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About the Journal

The Gavesana Journal of Management is a bi-annual refereed journal of the Vignana Jyothi Institute of Management. Its objective is to disseminate knowledge of contemporary issues related to management and development. The journal seeks to serve as a platform for intellectuals to share the rapid strides made in contemporary research. The Research Journal has been registered with the Registrar of Newspapers for India (RNI) vide No. 108534/2010 dated 1/3/2011.

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EDITORIAL

Human Resource function (HR), in any organization, has to be that of a strategic or business partner, by developing the talent in the entity through job rotation, job enrichment etc., involving expert teams, business leaders and line management. Such a partnership is a long-term relationship to achieve objectives common to the partners, as also the organization's financial success. In the process, the HR employees, as partners, should perform their assigned roles, and also support the activities of those in other functional areas. This needs a strategic plan which dovetails the HR Vision and Mission into that of the organization.

HR, as a Strategic Partner - increases employee productivity and thus the organization's profitability; enhances competency and talent management; uses the technology and knowledge to formulate, implement and review strategies; copes with the changes in the business environment arising from unforeseen business situations, and globalization; and serves the internal and external customers well. This is done through efficient and effective delivery of human resource services. For this, the HR needs to spend more time in the organization's planning, design and development. It must become part of the business team, involved in planning at the highest level. HR Managers and HR professionals are strategically suited to provide the necessary leadership in change management, which is a challenging task.

The Human Resource Information System (HRIS) has to be effectively used to handle daily administrative HR tasks. Employees can make use of the self-service facility online, to support business strategy development and implementation, which saves time and costs. There should be an HR Head who understands well the strategic partnership/relationship between organizational strategy and human resources. He should be an expert in all HR functions. Someone from within the organization can be groomed for this role.

Research has shown that the HR function will be effective in achieving the business objectives when it assumes the role of a strategic business partner. The top management should ensure this. The administrative reactive approach in people management can no longer support the organization in a competitive business environment. If the HR function is decentralized fully, the line managers and supervisors will eventually put the blame on HR when problems arise. If this happens, it interferes with the effective use of line managers' and supervisors' time in the operations of the organization on daily basis. The line managers and supervisors need to be supported to make them more proficient in managing their subordinates in the performance of daily tasks. Complete participation of HR people in strategy development and implementation promotes HR as a strategic partner. The HR Manager and HR professionals should contribute to business decisions; develop business acumen to understand how a profitable business is run; be customer-centric; and learn how to link HR practices to the organizational business strategy.

The expectations from HR as Strategic Partner include: recruiting the right employees; align corporate values to the recruitment strategy; well-developed competencies of the workforce, and their relevance to organizational core business; participative culture where HR initiatives fully support the overall strategic plan; discard ineffective HR practices that do not contribute to the success of your organization. HR management requires continuous improvement i.e., Kaizen to ensure and retain its relevance as strategic partner. For this, capable and committed people are needed at every level, supported by senior management. Change has to be managed well to avoid or minimize disruption in the organization's activities, and for its success.

The effectiveness of the HR people as a strategic partner is also dependent upon the corporate policies and practices, structure, types of activities carried out, location, effective communication, leadership and motivating employees to keep moving in the right direction as per plan. Every aspect of HR has to be reviewed in the process of implementing the necessary changes and reorganization. Having the right is crucial to help them succeed and engage their full attention with the view to ensure HR truly becomes strategic partner. The HR Scorecard shows whether the organization is making good progress on making HR as strategic partner. The competitive advantage of the organization can be enhanced by aligning the HR strategies to the overall business plan. To ensure that HR truly becomes a strategic business partner, adequate financial backing is necessary. One needs to take measures to eliminate or minimize risks to HR, and it should be ensured that HR plays a meaningful role and not necessarily a major role, particularly during financial crises. It cannot also be a trial and error approach.

In fact, in a business landscape that is changing fast, there is an imminent need for HR to be an active strategic partner. By aligning itself with strategic plans of the business, it needs to foster a stronger relation between the executive team and the workforce. Externally, it can make valuable contribution to branding and the tone of communication. By leveraging customised, more personalised metrics and deep analytics, it can vastly improve organizational learning, training and improve decision-making. Consequently, the human capital program will lend more impact, thereby encouraging and enhancing collaboration between various functions across the organization. HR can no longer be just a functional arm, a distant participant, but will have to assume the role of strategic partner, integral to organizational well-being and growth.

Dr. Ch. S. Durga Prasad

Role of HR Analytics on Employees Performance Improvement

Anand Hangal*

Abstract

With the emphasis on businesses being driven by Artificial Intelligence, Robotics, Machine Learning and Cloud computing brings a greater responsibility to the Business and Management to utilize and incorporate these technology into HR system. HR Analytics being the latest technology used across most of the IT Companies globally which starts with collecting, managing and analyzing big data which is stored in various forms within the organization. HR Analytics brings in clarity in employee trends in various areas either in recruitment, retention management, training and development, compensation management, performance management. Organization can really make a difference if they use this data during the Talent Management process for analyzing, identifying right candidates for a job fitment to managing the employees and bringing out high performance. The bottom line of any organization cannot be successful until the workforce related decisions are backed up by data analysis. The objective of this paper is to understand the role of HR Analytics on employee performance improvement and analyze the collected data through primary research to propose recommendations and suggestions which will be showcased through a model helping organizations to take strategic decisions during performance management process.

Keywords: *HR Analytics, Talent Hiring, PMS, Performance, Analytics*

Introduction

Organization today is becoming highly competitive in terms or processes, policies and decision making capabilities. Right from finding talent, training them, retaining the best talent, skilling them and giving them career opportunity, HR function has a hard role to play. Innovative tools and latest technology has been employed to capture data and analyzing the data base and decisions are being taken accordingly by management. With the introduction of HR analytics, which believes decisions can be taken based on available relevant data, HR processes are aligned to business goals. This paper examines how HR analytics facilities and fine tune improvement in the process of managing the top and talent workforce in bringing higher productivity to the organization. Through data analytics, the goal is to transform large complex masses of data into knowledge and, in this way, help the decision-making process of HRM by helping to make more accurate and data-driven decisions and also to make a forecast about the future, not just describing the past.There's no doubt that any business which can attract the right talent and manage talent effectively, utilize capacity effectively, engage their employees and retain employees is taking itself up for success. Organization has begun to realize that with sophisticated technology available they can use the available big data to arrive at concrete decisions on talent hiring. Use of extensive data, analysis and predictive models and fact based data in talent management predicts future top performers and highlight the risk of early leaving and successfully plan the successor. Talent hiring is no longer a mere manual system of calling candidates based on the resume. A much more work goes into this which includes matching the resume with much more comprehensive algorithm and existing data on the position required. Analytics will also support with finding suitable match of candidates based on the social media activity of the candidates, background check and throw the result to the HR Department whether to call the prospective candidates for interview. Job candidates profile can be matched with existing similar top performers candidates within the system. By using algorithm and existing employee performance pattern, Data analytics will throw decision on hiring the right people at right position. Big data is transforming large complex data into knowledge and which will help organization in taking strategic decision making related to people. HR Analytics data will not only predict the behavior of people but also showcase their trends and patterns in which they may behave.

Organization is moving from data management to Evidence Based Decision. Data is collected related to people, productivity, age, experience, performance, gender, absenteeism, sales, revenue, knowledge, people effectiveness,

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recruitment, training, etc. Evidence based data is pulled out and analysis is done based on true facts and figures. HR Analytics is still struggling at their initial stage in gathering, collecting relevant data to be predicted for the future and Management rightly use this data for business decision making.

Understanding HR Analytics Model

The HR data and information is stored in every organization and was used for day to day administrative function. Whether it is recruitment, identifying training and development needs within the organization, measuring the performance of every employee, understanding why an employee leaves the organization, HR was providing all data stored since a longer time and was managing complete gamut of HR function. Although without hiring of talent people and training of employees the company won't see progress, the fact remained that the company has always see HR Dept as a support and administrative function.

The big question was how to change this mind set and be a part of company's main revenue stream. With the advancement of technology and Big data coming through various sources, HR was able to showcase how it can add value to the overall revenue stream and improves company bottom line. Since HR was managing the complete people management process for the organization, it was indeed very critical to be a part of revenue stream to prove its existence and effect on business to be strategic partner.

HR was forced to validate their role in the strategic role in talent acquisition. Data driven and Predictive model came into picture and with advancement in technology in analytics, HR Analytics was developed and data was shared with management which acted as a tool to access performance of employees, critical hiring decisions, retention management and so on.

Following are few areas where HR analytics can add value to performance improvement.

- Job candidates can be matched with existing employees who are top performers.
- Grooming top talent for better performance and removing poor performers and control cost.
- Data analytics can help manage attrition by ensuring fair compensation to the new employee. Data collected from other sources, industry standard and bench marking help HR decided best compensation structure for the new joinees.
- Gives insight to behavior analysis to understand employee behavior pattern. This can be used by HR department understand most likely people who may leave the organization. Such employees can be counselled and engaged. Engaged employee can deliver more.
- But it was all not so easy to implement. Analyzing HR data required software which will analyze Behaviour, Pattern, Trend of employees from historic data. Available data was no longer used to just describe the situation or why it was happened but also data would predict the future of the above challenges.

Review of Literature

Gavin Walford-Wright, William Scott-Jackson, (2018) paper aimed to study the opportunities that have been created through technological advancement in the talent acquisition industry and how this links to strategic HR Management and business strategy. It focuses on how an organization can embrace the world's leading technology and compose a unique technology stack to overcome its challenges in talent acquisition. The analysis of the data shows a significant improvement in all the key metrics related to the talent acquisition process after the implementation of “Talent Rising” model. The role of a recruiter and the talent acquisition team has radically changed and has now become an internal strategic partner with aligned interest, an advisor to the organization. There is an increase in the use of new media/technology to attract candidates and with the increase in millennial candidates entering the workforce, social media will be increasingly important in talent branding and attraction; the digital by default generation is already here.

Andrew Mayo (2018) studied different areas of talent management and how HR metrics and analytics can be harnessed to make those areas more effective. He considered three areas for the application of metrics and analytics – data about individuals, the effectiveness and efficiency of talent processes and the extent of the supporting culture.

Geeta Rana, Alok Kumar Goel, Renu Rastogi, (2013) stated that the functioning of an organization largely depends upon several remarkable components, with the talented employee occupying the central role for the accomplishment of organizational goals. In this context, organizations are making more investment into talent development initiatives, which currently is a challenge. The purpose of this paper was to examine the talent retention practices in Bharat Heavy Electricals Limited (BHEL), a Navratna PSE of the Government of India. Effective talent management practices help the Indian public sectors in general to retain their best talent. At BHEL, talent management practices are focused on competencies, knowledge, learning and increased broad group engineering and technology transference.

According to Alice Snell, (2011) Up to 70 percent of a company's value is tied up in the skills and experience of its employees. All too often, however, business executives and Human Resource (HR) departments have very little insight into how to use this asset for better business outcomes. This paper aimed to look at the importance of effective talent metrics and to examine the problems organizations face when trying to develop talent intelligence. His Findings state that Despite the business value that accurate, accessible talent intelligence can provide, the research finds that there are significant differences between those talent metrics that organizations consider important and the data to which they have access. A legacy of disparate technology systems and a focus on measuring efficiency rather than effectiveness are the primary reasons for the lack of talent intelligence among many businesses.

Rakesh Sharma, Jyotsna Bhatnagar, (2009) in their paper worked on drawing lessons on how building a talent management strategy based on competency profiling becomes a critical impact area within the field of strategic HRM. They found that the talent mind set has helped the organization in recruiting the best talent from the best pharmaceutical organizations. The attrition of the top and valued talent segment has come down. Some of the key positions have been filled through succession planning.

Peter Cheese, (2008) paper discusses the importance of talent management to strategic success, in order to identify the challenges in building talent power and to explore how to overcome those challenges. The paper asserts that an organization needs to put in place key processes in order to retain and actively multiply talent. They include: maintaining visible leadership that is focused on talent; encouraging and rewarding line managers for nurturing talent; and modernizing HR and training to identify, develop and deploy talent to the best effect.

Objectives

1. To study the importance of HR Analytics in improving employee performance.
2. To understand the role of Analytics while analyzing employee performance.
3. To understand how evidence based data helps employee improve their performance.
4. To understand how

Research Methodology

Present research is descriptive in nature. Primary and Secondary data has been collected for the purpose of research. Primary data collection is by administering questionnaire to the respondents. The questionnaire has 10 parameters to be tested keeping in mind the research objectives.

30 Respondents are chosen for the study and convenience sampling technique is being employed. HR Heads and HR Managers of IT and Non IT companies and CEO and Business Heads are the sample. Selection of Sample includes collection of Database of HR and CEO/Business Heads from Linked-in and social media websites. Data collected is analyzed based on the position and the nature of profile respondent is handling in his current organization and geography which will be used to determine the methodology for data collection. Introductory mail is sent to the respondents to take their consent. Respondents are then personally called to explain the purpose of this research

The below methodology is used while collecting primary data from the respondents.

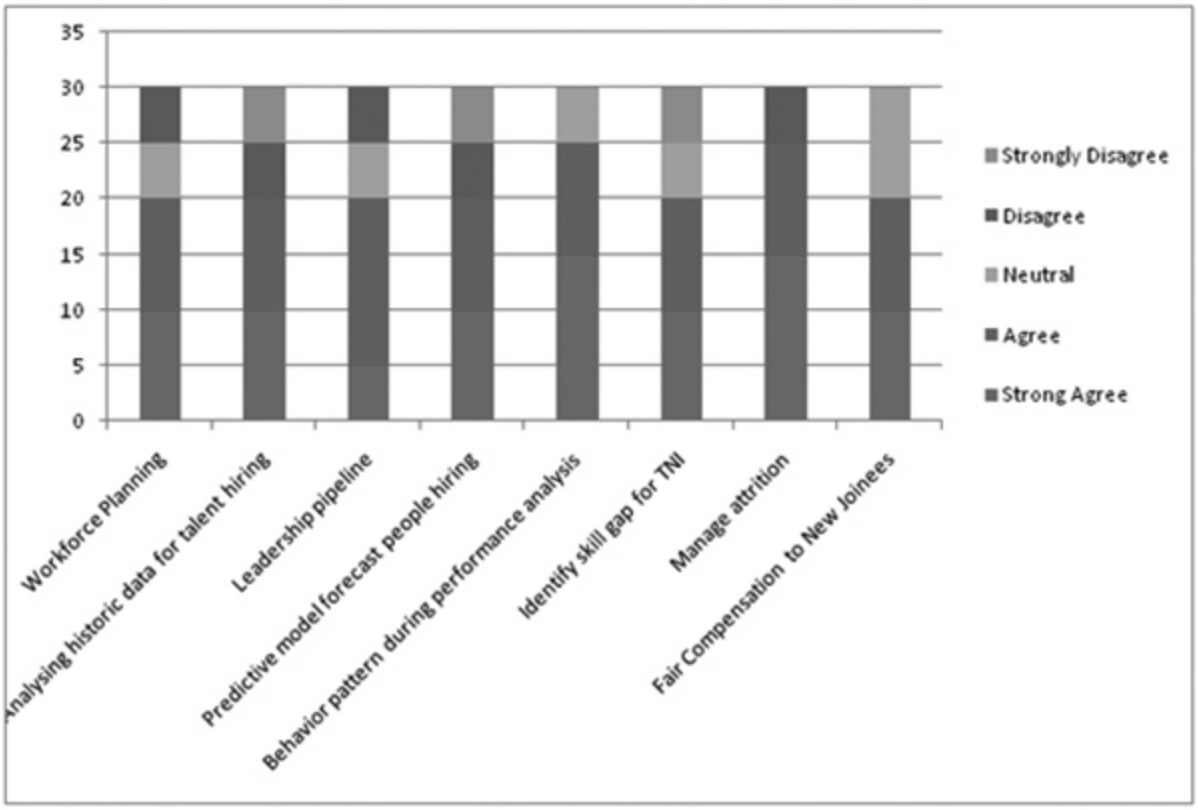
1. Personal Interview - Conducted personal interview with the respondent at their office.

