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A Study on the Factors that Influence Infusion of ERP Systems

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Abstract: Academic research has been lopsided on post implementation ERP research, heavily focused the acceptance and adoption of ERP using TAM and its extensions. This study is determined to bring out the factors and its intricacies for deep integration of ERP into organizational processes, routines, and practices, by centering on the concept of infusion. The study proposes a new research model for ERP infusion studies which categorizes the various factors into individual, departmental and organizational level factors. This grouping guides the organizations for in developing effective intervention strategies and identifying owners for operationalizing it. This study also reveals that, the factors impacting technology usage do not exert same degree of influence across the various stages of ERP lifecycle.

Keywords: Infusion in ERP, ERP, Infusion, Enterprise Resource Planning, Post Implementation Phase, Departmental Championship, Subjective Norm, Integrated Use, Extended Use

1. Introduction

Enterprise resource planning (ERP) is a comprehensive, integrated software that makes it easier to manage an organization's many businesses tasks. Human resources, finance, procurement, inventory, production, sales, and customer support segments are frequently included in ERP solutions. Further advancements in the form of machine learning, artificial intelligence, and data analytics have been incorporated into modern ERP systems to improve forecasting and decision-making. ERP systems are significant because they can deliver accurate, complete, and timely information, which is essential for efficient business administration. Organizations all throughout the world depend on ERP systems, which are often independent of industry. They make it easier to integrate different corporate functions and offer a solitary, consolidated source of information, allowing businesses to do away with data silos, cut down on shortcomings, and streamline their processes(Gattiker & Goodhue, 2005).
Even though the ERP system backers makes a lot of benefits claims, deployment success rates have not been great. Estimates of claimed success rates range from 40 to 70%, based on the source of information and the parameters used for defining "success". Several academic studies have explored the factors that contribute to this variation in success rates(Aloini et al., 2007; Motwani et al., 2002; Umble et al., 2003).
A report by (Panorama Consulting, 2018), found that only 42% of the organizations surveyed considered their ERP implementations successful, while 30% reported mixed results, and 28% considered their implementations a failure Several factors contribute towards the lesser success in ERP implementations than typical IT product implementation. One key factor, which is also a key differentiator with most other information system, is the complexity of ERP systems.

2. Research Gap

Over the past decade, research on Enterprise Resource Planning (ERP) systems has predominantly focused on the critical success factors (CSFs) and determinants of success or failure of ERP implementation(Ram et al., 2013).The study on usage of ERP systems in its post-implementation phase has emerged to the focus off late as researchers and practitioners as they recognized the importance of understanding the long-term usage and maintenance of ERP systems(Costa et al., 2016).
The ERPs, which busted into the scene in late 1990s and 2000s and has a long history now. Many organizations are having long experience in using ERP system now and several of them have reached a level of maturity in their ERP implementations. Majority of these organizations have now stabilized from initial hiccups and now exploring ways to maximize the benefits out of the current ERP implementation. ERP systems being very complex and expensive to implement, and many organizations having already made that investment and commitment, these organizations have to now ensure that their employees are committed to the system's success. This makes studies, which contribute to the knowledge on improving post implementation usage of ERP more relevant than ever.
Most of the studies on the usage of ERP system in post implementation phase used Technology Acceptance model (TAM) and its derivatives for their studies. This is pretty much in expected lines due to poll position Technology Acceptance Model and its derivatives has maintained in technology adoption research irrespective of the technology being studied. However, TAM may not be the best-suited for studying Enterprise Information System usage due to the nature and

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complexity of enterprise systems. Enterprise Resource Planning (ERP) systems are inherently more complex than individual-level technologies typically studied using TAM and its variations like UTAUT, or TAM2 (Ifinedo, 2011). This research attempts the expand the factors influencing the acceptance of enterprise systems beyond the individual-level perceptions of usefulness and ease of use to include organizational factors. By only focusing on individual-level perceptions, TAM and its derivatives have overlooked the critical role that organizational factors play in the successful adoption and use of enterprise systems. Another factor that was overlooked in TAM and related studies with regards to ERP usage studies is the department level factors. The adoption and usage of enterprise systems often require the coordination and collaboration of multiple departments and business units within an organization(Klaus et al., 2000). The uniqueness makes department-level factor also relevant in the context of ERP usage. This research, with its focus on multi-stakeholder and interdependent aspects of enterprise systems tries to provide and holistic view beyond what could be covered by individual-level factors.

When it comes to technological usage, predominantly in academic research, acceptance of technology is considered as technology usage. While technology acceptance is crucial for the initial adoption of a technology and can influence the success or failure of technology implementation within an organization (Venkatesh & Davis, 2000), technology acceptance does not necessarily imply a deep integration of technology into organizational processes, routines, and practices. This study rather than measuring the mere acceptance of technology in Enterprise resource planning solutions, goes deeper in exploring how ERP system are used in the way it is designed to be used and how much these solutions are embedded and rooted in the individual are organizations as such.

