Role of Digitalization in Rural Development of India : Scope and Challenges

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Abstract

"The digital revolution is transforming the world, aiding information flow and creating huge opportunities for growth and poverty reduction. India's Aadhaar program is today a model for many countries and recent initiatives like Digital India has the potential to generate greater digital dividends among all sections of its society," said Onno rhul, World Bank Country Director in India. India became a global powerhouse for information services. India is currently the largest exporter of ICT services and skilled manpower in the developing world. The Business Process Outsourcing (BPO) industry today employs more than 3.1 million workers, 30 percent of them are women. In rural India, a three-year awareness program on opportunities in the BPO industry increased women's enrollment in relevant training programs, as well as school enrollment among young girls, by 3–5 percentage points. Biometric registration, authentication, and payments in India's National Rural Employment Guarantee Scheme, the world's largest workfare program, reduced the time for paying beneficiaries by 29 percent and leakages by 35 percent, a recent survey report estimates. All this has the potential to significantly raise the efficiency of government service delivery. These trends have catalyzed innovations to trace the food supply from producer to consumer—which is important for developing countries that want to reach new export markets. Smallholder farms can turn to cooperatives and aggregators, who use digital tools to improve collection, transportation, and quality control. Digital Green uses video cameras, battery-operated projectors, and the internet to get information into the hands of villagers in India.

However, to reap the full benefits will require affordable and wider access to the internet and skills that enable all villagers to leverage the digital economy. Making the internet accessible, open and safe for all Indians must be a priority and is vital to close the digital divides. Because a huge majority of the nation's population remains locked out of the benefits of the digital economy. With nearly a billion people still not connected to the internet, the opportunities for increasing access to digital technology for creating higher growth, more jobs, and better public services are significant for India.

Keywords: Digital Economy, Digital Green, Digital India, Digital Revolution.

Introduction

Gandhi ji said "The Soul of India resides in Rural India". The gains from liberalization and economic development must percolate to all the segments in the country and every citizen has to be the beneficiary. Development of Telecommunication and the communications infrastructure is an essential precondition for making available the benefits of liberalization to the rural masses and for further powering the engine of growth of the nation. Information is critical to development, the telecommunications, as a means of sharing information, is not simply a connection between people, but a link in the chain of the development process itself, [Hudson 1995]. The role of telecommunications in transmitting information can be particularly significant in rural areas where alternative means of obtaining and conveying information such as personal contact, transport, and postal services are likely to be less accessible.

India's population now exceeds 1.21 billion with 69% of the population located in rural areas. Internet penetration is increasing with Mobile playing the major catalyst. Studies conducted by IAMAI reflect some

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interesting patterns. 90% of those accessing the internet were using it for entertainment, 80% were using it for communications, 67% for online services, 65% for e-commerce and 60% for social networking. The number of Internet users in rural India is estimated to cross 85 million by June 2014 making India the world's second largest market for Internet users. All these put together is now changing attitudes, awareness and lifestyles in rural India. A decade ago, the awareness, information and knowledge gap between the rural youth and his urban counterpart was significant. This has now rapidly narrowed and the gap is closing.

Aim of the Study

This research paper is aimed to analyze the role of digitalization in development of rural India and challenges before it. The data for study is collected from various sites, departments and government reports.

Current status and scope

The Global IT Report 2015, recently published by the World Economic Forum, provides some valuable international comparisons. The report computes a Network Readiness Index (NRI) for all countries which participate in and provide comparable data on various indices every year. According to the report, India with an NRI of 3.7 has a rank of 89th among 143 countries, indicating a slippage from previous year's rank of 83rd among 148 countries. The NRI is further divided into four sub-indices, namely, environment sub-index, readiness sub-index,

usage sub-index and impact sub-index, each one is related to different aspects of a country's digital strategy. Interestingly, India fared the best (as compared to itself on other sub-indices) on the impact sub-index in the Global IT Report of both 2015 and 2014. The sub-index had a value of 3.6 and a rank of 73 in the 2015 report .A redeeming feature of India's ICT infrastructure was country's mobile network coverage of 93.5 percent population, an improvement over 83 percent mobile network coverage in the previous year report. However despite this, India's rank among nations on this indicator is 110, again demonstrating that many other countries have performed better than India in this respect. With regard to international Internet bandwidth, India with a value of 6.5 kilobytes per user had a rank of 113 on this indicator. Thus, ICT infrastructure is clearly an area requiring major strengthening.