2. Telephonic Interview - Telephonic interview conducted in case of non-availability of the respondent. Filled questionnaire after taking inputs from the respondent is sent to their mail ID for approval

3.Mail - After telephonic interview mail is sent by the respondent with their inputs.

Results and Discussion

Graph 1 shows the response of the respondents on role of Analytics in Talent Management Process



Respondents were asked about the role of analytics in their organizations in the areas of Workforce planning, Analysing historic data for talent hiring, leadership pipeline, Predictive model forecast hiring, behaviour pattern during performance analysis, identifying skill gap for TNI, Manage attrition and fair compensation to new joins.

Following are the findings from the study

1.Existing usage of HR Analytics Data in Talent Management – Hiring is always been a core HR function in every organization and is not limited to just interview and selection. HR was hiring candidates on various parameters and using newer benchmark to assess capability and compensation. Right from performing background verification of previous companies to capability hiring and comparing the best fitment into the organization. Post HR Analytics Intervention

HR Analytics has gone one step ahead and got involved in the business operation by analysing why is this position important and how will it create value to the organization. Capability hiring was at the core. Predictions was made based on historic data on how existing employees with required qualification and experienced have performed or under-performed and their capability matrix and educational qualification. By throwing the analytics result to the HR, Right candidate was hired for the right job resulting into higher performance. It can be said that HR Analytics is more proactive rather than reactive.

2.HR Data in measuring the performance- Performance of employees was at the core to the success of the organization. HR department has started reviews taken from various reporting structure of an employee and shared the data with the management. Appraisal was purely based on the review which the supervisor has given to his subordinate.

Post HR Analytics Implementation

HR Analytics has changed the concept and started capturing data from day one the employee has reported the organization. Monthly performance, trends and employee behaviour was captured and the data was put up in the software which would then analyze performance , success factors and behaviour and skill areas which helped organization in forming a right opinion about the employee .

3.HRA in Learning & Development - Training was done assumption and based on the need identification. TNI used to be circulated to all the employees and their reporting managers to understand what and how much training is required by every employees. There was never used to be any concrete measurement of Training requirement. Post HR Analytics Implementation

With HR analytics the process of L & B has become much more easier. Skill data was available with HR and which was used to highlight necessary training requirement. Organization need not go on intuition and gut feeling to select necessary training needs. Analytics data has brought exact training requirements which has resulted into performance improvement.

4.HRA in Attrition Management- Data thrown by the HRM was only limited to people left the organization and why they left. It was a post-mortem job by HR which helped the organization to ensure that those issues are taken care properly,

Post HRA Implementation

HR Analytics predictive modeling has cut down the post-mortem work and helped org with data which says who are the most likely talented people who might leave. This data/ prediction has helped management in a bigger way by counselling such top talent and understanding their current issues.

Conclusion

Data analytics can come as a big game changer for organizations who wanted to really make a difference in employee performance improvement. Not only in the hiring segment but also employee nurturing, ensuring better performance and retention data analytics could play a bigger role in engaging workforce for higher performance. Mere guess work can be eliminated completely. Implementation of Data analytics in the area of Talent Management can make hiring and retention decisions more transparent and data driven and will be more quantitative in nature. It's time and trend to incorporate the data into various functions of the organizations in a meaningful way. Facts and figures available in technology driven business should be efficiently used for better management decisions. Talent Management especially is the biggest challenge and the best resource available for the organisations is the data available with them and the capability of deriving meaningful conclusions to address majority of the business issues and concerns.

References

1. Gavin Walford-Wright, William Scott-Jackson, (2018) "Talent Rising; people analytics and technology driving talent acquisition strategy", Strategic HR Review, Vol. 17 Issue: 5, pp.226-233, https://doi.org/10.1108/SHR-08-2018-0071

2. Anshu Sharma, Tanuja Sharma,(2017)" Hr Analytics and performance appraisalsystem Aconceptualframeworkforemployee performance improvement", ManagementResearchReview Vol.40No.6,2017.

3. Geeta Rana, Alok Kumar Goel, RenuRastogi, (2013) "Talent management: a paradigm shift in Indian public sector", Strategic HR Review, Vol. 12 Issue: 4, pp.197-202, https://doi.org/10.1108/SHR-02-2013-0012

4. Jeremy Langley, (2013) "Use data effectively to align people strategy with business goals", Strategic HR Review, Vol. 12 Issue: 5, https://doi.org/10.1108/shr.2013.37212eaa.004.

5 Alice Snell, (2011) "Developing talent intelligence to boost business performance", Strategic HR Review, Vol. 10 Issue: 2, pp.12-17, https://doi.org/10.1108/14754391111108301

6. Rakesh Sharma, Jyotsna Bhatnagar, (2009) "Talent management – competency development: key to global leadership", Industrial and Commercial Training, Vol. 41 Issue: 3, pp.118-132, https://doi.org/10.1108/00197850910950907

7. Peter Cheese, (2008) "Driving high performance in the talent powered organization", Strategic HR Review, Vol. 7 Issue: 4, pp.25-31, https://doi.org/10.1108/14754390810880507

Modeling the Barriers to Mobile Payment System in the Nepalese Payment Scenario: An ISM Approach

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Abstract

Even though the entire world is engulfing the 'digitalization and cashless economy', it has different effects on different countries. While it may be booming in the Indian economy, the neighboring country of Nepal is receiving below 2% transactions from the method of mobile payment system. The purpose of this study is to identify the barriers to mobile payment systems in the context of Nepal and to create a hierarchical framework so as to identify which barriers are drivers and which are dependents. A qualitative study through the Introspective Structural Modelling model was conducted where 10 experts in the mobile payment service industry were chosen through the Delphi Technique and extracted data from. Multiple rounds were conducted to come to a consensus response. A total of 12 barriers were identified and studied on and through the driving and dependence power, these were categorized into either dependent, independent, Linkage and Autonomous barriers. Finally, 2 users and 2 non-users were interviewed to match the findings. The research provides a final model which indicates how the barriers are related to each other and how they lay in different layers and lead to other barriers. It segregates the dependent with the driver barriers. The final model indicates that the hardware and software capability and lack of knowledge is the basic barrier which needs to be removed or else leads to other multiple barriers. The barrier which is driven by all other barrier is the payment preference of the individuals in Nepal. The research has its limitations of the biasness of the Delhi Method however, it has direct practical implications. It provides a framework of the barriers which will help the service providers focus on the right barrier removals through well informed strategies and will help the users to understand the concept of digital wallets.

Introduction

With the rapidly advancing technology comes new concepts which make our lives easier. Initially starting from the barter system to cash payments to debit and credit cards, certain parts of the world is currently transacting through digital wallets. In Nepal, E-sewa, which is one of Nepal's first digital wallet entered into the Nepalese digital payment system industry in 2009. However, when we look at the mobile payment industry in Nepal after a decade, we do not see a huge jump or an increment in the trend of using digital wallets.

We have seen a hint of progress in Nepal with the introduction of many digital payment service providers like eSewa, IME Pay, Khalti etc. yet we do not see much acceptance from the side of the customers. They do get huge downloads and registration but have a difficulty in maintaining the regular transactions which are done by the customers.

Mobile payment systems, when looked at in developing and underdeveloped countries, offer to assist in two major ways, as an engine for financial inclusion and as an emerging market business opportunity for providers. When looking at the business sectors, both small and large, we see that most business in emerging markets do not participate in such technological enhancements. As many as two billion individuals and 200 million small businesses in these economies today lack access to formal savings and credit. Their main transaction is through cash and have no safe way to save and invest their money, making them have a low bargaining power with the informal lenders and personal networks for credit. Even those with access can pay dearly for a limited range of products. Success in financial inclusion entails reaching these individuals and small businesses with products that go beyond payments and that can significantly improve their financial lives. (Osafo-Kwaako, Marc, White, & Zouaoui, 2018)

Looking at the background and introduction of the concept of digitalization of the payment service in Nepal, Kumari bank was the first company to start online banking in Nepal. The credit card system however, was initiated by Nabil bank in 1990. Moving forward to the digital wallet or the mobile wallet system, the first in the market was eSewa

which was launched in 2009 and was created by F1 Soft International. It took close to a decade for it to be accepted by the market and following its footsteps were other payment systems like Khalti, IME Pay, Q Pay, Ipay, Prabhu Pay. (Timsina, 2019)

With the varied perception of the introduction of digital wallets, the mobile payment system providers, the software developers and affiliated banks are rummaging through the barriers to understand the main reason for the slow growth of the mobile payments. This paper is aimed at digging out the barriers to the use of mobile payments in the Nepalese payments system using the Interpretive Structural Model (ISM) which will assist in the easier payment in the future of business activities. "Interpretive structural modeling (ISM) is a well-established methodology for identifying relationships among specific items, which define a problem or an issue." (Attri, Dev, & Sharma, 2013) This model aims to connect dots and help the policy makers of banks and payment system companies analyze the issues faced at various levels. The results will add to the body of literature and simultaneously help practitioners to understand the various levels of implementation. (Behl, Singh, & Venkatesh, 2016)

The main objective of the research is to understand the mobile payment system in a holistic manner and to path out its barriers and understand the interconnectivity.

Review of Literature

An international online payment gateway from Nepal although just started since the end of 2017 provides a safe, secure and easy payment solution. More and more successful merchants are using this online payment system in Nepal to increase their business potential. All around the world, we see how the introduction of online payment gateways have widened the financial sector and provided multiple means for payments for different people who cannot confine to the regulations of the debit and credit card. Online payment gateway, the future of payments authorizes credit or in some gateways also debit card transactions. As we enter a more technological area more and more consumers just don't have time to visit merchant shops or businesses for simple payments. (Weblink Nepal IT Institute, 2018). The role of mobile phones in the financial sector is undeniable strong. In an article submitted by Mas (2012) to the World Bank, he mentioned that 'the mobile phone has become a useful tool in tackling the financial access deficit in many countries. M-PESA in Kenya has shown that adoption curves typical of new information-based technologies (radio, TV, mobiles, internet) can be applied to financial services.'

In a blog written by Hawlk (2019), she mentions that a mobile wallet is pretty much exactly what it sounds like: a "wallet" that lives on your mobile device instead of in your back pocket. It has an advantage of eliminating the need to carry around a at wallet with multiple cards which are rarely used. She also includes that the mobile wallets are safer due to the encryptions which make it safer than carrying cards and money. Even in case of lost phone, there are other security systems like two-face authentications which improves the security of the system. A cashless economy is a popular term these days. There has been a lot of discussions and brainstorming on this issue. Digital payment is the latest innovation in the field of Information and Technology. Online/Digital payment OR Digital/Mobile wallet is a global trend and Nepal cannot remain unaffected from it. Although Nepal is still miles behind from creating a cashless society, there has been an effort made by the government and private sector in achieving this foot. Now, there are many digital payment or mobile wallet platforms in Nepal. (Timsina, 2019)

Digital payment services are mostly used for utility payments like electricity, Water bills, mobile top-ups, airline ticketing, movie ticketing, and transactions. Online digital payment service has eased the life of people as people don't have to queue up for hours to pay bills. You are just one tap away from recharging your mobile balance and buying a ticket for your favorite movie. You can get different offers for using their services including cash back when you use these apps for any purchase. (Timsina, 2019)

Giri (2013) mentions that Nepal being a dynamic country, needs to focus their attention on developing infrastructure and including mechanisms like payment systems. The people in Nepal heavily rely on the paper currency and this causes threat and a multitude of risks in transactions. He specifies that as per the various surveys conducted by World Bank, it is evident that the country is presently in need of an efficiently mechanized payment system like mobile payment system or real time gross settlement system (RTGS) along with a heavily regulated legal framework which supports it.

According to a research done by Katiyar and Badola (2018), out of the 12 barriers which were chosen in the Indian scenario, the main barriers to the adoption of mobile payment systems are online illiteracy and online unawareness while the weaker barriers were ineffective utilization of online banking system, unaffordable high e-banking fees and unclear e-banking legislation, instructions and guidelines.

Similarly, a research conducted by Behl, Singh and Venkatesh (2016) identified the below 11 barriers. These include Regulatory concerns, Modelling issues at various levels of banks, retailers and telecom partners, Reach and coverage reliability of telecom networks, Ability to exchange and use information among banks and telecom networks, Critical mass of users for growth, Usage issues (handset limitations and SMS/IVR language), Concern of customer related to security of transactions and loss of handset, Lack of basic need for banking/payment services, Cost of usage to consumer, Lack of consumer trust in services of Telecom companies and their retailers, Low responsiveness in resolving complaints from telecom companies.

In this paper, ISM methodology has been used. Interpretive structural modeling (ISM) is a methodology which identifies the relationships which are present while defining a problem or issue. For any complex problem under consideration, a number of factors may be related to an issue or problem. However, the direct and indirect relationships between the factors describe the situation far more accurately than the individual factor taken into isolation. Therefore, ISM develops insights into collective understandings of these relationships.

The barriers are classified as following.