3. Focus of the Study

3.1 Research Model

The conceptual framework for this study attained through extensive review of literature and theoretical support is depicted in Figure 1

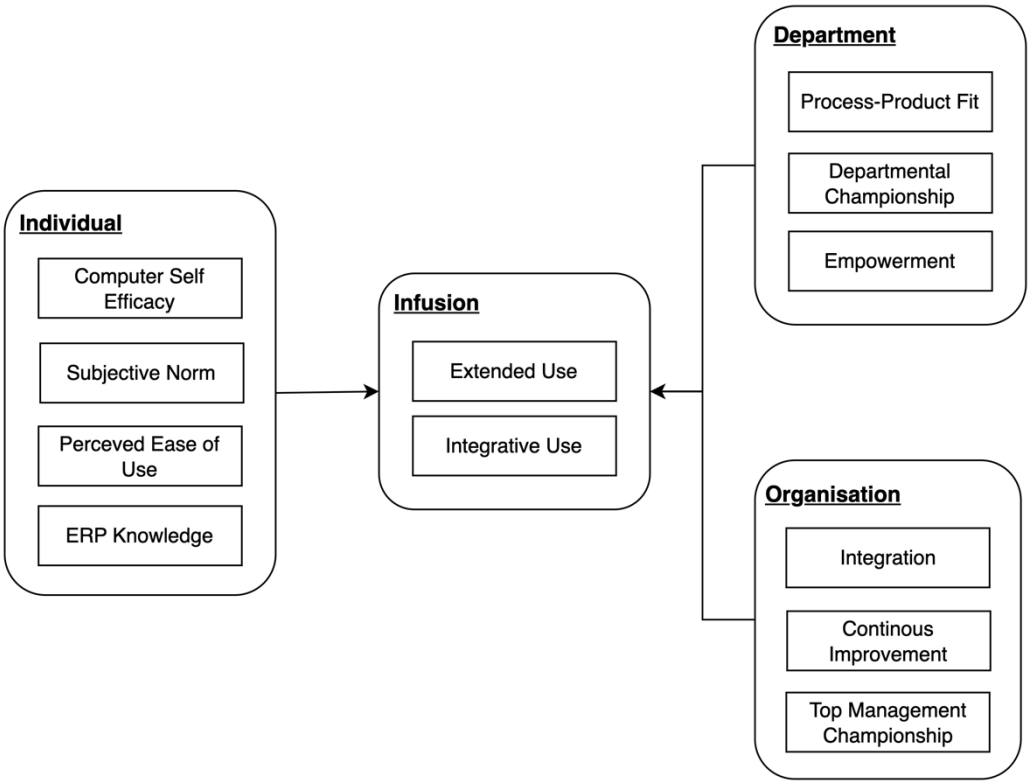

Figure 1: Conceptual Model

3.2 Infusion

Zmud's multi-stage model proposed by (Kwon & Zmud, 1987) on technology implementation process is one of the widely accepted models regarding system usage. This model is a six-step process comprising initiation, infusion, adaptation,

acceptance, routinization, and infusion describing the process through which an organization adopts and institutionalizes a new technology. Infusion is defined as the usage of the technology in a comprehensive as well as integrated way to realize the ultimate benefit of the technology system. Infusion focuses on how the technology and/or the system is used in the best possible way to fulfil the fullest of its potential. Infusion occurs when the organization fully exploits the technology's capabilities to achieve its goals and improve its performance. At infusion stage, users have fully integrated the technology into their work processes, and the organization has realized the intended benefits of the technology. In case of complex IT systems, earlier studies indicate that infusion is likely to be achieved after at least 1.5 to 2 years of system implementations(Li et al., 2013; Po-An Hsieh & Wang, 2007; Wang et al., 2008).

Infusion is perceived as a multifaceted concept with three distinctive subtypes: extended use, integrative use, and emergent use(Kim & Gupta, 2014; Maas et al., 2018; E. H. Ng & Kim, 2009; Saga & Zmud, 1994). Extended use is defined as utilizing majority of functionalities of the system to during the day-to-day work(E. H. Ng & Kim, 2009). Integrative use can be defined as using the system to enhance, establish or reinforce the linkages amongst the tasks (E. H. Ng & Kim, 2009). Emergent can be seen as utilizing the system to support the tasks in an innovative approach(Saga & Zmud, 1994). Emergent use involves users adapting and modifying the technology in novel and innovative ways, often beyond the original intended purpose. This type of use can lead to the discovery of new applications or benefits that were not initially envisioned by the developers or implementers of the technology.

In this study, the extended use, integrative use, which forms first two subtypes of infusion are studied in detail. Emergent use was discarded at construct validation stage, as experts who were approached during this study recommended not to use this construct as they believed it did not make sense from an ERP standpoint. The ERP being standard software, works the best when it is used in the way it is designed for and uses the standard processes defined by it. Hence there is limited scope for innovation from the end user side, unlike more flexible systems which provides innovation and tweaking opportunities.

3.3 Individual Factors

Computer Self Efficacy: (Bandura, 1986) defines self-efficacy as judgments of people's capabilities in organizing and executing course of action in attaining designated types of performances. The concept of computer self-efficacy can be divided into two as per (Marakas et al., 1998); one is general computer self-efficacy and the other is specific self-efficacy based on a specific computer task or an application. General computer self-efficacy refers to an individuals' perception of their ability to perform across multiple computer tasks or applications. Specific computer self-efficacy refers to the individual's perception of their ability to perform regarding a specific computer task or an application. In this research. It is the general computer self-efficacy that is measured in this study. As per (Downey Jr et al., 2008) even though specific computer self-efficacy is not measured, general computer self-efficacy has a strong generalizability, that lets the concept to be used to efficiently forecast individual performance in a particular technology domain.

