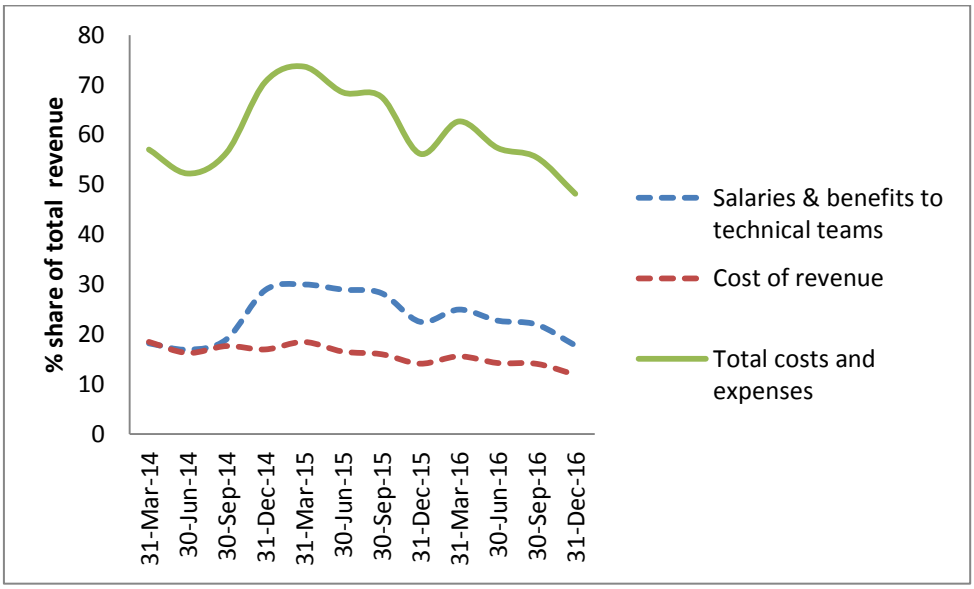


Source: Annual Financial Reports of Facebook

On the expenditure side, Facebook reports mainly four costs - cost of revenue, research and development, marketing and sales, and general administrative costs. Among these costs, the cost of revenue and research and development are the major costs. The cost of revenue consists of expenses associated with the delivery and distribution of Facebook products, which includes expenses related to the operation of data centers, server equipment depreciation, energy and bandwidth costs, etc. It is mainly an infrastructure operational cost, and this cost is mainly spent in the U.S. The research and development expenses consist of salaries and benefits for engineering and technical teams who are responsible for building new products and improving existing products.

The percent share of total costs and expenses to total revenue was 55% in 2016. The cost of revenue was 14% and the research and development expense was 21%. The costs of revenue and research and development expenses constitute 35% of the total revenue. The pattern of percent share of the major costs to total revenue shows a downward trend (Figure 4). However, this cost reduction and the increased profit share cannot be attributed to the conventional wisdom of the economies of scale principle as Facebook is not producing anything apart from its basic technological platform and minor incremental innovations; instead, it is due to the higher level of unpaid UGI production from all over the world on the Facebook platform.

Figure 4. Percent Share of Costs and Expenses to Total Revenue



Source: Annual Financial Reports of Facebook

Conclusions

In an information economy, 'information' is exchanged explicitly as a commodity or the 'information' is embedded in some product good or service. Information as a commodity in an information economy has all properties of other economic goods that are traded in the framework of the conventional world trading system. This study argues that if a piece of information is produced within the boundaries of a nation using its own resources, it would be considered as the product of that nation and any kind of cross national profit generation based on that particular piece of information should come under the purview of the rules and regulations of international trade. However, current global trading policies disregard this fact due to the prevailing structural disorder in the economies of peripheral regions in the world system. This structural disorder is exogenously generated and rooted from the core nations as an outcome of capitalistic innovations and its higher level diffusion in the peripheral economies. For instance, the rapid pace of the diffusion of capitalist internet information tools in emerging information economies like India creates an economic vagueness in their innovation systems, and implicitly contributes economic underdevelopment in peripheral economies. The 'crowdsourcing' systems of information and knowledge which are invented by capitalist innovators diffuse the socioeconomic chaos in the region of peripheral economies and reaffirm the emergence of a new regime of the world system. In other words, 'information' is the key factor of production in an information economy and the production of such information is a knowledge and cost-intensive activity. The present world trading system and trade policies in the peripheral region ignores these

factors due to a prevailing ambiguity in the conventional wisdom of international trade. For instance, information economy-driven capitalist innovations like Facebook, Google, YouTube, Twitter, LinkedIn, etc. accumulates huge profits from peripheral regions by enabling the multilateral trade of 'information' which generated within the national boundaries of peripheral economies using their own economic resources. This systemic error leads emerging economies like India to underdevelopment. Emerging market economies in the world should adopt appropriate policy measures to raise these issues in the venues of trade policy formulating bodies and forums.

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