S. N	Barriers	Classification	Reference
1	Regulatory Concern	External	(Behl, Singh, & Venkatesh, 2016)
2	Usage difficulties	External	(Ketkar, Shankar, & Banwet, 2012)
3	Security Issues	Internal	(Mahindra Comviva, 2016) (Financial Express, 2017) (Shah, 2017)
4	Payment Preferences	External	(Michael, 2013) (Behl, Singh, & Venkatesh, 2016)
5	Slow user adoption/ Inertia in adoption	External	(Financial Express, 2017) (Khalti Digital Wallet, n.d.) (Martin, 2016)
6	Risk of Cyber Fraud	Internal	(Financial Express, 2017) (Shah, 2017) (Behl, Singh, & Venkatesh, 2016)
7	Device Hardware & Software Capabilities	Internal	(Corporate Payments Insights, 2015) (Garrity & Kurd, 2015)
8	Lack of Knowledge and Experience	External/ Internal	(JN, 2017)
9	Technology doesn't always work properly	External	(Shah, 2017)
10	Competition from Debit and credit card	External	(Financial Express, 2017)
11	Less merchant acquisition	Internal	(Shah, 2017)
12	Less offers to the users	Internal	(Martin, 2016)

Table : Barriers to the use of digital wallets in the Nepalese Payment Sector

Methodology

We have seen the emergence of mobile wallets and their success stories in countries like India, Bangladesh, Kenya. These countries have a similar economy and business operations like Nepal but when comparing the situation of Nepal to these countries, we see that even after a decade of the first payment system in 2008, many people are still uneducated on this service. Hence, this research is to understand the main reasons for why this mode of payment isn't working. With the help of the Interpretive Structural Modelling (ISM) method, this research will assist in pointing out to the main problem and providing a flow of the other barriers which are interconnected so as to assist with policy development.

ISM is an interactive learning process. In this technique, a set of different directly and indirectly related elements are structured into a comprehensive systematic model (Sage, 1977). The model so formed portrays the structure of a complex issue or problem in a carefully designed pattern implying graphics as well as words (Raj, Shankar, & Suhaib, 2007)

The steps for ISM Modelling (Warfield, 1974) are:

1. The first step is the identification of variables which in our research is the barriers (both Internal and External)
2. Next, we develop the Structural Self Interaction Matrix (SSIM) based on pairwise comparison of the above identified variables which indicate the pair-wise relationship between the barriers under consideration.
3. After the SSIM, Reachability Matrix (RM) is developed and checked for transitivity. Transitivity is an assumption made in Interpretive Structural Modelling which says that if variable A is related to B and B is related to C then A must necessarily be related to C.
4. Then we move onto level Partitioning of barriers.
5. Development of Diagraph were the transitivity is removed.
6. The Final ISM Model where the variables are replaced with statements.

A qualitative approach was followed. Qualitative research is traditionally used in many disciplines like social sciences and market research and other context. A total of 12 barriers were selected through interviews with the service providers and after rummaging through different research of the same topic. With the help of the Delphi Technique, the internal and external data was analyzed to come to a conclusion. For this research, first the experts were interviewed separately and introduced with the definitions of this research. Next, they were asked to rate the barriers as mentioned above and then finally requested to fill up the questionnaire. The response led to the creation of the Structural Self Interaction Matrix (SSIM). The data is then worked on and analyzed to come to the final model. The expert panel for this research was a combination of experts from the different digital payment system providers in Nepal. A total of 10 experts were interviewed to arrive at the final analysis of the barriers to digital payments in Nepal. Finally, 2 active users and 2 individuals were interviewed to understand their point and to relate it to what the model had depicted. The location of the panel members and other participants are all from Kathmandu itself.

Data Analysis

The data filled by the 10 experts from various companies and bank is developed into the Self Structural Interaction Matrix by following the below rules.

- “V” means that the criteria 'i' lead to criteria 'j'
- “A” means that the criteria 'j' lead to criteria 'i'
- “X” means that the criteria that the 'i' and 'j' will lead to each other
- “O” means that the criteria that the 'i' and 'j' are unrelated to each other

			j											
	S.N.	Barriers for use of Mobile Payment System	12	11	10	9	8	7	6	5	4	3	2	1
	1	Regulatory Concern	O	V	O	O	O	O	A	V	V	A	O	X
	2	Usage difficulties	O	V	V	A	A	A	O	A	A	O	X	
	3	Security Issues	O	V	O	O	A	A	X	V	V	X		
	4	Payment Preferences	A	A	A	A	A	A	A	A	X			
i	5	Slow user adoption/ Inertia in adoption	A	V	A	A	A	O	A	X				
	6	Risk of Cyber Fraud	O	V	V	A	A	A	X					
	7	Device Hardware & Software Capabilities	O	O	V	V	O	X						
	8	Lack of Knowledge and Experience	O	V	V	O	X							
	9	Technology doesn't always work properly	O	V	O	X								
	10	Competition from Debit and credit card	O	V	X									
	11	Less merchant acquisition	V	X										
	12	Less offers to the users	X											

Table : Final Self Structural Interaction Matrix (SSIM)

The data from the SSIM Matrix has to be converted to binary numbers for analysis and hence is converted into the Reachability Matrix using the below rules.

	Then the element in the RM is -		
If the element (i,j) in the SSIM is -	**Element**	**(i,j)**	**(j,i)**
	V	1	0
	A	0	1
	X	1	1
	O	0	0

Table : Rules for developing the Reachability Matrix

S.N	Barriers for use of Mobile Payment System	1	2	3	4	5	6	7	8	9	10	11	12
1	Regulatory Concern	1	0	0	1	1	0	0	0	0	0	1	0
2	Usage difficulties	0	1	0	0	0	0	0	0	0	1	1	0
3	Security Issues	1	0	1	1	1	1	0	0	0	0	1	0
4	Payment Preferences	0	1	0	1	0	0	0	0	0	0	0	0
5	Slow user adoption/ Inertia in adoption	0	1	0	1	1	0	0	0	0	0	1	0
6	Risk of Cyber Fraud	1	0	1	1	1	1	0	0	0	1	1	0
7	Device Hardware & Software Capabilities	0	1	1	1	0	1	1	0	1	1	0	0
8	Lack of Knowledge and Experience	0	1	1	1	1	1	0	1	0	1	1	0
9	Technology doesn’t always work properly	0	1	0	1	1	1	0	0	1	0	1	0
10	Competition from Debit and credit card	0	0	0	1	1	0	0	0	0	1	1	0
11	Less merchant acquisition	0	0	0	1	0	0	0	0	0	0	1	1
12	Less offers to the users	0	0	0	1	1	0	0	0	0	0	0	1

Table : Initial Reachability Matrix

The final reachability matrix is derived from the Initial Reachability Matrix by applying transitivity to the matrix. The transitivity check is the basic assumption of ISM Technique which states that if barrier 'a' is related to barrier 'b' and barrier 'b' is related to barrier 'c', barrier ‘a' will be necessarily related to barrier 'c'. After the transitivity check, the new entries which are inferred are marked as 1*.

S.N	Barriers for use of Mobile Payment System	1	2	3	4	5	6	7	8	9	10	11	12	Driving Power
1	Regulatory Concern	1	1*	0	1	1	0	0	0	0	0	1	1*	6
2	Usage difficulties	0	1	0	1*	1*	0	0	0	0	1	1	1*	6
3	Security Issues	1	1*	1	1	1	1	0	0	0	1*	1	1*	9
4	Payment Preferences	0	1	0	1	0	0	0	0	0	1*	1*	0	4
5	Slow user adoption/ Inertia in adoption	0	1	0	1	1	0	0	0	0	1*	1	1*	6
6	Risk of Cyber Fraud	1	1*	1	1	1	1	0	0	0	1	1	1*	9
7	Device Hardware & Software Capabilities	1*	1	1	1	1*	1	1	0	1	1	1*	0	10
8	Lack of Knowledge and Experience	1*	1	1	1	1	1	0	1	0	1	1	1*	10
9	Technology doesn't always work properly	1*	1	1*	1	1	1	0	0	1	1*	1	1*	10
10	Competition from Debit and credit card	0	1*	0	1	1	0	0	0	0	1	1	1*	6
11	Less merchant acquisition	0	1*	0	1	1*	0	0	0	0	0	1	1	5
12	Less offers to the users	0	1*	0	1	1	0	0	0	0	0	1*	1	5
	Dependence Power	6	12	5	12	11	5	1	1	2	9	12	10	86/86

Table : Final Reachability Matrix

To level Partition the data, the Reachability Set (RS) and Antecedent Set (AS) needs to be identified. The barrier along with the barriers which help to achieve the barrier is known as the Antecedent Set (AS). The RS is the barriers which include the barrier itself and the other barriers which it may help arrive it. The common barrier between the RS and the AS is the intersection. To conduct the level partitioning, the second step after finding out the RS and the AS is to see which barrier has the same intersection set and the RS. If any barrier has the same RS and Intersection, it would be considered as the 1st level. Once this is identified, the barrier is removed and the procedure is done iteratively until all the levels are recognized. The technique to find the first level is as below. The final levels are shown in Table 7.

S. N	Barriers for use of Mobile Payment System	RS	AS	Intersection	Level
1	Regulatory Concern	1,2,4,5,11,12	1,3,6,7,8,9,	1	
2	Usage difficulties	2,4,5,10,11,12	1,2,3,4,5,6,7,8,9,10,11,12	2,4,5,10,11,12	1st
3	Security Issues	1,2,3,4,5,6,10,11,12	3,6,7,8,9	3,6	
4	Payment Preferences	2,4,10,11	1,2,3,4,5,6,7,8,9,10,11,12	2,4,10,11	1st
5	Slow user adoption/ Inertia in adoption	2,4,5,10,11,12	1,2,3,5,6,7,8,9,10,11,12	2,5,10,11,12	
6	Risk of Cyber Fraud	1,2,3,4,5,6,10,11,12	3,6,7,8,9	3,6	
7	Device Hardware & Software Capabilities	1,2,3,4,5,6,7,9,10,11,12	7	7	
8	Lack of Knowledge and Experience	1,2,3,4,5,6,8,10,11,12	8	8	
9	Technology doesn't always work properly	1,2,3,4,5,6,9,10,11,12	7,9	9	
10	Competition from Debit and credit card	2,4,5,10,11,12	2,3,4,5,6,7,8,9,10	2,4,5,10	
11	Less merchant acquisition	2,4,5,11,12	1,2,3,4,5,6,7,8,9,10,11,12	2,4,5,11,12	1st
12	Less offers to the users	2,4,5,11,12	1,2,3,5,6,8,9,10,11, 12	2,5,11,12	

Table : 1st Iteration of the level partition

S.N	Barriers for use of Mobile Payment System	Level
1	Regulatory Concern	3rd
2	Usage difficulties	1st
3	Security Issues	4th
4	Payment Preferences	1st
5	Slow user adoption/ Inertia in adoption	2nd
6	Risk of Cyber Fraud	4th
7	Device Hardware & Software Capabilities	6th
8	Lack of Knowledge and Experience	5th
9	Technology doesn't always work properly	5th
10	Competition from Debit and credit card	3rd
11	Less merchant acquisition	1st
12	Less offers to the users	2nd

Table : Level Partitioning of Barriers

Development of Diagraph

Digraph of the barriers represents the relationship between the barriers. Directed graph or diagraph is generated from the final Reachability Matrix after removing all transitive links. The levels are arranged and the relationship between the different barriers is shown in a hierarchical framework. The higher levels are placed on the top and subsequently the lower ones below that. The diagraph after removing all transitive links is shown in Figure 1.

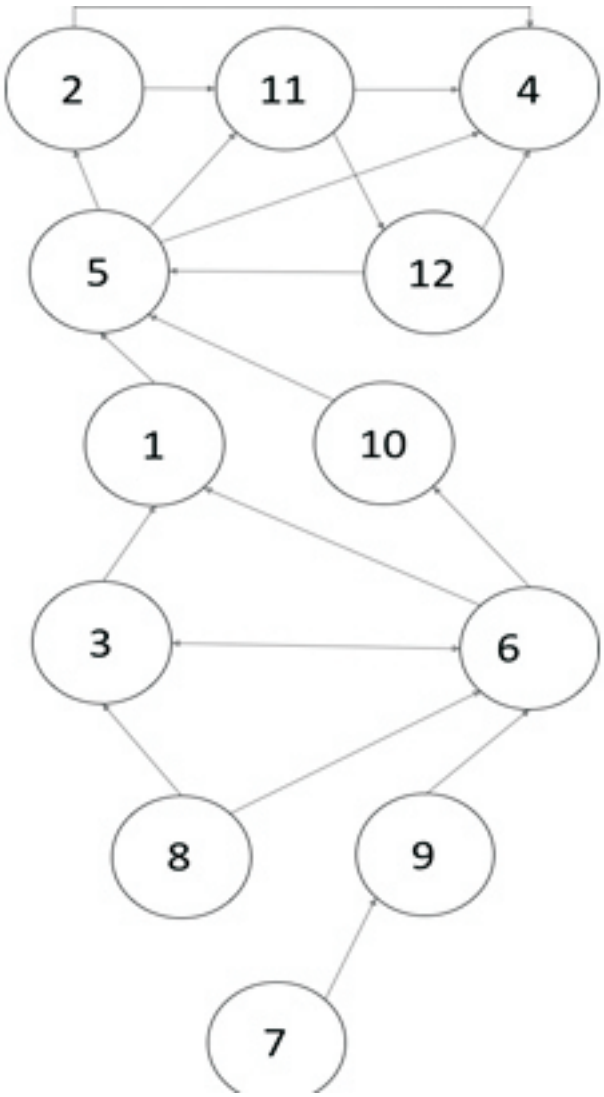

Figure : Diagraph of the barriers

MICMAC Analysis

The main reason for conducting a MICMAC analysis is to classify the barriers into 4 types i.e. dependent, independent, linkage and autonomous based on the driving power and dependence power. It is directly linked to the driving and the dependence power. According to the analysis procedure for the MICMAC analysis, the driving power is calculated from the Final Reachability Matrix by adding all the 1's in each column from each barrier. The dependence power is calculated by adding the 1's in each row from each barrier. The driving power and dependence powers are plotted in a graph which is divided into 4 quadrants representing the autonomous, independent, dependent and linkage drivers. (Tamrakar & Sudhindra, 2014)

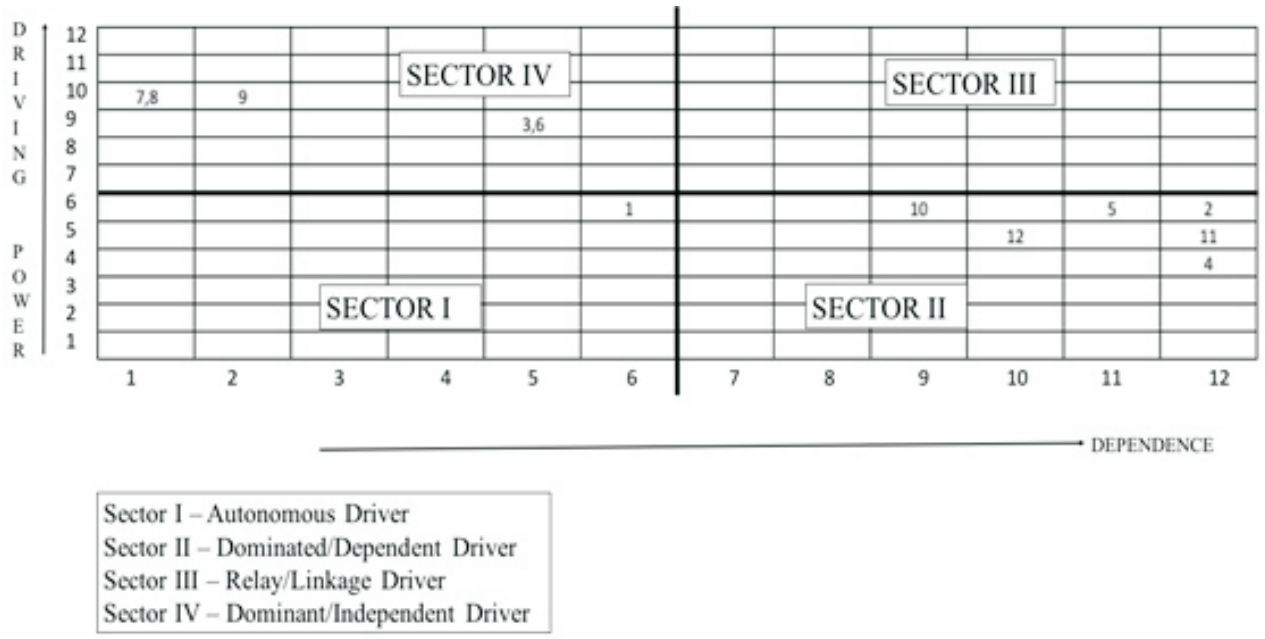

Figure : Classification of Barriers

The combined data arrived at can be summed up in the below Table.