Perceived Ease of Use: Perceived ease of use is defined (Davis, 1989) as "the point to which an individual can use a particular system free of effort''. In the context of ERP system, perceived ease of use is defined as the degree to which ERP users feel that system is not difficult and is effort free for an effective usage. There are ERP related studies which have flagged perception as poor usability, frustrating employees resulting the reduced usage of ERP systems (Ceaparu et al., 2004; Topi et al., 2005).

The ERP as system is very complex, and this complexity has also made its user-screens complex and impacting user experience. Due to this unique situation, perception of ease of use has much significance than most of the other IT systems, which might have better user-friendly UIs. In many cases, this not so intuitive UIs, have resulted in employees focusing only on the prescribed steps, without applying the underlying concepts and there by not contributing to the bigger picture.

Subjective Norm: Subjective Norm is described as the perception of an individual regarding the pressure from important people in their life to perform or not perform a certain behavior.(Venkatesh & Davis, 2000). It can be defined as an individual's perceptions about other's expectations on how they should behave or should not behave.

Recent studies have expanded the scope of subjective by stressing motivation factor in defining subjective norm. (Eckhardt, 2009) relates, subjective norms not only to the individual's perception of societal and environmental pressure from those who are significant to them to behave in a particular way but also to their direct or indirect needling to conform to their desirability.

ERP Knowledge: The notion of knowledge can be explained in simple terms as "understanding". Knowledge can be defined as the reality that human beings create in their mind; processing, reprocessing and interpreting facts and information, which they have gained via formal/informal education and experiences.

(Stewart et al., 2000) states that knowledge, is "an inference that is drawn from data and the processed information". Data is just a raw product, and it becomes information only when it is extracted, transformed and/or processed properly, and can be used to take educated decisions. The further processing information gives a comprehension and in-depth understanding of topic or situation and is called knowledge. Knowledge is what provides a person the ability to act and to perform in effective manner generating value. (Kanter, 1999; Polanyi, 1969).

An ERP end user mostly requires knowledge about the ERP system to perform their routine tasks and they are also expected to have integrated knowledge of their local process along with high level knowledge about how ERP works.

3.4 Organizational Factors

Top Management Championship: Top management consists of the executive team responsible for the collective development, dissemination, and execution of the organization's strategic and tactical plans. They operate as a cohesive entity that steers the organization's direction and are the central leadership cadre of the enterprise(Klenke, 2003). The word championing can be defined as to enthusiastically support, defend, and fight for a cause, belief, right, or principle. Many studies have identified 'Top management Support' as key predictor for the enhanced technology usage. However, 'Support' as a construct is much more subdued than a much more stronger 'Championing', which necessitates not only passive support, but also enthusiastic evangelism and commitment. This research deliberately, looks at the effect of this stronger variant 'Top Management Championing'.

Top management is frequently recognized as a crucial element in both IT deployment and research on innovation (Purvis et al., 2001). The engagement of top-level executives and their continuous backing throughout the project and after its completion are essential for facilitating a seamless transition and for garnering and directing the commitment of all parties involved (Somers & Nelson, 2004).

To ensure enhanced usage of ERP, significant importance in the post-implementation stage needs to be given continued user training, communication, and collaboration between departments(Ha & Ahn, 2014). Along with the incremental change management requirements which continuous to exist throughout the lifecycle of an ERP, further emphasis the important of top management championing.

Technical Integration: Technical integration involves connecting diverse systems or components to operate together. This approach ensures seamless data and feature exchange among unified systems, resulting in improved communication and reduced business operational complexity. System integration, on the other hand, entails combining various software and hardware elements into a unified entity, allowing the entire system to function collectively.

Even though ERPs came into prominence as an all-encompassing system covering different business processes required for an organization, the concept has evolved over years. Even though ERPs continues to be the backbone IT system for most of the organizations where it is implemented, different other systems also co-exist with it in today's world. In this environment, to ensure that ERP still is central system for data and users do not end up dropping ERP usage, proper integration with other systems is a must.

As the business and IT landscapes grows, such integration complexity increases, as changes to any single request requires changes to all the interconnected applications with the shared information.

Continuous Improvement: An ERP setting requires constant change and reassessment of processes and underlying ERP systems as well. Processes in an ERP environment is standardized, but in no way are static. To reap the advantages of an ERP system and to ensure consistent benefits, endless adjustments and modifications are needed throughout its lifecycle.

