Assessment of factors impacting Customer Buying Behaviour in Software Product Companies

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Abstract

Software product management is the process of managing software that is built and implemented as a product, taking into account life-cycle considerations of the product. It is the discipline and business process which governs a product from its inception to the market or customer delivery and service in order to maximize revenue. Software products comprise of web applications, Desktop applications, Mobile applications. They are available in various formats like ISOs, CDs, DVDs, appliances catering to the needs of markets like IT, ITES, Banking, Finance, Insurance, Medical, Pharmaceutical etc. The recent emergence of various technological platforms in the field of Cloud Computing like Software-as-a-service, Infrastructure-as-a-service, Platform-as-a-service has influenced the Software Product Management process and the software industry to a large extent in the areas like business, technology and end-user experience of the product.

On a broad level the software products are available to customers in two deployment modes. One is ON-PREMISE and the other is ON-CLOUD. While each of the Software product deployment mode has advantages one over the other, but it posed several challenges to the buying decisions of the customers. The goal of this paper is to find out the gaps in the existing literature in assessment of the factors impacting Customer Buying Behavior in Software product companies.

Keywords: Factors, Buying Behavior, Customer, Software Product, Software Market.

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Introduction:-

Software is basically a program, procedure and rules running in computer memory. Software when developed for a specific purpose is known as Software product. Software products are available in two deployment modes namely ON-PREMISE and CLOUD-COMPUTING.
Software product in ON-PREMISE mode will be available in CDs, Appliances where as software product in CLOUD-COMPUTING model is available in Software-as-a-Service (SaaS), Infrastructure-as-a-Service (IaaS) and Platform-as-a-Service (PaaS). With, these deployments models of software product, customers have a choice to procure either ON-PREMISE model or CLOUD-COMPUTING model. But, the buying decision of the customer is impacted by various factors.

There are Theories explaining different factors, stages, impacting customer's decision when adopting innovations in technologies by Organizations namely Diffusion of Innovation, DEMATEL approach, Technology-Organization-Environment theory.
Diffusion of Innovation (DOI) Theory, developed by E.M. Rogers in 1962, is one of the oldest social science theories. It originated in communication to explain how, over time, an idea or product gains momentum and diffuses (or spreads) through a specific population or social system. The end result of this diffusion is that people, as part of a social system, adopt a new idea, behavior, or product. There are five established adopter categories, and while the majority of the general population tends to fall in the middle categories, it is still necessary to understand the characteristics of the target population. When promoting an innovation, there are different strategies used to appeal to the different adopter categories and they are as follows: Innovators, Early Adopters, Early Majority, Late Majority, Laggards.
There are five main factors that influence adoption of an innovation, and each of these factors play an active role to a different extent in the five adopter categories and they are relative advantage, compatibility complexity, trialability, observability. The disadvantage of this theory is it does not cover all the factors that can effect the buying decision of customer in technical context, organizational context and environmental context. However, it covers the different stages of customer in buying process and due to this it has advantage over other theories.

The DEMATEL approach can separate involved factors into a cause group and an effect group. Trust is the willingness of an individual to behave in risky and uncertain situations when expected benefits surpass perceived risks. When users have low knowledge or less self-confidence of the situation of vulnerability and risk, trust is especially important to reduce users' perceived risks. Perceived benefits (PB) and perceived risks (PR) here are treated as two distinct themes, which require being handled by the DEMATEL approach separately to obtain the respective cause–effect factors. Further- more, the results of cause–effect analysis can be combined into a PB–PR matrix. The disadvantage of this theory is it does not cover all the factors that can effect the buying decision of customer in technical context, organizational context and environmental context. However, it covers risks and benefits factors perceived by the customer in buying process and due to this it has advantage over other theories.

The technology-organization-environment (TOE) framework describes factors that influence technology adoption and its likelihood. TOE describes the process by which a firm adopts and implements technological innovations is influenced by the technological context, the organizational context, and the environmental context (Tornatzky and Fleisher 1990). The advantage of this theory is it covers all the factors that can effect the buying decision of

customer in technical context, organizational context and environmental context. However, it does not cover risks and benefits factors perceived by the customer in buying process and also the stages of buying process.