S.N.	Barriers for use of Mobile Payment System	Classification	Quadrant	Driving Power	Dependent Power	Net	Dominant Nature	Rank Level
1	Regulatory Concern	External	Autonomous	6	6	0	Equal	3rd
2	Usage difficulties	External	Dependent	6	12	-6	Dependent	1st
3	Security Issues	Internal	Dominant	9	5	4	Driver	4th
4	Payment Preferences	External	Dependent	4	12	-8	Dependent	1st
5	Slow user adoption/ Inertia in adoption	External	Dependent	6	11	-5	Dependent	2nd
6	Risk of Cyber Fraud	Internal	Dominant	9	5	4	Driver	4th
7	Device Hardware & Software Capabilities	Internal	Dominant	10	1	9	Driver	6th
8	Lack of Knowledge and Experience	External/ Internal	Dominant	10	1	9	Driver	5th
9	Technology doesn't always work properly	External	Dominant	10	2	8	Driver	5th
10	Competition from Debit and credit card	External	Dependent	6	9	-3	Dependent	3rd
11	Less merchant acquisition	Internal	Dependent	5	12	-7	Dependent	1st
12	Less offers to the users	Internal	Dependent	5	10	-5	Dependent	2nd

Table : Summary of Classification

The final ISM model is derived by replacing the numbers in the diagraph by statements or barriers. The final ISM model is shown in Figure 3.

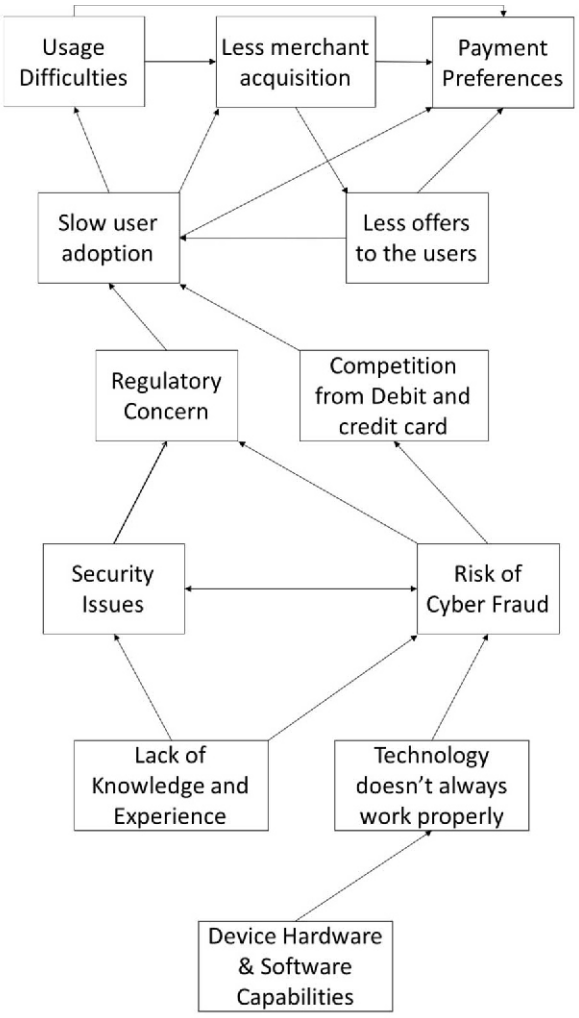

Figure : Final ISM Model

From this research, we can conclude that the first root barrier or the building blocks of barriers for the use of mobile payment systems is the Device Hardware and Software Capabilities. This is where the barriers start and this is the barrier which needs to be worked on first. People need to have the appropriate device in order to access this service. Similarly, the software capabilities may pose as a risk and lead to unsuccessful transactions. A lot of the software's are not compatible with the websites or the merchants leading to a huge gap in the technology transference.

The next direct link is that due to the hardware and software issues and the incapability, it leads to a lack of trust on Technology. Nepal is a slow adaptor of technology in general. Many new services which is introduced in the world come to Nepal late and many people yet do not use it in fear of change and the risks associated with it.

Furthermore, due to the technology not working properly and the lack of knowledge and experience, there is high risk of cyber fraud. First, if the technology isn't properly protected there is a chance of the user's data being available to the wrong people. Also, another reason for the risk of cyber fraud is that people lack the knowledge and experience.

It is evident and clear that risk of cyber fraud and security issues are correlated. Each compliment the other and due to the security issues, there is risk of cyber fraud and also the other way around that due to the risks involved, there is high security issues. Due to the risk of cyber fraud, the government step in creating another barrier while trying to ensure that the payments that are done are free from risk and are visible and not used for money laundering.

With the increase in risk, users will shift to different options like credit and debit cards which offer lesser risks making the competition high. From the total payments made, there is only a mere 2% which is done through digital

payment and from there too 98% is done through the debit and credit cards. With the increase in other medians like debit and credit cards and the regulatory concern which arise from the security issues and threats of cyber fraud which arise from the use of technology and lack of knowledge, the main one barrier which comes around is that there is slow user adoption from the individual's side.

Moving on, in the above Figure, we see a three-party triangular relation between less merchant acquisition, less offers to the users and slow user adoption. These are interrelated.

Finally, all the barriers lead to the final major barrier of payment preference and to solve this barrier, service providers need to focus on the barriers below it and as per the levels hence all their efforts will be unfruitful. Payment preference indicates that with other options like cash and credit/debit cards, individuals prefer it over mobile payments. Even though it provides the benefit of quick cashless transactions, the behavior of the mode of payment of the Nepalese is just cash. This can be traced to less offers given by the mobile payment service providers, slow adoption rate, usage difficulties and less merchant availability.

The major findings from the DDPA that barrier 1 i.e. Regulatory Concern is an autonomous driver. This driver has a low driving power and a low dependence power. The Dependent Drivers are 2,4,5,10,11 and 12. These drivers have high dependence and low driving powers. There are no Linkage Drivers. These have high dependence power and high driving power.

The Independent Drivers are 3, 6, 7, 8 and 9 and these drivers have high driving power and low dependence power. These are the drivers which should be targeted by the management to solve which will lead to other barriers being minimized.

The summary from the interview with frequent users and non-users are that the main places where the frequent users make payments are for recharging phones, booking movie tickets and for online shopping while the main reason for the choice of using digital wallets was its convenience.

When asked about the effect of offers and their relation with the usage, they mentioned that they do look for offers and make an active effort to use digital wallets when there are offers involved. When discussing about the usage difficulties, they mentioned that the initial part of downloading the application, connecting their bank account to the application, filling the KYC form and getting it approved was a hassle.

On the other hand, non-users were worried about the security of the wallets and are not comfortable in linking their bank accounts to these applications as they do not feel comfortable with the use of technology in Nepal. One of the main issues which non-users bought about is the bad customer service and that technology in Nepal is not up to the mark which makes them even more anxious to not try out the new services. If somehow there are any issues, the customer service provided in Nepal is terrible and would take a lot of time leading to users never going back to using that payment.

Finally, the non-users saw no benefit in shifting their payment preference to mobile digital wallets and saw a lot of hassle and hence they refrain from using these services.

Conclusion

The barriers to Digital Mobile Payment Systems in Nepal may be many but if carefully analyzed and structured, decision making can be made systematic which can lead to efficient implementation of the digital wallet in the Nepalese payment system. This requires efforts from both the service providers and individual users but also requires help from external units such as merchants, banks and the Government. If the right barriers are taken care of, other barriers which it leads to may or may not exist. The driving and dependence power of the barrier also plays a big role in prioritizing the barriers which are to be tackled. This ISM model can help the service providers make the best decisions to remove the barriers and encourage cashless transactions and get Nepal digitalize along with help the government to keep the illegal activities in control by getting good polices which are formulated by the right educated people. This way it will help the future business be conducted more quickly, safely and will lead to a larger impact.

References

- Attri, R., Dev, N., & Sharma, V. (2013). Interpretive Structural Modelling (ISM) approach: An overview. Research Journal of Management Sciences, 2(2), 3-8.
- Behl, A., Singh, M., & Venkatesh, V. G. (2016). Enablers and barriers of mobile banking opportunities in rural India: A strategic analysis. International Journal of Business Excellence., 100(2), 209-239.
- Corporate Payments Insights. (2015). Wex. Retrieved April 24, 2019, from Barriers to use of mobile payments: https://www.wexinc.com/insights/blog/inside-wex/barriers-to-useof-mobile-payments/
- Financial Express. (2017). Financial Express. Retrieved April 24, 2017, from 7 key challenges India's mobile wallet industry needs to overcome: https://www.financialexpress.com/money/7-key-challenges-indias-mobile-walletindustry-needs-to-overcome/832911/
- Garrity, J., & Kurd, J. (2015). The future of the mobile wallet: Barriers and opportunities for the next stage of the mobile payment revolution. Retrieved April 24, 2019, from Consumer Pulse: https://www.cmbinfo.com/assets/PR_Consumer-Pulse_MW_2015- min.pdf
- Giri, P. (2013). Payment and settlement system development in Nepal: Hurdles and way out. Economic Journal of Development (15&16), 116-127.
- Hawlk, K. (2019). What is a mobile wallet, and should you use one? Retrieved April 17, 2019, from Credit Karma: https://www.creditkarma.com/credit-cards/i/what-is-amobile-wallet/
- JN, N. (2017). A Case study of barriers to digital financial inclusion of auto-rickshaw drivers in Viman Nagar, Pune, Maharashtra. Journal of Political Sciences & Public Affairs, 5(3).
- Katiyar, R., & Badola, S. (2018). Modelling the barriers to online banking in the Indian scenario: An ISM approach. Journal of Modelling in Management, 13(3), 550-569.
- Ketkar, S. P., Shankar, R., & Banwet, D. K. (2012). Structural modeling and mapping of Mbanking Influencers in India. Journal of Electronic Commerce Research, 13(1), 70- 87.
- Khalti Digital Wallet. (n.d.). Challenges of digital payment in Nepal. Retrieved April 24, 2019, from Khalti Digital Wallet: http://blog.khalti.com/online-payment/digitalpayment-in-nepal/
- Lincoln, Y. S., & Denzin, N. K. (2005). Introduction: The discipline and practice of qualitative research. Thousand Oaks, CA, USA: SAGE Publication.
- Mahindra Comviva. (2016). Barriers to mobile payment adoption. Retrieved April 24, 2019, from Mahindra Comviva: http://blog.mahindracomviva.com/barriers-to-mobilepayment-adoption/
- Martin, J. A. (2016). 7 reasons mobile payments still aren't mainstream. Retrieved from CIO: https://www.cio.com/article/3080045/7-reasons-mobile-payments-still-arentmainstream.html
- Mas, I. (2012). The rich role of mobile phones in financial inclusion. Retrieved April 17, 2019, from The World Bank: http://blogs.worldbank.org/psd/ic4d/the-rich-role-ofmobile-phones-in-financial-inclusion
- Michael. (2013). Top 3 barriers to adoption in mobile payments. Retrieved April 24, 2019, from Mobile Marketing Watch: https://mobilemarketingwatch.com/top-3-barriers-toadoption-in-mobile-payments-32914
- Osafo-Kwaako, P., Marc, S., White, O., & Zouaoui, Y. (2018). Mobile money in emerging markets: The business case for financial inclusion. Global Banking Practice. McKinsey & Company

- Raj, T., Shankar, R., & Suhaib, M. (2007). An ISM approach for modeling the enablers of flexible manufacturing system: The case for India. International Journal of Production Research, 46(24), 1-30.
- Sage, A. P. (1977). Interpretive structural modeling: Methodology for large scale systems. NY, New York, United Stated of America: McGraw-Hill.
- Shah, Z. A. (2017). Digital Payment System: Problems and Prospects. International Journal of Economic and Business Review, 5(8), 194-201.
- Tamrakar, A. M., & Sudhindra, S. (2014). Barriers to green supply chain management in Indian construction industry: An interpretive structural modelling approach. Research Journal of Social Science and Management, 4(4), 129-140.
- Timsina, A. (2019). Top mobile wallets, online/digital payment providers in Nepal. Retrieved April 17, 2019, from Nepali Telecom: https://www.nepalitelecom.com/2019/03/topmobile-wallets-online-digital-payment-providers-in-nepal.html
- Warfield, J. N. (1974). Developing interconnected matrices in structural modeling. IEEE Transcript on Systems, Men and Cybernetics, 4(1), 81-87.
- Weblink Nepal IT Institute. (2018). Online payment gateway in Nepal. Retrieved April 17, 2019, from Weblink Nepal: https://www.weblinknepal.com/blog/4/online-paymentgateway-in-nepal.html

ICT Technology and its Impact on Public Services in Andhra Pradesh

(A Study with reference to the emphasis on Digital Technology on Public Services)

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Abstract

According to Pearl Zhu "The digital organization has a hybrid nature with flexibility, agility and innovativeness". At present the State of Andhra Pradesh heading towards a significant milestone in digital transactions, the value of card usage has tremendously increased the usage of ATMs, POS, volume of transactions, etc. by end of May 2019. Thus, there has been a significant improvement as far as digitalization is concerned during the last decade. Similarly, the virtual payment address nearly 91 per cent of millennial today own and are in close contact with their smart phones throughout the day. Most of the studies revealed that the consumers are currently making over $5 billion worth of purchases from their androids. The earlier researchers find out that the numbers will reach $ 35Billion in just recent years.