These post implementation changes can be grouped into either ERP vendor initiated or ERP implemented organization initiated. ERP vendors frequently updates their ERP solutions, offering patches and updates for the software. These patches are routinely applied to correct defects in the standard ERP programs, ensuring the system remains current and can adjust

to external changes such as new government regulations and compliance obligations.(C. S. P. Ng et al., 2002). Major version upgrades more sophisticated and bigger in nature and this include major maintenance updates or upgrades for troubleshooting, functional updates, new and advanced features, and revoking vendor support for certain releases etc.(C. Clegg & Shepherd, 2007).
Typically changes initiated by the customer organization can be change in the business processes that are supported by the ERP system or technology related changes, such as a change in other peripheral IT systems interfaced to the ERP system. Irrespective of whether improvement is initiated by vendor or organization, change typically results both technical and functional impacts. The benefit will be felt to the user in most cases, be it increased speed, reliability, simplified easier processes, increased flexibility, or more comprehensive integrated process/systems.

3.5 Departmental Factors

Product Process Fit: Product-process fit refers to the degree to which a product is perceived as being consistent with operating practices and processes of a unit along with needs of the unit. Innovations that are fitting with existing beliefs and requirements are more likely to be embraced. Various studies have noted that compatibility of systems positively impact system usage (Dedrick & West, 2003; Thong, 1999).

This influence of product-process fit seeks greater significance in case of enterprise-wide IT systems like the ERP. The very complex nature of ERPs, and its close-knit associations with business processes and its modifications and reengineering makes it a very important factor for ERP related studies.

In this study, focus is on the compatibility of process to the ERP products after the implementation stage and multiple incremental change processes. These would include the changes in processes to match the recommendation of ERP and customizations in ERP to match the existing process.

Empowerment: In simple terms, empowerment is the fact of allocating power and authority to subordinates so that they feel the sense of ownership to the work they do. (Moreno-Monsalve et al., 2020) defined empowerment in a more holistic approach. According to them empowerment is providing a certain degree of responsibility and autonomy to the employees for decision taking on organizational goals.

The process of empowerment involves sharing knowledge, rewards, and power with employees so that it enables them to take initiatives and make decisions to solve problems and improve performance. Empowerment is based on the key idea that it is always beneficial if employees have skills, resources, opportunity, authority, motivation to accomplish a task. Holding them responsible for outcomes of their actions will enhance their competency and ownership.(Moreno-Monsalve et al., 2020). Empowered employees have the authority to take the initiative and decisions to fix issues and problems thereby improving the overall organizational performance(Silatchom et al., 2017). Such employees will be more aligned to the goals of the department & organization. Empowerment makes the system more effective by reducing organizational barriers and giving employees the powers, which enable them to meet the organizational objectives efficiently and effectively(Elmes et al., 2005).

Users who are empowered and capable with the system are more effective in their system usage and would aim ways to completely exploit the system afar routine usage(Bassellier et al., 2001).

Departmental championship: Although various academic studies have identified management as a key factor that influence effectiveness of major organizational strategies, the emphasis has majorly been on top management. The middle level managers' influence where not in focus even though they play a crucial role in organizational change efforts.(Birken et al., 2012; Engle et al., 2017; Noble, 1999).

As (Webb & Weick, 1979) noted, it is not the not the "great men" who sit on the top, but the set of relationships in an organization that makes it possible to effect and enhance organizational functioning and performance. This goes clearly hand in hand relational views of power in organizations (S. R. Clegg et al., 2006). This highlights the influence of departments or subunits, on the employees and its importance.
In this study the departmental management is taken as the middle management layer above the first line supervisor till the department-head. This layer plays a catalytic and very critical role in the implementation of strategic decisions (Balogun

& Johnson, 2004). Even informal departmental decisions are found to be able to reduce the quality of implementation, redirect strategies, delay implementation, and sometimes even disrupt it completely. This can occur in situations where departmental management when they are incapable of implementing it, or when they have doubts on the benefits of the new strategy (Guth & MacMillan, 1986).

As stated earlier the word championing is defined as to enthusiastically support, defend, and fight for a cause, belief, right, or principle. Many studies have identified 'Management Support' as key predictor for the enhanced technology usage. However, 'Support' as a construct is much more subdued than a much more stronger 'Championing', which necessitates not only passive support, but also enthusiastic evangelism and commitment. This research deliberately, looks at the effect of this stronger variant 'Management Championing'.

4. Methods

4.1 Research Setting

The target population comprised all individuals that interact with any ERP system in organisations worldwide. The following inclusion criteria are defined for the study .

1. The respondent should be an ERP end-user.
2. The organisation of the respondent, should have a running ERP system and should have implemented it at least 2 years before.
3. The respondent should not be a novice user i.e. should have at least one year of experience using ERP in the current organization.

A sample size of 253 responses were collected. Users of the ERP system from the three continents of Asia, Europe, and America made up the study's cluster. The snowball approach was used to each cluster to help it grow. Following the selection of the initial few cases from of the user community, with their recommendations for more likely participation, 10 users from each cluster were approached. The chain grew from there on. The researcher relied on (Chein et al., 1948) view to restrict and precisely characterise the population in order to reduce the concern of bias associated with non-probability samples.

4.2 Instrument Development

As a best practice(Mvududu & Sink, 2013), review was done on the existing literature about the proposed construct of measurement to determine if an existing measure can be used. After careful examination, construct ideas and concepts were borrowed and operationalized from existing literature wherever possible. In case of constructs that lacked well accepted and validated measurement items new items were developed based on the theoretical definition of those constructs.It was decided to use Likert scale for measuring the latent variables.