TRAI (2016): Press Release 34/2016 Highlight of Telecom Subscription

Parameter	Unit	Feb-15	Feb-16
Total Phones	Lakh	9873.4	10588.6
Wireline Phones	Lakh	267.23	252.2
Wireless Phones	Lakh	9606.18	10336.3
Rural Phones	Lakh	4085.47	4491.7
Urban Phones	Lakh	5787.93	6096.9
Broadband	**Lakh**	**973.7**	**1497.5**

An Analysis of Tele-density in India

Year ending 31st March	Tele-density (percentage) - Rural	Tele-density (percentage) - Urban	Tele-density (percentage) - Overall	Tele-density (percentage) - Wireline	Tele-density (percentage) - Wireless	Tele-density (percentage) - Public	Tele-density (percentage) - Private
2001	0.93	10.37	3.58	3.23	0.35	3.2	0.38
2002	1.21	12.2	4.29	3.65	0.64	3.64	0.65
2003	1.49	14.32	5.11	3.87	1.24	4.04	1.07
2004	1.55	20.79	7.02	3.76	3.26	4.27	2.75
2005	1.73	26.88	8.95	3.77	5.18	4.74	4.21
2006	2.34	38.28	12.74	3.61	9.13	5.48	7.26
2007	5.89	48.1	18.22	3.61	14.61	6.32	11.9
2008	9.46	66.39	26.22	3.44	22.78	6.94	19.28
2009	15.11	88.84	36.98	3.27	33.71	7.71	29.27
2010	24.31	119.45	52.74	3.14	49.6	8.99	43.75
2011	33.83	156.94	70.89	2.91	67.98	10.55	60.34
2012	39.26	169.17	78.66	2.66	76	10.77	67.89
2013	41.05	146.64	73.32	2.47	70.85	10.62	62.69
2014	44.01	145.46	75.23	2.3	72.94	9.68	65.55
2015	47.21	148.96	78.73	2.13	76.6	8.08	70.66
2016	51.37	154.01	83.36	1.99	81.33	7.88	74.67

TRAI (2016): Press release 34/2016 Highlight of telecom subscription

Tele-density, which denotes the number of telephones per 100 populations, is an indicator of telecom penetration in the country. Data describes the tele-density percentage on different parameters viz. rural, urban, Wireless, Wire-line, Public and Private. Tele-density in India has increased at a phenomenal rate in the 21st century. Both rural and urban areas

have shown a remarkable progress in the growth of the number of telephones including mobiles and have consequently achieved a higher and higher level of Tele-density.The Tele-density in rural parts of India in the year 2001 was 0.93%. The Tele-density in rural parts of India in the year 2002 was 1.21% and recorded a growth of 0.28 percentage points over the

previous year. The Tele-density in rural parts of India in the year 2014 was 44.01% and recorded a growth of 2.96 percentage points over the previous year. The Rural Tele-density increased from 47.21 at the end of Feb-15 to 51.37 at the end of Mar-16 and recorded a growth of 8.81 % over previous year.

The maximum growth of 9.52 percentage points in Tele-density in rural parts of India was recorded in the year 2011. The minimum growth of 0.06 percentage points in Tele-density in rural parts of India was recorded in the year 2004. The overall Tele-density in India increased from 3.58 at the end of 2001 to 83.36 at the end of Mar- 2016. The Urban Tele-density increased from 10.37 at the end of 2001 to 154.01 at the end of Mar-2016.

The share of urban subscribers and rural subscribers in total number of subscribers at the end of Mar-16 was 57.58% and 42.42% respectively.

Telecom performance in India

Parameters	unit	2015
Public Phones	Lakh	1012.82
Private Phones	Lakh	8860.58
Wireline %age to Total Phones	%age	2.71
Wireless %age to Total Phones	%age	97.29
Rural %age to Total Phones	%age	41.38
Urban %age to Total Phones	%age	58.62
Public %age to Total Phones	%age	10.26
Private %age to Total Phones	%age	89.74

Total Telephone Subscribers

The number of telephone subscribers in India increased from 987.34 million at the end of Feb-2015 to 1,058.86 million at the end of Mar-16, thereby showing a yearly growth rate of 7.24 %. The rural subscription increased from 408.54 million to 449.17 million during the same period.