Organizations are aware of benefits while adopting a new technology but there are factors which impacts the buying behavior of customers. There is a need to design and study an integrated model which can explore, assess the various factors impacting the buying decision of customers while procuring software products.

Software Products are broadly categorized into two categories

1. Software Product for Consumer
2. Software Products for Organizations

Software Products for Consumers includes products like personal computers, operating systems, Microsoft Office etc. Till date, Researchers has done extensive research in identifying and assessing the factors influencing buying behavior of consumers for software products falling in Consumer category. The factors which influence the buying behavior of consumers for software products are Cultural, Social, Personal, Psychological.

Software Products for Organizations includes enterprise products like Routers, Switches, Firewalls, Mainframes, Office Applications, Anti Virus etc. The buying behavior of customers for enterprise software products is different than the buying behavior of customers in consumer market. Researchers in this domain have done research up to some extent in identifying and assessing the factors which can influence the buying behavior of customers for software products in organizations. The factors which influence the buying behavior of customers for software products in organizations are broadly classified in to eight categories:

1. Technological Factors
2. Organizational Factors
3. Environmental/Situational Factors
4. Communication Channel
5. Time
6. Social System
7. Perceived Benefits
8. Perceived Risks

If a customer wants to buy a software product for his organization from more than one available competing software vendors, Then the above factors will influence his buying decision. As defined above, Software products for organizations are available to customers in ON-PREMISE deployment mode and CLOUD COMPUTING (SaaS, IaaS, PaaS) deployment mode.

The research done so far on buying behavior of customers for software products in Organizations is limited. This area is growing rapidly and is current trend in software industry; it provides lot of scope for researchers to contribute to the body of knowledge on this subject and is looking forward to making this original contribution.

The purpose of this paper is to find out the gaps in the existing literature with respect to customer buying behavior in software product companies.

Literature review:-

The recent advancement in the Cloud computing technologies has provided opportunities to software vendors to provide the software as a service, infrastructure as a service and platform as a service. Recent literature study emphasized that there are factors which can impact the buying behavior of customers in procuring software products. Van de Weerd I, 2016 discussed that there are three organizational factors, namely top management support, organizational size, and organizational readiness, influence the decision to adopt SaaS. H.P. Borgman, B. Bahli, H. Heier, F. Schewski, 2013, investigated theoretically and empirically which organizational context factors inhibit or foster a firm's adoption of cloud computing.

Ramachandran M, 2016 argued several best practices, techniques, and methods to develop systems and services that are built for security, resiliency, sustainability. There is a need for product managers and architects to collaborate. Luccassen, 2014 emphasized how do software product managers and software architects collaborate in Software product management process.

Software product management is the intersection of business, technology and end user experience. Ebert, C, 2013, 2008 defines the software product management in more practical way from strategy phase to evolution phase. Andrey Maglyas, Uolevi Nikula, Kari Smolander, 2012, has showed that the companies are not familiar with software product management, but they showed an interest to the topic.Regnell, B. 2011, has advocated that Decision-making is central to Software Product Management (SPM) and includes deciding on requirements priorities and the content of coming releases. Dogan, 2011 covers the research involved in managing different versions of software in software product management. He has studied a two-period release software upgrade model where the initial features upgrades and upgrade design effort for a software product is chosen in strategic manner. I. van de Weerd and R. Katchow 2009, has described conceptual model for integrating software product management (SPM) and defect management in a distributed environment. I. van de Weerd, S. Brinkkemper, and J. Versendaal, 2010, has also advocated an incremental method for software product management.

Technology-organization-environment framework is very important to investigate determinants of cloud computing service adoption behavior. Cloud computing services offer enterprise clients many advantages such as reduced costs, easy maintenance and the easy re-provisioning of resources, thus contributing to increased profits. However, little is known about the adoption behavior of such services among enterprise. P.F. Hsu, 2013 advocated Theoretical Foundation of Technology-Organization-Environment Framework in adoption of CLOUD COMPUTING in enterprises where as S.C. Misra, A. Mondal, 2011 argued about the factors impacting the organization readiness to adopt cloud computing technologies.
Cloud Computing adoption refers to the acceptance and agreement to use cloud-based services as a new way of deploying technology . A new technology or a new service solution results in improving an organization's competitiveness. A. Saedi, N.A. Iahad, 2013, has studied argued the adoption adherence level by organizations. The main factors playing a significant role in SME adoption of cloud services were: relative advantage, uncertainty, geo-restriction, compatibility, trial ability, size, top management support, prior experience, innovativeness, industry, market scope, supplier efforts and external computing support. In contrast. Y.Alshamaila, S.Papagiannidis, F.Li, 2012, W. Venters, E.A. Whitley in 2012, C. Low, Y. Chen, M. Wu, 2011, has studied that Cloud computing has the potential to transform the way in which the IT function is provided in a large range of enterprises.