Table 1: Constructs and development method

Construct	Root Construct	Instrument Items	A/B/D
Computer Self Efficacy	Wei, K.-K., Teo, H.-H., Chan, H. C., & Tan, B. C. Y. (2011)	6	B
ERP Knowledge	Sousa, R. M. D. (2004)	3	D
Subjective Norm	Venkatesh & Davis (2000)	2	B
Perceived Ease of Use	Venkatesh & Davis (2000)	4	B
Empowerment	Sia et al. (2002)	3	A
Product-Processs Fit	Lin & Hunag(2008)	3	A
Departmental championship	NA	3	D
Top management championship	NA	3	D
Integration	Themistocleous and Irani (2003)	3	A
Infusion(Extended Use)	Po-An Hsieh & Wang, 2007	3	A
Infusion(Integrative Use)	Po-An Hsieh & Wang, 2007	3	A
Continous Improvement	NA	6	D
	Instruments Adapted(A) = 5 Instruments Borrowed without change(B) = 3 Instruments Developed(D) = 3		

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Pre-testing was conducted before the pilot study using Q-sort method. All scales achieved a Cronbach alpha value surpassing 0.70, which vouched for the instrument's reliability.

5. Data Analysis

Demographic & Professional Information

The total members of the entities that participated were 460 yielding 253 responses ie a response rate of 55%. As exit criteria was set in the questionnaire itself all the final responses received where satisfying the inclusion criteria.

Table 2: Demographic & Professional Summary

Characteristics		n	%
Gender			
	Male	135	53%
	Female	83	33%
	Others	8	3%
	Rather not say	27	11%
Continent			
	Asia	95	37%
	Europe	86	34%
	America	72	28%
Position			
	Senior Management	6	2%
	Managers	35	14%
	Non Managerial	203	80%
	Others	9	4%
Years in the organisation			
	1 - 4 Years	64	25%
	4 - 7 Years	130	51%
	More than 7 years	59	23%
Years in the organisation using ERP			
	1 - 4 Years	81	32%
	4 - 7 Years	127	50%
	More than 7 years	45	18%
Note : N = 253			

The evaluation of the study's constructs is determined by examining the measurement model. This examination begins with analyzing the factor loading and is succeeded by the determination of construct reliability and the verification of construct validity. The hypothesized relationships were accessed with the actual data, and it gave below results.

Table 3 Hypotheses testing results.

	Path Coefficient	Standard deviation (STDEV)	T statistics	P values
ComEffic -> ExtUse	0.172	0.051	3.37	0.001
ComEffic -> IntgrUse	0.24	0.069	3.488	0
ContImpr -> ExtUse	0.217	0.04	5.457	0
ContImpr -> IntgrUse	0.283	0.047	5.979	0
DeptChm -> ExtUse	0.326	0.035	9.327	0
DeptChm -> IntgrUse	0.314	0.036	8.779	0
ERPKnow -> ExtUse	0.243	0.035	6.944	0
ERPKnow -> IntgrUse	0.19	0.037	5.094	0
Empow -> ExtUse	0.214	0.038	5.662	0
Empow -> IntgrUse	0.239	0.039	6.045	0
PEOU -> ExtUse	0.195	0.038	5.137	0
PEOU -> IntgrUse	0.144	0.036	4.01	0
PPFit -> ExtUse	0.237	0.042	5.613	0
PPFit -> IntgrUse	0.243	0.05	4.863	0
SubNorm -> ExtUse	0.1	0.058	1.746	0.081
SubNorm -> IntgrUse	0.04	0.076	0.53	0.596
TechInt -> ExtUse	0.276	0.036	7.575	0
TechInt -> IntgrUse	0.208	0.041	5.093	0
TopMChm -> ExtUse	0.27	0.04	6.794	0
TopMChm -> IntgrUse	0.158	0.04	3.949	0