TRAI (2016): Press release 34/2016 Highlight of telecom subscription

Wireless Subscribers

Total wireless subscriber base increased from 960.61 million at the end of Feb-15 to 1,033.63 million at the end of Mar-16, thereby registering a yearly growth rate of 7.60%. And wireless subscription in rural areas also increased to 444.84 million during the same period.

The Wireless Tele-density in India reached at 81.38 at the end of Mar-16. Rural Wireless Tele-density also recorded 50.88 during the same period. The share of urban and rural wireless subscribers in total number of wireless subscribers was 56.96% and 43.047% respectively at the end of Mar-16.

Wire Line Subscribers

Wire line subscriber base was 25.225 million at the end of Mar-16. The share of urban and rural subscribers in total wire line subscribers was 82.86% and 17.14% respectively at the end of Mar-16. The Overall Wire line Tele-density remained same at the end of Mar-16. Urban Wire line Tele-density and Rural Wire line Tele-density were workout as 5.28 and 0.49 respectively.
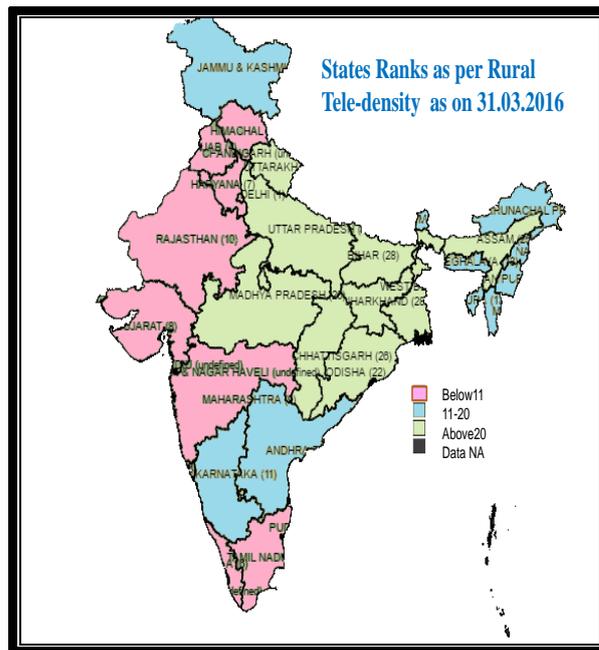
www.mygovdata.in

Role of Digitalization in Rural Development

In a study undertaken across 26 Latin American countries between 2003 and 2009, it was observed that a 10 per cent increase in broadband penetration resulted in an average increase of 3.19 per cent in per capita GDP. There is plenty of evidence to show that telephones have a high correlation with GDP per capita. Broadly we can say that if a country has a one per cent higher mobile phone subscription rate than another, its GDP per capita will be about $200 higher.

Role of Digitalization in Rural Health

Most of the patients in rural areas don't have access to medical specialists. Several large hospitals in Indian metros are now offering remote consulting services to underserved areas, using media-rich network capabilities so their doctors can see and interact with patients in remote telemedicine centers, with the case history and medical data automatically transmitted to the doctor for analysis. In a field trial conducted with the National Rural Health Mission, Tamil Nadu saw 95% pregnancies registered and monitored, 20% reduction in outpatient costs including drugs, 75% VHWs registering an increase in diagnostic efficiency and ease of operation.

Role of Digitalization in Education and Development of Women

Google has launched an initiative to introduce women to the internet especially those in the rural areas. They have launched a website 'Helping Women Get Online'. They have partnered with leading companies like Hindustan Levers, Axis Bank, Intel, Johnson & Johnson, Shaadi.com, Babyoye & iDiva. The website offers a step-by-step guide to computer basics, internet skills, chat & email and watching videos online. Each topic has different topics ranging from how to start and shut down your computer, how to create an email account. In addition, the site also offers information on a variety of topics such as cooking recipes, childcare, financial,

healthcare, maternity, relationship and style & beauty. They also offer a Toll-free helpline.