The nature and speed of this transformation, however, is unclear.

The adoption of emerging technologies is still in its early days amongst the organizations is effected by the factors such as organizational technology sensing capability, perceived relative advantage as well as perceived industry pressure are seen positively on its adoption, in fact, as a predictor of cloud computing adoption. M. Tan, T. Lin, 2012, S.S. Alam, M.Y. Ali, M.F.M. Jani, 2011 advocated the same factors which are mentioned above. W.W. Wu, L.W. Lan, Y.T. Lee, 2011, has emphasised the use of DEMATEL(Decision Making Trial and Evaluation Laboratory) Methodology to study the adoption of Cloud Computing technologies in organizations.

Value-based approach of software engineering proved to be one of the most important branches of software engineering because it elicits and reconciles stakeholder's value propositions with respect to the system into a mutually satisfactory set of objectives for the system. S.I. Mohamed and A.M. Wahba, 2008, has explained value based approach of software engineering.

The influence of Technological factors on Software Product Management is another aspect in adoption. Bekker W, 2008 carried out in finding the influence of situationall factors on Software Product Management with regard to Customer buying behavior.

T. Albourae, G. Ruhe, and M. Moussavi, 2006, described product features are the essence of good product management. High quality features lead to successful software products, both functionally and financially. One of the crucial processes in software product management is release planning where features are assigned to releases. SPM process includes 1. New Features. 2. Feature Categorization 3. Stakeholder Voting 4. Resource Estimation.

Software Product Management also includes: 1. Portfolio management 2. Product road mapping 3. Requirements management. I. van de Weerd, S. Brinkkemper, R. Nieuwenhuis, J. Versendaal, and L. Bijlsma, 2006, explained Reference framework towards software product management. However, the control strategies employed by software development firms in software product management process was best explained by Sarma R. Nidumolu and Mani R. Subramani, 2005. Joint Effect of Methods Control and Dimensions of the Structural Approach includes: 1. Standardization of methods 2. Decentralization of methods. Finally, Srinivas Raghunathan, 2005, proves the business aspect of software product management process.

In general, it has become increasingly clear that there are factors which impacts the buying behavior of customers in adopting software products. But these factors are not justified and studied thoroughly. There is need to form an integrated approach which can help in assessing the factors that impacts the customer buying behavior.

Problem statement:-

What are the factors that impact the buying behavior of customers for mobile device management software in organizations at par with information technology infrastructure?
Customers buy software products via different channels. There are two types of deployment models for software products namely ON-PREMISE and CLOUD COMPUTING. The existing buying process does not consider the impacts of factors in buyer behavior mentioned

in the theories in introduction section. After a period of time, Customers realizes and migrates from ON-PREMISE solution to CLOUD-COMPUTING or vice versa.

Customer buying behavior and decision for procuring software product can be studied in the below scenarios:

1. New Customers with a choice to buy either ON-PREMISE or CLOUD COMPUTING model of Software Product.
2. Customers having ON-PREMISE model of Software product and migrating to CLOUD COMPUTING model of Software Product.
3. Customers having CLOUD COMPUTING model of Software Product and migrating to ON-PREMISE model of Software product.

Objectives and scope:-

1. To spot the impact in complete buying process of customers.
2. To study factors influencing buying process for customers and to identifying requirement.

The first objective of this research is to spot the impact in complete buying process of customers via different marketing channels. The second objective is to study the factors which can influence the buying decision of customer and this objective will also identify the requirement of the customer.