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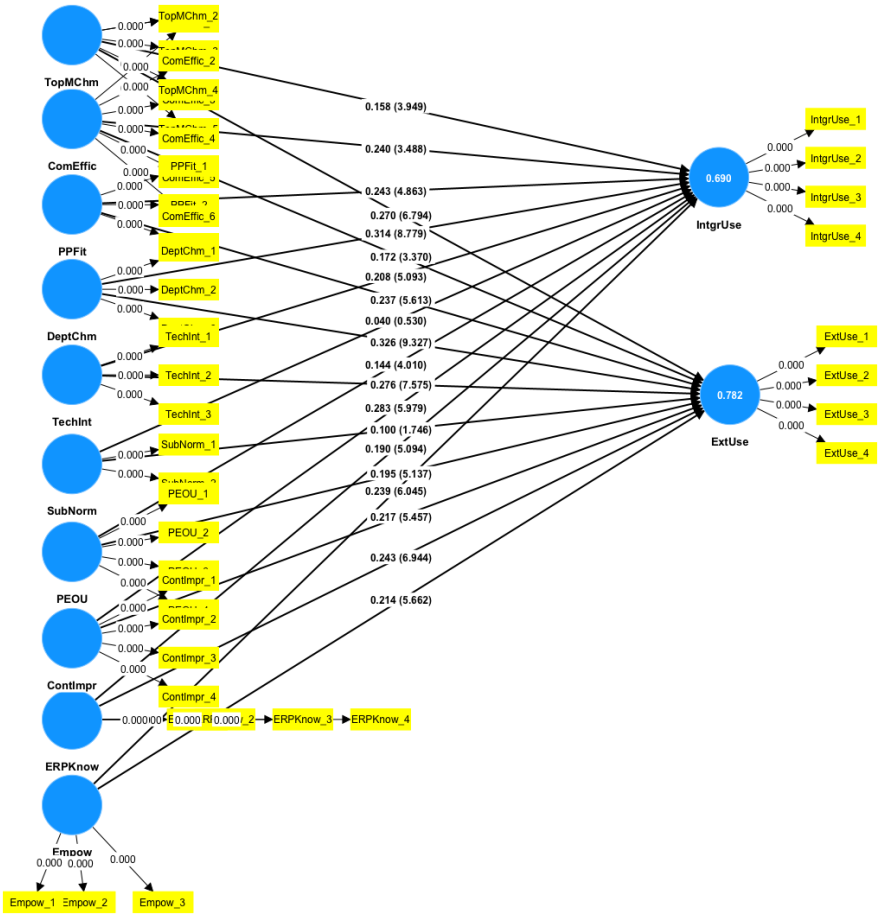

Figure 2: PLS-SEM Research Model

6. Findings & Discussion

Table 4: Findings of the study

Individual Factors	**H1:** Computer Self Efficacy of the individual has a positive effect on the infusion of ERP.	Supported
	H1a: Computer Self Efficacy of the individual has a positive effect on the extended usage of ERP.	Supported
	H1b: Computer Self Efficacy of the individual has a positive effect on the integrated usage of ERP.	Supported
	H2: Subjective Norm has a positive effect on the infusion of ERP.	Not Supported
	H2a: Subjective Norm has a positive effect on the extended usage of ERP.	Not Supported
	H2b: Subjective Norm has a positive effect on the integrated usage of ERP.	Not Supported
	H3: Perceived ease of use of ERP has a positive effect on its infusion.	Supported
	H3a: Perceived ease of use of ERP has a positive effect on its extended usage.	Supported
	H3b: Perceived ease of use of ERP has a positive effect on its integrated usage.	Supported
	H4: The knowledge in ERP has a positive effect on its infusion.	Supported
	H4a: The knowledge in ERP has a positive effect on its extended usage.	Supported
	H4b: The knowledge in ERP has a positive effect on its integrated usage.	Supported
Departmental Factors	**H5:** The product fit to the processes of department has effects on the infusion of ERP.	Supported
	H5a: The product fit to the processes of department has effects on the extended usage of ERP.	Supported
	H5b: The product fit to the processes of department has effects on the integrated usage of ERP.	Supported
	H6: The departmental championship has a positive effect on the infusion of ERP.	Supported
	H6a: The departmental championship has a positive effect on the extended usage of ERP.	Supported
	H6b: The departmental championship has a positive effect on the integrated usage of ERP.	Supported
	H7: The empowered culture of a department has a positive effect on the infusion of ERP.	Supported
	H7a: The empowered culture of a department has a positive effect on the	Supported
	H7b: The empowered culture of a department has a positive effect on the integrated usage of ERP.	Supported
Organisational Factors	**H8:** The integration of the ERP system with other IT systems has effect on its infusion.	Supported
	H8a: The integration of the ERP system with other IT systems has effect on its extended usage.	Supported
	H8b: The integration of the ERP system with other IT systems has effect on its integrated usage.	Supported
	H9: Continuous improvements implemented in ERP has positive effect on its infusion.	Supported
	H9a: Continuous improvements implemented in ERP has positive effect on its extended usage.	Supported
	H9b: Continuous improvements implemented in ERP has positive effect on	Supported
	H10: The top management championship has a positive effect on the infusion of ERP.	Supported
	H10a: The top management championship has a positive effect on the extended usage of ERP.	Supported
	H10b: The top management championship has a positive effect on the integrated usage of ERP.	Supported