Now, India needs faceless, paperless, and cashless has one of the professed roles of technology innovation. More particularly, our state has a knowledge Hub and imposes several digital services for promotion of quick and prompt and quality services to rural and remote areas through me-Seva, CFMS, RTGS, e-Office, etc.

The present paper made an attempt to evaluate the digital services for various departments of Govt. of Andhra Pradesh towards reaching the Vision 2050 with an aim to promote quality, promptness, accurate, adequate and trust of services through e-governance and information technology with due weightage to the employee and public relations in the state.

Key Words: *Digitalization, e-Office, Me-Seva, Spandana, e-Attendance, e-Pass, e-Poss, Video Conference.*

Introduction

The development of technology reflects upon many fields of facts, including science, engineering, mathematical, linguistic, and historical knowledge, to prove practical result. As a result of fact, technology is often a consequence of science and engineering, although technology as a human activity precedes the two fields. In the words of Albert Einstein "It has become appalling obvious that our technology has exceeded our humanity". Really, digital technology use technology to create new worth in business models, customer experiences and the internal skills that support its basic operations. The term includes both digital-only brands and traditional players that are transforming their businesses with digital technologies.

Review of Literature

Chinnamanaidu Jammu & GV Chalam (2019) made an attempt on to evaluate the various digital services towards vision 2050 to promote the quality, promptness, accurate, adequate and trust of services by e-governance and information technology to develop and promote employee relations in tribal areas in the select areas of Andhra Pradesh with quick services rendered to public through employees with the help of digital technology in tribal community.

Lissa ilomaki and minna lakkala (2018) studied digital technology enrich the leadership styles, easy learning methods while smooth administration in schools. In their study, they made an attempt on the collegial practice transfer process between more- and less-experienced teachers to encourage teachers to use information and communication technology (ICT) in a pedagogically meaningful way. They concluded that the technology use was

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successful in collaboration, knowledge construction and meta-cognition than their more-experienced colleagues.

Dr. Giridhari Mohanta, Dr. Sathya Swaroop Debasish , Dr. Sudipta Kishore Nanda (2017) paper is to focused the impact, challenges of digital India on several aspects of governance and improvement in the quality of life of citizens. The study stress to an optimistic thought of providing more employment prospects for the youth which will boost the nation's economy if it comes into reality.

James Chauvin and Marta Lomazzi (2017) focus Digital technologies are now part of our daily world. The challenge is to demonstrate their impact on health and health equity, and, if effective, to promote their adoption and use. The use of health-related digital technologies has skyrocketed over the past two decades. They have the potential to transform not only health care but the way we live. Within the public health domain, digital technology is used among other applications to improve immunization uptake and coverage, to deliver medicines to remote clinics, to encourage and help people adopt healthier lifestyles, to monitor the environment and to improve civil registration.

Shamsher Singh (2017) focus his study Increasing use of internet, mobile penetration and Government initiative such as Digital India are acting as catalyst which leads to exponential growth in use of digital payment. Electronics Consumer transaction made at point of sale (POS) for services and products either through internet banking or mobile banking using smart phone or card payment are called as digital payment.

Premchand & Choudhry (2015) identified the world payments system is gradually changing from coins and paper based money to electronic forms that provide more convenient, fast and secured process of making payments among individual and organizations. In the modern society, no economic activity is possible without payments and settlements. In this sense, it could probably be said that payment systems are one of the most imperative and significant social infrastructures that we have. E-Payments are an increasingly important part of payment systems as they allow for quick international connectivity in the payments world. In this paper, they discussed about the basic payments infrastructure, future of e-Payments as well as challenges and recommendations for e-Payment systems of tomorrow.

Mohamad, Haroon & Najiran (2009) studied transactions are constantly shifting from cash-based transactions to electronic-based ones. The e-payment system is increasingly becoming a daring means of payments in today's business world. This is due to its efficiency, convenience and timeliness. The study employed an extensive literature search on e-payment adoption with the aid of Google Scholar for those recent studies between the years 2010-2015.

Need of the Study

Against this background, now an attempt is made to discuss being an innovative state of Andhra Pradesh, which faced several changes in science and technology. Therefore, this paper will take- up the issues relating to the usage of different types of digital techniques and tools in the governance and their impact on the public services in the new state of Andhra Pradesh and its linkage to the implications of various sectors in Indian economy.

Statement of the problem: Andhra Pradesh is a knowledge hub while advance technology promotes transparency with the help of public relations to render better quality of public services.

Scope of the Study: To study the various digital services and their impact in terms of transparency, accountability and e-governance and by way of quality and quick services to the public and promote the economic and social equality to provide the opportunity.

Research Methodology

The paper is based on secondary data. The data has been collected from internet and the RBI bulletin and various published journals and articles related to technology and management.

Scope of further Study: The study focused few department public services remaining department services like ICDS, Housing, Horticulture and industries, etc.

Objectives of the Study

- To evaluate the impact of public relations with the help of digitalization of administration.
- To analyze the different types of digital techniques and tools for the impact on the public services in Andhra Pradesh.
- To examine the minimize time lag with quality services to general public with digitalization.
- To suggest measures for promotion of efficiency of employees through digitalization in the administration.

Limitations of the Study

The study has wider concept considered only few basic department public services. As it is a new dream project much more data are not available and with the limited data this descriptive and analytical research has been made.

Implementation of Digital Technology in Andhra Pradesh Government Administration

Educational Services

(i) Education Department: usually digital technology helpful teachers besides pupils in teaching learning process. However, it helps class room learning while beyond the class, which means global knowledge. Objective of our state has a knowledge hub; people have well aware utilization of technology in teaching such as establishment of digital class rooms, virtual class rooms, offer on line courses, apps, ALA schools and online counseling etc with use of satellite. It can reduce work load of teachers while promote quality of education with maximum utilization of technology with minimum cost. In the first stage arrange 4000 digital and virtual class rooms in 13 districts in the state connected with fiber grid. The technology reduced teachers work in preparation and presentation of teaching learning material while use of audio visual lessons with subject experts for promotion of learning abilities and international standards.

(ii) On-line Examinations: It is an innovative method of computerization of examination system though online without use paper pencil test in our state. It has conducted easily and evaluated on reliability basis and available response sheet for candidates on specific login with check their choosing answers in the examinations. For instance Govt. of Andhra Pradesh conducts first online examinations on DEE CET 2016, now the system adopted by APPSC in various examinations.

(iii) On-line Courses: Now, Our education system adopts on line admissions, enrollment, digital/ virtual learning and finally attend online exams without physical presence of candidate with the help of digital advanced innovations.

Health Department

Our state has implementation of digital technology in medical and health services in various modes such as digital blood/ urinal testing equipment, digital x ray, scanning, endoscopy etc.,

(i) **Digital Blood Banks/DNA Banks:** Now, blood banks adopt advanced technology for processing and storage of blood/ DNAs for long period without spoil or damage. The technology serve number of beings in severe conditions happened. For instance, stem cell technology is an advance stage in Andhra Pradesh.

(ii) **SMS Alert:** Now, technology aware patients needs viz., dosage of medicine, precautions, available medical stores in nearest places, level of health conditions, and status of patient's conditions, nutria food requirements with calories with the help of IOT mode.

Planning Department

(i) Automatic weather rain gauge stations: Now, metrological department establish automatic weather rain gauges in all mandals of Andhra Pradesh. It can measure rain and weather conditions sent details through sensor technology. It can process, analyze data and made reports online mode according to our needs. However, measuring of seasonal conditions in our state entire process taken by automatic machines without physical man power required.

(ii) E-surveys: Government of Andhra Pradesh implementation of app oriented surveys in our state like Smart Pulse survey, 7th Economic survey, Election enrollment etc.

(iii) e- Attendance: This also popularly known as biometric attendance, it has one of the real innovations on technology implemented by Government of Andhra Pradesh. It can authenticate by real employee with the identification recognized by Aadhar. It discloses the information about when and where the employee attended office. In this regards 40 departments enrolled and adopted the system in our state.

(iv) Computers: It is common technical instrument in each and every office in Andhra Pradesh. It is an electronic device stored data, analyses data and presented data whenever required quick and fast. This is basic device for use of internet and other office work done in proper time. However, bulk files are stored easily and safely with system or hard disc. Searching of files easily and quickly whenever required. Scanning, texts, PDF, JPG, and Images are sent though mail with personal computers.

(v) E-Office: e- Office which recognized the long term need for competence in government procedures and service delivery mechanism. Thus e-Office has a core mission mode project (MMP) monitor the national e- Governance Plan (N e G P) implemented by The Government of India. It constitutes that this MMP has the potential of target over 2 lakh consumers. This MMP aims at significantly improving the operational efficiency of the Government by transitioning to a neither "Less Paper nor paper Office.

Objectives of machine mode project:

- To evaluate effectiveness and reliability of government response server
- To ease time lag and to meet the needs of the citizens charter
- To provide for effective resource management to improve the quality of services
- To minimize processing delays
- To establish transparency and accountability
- To promote efficiency of employees.

Rural Development

(i) YSR Pension Kanuka: It is a prestigious scheme implemented by our state with link up to UIDAI for pension holders for elimination of fraud and in eligible pension holders. The primary objective of state Government subsidy or monetary benefits to wards real beneficiaries with the use of new technology i.e. direct beneficiary transfer in welfare schemes. Jandhan, Mobile banking and Aadhar based payments adopted by our state government with implementation of Technology. In this regards more than 40 lakh of pension holders' survival accurate and adequate payments within 5 days of span with the help of technology.

(ii) **JAM:** It has related to MGNREGS scheme connected with IOT for prompt payments to workers engaged in respective places. The app collected details of beneficiaries, work allotted details and transfer of funds to real workers without interferes of politicians' mediators and other unnecessary personnel.

(iii) **E- Sanitation:** Now, Government focused sanitation growth with the help of technology for increasing environment protection. However, entire houses in urban areas attached GPS system, which identified segregation of wastage, cleaning the roads and drains and their status can supervised at office.

Information Technology: It has prominent development in our state since 1998such as Responsibilities of IT department.

- To provide Computer orientation support
- To arrange the business computer network and database system
- To establishment of business software deployment
- To preserve the information security

Limitations:

› Heavy Expenditure incurred

› High skilled professional required

› creates un employment for unskilled labour

› lack of sources available

(i) **Cloud Hub:** It is one of the greatest data centers maintained by the state of Andhra Pradesh. It can commence with a part of e-governance which ultimate objective of the centre preserve huge data in a centralized process server with required standards in computer applications when minimized cost. It can protect data safely for period besides available whenever necessary by our state needs.

(ii) **Internet of Things:** It is a prestigious first and prominent technological instrument implemented by our Government. It can link up several departments such as public distribution system, e-pass machines, pension distribution, and MGNREGS wage payments besides observation of biometric attendance of PHCs, Gram panchayats and schools in Andhra Pradesh. Moreover, review of working conditions and maintenance of LED lights at CM chamber while connected more than 10 lakh IOT centers of Andhra Pradesh.

(iii) **ROM (Real Time Outcome Monitoring):** It can connect all departments in the state which operates with the help of online app. It can assessed GSDP (Gross State Domestic Product), Gross Value Added (GVA) and IPP while evaluate family development with society development target determine by Government of Andhra Pradesh by vision 2029.

Progress of Internet usage in India

India is an innovative digital making country in the world. It can prove the following below table.

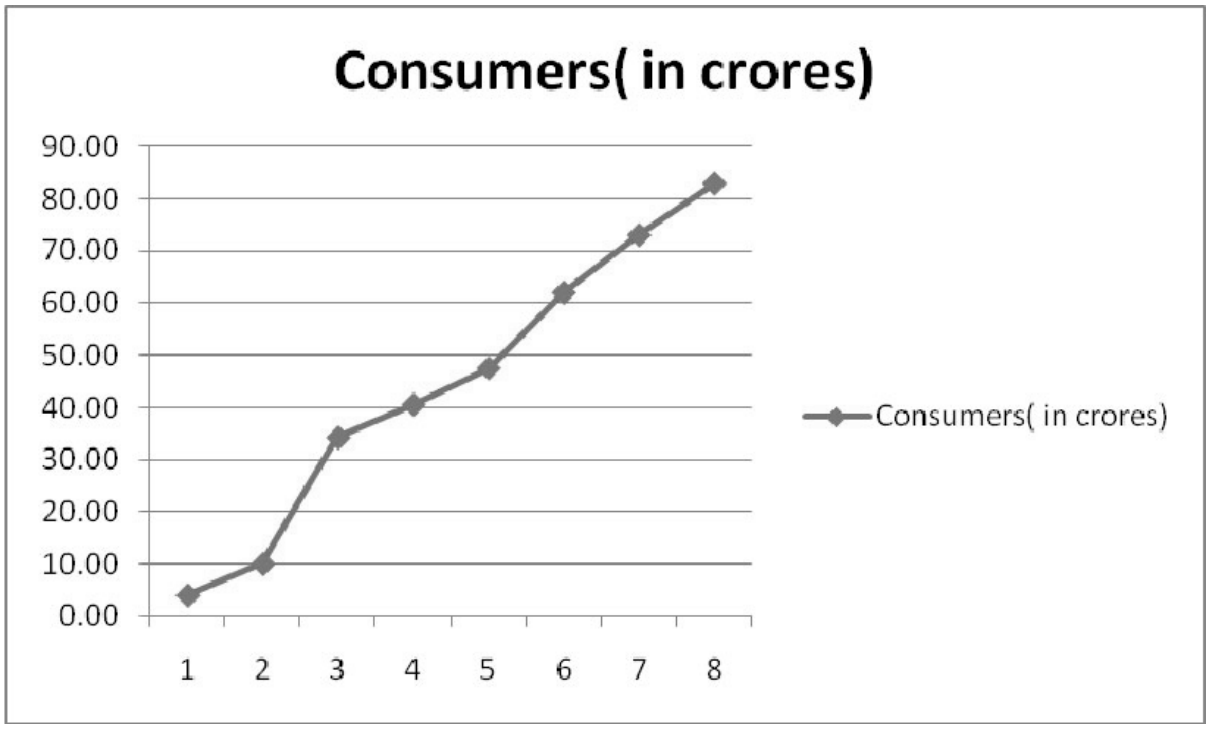
Table -1.1.1: Distribution of Internet Consumers in India

Year	Consumers (in crore)
2005-2006	4.00
2009-2010	10.00
2014-2015	34.20
2015-2016	40.50
2016-2017	47.50
2017-2018	62.00
2018-2019	73.00

Source: Trai.com

Table-1depicts the data on the consumer progress of internet usage in India. It can be seen from the data in table-1 that only 4 crore consumers are used the internet in the year 2005-06 to rose to 73.00 crore internet consumers by the year 2018-19. It reveals that during the last 14 years period it was gone-up to 18 times usage of the internet in our country.