The scope of this research is to explore, study and assess the the factors impacting the buying decision of industrial customers for mobile device management software. The limitation of this research will be for enterprise software product like mobile device management on both on-premise and cloud computing model. The geographical limitation of this research is United States(US), and India regions. This research will be confined to customers of Mobileiron softwares india private limited.

For future studies, it is recommended to do research on more industrial and enterprise products in both large enterprise and SMEs. Population comprises of competitors as well, However, this research sample is limited to Mobileiron softwares india private limited.It is recommended to do research by considering samples from all competitors.

Hypothesis:

H0: There is no impact of factors on customer buying behavior for mobile device management software in organizations at par with information technology infrastructure.

H1: There is impact of factors on customer buying behavior for mobile device management software in organizations at par with information technology infrastructure.

Research Framework: Integrated Approach

Relevant theories in explaining the influence of factors impacting customer buying decision has been discussed in Introduction chapter. Combination of DOI, DEMATEL and TOE framework is strong combination to help better understand the decision of customers in

adopting the new technology. Factors and aspects of all these theories are equally important and therefore need to be studied in combination.

The conceptual model of this research is mentioned below:

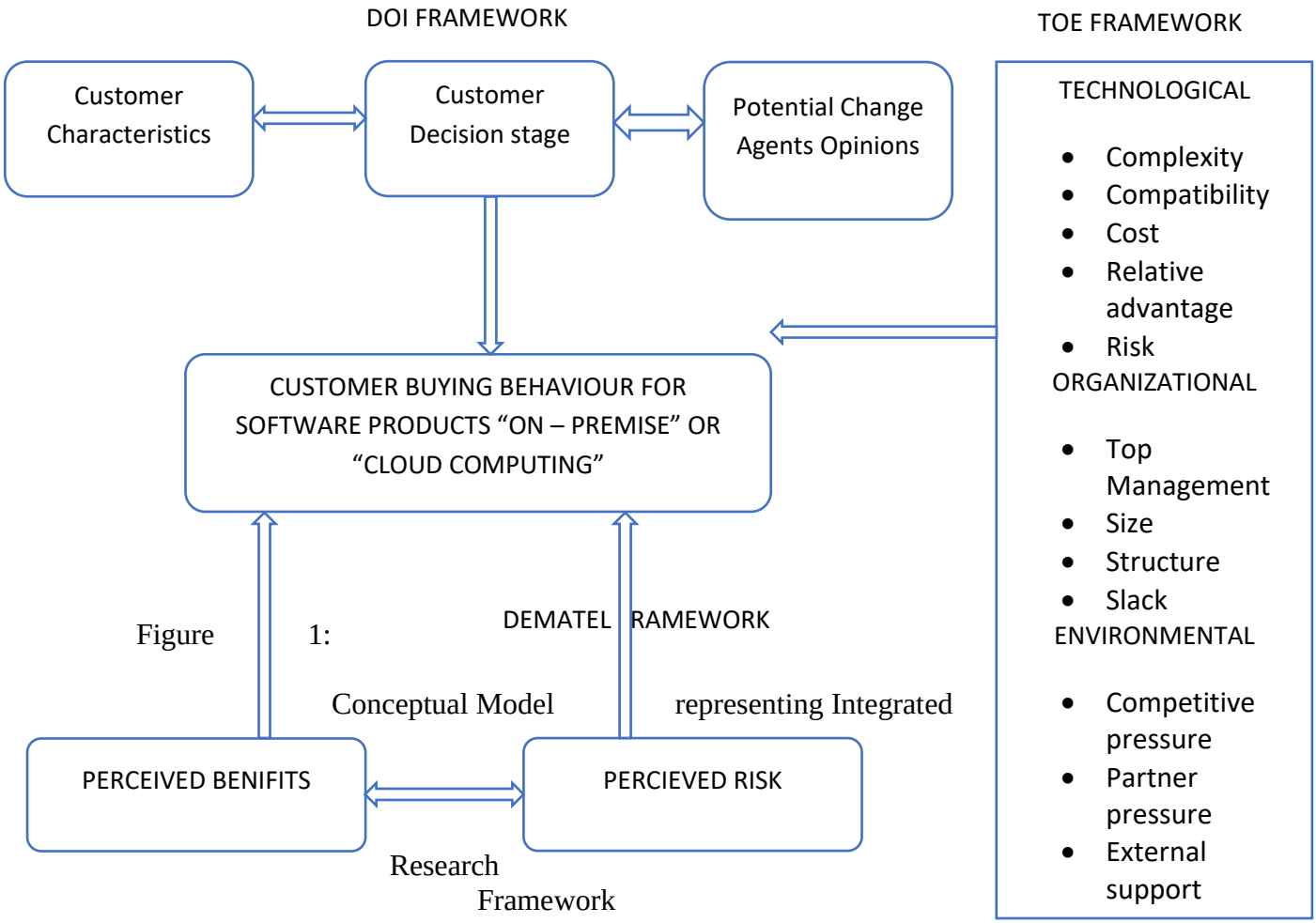

Figure 1: Conceptual Model representing Integrated Research Framework

At a Broad level, there are eight aspects in integrated research framework to consider while formulating hypotheses and they are:

Table 1: Overview of factors in integrated model

SL No.	Factors	Advocating Theory
1	Technological	TOE Framework
2	Organization	TOE Framework
3	Environmental	TOE Framework
4	Communication Channel	Diffusion of Innovation
5	Time	Diffusion of Innovation
6	Social System	Diffusion of Innovation
7	Perceived Benefits	DEMATEL
8	Perceived Risks	DEMATEL

Proposed methodology:

Population and sample frame

Population is defined as customers with requirement of enterprise mobile device management software. There are enterprises that consist of small, medium and large companies. This population consists of customers of Mobileiron and customers of its competitors.

A proportionate stratified random sampling will be used in the study. This method satisfies the aim of the study: results generalization. Moreover, it provides advantage as this is the most efficient sample method and possible to have comparisons among groups (Sekaran & Bougie, 2009). A proportionate sampling is given to the customers of regions like US, India. It is then followed by a random selection of each subject from each stratum.

Data collection using Qualitative Methods