6.1 Individual Factors

The conceptual framework hypothesized that the different individual level factors (computer self-efficacy, subjective norm, perceived ease of use and ERP knowledge) will be positively related to extended usage of ERP. It was proposed that all these factors would also have a positive influence on integrated usage of ERP.
Consistent with the proposal, this study identified that computer self-efficacy, perceived ease of use and ERP knowledge have a strong positive impact on extended usage and integrated usage of ERP infusion
However in this study, the influence of subjective norm on ERP infusion could not be established. In other words the positive influence of subjective norm on extended use(H2a) and integrated use(H2b) could not be verified thereby its influence on infusion(H3) is not supported. This might be because ERP infusion, unlike acceptance or adoption of technology is not straightforward, but denotes a more profound and comprehensive utilization of technology. A possible explanation is that the initial behaviour (adoption) is more susceptible to social influences, whereas long-term behaviour (infusion) may be more dependent on personal experience, intrinsic motivation, and the perceived value of the technology. This notion finds support in academic literature. A study by (Tsai & Tsai, 2019) on teachers' technology use suggested that while subjective norms influenced teachers' decisions to adopt technology, their impact was less pronounced on the level of technology infusion in classrooms. Further, (Wu & Chen, 2017) examined the determinants of e-learning infusion. Subjective norms had a weaker and non-significant influence on the comprehensive use of e-learning. These findings were echoed by (Normalini & Ramayah, 2017) in their study on internet banking, which found that subjective norms influenced adoption but not infusion, with the latter being more heavily influenced by other factors. It is worth noting, however, that these findings do not conclusively rule out the influence of subjective norms on ERP infusion. Thus, while subjective norms may be playing a positive role in IT adoption which is clearly articulated by previous studies, their impact on IT infusion is less clear and appears to be overshadowed by other factors. This suggests that while social influences can motivate initial technology use, achieving deep and integrative technology use may require a more personal, user-centric approach. It is also a compelling reminder that although individuals are social beings influenced by others, their long-term behaviour, especially in the realm of technology use, is influenced by a complex interplay of individual and contextual factors.

6.2 Departmental Factors

The conceptual framework hypothesized that the different department level factors (product fit to processes, departmental championship and empowerment) will be positively related to extended usage of ERP. It was proposed that all these factors would have a positive influence on integrated usage of ERP.
Consistent with the proposal, this study identified that product fit to processes, departmental championship and empowerment has a strong positive impact on extended usage and integrated usage of ERP infusion.

6.3 Organizational Factors

The conceptual framework hypothesized that the different organisational level factors (integration with other IT systems, Top management championship and continuous improvements) will be positively related to extended usage of ERP. It was proposed that all these factors would have a positive influence on integrated usage of ERP.
Consistent with the proposal, this study identified that integration with other IT systems, Top management championship and continuous improvements have a strong positive impact on extended usage and integrated usage of ERP infusion.

6.4 Implications to Theory

The studies related Information Technology usage has been very much confined to walls of TAM and UTAUT model frameworks and their extension. This study took an approach were this is not another TAM or UTAUT extension but to provide insights which are a practically actionable in the real practical world. The typical approach in ERP usage studies and in general most IT usage studies in focussing on the initial stages of system usage like adoption and acceptance was not followed, instead this study focussed on the infusion, which is final frontier which every organisation aims with respect to usage of ERP.

The model framework involving individual, departmental and organisation factor and their impact on ERP infusion, envisaged and validated in this study, delivers a significant contribution to ERP literature, in its efforts to understand the role of various factors at these three level in an ERP settings.

This study proved that that many factors that influenced the IT adoption and acceptance are relevant for higher order usage concept of infusion in ERP as well. However, the factor of subjective norm which was very widely regarded as a factor in IT usage studies was found to have no significant effect on infusion. This might be due to the fact that for higher order usage constructs do not have the level of influence and are varied with respect to initial stage usage concepts. ERP infusion, unlike acceptance or adoption of technology, denotes a more profound and comprehensive utilization of technology, and is complex. The initial behaviours like adoption or acceptance are more susceptible to social influences, whereas long-term behaviour like infusion may be more dependent on personal experience, intrinsic motivation, and the perceived value of the technology.

The impact of the variables on extended use and integrated use are also varied with some factors having more influence on integrated use and some on extended use. Carefully analysing the factors, a pattern can be identified, that individual factors being more relevant for the extended usage stage than its successor stage integrated stage. This also means organisational and departmental factors seems to have more impact on as the stage of usage goes higher. This might be the reason that majority of studies were adopting variables from TAM and its derivatives when it comes to their studies based on initial usage like adoption and acceptance in IT space. The TAM and its derivatives were mostly using the individual level factors. Individual factors having more influence in adoption and acceptance would also be reason why they were able account for variances in IT usage studies with mostly individual level factors. However, on the flipside, this study brings to the forefront the need to focus on organisational and departmental factors in IT infusion studies and in particular ERP related infusion studies.

Unlike most other studies, where management support was considered as a single variable, splitting the variable to departmental and organisational level, and also extending its scope from mere support to active championships has brought out some interesting facts. This study shows that departmental championship is one of the most important factors impacting the ERP infusion and its influence is extremely high in both extended and integrated usages. However, when it comes to top management championship, the influence seems to reduce when it comes to higher order integrated usage even though both are very much significant.

6.5 Implications to Practice

First and foremost, the study has focused on the infusion of ERP in matured ERP implementation. Since ERP implementation phase is over in majority of ERP implemented organisations, they are now in the lookout for various option to utilise the full potential of ERPs they have implemented. This study has extreme practical relevance from this standpoint. Infusion, a higher order usage concept is the goal with respect to ERP usage for any organisation, which strategically targets in maximising ERP footprint for achieving operational efficiency, productivity gain and data driven insights. Even though there are multiple studies on implementation aspects and post implementation adoption and acceptance of ERP, which have helped organisations to be better equipped and guided them to navigate, there are limited number of studies which focussed on infusion of ERP. This study will act as a guide to enhance their ERP journey providing areas that they need to focus for successful ERP output. The factors grouped as individual, department level and organisation level should aid the organisation in devising strategies and identifying owners for operationalising it.