Accessibility to Global Markets

Digital channels provide farmers and artisans the ability to directly reach extensive national and even global markets. A host of 'localization' technologies can help different regions communicate so language is not a barrier. Relevant information and updates are now provided in local languages and scripts.

Role of Digitalization in Economic Development of Rural Area
Increase in Employment Opportunities

First and foremost benefit of digitalization is increase in employment opportunities in rural areas. Large number of small entrepreneurs has got employment in provision of Internet kiosks in rural areas.

Improvement in Standard of Living

The second benefit is the improvement in standard of living of the people by improving their income. Large numbers of people are getting benefitted by these facilities. They are using internet services and other facilities provided by various schemes like lifelines India and are getting awareness regarding various plant diseases, new methods of farming etc. They are also getting information on various diseases of farm animals and methods by which they can remain healthy and their output also increases.

Reduction in Risk and Uncertainty

Rural community is making full use of available techniques and is reducing risk and uncertainty by getting market information online. Fishermen are checking weather conditions before venturing into the sea. They are also carrying mobile phones with them so that in case of any emergencies they can contact their relatives or authorities and they can get help.

Saved life during Tsunami

"Residents of the village of Nallavadu, Pondicherry on the east coast of India escaped December's deadly tsunami after some quick thinking, and forewarned, citizens managed to broadcast an alert of the oncoming waves. After receiving a phone call from a relative in Singapore who had heard of the earthquake and resulting tsunami headed for India, villagers broke into the community centre set up by the IDRC-supported M S Swaminathan Research Foundation (MSSRF) where a public address system used routinely to announce sea conditions to the fishermen was housed. The warning was successful and the entire village's population of more than 3,500 evacuated the area in time " (Digital Review of Asia Pacific) This is only one instance in which ICT could save lives of large number of people.

Role in Increasing E-Literacy in Rural Areas

Large number of rural youth is getting training in using computers, MS Office and Internet. Internet Kiosks are conducting educational and training programs for rural youth. Under various programs large number of rural youth is being trained through village knowledge centers.

Increasing Awareness about Spoken English

Rural people have become aware of importance of spoken English, since English is the main language required for Internet.

Steps towards Digitalization of Rural India
ITC's E-Choupal

Launched in June 2000, ITC's e-choupal initiative has emerged as the largest internet based intervention in rural India, reaching out to 4 million farmers in over 40,000 villages through 6,500 internet kiosks. The initiative leverages technology through internet kiosks managed by farmers themselves and providing all relevant information to the farming community covering weather, market prices, information on best farming practices and risk management, while providing all information to facilitate sale and optimizing farmer profitability.

Bhoomi Project

The Bhoomi Project of Karnataka state covers 6.7 million farmers and holds millions of records of land ownership.This project has reduced the delays involved in interacting with the bureaucratic hierarchy of the state revenue department. Bhoomi centres are located all over the state. Any land record can be reviewed through a touch screen at these kiosks. The project has won the 2002 Commonwealth Association of Public Administration and Management award for creating "self content governance and opening up new frontiers."

Kisan Call Centre

The Department of Agriculture & Cooperation (DAC), Ministry of Agriculture, Govt. of India launched Kisan Call Centers on January 21, 2004 across the country to deliver extension services to the farming community. The purpose of these call centers is to respond to issues raised by farmers, instantly, in the local language. This is a wonderful effort made by the Ministry of Agriculture, Government of India to bridge the gap between the actual information resource and the user by using the phone.

Life Line India

BT approached One World – a charitable organization working to promote human rights and sustainable development across the globe – to explore ideas for a telephone based information service to enable farmers to record a question and, soon after, retrieve a recorded reply. BT engaged with Cisco to co-sponsor the initiative. Life Lines India was launched in November 2006. Coverage currently extends to 700 villages and an average of 350 calls to the service is being received each day. A database of over 88,000 'frequently asked questions' has been created. Crop quality and efficiency has already improved and some farmers have seen profits increase by between 25 and 150 per cent.

Gyandoot Project

Gyandoot is an intranet in Dhar district connecting rural cybercafes catering to the everyday needs of the masses. Gyandoot is the first ever project in India for a rural information network in the Dhar district of Madhya Pradesh which has the highest percentage of tribes and dense forest. Every village has a computer centre or "soochnalayas" at prominent market places or major roads. People can

easily log in and complain or request information on crops, forest fields, water resources, etc. of the district.