Figure-1.1.1



(I) Fiber Net: It was force in to 2013 in our state Andhra Pradesh fiber grid project for rendered broad band, digital and fiber net services at lower cost. However, 370000 electrical poles used for33 KV sub stations with 2449 point of presence are connected optical fiber cable 23800 KMs around 13 districts in the state. In this regard, State wide control centre establish at Visakhapatnam while covers 85 percent of people in the grid. According to apsfl 2449 pops covered with distance of 23553 kilometers.

Table-2: Packages of APSFL						
Sl.No	**Name of the Package**	**Channels**	**Internet**			**Cost in Rs (Excluding Taxes)**
			Speed	**FUP Limit**	**Speed Post FUP**	
1	Basic	250	15 Mbps	15 GB	1 Mbps	149
2	Home Essential	250	30 Mbps	50 GB	3 Mbps	299
3	Standard	250	50 Mbps	100 GB	5 Mbps	399
4	Premium	250	50 Mbps	200 GB	10 Mbps	599
5	Basic	Institutions / Private Offices	100 Mbps	300 GB	1 Mbps	999
6	Standard	Institutions / Private Offices	250 Mbps	600 GB	2 Mbps	1499
7	Premium	Institutions / Private Offices	250 Mbps	1024 GB	3 Mbps	2499

Source: apsfl.co

(ii) Triple-play services:

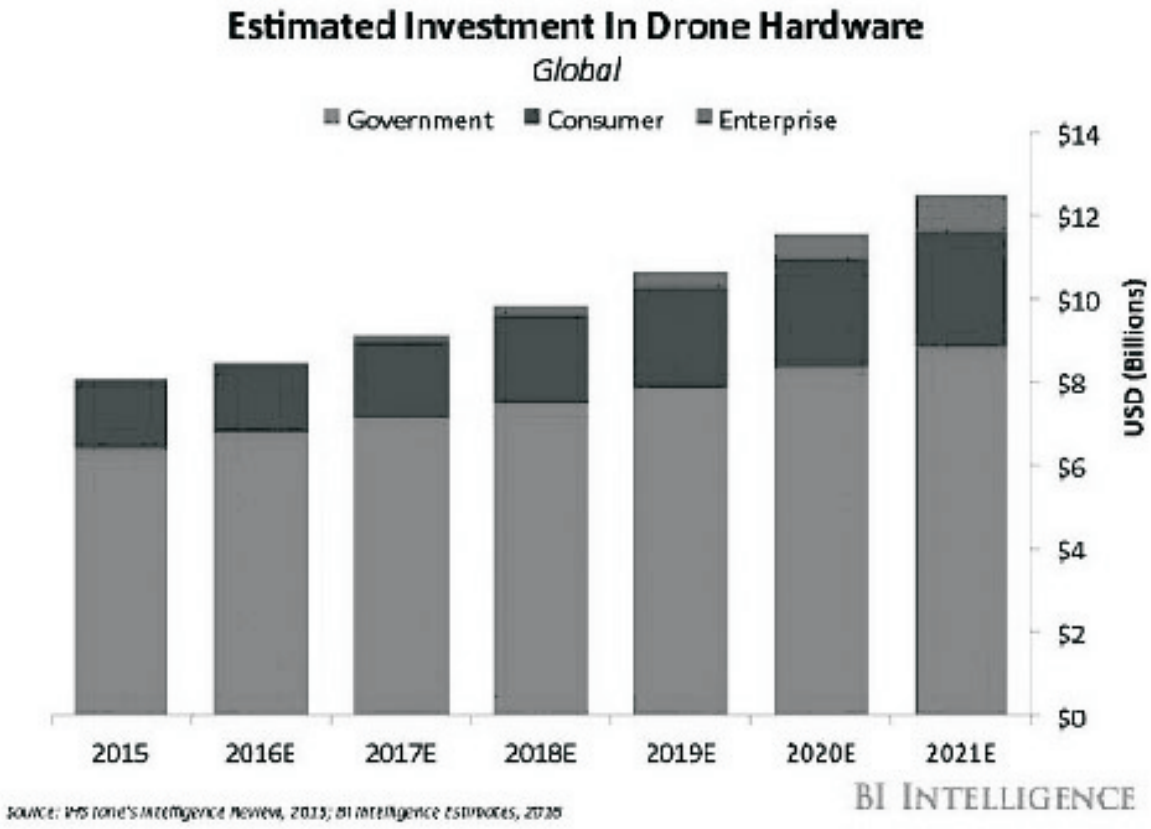
It provides 15 MBPS for houses, 100 MBPS to 1GBPS internet services to business and trade centers and other organizations with connectivity of broad band with collaboration of BSNL.IPTI provides 250 channels with video conference, recording with app store facility along with free land phone connection available.

ICT Technologies in Usage:

(i) CCTV Surveillances project: The CC cameras are connected with fiber net centers of Visakhapatnam, Amaravati and other major cities with control of RTG centre. The centre collects 13 districts data and processed and observed in 3 stages. The arrangement of CCs is served to police, crime and other disaster management authorities regularly.

(ii) Drone Technology: drone is a flying robot that can be remotely controlled or fly autonomously through software-controlled flight plans in their embedded systems, working in conjunction with onboard sensors and GPS, which can useful tribal and interior narrow places. However, exploring the latest drone technology implementation towards commercial, industrial, military and other purpose both urban and rural places.

The services utilized by 5 main organizations such as agriculture, transport, protection, basic and infrastructure sectors in our state. However, drones were early mapping to Tirupati and Kakinada cities in other cities in our state.



(iii) Public Wi-Fi: It can connect with fiber net create public Wi-Fi in cloud and rush areas in the state. For instance Agricultural College Bapatla has been implemented in pilot project. Thus, Wi-Fi utilizing institutions pay only 42 percent of cost to fiber network centers in our state. However, Government established Wi-Fi facility to all public service institutions of our state.

(iv) Free Space Optical Communications (FSOC): This system constitutes not possible fiber net cable areas creates internet facilities used advanced technology within 20 kms distance without any connectivity and 20GBPS mode. In our state can used the technology in general elections 2019 in remote areas of Andhra Pradesh

(v) Androids: These devices supplied to all employees while provide with sim cards in our state. These are working like smart phones such as apps, videos, camera, sports and games and internet usage in mobile phone. It can freely communicate either written or oral communication whenever necessary. It reveals strong relations in employees without the scope of leakage of secrets and conferential matter with less effort, which requires higher capable persons for handling these devices.

(vi) E-mail: It can frequently use popular method communicates both employer and employee in government offices. However, bulk messages, huge number of sheets of text matter transmits immediately with use of internet while accurate and prompt delivery to recipients in box and senders send box safely and referred whenever necessary.

(vii) **Mobile:** It can rather than land phone, which can carry easily and directly communicate to field staff discuss and directions are promptly without difficulty. However, the device most frequently used both oral and written communications in public service institutions of our state.

(viii) Apps: It is one of the latest technologies for collecting and uploads data process and analyzes and submitted to server for defined object. It can easy operate on selective mode with choice of options. In fact, Smart Pulse Survey is one of the app collected huge data and process and submit immediately to the server conducted by Government of Andhra Pradesh, which has several versions in 2016 onwards.

(ix) SMS: It is one of the largest written texts in briefly communicate to employees within seconds of sent message. Bulk messages and group messages are sending easily and quickly to all employees whenever necessary. Banks are alert their customers for alert of his/her accounts details and health alerts are popular in Andhra Pradesh.

(x) Software: It has a set of instructions/ programs instructing to computer to do specific tasks designed by specific objective. In fact software is a common term used to describe computer programs rather manual. Moreover, scripts, applications, programs and a set of instructions are all terms frequently used to prescribe software.

Revenue Department:

(i) e- Pragathi: This is one of the advanced technological innovation core 2.0 adopted by our state Government especially promote and aware people for achieve progress of the state. It serve to quite a lot of services rendered such as maintenance and working conditions of street lights, agriculture, levels of ground waters, rainfall, health, PDS and pension distribution detailed data connected all departments and analyzed regularly by subject experts with custodian safety mode. Finally, it can assess departmental wise progress with allotted targets in respective departments and sections in our state.

(ii) e- POSS: It is public distribution system linked with UIDAI for biometric authentication for supply of essential commodities to poorer section house holders belongs to white ration card. This system has firstly implemented by our state government. In this purpose Government provides e-Poss machines to dealers for benefits to real beneficiaries and avoids wastage and malpractices of distribution of commodities while accurate measurements also registered in the machine. The major benefit of implemented electronic machine save commodities to Government due to unofficial house hold card holders, duplicate card holders and died holders. It has an official record of distribution of subsidy commodities to 3.6 crore beneficiaries in our state.

(iii) Video Conference: This is one of the popular modes for communicate offices in the state, which has two-way communication system between employer and employees. It reveals time consuming, cost saving, direct contact between two parties without any ambiguity and promote employee relations in the state with prompt communication. However, which has required huge amount of capital expenditure is major limitation.

(iv) Tele-Conference: This is one of the popular and wider audio communicated devices to connect huge number of mobile holders at a single time in our state. It can easy operate and discuss regular and routine work with bulk number of recipients in low cost without efforts.

(v) Digital Certificates: It is one of the most and trustable device used digital signature for issue certificates with a special barcode and easily identified logos and symbols on certificate. It can apply online system at anywhere in a separate portal while issuing authority can check either approval or reject due to sufficient cause. The verification of certificate online and barcode and issuing authority details on the certificate. Now, UGC can propose issue digital certificates for graduates' onwards.

(vi) Mee-Seva: It is one of the latest digital methods of issue number of certificates such as income, caste, birth and death certificates etc. However, Mee-Seva services thorough online without contact between issuing authority and applicants. It can disposal within certain limit of time i.e. service level agreement SLA. A service-level agreement has a contract between a service provider and its internal or external customer's services provider with in limited period. On the contrary will furnish and defines the performance standards the provider is obligated to meet other wise called as beyond SLA.

(vii) Grievances:/Spandana: It is a plot form between clients and solving authority. Grievance Redressed System which receive applications from object objectionable clients either solve or rejected with in specific time and norm, which grievances reported by suffering customer either private institute or

public citizens accessing a government (G2C) service. Grievance Redressed may be handled directly by institutes either own websites or help of call centers for processing.

(viii) Call center Grievances: It is one of the recent electronic grievance redressed mode introduced by Government of Andhra Pradesh. However, solve beneficiaries' problem within 72 hours by concerned authority.

(ix) Spandana: An integrated Grievance system is proposed to Register, Track and Redress the grievances received at CMO / SECYs / HODs / District Collect orates / District and Mandal level Offices on a common platform linked with UID number of the petitioner with proper accountability while automatic escalation/SMS/Mails. However, dedicated call centers for 100 percent quality audit of redressed grievances with facility to register grievances over Online and phone.

(x) Real Time Governance Services: The ultimate objective of constitution of RTG centre in the secretariat, could watch the progress of field level functionaries with implementation of e-governance. AP fiber and e-Pragathi supported to Real Time Governance. Government of AP establishment of RTG centre which is one of the largest centers in Asia. It has observed at a time of biometric attendance, virtual reality, machine learning technology and call centers information with large screen in which 66 feet. However, tech serves also directed the officials to plan a platform that will bring all the departments under e-Pragati, a holistic and coherent framework designed to propel the state into a developed state by 2029 and country's first state wide enterprise architecture initiative. The RTG which is a comprehensive communicative instrument technology link up to various departments with employees details and their work performance index determined by problem solving of public grievances with implementation of Artificial intelligence in Andhra Pradesh.

Banking Services

Digital Payments: Cash payments creates some ambiguity and secrecy, which realized cashless transactions like, NEFT, paytm, RTGS, POS and mobile banking creates quick, prompt and accurate payments in beneficiaries. It can serve official record of evidence in future reference. Now, check and prevention of fraud and misplacement of various payments of clients with the help of digital technology in Andhra Pradesh while minimize cost.

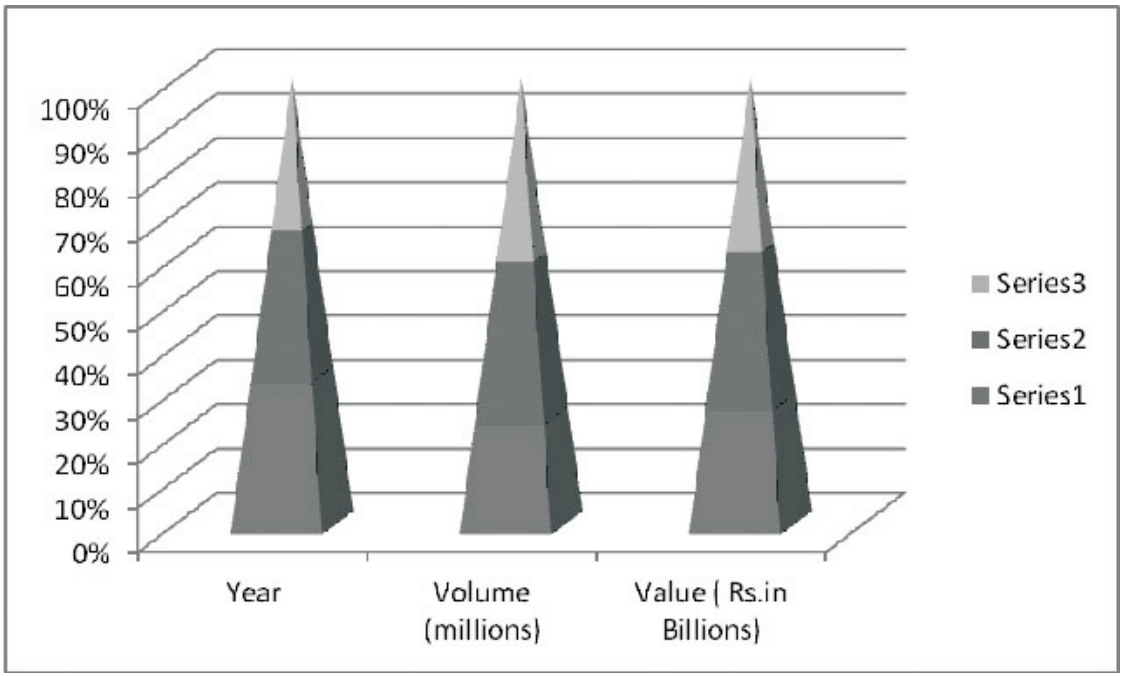
Table-3

Statement showing the details of electronic payments in India		
Year	Volume (millions)	Value (Rs.in Billions)
2016	671.5	94004.2
2017	998.5	121047.1
2018	1122.3	131980.8

Source: npci.org.in

Table-3 explicit the volume and the value of digital payments of India during the period i.e. 2016 to 2018, it can evidence of the table increase 671.5 to 1122.3 millions of electronic payment transactions registered during the period 2016 to 2018.It can trace out the table also increase 94004.2 to 131980.8 billion of rupees during the study period. It can be concluded that up words trends of both volume and values of digital payments transactions instead of cash mode of transactions.