"Qualitative Methods" will be employed to gain a general sense of phenomena and form hypothesis. Qualitative data will be used to design the proposed model and understand the various outcomes. This data will be derived from case studies, observant methods, interview methods, notes etc.

This method will be used to help categorize data into patterns as the primary basis for organizing and reporting results using the following:

- Interviews
- Survey Size: Product Management Teams
- Respondent Profiles: Product Management Team: Product Directors, Product Managers
- Method of collection:In person interviews based on the interview questionnaire developed to gather the required details.

Data collection using Quantitative Methods

"Quantitative Method" will be employed to provide empirical support for hypotheses and verify whether they are acceptable or unacceptable. Quantitative data will be used to test the model for integrated research framework which will be derived from survey / questionnaires.

Once the construct of the hypothesis has been verified, we will employ the following:

• Survey

- Survey Size
    - Customers in India region
    - Customers in US region
- Respondent Profiles

  IT: Management, Technology, Operations

- Method of collection

  Electronic survey method will be preferred (Online Questionnaire)

Statistical Techniques:

Exploratory Factor Analysis (EFA) will be the statistical method used to develop the underlying relationships between measured variables. EFA is used to develop the scale as there will be no a prior hypothesis about patterns of measured variables and it will also help identify latent constructs within measured variables.Hypotheses will be tested using different test of hypothesis techniques. Regression will be used to find out the nature of correlation among the variables and estimate the relationship between variables (predict and forecast).

Managerial Implications:

In this study, the focus is on factors that may facilitate the buying behavior of customers for software products in organizations with IT infrastructure. The knowledge and results gained in the study are expected to provide:

1. Enrichment of the existing knowledge on customer buying process.
2. Assessment of Factors influencing buying behavior of customers in the organization with IT infrastructure.
3. Filling the knowledge gap on the adoption factors of Software products, especially ON-PREMISE, CLOUD COMPUTING model of Software products.
4. Understanding the factor that influences Customer buying process in procuring IT infrastructure. It is expected to provide inputs for Software vendors to set guideline for customers in procuring software products and maximize profits for them.
5. Understanding the factor that influences Customer buying process in procuring IT infrastructure. It is expected to provide inputs for customers in decision making process for procuring Software products either ON-PREMISE or CLOUD COMPUTING.

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