Mahila Shakti

An initiative from Human Welfare Association called Mahila Shakti. HWA works with underserved, disadvantaged and minority communities in the Varanasi area through education, literacy and livelihood by using personal contact programs, group meetings, SMS, education hubs etc.

Bharat Nirman Scheme

In 2005, the Govt. of India launched Bharat Nirman Scheme a time-bound business plan for action to promote rural infrastructure in the next four years i.e. 2005-09. Under this programme it has been targeted that 66,822 revenue villages in the country, which have not yet been provided with a Village Public Telephone (VPT), shall be covered by November, 2007. Out of the above villages, connectivity in 14,183 remote and far flung villages will be provided through digital satellite phone terminals. Assistance for both capital as well as operational expenditure for these VPTs will be met out of the Universal Services Obligation Fund (USOF). As on 30-9-08, out of total 66822 uncovered villages, 55257(82.69%) have been provided with VPT2.

Digital India Mission

Bharat Net

The Government's ambitious "Digital India" plan aims to digitally connect all of India's villages and gram panchayats by broadband internet, promote e-governance and transform India into a connected knowledge economy. By the year 2019, the 'Digital India' program of the Government of India (GOI), envisages that 250,000 Indian villages will enjoy broadband connectivity, and universal phone connectivity.

Challenges

Today, India is a force to reckon with in the IT/ITeS domain on a global scale, powering some of the biggest companies on the planet. And yet, in spite of revolutionizing the IT Services business, there has been little change brought by IT back home. Adoption of technology, especially in the government domain (which has a mass rural interface) has been rather muted and slow in the uptake.

Market & Government Failure in Rural Broadband

The private market finds it unattractive to invest in rural broadband infrastructure - a condition that economists describe as 'market failure'. Ubiquitous broadband access is associated with extensive positive externalities and spillover benefits. However, that is not factored by private actors in their decision making due to absence of direct financial benefits.

Right of Way

In the rural area, for providing backhaul connectivity, if fibre or cable is to be laid then even though the laying is along kuchha roads or through forest, but as the route involves jurisdiction of multiple state and municipal agencies / panchayats, therefore to coordinating different agencies and getting the requisite permission is time consuming. These state agencies involved in the process takes a long time in

granting the right of way and have also started charging exorbitantly higher amount for the permission for the laying.

Backhaul Connectivity

Unavailability of cheap and fast backhaul connectivity is one of the major hurdles in faster proliferation of telecom in rural areas. Unlike urban areas where optical fiber is largely deployed to provide the backhaul connection, about 80% of the rural BTS are on microwave system. Though, at many places OFC connectivity has been provided but the provisioning cost is prohibitory high and as discussed subsequently, providing backhaul using the satellite link is a cumbersome process.

Lack of Infrastructure Sharing

According to industry estimate, cost of setting up a cellular tower (BTS) is varies from around Rs 3-4 million inclusive of equipment, power plant, etc. Though significant number of existing cell sites are already being shared by competing operators across the country, however, this is mainly in urban areas. In rural areas, sharing of infrastructure is yet to be attained at a significant level/rate.

Power Supply

In a number of villages the power supply is either not available or is available only for few hours. As a result even if battery backup is provided for the BTS, due to availability of electricity for a very short duration, the batteries are not able to get fully charged. Further due to frequent interruption of power supply the life of these batteries get shortened which in turn increases operational cost to run services in rural areas. Unavailability of reliable power supply in semi-urban, rural and remote areas increases operational costs further because sufficient backup systems have to be maintained.

Operation and Maintenance cost

Maintenance costs of the network in rural areas are high as compared to urban areas because of several factors such as poor transportation systems, difficulty in supply of spare parts and non-availability of skilled manpower etc.

Low Average Revenue per User (ARPU)

The profit motive being of primary importance to all, the low ARPUs expected in the rural areas do not provide sufficient motivation for the Service Providers to provide service in these areas. At least initially, large call volumes cannot be expected from subscribers in these areas and also the paying capacity being lower than in urban areas tariffs would also have to be kept at very reasonable levels.