Picture-2: Block Chain Technology



The state was leading in e-governance; it can adopt block chain technology to address cyber security matter. Recently, Government of Andhra Pradesh has been launched pilot projects in two fields i.e. land records and transport. The technology was required to prevent tampering of land records, which had already been digitized at web land and placed online whenever necessary. However, the same technology is cast-off in Transport Department to restructure titles of the vehicles.

(i) Immediate Payment Service (IMP): An IMP is one of the drastically innovative methods of payments in the world. The system has played a vital role in quick payments. As a result of IMPS and UPI methods promotes 24 billion of transactions in India for promotion of transactions in our economy. In our state has been advance in the payment mode.

(ii) Mobile/Net Banking: India is the third place for use of internet in the world. Around 30 crore of internet consumers in India, out of which 50 percent of consumers used mobile banking used for payment of financial transactions estimated by IDC financial institute. Moreover, large number of mobile banking customers utilized the service with their androids. For instance, paytm, UTS apps are most popular in net banking modes in Andhra Pradesh.

(iii) Point of Sale: It has a popular method of payments in commencement of demonetization in our state. It promotes prompt payment with follows speed and accuracy. It increase number of transactions various payments like electricity consumption bills, water tax and other legal payments, POS machines creates a great platform rather than ATM Machines when commencement of demonetization.

(iv) ATM/ debit card: Automatic Teller Machines are popular for using both debit and credit cards for payment of financial transactions, which drastically innovative method of payments in financial sector. The positive impact for establishment of number of bank branches in rural areas and credit deposit ratio of banks (proxies of financial inclusion) on significant growth of GSDP in the economy. Whereas, one indicator of financial inclusion, ATMs growth rate has been reveals a statistically significant impact on state GSDP.

Transport department

(i) **GPS (Global Positioning System):** It is also known as Navstar GPS that provides geo location and time information to a special receiver in all weather conditions, anywhere on or near the earth where there is an unhindered line of sight connected to four or more GPS satellites. For instance, APSRTC live tract play huge role where your bus standing/ travelling easily visit by passengers round the clock and sand policy of Andhra Pradesh also adopts GPS system tracking for travelling vehicles.

(ii) **Track App:** Now, APS RTC introduced live track app for search the bus where running and analyze late period and schedule and actual arrival and departure on a particular station of vehicle identified by passenger with their android phone with internet connection.

(iii) **Online Reservation:** APS RTC implementation of online advance reservation facility for on line payment without physically attends any bus stations/ agencies at anywhere.

Agriculture

(i) **e –Crop:** Now, Government of Andhra Pradesh implemented technology in agricultural sector in the forms of e panta, soil sampling ,pest control, techniques of plantation linked to GPS geo co-ordinates, which reveals increase productivity minimize wastage in primary sector of our state. However, new and latest technology implementations such as sprinklers, center pivot irrigation, hydroponics and micro spray heads from hand tools and power tools to tractors and the countless kinds of farm implements that they tow or operate.

(ii) **Soil Tests:** The objective of Government Agricultural development, which implementation of modern trends and technology modes such as drip irrigation, spinnakers, form plantation, high yielding verities with suitable soil conditions displayed by soil cards issued by Agriculture department.

(iii) **Machines:** Our cultivation modes changed from man made to machine made. However, it helps from tilling to post harvested. For instance tractors for tilling operations, while harvested machines for harvested without physical use of unskilled labour with in few minutes than manmade harvest.

(iv) **e- NAM:** It has an electronic market either buy or sale of agricultural products in a fair price to real farmers in the country. The farmer can observe different prices in different places are quoted; hence he can sell higher price at their quality products.

Conclusion:

- The present study emphasized the impact of relations with implementation of new and innovative technology. A famous quote depicts “When an individual who feels appreciation will always produce more than what is targeted”. There are perspectives of the relationship assessed three consequences.
- The technology more helpful in enrich of employee relations along with general public. The quality of public relations is difficult to determine and the criteria by which it may be assessed are influenced by digital mode. The present study assessed the notion of a public relations system and the various electronic devices depend upon the implementation of technology level.
- Finally conclude that performance level of organization determines the healthy employee relations between the employer and the employees' major element digital mode especially Government employees are public servants rendered quality of services without delay otherwise Government can force in to employee, it reveals disturb good relations which can relaxed with the assistance of digital based services in the society.
- Most of the employees frequently used what sup, face book, telegram, twitter, in star gram people first mobile append Kaizal apps in work place and improve positive relation between employee and employer i.e. public relations. Moreover, the impacts of public relations cope up with the help of quality of digital services in Andhra Pradesh with support of UIDAI connectivity. SWASH, spandana, CMO,prjavedika,

prajasadikara survey, smartcities, sustainable development, prompt online payments etc. researched beyond the target with help of electrical support utilized pertain to well relations between Government and employees along with public relations in our state.

Suggestions:

- To enrich internet accessibility.
- To spread over technology to rural areas.
- To promote skills of employees with implementation of training.
- To upgrade skills of employees towards technology.
- To utilize technology promptly with maximum extent with minimum cost.

The success of public relations depends upon the skills of utilization with technological innovations, it promotes level of quality of services to public while reduce disputes and promote morale of public servants.

References:

- Beer M, Spector B, Lawrence PR, Quinn Mills D and Walton R (1984) Managing Human Assets.New York: Free Press.
- Blyton P and Turnbull P (2004) the Dynamics of Employee Relations. (3rd edn). Basingstoke: Macmillan.
- Chinnamanaidu Jammu & GV Chalam "Dynamics of e-Administration in Tribal Andhra Pradesh (Emphasis the Impact of Digital Technology Implementation ITDA KR Puram, West Godavari, A. P)" International Journal for Research in Applied Science & Engineering Technology Vol.7(VI), June 2019
- Guest D (1987), Human Resource Management and Industrial Relations. Journal of Management Studies, 24 (5), 503–521.
- Guest D and Conway N (1999) Fairness at Work and the Psychological Contract. London: IPD.
- Herzberg F (1966) Work and the Nature of Man. Cleveland, OH: World Publishing Company.
- Kapur, D., & Ramamurti, R. (2001). India's emerging competitive advantage in services. The Academy of Management Executive, 15(2), 20-32.
- Lakkala, M. & Ilomäki, L., (2015), In : A Case Study of Developing ICT-Supported Pedagogy Through A Collegial Practice Transfer Process, Computers & Education, December, 1-12.
- Kersley B, Alpin C, Forth J, Bryson A, Bewley H, Dix G and Oxenbridge S (2005) Inside the Workplace: First Findings from the 2004 Workplace Employment Relations Survey (WERS 2004). London: DTI.
- Legge K (1995) Human Resource Management: Rhetorics and Realities. Basingstoke: Macmillan.
- Marchington M and Wilkinson A (1996) Core Personnel and Development. London: IPD, 223.
- Maslow A (1943) A theory of human motivation. Psychological Review, 50, 370–396.
- Quibria, M. G., & Tschang, T. (2001). Information and communication technology and poverty: An Asian perspective (No. 12).
- Sharma, S. K., Lama, V., & Goyal, N. (2015). Digital India: A Vision towards Digitally Empowered Knowledge Economy, Indian Journal of Applied Research, 5(10).
- Anshu Premchand & Anurag Choudhry (2015), Future of Payments – e-Payments, International Journal of Emerging Technology and Advanced Engineering Vol.5(1), January, 110.

Testing for Exchange Rate Bubbles using the Recursive Flexible Window Methodology Case Study: US Dollar / Indian Rupee

Swarna D. Dutt* Dipak Ghosh**

Abstract

Identifying and dating financial bubbles in real time is in the forefront of current empirical research. Their accuracy provides very useful "warning alerts" to central bankers and fiscal regulators with real time data. But the complexity of their nonlinear structure and the inherent sudden break mechanisms makes the econometric testing challenging, to say the least.

The new recursive flexible window methodology provided by Phillips, Shi and Yu (2015) gives consistent results and delivers significant power gains when multiple bubbles occur. It successfully identifies the well-known historical episodes of exuberance and collapse.

Following the economics literature closely, we see a lot of interest in detecting exchange rate bubbles, but it is missing for a major currency, namely the Indian Rupee. Hence as a first step, here, we want to apply it to the US / Indian Rupee, over a long period of time.

Introduction

History is replete with incidents of financial crisis, which ex-post become a wakeup call for policy makers and the people. Again and again it was stated by experts that the present crisis was preceded by "asset market bubbles" and / or "excessive credit expansion." But the fact of the matter remains that we do not have good quantitative markers which can ex-ante indicate the genesis of a momentum being built in the asset / credit markets which may lead to a catastrophe down the line. Thus we had to accept that there was no practical way to identify the "red flags" of a crisis. Thus the task at hand is to try to decipher possible quantitative markers from the data, that a speculative bubble is probably taking shape. In the economics literature we have multiple tests to detect ex-post the crisis, and then explain it. But there was no test to ex-ante identify the origination of a bubble which is in the making.

Phillips, Wu and Yu (PWY henceforth, 2011) presented a recursive method to detect exuberance in asset prices in the early detection of bubbles. The next step in the evolution of these detection tests was to create the one that could decipher multiple bubbles in the same sample period. This is where the Phillips, Shi and Yu (PSY henceforth, 2014) research comes into effect. This paper offers the first powerful and credible "quantitative metric" to detect exuberance in financial data, right where it is originating. PSY (2014) presents a recursive econometric technique to detect / test / date financial bubbles in the same sample data, and separate them when multiple bubbles are present. Here the authors extend on their (PWY, 2011) methodology, which is based on a sequence of forward recursive right tailed ADF unit root tests, using the Sup ADF (designated SADF) measure. This process allows for a dating strategy to identify the origination and termination dates of a specific bubble. This is achieved by using "backward regression techniques."

But what if there are multiple bubbles, originating and decaying in sequence over time. Here PSY (2014) present an extension of the SADF tests, in form of a generalized SADF called the GSADF method. It includes a recursive backward regression technique, to time identify the origin and collapse of bubbles. This sequential test works in deciphering multiple bubbles from explosion to collapse, and separate them over time. They apply it to the S&P 500 stock market data from January 1871- December 2010. It has been able to identify all the historically documented bubble episodes, like the 1929 crash, 1954 boom, 1987 black Monday and the latest dot-com bubble.

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In section 3, we apply the PWY test, the sequential PWY test and the CUSUM test, and do an extensive examination for the presence of multiple bubbles in the US Dollar-Indian Rupee exchange rate, in a data set of over one century. This should be able to pinpoint all of the upheavals (bubbles if you will), since this is a long enough time period. Section 4 contains some concluding remarks.

The idea is to identify bubbles in real time data and then look for the "markers" identifying those bubbles / episodes of market exuberance. The problem is that the standard ADF test can identify extreme observations, but cannot separate between a bubble phase observation from one which is part of a natural growth trajectory. Thus ADF tests may result in finding "pseudo bubble detection." So, how to make this distinction is the major contribution of this PSY (2014) test. The authors run backward sup ADF or backward SADF tests, to improve the chances of deciphering a bubble from a growth trajectory. The recursive test means running SADF backwards on the same sample.

Literature Review: (A)

We start with the state of the Indian Rupee (B) (INR, henceforth), which has been the worst performing currency in Asia, losing more than 12% against the US dollar compared to the beginning of the year (2019) and registering a historic low of 72.7 against the USD in September of the same year. Popular belief is that the authorities will step in with "intervention methods" and try to stop the free fall. The truth is that this is not a first for the INR. To discuss recent history, over the last half a decade (or so) the INR has experienced demonetization (consequently falling 3% depreciation against the USD.) Then there was the oil price spike, which according to Middeldorp, Groenewegen and De Vreede (2018), resulted in a 2-3% drop in the INR. Thus there is the possibility of intervention by the Reserve Bank of India (the country's central bank) on the currency market in which they will buy local currencies in order to swap them for foreign currency (e.g. US dollars) on the forward market. If the current set of measures and monetary policy fail to stop the INR from sliding further, the government will have to think of more unorthodox measures, such as capital controls or bilateral swap arrangement.

Upheavals like these are not new to the Indian economy. It has happened a multitude of times over history, but a search of the literature did not bear out any research on the fluctuation of the INR vis-à-vis the US Dollar (USD, henceforth.) This piqued our interest in the search for the evolutionary tract of the INR versus the USD, over an extended period of time, and see if indeed bubbles did arise and then die out, as is evident for multiple currencies.

According to Erken, Hayat and Heijmerikx (2018), who estimate a model for Indian portfolio investment on a quarterly frequency basis, the INR has experienced high volatility over time. There has been deviations of the value of the INR from that predicted by market fundamentals. This deviation of market prices from fundamental values is a phenomenon present during pricing-bubbles. The deviation of market prices from fundamental values is not only a phenomenon of the present, but is also observed since the last centuries, e.g. The Tulipomania in Netherlands, the South Sea Bubble in Great Britain, or even the DotCom bubble.

To have a proper background and a contextual connection, we start with the recent publications of the Bettendorf & Chen (2013) and Jiang et al. (2015) papers, which empirically examine the explosive behavior of the Sterling-Dollar and Chinese RMB-Dollar exchange rates, respectively. Bettendorf & Chen (2013) use the GSADF test to examine the existence of bubbles in the Sterling-dollar exchange rate from January 1972 to June 2012 and they found evidence of explosive behavior in the nominal exchange rate. According to them, this ? nding of explosive behavior in the nominal exchange rate could not simply be interpreted as the evidence of rational bubbles. The explosiveness in the nominal exchange rate may be driven either by rational bubbles or explosive fundamentals themselves.

Similarly, Jiang et al. (2015) applied the same bubble-detection test to explore the presence of bubbles in Chinese RMB-dollar exchange rate between July 1995 and October 2013 and they found explosive behavior in the nominal exchange rate. The explosiveness in the nominal exchange rate is explained by both rational bubbles and relative prices of traded goods.