The individual factors which are the profoundly studied in IT usage studies are found to be less influential when compared to adoption and acceptance. The ERP knowledge even though an individual level factor seems to be very much relevant for both level of infusion the extended usage or integrated usage. The fact that subjective norm is not significantly impacting infusion allows the organisations to focus on one area less when it comes to infusion.

The organisation and departmental factors are found to be more impactful in infusion stage of ERP. Also, some of the factors are found to be more prominent in extended phase while others are at integrated phase. This should be an eye-opener for organisations that all factors do not have same influence across the various stages of ERP lifecycle. Hence organisations should focus on prioritising & packaging factors based on the stage they have reached with respect to ERP usage.

The individual factors computer self-efficacy, ERP knowledge, perceived ease of use even though relevant in for both integrated and extended use, is less influential in integrated use when compared to extended use. Same is true with the departmental and organisation factors technical integration, top management championship and to some extent

departmental championship. However other organisation factors like continuous improvement, empowerment, product to process fit are more influential in case of integrated use. This information is vital for an organization in devising the strategy for enhancing ERP infusion.

Limitation of the Study

Even though utmost care and efforts is taken to ensure this study is as holistic, enhances theory and practically useful as possible, this study is not without limitations.This study is based on self-reports which are mostly perceptions and therefore subjective. Self-reports can often be shaped by factors like the respondent's tendency towards social desirability bias. Despite applying statistical tests to address potential common method variance, the exclusive reliance on self-reports for both predictor and outcome variables in this study might have subtly affected the relationships. However, the observed results align well with theoretical frameworks and empirical findings from the existing body of research.

This study employs snowball sampling. Since snowball sampling is a non-probabilistic sampling technique and is not as statistically generalizable when compared to probabilistic sampling techniques. While probabilistic sampling methods, where each member of the population has a known, non-zero chance of being selected, remain the gold standard for generalizable research findings, this study is a typical context where snowball sampling offers distinct advantages. Probabilistic methods, especially in scattered or niche populations, can be resource intensive. Snowball sampling can be more economical in terms of time, effort, and finances. In this study often expected to have a higher likelihood of participation when potential respondents are approached or referred by someone they know or trust. Snowball sampling allowed initial respondents to refer researchers to other potential participants, creating a chain of trust.

There are diverse viewpoints on whether it is sufficient to study ERP systems at a global level or if there is value in examining them at the country or regional level. The backers of the view that global study is best suited for study on ERP grounds their view on primary premise behind ERP systems is that they encompass best practices for a wide range of business processes. This assumption has its origins that ERPs are standard software solutions that could cater to the needs of organizations across various industries and regions (Davenport, 1998). This approach seems logical and efficient as is backed by eminent researchers. By studying ERP systems at a global level, researchers can identify overarching trends, challenges, and best practices that apply to organizations across different countries and industries (Mabert et al., 2003). This global perspective can lead to valuable insights and recommendations that can benefit a wide range of organizations, regardless of their location or sector(Shehab et al., 2004). However, critics of the global approach points out that business processes and organizational contexts can vary significantly across industries, countries, and regions, due to factors such as cultural differences, legal and regulatory environments, and unique industry-specific requirements(Soh et al., 2000). By focusing exclusively on a global perspective, researchers may overlook these important contextual factors. (Soh et al., 2000). They also point out that organizations may be tempted to adopt "one-size-fits-all" solutions without fully considering the unique aspects of their own business. They point out there is value in studying ERP systems at the country or regional level, in addition to global analysis. In this study however the researcher has chosen not to limit the study to any region, country, or sector, but to truly base the study at a global level. This would enable finding of the study to be resonated to across the globe and not limit it to any specific context. However, in doing so the researcher might have missed to capture variations due to contextual factors.

Undertaking this research as a longitudinal study would undeniably have enriched the findings, particularly in terms of establishing causal relationships. A longitudinal approach examines changes and developments over extended periods, providing a temporal dimension to the cause-effect analysis. By observing the same variables over consistent intervals, it offers a dynamic view, highlighting how variables interact and influence each other across different time frames. This design would have facilitated a deeper understanding of the evolving impact of various factors on infusion as they unfold over time. Additionally, capturing these time-bound nuances would have enhanced the study with a more comprehensive narrative, revealing patterns or trends that might be obscured in cross-sectional studies.

Future Research

During the extensive duration of this research, the investigator encountered numerous facets and dimensions that were not addressed in the present study.The methodology adopted relied heavily on the perceptions of end-users, which, while valuable, could have been better. Several variables within this study could have been assessed in a more direct manner. By doing so, the resulting data could offer a clearer, more definitive understanding of the cause-and-effect dynamics at play.

Instead of adopting a holistic, global approach, a more targeted study could have been designed to evaluate the ERP system's infusion while considering local specificities. Such a perspective would not only illuminate the unique influencers present in different organizational or regional contexts but also gauge the intensity and nature of their impact.
Research structured as a longitudinal study, tracking the same subjects and variables over extended periods, it would deepen the grasp of causal relationships. This time-sensitive approach could unveil evolving patterns and trends, enhancing the richness and depth of our insights into ERP system dynamics.

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