Low Literacy Levels (Relevant Mainly for Broadband)

The literacy levels are very low in rural India. No matter how wired or connected a rural community is, no matter GSM or CDMA, WiMax or 3G, broadband or dial-ups are in place, without appropriate literacy to utilize the technology or the value added services that it provides, the connectivity will have no value. Presently, more than 98% of computer work is done in English. Apart from the issue of lack of skills in English, a large percentage of the rural masses do not even have even sufficient reading and writing skill in their own language.

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Unavailability of locally relevant applications (Relevant mainly for Broadband)

India being a multi diverse country has different requirement from one geographical area to the other area. However, the content being developed at present are meant to be used universally even though it fulfills the requirement of a particular geographic area and not all the whole country.

Suggestions

Currently, India has a total of 450,000 telecom towers, only 60% of which are located in rural areas. These tracts have a poor tele-density of 46% (according to TRAI). We need another 60,000 telecom towers in order to achieve the goals of the 'Digital India' programme. Rural telecom remains expensive. In order for 60,000 additional towers to be installed in rural India, Government has to provide incentives to businesses to make it attractive for them to invest Rs. 20,000 crores, not even counting the backhaul cost.

Public private partnerships

The only way, to get broadband penetration in rural India is through Public Private Partnerships (PPP) .The salient features of this partnership should be:

Government will provide free backhaul for rural broadband

1. Viability gap-funding would have to be restored by DoT's USO fund for serving areas where tower companies will not build towers.
2. Device Manufacturers will need to provide affordable low end broadband phones
3. Telecom carriers would package relevant content and features for rural households

Digital "Town Squares"

Globally, cities have an open public space like a "town square" which becomes a focal point for recreational and social activity. In a similar fashion, the site of the telecom tower can become a focal point – like a Digital "Town Square" for providing services to the village. Towers provide in-site physical infrastructure, each with its own ecosystem of energy, security etc., which can be utilized to deliver several critical services and facilities. These towers can extend significant benefits to the village's economy, as demonstrated in several countries in Africa. Typical benefits are:

1. The 24x7 backup energy at site premises can be used to offer a range of additional services such as mobile charging and recharging points. A tower can also provide the anchor demand for an ESCO to install a 15-25KVA energy solution (Bio gas, solar, battery etc.) to serve the tower and the entire village.
2. Additional towers will also offer an entrepreneurial opportunity to set up cyber cafes and other small businesses that require internet connectivity.
3. Additional shelter and the broadband backhaul on the tower can be used for uninterrupted e-education.
4. A tower is a logical place to deploy mini ATMs. This could offer great value to villagers enabling them to transact and transfer money effortlessly. ATMs at the site will therefore help promote

financial inclusion in rural India. E-Government and other value added services can be offered at these sites. These include utility payments (power, water and telecom bills) and e-learning stations. ATC, in its own endeavor to reach out to villages to provide e-learning, has installed Learning Stations (Kiosks) that have pre-loaded educational material that aim at enhancing functional computer literacy among school children aged 6 to 14 years.

Development of Customized Content

The contents developed should be in the vernacular language and the application software should largely be menu driven and graphic as far as possible in order to overcome the issue of illiteracy. In absence of these, there will be lack of demand generation in rural areas, leading to a failure of the entire initiative.

Government Incentives

Rather than imposing taxes, levies, charges, and license fees on the telecom sector, the government must provide 'gap funding' and other incentives to the Industry for expanding into rural locations; they also need to form a public-private partnership (PPP) to initiate and manage wireless broadband pilot projects in districts with government provided fiber backhaul (NOFN) aimed at creating smart villages.

Broadband Penetration for Digital Villages

1. First the telecom infrastructure for broadband facilities have to be available to a critical mass of consumers – a few islands of connectivity will not add significant economic value
2. A wide range of applications and content relevant for rural consumers must be accessible on mobile devices and the operators must provide service packages affordable to the target user. Broad based availability of broadband services, through handheld devices, is a pre-requisite for the achievement of the goals of 'Digital India'.

Conclusion

From various discussions and case studies, it emerged that Information and Communications Technology (ICT) can be used as an effective tool for rural development. So it is the need to implement digitalization missions effectively to bridge the digital divide. The vehicles that could drive the digital literacy agenda could be used to provide various other services to the rural population.

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