A number of older studies have tested for bubbles in the exchange rates. Evans (1986) found evidence to support the presence of bubbles in the Sterling-dollar exchange rate between 1981 and 1984. Similarly, Meese (1986) provided

evidence of bubbles for the dollar-deutsche mark and Sterling-dollar exchange rate using the monthly data between 1973 and 1982. Wu (1995) applied the Kalman ? lter technique to estimate and test for exchange rate bubbles between the US dollar, the British pound, the Japanese Yen and the Deutsche Mark (using the monthly data over 1974-1988), but found no signi? cant evidence of bubbles in these exchange rates. Van Norden (1996) investigated the existence of speculative bubbles in exchange rates of the Japanese yen, the German mark and the Canadian dollar from 1977 to 1991 by applying a new regime switching test.

The presence of bubbles display a particular kind of regime-switching behavior by implying some coe cient restrictions on a simple switching-regression model of exchange rate. Empirical results are sensitive to the choice of exchange rate fundamentals and measurement of exchange rate innovations. Elwood et al. (1999) made use of state-space models and Monte Carlo experiments to explore the presence of a stochastic rational bubble in the Japanese and German exchange rates over the period of December 1984 to November 1998. According to the theory of uncovered interest parity, a series under rational expectation is supposed to be white noise. Elwood et al. (1999) therefore inspected this condition for evidence of bubbles. A ? nding of a deviation from white noise implies the existence of a stochastic rational bubble. Their results suggest a bubble have burst between the end of March and the end of April of 1990, which is coincided with economic turmoil in Japan and Germany.

Diba & Grossman (1988) de? ned a rational bubble as a belief that an asset's price depends on a variable (variables) which is not relevant to fundamentals. Canadian dollar, the Danish krone, the Japanese yen and the South African rand against the US dollar covering the period from January 1989 to December 2004. Three di erent bubble detection procedures have been used: the augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests, the Johansen's multivariate cointegration test and the duration dependence test of McQueen & Thorley (1994). All three tests provide ? rm evidence of no rational speculative bubbles in theses currency pairs.

Empirical Application

We use monthly data for the Rupee-dollar exchange rate for the period March 1992 to August 2019, for a total of 330 observations. The data set was obtained from the website of the Reserve Bank of India (https://www.rbi.org.in). We then conduct the SADF and the GSADF tests on the stock price index according to the basic model in eq.(1). The results are given in table 1. Also given in table 1 are the critical values of the two tests obtained from a simulation exercise using 2000 replications of the data in each case.

Both tests find evidence of bubbles or explosive sub-periods over the long-term data for the Rupee-dollar exchange rate (test statistics in each case exceed the critical values for both test statistics considered). We then conduct a bubble monitoring exercise for each index using the backward ADF test and its critical value (using the PWY strategy), and the backward SADF statistic and its critical value (using the PSY strategy). This is done in graphs 1 – 2. In each graph the solid line represents the relevant test statistic, and the dark broken line represents the critical value, and the light broken line represents the Rupee-dollar exchange rate. Figure 1 presents results from the use of the backward ADF test from the PWY paper, and figure 2 presents results from the use of the backward SADF statistics from the PSY paper. In Figure 1 we look at the Rupee-dollar exchange rate and the existence of a bubble (test statistic greater than the critical value) is evident in the late 1990s to early 2000s and again from about 2012 to 2018 intermittently. The late 1990s – early 2000s is clearly very volatile and also coincides with high growth rates in the Indian economy. The period from 2012 – 2018 is also quite volatile, and this is all post financial crisis. Figure 2 shows a bubble again for the late 1990s and early 2000s (just like in figure 1), and somewhat shorter periods of volatility after 2012. The ability of the BADF statistic to detect multiple bubbles is suspect, and therefore the results in Figure 2 (based on the PSY paper) are more reliable. There is evidence of a bubble in the late 1990s to early 200s, right around the technology bubble and the bursting of the bubble. The exchange rate does not seem to have been particularly volatile around the time of the financial crisis in 2007-08. Both statistics indicate a spike in volatility around 2013. Demonetization in 2016 does not seem to have led to more volatility in the exchange rate.

Conclusion:

The new test, the GSADF procedure is a recursive test, able to detect multiple bubbles. It's a rolling window, right sided ADF unit root test, with a double sup-window selection criterion. The SADF test is good, but it cannot credibly detect multiple bubbles over the same sample data set. The GSADF test overcomes this weakness and has significant discriminatory power in detecting multiple bubbles. We have evidence for the existence of bubbles in the late 1990s and early 2000s for the Rupee-dollar exchange rate, thus providing evidence of a volatile exchange rate around the time of the technology bubble. There is some evidence in favor of bubbles in the period 2012-18.

Note:

(A): Our literature review owes a lot to "Are there bubbles in the exchange rates? Some evidence from G10 and emerging markets countries" by Hu and Oxley, 2016.

(B): Hugo Erken, 2018.

Table 1

	Test Statistic	Finite Sample Critical Values		
		90%	95%	99%
SADF	1.5524	1.1294259	1.4009684	1.9471456
GSADF	2.9987	1.8997812	2.1524257	2.7079079

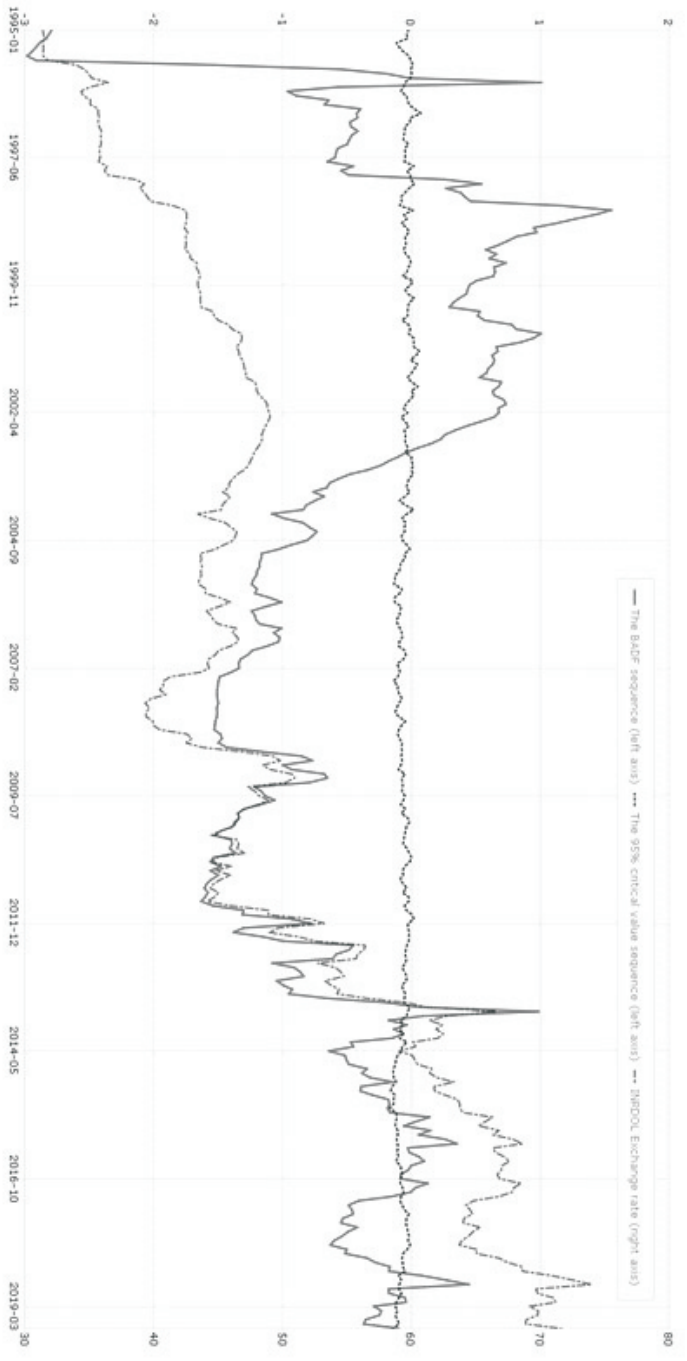

Figure 1 Rupee –Dollar Backward ADF statistic

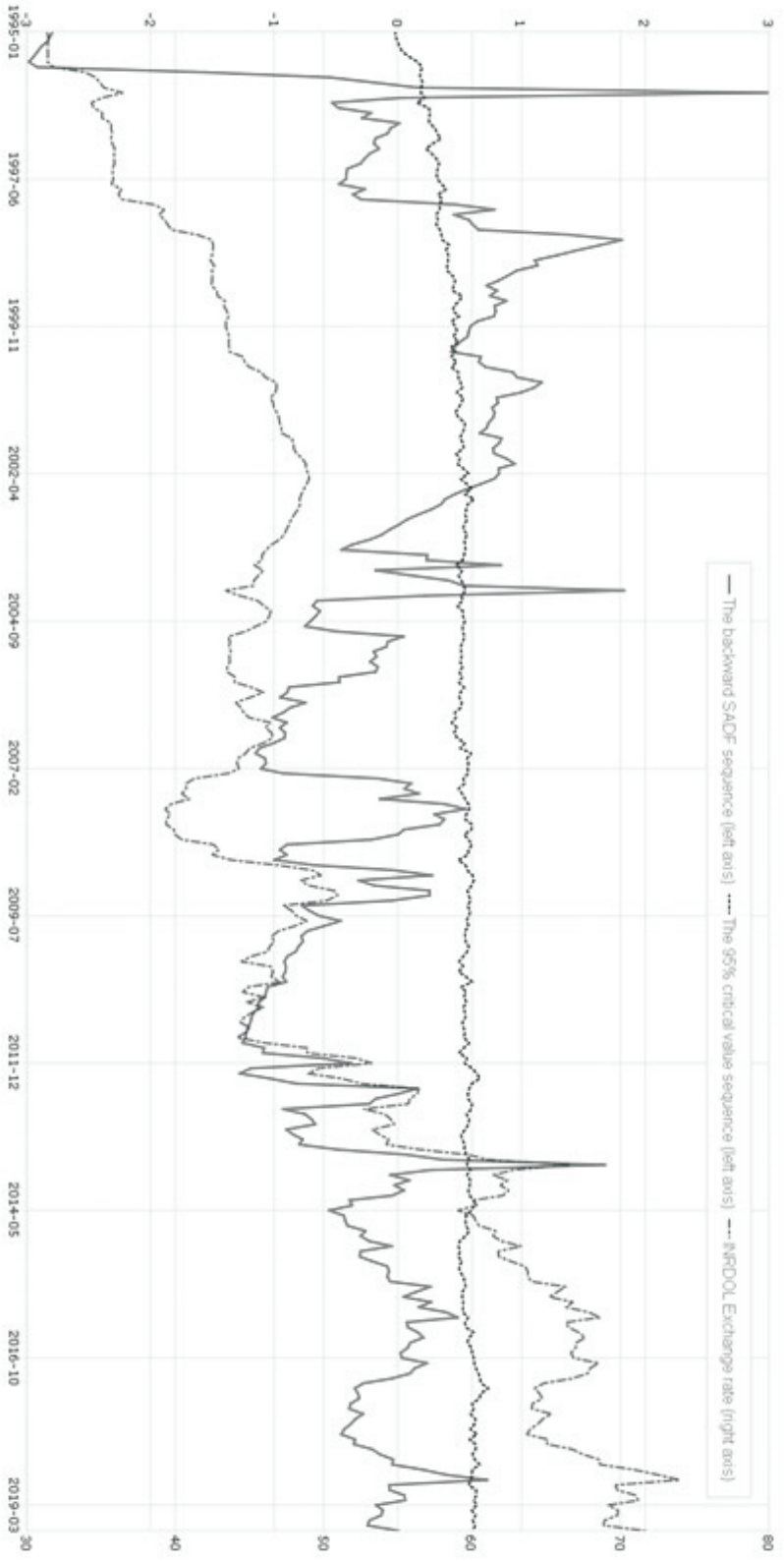

Figure 2 Rupee-Dollar Backward SADF statistic

References

- Bettendorf, T., & Chen, W. (2013). Are there bubbles in the Sterling-dollar exchange rate? New evidence from sequential ADF tests. Economics Letters, 120, 350–353.
- Diba, B. T., & Grossman, H. (1988). Explosive rational bubbles in stock prices? The American Economic Review, 78, 520–530.
- Erken, H.P.G., R. Hayat and M. Heijmerikx (2018). India: trade wars and capital flight. Rabobank.
- Elwood, S. K., Ahmed, E., & Rosser, J. B. (1999). State-space estimation of rational bubbles in the Yen/Deutsche Mark exchange rate. Weltwirtschaftliches Archiv, 135, 317–331.
- Evans, G. W. (1986). A test for speculative bubbles in the Sterling-Dollar exchange rate: 1981-84. The American Economic Review, 76, 621–636.
- Hu and Oxley, "Are there bubbles in the exchange rates? Some evidence from G10 and emerging markets countries", Working paper, 2016.
- Hugo Erken, 2018. An assessment of the Indian rupee crisis. Rabobank Special
- Jiang, C., Wang, Y., Chang, T., & Su, C.-W. (2015). Are there bubbles in Chinese RMB–dollar exchange rate? Evidence from generalized sup ADF tests. Applied Economics, 47, 6120–6135.
- McQueen, G., & Thorley, S. (1994). Bubbles, stock returns, and duration dependence. Journal of Financial and Quantitative Analysis, 29, 379–401.
- Meese, R. A. (1986). Testing for bubbles in exchange markets: A case of sparkling rates? The Journal of Political Economy, 94, 345–373.
- Menno Middeldorp, Jesse Groenewegen and Inge de Vreede. (2018). Outlook 2018: The economic impact of geopolitical risks and events on the Dutch economy, Economic Quarterly Report.
- Phillips, P. C. B., Shi, S., and Yu, J., "Specification sensitivity in right-tailed unit root testing for explosive behavior," Oxford Bulletin of Economics and Statistics, 76 (2014), 315-333.
- Phillips, P.C.B., Shi, S., and Yu, J., "Testing for Multiple Bubbles: Limit Theory of Dating Algorithms," International Economic Review, forthcoming (2015).
- Phillips, P.C.B., Wu, Y., and J. Yu, "Explosive behavior in the 1990s Nasdaq: When did exuberance escalate asset values?" International Economic Review, 52 (2011), 201-22.
- Van Norden, S. (1996). Regime switching as a test for exchange rate bubbles. Journal of Applied Econometrics, 11, 219–251
- Wu, Y. (1995). Are there rational bubbles in foreign exchange markets? Evidence from an alternative test. Journal of International Money and Finance, 14, 27–46.

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